International Journal
of Business & Marketing
(IJBMKT)

ISSN 2447-7451

Recebido em: 28/09/2023
Decisão editorial: 27/02/2024
Publicação: 30/09/2024
Editor-chefe: Flávio Santino Bizarrias
Avaliado pelo sistema *double-blind review*
https://doi.org/10.18568/ijbmkt.9.1.275

Behavior intention in coping cloud adaptation

Intenções comportamentais no uso de estratégias de coping voltadas para adoção de plataformas de nuvem

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ABSTRACT

This study investigates the indirect impact of perceived technology complexity on the adoption of cloud platforms by data scientists in Brazil. Specifically, it examines the mediating role of perceived work-related opportunities and behavioral intentions, as well as the use of exploration-to-innovate coping strategies. The research employs an online questionnaire survey and uses Confirmatory Factor Analysis, SEM, and OLS to analyze the data. The findings suggest that a serial mediation effect focused on behavioral aspects can better explain the adoption of cloud computing technology. The study identifies the need for further investigation into the potential moderating effects of voluntariness and self-efficacy on the relationship between perceived technology complexity and cloud platform adaptation. Moreover, incorporating other exogenous constructs such as new adaptation strategies, job outcomes, and job satisfaction may provide a more comprehensive understanding of the factors influencing technology adoption in the context of data science. The study highlights that reducing technology complexity can lead to increased adoption, better user experience, better retention rates, more innovation possibilities, and better competition position. However, additional training and support requirements for data scientists can increase the cost and time required for onboarding and maintenance. A cloud platform that is easy to use can enable remote work and collaboration, opening up opportunities for job growth and flexible work arrangements. This can be particularly beneficial for Brazilian professionals who have strong innovation skills but limited training and support. By transcending geographic barriers and infrastructure limitations, a user-friendly cloud platform can help bridge the digital divide. On the other hand, a complex cloud platform can widen the digital divide, particularly in developing countries, exacerbating existing inequalities. The research contributes to theory building by providing a serial mediation framework that better explains technology adaptation phenomena by combining coping theory and technology acceptance model.

Keywords: Cloud. Data Scientists. Technology Adaptation. Coping Theory.

RESUMO

Este estudo investiga o impacto indireto da complexidade percebida da tecnologia na adoção de plataformas de nuvem por cientistas de dados no Brasil. Especificamente, examina o papel mediador das oportunidades percebidas relacionadas ao trabalho e das intenções comportamentais, bem como o uso de estratégias de coping voltadas para a inovação. A pesquisa utiliza um questionário online e emprega Análise Fatorial Confirmatória, SEM e OLS para analisar os dados. Os resultados sugerem que um efeito de mediação em série focado em aspectos comportamentais pode explicar melhor a adoção da tecnologia de computação em nuvem. O estudo identifica a necessidade de investigação adicional sobre os possíveis efeitos moderadores da voluntariedade e da autoeficácia na relação entre a complexidade percebida da tecnologia e a adaptação à plataforma de nuvem. Além disso, a incorporação de outros construtos exógenos, como novas estratégias de adaptação, resultados no trabalho e satisfação no trabalho, podem fornecer uma compreensão mais abrangente dos fatores que influenciam a adoção de tecnologia no contexto da ciência de dados. O estudo destaca que a redução da complexidade da tecnologia pode levar a uma maior adoção, melhor experiência do usuário, melhores taxas de retenção, mais possibilidades de inovação e melhor posição competitiva. No entanto, requisitos adicionais de treinamento e suporte para cientistas de dados podem aumentar o custo e o tempo necessários para integração e manutenção. Uma plataforma de nuvem fácil de usar pode possibilitar o trabalho remoto e a colaboração, abrindo oportunidades para crescimento profissional e arranjos de trabalho flexíveis. Isso pode ser particularmente benéfico para profissionais brasileiros que possuem fortes habilidades de inovação, mas treinamento e suporte limitados. Ao transcender barreiras geográficas e limitações de infraestrutura, uma plataforma de nuvem amigável pode ajudar a reduzir a desigualdade digital. Por outro lado, uma plataforma de nuvem complexa pode ampliar a desigualdade digital, especialmente em países em desenvolvimento, exacerbando desigualdades existentes. A pesquisa contribui para a construção teórica ao fornecer um quadro de mediação em série que explica melhor os fenômenos de adaptação tecnológica, combinando a teoria de coping e o modelo de aceitação de tecnologia.

Palavras-chave: Nuvem. Cientistas de Dados. Adaptação Tecnológica. Teoria coping.

INTRODUCTION

The proliferation of new digital technologies and increased touch points throughout the consumer journey have resulted in an abundance of disposable customer data (Grewal, Roggeveen, & Nordfalt, 2017), making proper data-driven decision-making a significant challenge for organizations (Acito & Khatri, 2014).

In the context of abundant customer data, data science on cloud platforms refers to the provision of advanced computing services via the internet, enabling companies to effectively manage this data. As a result, data science has become one of the most critical factors in modern decision-making (Davenport & Patil, 2012).

Cloud-based data science services offer advanced computing provided as a service via the internet, assisting companies in managing this customer data. However, not all data science professionals prefer cloud platforms over on-premise computing (Louro, Brandão, & Sincorá, 2020), which raises concerns about how the degree of complexity of new technologies affects qualified workforce technological adoption.

Previous studies have shown that individuals' acceptance of more complex technologies is explained when job-related opportunities are perceived, resulting in a more proactive and innovative mindset known as an exploration-to-innovate coping strategy. Nonetheless, attitudes towards specific behaviors also explain the relationship between complexity and the tendency to adopt technologies.

In this context, the paper compares Bala & Venkatesh (2013) and Bala & Venkatesh (2015) constructs based on the coping theory with the new one, aiming to understand the conditions that better explain the indirect impact of technology complexity on technology adaptation. It's important to note that behavioral intention is traditional construct studied within the technology acceptance model (TAM) lens (Venkatesh, Morris, Davis, & Davis, 2003; Venkatesh, Thong, & Xu, 2016), but it is not present on coping theory.

Due to the increasing demand for big data infrastructure, data science professionals often need to adapt their knowledge to cloud platforms. In this study, we examined the technological adaptation process using Bala and Venkatesh's (2015) work as a foundation. However, while Bala & Venkatesh (2015) proposed a simple mediation model involving technology complexity, perceived opportunity, and technology adaptation, we introduced behavior intention as an additional construct from TAM.

We delved deeper into the TAM tradition and observed that attitude, affect, desire, and intention are sometimes intertwined as antecedents to behavior intentions due to their multicollinearity (Bagozzi, 2007). However, other literature suggests that cognition and emotional aspects should be differentiated. Therefore, attitudes toward technology adaptation, coping theory, and behavior intention from the TAM tradition should be considered distinct phenomena and measured as separate constructs.

The research was conducted using Structural Equation Modeling (SEM) in Mplus for better model comparisons and the SPSS PROCESS macro for a more in-depth analysis of the serial mediation. The survey respondents were Brazilian IT professionals who are new to using Data Science techniques and have little or no experience with cloud computing. The paper covers the hypotheses, confirmatory factor analyses, competing models, methodological underpinnings, and survey findings. The study's main conclusions, along with advances in theory building, practical contributions, and research limitations, are presented.

The research question raised by previous discussions was, "How does perceived technology complexity affect technology adaptation?" The study adapted Bala and Venkatesh (2013) and Bala & Venkatesh (2015) constructs and confirmed the additional role of behavior intention in the original model. The theoretical contribution is the inclusion of an additional construct for a serial mediation model of the coping theory. From an empirical point of view, this adds more explanatory power to the accepted assumption of the link between perceived opportunity and technology adaptation.

We assert that both mechanisms, i.e., career-related opportunities (Bala &Venkatesh, 2015) and positive attitudes towards knowledge-seeking behavior, (Louro, Brandão, & Sincorá, 2020) have a joint impact on the relationship between complexity and technology adoption. This joint impact enhances IT professionals' desire to engage with innovative computing software. Hence, this research contributes to theory building by demonstrating that a serial mediation model that combines coping theory and the technology acceptance model better explains technology adaptation phenomena.

The paper is organized as follows: First, a brief literature review is presented, followed by the development of hypotheses and confirmatory factor analyses. Then, competing models are introduced, and methodological underpinnings are discussed. Survey findings are presented next, and finally, the paper concludes with the main conclusions from the study, theoretical advancements, practical implications, and research limitations.

LITERATURE REVIEW

Literature Review

Coping is defined as cognitive or behavioral efforts used by individuals to deal with stressful or problematic situations that occur in the environment (Lazarus & Folkman, 1984). When it is adapted to the technological environment, the coping theory proposes that the professional has a cognitive appraisal related to the opportunities related to technological changes (Beaudry & Pinsonneault, 2005).

Coping theory suggests that individuals adopt various coping strategies to manage stressors or challenges they face in their environment (Lazarus & Folkman, 1984). In the case of cloud computing, complexity can be seen as a stressor that data scientists need to cope with to effectively adopt this technology. Simplifying the cloud computing environment can reduce the perceived complexity, thus making it easier for data scientists to adopt it.

Coping theory suggests that individuals experience stress when they face situations that exceed their ability to cope effectively(Beaudry & Pinsonneault, 2005). In the context of big data investments, these situations can arise due to the complexity of the technology involved, the need for specialized skills, and the rapid pace of change in the field.

The implementation of big data technology can be a significant stressor for organizations and individuals. For instance, data scientists may struggle with adapting to new software or tools, integrating data from disparate sources, and managing large volumes of data. In turn, this can lead to feelings of frustration, overwhelm, and burnout. Specially on organizations, or even countries, with less investments on support and training

A literature review has shown that reducing complexity can lead to increased adoption rates of cloud computing, this relationship is especially important for developing countries (M'rhaouarh et al., 2018). Data scientists are more likely to adopt a technology that they perceive to be easier to use and manage, as this reduces the stress and uncertainty associated with learning and implementing new technologies. This can result in better user experience and retention rates, as users are more likely to continue using a technology that they find easy and useful.

When data scientists have a positive attitude towards using cloud platforms, they are more likely to invest time and effort in learning how to use the platform effectively, even if it initially seems complex (Louro, Brandão, & Sincorá, 2020) . Providing data scientists with comprehensive training on how to use a cloud platform and offering ongoing support can help to minimize the perception of complexity and increase their positive behavior intention towards using the technology

By simplifying the technological environment, for example for big data solutions, data scientists can devote more time to exploring new features and capabilities. This not only reduces complexity but also enhances innovation possibilities. As a result, creativity is promoted, and new solutions can be developed that benefit both the organization and its customers. Brazilian data scientists possess a natural inclination towards creativity and aim to minimize stress and uncertainty in the learning process (Louro, Brandão, & Sincorá, 2020). These qualities can increase Brazil's competitiveness in the rapidly evolving landscape of data-driven organizations.

The original theoretical model is presented in Figure 1. It shows a simple mediation, meaning that Technology Complexity (Bala & Venkatesh, 2013), understood as the

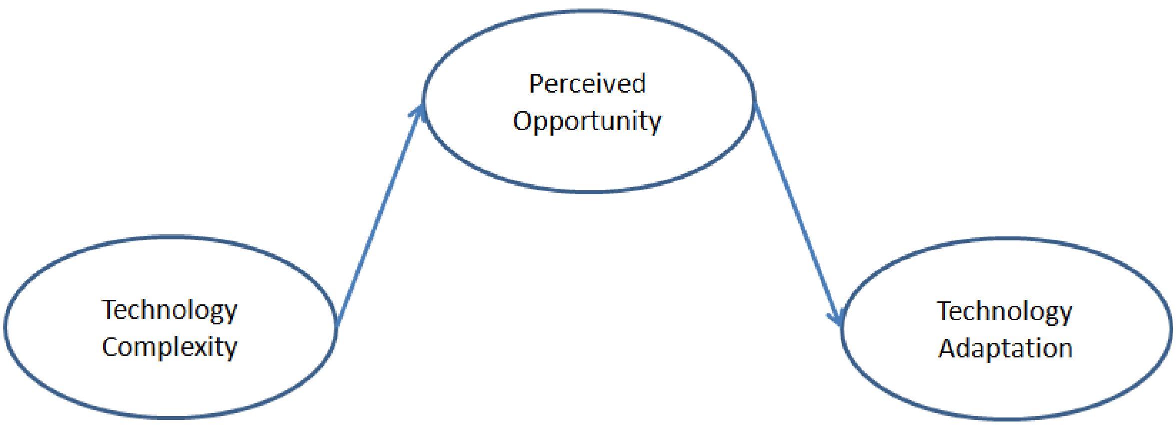

Figure 1. Original Theoretical Model (Model 1)

Source: Adapted from Bala & Venkatesh (2013) and Bala & Venkatesh (2015).

stressful factor, has an indirect impact on technology adaptation thru Perceived Opportunity, the coping cognitive appraisal.

Originally, there are four different adaptation strategies, which are: exploration-to-innovate, exploitation, exploration-to-revert, and avoidance (Bala & Venkatesh, 2015). The present work choice for technological adaptation is exploration-to-innovate, which is characterized as an individual's strategies for finding or altering resources to accomplish their tasks in new ways (Bala & Venkatesh, 2015). The coping literature emphasized that adaptation is contextual because individuals need multiple efforts to deal with different and specific situations (Folkman, Lazarus, Gruen, & DeLongis, 1986). Here, the stressful specific situation is the technology complexity.

In conclusion, we propose that organizations simplify their cloud computing environment to achieve a positive impact on adoption, user experience, retention rates, and innovation possibilities. Companies can leverage these benefits by providing their data scientists with the necessary resources and support to overcome the challenges associated with adopting new technology. This is particularly relevant for creative data scientists who thrive in simplified environments.

Hypotheses Development

Data scientists face frequent technological transformations that require them to continuously adapt their knowledge and skills (Louro, Brandão, & Sincorá, 2020). As a result, they perceive opportunities but also intend to overcome stressful situations with determination, thus behavior intention is also an important construct for data scientists.

Based on the coping theory, individuals in organizational contexts use primary appraisal to evaluate the consequences of an IT event. If they perceive adopting a complex system will bring benefits to their work, they can perceive it as an opportunity and evaluate the situation positively (Beaudry & Pinsonneault, 2005). Once an opportunity is perceived, such as professional growth or formal recognition, the individual tends to maximize it by using the IT solution (Bala & Venkatesh, 2015). This, in turn, shapes their behavioral intention and leads to exploration-to-innovate behaviors, which involve discovering, learning, and applying IT resources (Bala & Venkatesh, 2015). Therefore, the serial mediation hypothesis can be stated as follows:

The principal hypothesis (Hp) is tested after the models comparison. But to check the primary hypothesis, it is necessary to test three previous statistical hypotheses:

"H1- Technology Complexity impacts positively on Perceived Opportunity",

"H2- Perceived Opportunity impacts positively on Behavior Intention" and

"H3- Behavior Intention impacts positively on Technology Adaptation (Exploration-to-innovate)".

And finally:

"(Hp) - Technology Complexity impacts positively on Technology Adaptation thru a serial mediation of Perceived Opportunity and Behavior Intention."

Serial mediation is an important technique in structural equation modeling because it provides a powerful tool for understanding the complex relationships among multiple variables. By identifying the underlying mechanisms that link variables, we can gain a deeper understanding of the phenomena related with data scientists to develop future effective interventions to improve data science, or big data, outcomes.

METHODOLOGY

Research Model

Based on the findings of Louro, Brandão, & Sincorá (2020), we made one improvement to Model 1 to account for the importance of intention in the work of data scientists. Specifically, we incorporated the serial mediation of Behavior Intention, as illustrated in Figure 2, to enhance the original model.

Data Collection Procedure and Measurement Instrument

A survey was executed to test the hypotheses with Brazilian data scientists present on Linkedin and a data science slack group. It was sent a google docs form. Upon opening the questionnaire link, a filter question asking about the respondent's profession was performed to ensure that only data professionals (e.g., data scientists, big data architect, and machine learning professionals) were included in the sample. Further, individuals answered about their demographic and professional profile (i.e., gender, age, education level, time working as data professional, experience with cloud computing, and organization size), followed by exposure to a cloud platform (i.e., BLUEMIX/WATSON). This choice is justified because it is a service offered by a world-famous company that has only a small market share part of the cloud platform industry, potentially diminishing related previous respondent platform experience.

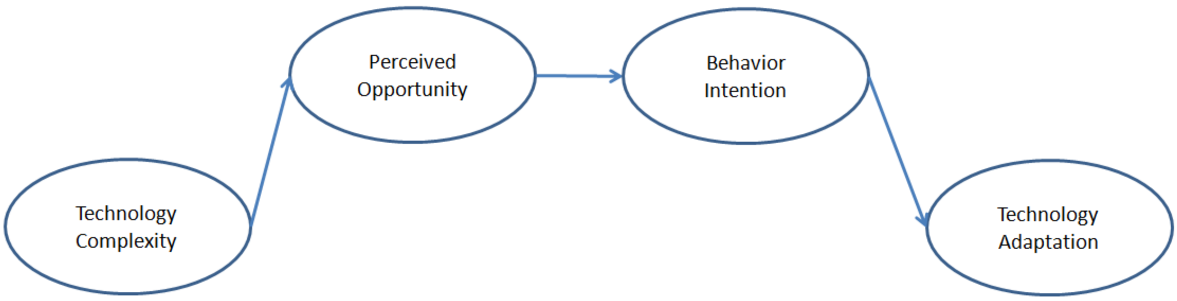

Figure 2. Proposed Theoretical Model (Model 2).

Source: Prepared by the authors.

To test our hypotheses, we conducted a survey targeting Brazilian data scientists who were members of a data science Slack group and LinkedIn. Participants were then asked to provide information about their demographic and professional profile, such as gender, age, education level, time spent working as a data professional, experience with cloud computing, and organization size.

Subsequently, respondents were asked about their exposure to a cloud platform, specifically BLUEMIX/WATSON. We selected this platform because it is offered by a renowned company that holds only a small market share within the cloud platform industry. This choice helped to reduce the potential influence of previous respondent platform experience on our results.

The initial construct was derived from Bala & Venkatesh's (2013) research, while the subsequent two primary constructs were derived from their 2015 study. These constructs include technology complexity, perceived opportunity, and exploration to innovate, which are all measured using a four-item scale. The behavior intention construct, which is also based on social psychology, was adapted from the technology acceptance and use tradition and utilizes a four-item scale originally developed by Venkatesh, Morris, Davis, & Davis (2003).

All modified items can be seen in Table 1.

Based on the rule of thumb of 10 times the number of arrows or items (Hair, Hult, Ringle, & Sarstedt, 2017), the sample size of 102 respondents was deemed sufficient for scale validation, item purification, and model validation (MacKenzie, Podsakoff, & Podsakoff, 2011). The survey was conducted without any additional treatments. Of the total sample, 93 respondents (91.20%) were male, with ages ranging from 20 to 54 years (M= 35.95; σ= 13.12). On average, respondents had 6.23 years (σ= 6.74) of professional experience with data.

Statistical technique

We collected information about the respondents' years of experience in data science, years of experience in IT, and their expertise in various IT domains to conduct multi-group analyses using the non-parametric equivalence analysis technique, Partial Least Square - Multi-Group Analysis (PLS-MGA) (Henseler, 2009). The analysis revealed no significant differences. Additionally, we conducted another PLS-MGA and Permutation algorithm to evaluate differences between early and late respondents, but again found no significant differences when dividing the sample using the mean.

Our survey design style ensured that there was no missing data. After scale purification and refinement (MacKenzie, Podsakoff, & Podsakoff, 2011), all questions were deemed suitable for use except for two. We confirmed the possibility of pooling the data using the MICOM process (Henseler, Ringle, & Sarstedt, 2016) after ensuring configural invariance and compositional invariance. Finally, we executed the permutation algorithm with 5000 subsamples, which indicated no significance and measured invariance.

Covariates such as age, data experience, and cloud experience profiles were included but showed no significance on the endogenous construct. The inclusion or exclusion of these covariates did not affect the effects and R2. To assess common method bias, Harman's single-factor test (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) was used as a precautionary measure.

The PLS algorithm was executed with default values following the guidelines of Hair et al. (2017). All constructs used had at least three variables and were reflective based on content definition or a priori specification. The CTA-PLS tests using Gudergan, Ringle, Wende, and Will (2008) procedures about tetrads vanishing were also conducted for all latent variables of both measurement models.

Table 1

Questionnaire items

Construct	Indicator	Item	Reference
Perceived Technology Complexity	PTC1	I find it time-consuming to get from Bluemix/Watson services what I want to do.	Bala & Venkatesh (2013)
(PTC)			
PTC2	Working with the Bluemix/Watson services is complicated because it's hard to understand what's going on.		
PTC3	Interacting with the Bluemix/Watson services requires a lot of my mental effort.		
PTC4	In general, the Bluemix/Watson services are more complex than the ones I used to work with		
PTC5	I can change some settings of the Bluemix/Watson services to meet my requirements.		
PTC6	IBM can make specific changes to the Bluemix/Watson services to meet my requirements.		
Behavior Intention	BI1	I intend to use the Bluemix/Watson services in the next 12 months	Venkatesh et al. (2003)
(BI)			
BI2	I predict i would use the Bluemix/Watson services in the next 12 months		
BI3	I plan to use the Bluemix/Watson services in the next 12 months		
Perceived Opportunity	PO1	I am confident that the Bluemix/Watson services will have positive consequences for me.	Bala & Venkatesh (2015)
(PO)			
PO2	I feel that the Bluemix/Watson services will open new avenues for success in my job.		
PO3	The Bluemix/Watson services will provide opportunities to improve my job performance.		
PO4	The Bluemix/Watson services will provide opportunities to gain recognition and praise		
Technology Adaptation	TA1	Explore the Bluemix/ Watson services for potential new application to my work context.	
(TA)			
TA2	Explore the Bluemix/Watson services to find new ways of accomplishing my tasks.		
TA3	Discover new ways of using the Bluemix/Watson services to accomplish my tasks.		
TA4	Experiment with the Bluemix/Watson services to find features to accomplish tasks in novel ways.		

Source: the authors.

Univariate skewness and kurtosis showed some values outside the interval from -1 to 1, indicating non-normality for the sample. This was confirmed after executing the Shapiro-Wilks and Kolmogorov-Smirnov tests, which rejected the hypothesis of normality for all variables (Hair, Black, Babin, Anderson, & Tatham, 2009). Therefore, Confirmatory Factor Analysis was conducted using SmartPLS software (version 3.2.4).

DATA ANALYSES AND RESULTS

Both models underwent scale purification and refinement, which resulted in the exclusion of two questions due to cross-loading tests. The measurement model was then assessed for validity and reliability. Cronbach's alpha and composite reliability were both found to be greater than 0.7, and AVE was greater than 0.5, indicating acceptable reliability and convergent validity. Additionally, external loads met the criteria for convergent validity, with values greater than 0.7.

According to the results of the structural equation modeling, it can be inferred that Model 2, as proposed, is robust. This is demonstrated by the satisfactory values of indicator and construct reliability presented in Table 2, as well as by the Fornell-Lacker criterion indicating discriminant validity (as shown in Table 3). Convergent validity was also confirmed, as only two indicators (PTC1 and PTC4) had outer loadings below the acceptable threshold of 0.7 and were thus removed. Similar results were observed for Model 1.

To assess collinearity in the structural model, we used the VIF indicator, with a threshold of less than 5, with model 1 having the highest value (Hair et al., 2017). Following this, we evaluated the coefficients using the Bootstrapping procedure, with 5000 subsamples and the option "no sign changes". The statistical test results indicated that the coefficients were not significant (p-value < 0.05) for the direct-effects relationship, highlighting the importance of indirect-effects in both models. The SmartPLS bootstrap results are presented in Figures 3 and 4.

Covariates were tested on SmartPLS using endogenous construct and presented no significance. The models were also tested with a confounder, a special kind of

Table 2

Reliability tests Model 2

	Cronbach alpha	Composite Reliability	AVE
PTC	0.746	0.756	0.563
PO	0.908	0.910	0.785
BI	0.915	0.946	0.854
TA	0.922	0.923	0.811

Source: the authors.

Table 3

Fornell-lacker criterion Model 2

	TA	BI	PO	PTC
TA	0.901			
BI	0.897	0.924		
PO	0.822	0.833	0.886	
PTC	0.590	0.553	0.652	0.751

Source: the authors.

covariate: Brand Image, that needs to be tested with all constructs and will be better explained later.

The present paper's suggestion is to increase Behavior Intention, a serial mediation construct, as presented in Figure 4, bootstrap results.

Both models could be accepted, but we need to compare them from empirical and theoretical points of view.

Models Comparison

Regrettably, SmartPLS does not provide any tools for comparing models. As a result, we conducted an additional phase of model comparison using MPlus.

To compare the original and proposed models, we used the full-information maximum likelihood approach to run a Structural Equation Model (SEM) in MPlus 8. Table 4 shows all of the best-fit indices for the proposed model based on the present sample. In the last column, parameter information is displayed according to Byrne's (2012) guidelines.

According to Byrne's (2012) recommendations, AIC and comparative indices are the most suitable indicators for SEM, as traditional chi-square based statistics have certain limitations in this context. Therefore, we considered the proposed model to have the best fit based on information criteria (absolute indices), CFI/TLI (incremental/comparative indices), and RMSEA.

For a more detailed mediation analysis (see Table 5), we utilized the SPSS PROCESS macro, which confirmed the Hp serial mediation. The tool provided comprehensive information using Ordinary Least Squares (OLS) regression analysis with summed items. We followed the procedures and parameters outlined by Hayes (2013), and the results of the bootstrap with 10,000 resamples are summarized in Table 5. The table includes R2, F statistics (with degree of freedom 1 and 2), and p-values. It also presents the unstandardized regression coefficients of the direct and indirect paths, along with the significance level for bias-corrected 95% confidence intervals and standard error (SE).

Table 5 also provides a crucial discussion on confounders. By including confounders in our statistical model, we could eliminate shared variance that might influence the association we are attempting to identify. This, in turn, may lead to false negative findings or inaccurate interpretations of our results downstream. However, the confounder we tested, Brand Image, was only significant as a perceived opportunity antecedent, and it had no significance for other constructs. As a confounder, it should not only be tested with exogenous constructs, as other covariates were tested. This is a minor distinction when dealing with a variable that

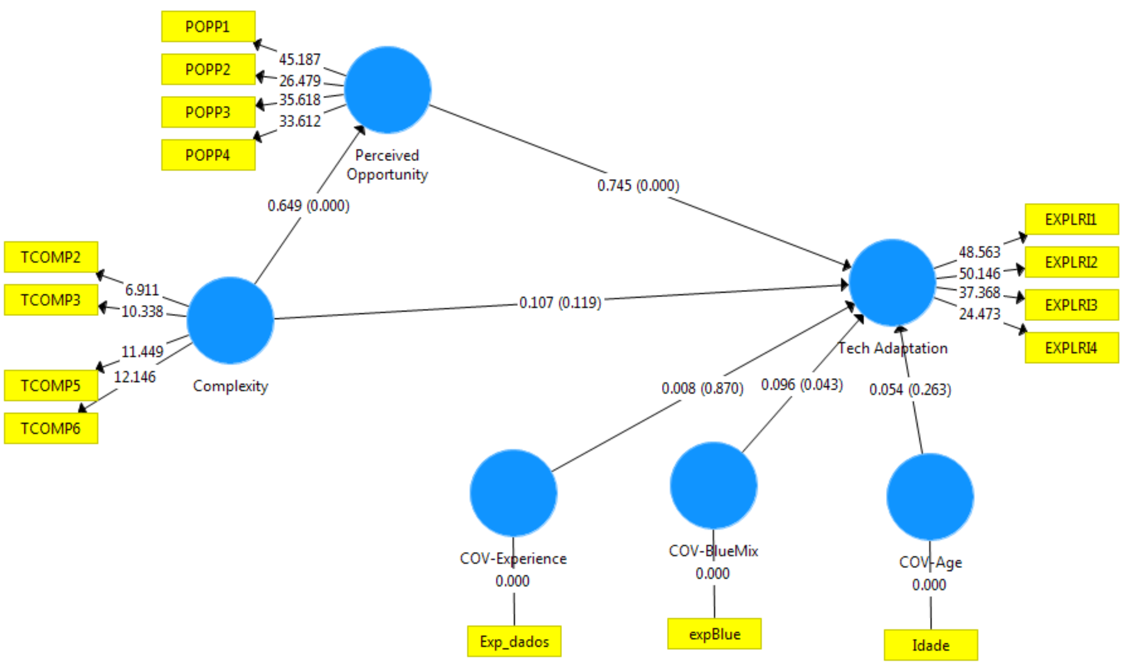

Figure 3. Original Theoretical Model Test (Model 1).

Source: Prepared by the authors using SmartPLS.

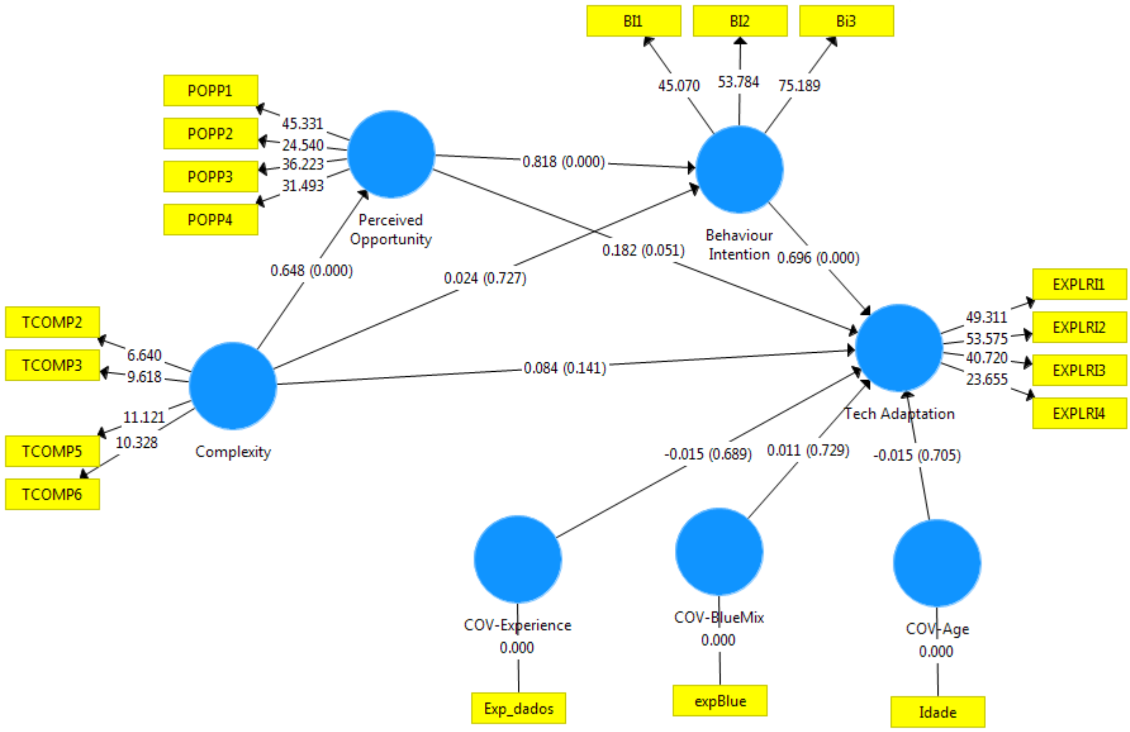

Figure 4. Proposed Theoretical Model Test (Model 2).

Source: Prepared by the authors using SmartPLS.

Table 4

Models comparison - Goodness-of-Fit statistics

		Proposed Model	Original Model	Parameter
Information Criteria	Akaike (AIC)	4015.45	4913.47	Smallest
	Bayesian (BIC)	4117.82	5044.72	Smallest
	Sample-Size Adjusted BIC	3994.64	4886.79	Smallest
Chi-Square	Value	47.74	130.91	Biggest
	Degrees of Freedom	51	85	
	p-Value	0.600	0.001	Significant
RMSEA (Root Mean Square Error Of Approximation)	Estimate	0.00	0.07	Smallest
	90 Percent C.I.	0.00 : 0.05	0.04 : 0.09	
	Probability RMSEA <= .05	0.91	0.07	
CFI/TLI	Comparative Fit Index(CFI)	1.00	0.96	Biggest
	Tucker-Lewis Fit Index(TLI)	1.00	0.95	Biggest
SRMR (Standardized Root Mean Square Residual)	Value	0.06	0.05	smallest

Source: Prepared by the authors.

Table 5

PROCESS OLS mediation results

Antecedent	M1 (Perceived Opportunity)			M2 (Behavior Intention)			Y (Technology Adaptation)		
	Coeff.	SE	*p*	Coeff.	SE	*p*	Coeff.	SE	*p*
X (Technology Complexity)	a1 .679	.133	<.001	a2 .091	.123	NS	c' .065	.088	NS
M1 (Perceived Opportunity)	—	—	—	d21 .904	.083	<.001	b1 .229	.088	<.05
M2 (Behavior Intention)	—	—	—	—	—	—	b2 .626	.072	<.001
Confounder (Brand)	.313	.102	.002	.087	.088	NS	063	.088	NS
Constant	i1 .284	.755	NS	i2 -1.637	.621	<.01	I3 .131	.460	NS
	R2 = 0.405 p<.001 F(3,98) = 22.241			R2 = 0. 703 p<.001 F(4,97) = 57.506			R2 = 0. 826 p<.001 F(5,96) = 91.113		

Source: Prepared by the authors (2022).

could be theoretically related to both endogenous and exogenous constructs.

The first three hypotheses were confirmed (see respectively a1, d21, b2), and they gave responses to the existing literature and introduced Behavior Intention as a possible statistical antecedent Technology Adaptation.

About the primary test, mediation, the serial indirect effect (Technology Complexity -> Perceived Opportunity -> Behavior Intention -> Technology Adaptation) resulted in a coefficient value of .385 using bootstrap confidence interval (Hayes, 2013). Different path (Technology Complexity -> Perceived Opportunity -> Technology Adaptation) has a smaller but also significant coefficient value of .156, and the latter indirect path (Technology Complexity -> Behavior Intention -> Technology Adaptation) and the direct effect (Technology Complexity -> Technology Adaptation) -has no significance.

In summary, the Model 2 serial indirect effect is the best explanation mechanism for how Technology Complexity impacts Technology Adaptation for Brazilian data scientists. The serial indirect effect confidence intervals robustness is the central thesis of the present paper. Thus, another test procedure was executed using a simulation-based method, Monte Carlo using the MCMED macro (Hayes, 2013). MCMED showed the same value with confidence intervals ranging from .3572 and .8588 (Preacher & Selig, 2012), i.e., not passing thru zero. Thus serial mediation was confirmed with no direct significant effect using OLS.

CONCLUSIONS, IMPLICATIONS, LIMITATIONS AND FUTURE RECOMMENDATIONS

The present paper helps to explain the advent of cloud platforms technology adaptation for data scientists, a new and emerging trend for data-driven professionals and organizations. The paper better explains the impact of complexity perception on technology adaptation, and it is possible to analyze the serial mediation of perceived opportunity and behavior intention, presenting a more complex phenomenon than coping theory assumes.

According to Louro, Brandão and Sincorá (2020), big data infrastructure investments go beyond individual self-efficacy issues, thus big data approach is also dependent on organizations and countries infrastructure investments. The big data approach is revolutionizing the way data is processed and utilized across industries, and Brazilian data scientists can be at the forefront of this trend.

To address the challenge of investing in big data infrastructure, Brazilian data scientists are increasingly adopting cloud platforms designed to simplify and streamline big data analysis. These platforms reduce technology complexity and enable data scientists to focus on creative problem-solving, leading to more effective and innovative solutions.

In addition to facilitating analysis, an easy-to-use cloud platform enables remote work and collaboration, creating opportunities for job growth and flexible work arrangements. This is particularly beneficial for Brazilian professionals with strong innovation skills but limited training and support. By transcending geographic barriers and infrastructure limitations, a user-friendly cloud platform can help bridge the digital divide. On the other hand, a complex cloud platform can exacerbate existing inequalities, particularly in developing countries, widening the digital divide.

The complexity perception can influence perceived opportunity, behavior intention, and finally, adaptation. It is interesting findings both from academic and practical points of view. The academic relevance is that behavior intention can be inserted into coping theory as a predictive element in high technology scenarios. Thus, the results of the research contributed to clarifying the complex mechanism in which the construct operates.

This research effort has provided valuable insights for managers in understanding how cloud platform complexity influences adaptation. While the study did not measure self-efficacy, it is possible that data scientists have higher levels of self-efficacy compared to other professionals, which may explain the positive impact of platform complexity on adaptation. In future studies, self-efficacy can be explored as a potential moderator in the relationships between perceived opportunity, behavior intention, and technology adaptation.

Additionally, cloud platform owners can use the findings to better understand how their platforms compare to competitors in terms of complexity and how it may affect data scientists' adoption. Louro, Brandão, and Sincorá (2020) identified various characteristics of data scientists that could be further explored to predict investments in platform improvement. Furthermore, future studies should give more attention to the confounding variable of brand image, which was found to be significant only as a perceived opportunity antecedent.

The empirical evidence on cloud platform complexity is still limited and inconclusive. This study aimed to contribute to the literature by developing a serial mediation model that includes constructs not commonly moderated in the Technology Acceptance Model (TAM) literature. However, future studies may yield different results if additional moderators are included.

The cornerstone models of this study, Bala & Venkatesh (2013) and Bala & Venkatesh (2015), produced weaker statistical results compared to the new study. This may be attributed to the context of the present study and further replications are needed.

Furthermore, there is a future opportunity to investigate the moderating effect of voluntariness on technological adaptation theory, as this construct may alter the way individuals cope with technology. A more in-depth investigation is required to fully understand the role of voluntariness in the TAM framework.

One limitation of this study is that it only tested one adaptation strategy, "exploration to innovate," using the construct proposed by Bala & Venkatesh (2015), while there are three other strategies that could be explored in future experiments. However, this delimitation presents an opportunity for further research to confirm the causal relationship between the other constructs and adaptation strategies. Additionally, Bala & Venkatesh (2015) proposed that adaptation strategies impact job results and satisfaction, which were not tested in this study.

Despite these limitations, this study provides valuable insights into the human factors that influence data scientists' activities. The introduction of quantitative psychological measures in the data science context, as recommended by Louro, Brandão, and Sincorá (2020), is an important contribution of this research.

Ultimately, the combination of big data approaches and the creative characteristics of Brazilian data scientists has the potential to drive advancements across industries. By utilizing user-friendly cloud platforms, Brazilian data scientists can continue to innovate and overcome technological complexity, contributing to the country's growth and development.

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