
Organisational influences on attitudes in mandatory system use environments: a longitudinal study

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Abstract: Usage of information systems has moved increasingly from being an optional means of enhancing productivity to a required part of organisational jobs. However, prior research on technology acceptance has largely focused on volitional systems and on individual, rather than organisational factors that could influence technology acceptance and use. As a result, little is known about how management may be able to influence user attitudes toward use of mandatory systems. In this paper, we examine the impact of organisational level influences on individual user attitudes toward system use *over time*. Our study is set in the context of a major mandatory system implementation at a multi-bank holding company. Our results suggest that subjective norms, top management commitment, and perceived organisational benefits are important to users at different times in the implementation process. Our results also highlight that direct system experience plays a significant role in determining which factors are important and when.

Keywords: technology acceptance; mandatory system use; organisational factors; subjective norms; top management commitment; user attitudes; survey research.

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1 Introduction

As information systems have become increasingly prevalent in organisations, systems use has moved from being an optional means of enhancing productivity to a required part of organisational jobs. Systems implemented in the last decade tend to be enterprise-wide and highly integrated, resulting in the need for employees to conform to the requirements of system use. Yet, even though people are required to use the systems, examples still abound regarding failed, over budget, and delayed implementations (see, for example, Scott and Vessey, 2000).

Many prior researches have focused on individual level factors that influence the adoption of information technology to understand the problem of information system acceptance (or lack thereof) (Davis *et al.*, 1989; Karahanna *et al.*, 1999; Venkatesh, 2000). Yet, the theoretical basis for this research has typically relied on the Theory of Reasoned Action (TRA) (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975), which is aimed at understanding volitional behaviour. Since more and more of the systems in question are complex, highly integrated, and rarely optional for performing one's job (Brown *et al.*, 2002), prior research may not offer much guidance. Research has focused more on individual, rather than organisational factors that could influence technology acceptance and use, despite the fact that technology implementation is viewed as an issue of organisational change (Markus and Tanis, 2000). As a result, little is known about how management may be able to influence user attitudes toward use of mandatory systems.

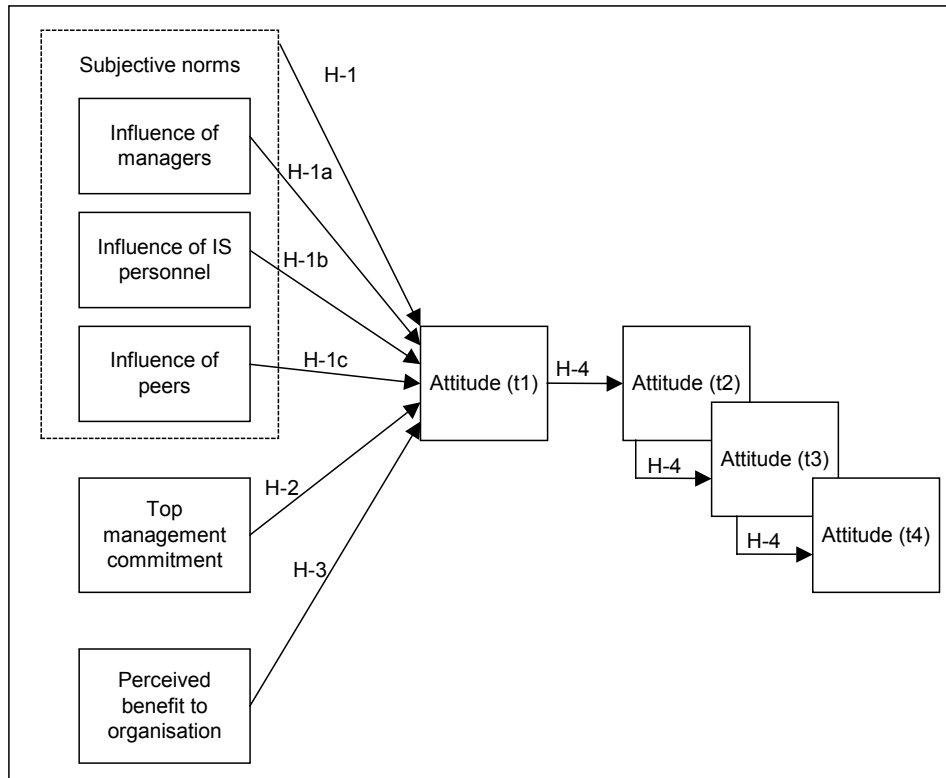
The current study seeks to fill this void in the research literature by examining the impact of organisational level influences on individual user attitudes toward system use *over time*. This research has the following objectives:

- to identify the important organisational influences on user attitudes when system use is *required* to perform the activities of one's job
- to empirically examine how those organisational factors influence user attitudes toward the systems they are required to use
- to make recommendations regarding how these factors can be leveraged as part of a comprehensive change management programme to accompany systems implementation and, thus, increase the likelihood of acceptance.

2 Theoretical background and hypotheses

Figure 1 shows the proposed research model. Below, we define and discuss each of the constructs and present hypotheses based on the relationships between the constructs.

Figure 1 Research model



2.1 Mandatory use and user attitudes

The use of an information system in today's business context is frequently a necessity for an employee to fulfil his or her job (Ram and Jung, 1991). This is in contrast to non-automated jobs of the past or jobs where information system use is an option but not necessary to complete the job. For example, prior to the use of information systems, the job of a bank teller required extensive manual documentation. Tellers recorded each customer's transaction using paper and pen and then manually reconciled the cash in their drawer at the end of each working day. Each teller's transactions were manually summarised and recorded by a bookkeeper. Today, however, these same transactions cannot be conducted without interfacing with the bank's information system to record and reconcile them. The system reduces the potential for human error and increases efficiency by eliminating time-consuming manual processes. However, there is little choice associated with system use in the current environment; as long as the teller wants to keep his or her job, system use is required (Brown *et al.*, 2002).

Information systems can also be used to support or augment job functions. For example, managers employing what-if analysis to assess the likelihood of certain outcomes from an investment use the system to augment their decision-making. The information system, though required in making good decisions, neither interface with other aspects of the organisation, nor do other people rely on the data that has been entered into the system to do their jobs. In this case, information system use is a nice option, but its use is not required for the analyst to keep his or her job.

A voluntary system, such as the use of the what-if analysis, is simply defined as one where users perceive adoption of the system as 'non-mandatory' (Venkatesh and Davis, 2000). Alternatively, a mandatory use environment exists when employees perceive the system use to be an organisational requirement (Agarwal and Prasad, 1997; Hartwick and Barki, 1994; Venkatesh and Davis, 2000). Specifically, a mandatory environment can be defined as "one in which users are required to use a specific technology or system in order to keep and perform their jobs" (Brown *et al.*, 2002, p.283). The voluntary versus mandatory nature of information systems use has been proven to have an impact on the relationship among the constructs in technology adoption research (Brown *et al.*, 2002; Hartwick and Barki, 1994; Venkatesh and Davis, 2000). The Technology Acceptance Model (TAM), in particular, has been shown to be less explanatory when system use is mandatory as compared to voluntary use (Brown *et al.*, 2002).

The focus on mandatory use is problematic for the application of TAM because the primary dependent variable – behavioural intention to use the system – has little meaning when one is forced to use a system. Researchers have suggested that there is little value in examining behavioural intention as an indicator of system success in mandatory system use environments (Brown *et al.*, 2002; Hartwick and Barki, 1994). This is particularly relevant when we consider that while employees may use the system, they may also experience low morale, attempt to sabotage the system, or provide poor customer service and blame the poor service on the system in question (Leonard-Barton, 1988; Markus, 1983; Zuboff, 1988). Thus, the important factor is not whether employees intend, or even expect, to use the system, it is really how 'happy' they are in doing so. As a result, user attitude towards the system has been suggested as a more meaningful dependent variable for the mandatory setting (Brown *et al.*, 2002).

User attitude was originally included in TAM as a variable mediating among the independent variables of perceived usefulness and ease of use, and the dependent variable, behavioural intention (Davis, 1989; Davis *et al.*, 1989). Attitude was found to be highly correlated in volitional settings, with behavioural intention and failed to provide substantial additional explanatory power (Davis *et al.*, 1989). However, there is evidence that the high correlation between attitude and behavioural intention may not be the case in mandatory systems (Brown *et al.*, 2002).

Users may intend to use the mandatory system, regardless of their attitude towards the system, simply because they lack the option to not use the system if they want to retain their current position. Thus, in mandatory use, situations attitude becomes a more relevant dependent variable (Brown *et al.*, 2002; Karahanna *et al.*, 1999). Attitude becomes more salient because while the employee uses the system, the user's attitude towards the system can have positive or negative organisational consequences (Zuboff, 1988). We build upon Brown *et al.* (2002) in this research, and consider user attitude as the primary dependent variable. We define attitude based on Ajzen's (1988) definition as an individual's predisposition to respond favourably or unfavourably toward the system.

2.2 Organisational influences on technology acceptance

It is widely recognised that the implementation of technology has organisational level consequences (Barley, 1986; Markus and Tanis, 2000; Orlikowski and Robey, 1991; Scott and Vessey, 2000). This suggests that when examining technology introduction, it is important to view it as an interaction among individuals, organisational factors, and technology (Orlikowski and Robey, 1991). This interactive view highlights the idea that organisational factors can influence the way technology is received by the individuals who use it (Markus and Benjamin, 1997; Massey *et al.*, 2001).

Orlikowski and Robey (1991) have pointed out that technology use is a social process. Thus, a critical factor in framing favourable attitudes toward technology revolves around the social influence of others in the organisation. Prior research in technology acceptance has employed subjective norm as a mechanism for capturing the influence of important others in the organisation (Karahanna *et al.*, 1999; Taylor and Todd, 1995). Thus, in order to capture this social dynamic, we examine subjective norms as an important organisational factor in technology acceptance. Much prior research also stresses the importance of management support as a critical factor in information systems implementation (see, for example, Fui-Hoon Nah *et al.*, 2001; Scott and Vessey, 2002). Thus, we incorporate perceptions of top management's commitment to the system as an additional organisational factor. Finally, in the mandatory situation, we propose a significant organisational influence on whether an employee uses the system happily or not, focuses on the perception of overall benefits to the organisation, and ultimately to them (*e.g.*, raises, bonuses, *etc.*).

2.2.1 Subjective norm

In developing TAM, Davis (1989) and Davis *et al.* (1989) concluded that it was difficult to separate the direct effect of subjective norms on behavioural intention from the indirect effect of subjective norms on attitude. Thus, Davis *et al.* (1989) excluded subjective norms from TAM. Other research in technology adoption has incorporated subjective norm, but when examined as an antecedent to behavioural intention, it has been found to be non-significant (Taylor and Todd, 1995). However, it is important to note that TAM theorises behaviour in voluntary use situations, just as the theory on which it is based, *i.e.*, TRA. Likewise, many of the studies where subjective norms were found to be non-significant examined technology adoption in a volitional setting. However, given the relationship between subjective norm and attitudes (Davis *et al.*, 1989), the importance of attitudes in the mandatory environment (Brown *et al.*, 2002), and evidence of the potential influence of subjective norms provided in previous research (Hartwick and Barki, 1994; Venkatesh and Davis, 2000), we expect that subjective norms will have a significant impact in mandatory use environments.

Subjective norms are defined as "a person's perception that most people who are important to him think he should or should not perform the behaviour in question" (Fishbein and Ajzen, 1975, p.302). Subjective norms affect behaviour when individuals perceive that a person who has influence over them (*e.g.*, the ability to reward or punish) wants them to perform a specific behaviour (Venkatesh and Davis, 2000). Attitude and subjective norm, according to TRA, determine an individual's behavioural intention, which in turn predicts actual behaviour. As previously noted, in mandatory systems, behavioural intention and usage behaviour provide little insight into *how* systems are

being accepted by those who must use them. Given the social nature of technology acceptance, we posit that subjective norms will have a direct effect on attitudes toward the new system.

Hypothesis 1: Subjective norms will have a positive direct effect on user attitude early in the systems implementation process.

Subjective norms can be examined based on the influence of different stakeholder groups on the individual's behaviour, as different groups have different expectations concerning the results of the implementation of a system. Such expectations will likely create an impact on user attitudes toward the system (Massey *et al.*, 2001). Key influential groups are typically included when subjective norms are examined, such as managers, peers, and other departments (*e.g.*, the information systems department) (Karahanna *et al.*, 1999; Taylor and Todd, 1995). In keeping with those distinctions, we offer the following hypotheses:

Hypothesis 1a: Managers' influence will have a positive direct effect on user attitude early in the systems implementation process.

Hypothesis 1b: IS consultants' influence will have a positive direct effect on user attitude early in the systems implementation process.

Hypothesis 1c: Peer influence will have a positive direct effect on user attitude early in the systems implementation process.

2.2.2 *Perceived top management commitment*

The perceived commitment of top management is an additional organisational influence that is expected to create an impact on user attitudes. Top management commitment has long been recognised as an important issue in system implementation (Fui-Hoon Nah *et al.*, 2001; Scott and Vessey, 2002). As noted above, it is the perception of positive and negative consequences that are likely to accrue to the user that gives subjective norms influence over the individual. The perception of top management commitment directly indicates the importance that management places on the implementation of a new system. This is different from subjective norm because top management commitment refers to the way in which managerial words and actions lead employees to believe that use of the system is *supported* and *accepted* in the organisation, as opposed to *required*. In essence, it can be perceived as the way employees perceive top management's attitude toward the new system. The importance placed on the system by management will be interpreted by the individual user as a proxy for the likelihood and magnitude of potential positive or negative consequences from system use.

Hypothesis 2: The perceived commitment by top management will have a positive direct effect on user attitude early in the systems implementation process.

2.2.3 Perceived benefit to the organisation

The final independent variable of interest is perceived to be the benefit that the system will offer for the organisation. Social identity theory indicates that an individual not only gets their identity from their peer group, but also from the organisation as a whole (Hopkins, 1997). The identity of the individual is thus tied to the success of the organisation (Ashforth and Mael, 1989). When the organisation that an individual identifies with is successful, it increases group identity and the positive impact on the group transfers to increased positive attitudes toward oneself, and ultimately toward the object that is associated with success. The greater the perceived benefit of an information system to the organisation, the greater the perceived benefit to one's self and the more likely for a positive influence on the user's attitude toward the system. It is thus hypothesised that the impact on the system will positively influence user attitudes towards the system.

Hypothesis 3: The perceived benefit to the organisation will have a positive direct effect on user attitude early in the systems implementation process.

Pre-adoption perceptions are formed by indirect experience (Karahanna *et al.*, 1999). This indirect experience is based on a variety of sources such as training, management, peer groups, and consultants. Conversely, post-adoption beliefs are based on actual experience which serves to either confirm or deny the initial expectations (Brown *et al.*, 2002; Festinger, 1957; Karahanna *et al.*, 1999; Szajna and Scamell, 1993) based on an individual's direct experience with the system, the impact of subjective norms, and other organisational factors on individuals' attitudes tends to dissipate (Hartwick and Barki, 1994; Venkatesh and Davis, 2000). As direct experience with the system increases, attitudes become more salient and important in framing future attitudes (Ajzen and Fishbein, 1980).

Hypothesis 4: Following direct experience with the system, attitudes in prior times will predict attitudes in later times.

3 Methodology

A longitudinal field study was conducted to test the influence of organisational factors on user attitudes. The primary focus of our study is a survey of tellers and loan officers in the commercial and retail banking services provided by four regional affiliated banks in the Midwestern United States. These specific banks were implementing a mandatory banking system that provided a standardised hardware and software platform.

3.1 Setting for field survey

The selected regional bank affiliates represent four of the 30 affiliated regional banks of a large multi-bank holding corporation (BHC). In aggregate, BHC has over \$5 billion in annual revenues and employs 3000 individuals at 130 locations across the Midwest United States. BHC was formed as a result of multiple acquisitions during the 1990s. Such acquisitions represent regional community banks that had grown as a result of close,

long-standing ties to the local customers. Each acquisition was unique and thus the affiliates varied greatly in total assets, number of branches and target markets. The affiliates were initially provided substantial autonomy to allow them to continue to succeed in their local markets. Traditionally, the affiliates were allowed to select whatever software and technology platform that best suited their needs while BHC as a parent holding company, outsourced its data processing needs.

BHC believed, during the late 1990s, they could reduce costs by standardising the hardware and software platforms across the affiliates. An IS subsidiary was established to provide data processing and operations to the affiliates. Specifically, the IS subsidiary was required to install and support a standardised Computer Banking System (CBS) based on Windows PCs and LANs that connected all the affiliates to BHC via a wide area network.

The use of the CBS is mandatory for those who are surveyed. The nature of their tasks is to conduct transactions with bank customers that require interaction among those surveyed, the customer and the CBS. CBS was implemented over a weekend in which the old system was completely shut down and removed, leaving only the new system in place for conducting transactions. Those surveyed could not perform their given job functions without using CBS, which thus classifies its use as mandatory.

3.2 *Instrument development*

We developed a survey instrument to measure the theoretical constructs presented in the research model (see Figure 1). Wherever possible, the constructs were operationalised using measures validated in prior research (see Appendix). Subjective norms were derived from measures developed by Karahanna *et al.* (1999) and Taylor and Todd (1995). Items for top management commitment were developed specifically for this study based on attitude items (Karahanna *et al.*, 1999). In essence, they represent employee perceptions of the attitudes, held by top management, toward the system. Items for perceived benefit to the organisation were developed for this study and were based on interviews with BHC management. The factors included are those that were deemed important to bank management and identified based on a series of interviews. Items to measure the dependent variable, attitude, were selected from Karahanna *et al.* (1999).

3.3 *Data collection*

A mail survey was conducted of all employees in the four most recently converted BHC bank affiliates at three time intervals (time one – one month prior to implementation, time two – three months after implementation, time three – six months after implementation, and time four – one year after implementation). The surveys were distributed via internal mail at BHC and included a letter from management regarding the importance of participation. Surveys included addressed, postage paid envelopes that delivered the completed surveys directly to the researchers. A total of 195 surveys were distributed with 97 complete, usable responses returned over all time periods, resulting in an overall response rate of 50%.

4 Data analysis

The data were analysed using Partial Least Squares (PLS) graph version 3.0, build 1126. Analyses were conducted as recommended by Chin (1998a–b). Descriptive statistics for the measures are presented in Table 1. The correlation matrix, Internal Consistency Reliability (ICR), and the Average Variance Extracted (AVE), are presented in Table 2. All ICR values are above the accepted cut-off of 0.7 (Nunnally, 1978). The AVE measures are on the diagonal and provide a measure of the average variance shared between a construct and its measures and thus provides a means of assessing discriminant validity. The diagonal is larger than the corresponding row and column correlation, suggesting adequate discriminant validity in each case (Fornell and Larcker, 1981). Table 3 provides the factor loadings. All loadings are greater than the 0.75, which provides evidence in support of convergent validity. Together, these analyses demonstrate that the measures have good reliability and validity.

Tables 1 Descriptive statistics

<i>Construct</i>	<i>Mean</i>	<i>Standard deviation</i>
Subjective norms: peers	5.154	1.231
Subjective norms: IS consultants	5.923	1.029
Subjective norms: managers	5.974	1.032
Subjective norms: overall	5.372	1.481
Perceived organisational benefits	4.749	1.341
Top management commitment	5.707	0.891
Attitudes	5.264	1.001

Tables 2 Correlation matrix, ICR, and AVEs

	1	2	3	4	5	6	7	8	9
1 Attitude T1	0.939	0.755							
2 Attitude T2	0.963	0.476	0.838						
3 Attitude T3	0.945	0.352	0.814	0.774					
4 Attitude T4	0.951	0.309	0.604	0.743	0.866				
5 Subjective norms: peers	0.947	0.530	-0.064	0.089	0.899				
6 Subjective norms: IS	0.944	0.256	0.063	-0.277	0.125	0.516	0.895		
7 Subjective norms: management	0.950	0.166	0.099	-0.269	-0.065	0.461	0.866	0.905	
8 Perceived organisational benefit T1	0.953	0.670	0.513	0.556	0.125	0.212	0.108	0.228	0.742
9 Top management commitment T1	0.944	0.454	0.047	-0.011	0.228	0.278	0.187	0.191	0.772
10 Perceived organisational benefit T2	0.955	0.327	0.806	0.432	-0.142	-0.107	0.132	0.535	0.050
11 Top management commitment T2	0.976	-0.457	-0.813	-0.712	0.142	0.134	0.101	-0.384	-0.125
12 Perceived organisational benefit T3	0.959	0.366	0.751	0.683	0.757	0.008	-0.288	0.316	0.050
13 Top management commitment T3	0.963	-0.201	-0.652	-0.472	0.175	0.184	0.313	0.026	-0.356
14 Perceived organisational benefit T4	0.958	0.410	0.757	0.690	0.708	0.221	0.004	0.239	0.146
15 Top management commitment T4	0.936	-0.111	-0.115	-0.227	-0.398	0.212	0.042	-0.010	-0.202
16 Subjective norms: Peers T4	0.906	-0.297	0.048	0.457	0.303	-0.318	-0.412	-0.283	-0.135
17 Subjective norms: IS T4	0.922	0.409	0.098	-0.097	-0.176	0.367	0.250	0.318	0.124
18 Subjective norms: Management T4	0.966	0.409	0.212	-0.120	0.340	0.195	0.273	0.311	0.196

Note: AVE is on the diagonal

Tables 2 Correlation matrix, ICR, and AVEs (continued)

	ICR	I0	I1	I2	I3	I4	I5	I6	I7	I8
1 Attitude T1	0.939									
2 Attitude T2	0.963									
3 Attitude T3	0.945									
4 Attitude T4	0.951									
5 Subjective norms: peers	0.947									
6 Subjective norms: IS	0.944									
7 Subjective norms: management	0.950									
8 Perceived organisational benefit T1	0.953									
9 Top management commitment T1	0.944									
10 Perceived organisational benefit T2	0.955	0.752								
11 Top management commitment T2	0.976	-0.701	0.893							
12 Perceived organisational benefit T3	0.959	0.562	-0.667	0.770						
13 Top management commitment T3	0.963	-0.508	0.740	-0.488	0.840					
14 Perceived organisational benefit T4	0.958	0.625	-0.750	0.704	-0.659	0.768				
15 Top management commitment T4	0.936	-0.207	0.073	-0.210	0.441	-0.261	0.745			
16 Subjective norms: Peers T4	0.906	0.161	0.012	0.411	-0.265	0.218	-0.168	0.830		
17 Subjective norms: IS T4	0.922	-0.008	-0.188	-0.194	0.183	-0.098	0.341	-0.723	0.856	
18 Subjective norms: Management T4	0.966	0.267	-0.290	0.100	0.159	-0.008	0.391	-0.444	0.706	0.933

Note: AVE is on the diagonal

Tables 3 Factor loadings

<i>Item</i>	<i>Factor loadings</i>
Attitude 1 T1	0.8140
Attitude 2 T1	0.9415
Attitude 3 T1	-0.9074
Attitude 4 T1	0.7993
Attitude 5 T1	-0.8737
Attitude 1 T2	0.8021
Attitude 2 T2	0.9721
Attitude 3 T2	-0.9619
Attitude 4 T2	0.9127
Attitude 5 T2	-0.9186
Attitude 1 T3	0.8205
Attitude 2 T3	0.9091
Attitude 3 T3	-0.8792
Attitude 4 T3	0.8450
Attitude 5 T3	-0.9391
Attitude 1 T4	0.7671
Attitude 2 T4	0.8761
Attitude 3 T4	-0.8430
Attitude 4 T4	0.7587
Attitude 5 T4	-0.6772
Subjective norms: peers 1 T1	0.9483
Subjective norms: peers 2 T1	0.9481
Subjective norms: IS 1 T1	0.9566
Subjective norms: IS 2 T1	0.9352
Subjective norms: management 1 T1	0.9625
Subjective norms: management 2 T1	0.9402
Perceived organisational benefit 1 T1	0.8991
Perceived organisational benefit 2 T1	0.9249
Perceived organisational benefit 3 T1	0.8060
Perceived organisational benefit 4 T1	0.8300
Perceived organisational benefit 5 T1	0.8982
Perceived organisational benefit 6 T1	0.7899
Perceived organisational benefit 7 T1	0.8734
Top management 1 T1	-0.7618
Top management 2 T1	0.9115
Top management 3 T1	-0.9301
Top management 4 T1	0.9380
Top management 5 T1	-0.8791

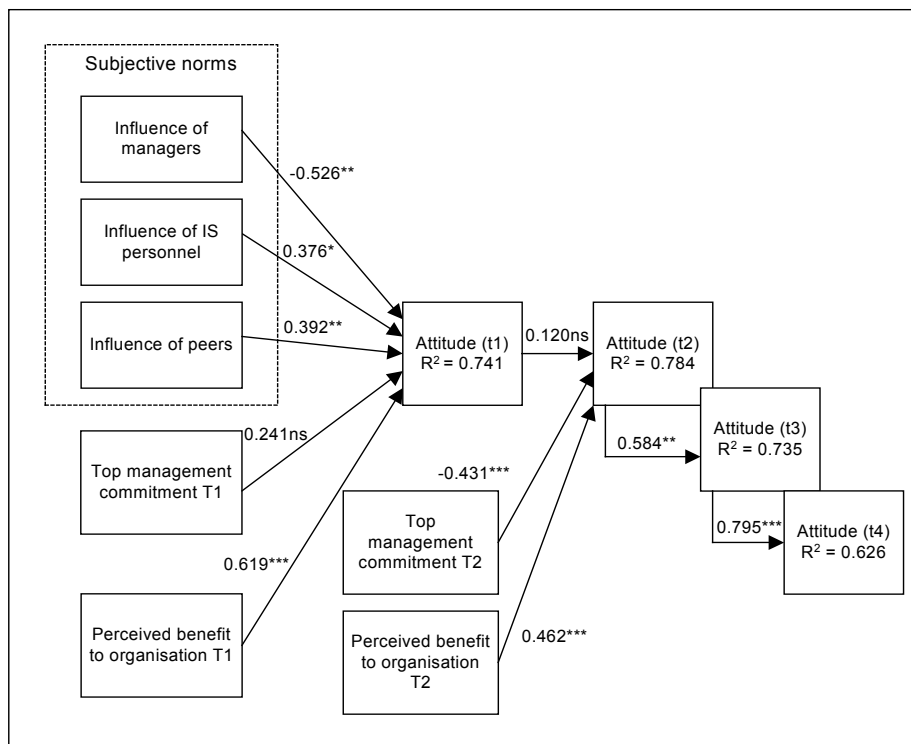
Tables 3 Factor loadings (continued)

<i>Item</i>	<i>Factor loadings</i>
Perceived organisational benefit 1 T2	0.9267
Perceived organisational benefit 2 T2	0.8927
Perceived organisational benefit 3 T2	0.7874
Perceived organisational benefit 4 T2	0.7844
Perceived organisational benefit 5 T2	0.9278
Perceived organisational benefit 6 T2	0.8536
Perceived organisational benefit 7 T2	0.8871
Top management 1 T2	0.8714
Top management 2 T2	-0.9508
Top management 3 T2	0.9682
Top management 4 T2	-0.9645
Top management 5 T2	0.9654
Perceived organisational benefit 1 T3	0.9004
Perceived organisational benefit 2 T3	0.8440
Perceived organisational benefit 3 T3	0.9372
Perceived organisational benefit 4 T3	0.7812
Perceived organisational benefit 5 T3	0.9134
Perceived organisational benefit 6 T3	0.8474
Perceived organisational benefit 7 T3	0.9086
Top management 1 T3	0.8351
Top management 2 T3	-0.9673
Top management 3 T3	0.9701
Top management 4 T3	-0.9700
Top management 5 T3	0.8270
Perceived organisational benefit 1 T4	0.9159
Perceived organisational benefit 2 T4	0.9210
Perceived organisational benefit 3 T4	0.8768
Perceived organisational benefit 4 T4	0.9182
Perceived organisational benefit 5 T4	0.8689
Perceived organisational benefit 6 T4	0.9309
Perceived organisational benefit 7 T4	0.8727
Top management 1 T4	0.7154
Top management 2 T4	-0.9037
Top management 3 T4	0.9152
Top management 4 T4	-0.8632
Top management 5 T4	0.9027
Subjective norms: Peers 1 T4	0.9757
Subjective norms: Peers 2 T4	0.8411
Subjective norms: IS 1 T4	-0.8684
Subjective norms: IS 2 T4	-0.9788
Subjective norms: management 1 T4	-0.9787
Subjective norms: management 2 T4	-0.9534

4.1 Structural model

The tests of the structural model are shown in Figure 2. Overall, the model explains 74% of the variance in attitudes at time one, 78% of the variance in attitudes at time two, 73% of the variance in attitudes at time three, and 63% of the variance in attitudes at time four. Figure 2 shows the path coefficients and explained variances for the model. A bootstrapping re-sampling technique in which 200 samples were generated was performed to generate t-statistics to indicate significance of the model paths (Chin, 1998a–b).

Figure 2 Results



Notes: * p < 0.50
 ** p < 0.01
 *** p < 0.005
 ns non-significant

Hypotheses 1a to 1c suggested that the normative influences of managers, IS consultants, and peers would positively influence initial attitude formation. The normative influences of IS consultants and peers have a positive impact on attitude, with beta coefficients of 0.376 (p < 0.05) and 0.392 (p < 0.01), respectively, providing support for Hypothesis 1b and Hypothesis 1c. The coefficient of -0.526 (p < 0.005) is contrary to what was hypothesised, thus suggesting that managers’ influence has a negative impact on user attitudes, and failing to support Hypothesis 1a.

Hypothesis 2 suggests that top management commitment would positively influence initial attitude formation. The beta coefficient of 0.241 is non-significant, and fails to support Hypothesis 2. Hypothesis 3 suggests that perceived organisational benefit would positively influence initial attitude formation. The beta coefficient of 0.619 ($p < 0.005$) provides support for Hypothesis 3.

Finally, Hypothesis 4 suggests that with direct experience, attitudes from one time period will positively influence attitudes at a later time. The beta coefficient between attitudes at time one and time two is non-significant. Attitudes at time two are positively influenced by perceived organisational benefits with a beta coefficient of 0.462 ($p < 0.005$). Contrary to expectations, attitudes at time two are negatively influenced by top management commitment with a beta coefficient of -0.431 ($p < 0.005$). The beta coefficients between attitudes at time two and three and attitudes at time three and four are significant at 0.584 ($p < 0.01$) and 0.795 ($p < 0.005$), respectively. These results demonstrate that after direct experience with system, of greater than three months, attitudes determine future attitudes, and thus provide support for Hypothesis 4.

5 Discussion

The hypothesis testing provides evidence that at different times during the implementation process, different factors are influential in forming user attitudes toward the system. Specifically, prior to use of the system, perceived organisational benefits and the opinions of both peers and IS consultants have exerted positive influence on attitudes. Contrary to expectations, the influence of managers has a negative influence on attitudes. Once there has been some experience with the system, top management commitment replaces normative influences. However, it does so in a negative manner. Perceived organisational benefit continues to have a positive influence on attitudes. Finally, after somewhat extensive direct experience (*i.e.*, six months of use), attitudes in one time period positively impact attitudes in a later time period.

Interestingly enough, this research has discovered that the influence of managers has a negative impact on early user attitudes. Unlike peers and IS consultants who are more closely tied to the users, managers are further removed from understanding the direct implications the system holds for work change (Massey *et al.*, 2001). These findings raise an important issue around management's understanding of the current and future systems. Specifically, if users are satisfied with the system they currently have, then management's influence may be seen as counter-productive, particularly if the wrong reasons for change are emphasised. For the bank employees, in addition to significant procedural changes, the new system represented a radical departure from their current system in terms of data record formats, report formatting and report generation, and user interfaces. When users perceive the status quo is quite satisfactory, mandatory change may require management to offer broader motivating reasons or drivers to explain the importance and urgency of a new system. For example, management may need to explain that the organisation is responding to a competitive threat or changes in laws or reporting requirements. Finally, these findings may highlight the need to examine in more detail the relationship between the users and management. For example, trust in management may be a moderating factor of the influence on attitudes, such that if management is trusted, the relationship between managers' influence and attitudes would be positive.

However, lack of trust may result in negative relationship, as we have seen here. Additional research is needed to understand the impact of trust in the other person (or group) on their influence in attitude formation.

A second interesting outcome of this research is that after some direct experience with the system, top management commitment has a negative impact on attitudes. The findings of this study, while prior research highlights the important role of top management commitment, seem to suggest something different. One explanation for these results could be the existence of a 'disconnect' between the way management portrayed the system and how it actually performed. This disparity in the system was portrayed and how it performed may impact end users' trust in the words of top management and lead to this negative association. Future research should examine the role of trust in this context, as well as the relationship among expectations of the system and what was actually realised in order to assess the impact of expectation disconfirmation on this relationship (*e.g.*, Bhattacharjee, 2001a). Further, relating to the point above, management may simply not understand the system the way the employees do, and may highlight aspects of the system that are irrelevant at the end-user level (Massey *et al.*, 2001). After some experience with the system, users may realise that the system does, in fact, do what they expected it would.

Following from the second finding, a third interesting outcome of this research is that after direct experience with the system, in this case six months, initial attitudes determine later attitudes. This suggests that organisations may not reap the full benefits of information system investment for some time after installation. Since attitudes change over time, it is important to recognise the need to manage the process beyond initial implementation. Measuring the impact of a system implementation shortly after installation may be misleading as to user attitudes and the true value and benefits of the system (Peffer and Dos Santos, 1996). Thus, it is important for employees and managers to realise that actual benefits are not likely to be achieved immediately after implementation of the system.

As with any research, this study has limitations. First, the focus on one information system in one organisation raises questions regarding the generalisability of the results. The focus on one system does help to control for system-related variables that might confound the results. However, different system configurations could lead to different results. This research was conducted in two previously independent, affiliate banks. Thus, this study was conducted under the umbrella of one organisation and while there may be some bias in the results, we believe it is minimised due to the nature of this particular organisation. A second limitation lies in the potential for common method bias as both the dependent and independent variables were collected on the same instrument. Some of the impacts of common method bias are minimised by capturing data over time and, in particular, using prior period attitudes to predict later attitudes.

This study has several important implications for research. First, this study builds on research in technology acceptance that examines mandatory system use (Brown *et al.* 2002). Brown *et al.* demonstrated that attitudes were a more meaningful dependent variable for mandatory systems. Further, they provided evidence that the traditional TAM variables that may not provide sufficient information to influence attitudes. This study identifies perceived organisational benefits and perceived top management commitment as important factors influencing early attitude formation.

The relationship between attitudes at times two, three, and four raises important questions for technology acceptance research. Attitude has been omitted from the models since the origination of TAM (Davis *et al.*, 1989). However, the results of this study provide additional evidence of their importance in mandatory use environments. This may be particularly important when examining continuance intention (*e.g.*, Bhattacharjee, 2001a–b) which is based on extended direct experience with the system. An important direction for future research is to develop an integrated model that combines the individual and organisational factors that influence attitudes toward mandatory systems.

This study has important implications for practice. Specifically, the results highlight the importance of clearly articulating the perceived organisational benefits of a system prior to, and in the early stages of, systems implementation. In mandatory settings, communicating the reasons for change take on a heightened importance when the status quo is perceived to be quite satisfactory. Further, the influence of peers and IS consultants can be leveraged to positively influence attitudes by communicating what is known *and* unknown about the system and how it will change work processes.

This study also highlights the importance of establishing positive attitudes early in the implementation process and continuing to portray the system positively even after it has been implemented. Prior research has repeatedly challenged the view that the implementation process ends with adoption or installation of the system (Kimberly, 1981; Cooper and Zmud, 1990). For example, Cooper and Zmud (1990) articulate six stages of implementation, three of which focus on post-installation behaviour. Given that the full complexity of a new system spanning all of these stages is most likely unknown at the outset, we suggest that attitude formation is a dynamic ongoing process that can be influenced for some time after installation.

6 Conclusion

We identified important organisational factors in attitude formation regarding information systems use. Subjective norms, top management commitment, and perceived organisational benefits were identified as important to users at various times of the implementation process. The results supported the importance of these different factors, and highlighted that direct experience plays a significant role in determining which factors are important. Specifically, the results indicate that peers and perceived organisational benefits are important prior to use, and top management commitment and perceived organisational benefits are important with some system exposure. After prolonged use of the system, prior attitudes determine later attitudes. These results highlight the importance of communication regarding the system early in the implementation process in order to positively influence attitudes.

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Appendix: items used to measure constructs

Attitude

- 1 I am enthusiastic about using CBS (7-point Likert scale from strongly disagree to strongly agree).
- 2 All things considered, my use of CBS in my job will be...
 - Extremely negative
 - Quite negative
 - Slightly negative
 - Neither negative nor positive
 - Slightly positive
 - Quite positive
 - Extremely positive
- 3 All things considered, my use of CBS in my job will be...
 - Extremely good
 - Quite good
 - Slightly good
 - Neither good nor bad
 - Slightly bad
 - Quite bad
 - Extremely bad
- 4 All things considered, my use of CBS in my job will be...
 - Extremely pleasant
 - Quite pleasant
 - Slightly pleasant
 - Neither pleasant nor unpleasant
 - Slightly unpleasant
 - Quite unpleasant
 - Extremely unpleasant
- 5 All things considered, my use of CBS in my job will be...
 - Extremely harmful
 - Quite harmful
 - Slightly harmful
 - Neither harmful nor beneficial

- Slightly beneficial
- Quite beneficial
- Extremely beneficial

Sources of influence

(7-point Likert scale from strongly disagree to strongly agree)

Peers

- 1 My co-workers think that I should use CBS.
- 2 My peers think that I should use CBS.

Boss

- 1 My superiors think I should use CBS.
- 2 Top management thinks I should use CBS.

IS

- 1 The members of the ONSC conversion team think I should use CBS.
- 2 Computer specialists at ONSC think I should use CBS.

Perceived organisational benefits

(7-point Likert scale from strongly disagree to strongly agree)

I expect that...

- 1 CBS will increase our bank's level of customer service.
- 2 CBS will improve the consistency of our service to our customers.
- 3 CBS will increase customer confidence in our bank.
- 4 CBS will enable our bank to introduce new services and products.
- 5 CBS will increase the quality of information we are able to provide to our customers.
- 6 CBS will increase the timeliness of information we are able to provide to each other (e.g., co-workers, supervisors).
- 7 CBS will increase the timeliness of information we are able to provide to our customers.

Top management comment

- 1 Management at my bank is enthusiastic about the change to CBS.

- Strongly agree
- Quite agree
- Slightly agree
- Undecided

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Slightly disagree

Quite disagree

Strongly disagree

2 Management at my bank has presented CBS as...

Extremely negative

Quite negative

Slightly negative

Neither negative nor positive

Slightly positive

Quite positive

Extremely positive

3 Management at my bank has presented CBS as...

Extremely good

Quite good

Slightly good

Neither good nor bad

Slightly bad

Quite bad

Extremely bad

4 Management at my bank has presented CBS as...

Extremely harmful

Quite harmful

Slightly harmful

Neither harmful nor beneficial

Slightly bad

Quite bad

Extremely bad

5 Management at my bank has presented CBS as...

Extremely pleasant

Quite pleasant

Slightly pleasant

Neither pleasant nor unpleasant

Slightly unpleasant

Quite unpleasant

Extremely unpleasant