

The Mediating Role of Workaround Behavior and the Shadow IT Usage in the Relationship between Job Characteristics and Individual Performance

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ABSTRACT

This research aimed to evaluate the effects of workaround behavior and the shadow IT usage as mediating variables in the relationship between job characteristics and individual performance. To achieve the objective, a survey was conducted with 415 IT users. Data analysis was performed using SPSS and SmartPLS softwares. The main results indicate that the effect of job characteristics on individual performance is explained by the mediating variables workaround behavior and the shadow IT usage. In addition, the relationship between job characteristics with the workaround behavior and the shadow IT usage were confirmed. Finally, it was confirmed that the workaround behavior and the shadow IT usage are positively related to individual performance. As theoretical contributions this study presents information about workaround behavior that has been little explored in Brazilian researches. In addition, there is a lack of researches that has assessed how the job characteristics influence alternative solutions in the organizations.

PALAVRAS-CHAVE

Características do trabalho, comportamento workaround, uso de shadow IT, desempenho individual.

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RESUMO

Esta pesquisa teve por objetivo avaliar os efeitos do comportamento workaround e do uso da shadow IT como variáveis mediadoras da relação entre as características do trabalho e o desempenho individual. Para atingir o objetivo foi realizada uma survey com 415 usuários de TI. A análise de dados foi realizada nos softwares SPSS e SmartPLS e os principais resultados indicam que o efeito das características do trabalho no desempenho individual é explicado pelas variáveis mediadoras comportamento workaround e uso da shadow IT. Ademais foi comprovado que a variável independente características do trabalho impacta no comportamento workaround e no uso da shadow IT. Com relação a análise do desempenho individual, tanto o comportamento workaround quanto o uso da shadow IT apresentam-se positivamente relacionados com o desempenho individual. Como contribuições teóricas este estudo apresenta informações acerca do comportamento workaround que vem sendo pouco explorado nas pesquisas brasileiras. Além disso, identifica-se a ausência de pesquisas que tenham avaliado como as características do trabalho influenciam as práticas alternativas de trabalho.

1 Introduction

Organizations are constantly seeking to increase their growth capacity through investments in Information Technology (IT), enabling to achieve higher levels of performance and productivity in their activities, as well as the standardization of processes and tasks (Roder et al., 2014; Rikhardsson & Dull, 2016). On the other hand, due to the complexity of enterprise systems, a large volume of investments is required, which often don't attain the expected return. IT users dissatisfied with the enterprise systems look for workarounds to finish their work (Grabski et al., 2011). Workaround represent a post-implementation phenomenon in organizations (Bozan & Berger, 2018). With the evolution of information technology, IT user behavior has been affected by utilitarian issues and by the IT management model adopted by the organization. Today's users are increasingly technologically competent and have easy access to available web-based solutions and end-user computing tools (Barker & Fiedler, 2011). Consequently, it has been increasingly difficult for IT managers to administrate the growing variety of systems available to the employees and the risks arising from the use of those external systems (Fürstenau and Rothe 2014).

Workaround behavior refers to the activities to overcome obstacles in performing a certain task. The obstacle might be system or workflow failure; however, employee training or business policies can affect how an IS is applied (Alter, 2014). Users resort to workaround to compensate for functionalities not found in the enterprise systems (Fries, Wiesche & Krmar, 2016). Boudreau and Robey (2005) consider crucial the use of workarounds in the workplace.

Vaezi (2016) notes that the more satisfied the users are with an IS, the less likely they are to adopt workaround behavior and use shadow IT, since they adopt alternative solutions and technologies when their expectations are not met. Workaround behavior is conceptualized by Alter (2014) as adaptations of the systems and resources provided by the company with the purpose to overcome constraints that makes impossible or harder the completion of tasks in an effective way. Workaround can be a strategy of using a system in a way that is not expected to be used or using alternative methods to solve an immediate and

urgent problem (Azad & King, 2008). Haag and Eckhardt (2014) define shadow IT as the “voluntary use of any IT resource that infringes IT norms at the workplace in reaction to perceived situational constraints, whose objective is to improve work performance”.

Hauff, Richter, and Tressin (2015) claim that work satisfaction is influenced by several job characteristics, which Hackman and Oldham (1976) defined to be skill variety, task identity, task significance, autonomy, and feedback, which may act as predictors of alternative solutions and technologies. Job performance depends on how employees perceive their jobs (Herzber et al., 1976). The basic thesis of the Job Characteristics Model (JCM) relates several job characteristics to job satisfaction, and may lead to superior individual performance (Hackman & Oldham, 1976).

Several authors have studied JCM related to satisfaction and superior performance (Igbaria & Guimaraes, 1993; Moore, 2000; Ahuja et al., 2007; Ang & Slaughter, 2001; Morris & Venkatesh, 2010; Tripp et al., 2016; Liere-Netheler, 2017, Brooks & Califf, 2017). Often, the focus of studies has been on implementing a technology from the perspective of frequency of use. A small number of studies have evaluated how job characteristics and performance can be altered as a result of large-scale technological implementations in organizations. Understanding and designing user interaction with technology affects work-related outcomes, such as individual performance (Liere-Netheler, 2017).

According to Kim et al. (2009) there are important empirical studies that analyze the positive relationship between job characteristics and behavioral outcomes – see, for example, Chang & Lee (2006), Lee-Ross (2005), Thomas et al., (2004). The study of workaround behavior impact on organizations becomes very important to prevent the adoption of shadow IT, avoiding possible problems in the organizations. In many situations, the organization is unaware that employees are adhering to workarounds. The Ponemon Institute, for example, argues that the average data breach in 2015 cost to businesses an average of \$4 million. Of those costs, 70% were due to unauthorized data access committed by the organization's own employees (Globalscape, 2016).

This research contributes to the study of workaround behavior and the shadow IT usage,

identifying how job characteristics are related to employee choice to adopt a solution not prescribed by the organization. In addition, through the results presented, this research contributes to the management of this phenomenon increasingly present in organizations, enabling the development of measures, such as policies and standards, to avoid or minimize deviant behavior.

Although workaround is well known in many fields (such as nursing, project management, military, and financial), some researchers have stated that workaround remains poorly studied and in the IS area (Alter, 2014). According to Yang et al. (2012) and Alter (2014) a small number of studies explored "how" and "why" workaround behavior can influence the use of a system. Instead, most research provides empirical evidence of developing and using alternative solutions without providing comprehensive theoretical explanations.

In this context, this research aimed to evaluate the effects of workaround behavior and the shadow IT usage as mediator variable in the relationship between job characteristics and individual performance.

This paper is organized as following: Section 2 presents the theoretical background and hypothesis. Section 3 describes the method used. The analysis of the results is presented in section 4. Next, the results are discussed in section 5. Finally, section 6 presents the final considerations

2 Theoretical Background and Hypothesis

2.1 Job Characteristics

Hackman and Oldham (1976) created a model of variables that constitute the "job characteristics" construct, which suggests that five main dimensions are able to affect certain work-related outcomes: autonomy, feedback, skill variety, task identity, and task significance. These five characteristics increase positive outcomes (e.g., job satisfaction) and decrease the negative ones (e.g., turnover). Hauff, Richter, and Tressin (2015) propose that individual job satisfaction and performance can be influenced by various situational job characteristics.

Several authors have studied JCM related to satisfaction and superior performance (Morris & Venkatesh, 2010; Tripp et al., 2016; Liere-Netheler 2017, Brooks & Califf, 2017). As explained above, job characteristics are related to

the employee's motivation and satisfaction and can affect their individual performance. According to Laumer et al. (2017), user satisfaction influences the manifestation of workaround behavior. In addition, Györy et al. (2012) defines shadow IT usage as the phenomenon in which the user adopts an IT solution that meets their need to attain a certain level of job satisfaction. Thus, it is inferred that there is a relationship between job characteristics and alternative solutions.

In this study, the job characteristics are made up of such factors as autonomy, task identity, and skill variety. According to Tripp, Riemenschneider, and Thatcher (2016), autonomy and task identity were significant in relation to job satisfaction, thereby confirming the hypotheses formulated by the authors. Coelho and Augusto (2010) affirm that task identity encourages the feeling that the work is meaningful and worthwhile and motivates the employee to work intelligently. Task identity requires concluding a "complete" job or executing a task from start to finish with a visible result (Piccolo & Colquitt, 2006). On the other hand, autonomy gives the employee the power to decide how to complete the required work and even plan the schedule for completion (Tripp et al., 2016). Accordingly, employees may manifest workaround behavior or use shadow IT depending on the degree of autonomy.

This study also looks into skill variety since users are responsible for multiple processes. The skill variety are characterized by Hackman & Oldham (1976). Tombu and Jolicœur (2003) argue that performance is impaired when multiple tasks are performed simultaneously since cognitive ability is lower for each individual task. The brain often cannot satisfy the demands of multiple, concurrent tasks (for example, responding to a warning in the middle of another primary task) (Jenkins et al., 2016). Skill variety may be related to workaround behavior by requiring the employee to acquire a set of skills to perform their job, to follow a process, or to use a system. If the employee is dissatisfied with or unaware of the system or any process, they may resort to alternative practices (e.g., shadow IT), manifesting workaround behavior. Therefore, we formulate the following hypotheses.

H1: Job characteristics are positively related to workaround behavior.

H1A: Job characteristics are positively related to shadow IT usage.

H3: Job characteristics are positively related to individual performance.

2.2 Individual Performance

IT users believe that workaround behavior and shadow IT usage overcome the anomalies and constraints in the enterprise's system that make it impossible to perform tasks completely and effectively. Thus, workaround behavior and shadow IT usage increase their productivity (Alter, 2014; Malaurent & Avison, 2015). Workaround behavior can be defined as the decision of use an alternative solution to perform a work task, and is useful for solving an immediate, urgent problem and can increase work performance (Azad & King, 2008). Alter (2014) states that workaround behavior can overcome the obstacles encountered in the enterprise's system.

Shadow IT usage is defined as the voluntary use of any IT resource that infringes IT norms at the workplace, reacting to perceived situational constraints, whose objective is to improve work performance (Haag & Eckhardt, 2014). Mallmann & Maçada (2016) argues that in the employee's perception, shadow IT improves individual performance when executing work tasks. Similarly, Silic and Back (2014) demonstrate that the study of shadow IT at the individual level can lead to a greater understanding of the mechanisms related to business innovation and employee productivity. In light of all this, we arrive at hypotheses H2 and H2A.

H2: Workaround behavior is positively related to individual performance.

H2A: Shadow IT usage is positively related to individual performance.

Both workaround behavior and shadow IT usage make it possible to minimize perceived constraints and improve individual performance. Employers use shadow IT for the purpose of improving work performance without intent on harming the organization (Haag & Eckhardt, 2014).

Job characteristics influence employee behavior and satisfaction. In addition, Laumer et al. (2017) shown the satisfaction appears as a motivator of workaround behavior. Thus, hypotheses H4 and H4A verify whether the workaround behavior and shadow IT usage act as

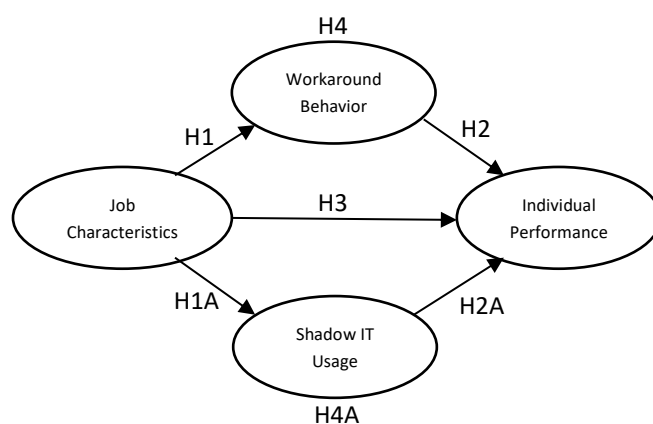
mediator variables in the relationship between job characteristics and individual performance. In this sense, the following hypotheses are proposed:

H4: The relationship between job characteristics and individual performance is mediated by workaround behavior.

H4A: The relationship between job characteristics and individual performance is mediated by the shadow IT usage.

Based on the formulated hypotheses, the research model is presented in Figure 1.

Figure 1. Research Model



Source: Developed by the authors

3 Method

The quantitative method was developed through a survey of IT users. According to Hair et al (2010), this is a methodological procedure used to collect data from individuals whether they are organized into groups or not. The following sections specify the methodological procedures employed.

3.1 Variables Operationalization

To prepare the instrument for data collection, we adapted previously validated measures for constructs from prior studies.

Subsequently, the face and content validity of the instrument were performed in three stages:

- 1) The items back-translation was performed by professionals versed in Portuguese and English;
- 2) The instrument was revised by IS graduate students;

3) 35 undergraduate and graduate management students read and analyzed their items.

Finally, a pre-test with 90 IT users was conducted, in order to validate the research model. Table 1 presents the items and the respective authors of the applied questionnaire. The final instrument has 4 factors and 22 items and the questionnaire variables were operationalized using a 7-point Likert Scale (ranging from “strongly disagree” to “strongly agree”).

Table 1. Constructs and Items

Construct	Items	Source
Job Characteristics	I have autonomy to plan my work.	Adapted from Morgeson and Humphrey (2006)
	I can decide when and how my work should be done.	
	I can decide which methods to use to complete my work.	
	I can identify my effort in the results of my tasks.	Hackman and Lawler (1971)
	I do not consider my work repetitive.	Adapted from Morris and Vankatesh (2010)
Workaround Behavior	I always use alternative solutions and avoid using my company's system,	Adapted from de Laumer et al. (2017)
	When I believe necessary, I usually employ alternative solutions instead of using my company's system.	
	Using alternatives instead of the system is an obvious choice for me.	
	I use Internet-based software or Software as a Service (SaaS), such as communication and content-sharing software, to communicate and share work information with co-workers, clients, or partners, among other	

Shadow IT Usage	cloud services that are unauthorized or unrecognized by the IT department. Examples of these systems are WhatsApp, Facebook, Skype, Dropbox, Google Apps, etc.	Mallmann & Maçada, 2016
	I use a solution developed by me or another employee on the company's computers that is unauthorized or unrecognized by the IT department to perform my work tasks. Examples: a software developed by employees, Excel spreadsheet, etc	
	I use software installed by me or another employee on the company's computers that is unauthorized or unrecognized by the IT department to perform my work tasks. Example: free download software.	
	I use my own devices at work without the IT department's permission. For instance, Smartphone, tablet, notebook, etc.	
Individual performance	My productivity increases when I use shadow IT at work.	Mallmann & Maçada, 2016
	My productivity increases when I use alternative solutions.	Pinto et al. (2018)
	I perform my tasks faster when I use Shadow IT.	Adapted from Mallmann (2016)
	I perform my tasks in less time when I use alternative solutions	Pinto et al. (2018)
	I can perform complex	

	tasks when I use Shadow IT.	
	I can perform complex tasks when I use alternative solutions.	

Source: Developed by the authors

3.2 Sample Procedures and Data Collection

The data were collected through an online survey by Google docs and the Type Form platform. The type Form platform was used in only one of the enterprises, this occurs because the enterprise systems doesn't allow access to the Google docs platform link.

The enterprises were chosen according to their representativeness within their respective sector in the national ambit, making eligible only those that had IT use policies. In addition, some of the selected companies in the financial, technological, public and health sectors have already participated in studies conducted by members of the research group that supported this work. Thus, the questionnaire link was sent by email to the company manager, who was responsible for distributing it internally to employees (IT users).

Eight hundred IT users were invited to participate in the final survey, of which 421 answered the questionnaire, thereby obtaining a return rate of 52.6%. Of the 421 who responded, 415 were considered valid. Incomplete questionnaires and those with 80% or more of the answers in the same item or in only two items were removed, as suggested by Hair et al. (2014). To estimate the minimum sample size, the G * Power 3.1 software was used. The calculation is performed based on the number of predictors of the dependent variable, the power of the test and the size of the effect (f^2) (Hair et al., 2016). The result suggests that the sample of 415 respondents is sufficient, given the characteristics of the model. Table 2 details the respondents' profiles.

Table 2. Respondents' Profiles

Place of application	Number of respondents	Outliers
Financial sector	130	05
Technology Sector	95	01

Healthcare Sector	129	-
Public sector	67	-
Total	421	06

Source: Developed by the authors

After data collection, it is considered that the common method bias (CMB) can be a threat and therefore should be evaluated. Common method bias is a problem because it is one of the main sources of measurement error. In order to evaluate whether or not CMB is a threat, the Harman factor test was performed, including all items in a principal component factor analysis (Podsakoff et al., 2003), by examining the solution of the unrotated factor to determine the number of factors that are required to explain the variance of the items. The evidence for CMB exists whether a single factor emerges or whether a general factor explains most of the covariance between items. In our study, 4 factors of analysis appeared, of which the largest represented 34,17% of the variance, indicating that CMB is not a problem.

3.3 Statistical treatment of data

First, Reliability Analysis and Exploratory Factor Analysis (EFA) were performed, which were done by using the SPSS statistical software. Subsequently, the Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) were performed using the SmartPLS 3.2.7 software. This software was used due to result of asymmetry and kurtosis.

According to Hair et al. (2009), skewness verifies whether the distribution of the data is symmetrical or asymmetrical, and kurtosis shows how much the data are centralized in a peak of the curve. In addition to skewness and kurtosis, the normality of the data was analyzed using the Shapiro-Wilk test. The analyses for kurtosis and skewness and the Shapiro-Wilk test follow a non-normal distribution; therefore, PLS-SEM is the most appropriate method.

4 Data Analysis

4.1 Exploratory Factor Analysis

The reliability analysis of the instrument and its factors was performed by calculating Cronbach's alpha coefficient, which aims to

measure its internal consistency. According to Hair et al. (2016), the Cronbach's Alpha value must be greater than 0.70. Table 3 presents Cronbach's Alpha values, with all model factors above 0.70, proving that the instrument is consistent.

Table 3. Reliability Analysis

Factor	Items	Alpha de Cronbach
Job Characteristics	5	0,753
Workaround Behavior	3	0,797
Shadow IT usage	4	0,773
Individual Performance	6	0,967

Source: Developed by the authors

According to Hair et al. (2009), exploratory factor analysis evaluates the unidimensionality within a set of items for each factor, verifying whether the items of a given factor converge to determined direction, which means that they are associated with each other. To perform the Exploratory Factor Analysis, we utilized SPSS statistical software. First, the Kaiser-Meyer-Olkin index (KMO) and the Bartlett's test of sphericity were calculated; both indicate the data's adequacy for factor analysis. For Hair et al (2009), values above 0.5 indicate that factor analysis is acceptable, the samples are adequate for applying factor analysis (KMO > 0.5), and to the Bartlett's test is demonstrating that the sample is significant.

Finally, the Exploratory Factor Analysis was conducted in blocks. The values obtained in the analysis were higher than 0.4, according to requirements by Koufteros (1999). Subsequently, the Confirmatory Factor Analysis and Structural Equation Modeling were performed with SmartPLS 3.2.7 software

4.2 Confirmatory Factor Analysis

To validate the measurement model, we tested the convergent and discriminant validity of the latent constructs of the total sample according to the guidelines of Hair et al. (2016). Thus, were calculated the outer loadings, the Composite Reliability (CR), the Average Variance Extracted (AVE) and discriminant validity (Fornell-Larcker). This study has satisfactory convergent and discriminant validity, as shown in Tables 4 and 5.

Table 4. Measurement Model

Factor	Items	Outer Loadings	CR	AVE
Job Characteristics	JC1	0,786	0,834	0,512
	JC2	0,837		
	JC3	0,829		
	JC5	0,507		
	JC9	0,544		
Workaround Behavior	WB1	0,863	0,880	0,710
	WB2	0,864		
	WB3	0,800		
Shadow IT Usage	SIT1	0,731	0,854	0,594
	SIT2	0,776		
	SIT3	0,757		
	SIT4	0,817		
Individual Performance	IP1	0,914	0,973	0,859
	IP2	0,908		
	IP3	0,939		
	IP4	0,924		
	IP5	0,940		
	IP6	0,936		

Source: Developed by the authors

Firstly, the items reliability was analyzed using the outer loadings values, which must be greater than 0.7, as stipulated by Hair et al. (2016). The results of the Composite Reliability (CR) and the Average Variance Extracted (AVE) were also analyzed. The items (CT4, CT6, CT7 and CT8) were excluded from the model, since they negatively impacted reliability, in addition to having factorial loads below 0.7.

The CR analysis aims to assures the internal consistency of the items and should present values higher than 0.70 (Hair et al., 2016). After excluding the mentioned items, the values obtained in the calculation of the CR confirmed the internal consistency of the model.

The analysis of convergent validity was performed using the AVE of the factors. The model reached the minimum stipulated value of 0.5 (Hair et al., 2016). In view of the satisfactory values obtained for the criteria of reliability and convergent validity, the model's discriminant validity analysis was performed. As recommended by Hair et al. (2016), the Fornell-Larcker criterion (Fornell & Larcker, 1981) was used to calculate discriminant validity. The Fornell-Larcker criterion states that the square root of each construct's AVE should be greater than its highest correlation with any other construct.

Table 5. Discriminant Validity

	JC	WB	IP	SIT
JC	0,715			
WB	0,168	0,843		

IP	0,102	0,642	0,927	
SIT	0,194	0,634	0,720	0,771

Source: Developed by the authors

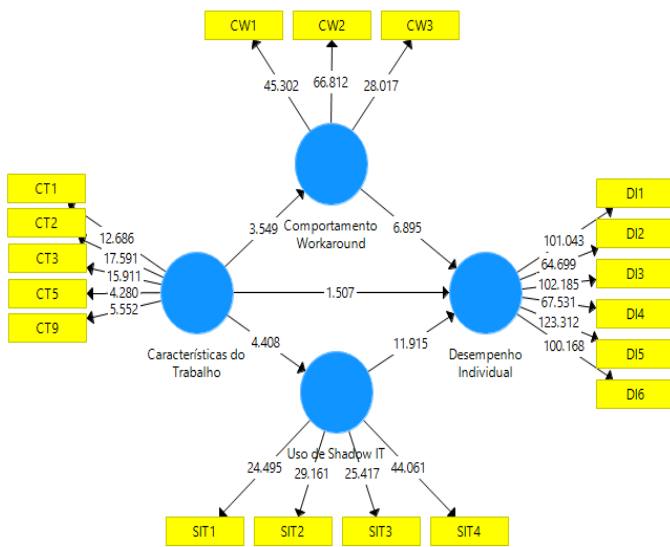
As shown in Table 5, the AVE square root (diagonal values) for the model is greater than the correlation between the factors. Thus, the discriminant validity of the model was met according to the criterion used.

4.3 Structural Model and Hypotheses Testing

After confirming the reliability and validity of the construct measures, we assessed the structural model. Based on steps suggested by Hair et al. (2016), collinearity was first examined by using Variance Inflation Factor (VIF) values. The results showed that VIF values for all variables ranged between 1.199 and 2.132. This indicates that the results were not negatively affected by collinearity as they were larger than 0.20 and smaller than 5 (Hair et al., 2016).

The following results are based on the application of the bootstrapping procedure provided by SmartPLS. We adhere to orientation from Hair et al. (2011) for a minimum of 5,000 bootstrap samples. Figure 2 shows the structural model.

Figure 2. Structural Model



Source: Developed by the authors

Then, the “t test” was used to calculate the significance of the model relationships. “t” values must be greater than 1.96 (p <0.05) to support the proposed hypotheses. T-values for two-tailed test:

** 1.96 (sig. level =5%); *** t-value 2.57 (sig. level =1%) (Hair et al., 2016). Table 6 shows the values obtained in the hypothesis test.

Table 6. Hypothesis Test

	Relationship	Path coefficient	“t”	(p)	Result
H1	JC->WB	0,168	3,549 ***	0,000	Supported
H1A	JC->SIT	0,194	4,408 ***	0,000	Supported
H2	WB ->IP	0,314	6,895 ***	0,000	Supported
H2A	SIT-> IP	0,532	11,915 ***	0,000	Supported
H3	JC ->IP	0,054	1,507	0,132	Not supported
H4	JC -> WB->IP	0,053	3,241 ***	0,001	Supported
H4A	JC -> SIT->IP	0,103	3,923 ***	0,000	Supported

Source: Developed by the authors

Hypotheses H1 and H1A were supported, thereby confirming that job characteristics are related to workaround behavior ($\beta = 0,168$, $p <0,01$) and shadow IT usage ($\beta = 0,194$, $p <0,01$).

Workaround behavior is positively related to individual performance ($\beta = 0.314$, $p <0.01$) providing empirical support for hypothesis H2. The H2A hypothesis also confirms that the shadow IT usage is positively related to individual performance ($\beta = 0.054$, $p <0.01$). Often the adoption of a technology helps the employee to perform a task that he was not able to perform with the system or technology available by the company. Consequently, the use of alternative solutions or shadow IT increase productivity and impact the individual performance. However, the relationship between job characteristics and individual performance was not significant in the model, rejecting hypothesis H3.

Hypotheses H4 and H4A verify whether workaround behavior and the use of shadow IT act as mediators in the relationship between job characteristics and individual performance. Both hypotheses were confirmed and their results are explored in section 4.4.

After performing the hypothesis test, the analysis of the Coefficient of Determination (R^2) and the Predictive Relevance (Q^2) was performed. The values attributed to the Coefficient of Determination (R^2) indicate the quality of the

adjusted model, since this coefficient represents how much the dependent variable is explained by the independent variables (Hair et al., 2016). The R^2 value of the endogenous constructs workarround behavior, shadow IT usage and individual performance are 2,8%, 3,8%, and 57.9%, respectively.

The R^2 value ranges from 0 to 100%, with higher values indicating greater prediction capacity. However, it is difficult to provide practical rules for acceptable values of R^2 , as it will depend on the complexity of the model and the research discipline (Hair et al., 2016). In social and behavioral sciences, Cohen (1988) suggests assessing the R^2 values for endogenous latent variables as follows: 26% as a substantial effect, 13% as moderate, and 2% as weak. Therefore, the R^2 values are satisfactory, despite the weak effect of the workarround behavior construct.

Thus, the constructs workarround behavior and shadow IT usage demonstrate a low effect, while the individual performance has a high effect according to the criteria of Cohen (1988).

The Predictive Relevance (Q^2) of the model evaluate its predictive relevance for each structural relationship, this value is obtained through the Blindfolding procedure available in the SmartPLS software. According to Hair et al. (2016), any value of (Q^2) greater than zero means that the model has predictive relevance. The values identified in this analysis were greater than 0 confirming the model's predictive relevance.

Finally, the study assessed the standardized root mean square residual (SRMR) as an appropriate measure of model fit. Assuming a cut-off value of 0.08 as the most adequate for PLS path models (Henseler, Hubona & Ray, 2016), the resulting SRMR value was 0.058. Hence, the model shows an acceptable fit.

4.4 Mediation Analysis

Hypothesis H4 states that the relationship between job characteristics and individual performance is mediated by the workarround behavior, and hypothesis H4A states that the relationship between job characteristics and individual performance is mediated by shadow IT usage. The mediation analysis was performed based on Hair et al. (2016), which suggest that the role of the mediator variable is to explain or clarify the relationship between the constructs.

As shown by the hypothesis test (Table 6), the direct impact of the independent variable on the dependent variable was evaluated. Then, the impact of the independent variable on the dependent variable through the mediator variable was evaluated. We run a full model using a bootstrapping procedure with 5000 bootstrap samples (e.g., Zhao, Lynch & Chen, 2010; Shujahat et al., 2017). Tables 7 shows the values of the direct, indirect and total effects of hypothesis H4.

Table 7. Direct, Indirect and Total Effects

Relationship	Direct effect	Indirect effect	Total effect
JC -> WB ->IP	-0,054	0,053	-0,01

Source: Developed by the authors

The direct effect of the job characteristics on the individual performance is considered negative and not significant ($\beta = -0,054$, $p > 0,01$; Table 7). Subsequently, we evaluated the indirect effect of the job characteristics on the individual performance through the workarround behavior mediator variable. The indirect effect is considered positive and significant ($\beta = 0,053$, $p < 0,01$, Table 7). Table 8 shows the values of direct, indirect and total effects of hypothesis H4A.

Table 8. Direct, Indirect and Total Effects

Relationship	Direct effect	Indirect effect	Total effect
JC -> SITU ->IP	-0,054	0,103	0,049

Source: Developed by the authors

In hypothesis H4A, the direct effect of the job characteristics on the individual performance is considered negative and not significant ($\beta = -0,054$, $p > 0,01$; Table 8). The indirect effect of the job characteristics on the individual performance through the shadow IT usage mediator variable effect is considered positive and significant ($\beta = 0,103$, $p < 0,01$, Table 8).

Therefore, total mediation occurred in both hypotheses, since the direct effect was not significant, which follow the Hayes' (2013) definition. Thus, the effect of job characteristics on individual performance is only explained by the mediating variables workarround behavior and shadow IT usage.

5 Results Discussion

This study analyzed a research model that aimed to verify the mediating role of workaround behavior and the shadow IT usage in the relationship between job characteristics and individual performance. The analysis was performed through the direct, indirect and total effects of the 7 hypotheses proposed in this study. This research showed the characteristics autonomy (as a form of independence at work), skills variety (where the execution of tasks requires knowledge of a range of skills) and task identity (when the employee can do a whole job, identify your effort in completing your tasks). Thus, hypotheses H1 and H1A analyzed the impact of job characteristics on workaround behavior and shadow IT usage, demonstrating a positive relationship between the hypotheses despite the different effects that the job characteristics present.

The "autonomy" characteristic is positively related to both workaround behavior and shadow IT usage. Employees who can decide how to do their work, as well as which methods to use, tend to make use of workaround and shadow IT. Regarding the "task identity" characteristic, it was possible to keep only one item in the model, demonstrating that, unlike the "autonomy" characteristic, the "task identity" is not strongly related to workaround behavior or shadow IT usage. The last characteristic studied was the "skills variety", which is also not strongly related to workaround behavior or shadow IT usage, keeping only 1 item in the analysis. These results indicate that the job characteristics have different influences, depending on the type of characteristic analyzed.

Hypotheses H2 and H2A, which relate workaround behavior and shadow IT usage to superior individual performance, were supported and therefore evidence a positive and significant relation. This provides empirical evidence that employees generally perceive that using solutions and technologies offers superior individual performance. According to Azad and King (2012), workaround is not necessarily an act of resistance by IT users but rather a necessity for completing tasks. Safadi and Faraj (2010) state that workaround behavior is a normal part of an IS implementation process and as such provides sources of future improvement. Petter et al. (2013) maintain that it is necessary to identify the essential attributes in the system, such as the quality of the

system and service and usability aspects, like ease of use, efficiency, navigation, and reliability, for employees to fully utilize the technology adopted by the organization. Employees adopt alternative solutions and technologies to be productive and perform their tasks effectively.

H3 was the only unsupported hypothesis, demonstrating that the relationship between job characteristics and individual performance is not significant, resulting in a total mediation. Thus, the H4 and H4A mediation hypotheses were supported by providing empirical evidence that the relationship between job characteristics and individual performance in this study is only explained through the mediating variables workaround behavior and shadow IT usage.

6 Final Considerations

This research aims to measure the mediating role of workaround behavior and shadow IT usage in the relationship between job characteristics and individual performance. The first step to achieve the objective of this research was to validate the proposed research model, attesting the model reliability. The exploratory analyzes were performed using the SPSS software, in the sequence the confirmatory analyzes were performed on the SmartPLS software.

Six from the seven proposed hypotheses were confirmed, leading to the following conclusions: The independent variable job characteristics directly impacts workaround behavior and shadow IT usage. Regarding the analysis involving individual performance, both workaround behavior and the shadow IT usage are positively related to individual performance, proving that employees who adopt alternative procedures to perform their tasks perceive a superior individual performance. However, the hypothesis that relates job characteristics to individual performance was not significant.

For the mediation analysis, the direct, indirect and total effects were evaluated, concluding that the effect of job characteristics on individual performance is explained by the workaround behavior and shadow IT usage.

6.1 Theoretical and managerial

This research brings academic and managerial implications through the results of the

mediation and complementary analyzes. As theoretical contributions this study presents information about workaround behavior, which has been little explored in Brazilian research. This study presents data that show that workaround behavior can provide superior performance, increasing productivity and enabling the execution of tasks in less time. According to Li and Mueller (2017) a small number of studies have explored how and why workaround behavior can improve performance, demonstrating a gap addressed in this research on the relationship between workaround behavior and individual performance. The relationship between the shadow IT usage and individual performance is also explored in this study, showing that employees adopt alternative technologies in order to be more productive and improve individual performance at work.

This research proves that job characteristics have a positive relationship with workaround behavior and with the shadow IT usage. In addition, the relationship between job characteristics and individual performance in this study is only explained through the mediating variables workaround behavior and shadow IT usage.

As for managerial contributions, this study establishes crucial arguments about workaround behavior and shadow IT usage, making it possible to identify the positive and negative consequences of these solutions. Aside from that, this study's results aid managers in overseeing this phenomenon that is increasingly present in organizations, allowing them to develop measures, such as policies and norms, to prevent or minimize this behavior. On one hand, alternative practices provide for better individual performance. On the other hand, these practices may compromise the security of sensitive data or affect workflow.

In 2013 the MISQuarterly Executive magazine published a case that occurred at Intel about information governance, in which the constant concern to protect the organization's data prevented any unnecessary access to information assets, resulting in an increase in employees using alternative solutions to complete certain tasks. The managers considered that this alternative use could increase organizational, reputation and financial risks. Intel's case proves that employees are always looking to increase their productivity at work and, if the organization does not provide the necessary

means, employees will resort to workaround and shadow IT.

Thus, we suggest that future studies assess how suitable IT governance practices can minimize the negative effects of workaround behavior and shadow IT usage. According to Lunardi et al. (2016), IT governance practices may minimize the risks associated with IT use. Based on Globalscape (2016), in some cases, employees do not know or understand the organization's security policies regarding unauthorized devices or software in the workplace.

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