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Richness of IT Use Operationalization: A Conceptual Replication

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Abstract:

Use of information technology (IT) remains a key concern for organizations. This article presents a conceptual replication of Burton-Jones and Straub's (2006) study, exploring the effect of IT Use operationalization richness – lean and rich – on Performance. We used 352 valid responses from Amazon MTurk through an online survey. Consistent with the original study, the hypothesis was tested by using the Structural Equation Modeling technique. Our results – which indicated support for the same hypothesis in the original study – suggest that the richer the IT use operationalization, the higher the individual Performance.

Keywords IT Use, Performance, Replication, Lean Measure, Rich Measure, Duration, Cognitive Absorption, Deep Structure Use.

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1 Introduction

1.1 Context

Information technology (IT) use is one of the most important elements for organizations that are increasingly investing in digital tools (Boudreau & Robey, 2005; Devaraj & Kohli, 2003; Gartner, 2021; Straub & del Giudice, 2012). One reason for the centrality of use is that "technology per se can't increase or decrease workers' performance, only use of it can" (Orlikowski, 2000, p. 425). This importance is reflected in prior research. Indeed, IT use is one of the most central and studied concepts in our discipline (Córdoba et al., 2012; Shuraida et al., 2018; Straub & del Giudice, 2012).

1.2 Burton-Jones and Straub (2006) Article

One of the most influential studies in the IS field on IT use was published by Burton-Jones and Straub (2006) who propose a construct related to IT use, namely, Deep structure use (DSU). Burton-Jones and Straub (2006) study the link between IT Use and individual performance. In this study, IT use construct is composed of DSU and another existing construct, Cognitive absorption (CA). The former is defined as "use of features in the IS that support the underlying structure of the task" (pp. 237-238) and focuses on the task and IS components. The latter is defined as "a state of deep involvement with software" (Agarwal & Karahanna, 2000, p. 665) and is related to the user and IS (respectively p. 235 and p. 233).

1.3 Richness of IT Use Operationalizations

Burton-Jones and Straub (2006) have also defined the richness of IT Use operationalization (Figure 1). The degree of richness is a continuum from Very lean to Very rich. According to Burton-Jones and Straub (2006), "lean measures reflect usage alone; rich measures reflect its nature, involving the system, user and/or task" (p. 233). A use/non-use binary measure is a very lean measure. Frequency is considered a lean measure. A somewhat rich measure includes the system element; that is, it takes account of the system's features. A rich measure involves two elements: the system and the user or the system and the task. Finally, a very rich measure draws on all three elements (the system, the user, and the task). This continuum can also be considered a dichotomy between lean and rich measures.

Richness of measures	1. Very lean	2. Lean	3. Somewhat rich (IS)	4. Rich (IS, User)	5. Rich (IS, Task)	6. Very rich (IS, User, Task)
Type	Presence of use	Extent of use (omnibus)	Extent to which the system is used	Extent to which the user employs the system	Extent to which the system is used to carry out the task	Extent to which the user employs the system to carry out the task
Domain of content measured*	Usage	Usage	Usage System User Task	Usage System User Task	Usage System User Task	Usage System User Task
Example	Use/nonuse	Duration; extent of use	Breadth of use (number of features)	Cognitive absorption	Variety of use (number of subtasks)	None to date (difficult to capture via a reflective construct)
Reference	Alavi and Henderson (1981)	Venkatesh and Davis (2000)	Saga and Zmud (1994)	Agarwal and Karahanna (2000)	Igbaria et al. (1997)	

Figure 1. Richness of IT use Construct Operationalization (Burton-Jones & Straub, 2006, p. 233)

In other words, the more components (the user, the system, and the task) the IT Use operationalization considers, the richer it is. As a result, operationalizations that rely solely on the system are lean, while operationalizations that integrate at least two of the three components are rich. Importantly, Burton-Jones and Straub (2006) show that the duration of use (lean measures) explains less variance in individual performance than DSU (rich measures). This enables them to claim that the richer the IT Use operationalization, the higher the explanatory power of individual performance.

These findings were recently contradicted by Sun et al. (2019) who operationalized the lean measures by Frequency and Duration of use and the rich measures by Adaptive System Use (ASU) proposed by Sun (2012). Their results indicate that lean measures are always positively related to Performance, whereas this is not verified for ASU. Given these conflicting results and an interest in replication to support or falsify the original study (Brendel et al., 2023), we propose to re-examine one of Burton-Jones and Straub's (2006) research questions: "[Does] the ability to explain the relationship between individual system usage and short-run task performance improv[e] when richer measures are used?" (p. 235). We chose this particular study to replicate as with more than 1,400 citations at the time of writing, it is one of the most seminal studies on IT use, upon which much subsequent research literature is built. Should its core findings be falsified – as Sun et al. (2019) would suggest – it would have a significant impact on past, current, and future research in this area.

1.4 Objectives

To answer our research question, a conceptual replication of Burton-Jones and Straub's (2006) study in a work context is conducted. Conceptual replications test the same research questions but use different measures, treatments, analyses, and/or contexts. For the present study, we adapt the measures of the original study and conduct it in a professional work context rather than a student context. Conducting studies with samples composed of professionals is worth highlighting as it is not a common practice in the IT Use literature (Ringeval, 2022). In the context of the current study, professionals are relevant respondents since they are the primary users of Microsoft Excel, which is the IT artifact of concern, providing a better representation of the population of users than students (Compeau et al., 2012; Hanel & Vione, 2016).

Replications are a way to validate the generalizability of prior empirical findings (Brendel et al., 2023; Dennis et al., 2020; Dennis & Valacich, 2015; Niederman & March, 2015). This involves testing whether the findings are associated solely with the dataset, while providing more empirical evidence to support or falsify a theory and its conclusions (Brendel et al., 2023; Niederman & March, 2015). This is especially important because many contextual elements such as technology or users can influence the results. This practice of conducting replications has recently been encouraged in the IS field (Brendel et al., 2023; Dennis et al., 2020).

1.5 Research Model

In the present study, we aim to confirm or refute the validity of Burton-Jones and Straub's (2006) results by testing their central hypothesis with a new sample of professionals. This hypothesis corresponds to whether the richer the IT Use operationalization is, the better it explains the variance of individual performance.

Similarly to Burton-Jones and Straub (2006), we rely on the use of Microsoft Excel and compare the influence of lean and rich operationalizations on individual performance. Burton-Jones and Straub (2006) captured the duration of use by the amount of time spent on Excel (lean operationalization). They used two constructs to capture the rich operationalizations of IT Use, namely, DSU and CA. The effects of these constructs are analyzed in several stages in Burton-Jones and Straub (2006, p. 240, Table 7). First, all constructs are examined one after another to assess their relationship to Performance. Then, DSU and CA are analyzed within the same model and then these two constructs are studied as forming a construct called Exploitative System Use. As the present study is a replication, the exact same operationalizations are used here. Table 1 presents the definitions of the constructs included in the present study.

Table 1. Definitions of Constructs Used in this Replication Study

Construct	**Definition**
Constructs with lean operationalizations	
IT use	"Individual user's employment of one or more features of a system to perform a task." (Burton-Jones & Straub, 2006, p. 231)
Constructs with rich operationalizations	
Deep structure use	"Use of features in the IS that support the underlying structure of the task." (Burton-Jones & Straub, 2006, pp. 237-238)
Cognitive absorption	"A state of deep involvement with software." (Agarwal & Karahanna, 2000, p. 665)

2 Research Method

2.1 Replication Type

Dennis and Valacich (2015) proposed to classify the replication studies into three categories: (1) the Exact Replications, (2) the Methodological Replications, and (3) the Conceptual Replications. Exact replications use both the same study context and the same methodology (i.e., measurements, analyses, etc.). Methodological replications, for their part, use the same methodology but change the study context (e.g., different technologies, different sample types). Last, conceptual replications - the strongest form of replication studies - test the same research questions and hypotheses, with a different methodology and/or context (Dennis & Valacich, 2015). As mentioned earlier, our study aims to test the same research hypothesis as Burton-Jones and Straub (2006) using the same IT artifact (i.e., Microsoft Excel) but applies it in a different study context with different measures for Performance. Our study thus corresponds to a conceptual replication.

2.2 Data Collection

Consistent with the original study, our empirical data were collected using a cross-sectional survey. However, unlike the original study, in which students at a US university were surveyed, participants were randomly recruited from a population of professional Microsoft Excel users via the MTurk platform (https://www.mturk.com), an online crowdsourcing platform with a US user base of approximately 85,000 “Turkers” (Robinson et al., 2019). Using such platforms allows easy access to a pool of respondents, but there are several precautions to consider (Aguinis et al., 2020).

To guide our data collection on MTurk, we followed the recent recommendations by Aguinis et al. (2020). These include careful planning of the data collection (e.g., qualification of participants, amount of compensation) and its implementation (e.g., monitoring participants’ speed of response, approving responses within 48 hours with justifications for excluded participants). In our case, we had several criteria for selecting participants. We included anyone who uses Microsoft Excel in the context of their work. In addition, participants had to be familiar with this software because an implicit assumption associated with DSU is that users have knowledge of the system structure (Burton-Jones & Straub, 2006). In other words, users have to have some degree of knowledge or familiarity with the IT system. Finally, we limited our sample to a particular geographical area, the United States. This practice is consistent with recommendations made by Steelman et al. (2014) on the use of platforms to collect data.

In terms of data collection, we aimed for a sample size of 350 usable responses. To determine this, we relied on the recommendations of MacKenzie et al. (2011) who refer to the need of a number of respondents ranging from three to ten times the number of items to measure the variables included in the research model. Given the operationalization of our constructs (see Table 2), our sample was at the high end of this recommendation. Therefore, we set on MTurk the participant limit at 700 respondents to account for attrition (Aguinis et al., 2020). For respondent compensation, we used the minimum wage in the United States. As the questionnaire was completed in approximately ten minutes, each MTurker was compensated with an amount of 1.5 USD, which was well above the average compensation for an MTurker which is around 2 USD per hour according to Hara et al. (2018).

A total of 1,917 responses were submitted through MTurk. We applied our selection criteria as the questionnaire was completed to allow additional individuals to participate. Respondents were excluded when they (i) failed to answer our attention check question correctly (n = 645), (ii), had a low level of MS Excel familiarity (n = 516), (iii) indicated that they were not users of MS Excel at work (n = 206), or (iv) completed the same questionnaire multiple times (n = 9). The attention question and the MS Excel familiarity measure are available in Appendix A. Any incomplete questionnaire was also rejected (n = 189). As a result of the screening process, our final sample includes 352 usable responses.

2.3 Construct Operationalizations

All constructs were operationalized using existing measures validated by prior research (Table 2). For the lean operationalizations, Duration was adapted from Venkatesh et al. (2008). This measure differs from the one used by Burton-Jones and Straub (2006) because theirs was context-specific, namely “About how many minutes did you spend doing the case?” (p. 238). As our sample does not involve students but professionals, Venkatesh et al.’s (2008) operationalization of Duration is relevant because it can be used for any IT artifact in an organizational context. For the rich operationalizations of IT use, we used the same measures as Burton-Jones and Straub (2006) for DSU and CA. For the dependent variable, we could not use the same measure as Burton-Jones and Straub (2006), namely, students' assignments. In our case, we adapted Schmitz et al.'s (2016) operationalization because it is consistent with the majority of performance measures found in the IT Use literature (Ringeval, 2022).

Table 2. Construct Operationalizations

Construct	Measurement items	Adapted from
Constructs with lean operationalizations		
Duration	On average for the last three weeks, how many hours do you use Microsoft Excel each week?	Venkatesh et al. (2008)
Constructs with rich operationalizations		
Cognitive absorption		Burton-Jones and Straub (2006)
CA1	When I am using Microsoft Excel, I am able to block out all other distractions.	
CA2	When I am using Microsoft Excel, I feel totally immersed in what I was doing.	
CA3	When I am using Microsoft Excel, I get distracted very easily.	
CA4	When I am using Microsoft Excel, I feel completely absorbed in what I am doing.	
CA5	When I am using Microsoft Excel, my attention does not get diverted very easily.	
Deep structure use		Burton-Jones and Straub (2006)
DSU1	When I am using Microsoft Excel, I do not use features that would help me analyze my data.	
DSU2	When I am using Microsoft Excel, I use features that helped me compare and contrast aspects of the data.	
DSU3	When I am using Microsoft Excel, I use features that helped me test different assumptions in the data.	
DSU4	When I am using Microsoft Excel, I use features that helped me derive insightful conclusions from the data.	
DSU5	When I am using Microsoft Excel, I use features that helped me perform calculations on my data.	
Performance operationalization		
General performance		Schmitz et al. (2016)
PERF1	Using Microsoft Excel enables me to accomplish work tasks more quickly.	
PERF2	Using Microsoft Excel improves the quality of work I do.	
PERF3	Using Microsoft Excel makes it easier to do my job.	
PERF4	Using Microsoft Excel enhances my effectiveness on the job.	
PERF5	Using Microsoft Excel gives me greater control over my work.	

2.4 Data analysis

Like Burton-Jones and Straub (2006), we applied PLS, a structural equation modeling (SEM) technique, to perform data analysis. PLS has been widely used to test structural models such as ours, both because of the reflective and formative measures on the one hand and direct effects and interactions on the other hand. We used SmartPLS v4 to test different models (Ringle et al., 2022). We used a bootstrapping method (10,000 times following the recommendations of Hair et al. (2022)) that used randomly selected subsamples to test the significance levels of different PLS models.

3 Results

3.1 Descriptive Statistics

Table 3 details the study's descriptive statistics.

Table 3. Descriptive Statistics

Items	N		Mean		Standard deviation	
Performance	166		81.01		15.87	
Performance1	352		4.00		0.71	
Performance2	352		4.17		0.75	
Performance3	352		4.14		0.76	
Performance4	352		4.11		0.76	
Performance5	352		4.11		0.73	
Duration	352	166	11.74	81.07	11.27	19.99
CA1	352	171	3.70	5.96	0.88	1.89
CA2	352	171	3.85	5.78	1.01	1.80
CA4	352	171	3.80	5.94	0.97	1.65
CA5	352	171	3.75	5.73	1.09	1.68
DSU2	352	171	3.86	6.11	0.85	1.73
DSU3	352	171	3.87	6.08	1.01	1.68
DSU4	352	171	3.98	6.09	0.84	1.59
Performance	352	166	11.74	81.07	11.27	19.99

Notes: 1. Performance is the unidimensional item used by Burton-Jones and Straub (2006). Performance 1-5 are the items we used in the current study. Performance was measured on a 0–100 scale, CA (cognitive absorption) and DS (deep structure) used a 1–9 scale in Burton-Jones and Straub (2006). In our study, all constructs were measured based on a 1-5 scale.
2. The current study is left and Burton-Jones and Straub's (2006) study is right

The variance inflation factors (VIF) of all our variables for both the structural and measurement models (inner model and outer model, respectively) are less than 2, showing that multicollinearity is not an issue in our study (Hair et al., 2022; Hair et al., 2021). According to Kock (2017), if all VIFs in the inner model resulting from a collinearity test are equal to or lower than 3.3, the model can be considered free of common method bias. Common method bias is therefore not an issue in our study.

3.2 Measurement validity

We followed Straub et al.'s (2004) recommendations to assess the validity and reliability of the constructs included in our study. All constructs had acceptable reliability. That is, the reliability coefficients were all above the minimum acceptable of 0.60 according to Straub et al. (2004) (see Table 4). Analysis of the external loadings shows that, with the exception of three items, indicators are all nearly or above 0.70, which supports the good representation of the indicators in their constructs (see Table 5). As there were multiple reflective indicators for each construct to be interpreted, it was decided to delete the three problematic items (DSU1, CA3, and DSU5) so that convergent and discriminant validity levels were improved (Hair et al., 2009). We posit that the first two items were problematic as they were the only reverse-coded items in the two scales whereas the last item had low loading due to the change from student to professional context. Discarding DSU1 and CA3 is consistent with Burton-Jones and Straub (2006) since these two items were also excluded in their analysis.

Table 4. Construct reliability

	Cronbach's Alpha		rho_A		Composite reliability	
CA	0.806	0.81	0.814	NR	0.873	0.69
DSU	0.652	0.82	0.653	NR	0.812	0.70
PERF	0.750	NR	0.753	NR	0.833	NR

Notes: 1. Constructs with one item are not represented in this table.
2. Constructs are represented by their abbreviations. CA: Cognitive absorption, DSU: Deep structure use, PERF: Performance. NR: not reported.
3. The current study is left and Burton-Jones and Straub's (2006) study is right.

Next, we tested for significance using the bootstrapping method with a sample size of 10,000 as recommended by Hair et al. (2021). The results in Table 5 show that discriminant validity is acceptable since all factors load in their respective construct.

Table 5. Item-to-construct loadings

	Cognitive Absorption		Deep Structure use		Duration		Performance	
CA1	**0.794**	**0.73**	0.189	0.009	0.018	0.06	0.311	NR
CA2	**0.841**	**0.81**	0.270	0.36	-0.066	0.03	0.340	NR
CA4	**0.796**	**0.84**	0.211	0.345	0.017	0.11	0.293	NR
CA5	**0.745**	**0.81**	0.143	0.36	0.085	-0.01	0.277	NR
DSU2	0.178	0.39	**0.751**	**0.81**	0.005	-0.02	0.327	NR
DSU3	0.221	0.31	**0.755**	**0.82**	0.048	-0.04	0.245	NR
DSU4	0.220	0.53	**0.797**	**0.86**	-0.029	0.03	0.283	NR
DUR	0.011	0.06	0.009	-0.01	**1.00**	**1.00**	0.072	NR
PERF1	0.327	NR	0.208	NR	-0.055	NR	**0.670**	NR
PERF2	0.237	NR	0.253	NR	0.074	NR	**0.708**	NR
PERF3	0.232	NR	0.278	NR	0.079	NR	**0.696**	NR
PERF4	0.247	NR	0.296	NR	0.106	NR	**0.718**	NR
PERF5	0.330	NR	0.273	NR	0.034	NR	**0.743**	NR

Notes: 1. Constructs with one item are not represented in this table.
2. Constructs are represented by their abbreviations. CA: Cognitive absorption, DSU: Deep structure use, PERF: Performance. NR: not reported.
3. The current study is left and Burton-Jones and Straub's (2006) study is right.

As shown in Table 6, the square roots of the shared variance between constructs and their measures were higher than the correlations between constructs. In short, all the performed tests support convergent and discriminant validity.

Table 6. Interconstruct Correlations and Average Variance Extracted

	Cognitive Absorption		Deep Structure use		Duration		Performance	
Cognitive Absorption	**0.795**	**0.80**						
Deep Structure use	0.260	0.51	**0.768**	**0.81**				
Duration	0.011	-0.08	0.009	-0.03	**1.000**	**1.00**		
Performance	0.385	0.37	0.372	0.46	0.072	-0.29	**0.707**	**1.00**

Notes: 1. The bolded values on the diagonal are the square root of each construct's average variance extracted (AVE) and should be higher than 0.50.
2. The current study is left and Burton-Jones and Straub's (2006) study is right.

3.3 Structural Model and Nomological Validity

Table 7 shows the results for nomological validity. Similarly to Burton-Jones and Straub (2006), we relied on the explained variance (R2). According to Edwards' (2001) recommendations, we analyzed higher-order model use in two steps to test its effects. On the one hand, we tested a model that included the sub-constructs as independent components, and on the other hand, we tested a second-order construct formed from the sub-constructs. This was the case for the richer measures of IT Use.

Results indicate that the lean measure (Duration) has a positive but not significant relationship with Performance. Furthermore, the rich measures (CA and DSU) both positively explain Performance, and each yields around eight times the variance explained by the lean measure. The result has a small discrepancy in whether CA and DSU are analyzed as a combination or as formative constructs of IT Exploitative Use. Our findings further show that the richer the IT Use operationalization, the more it explains the variance in the dependent variable, therefore they fully support Burton-Jones and Straub's (2006) claim.

Table 7. PLS Results

	Mean	**St.dev**
Duration → Performance	B_D = 0.144, p = 0.169, R^2 = 0.021	B_D = -0.29, p < 0.01, R^2 = 0.087
Cognitive absorption → Performance	B_{CA} = 0.396, p = 0.000, R^2 = 0.157	B_{CA} = 0.42, p < 0.01, R^2 = 0.178
Deep structure use → Performance	B_{DSU} = 0.374, p = 0.000, R^2 = 0.14	B_{DSU} = 0.47, p < 0.01, R^2 = 0.218
Component model Cognitive absorption → Performance Deep structure use ↗	B_{CA} = 0.316, p = 0.000 B_{DSU} = 0.287, p = 0.000 R^2 = 0.229	B_{CA} = 0.25, p < 0.01 B_{DSU} = 0.34, p < 0.01 R^2 = 0.264
High-order model IT exploitative use → Performance ↗ ↖ CA DSU	B_U = 0.469, p = 0.000 $Weight_{CA}$ = 0.813, $Weight_{DSU}$ = 0.406 R^2 = 0.220	B_U = 0.51, p < 0.01 $Weight_{CA}$ = 0.83, $Weight_{DSU}$ = 0.90 R^2 = 0.262

4 Discussion

Consistent with the original study published by Burton-Jones and Straub (2006), our replication supports the hypothesis that the richer the IT Use operationalization, the higher the explained variance of Performance. Compared to the original study, our sample size is larger, composed of professionals, and includes additional constructs to further assess the validity of Burton-Jones and Straub's (2006) findings. Consistent with the original study, rich operationalizations (DSU and CA) explain more variance than the lean measure (Duration). By corollary, this then refutes the findings of Sun et al. (2019), who found lean measures (Frequency, Duration) to explain more variance than a rich one (ASU), posing the future question of whether there are further differences in operationalization of lean versus rich models. We suggest three possible explanations why Sun et al.'s (2019) were refuted.

First, Sun et al. (2019) included exploratory and exploitative IT Use constructs that differ in nature and with regard to their nomological network (Ringeval, 2022). As Burton-Jones and Straub (2006) examined only exploitative applications, we posit that a difference may exist between exploratory and exploitative IT Use constructs.

Second, Performance was measured in two ways, one related to exploitative performance (Task Productivity) and the other to innovative performance (Task innovation). We posit that this difference in the nature of Performance can further explain the difference in effects between the richness of IT Use measures and the dependent variable.

Finally, in Burton-Jones and Straub (2006), IT use was mandatory, whereas it was not specified in Study 1 and mandatory in Study 2 in Sun et al. (2019). Similarly, the participants were familiar with MS Excel in Burton-Jones and Straub (2006) and in Study 1 in Sun et al. (2019) but inexperienced with video editing software in Study 2 in Sun et al. (2019). We posit that the contextual factors in the studies may have contributed to the disparities in results, not only in comparison to Sun's (2019) findings but also to those of Burton-Jones and Straub (2006). As presented in Table 7, subtle disparities emerge between our findings and those of Burton-Jones and Straub (2006). Two noteworthy distinctions are apparent. Firstly, the linkage between DSU (Deep Structure Use) and Performance appears to be weaker in our study. This outcome aligns with prior research indicating that IT-related constructs tend to exert a more pronounced influence on mandatory operational settings as opposed to voluntary ones (e.g., Brown et al., 2002; Saeed & Abdinnour, 2013). In our study, a significant majority of respondents (77.56%, 273/353) operated within a voluntary setting. Secondly, in contrast to Burton-Jones and Straub (2006), our data reveals a heightened influence of Cognitive Absorption (CA) over DSU in both the component and higher-order models. In mandatory contexts, users are more likely to develop habitual patterns of system use (Hsieh et al., 2012), leading to automated behaviors (Limayem et al., 2007). Conversely, in voluntary settings, users enjoy greater autonomy in regulating their behavior, potentially resulting in reduced engagement with the system and, consequently, a shallower understanding of its advanced functionalities (Hsieh et al., 2012). This difference in knowledge levels is partially compensated for by users' heightened cognitive involvement during system interaction.

4.1 Implications

4.1.1 Theoretical Implications

As with the replications, the main theoretical contribution of this study is to test the generalizability of the conclusions reached in the original study. Our results confirm that the richer the IT Use operationalization, the higher the individual performance.

4.1.2 Practical Implications

Because the current study is part of the understudied literature addressing the link between IT Use and Performance, it has relevant practical implications. Our work provides insight into the effects of different measures of IT use. Specifically, managers who favor duration of use will likely observe limited performance from their employees. To get maximum benefit from IT, managers should consider the user, the system, and the task altogether. In concrete terms, this means taking into account what the technology allows the user to do, the interaction the user has with the technology, and his or her cognitive load during these interactions. For example, simply using MS Excel all day is not sufficient to lead to high individual performance. Rather, a deep understanding of the application and a thoughtful engagement with the system within the context of the task undertaken leads to high performance, resulting in managerial conclusions regarding the assessment of employee aptitude, self-efficacy, and continual training requirements.

4.2 Limitations

Like any study, ours is not without limitations. First, we used MTurk to collect our data. While this practice is not problematic per se (Aguinis et al., 2020; Steelman et al., 2014), it does come with a few risks, such as respondent inattention. To limit these problems, we followed the recommendations formulated by Aguinis et al. (2020). For example, adding a Captcha at the beginning of the questionnaire to avoid automatic answers or adding an attention check, meaning a question for which a particular answer is requested.

As per Burton-Jones and Straub's (2006) continuum of richness of IT Use operationalizations, there are more than just lean and rich operationalizations of IT use (six were identified in total), different constructs within each type (such as Frequency or Duration as both lean measures) and different types of individual performance (such as efficiency versus effectiveness). While the current study was a conceptual replication of the original study and hence maintained original measures as closely as possible, we can see the value of future studies that extend the investigation into other areas of the continuum.

5 Conclusion

This study sought to conduct a conceptual replication of Burton-Jones and Straub's (2006) original work to confirm or disconfirm the hypothesis that the richer the operationalization of IT Use, the greater the explaining variation in individual performance. To achieve this goal, we conducted a cross-sectional survey of MS Excel use and performed a PLS-SEM analysis using a sample of 352 professionals. The results of this study are consistent with those of the replicated study and, therefore, reinforce and generalize the original findings.

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Appendix A: Attention Check Question and IT Familiarity Questions

Attention check question

When I obtain data/information from Microsoft Excel, I leverage good pieces of it to. Please reply neither agree nor disagree to this question.

Microsoft Excel familiarity questions

- What is the keyboard shortcut for fixing cell references in a formula?
- The company A is evaluating four projects and will accept any if its Internal rate return (IRR) is equal or higher than 10 %, as indicated in the E2 cell. What is the formula in the C2 cell, which can be copied in the cells from C3 to C5, to generate results as indicated below?

	A	B	C	D	E	F
1		IRR	Accepted or Rejected		Rule to decide	
2	Project 1	12.5%	Accepted		10%	
3	Project 2	9.3%	Rejected			
4	Project 3	8.2%	Rejected			
5	Project 4	11.1%	Accepted			
6						

- An example of a cell range is:
- You click on this tool in the formula bar of Microsoft Excel:

- What is the fourth component of the VLOOKUP function?
- You notice the presence of ###### in a cell in your Excel file. This is due to the fact that:
- Which statement is true about the pivot tables in Microsoft Excel?
- You need to borrow money. You know how much you need to borrow, how long you need to repay the loan, and how much you can afford to pay each month. You can use the ________ function to determine the interest rate that will meet you borrowing goal.
- Getting data from a cell in another sheet is called ______
- The formula =A1+B1, in the C3 cell, is copied/pasted in C7. C7 will have the following formula:

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