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Employee Acceptance of Employer Control over BYOD Devices

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Abstract

Organizations face new and growing security challenges as consumer technology continues to be integrated into organizational workflows. Bring your own device (BYOD) is a phenomenon that is here to stay; however, securing employee's personally owned devices may require the organizations to consider exerting some control over the employee's device. In order for organizations to secure access to their sensitive information in this way, they must first garner the employee's consent. This research seeks to examine employee acceptance of employer control by constructing a model of employee acceptance based upon the extant acceptance literature. The model is then empirically tested through the use of structural equation modeling. The results indicated that social influence and to a lesser extent habit play a crucial role in employee's desire to accept employer control over personally owned devices. Supporting these two significant factors can help technology managers secure employee acceptance over personally owned devices.

Background

Employees are increasingly demanding to be allowed to use their own personal devices for work, even if it goes against an organization's current security policy (Dillow, 2013; Eddy, 2013). When companies allow employees to use personal devices for work related task it is typically referred to as Bring Your Own Device or BYOD for short. The use of personal devices for work activities opens up a whole new arena of security and privacy concerns (Miller, Voas, & Hurlburt, 2012). Several solutions have been proposed for the organizational concern of privacy including exerting some control over the employee's privately-owned device (French, Guo, & Shim, 2014). These solutions include employees installing special applications or device management software to maintain control over the organization's sensitive data.

This research seeks to identify the antecedents of employee acceptance of employer control over personally owned devices. The primary objective is to model employee acceptance using the extant technology acceptance theories and test this model to determine which factors are relevant to employee acceptance of control. This model can be quantitatively examined to determine if the constructs proposed in the relevant technology acceptance literature apply in this instance. While the prior research into technology acceptance provides an appropriate starting point for the development of a model of employee acceptance it has not be applied or empirically tested in the same manner as suggested by this research. In the end there are two primary goals for this research: First, this research seeks to examine the factors that support employee acceptance of employer control over personally owned devices. Second, this research seeks to expand the technology acceptance literature into a new domain and provide empirical evidence to support its application in such a context.

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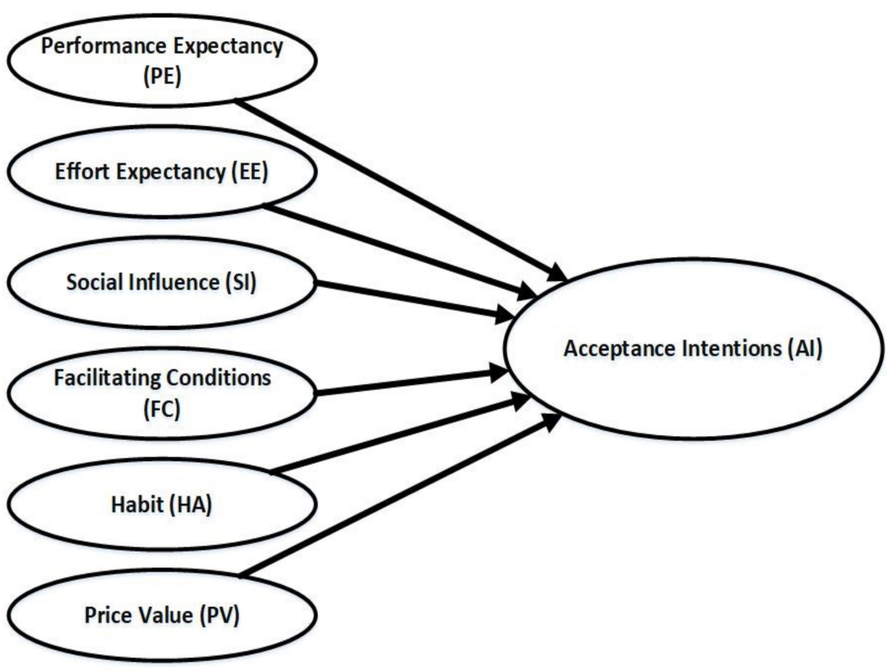
Literature Review and Model Development

BYOD appears to be on the rise (Eddy, 2013); therefore, organizations must address the security and privacy concerns that accompany BYOD. Author Scarfo summarized the BYOD security approaches as "…two opposite approaches: hands-off devices versus hands on-devices." (2012, p. 451). There are certain benefits to a hands-on approach to BYOD security such as quicker response times and less network dependence; additionally, end users tend to prefer native applications (Abed, 2016; Forrester, 2015). This means that one of the two major approaches to security in BYOD requires the employer to apply some control over the employee's device. However, employees must consent to the hands-on approach as the organization will need access to their personal devices. Employee consent to employer control has yet to be fully researched but there are several IT behavior models that can be used as the theoretical background for predicting employee behavior.

The Unified Theory of Acceptance and Use of Technology (UTAUT) as proposed by Venkatesh, Morris, Davis, and Davis (2003) attempts to build upon other models including the influential technology acceptance model (TAM). TAM has been used and applied in a variety of contexts since its inception in 1989 (Davis, Bagozzi, & Warshaw, 1989) and has seen several extensions including TAM2 (Venkatesh & Davis, 2000) and more recently UTAUT. UTAUT has also since been extended with the addition of several new constructs, all theorized as antecedents of acceptance intention. This updated model is known as UTAUT2 (Venkatesh, Thong, & Xu, 2012). The original UTAUT model distills several different acceptance models into four main constructs that are theorized as antecedents of technology acceptance intentions. These antecedents include performance expectancy, effort expectancy, social influence, and facilitating conditions. UTATU2 extended the original model by adding hedonic motivation, price value, and habit, again theorizing these new constructs as influencing behavior intentions. The application of UTAUT has been found fairly consistent and is a good place to start for modeling user acceptance of employer control.

UTAUT has been used to create a variety of models relating to general technology and policy acceptance. Most research has used a combination of variables and constructs from the prevailing social theories in a similar manner as presented in this research. This suggests that extending and applying either TAM and its extensions into acceptance of employer control is appropriate. There are six constructs hypothesized to affect acceptance intentions.



Methodology

The model posits six constructs that directly affect an employee's acceptance intentions. To empirically test the hypotheses structural equation modeling can be applied. To measure the constructs hypothesized in this research a survey instrument was created based upon measures used in other technology acceptance research. Meaning each construct is operationalized by examining other research that includes similar constructs and adapting the measures to this research. At least three or four measures were developed for each latent construct in order to avoid an under-identified model.

The survey was administered using SurveyMonkey, an online survey creation and data collection tool. To find participants for the survey several social media posts were placed on reddit.com/r/samplesize, which calls itself "…a community dedicated to scientific, fun, and creative surveys produced for and by redditors!" ("reddit.com/r/samplesize," 2018). In addition, SurveyMonkey provided a targeted collector of 300 participants and the survey was shared via other social media platforms. A total of 410 responses were collected with an initial completion rate of 85%. However, after removing responses with missing or incomplete data a total of 298 responses remained, which neighbors the desired 300 responses (O'Rourke & Hatcher, 2013). These final 298 responses were used for the final data analysis.

Results

The results of the confirmatory factor analysis demonstrate the reliability and validity of the survey instrument. Using the criteria presented by O'Rourke and Hatcher this measurement model is nearly ideal (2013, p. 263). Select measures of fit are displayed in the center column of Table 1. The fit indexes are good with a CFI exceeding 0.94 and both RMSEA and SRMR below the desired 0.055. Additionally, each parameter loads significantly against its construct. Lastly, the CR of each construct is above 0.70 with many above 0.80. The only characteristic where this model deviates from the ideal is in the average variance extracted. Only two constructs are near, but fall short, of the absolutely ideal 0.5. Taken as a whole the measurement model is acceptable and moving on to the examination of the structural model and hypothesis testing is reasonable at this juncture.

Table 1. Overall Fit Indices for Measurement and Structural Models

Chi-square (X^2)	**Measurement Model**	**Structural Model**
Chi-square	416.81	416.82
Chi-square p value	<.0001	<.0001
Degrees of freedom	231	231
Absolute Fit Measures	**Measurement Model**	**Structural Model**
Goodness-of-fit index (GFI)	0.90	0.90
Standardized root mean residual (SRMR)	0.053	0.053
Parsimony Fit Indices	**Measurement Model**	**Structural Model**
Adjusted GFI	0.87	0.87
RMSEA	0.052	0.052
RMSEA Lower 90% Confidence Limit	0.044	0.044
RMSEA Upper 90% Confidence Limit	0.060	0.060
Incremental Fit Indices	**Measurement Model**	**Structural Model**
Comparative fit index (CFI)	0.95	0.95

The structural model is used to estimate the relationships between the latent dependent and independent variables. The first step in examining the Structural Equation Modeling (SEM) analysis is to compare the goodness-of-fit statistics between the final measurement model and the structural model. These statistics are compared in Table 1 above. As can be seen these values are unchanged. This means that specifying the structural relationship did not negatively impact the overall model fit.

The structural path estimates are summarized in Table 2. As can be seen only the relationships between Social Influence and Acceptance Intentions and Habit and Acceptance Intention have t-values above the 1.96 significance level. Meaning these are the only relationships that are supported at a 0.05 probability.

Structural Relationship	**Standardized Parameter Estimates**	**Standard Error**	**t value**
Hypothesis 1: PE → AI	0.04	0.09	0.38
Hypothesis 2: EE → AI	0.04	0.07	0.55
Hypothesis 3: SI → AI	0.74	0.06	12.27
Hypothesis 4: FC → AI	-0.03	0.13	-0.23
Hypothesis 5: HA → AI	0.13	0.06	1.96
Hypothesis 6: PV → AI	-0.08	0.05	-1.49

Table 2. Standardized Parameter Estimates

Conclusions

The analysis showed that the instrument was successful in capturing the constructs but that employees seem slightly reluctant to allow employers to control their personally owned devices. Only the constructs social influence and habit had a significant impact on employee acceptance intentions. According to this research social influence is by far the most predictive construct when it comes to employee acceptance intentions. Habit has a much lower parameter estimate, when compared to social influence and also only just passed significance. The other constructs, performance expectancy, effort expectancy, facilitating conditions, and price value; did not pass the significance test and do not have significant parameter estimates. From the empirical analysis of this research these constructs are not supported as antecedents of acceptance intentions.

The results from this research show that employers and developer wishing to implement a native application on employee's personal devices may need to ensure that social influence and habit are properly supported. Social influence means that key individuals and influencers among the organization should support any implementation of employer control. Employees feel a greater willingness to accept employer control when they believe that other individuals are willing to accept control. To a lesser extent habit should be also be supported to ensure acceptance. This means that organizations where employees are used to strong controls or used to employee control will be more willing to accept further employer security measures. Small changes prior to implementing employer control may build employee acceptance by establishing a pattern of acceptance.