The effect of BYOD adoption on job performance and work motivation

Many organizations are considering BYOD (Bring Your Own Device) programs, in which employees are permitted to use personal mobile devices for work-related purposes. Based on the Job Demands-Resources model, this study empirically investigated the effects of BYOD adoption on employees' motivation and perceived job performance. Using a sample of 400 full-time employees from different occupational sectors in Mauritius, this study adopted Structural Equation Modelling to test the hypotheses using AMOS version 22. Results show that BYOD has a significant positive relationship with Technology Self-Efficacy, perceived workload and perceived job autonomy, while perceived job autonomy is a positive antecedent to perceived workload. In addition, Technology Self-Efficacy, perceived job autonomy and perceived workload in turn influence perceived job performance, while perceived job autonomy and perceived job performance were found to be significant determinants of work motivation. Implications of these findings, limitations and potential research avenues are also discussed.

Keywords: BYOD, Job Demands-Resources model, work motivation, job performance

INTRODUCTION

Historically, organizations have controlled the IT tools used by employees within their corporate environment. However, this has changed in many organizations due to the pervasive spread of mobile devices and the significant drop in the price of services provided by mobile networks. Individuals' growing reliance on powerful devices such as smartphones, laptops and tablets has pushed the adoption of these devices inside organizations for work-related use. People carry their personal devices with them almost everywhere they go and are increasingly encouraged to use their devices for both personal and professional purposes.[1] For these reasons technology now brings work to the home and home to work.

This relatively recent phenomenon of allowing employees to use privately-owned mobile devices for work-related purposes is commonly referred to as Bring Your Own Device (BYOD), along with other terms such as Shadow IT, IT Consumerization and 'Consumer IT used as corporate IT'.[2-4] For the purpose of this study, BYOD is defined as the adoption of privately-owned consumer technologies to fulfil work-related activities and includes both hardware and software.

The low cost and ubiquitous nature of mobile devices and telecommunication networks has led to new work behaviors and attitudes towards IT use and this is reflected in the increasing popularity of BYOD, which increasingly alters the traditional top-down approach to IT to a more consumer-driven bottom-up approach.[5] Employees' familiarity with leading-edge technologies, combined with the fact that their personal devices are entrenched in their daily lives, results in reluctance to use company-provided technology. For many employees, their personal technology is more useful, powerful, fun and faster.[6]

While there is strong demand for BYOD from workers, it is not without risk.[7] Indeed, some have even referred to BYOD as "Bring Your Own Danger", and argue that it can introduce security threats, particularly to data confidentiality, integrity and authenticity.[8]

While organizations are aware of these threats they are often not understood or addressed by end-users,[9] and furthermore, organizations can find it difficult to establish effective security guidelines for BYOD.[10]

Legal and regulatory issues can also stem from the adoption of BYOD. Compliance challenges can stem from different data protection and privacy requirements in different jurisdictions,[7] and technical issues such as data accuracy can emerge when data on mobile devices can become stale or out-of-date due to lack of connectivity as devices move in and out of range of networks.[11]

Nevertheless, such risks can be addressed by finding a "manageable compromise" between authoritarian and laissez-faire approaches,[7] and hence BYOD has become increasingly popular.[12] However, although there have been many practitioner studies on the subject there has been little empirical research into the phenomenon,[13] and particularly under-researched is the impact of BYOD on work performance, despite research on the consequences of its use being called for.[6,10,14-22] Hence, the research question addressed in the present study is as follows:

RQ: What is the impact of BYOD use on workers' autonomy, perceived workload, job performance and work motivation?

LITERATURE REVIEW

To determine if the observations referred to above – that the impact of BYOD on work performance is under-researched – remain true today, a systematic search of the literature was conducted. Eight scholarly databases were searched (ProQuest, Emerald, ScienceDirect, IEEE Xplore, EBSCOhost, ACM Digital Library, SpringerLink and Google Scholar), using search terms 'BYOD', Bring Your Own Device' and 'IT Consumerization'. This process yielded a set of 655 articles, which were subsequently filtered to include recent articles published during

2012 – 2018 and in highly regarded IS journals ranked B, A or A* in the ABDC journal ranking list, and also in prominent IS conferences. The resultant articles were supplemented by other sources known to the authors or recommended by colleagues. This yielded 89 articles from the journals and conferences within the search scope, which were then reviewed by scanning the title, abstract, and keywords to determine their relevance to the study. This resulted in a total of 52 relevant articles that were subsequently reviewed, resulting in the following gaps being observed:

1. Quantitative empirical studies focused on people's intention to use BYOD,[20,21,23,24] its antecedents and factors of its adoption and for employee participation in BYOD programs,[3,6,16,21,25-31] factors affecting work-to-life conflict,[32] its impact on learning behavior and wellbeing,[33] factors of compliance with BYOD policies, including security, organization encouragement for 'dual use' of both personal and company-provided devices,[24,34-37] and other consequence for security, privacy and legal aspects.[38]

   However, none of the studies reviewed attempted to empirically investigate the consequences of BYOD adoption on perceived job performance and work motivation.

2. While previous BYOD studies have attempted to investigate the relationship between BYOD and job performance, no prior studies have used the otherwise widely used job demands-resources model. Again, this is despite other researchers specifically requesting for the use of other theoretical perspectives as the integrative lens.[14,15,19] The present research attempts to fill this gap by employing the JD-R model as a lens to understand the consequences of BYOD adoption.

3. The penetration of BYOD in developing countries is relatively low in comparison to developed countries. Many of the studies identified focused on developed countries,

particularly the United States and Europe, while BYOD has not been comparably researched in developing countries.[39-41] This gap is addressed in the current study, which is situated in Mauritius.

Addressing these research gaps is theoretically important, as discrepancies still exist between qualitative data and theoretical understandings of the relationship between BYOD and work performance.[10] Such research is also important for practice as productivity is often 'laundry-listed' in practitioner literature, and while a systematic understanding of the consequences of BYOD would allow a positive manipulation of specific impacts,[10] relatively few business leaders believe it has benefits for their organization and have hence changed their policies to accommodate it.[42] Finally, BYOD is becoming increasingly popular and is even regarded by some younger workers as a necessity rather than an option,[43] and so understanding its outcomes will have increasingly widespread relevance.

However, despite its importance, the effect of BYOD on job performance has not been treated exhaustively and further extensive work, including empirical work, needs to be conducted on this topic and its relationship to work outcomes.[2,6] Novel theoretical lenses might enhance the literature on the consequences of BYOD for work performance.[10,15]

Nevertheless, some prior research into the impact of BYOD on work outcomes has been conducted. Based on qualitative findings, Niehaves et al. (2012, 2013) utilized self-determination theory and the cognitive model of stress to propose a model of the impact of BYOD on work performance, and asserted that perceived autonomy, increased workload and perceived competence all influence the impact of BYOD on employees.[10,15] Similarly, Harris et al. (2012) posited that employees would be more productive and more satisfied when utilizing their personal devices for work purposes,[7] and Köffer et al. (2014) identified five key concepts (functionality, work-life overlap, work satisfaction, IT competence and self-responsibility), all of which have a direct effect on job performance.[2]

Giddens and Tripp (2014) explored the impact of BYOD on device competence and job satisfaction and claimed that "there has yet to emerge a theory as to how the use of personal devices at work leads to positive work outcomes", and made the tantalizing theoretical suggestion that the job characteristics model and social cognitive theory could explain the impact of BYOD on job performance and job satisfaction.[17]

The current study takes this line of research further and specifically contributes to BYOD literature by empirically showing its positive impact on perceived job performance and work motivation. Although (Anonymised for Review) call for such research, to the best knowledge of the authors no prior studies on BYOD have assessed its impact on work motivation. The findings are relevant to both practitioners and researchers by providing an empirical and theoretical understanding of the impact of BYOD on employees' performance and motivation. The study is also one of the first studies of BYOD to employ the Job Demands-Resources (JD-R) model.[44] Being motivational in nature, this perspective is an ideal theoretical lens for the current study; further detail on the JD-R is provided in the following section.

THEORETICAL BACKGROUND

Ruch and Gregory (2014) argue that there are many aspects to BYOD that it deserves a multi-theoretical perspective.[13] This study, which focuses on workplace outcomes of BYOD, makes use of the Job Demands-Resources (JD-R) Model, a popular, parsimonious and comprehensive model borrowed from organizational psychology and which is used for exploring and hypothesizing occupational well-being, burnout, and engagement.[45] The JD-R model can be applied to any work environment, or can be tailored to specific occupations.[46] While every occupation has its own characteristics, the assumption at the heart of the JD-R model is that these characteristics can be categorized into two groups: job demands and job resources.[47,48]

Job demands are the physical, social, psychological or organizational aspects of the job which demand continuous mental or physical effort, and these subsequently have psychological or physiological costs.[49] A few examples of job demands include workload, job insecurity, high work pressure, heavy lifting, interpersonal conflicts, and emotionally demanding interactions with clients. On the other hand, job resources are those social, physical, psychological, or organizational aspects of the profession which assist in supporting personal learning, growth and development, in accomplishing work objectives, and in decreasing job demands and their related psychological and physiological expenses. Job resources exist at various levels of an organization including the company level, the task level and at the social relation and interpersonal level.[46] A few examples of Job Resources include job autonomy, feedback, social support and job control. The JD-R model has matured into a theory due to its utilization in numerous studies, and enables the prediction, explanation and understanding of employee well-being and job performance.[48]

Job resources give rise to low cynicism, high performance, work enjoyment and high work engagement. Bakker and Demerouti (2007) put much emphasis on the intrinsic and extrinsic motivational nature of job resources and suggest that an intrinsic motivational role triggers employees' learning, development and growth while an extrinsic motivational role assists in realizing work goals.[46] Job resources satisfy basic human needs such as the need for autonomy, competence and relatedness,[50] while job demands are known to be the greatest key predictors of psychosomatic health complaints, repetitive strain injury, exhaustion, and several other health problems. Poorly designed jobs or emotionally demanding jobs where employees are overloaded give rise to such problems.[49]

Since the JD-R model is motivational in nature it is ideal for the current study, which aims to understand the consequences of BYOD for workers' motivation and therefore we apply this theoretical perspective to develop a model which will investigate the relationship that

BYOD has with work motivation. The model contains two specific job resources, perceived job autonomy and technology self-efficacy, and one job demand, perceived workload. The rationale for choosing these constructs is because they are relevant to BYOD, while the same cannot necessarily be said about other job demands and job resources.

RESEARCH MODEL AND HYPOTHESES

The proposed BYOD model is shown in Figure 1 and theorizes that BYOD leads to increases in technology self-efficacy, perceived job autonomy and perceived workload, resulting in increased work motivation and perceived job performance. Each of the hypotheses is discussed below.

[Figure 1 near here]

BYOD was defined in Section 1. Perceived job autonomy refers to "the degree to which a worker has control over how and when work is done".[51] We argue that enabling employees to choose the devices they use to complete their work and thus giving them a degree of greater control over how they complete it, should result in employees' increased perceptions of autonomy. This logical deduction has previously been borne out in empirical studies, which confirm that employees do indeed perceive a greater sense of autonomy when allowed to use tools of their own choice to fulfil business tasks, in constrast to those who are not given the same freedom and hence who perceive less autonomy.[14,52] Furthermore, employees value this independence.[7] BYOD is also said to provide increased autonomy for schoolchildren,[53] suggesting that this outcome is applicable regardless of the age of the user.

Thus, in our research model we propose the following hypothesis:

H1. BYOD has a direct and positive effect on perceived job autonomy.

However, Niehaves et al. (2012, 2013) also reported that employees feel they have more work

to do when utilizing their personal devices for work purposes.[10,15] The mechanism by which this can occur is that by being able to work in times and locations other than their traditional working hours and workplace, employees end up working on tasks that it is important for them to complete, while outside their usual working hours and away from their workplace.

This is related to the concept of presenteeism,[54] or the intrusive characteristic of technology to allow workers to be reachable, which is a source of work overload. Relatedly, Qi et al. (2017) proposed that two aspects of BYOD – flexibility and work connectivity behavior after-hours – are antecedents of work overload.[55] Gupta et al. (2013) also found that interruptions from instant message services, which are commonly accessed via mobile devices such as those used by BYOD workers, are associated with an increase in perceived workload.[56] For the purpose of this study, perceived workload is defined as the perceived pressure that employees experience given the amount of work they need to complete.[57,58] Thus, we believe that employees feel that they have more work to do when utilizing their privately-owned devices to fulfil business tasks, as in the following hypothesis:

H2. BYOD has a direct and positive effect on perceived workload.

It is logically intuitive that BYOD would result in higher technology self-efficacy as people are likely to be more familiar with their personally-owned devices than those provided by their workplace. As Dernbecher et al. (2013) might say, users who choose to bring their own devices "switch to their own to work with the known".[59] It could well also be the case that employees explore personally-owned devices more completely; that is, they will learn each feature and application available for those devices, resulting in higher self-efficacy for those devices than for others.

Although prior research has not specifically tested whether BYOD can leader to greater technology self-efficacy, related empirical studies give us reason to suggest it. Computer

Anxiety is a negative antecedent to Technology Self Efficacy,[60] and hence we propose that if employees are able to choose to use devices with which they are more familiar, such as those they own personally, it is likely that they would experience less anxiety and greater self-efficacy relating to the use of that device. Relevant prior experience is also antecedent to Technology Self Efficacy,[61] and assuming that users have more prior experience with their own devices than those provided to them by their employer, they would therefore also be likely to experience higher technology self efficacy when using their own devices.

Consequently, we propose the following hypothesis:

H3. BYOD has a direct and positive effect on technology self-efficacy.

The JD-R model proposes that job resources also affect job demands. There is a significant correlation between perceived workload and autonomy,[62] and indeed autonomy is associated with a lower perception of being overworked.[63] Shirom et al. (2009) found that physicians' subjective workload was correlated with autonomy,[64] with more autonomous physicians being more able to manage their workload and hence being less prone to burnout. There is a body of literature that suggests that "giving employees more autonomy is often accompanied by requiring them to take on greater responsibility for achieving results", and that greater autonomy is often offset by greater work intensity.[65] In the present study we propose that being autonomous gives employees' greater flexibility, which allows them to complete a greater volume of work and hence has a positive impact on perceived workload. Therefore, we propose the following hypothesis:

H4. Perceived job autonomy has a direct and positive effect on perceived workload.

In the current study, perceived job performance refers to employees' perception of the quantity

and quality of their work, as well as their overall performance. Autonomy has long been known to have a relationship with performance,[66] with highly autonomous employees enjoy greater job satisfaction and performance while less autonomous employees experience work exhaustion and poorer performance.[67] Similarly, Eaton (2003) found that the related concept of job flexibility is also associated with greater self-perceptions of job performance. This is consistent with JD-R theory, which posits that increases in resources allow for increased job demands, thus the increased job resource of being autonomous allows workers to perform better, all other things being equal.[44] Hence, we propose the following hypothesis:

> H5: Perceived job autonomy has a direct and positive effect on perceived job performance.

Job demands lead to job insecurity, work-family conflict, and exhaustion. However, prior literature has also reported that job demands such as work overload can result in higher job performance.[44] This relationship has not received much attention in the literature, although we note that Niehaves et al. (2013) found support for this relationship in a qualitative study.[15] Kim et al. (2010) proposed that perceived workload would have an inverse relationship with perceived performance; however, they did *not* find support for this proposition.[68] Work stress, of which workload is one component, is also significantly correlated with self-reported job performance.[69] We suggest that this could be explained by workers' belief that if they are working a lot they must also be performing well. Thus, we propose that:

> H6: Perceived workload has a direct and positive effect on perceived job performance.

For employees to perform better in their tasks, their technological self-efficacy should be high, which means that the employees should trust their capabilities to conduct activities using those devices. Previous scholars have investigated the role of self-efficacy in different environments

including job performance and satisfaction.[70]

Stajkovic and Luthans (1998) conducted a meta-analysis of 114 research reports and found that TSE consistently leads to higher work performance across various organizations.[71] BYOD, which generally relates to the use of mobile devices, has similarities with remote work, and so the findings from Staples et al. (1998; 1999) that TSE is implicated in increased productivity and performance for remote workers suggests that increased TSE resulting from workers' using their own mobile devices might also lead to increased productivity.[72,73] Furthermore, Tarafdar et al. (2011) found support for the hypothesis that TSE is antecedent to "Technology-Enabled Performance".[74] Therefore, we propose the following hypothesis:

> H7: Technology self-efficacy has a direct and positive effect on perceived job performance.

Many scholars trust that job characteristics are the key factor determinant of job satisfaction, job performance and work motivation. Employees enjoy greater job satisfaction and motivation when they rate higher on skill autonomy, identity, feedback and variety.[75,66]

The dependent variable in this study is work motivation and the focus is more on intrinsic motivation, that is, the desire to spend one's effort on what one is interested in while enjoying one's work.[76] It would be logical to expect that employees who are intrinsically motivated feel pulled or naturally drawn towards finishing their work.[77] The personal enjoyment that employees derive from their work is the reason that they expend effort, and this is autonomous, self-determined and volitional. One would engage in an activity while being intrinsically motivated because one finds the activity inherently enjoyable and interesting.[78] Elias et al. (2012) posit that any employee who is intrinsically motivated will conduct his work partly because the employee believes that the job is interesting and enjoyable,[79] and there is a substantial body of empirical evidence that concludes that autonomy leads to motivation and

similarly, the relationship between autonomy and performance is supported in prior studies which reported that autonomous employees are more productive and enjoy greater job performance.[64,80,81]

Thus, we propose the following two hypotheses:

H8: Perceived job autonomy has a direct and positive effect on work motivation.
H9: Perceived job performance has a direct and positive effect on work motivation.

METHODS

Sample profile and representativeness

The current study is based on a questionnaire survey and gathered 402 responses from full-time knowledge workers in different occupational sectors in Mauritian organizations. Knowledge workers have been differentiated based on various factors such as the generation to which they belong, such as so-called 'millennials', 'Generation X' or 'baby boomers', and other aspects such as their degree of autonomy and interaction with others.[82] Technology usage has also been accepted as another differentiating factor of knowledge workers,[83] due to the common practice to furnish knowledge workers with technological devices such as personal digital assistants, mobile phones and laptops. Hence, the sample frame or target population for this study is employees engaged in workplace tasks with personal devices such as smartphones, tablets or laptops. The study recruited respondents using convenience sampling, supplemented with respondents recruited via social media.

Two questionnaires containing missing responses were removed from the dataset in order to avoid biased statistical results. Thus, the final sample contained 400 respondents, therefore satisfying the recommended minimum sample requirement of 200 for the effective use of Structural Equation Modelling (SEM).[84] 195 (48.3%) respondents were female while the remainder (51.3%) were male. The largest age group consisted of employees aged between

25-34 (n = 148, 37%), followed by 35-44 (n = 108, 27%), 15-24 (n = 79, 19.8%), 45-54 (n = 31, 7.8%), 55-64 (n = 26, 6.5%) and finally 65+ (n = 4, 1%). There were 175 respondents in medium-sized enterprises (n = 175, 8%), 153 respondents in small enterprises (n = 153, 3%), and 72 respondents in large enterprises (n = 72, 18%).

Measurement of constructs

Items used to measure the various constructs as presented in Table 1 were derived from existing literature and were measured on a 7-point Likert scale. Three items were borrowed from Köffer et al. (2015) to measure BYOD,[19] in which respondents had to rate the extent to which they make use of their personal devices for work-related purposes on a scale where 1 represented 'to the least extent possible' and 7 'to the greatest extent possible'.

The scale used for all the remaining items ranged from 1, which denoted 'strongly disagree', to 7, which denoted 'strongly agree'. Perceived job autonomy was measured using three items adopted from McKnight et al. (2009), Tripp et al. (2016) and Morris and Venkatesh (2010).[52,85,86] Three items were taken from studies by Chen et al. (2001) and Lin and Huang (2008) to measure technology self-efficacy,[87,88] while four items were derived from Bakker and Demerouti (2014) to measure perceived workload.[48] Three items were borrowed from Krishnan et al. (2002) and Lin and Huang (2008) to measure perceived job performance,[88,89] and three items borrowed from Keaveney and Nelson (1993), Vallerand et al. (1992) and Vallerand and Bissonnette (1992) to measure work motivation.[90-92]

Prior to further analysis, the authors conducted a pilot test using purposive non-probability sampling with 30 knowledge-workers in Mauritius with the view of revising and modifying the indicators if necessary, and hence establishing validity and reliability. The purpose of the pilot test was to obtain participant respondent feedback about the questionnaire

was clear and easily understood by participants. Following the pilot test results, only one of the BYOD indicators (BYOD2) was revised.

Data analysis

This study used Amos version 22 software and employed a two-step approach for the SEM analysis, which comprised of the measurement model and the structural model.[93] Also known as the confirmatory factor model, the measurement model uses the maximum likelihood method of estimation to measure the adequacy of the model, while the structural model describes a hypothetical model proposing relationships among unobserved and observed variables.[94,95] The fit indices adopted to assess if the theory presented fits the sample data were chi-square ($\chi 2$), including its degrees of freedom and p-value, comparative fit index (CFI), Goodness-of-Fit Index (GFI), Tucker-Lewis Index (TLI), Adjusted Goodness-of-Fit Index (AGFI), Normed Fit Index (NFI), Incremental Fit Index (IFI), Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR) and p of Close Fit (PCLOSE) value.

To obtain a good model fit, literature suggests the following values should be obtained: $\chi 2$ less than 3.0; AGFI greater than 0.80; and CFI, NFI, GFI, and IFI higher than 0.90,[96,97] RMSEA less than 0.06,[98] SRMR less than 0.09, and PCLOSE above 0.05.

In addition, it is vital to check the validity and reliability of each construct. Some authors suggest that these values should range between 0.60 and 0.70 for a construct to be reliable,[97,98] while others recommend a loading of at least 0.50.[99] Besides reliability, validity is measured using two methods comprising of convergent and discriminant validity. Convergent validity is measured by examining the average variance extracted (AVE) and should be greater than 0.50, while discriminant validity is achieved when the AVE is higher than the maximum shared variance (MSV).[96]

THE RELIABILITY OF THE STUDY CONSTRUCTS WAS ESTABLISHED USING CRONBACH'S ALPHA FOR EACH CONSTRUCT. ALL THE STUDY CONSTRUCTS WERE ABOVE 0.7 RECOMMENDED BY HAIR ET AL. (2010) AND THEREFORE ALL OF THE STUDY CONSTRUCTS ARE CONSIDERED RELIABLE (WORK MOTIVATION: 0.784; BYOD: 0.745; WORKLOAD: 0.805; TECHNOLOGY SELF-EFFICACY: 0.794; JOB PERFORMANCE: 0.846; JOB AUTONOMY: 0.830).[97]RESULTS

Confirmatory factor analysis

Prior to further measurement examination, we started by evaluating and re-specifying the measurement model. The unidimensional constructs were paired with each other and the CFA was run. This was done in order to determine whether one specific measure contained large standardized residuals. Consequently, those items were eliminated to obtain an improved model fit. The model was re-evaluated following the deletion of three items; the remaining items are shown in Table 1.

The results of the confirmatory factor analysis, including their standardized loadings, are illustrated in Table 1. The results presented in Table 1 indicate that the measurement model is reliable and the AVE scores for each construct were above 0.50. In addition, the results presented in Table 3 indicate a good model fit for the measurement model.

[Table 1 near here]

Discriminant validity results

The results of the discriminant validity are presented in Table 2 and indicate that for all constructs the AVE was higher than the MSV, confirming that discriminant validity was achieved.

[Table 2 near here]

Common method bias

Since this study collected data at a single point in time through the same method, common method bias is potentially an issue.[101] To check if this was the case we employed the common latent factor approach, running the measurement model with the items indicated in Table 1 loaded onto a single common factor. A chi-square difference test was then performed to compare the results of the measurement model with that of the common factor model. The findings specified that the measurement model (Table 3) fit the data significantly better than the common factor model, thus confirming that common method bias was not an issue.

Structural model results

After establishing that the measurement model was reliable and valid, the structural model illustrated in Figure 1 was evaluated and tested. The results obtained from the structural model are presented in Table 3, confirming a good and acceptable model fit. Furthermore, findings supported the nine proposed hypotheses as shown in Figure 2.

[Table 3 near here]

[Figure 2 near here]

All the standardized path coefficients were thus significant as hypothesized. BYOD use was a significant predictor of Perceived Job Autonomy, Perceived Workload and Technology Self Efficacy, while these three constructs were in turn significant factors of Perceived Job

Performance. Further, Perceived Job Autonomy significantly influenced Perceived Workload, while Perceived Job Autonomy and Perceived Job Performance were significant factors of Work Motivation.

DISCUSSION

Although BYOD might seem a relatively minor technical matter, this study has shown that its adoption can have consequences for the organisation that extend well beyond IT. Although a growing number of studies into the consequences of BYOD have been conducted, the IS discipline had not yet developed a theoretical understanding of BYOD.[10] This study makes a step to addressing this gap in the literature by adding to the small but growing body of research by investigating the impact of BYOD on individual workers' motivation and their self-perceptions of work performance. It extends the existing research into the impact of BYOD by proposing a model based on empirical research, which suggests that workers who are able to use their own devices for work-related purposes are likely to experience greater autonomy and a greater sense of technology self-efficacy, and although they also experience a greater perceived workload, the combined effect of these impacts is a greater sense of self-performance, which in turn leads to greater motivation.

Some of the findings of this study are consistent with prior BYOD research. That BYOD leads to employees feeling more autonomous is congruent with Niehaves et al. (2012, 2013) and Morris and Venkatesh (2010);[10,15,52] that it leads to higher Technology Self-Efficacy is consistent with Huffman et al. (2013) and Lucas et al. (2009),[102,103] and the effect of self-efficacy on perceived job performance is also consistent with Compeau and Higgins (1991, 1995) and Agarwal et al. (2000).[61,104,105]

In addition, the fact that BYOD leads to a higher perceived workload could be explained by the fact that as BYOD devices are typically mobile and enable workers to work more often,

including after office hours, during the weekend and at home. This raises the likelihood that BYOD might have undesirable impacts on work-life balance in the same way that other mobile and work-provided smartphones can.[106;107] Further investigation into consequences of BYOD for work-life balance is suggested given the increasing popularity of BYOD in workplaces.

The finding that perceived workload is an antecedent to perceived job performance is consistent with prior literature,[44] although it is important to note that a worker's perceived workload and perceived job performance might not be aligned with the views of managers. Hence, a notion such as "I am working hard so I must be performing well" might lead to worker dissatisfaction if there were a gap between the employee's and the organisation's perceptions. Such issues were not within the scope of the current study, and further research is warranted into the potential for BYOD to lead to such outcomes, particularly given that high workloads are actually associated with increased fatigue and lower performance,[108] rather than higher performance.

The findings also lend support to the JD-R model, which contends that an increase in job resources is likely to influence its demands. Bakker and Demerouti (2007) argue that job autonomy assists in handling job demands,[46] presaging the finding in this study that higher perceived workload is offset by perceived job autonomy. The mechanism through which this occurs might be by providing flexibility that allows employees to make adjustments to accommodate a greater workload, although to confirm this would require further research. Similarly, JD-R research has found that job autonomy is associated with work motivation,[46,109] and with job performance,[44] and these findings are also supported by the current study. The potential for BYOD to lead to improved performance and motivation, via an increased sense of autonomy, is encouraging. Conversely, employees with a low sense of autonomy will

experience work exhaustion and poorer performance,[67,81,110] and so the potential for BYOD to be beneficial in reducing work exhaustion and poor performance is also encouraging.

As this study has shown that effects for both perceived workload and motivation, there is also the potential for BYOD to have an impact on workers' learning approach in the workplace. High perceived workload is associated with surface-learning as opposed to deep learning, while high motivation on the other hand is associated with deep learning.[111] High perceived workload can also lead to a more disorganised way of working and can also have negative consequences for workers' health and mood,[111-112] and so there is potential that BYOD could lead to these outcomes as well.

While this study has investigated the self-perceived performance of individuals, it is possible that performance of teams as a whole could also be affected by BYOD, as Task Technology Fit and technology appropriation are known to affect team performance.[113]

Finally, this study also demonstrates the applicability of the JD-R model to research into the impacts of IT use in the workplace. The JD-R is widely used in the organizational psychology and human resource management disciplines and is a well-established framework for understanding employee well-being. As the prevalence of IT in the workplace increases the potential impact on the wellbeing of employees also increases and concomitantly, a framework for understanding the impact of information technology in the workplace becomes increasingly important. The focus in this study on the impact of BYOD on motivation is but one example of the potential contribution the JD-R model could make to information systems research more broadly.

CONCLUSIONS

Understanding what motivates employees to work hard and perform well is a pertinent area of research for practitioners and scholars and a significant issue for contemporary organizations.

The influx of new devices and applications in the consumer market has led to employees using their devices at work to complete work tasks, leading to potential impact on work outcomes. Drawing on the Job Demands-Resources theory, we identifyied a significant impact of BYOD use for work motivation.

Our purpose is to shed further light on the role that BYOD plays on work motivation. Due to its motivational process, the JD-R model proved to be a suitable theoretical lens for and hence was applied in this study. This is the first time that the JD-R model has been applied in a study of BYOD and this therefore represents a theoretical contribution of the current study.

Another contribution is that this is the first study of the impact of BYOD on work motivation that integrates perceived workload, perceived job autonomy and technology self-efficacy. No prior BYOD model has used these constructs in an integrated theoretical framework to examine the effect that BYOD has on these outcomes.

Practical Implications

This study has demonstrated that BYOD use can lead to improved employee motivation and potentially increased performance. Yet a large proportion of organizations have resisted allowing BYOD: a recent industry report found that fewer than half the organisations surveyed had made BYOD available across the organization.[114]

BYOD, like any other technology, has both pros and cons, but this research suggests that the impact for work outcomes could be significant. The benefits of BYOD deployment revealed in this study have implications for organizations that have not adopted BYOD; the authors suggest that organizations should consider the impact on worker motivation in conjunction with other factors when weighing up whether to implement BYOD, or not.

Theoretical Implications

A growing number of studies have called for research to contribute a greater understanding of the consquences of BYOD use,[6,10,14-22] and so this study contributes a theoretical understanding of the impact of BYOD use on a number of work-related variables. As BYOD is but one example of technology resource provided to workers, and as the core tenet of the JD-R relates to the balance between the demands placed on workers and the resources made available to them, this study then suggests the efficacy of using the JD-R model more broadly in information systems scholarship to explain work outcomes for a wide range of technologies. The authors therefore encourage future information systems research to consider the JD-R as a useful theoretical framework.

Limitations and further research

This study asked participants to report their individual job performance, workload and autonomy, which could differ from objective measures. Similarly to Lee and Lee (2018),[115] we adopted this approach due to the difficulty of obtaining objective measures of these constructs; given the anonymous and voluntary nature of the survey it would have been infeasible to collect data from respondents' line managers or others in their workplace.

Additionally, although we have no evidence to suggest it, there is the possibility that the sample used in this study was subject to selection bias and further, that the sample of knowledge workers in Mauritian organizations might not be generalizable to other contexts. Further, the data indicated that many (although not all) respondents are relatively young, with the most common age of respondents being between 20-34 years. Hence, we recommend that the model be tested in other contexts, including comparisons with other countries and different types and ages of workers.

A number of other directions for further research have also been identified during this study, including investigation of the impact of BYOD on work-life balance, and issues relating

to BYOD and its impact on self-perceptions of workload and performance. Another direction deserving further attention is whether BYOD allows workers to handle high workloads more effectively by providing workers with more flexibility. Finally, there are a number of different approaches to BYOD, ranging from giving employees complete and unfettered freedom to use any device they like, to much more limited implementations in which the employer provides workers with devices from a limited, and sometimes very limited, range of options. Mobile devices such as mobile phones might also have different phenomena to laptop computers. While the present research considered BYOD as a single variable, further research could consider different dimensions of BYOD to determine if the consequences of its use are the same for different BYOD approaches and devices.

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