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# Effects of MDM Adoption on Employee in the context of Consumerization of IT.

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## Abstract :

Enterprises are adopting mobile technologies to increase their operational efficiency. They provide employees with greater access to real-time information that improves responsiveness and competitiveness. The adoption of mobile technologies has given rise to the Consumerization of information technology (CoIT) phenomenon. Consequently, with ubiquity of mobile devices, individuals are concerned about privacy and organization are worried over data security issues. Mobile Device Management (MDM) adoption in organizations is hence, perceived a necessity. However, the effects of mobile technologies, Consumerization, and MDM adoption on employees remains a pertinent question. A review of the literature revealed an apparent gap in the research on the role of MDM adoption in employee engagement and task performance. This paper identifies the possible relationships and interactions between these critical constructs. The results of Partial Least Squares - Structural Equation Modeling (PLS – SEM) indicate some key implications for research. Previously unexplored, CoIT construct has been conceptualized as a ‘habit’, shows positive influences on MDM adoption, corroborating extant literature. Also, hitherto unreported, MDM adoption positively affects employee engagement and task performance, a potential incentive for organizations to implement MDM solutions. Mediation results show effects of MDM adoption between CoIT and employee engagement apart from corroborating earlier reported relationships between employee engagement and task performance. The managerial implications show the positive role of MDM adoption on employee engagement and task performance in the context of CoIT.

**Keywords:** MDM Adoption, Consumerization of IT, Employee Engagement

## 1 Introduction

Enterprises are adopting mobile technologies to increase their operational efficiency. They provide employees with greater access to real-time information that improves responsiveness and competitiveness. They enable companies to capitalize on the mobile revolution and to meet new customer demands [1]. Mobile technologies have brought about the bring your own device (BYOD) trend. BYOD refers to the increased use of employees' personal devices for professional purposes [2].

Ortbach, K., Bode, M., & Niehaves, B. [3] defined the CoIT as the dual use of technologies, i.e., the use of private spaces for business purposes. Though advantageous for organizations, the CoIT presents significant security threats. Organizations are under considerable pressure to respond to this challenge, which includes multiple mobile application platforms, form factors, and technologies ([1], [4], [5]). As a result, organizations have been implementing mobile device management (MDM) solutions [6].

Moschella, D., Neal, D., Opperman, P., & Taylor, J. [7] termed the phenomenon of personal devices being used for official and personal activities within and outside organizational boundaries as the Consumerization of Information Technology (CoIT). This is the individualization of professional activities using consumer information technology (IT) that is not provided by the enterprise.

In a related stream of literature, Chung et al. [8] stated that the use of the mobile enterprise system positively influences individual perceptions of performance. Other researchers have indicated that mobile device security, especially regarding data, has not received much attention [9].

Effects of mobile technologies on employee performance and creativity have been evaluated in extant research. User perceived value and continued engagement have been addressed earlier ([1], [5]). The effects of mobile technologies on employee productivity have also been examined ([5], [10]). The CoIT has been found to improve organizational productivity by lowering technology costs [11]. The effects of consumerization on employee workload, autonomy, and stress have also received attention [12].

Many studies have been conducted on the traditional conceptualization of employee engagement. Since Kahn [13] [14] formulated the concept, significant contributions have been made by other researchers, such as Saks [15], Schaufeli et al. [16], and Macey and Schneider [17][18]. The previous employee engagement literature has shown interaction effects on employee task performance [19]. Employee engagement, regarded as crucial for an organization's success [19], has seen a surge of interest in human resource development (HRD) circles and has been the subject of extensive research in recent years ([20], [21], [22]). However, the effects of mobility, consumerization, and MDM adoption on employees remains a pertinent question. A review of the literature revealed an apparent gap in the research on the role of MDM adoption in employee performance and engagement [4].

This paper attempts to bridge this research gap by: (1) analyzing the effects of the CoIT on MDM adoption, (2) assessing the effects of MDM adoption on employee engagement from both the job and organization perspectives, and (3) examining the interaction or mediation effects of MDM adoption on employee job engagement and task

performance. The remainder of the paper is as follows: The theoretical background and the research questions are presented. The hypothesis is developed, and the research model is discussed. The final sections focus on the research design, including survey administration and construct operationalization, as well as the results and analysis, inferences, conclusions, limitations, and new research opportunities.

## **2 Theoretical Background**

### **2.1 Consumerization of Information Technology**

Moschella, D., Neal, D., Opperman, P., & Taylor, J [7] defined the CoIT as an important trend with significant long-term consequences, including lower costs, improved functionality, and successive generations of ever more technology savvy users, for business. Studies earlier, have identified the critical aspects of the CoIT (e.g., [23], [10], [7]). They include the risks associated with BYOD, “duality of usage of devices,” which outlines the fundamental idea behind the CoIT, i.e., the blurring of the boundary between the use of personal and official devices for official and personal purposes.

In addition to privacy and security concerns in the CoIT are the costs of the devices and the related technology ([24], [10]). In a review of the literature, Ruch and Gregory [25] discussed the theoretical underpinnings of the CoIT. Kim [26] posited that the memory-based technological usage model identifies four possible mechanisms for the proximal and distal effects of memory-based models. In the proposed framework, habit (i.e., the robustness of the script that is built over repeated usage) is a function of the proximally and distally lagged usage factors. Based on the habit framework used by Kim[42], the present study has articulated the CoIT as a behavioral construct.

### **2.2 Employee Engagement and Task Performance**

Kahn [13][14], defined personal engagement as the “simultaneous employment and expression of a person’s ‘preferred self’ in task behaviors that promote connections to work and to others, personal presence (physical, cognitive, and emotional), and active, full role performances” (p - 700). He identified the dimensions of the engagement construct as meaningfulness, availability, and safety. Unlike Kahn’s definition of personal engagement, which is affected by outside context, the dimensions of the engagement construct incorporate vigor, dedication, and absorption. Gruman and Saks [22] further defined the engagement construct corresponding to the concepts of meaningfulness, availability, and safety based on Kahn [13].

Multiple studies on employee engagement have concluded that employee engagement is a critical element in maintaining the organization’s vitality, survivability, and profitability [27]. Turner [28] highlighted that employee engagement may be found higher in an aligned work environment with workplace structures with clear organizational goals, and individual job or role specifications and enabling performance management systems. Murphy et al. [29] defined job performance as the accomplishment

of job-related duties and responsibilities. According to Motowidlo et al. [30], “task performance bears a direct relation to the organization’s technical core, either executing its technical processes or by maintaining and servicing its technical requirements” (p. 75).

The research on mobile technology has also focused on its effects on individual intellectual capital, roles, and work practices in business organizations [31]. Organizations have been increasingly incorporating these features into their work designs by introducing flexible work schedules [32], open office environments [33], telecommuting arrangements [34], and other recent initiatives. The effects of EMS on employee performance and creativity, as well as mobile users’ value perceptions and continued engagement, have been investigated by Stieglitz and Brockmann [5] and Chung et al. [8]. However, the effects of MDM adoption on employee parameters, such as engagement and job performance, have not received much attention.

### **2.3 Mobile Device Management**

This has led to the adoption of MDM and other solutions. MDM refers to the system that performs the critical functions to ensure the security of mobile devices without compromising individual features and privacy. The key features in the implementation of the typical MDM solution include the enrollment and configuration services, distribution, and control of the MDM agent on the device and authentication instructions, device reporting and ensuring security of the device through the provisioning services. MDM solutions also enable the asset management and control of the devices, including reporting about the devices ([6], [35])

There is a potential gap in the CoIT literature regarding the effects of CoIT and MDM solution adoption on the employee especially employee engagement and employee task performance. Accordingly, the following research problem was developed: the effects of enterprise MDM solutions on employee engagement and task performance. Thus, the following research questions were posed: RQ1)What is the effect of Consumerization of IT ( Mobile devices) on MDM adoption in organization? RQ2)What are the effects of MDM adoption on employee organizational engagement, job engagement and task performance? RQ3) What are the interaction effects of employee engagement and task performance in context of MDM adoption?

## **3 Hypothesis Development**

As was previously mentioned, the CoIT has had a significant effect on organizational perceptions of security threats. Consumerization presents serious security threats and data breach concerns ([3], [10], [12]). Therefore, organizations are under pressure to respond to this challenge, given the diversity of mobile application platforms, form factors, and mobile technology variations across the users ([1], [4], [5]). Organizations have been responding to this challenge by implementing MDM solutions [6]. There has been a tremendous increase in the number of company- and employee-owned mobile

devices in organizations. Comprehensive MDM solutions are needed to accommodate multiple form factors, platforms, and other technologies across many user bases ([1], [5]). Thus, the following hypothesis was proposed:

H1: CoIT would positively affect MDM adoption.

Employees have a special relationship with their mobile devices. Organizations have recognized this phenomenon and have attempted to exploit it. Studies have reported that enterprises are adopting mobile technologies to increase operational efficiency, to improve responsiveness and competitiveness, and to cultivate innovativeness ([1], [36]). Stieglitz and Brockmann [5] argued that a positive and encouraging institutional climate surrounding the use of mobile technology in the workplace has a positive effect on mobile usage.

Studies have indicated that MDM adoption varies among levels and roles of the employees, and successful implementation is influenced by the perceptions of the fairness of the decisions ([4], [8], [37]). Gebauer et al. [38] argued that mobile usage is based ultimately on employee individual preferences and motivations. Therefore, MDM adoption, apart from organizational support for employee adoption, would be expected to exert a significant influence on the characterization of jobs. The following hypotheses were therefore proposed:

H2 a: MDM adoption should positively affect employee job engagement.

H2 b: MDM adoption should positively affect employee organizational engagement.

The effects of mobile computing on employee performance and creativity have also been the focus of recent research ([5], [8]). EMSs are being adopted to facilitate employee access to internal IT systems to increase efficiency and, thus, improve organizational competitiveness [39]. EMS implementations have been driven by security concerns and consumerization ([40]; [12]). Mobility solutions provide opportunities for organizations to explore and to exploit employee capabilities. The effects of mobility in general have been examined. However, it is critical that the influence of MDM implementations on individual performance be assessed. MDM solutions are designed to monitor workflow processes and to manage data and security remotely. Thus, it is argued that higher adoption levels of MDM solutions would lead to higher task performance. The following hypotheses were proposed:

H3: MDM adoption should positively affect employee perception of task performance.

H4: Job engagement should mediate the relationship between MDM adoption and employee perceptions of task performance.

## **4 Research Design**

### **4.1 Survey Administration and Construct Operationalization**

The questionnaire was distributed to more than 400 possible respondents who were mobile phone users in four large organizations in the metropolitan National Capital Region (NCR) of Delhi. The firms to which the questionnaire was sent were selected by convenience sampling. The data from 300 valid respondents (43% female, 57% male) aged 22 to 50 years were used. The data quality review was performed after the questionnaires with too many missing values or the same answer to all the questions were omitted. The survey session lasted approximately 25 minutes. The survey response rate was 63.8%. The sample was controlled for the following key parameters: firm size, geographic location(s), employee mobility experience, company origin (Indian or non-Indian), and industry type (IT or non-IT). The model was controlled for the above parameters because of their possible influence on MDM implementations and the possible variations in MDM policies across organizations. The sample distributions of the first and second respondent groups were compared through the Kolmogorov–Smirnov test. No non-response bias was found [41]. Common method bias was analyzed through Harman’s one-factor test [42]. No single factor emerged to account for most of the covariance among the measurement items.

The CoIT construct was operationalized as CoIT behavior. For this study, the consumerization behavior construct was operationalized based on the adoption literature ([43]). Zhou et al. [43] examined mobile usage in the context of mobile banking, and the model that was used in that study was adapted for the CoIT construct. MDM adoption is considered an outcome construct in this study. MDM adoption was conceptualized as the dependent variable, based on the adoption literature on mobile banking [43]. Kahn’s [13] definition of job engagement was adopted for the present study as earlier utilized by ([44], [15]). Work role was a construct, and Saks’ [15] scale was adapted for this study. Task performance was measured in accordance with Chung et al. [8]. The items were pretested in a draft survey instrument. The feedback informed the revisions that ensured the appropriateness of the design and the quality of the presentation. The draft questionnaire was then tested with a group of five MDM experts. Based on their feedback, the design and instructions were finalized.

### **4.2 Measurement Model and Outcomes**

The reliability and validity of the instrument were tested in accordance with the two-step approach recommended by Gerbing and Anderson [45]. First, a Confirmatory Factor Analysis(CFA) was performed to assess reliability and validity, including convergent and discriminant validity. The Heterotrait–Monotrait (HTMT) criterion, were found to be well below 0.85 for all the constructs. This indicated good discriminant validity, as per Henseler et al. [46]. The AVE, CR, and alpha values exceeded or were close to the recommended threshold values of 0.5, 0.7, and 0.65, respectively ([47],

[48]). The results showed good convergent validity and reliability. Discriminant validity indicates whether two factors are statistically different ([46], [47]). Partial least squares (PLS) regression was performed in SmartPLS 3 [49]. PLS regression was appropriate for testing the structural model because a multi-path research model was used, the mediation and moderation effects could be assessed, and the data contained non-normal data. It was also appropriate for testing for mediation effects [50]. The normality of the sampling distribution was assessed in SmartPLS 3 through the Kolmogorov–Smirnov and Shapiro–Wilk tests with sample size of 300 in accordance with Hair et al. [51], with bootstrapping of 5,000.

## 5 Analysis and Results

The analysis aims to answer the three research questions stated at the beginning of this paper. Table 3 shows the results of the PLS-SEM model run over the bootstrapped samples. The actual values of the other fit indices were better than the recommended values. This indicated that there was a good fit between the model and the data ([47]). The t-statistic for each path model was greater than 1.96, with a path coefficient greater than 0.2 at p values below 0.05 [47]

**Table 3.** T Statistics of hypothesized Path Model. \*at 95 % confidence interval, \*\* at 99.5% confidence interval

Path	Original sample-path coefficients	T Statistics	P-value
COIT -> MDM Adoption	<b>0.261</b>	<b>5.259</b>	<b>*0.000</b>
MDM Adoption -> Job Engagement	<b>0.437</b>	<b>9.406</b>	<b>**0.000</b>
MDM Adoption -> Org. Engagement	<b>0.347</b>	<b>7.072</b>	<b>**0.000</b>
Job Engagement -> Task Performance	<b>0.376</b>	<b>2.309</b>	<b>*0.000</b>
MDM Adoption -> Task Performance	<b>0.137</b>	<b>6.851</b>	<b>*0.020</b>

Given the limitations of PLS-SEM on the calculation of model fit indices, the following key fitness measures were achieved: SRMR – 0.085 GOF – 0.303 Goodness Of Fit (GOF) =  $\sqrt{[(\text{Average AVE}) * (\text{Average R}^2)]}$ ; GOF small = 0.1, GOF medium = 0.25, GOF high = 0.36. These may serve as baseline values for validating the PLS model globally [100]. The cross-loadings matrix for the measurement model was above the acceptable range of above 0.60 in each case.

In the following sub section of this results, tests of mediations conducted are reported. The two mediation tests conducted on the relationships included (a) Employee job engagement as a mediator of MDM adoption and employee Task performance and (b) MDM adoption as a mediator of the relationship between CoIT and job engagement The Sobel test statistics were found to be 3.79 and 2.78, with one-tailed probabilities of



0.001832 and 0.001763 and two-tailed probabilities of 0.00372 and 0.00564 for these two mediation tests. The relationship between MDM adoption and task performance was found to be significant when job engagement was introduced into the model as a mediator. It is therefore suggested that job engagement partially mediates the relationship between MDM adoption and task performance. In addition, MDM adoption was also found to partially mediate the relationship between CoIT and job engagement. In terms of the proposed path model, all the paths were found to be statistically significant in the hypothesized direction.

## **6 Findings and Contributions of this study**

Several key findings can be found from this study. Following outcomes can be inferred; CoIT has positive effects on MDM adoption in the organization. MDM adoption positively effects the employee's job and organization and task performance. Finally, there are positive interaction effects observed between MDM adoption, job engagement and task performance and Consumerization, MDM adoption and employee engagement. In summary, the results from the study addressed all the research questions that were initiated.

The insights of Ortbach et al. [3] regarding the new relationships between the CoIT behavior and MDM adoption constructs were confirmed. The results obtained in this study, indicate that given the MDM solution's recent emergence, employees might display a range of behaviors towards its adoption. The employees are often led to use their mobile devices to check for unpredictable work developments during on- and off-job hours. The off-time usage due to Consumerization, corroborates the adoption and usage of MDM solution in the organization.

The results found in this study with respect to organizational engagement confirm those of ter Hoeven et al. [52] regarding the positive effects of reduced burnout and higher employee engagement. Task performance has also been found to be positively affected by employee engagement ([13], [14]). This is consistent with the JD-R model, which posits that Resources are better than Demands at predicting motivational work outcomes. The outcomes of the study are also congruent with findings of Doargajudhur and Dell [53] with respect to BYOD and JD-R model.

The results of the present study provide an interesting counter-intuitive insight. MDM adoption was considered driven mainly due to security concerns and possibly thwarted due to privacy issues. However, our findings indicate that consumerization as an individual habit might positively influence MDM adoption. This study contributes to the research on literature stream related to the construct of 'habit' by giving greater credence to the counterargument that individual decisions affect adoption behavior.

Our study confirms that employee tend to be engaged more, when using mobile devices with adoption of MDM solution since that enables the necessary flexibility to operate. The present study contributes to the stream of literature related to supporting the assertion of ter Hoeven et al. [52] related to work engagement and usage of communication technologies. Also, our results provide an additional insight to the findings

of Vrontis et al. [39] who contended that the business process changes driven by evolving requirements provide the needed flexibility for employees to use mobile applications to complete the work at hand. Thus far, EMS implementations have been driven by the security concerns related to consumerization by Niehaves et al., [12].

This study has limitations. First, the implications of specific features or sub - dimensions of MDM solutions, e.g., OTA and remote access management or wiping, were not addressed. Such dimensions could have varied effects on employee behavior and engagement. Future studies should explore the impact of MDM dimensions like OTA features or remote wiping on employee engagement and task performance. These studies could also focus on the higher order services and functions such as unified endpoint management (UEM).

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