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# Factors affecting auditors' decisions to adopt Big Data analytics: a mixed method study

## *Factores que influyen en la adopción del análisis de Big Data por los auditores: un estudio mixto*

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**Abstract:** the purpose of this study is to investigate the primary research question: To what extent do perceived ease of use (PEOU) and perceived usefulness (PU) explain auditors' behavioral intentions (BI) to adopt big data analytics (BDA) in auditing firms in Palestine? A mixed-method approach was employed, combining quantitative data from a census survey of 94 auditors at the Big Four accounting firms in Palestine (achieving an 86 % response rate) with qualitative data from semi-structured interviews conducted with 9 auditors at the managerial level or higher. This methodological integration enhanced the validity and reliability of the research findings. The results demonstrated that PU significantly and directly impacts auditors' intentions to adopt BDA, while PEOU also influences BI, though to a lesser extent. The study validated the applicability of the Technology Acceptance Model (TAM) in the auditing profession and addresses the research gap on BDA adoption in developing economies. Findings highlight perceived usefulness as the key driver and suggest that improving ease of use could further boost adoption. Practical implications include training for firms, supportive policies from regulators, and user-friendly solutions from technology providers. By offering insights for resource-constrained environments, this study guides BDA adoption in auditing for both academia and industry

**Keywords:** audit transformation, behavioral intentions, big data analytics, perceived ease of use, perceived usefulness, technology acceptance model, Palestine, Big Four.

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**Resumen:** el objetivo de este estudio es analizar: ¿En qué medida la percepción de facilidad de uso (PEOU) y la percepción de utilidad (PU) explican las intenciones conductuales (BI) de los auditores para adoptar el análisis de grandes datos (BDA) en firmas de auditoría en Palestina?. Se utilizó un enfoque mixto, combinando datos cuantitativos de una encuesta censal a 94 auditores de las cuatro grandes firmas en Palestina (tasa de respuesta del 86 %) con datos cualitativos de entrevistas semiestructuradas a nueve auditores en niveles gerenciales o superiores. Esta integración metodológica fortaleció la validez y confiabilidad de los resultados. Los hallazgos mostraron que la PU influye significativamente en las intenciones de adopción de BDA, mientras que la PEOU tiene un impacto menor pero relevante. El estudio confirmó la aplicabilidad del Modelo de Aceptación Tecnológica (TAM) en la profesión de auditoría y aborda la brecha de investigación sobre la adopción de BDA en economías en desarrollo. Los hallazgos destacan que la percepción de utilidad es el principal impulsor y sugieren que mejorar la facilidad de uso podría aumentar aún más la adopción. Las implicaciones prácticas incluyen capacitación para las firmas de auditoría, políticas de apoyo por parte de los reguladores y soluciones de BDA accesibles y fáciles de usar para los proveedores de tecnología. Al ofrecer *insights* adaptados a entornos con recursos limitados, este estudio orienta la adopción de BDA en auditoría, beneficiando tanto a la academia como a la industria.

**Palabras clave:** transformación de la auditoría, intenciones de comportamiento, Big Data Analytics, percepción de facilidad de uso, percepción de utilidad, modelo de aceptación tecnológica, Palestina, los Cuatro Grandes.

## Introduction

In today's data-driven world, the exponential growth of data production presents both challenges and opportunities for organizations worldwide. One approach to harnessing this vast volume of information is through the adoption of big data analytics (BDA) technologies, which enable organizations to process large datasets, identify meaningful patterns, and improve overall efficiency (Bumblauskas *et al.*, 2017). While BDA is widely adopted in large organizations across developed economies, companies in developing countries, such as Palestine, often struggle to implement and utilize these advanced analytics tools effectively. Limited resources, infrastructure constraints, and shortages of skilled personnel pose significant barriers to adoption in these regions (Dagilienė and Klovienė, 2019; Abu Al Rob *et al.*, 2024b). Understanding these unique challenges is essential to exploring how BDA might be more effectively leveraged in developing contexts, where its potential impact on organizational performance and decision-making is substantial.

Organizations often struggle to leverage data effectively to meet their goals due to a shortage of personnel with the necessary analytical skills. Even large firms, including the Big 4 auditing firms, face challenges in introducing BDA for their auditors and make them implies it in their work. (Dagilienė and Klovienė, 2019; Abu Al Rob *et al.,* 2024a). In regions like Palestine, the transformation from the traditional audit approach to a BDA technique represents a significant challenge for the Big 4 firms seeking to implement BDA successfully (Abu Al Rob *et al.*, 2024a). Although existing literature has thoroughly examined the technology acceptance model (TAM) and BDA, there is still a lack of research on how perceived ease of use (PEOU) and perceived usefulness (PU) impact auditors' intentions to adopt BDA within Big 4 auditing firms operating in developing contexts like Palestine.

This study is grounded in the TAM as its theoretical framework. Olufemi (2018) noted that TAM is widely used by researchers to understand the factors influencing individuals' decisions to adopt new technologies. Empirical studies have consistently shown a positive relationship between TAM constructs, which helps explain users' acceptance and use of innovative technologies (Brock and Khan, 2017; Verma *et al.,* 2018). According to Olufemi (2018), TAM primarily focuses on a user's intention to use technology, rather than the broader organizational processes involved in adoption. This makes TAM particularly relevant for exploring auditors' decisions to adopt BDA in Big 4 firms in Palestine, where unique economic and infrastructure challenges may further influence their adoption behavior.

Although previous research has explored the adoption of BDA and the TAM in various contexts, most studies have focused on developed economies and fields other than auditing

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(Brock and Khan, 2017; Shahbaz *et al.*, 2019; Verma *et al.*, 2018). Additionally, research indicates that organizations in resource-limited settings, such as those in developing countries, face substantial barriers to adopting BDA, including infrastructure constraints, skills shortages, and organizational resistance (Abu Al Rob *et al.,* 2024a; Olufemi, 2018). However, limited research explores how these factors influence auditors' BI to adopt BDA within Big 4 firms in developing regions.

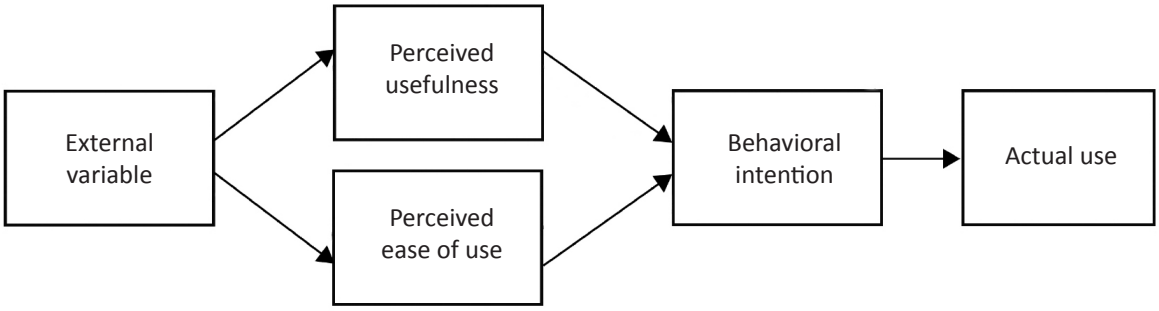
Despite BDA's benefits in auditing, its adoption in developing economies remains underexplored, particularly among Big 4 auditors in Palestine. Research on PU and PEOU's impact on BI in resource-constrained settings is also scarce. This study addresses these gaps, offering insights that contribute to technology acceptance literature and the practical implementation of BDA in auditing firms.

The findings of this study are relevant to researchers, auditors, and auditing firms seeking to understand the factors influencing BDA adoption in auditing. For Big 4 auditors, leveraging BDA can transform raw data into actionable insights (Müller and Jensen, 2017). However, many auditors remain hesitant due to challenges like resource constraints and skills shortages (Abu Al Rob *et al.,* 2024a; Dagilienė and Klovienė, 2019; Verma, 2018). This reluctance poses risks for firms, as delayed adoption of innovative technologies could impact competitiveness in an increasingly data-driven industry.

## Literature review

As depicted in Figure 1, the TAM framework posits that external variables influence PU and PEOU, which in turn impact BI and, ultimately, actual usage (Davis and Venkatesh, 1996). This theoretical model provides a foundation for understanding user acceptance of technology, making it highly applicable for studying technology adoption in various contexts.

**Figure 1**
*Technology Acceptance Model (TAM)*




*Note.* Davis and Venkatesh (1996, p. 20).

## TAM and technology adoption

While multiple models exist to examine technology acceptance, TAM has gained importance for its robustness and reliability in explaining user attitudes and behaviors across diverse fields (Davis *et al.*, 1989; Verma *et al.,* 2018; Demoulin and Coussement, 2020; Grimaldo and Uy, 2020). For example, Chopdar *et al.* (2018) explored factors affecting mobile shopping app adoption, emphasizing the influence of perceived privacy and security risks on adoption decisions across cultural contexts, particularly in India and the USA. Their findings highlighted that while core constructs of the Unified Theory of Acceptance and Use of Technology

(UTAUT) like performance expectancy and effort expectancy are significant predictors of BI, cultural differences alter the impact of perceived risks.

Numerous studies have expanded TAM by integrating additional factors to gain deeper insights into BI. For instance, Ofori and Appiah-Nimo (2019) included perceived cost and risk in their study on online shopping behavior, finding that cost savings and security concerns significantly impact user intention. Similarly, Ajibade (2018) noted that TAM's simplicity contributes to its widespread application in organizational settings, observing that employees' intentions to use technology are shaped by PU and PEOU, as well as personal and professional motivations for success.

Overall, a substantial body of research has validated BI as a central TAM factor in predicting technology adoption, with Cronbach's alpha consistently confirming the reliability of TAM variables across diverse studies (Mei and Aun, 2019; Tarabasz and Poddar, 2019; Hossain *et al.*, 2020). Davis and Venkatesh (1996) proposed that external variables significantly impact PU and PEU, which in turn affect users' adoption decisions, a finding supported by subsequent research (Tarabasz and Poddar, 2019; Davis *et al.,* 1989).

## Big Data Analytics and the technology acceptance model

Interest in the adoption of BDA has grown substantially, with numerous studies addressing the benefits and challenges associated with BDA implementation (Olufemi, 2018; Brock and Khan, 2017; Verma *et al.,* 2018). Research on BDA adoption often emphasizes the importance of selecting an appropriate theoretical framework to assess adoption behavior (Ajibade, 2018; Demoulin and Coussement, 2020). Despite various barriers to BDA adoption, studies consistently highlight the value of BDA for organizations across industries and economies (Lutfi, 2022).

Bumblauskas *et al.* (2017) argued that BDA enhances an organization's capacity to mitigate risks by leveraging large volumes of data from diverse sources. They emphasized the importance of adopting technologies capable of storing, managing, visualizing, and analyzing data to transform it into actionable knowledge. Similarly, Brock and Khan (2017) noted that TAM provides insights into users' motivations for adopting BDA, although it does not fully account for practical considerations in system adoption.

Olufemi (2018) criticized TAM for its limitations in addressing contextual factors such as cost, management support, and organizational culture, all of which impact technology adoption intentions. Experience and familiarity with BDA have also been identified as significant factors; for instance, Muller and Jensen (2017) found that organizations with prior BDA experience report higher confidence in using such technologies. Alyoussef and Al-Rahmi (2022) studied BDA adoption in education, recommending guidelines for educators to foster students' BI toward BDA in multi-sector programs, thus advancing digital evolution in academic settings.

Gangwar (2020) developed a research framework that combines TAM with the Task-Technology Fit (TTF) model to examine BDA's impact on organizational performance. This integrated model, tested on a sample of 523 organizations in India, revealed that factors such as technology fit, organizational fit, and task compatibility significantly influence BDA adoption. Gangwar concluded that adoption intentions are strongly linked to task-technology alignment, highlighting the need for organizations to manage PU and PEOU through targeted data strategies and employee satisfaction initiatives.

While BDA adoption has been studied across sectors, limited research explores its use in Big 4 auditing firms in developing economies. Additionally, despite TAM's extensive application, the impact of PU and PEOU on auditors' BI in resource-constrained settings

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remains untested. This study fills this gap by providing empirical evidence from Palestine, offering insights for both academia and industry.

## Big data analytics in auditing

The application of BDA in auditing is a growing area of research, driven by BDA's potential to enhance business insights and improve decision-making processes (Adrianto, 2018). BDA is increasingly used in financial reporting and accounting, with professionals adopting it to improve analytical capabilities and align with complex accounting standards (İdil and Akbulut, 2018). This trend reflects a shift toward real-time data processing, enabling companies to better capture and analyze financial activities.

Dagilienė and Klovienė (2019) examined the role of BDA in external auditing, emphasizing its importance for analyzing non-financial data and supporting regulatory compliance. They noted that factors such as competition and regulatory requirements drive BDA adoption in auditing, although high costs and limited competencies restrict its use to larger audit firms. Effective application of BDA requires user-friendly visualizations and real-time reporting capabilities, which challenge traditional auditing methods. Eilifsen *et al.* (2020) conducted an exploratory study on data analytics adoption among large public accounting firms, finding that data analytics implementation in auditing is still in its early stages. Their findings reveal thet although data analytics in auditing enhances audit quality, its use is limited by regulatory constraints and the absence of a mandate for advanced data analytics tools. For data analytics in Auditing to become widely adopted, it must be integrated into audit firms' processes, supported by training, and endorsed by regulators. No *et al.* (2019) explored BDA's application for fraud detection and substantive testing in auditing. Their study suggests that BDA can improve audit accuracy by analyzing 100% of journal entries, thereby enhancing audit quality. However, implementing BDA also requires auditors to adapt to new technologies and conduct comprehensive evaluations to ensure audit objectives are met.

## Hypothesis development

Building on the literature regarding the impact of PU and PEOU on BI to adopt BDA in auditing, as well as other findings presented in the literature review, we propose hypotheses H1 and H2 in response to the set research questions.

Main Research Question: Do PEU and PU influence auditors' BI to adopt BDA tools within the audit process?

The above research question is then divided onto two sub-questions: To what extent PU explains auditors' BI to adopt BDA in auditing? and to what extent PEOU explains auditors' BI to adopt BDA in Big 4 auditing firms?

The literature supports the notion that PU and PEOU significantly impact users' intentions to accept and utilize a specific technology (Davis and Venkatesh, 1996). This intention, in turn, drives the actual adoption and use of the technology (Diop *et al.*, 2019). Within the TAM, PU and PEOU are widely regarded as the most influential variables in shaping users' intention to adopt technology in practice (Davis and Venkatesh, 1996). Several studies underscore the importance of understanding how PU and PEOU affect technology adoption behaviors (Al Amin *et al.*, 2020; Cabrera-Sánchez and Villarejo-Ramos, 2020; Olufemi, 2018). For example, Grimaldo and Uy (2020) concluded that users' perceptions of a technology's usefulness and ease of use are directly related to their intention to adopt that technology. BI, understood as a user's intention to engage in certain behaviors in the future, is a strong predictor of actual technology adoption, indicating that a positive intention to use a technology often leads to its actual usage (Shahbaz *et al.*, 2019).

Based on these findings, as well as insights from the literature review regarding the effects of PU and PEOU on BI, we propose the following hypotheses:

H1: PU has a positive effect on the BI to adopt BDA tools in the audit process.

H2: PEOU has a positive effect on the BI to adopt BDA tools in the audit process.

The literature underscores PU and PEOU as key drivers of technology adoption within TAM. However, few studies examine these factors among Big 4 auditors in developing economies like Palestine. To fill this gap, this study uses a mixed-methods approach, integrating quantitative and qualitative data for a comprehensive analysis of auditors' BDA adoption intentions. The next section details the methodology, including statistical analysis and in-depth interviews.

## Materials and methods

This study employs a mixed-methods approach, combining quantitative and qualitative research methods in alignment with Creswell's framework (2009) to provide a comprehensive understanding of auditors' perspectives. The research begins with a quantitative phase, utilizing questionnaires to statistically analyze the relationships between variables related to the TAM and BDA (Khaldi, 2017). Data will be collected from auditors employed by the Big Four auditing firms in Palestine, aiming to address the study's research questions. This quantitative approach allows for correlation analysis, examining variable relationships without altering respondent behavior, although causation cannot be implied (Glasofer and Townsend, 2020).

Following the quantitative phase, the study incorporates a qualitative component through semi-structured interviews with nine auditors who also participated in the questionnaire phase. This qualitative phase provides deeper insights and context for the quantitative findings, using thematic analysis to interpret the data (DiCicco-Bloom and Crabtree, 2006; Braun and Clarke, 2006).

### Sampling techniques

The study's target population consists of auditors from the Big Four auditing firms operating in Palestine. The decision to focus exclusively on the Big Four firms is based on their advanced use of data transformation and strategic application of BDA in auditing, in contrast to smaller audit firms that have yet to adopt emerging BDA practices (Li and Lai, 2011; Dagiliene and Kloviene, 2019).

A census approach was adopted, selecting the entire population as the sample to enhance data accuracy and eliminate sampling errors, particularly valuable in studies with smaller populations (Levy and Lemeshow, 2013). Initially, 105 auditors from the Big Four firms were included in the sample; however, those with less than one year of experience were excluded to ensure participants had adequate professional exposure, resulting in a final sample of 94 auditors. The questionnaire yielded an 86% response rate from the targeted auditors.

For the qualitative phase, interview participants were selected from among those who had completed the questionnaire and held managerial positions or higher. This selection aimed to gather insights on BDA adoption from auditors with significant decision-making roles. Out of the 26 eligible managers and partners, nine agreed to participate in the semi-structured interviews, enriching the depth of the qualitative analysis.

### Measurement development

The research questionnaire is divided into three sections, comprising a total of 14 items, in addition to demographic information. The first section contains 6 items that measure the PU of BDA. The second section contains 6 items that assess the PEOU of BDA The last two items is related to the behavioral intention independent variable. This section utilizes Davis's (1989) measurement scales, with specific items allocated to PU (C.1.1 to C.1.6) and PEOU (C.2.1 to C.2.6). Although Davis's original TAM did

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not include behavioral intention as a construct, this study incorporates behavioral intention based on Davis and Venkatesh's (1996) extended TAM, using two items (C.3.1 and C.3.2) to measure auditors' intentions to adopt BDA. To provide a clearer understanding of how the study variables are measured, the operationalization of each theoretical construct in the structural model is presented in Table 1. This table outlines the items used for each construct, providing a detailed view of the measurement instruments employed in the study.

**Table 1**

*Operationalization of study variables and corresponding measurement items*

| Reflective constructs | Instrument items | N.º of ítems | Source |
|---|---|---|---|
| PU | • Using big data analytics tools in my job would enable me to accomplish tasks more quickly.<br>• Using big data analytics tools would improve my job performance.<br>• Using big data analytics tools in my job would increase my productivity.<br>• Using big data analytics tools would enhance my effectiveness on the job.<br>• Using big data analytics tools would make it easier to do my job.<br>• I would find big data analytics tools useful in my job. | 6 | (Davis, 1989) |
| PEU | • Learning to operate big data analytics tools would be easy for me.<br>• I would find it easy to get big data analytics tools to do what I want them to do.<br>• My interaction with big data analytics tools would be clear and understandable.<br>• I would find big data analytics tools to be flexible to interact with.<br>• It would be easy for me to become skillful at using big data analytics tools.<br>• I would find big data analytics tools easy to use. | 6 | (Davis, 1989) |
| BI | • Assuming I had access to big data analytics tools, I intend to use them.<br>• Given that I had access to big data analytics tools, I predict that I would use them. | 2 | (Davis y Venkatesh, 1996) |

To supplement the quantitative findings, the study employs a semi-structured interview approach in the qualitative phase. This method enables a richer understanding of complex issues, allowing auditors to provide in-depth insights into the core research topics related to BDA adoption and professional skepticism (DiCicco-Bloom and Crabtree, 2006). Qualitative data from semi-structured interviews were analyzed using thematic analysis (Braun and Clarke, 2006). After transcription, initial coding identified key concepts, which were grouped into broader themes aligned with research objectives. An iterative process ensured accuracy in reflecting auditors' perceptions of BDA adoption.

To reduce bias, auditors with varying expertise levels were included, and follow-up questions clarified whether perceptions stemmed from experience or industry views, ensuring a balanced representation.

## Bias control

Several measures ensured validity and reliability by minimizing bias. Selection bias was reduced through census sampling of all eligible auditors. Response bias was controlled with anonymous, self-administered surveys. Social desirability bias was mitigated using neutral wording and confidentiality assurances. Measurement bias was minimized with validated scales (Davis, 1989; Davis and Venkatesh,

1996) and a pilot test for clarity. These steps enhance the study's accuracy and reliability.

## Results and discussion

### Analysis of questionnaires

To achieve the research objectives and test the proposed hypotheses, this study utilized SMARTPLS 4 software. Path analysis, a component of Structural Equation Modeling (SEM), was employed as the primary statistical method. This study uses Partial Least Squares Structural Equation Modeling (PLS-SEM) for data analysis. While CB-SEM is suited for theory testing with large samples, PLS-SEM is preferred for exploratory research, smaller samples, and predictive modeling (Hair *et al*., 2019). Given the under-researched nature of BDA adoption among auditors in developing economies, PLS-SEM's flexibility and suitability for complex models make it the appropriate choice.

### Measurememt model assessment

The assessment of the measurement model is essential for estimating the relationships between latent variables and their observed indicators, with a primary focus on evaluating reliability, internal consistency, and validity. This is especially relevant for reflective constructs such as the dimensions of the TAM; namely, PU, PEOU, and behavioral intention. Table 2 presents the results of the measurement model, evaluated through three key metrics: item loading, convergent validity (assessed via Average Variance Extracted, AVE), and internal consistency (measured by Composite Reliability, CR).

According to Hair *et al.* (2019), CR values exceeding 0.708 indicate sufficient reliability. Item loadings should also exceed the threshold of 0.708 to confirm construct validity. Additionally, an AVE value greater than 0.50 is required to validate the applicability of each construct (Fornell and Larcker, 1981). The results of the measurement model, as shown in Table 2, indicate that item loadings for the constructs ranged from 0.839 to 0.977. Furthermore, each construct demonstrated a CR value above 0.951, reflecting high internal consistency. The AVE for all constructs also exceeded the threshold of 0.5, confirming their convergent validity. Discriminant validity was assessed to ensure that each construct is distinct from the others, which is crucial for the uniqueness of measurement instruments across different factors. This was confirmed by verifying that the square root of the AVE for each construct was greater than the correlations among the constructs (Fornell and Larcker, 1981).

Table 3 provides the results based on the Fornell-Larcker criterion, confirming compliance with this discriminant validity requirement. Additionally, discriminant validity was further evaluated using the heterotrait-monotrait ratio (HTMT) of correlations, as recommended by Ab *Hamid et al.* (2017). An HTMT value below 0.90 is generally considered acceptable, indicating adequate discriminant validity, while values above this threshold suggest otherwise. The HTMT test results are shown in Table 4, with all values falling below the 0.90 threshold, thereby confirming the model's discriminant validity.

**Table 2**

*Reflective constructs measurement properties*

| Reflective constructs | Construct items | Items loading | CR | AVE | Reference |
|---|---|---|---|---|---|
| PU | C.1.1 | 0.930 | 0.971 | 0,874 | Davis (1989) |
| | C.1.2 | 0.964 | | | Davis (1989) |
| | C.1.3 | 0.949 | | | Davis (1989) |
| | C.1.4 | 0.947 | | | Davis (1989) |

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| Reflective constructs | Construct items | Items loading | CR | AVE | Reference |
|---|---|---|---|---|---|
| | C.1.5 | 0.900 | | | Davis (1989) |
| | C.1.6 | 0.920 | | | Davis (1989) |
| PEOU | C.2.1 | 0.868 | 0.951 | 0.804 | Davis (1989) |
| | C.2.2 | 0.904 | | | Davis (1989) |
| | C.2.3 | 0.943 | | | Davis (1989) |
| | C.2.4 | 0.923 | | | Davis (1989) |
| | C.2.5 | 0.899 | | | Davis (1989) |
| | C.2.6 | 0.839 | | | Davis (1989) |
| BI | C.3.1 | 0.976 | 0.976 | 0.954 | Davis and Venkatesh (1996) |
| | C.3.2 | 0.977 | | | Davis and Venkatesh (1996) |

**Table 3**
*The measurement model discriminant validity- Fornell-Larcker criterion*

| Constructs | BI | PEOU | PU |
|---|---|---|---|
| BI | 0.977 | | |
| PEOU | 0.633 | 0.897 | |
| PU | 0.713 | 0.712 | 0.935 |

**Table 4**
*Heterotrait-monotrait (ratio HTMT)*

| Construcciones | BI | PEOU | PU |
|---|---|---|---|
| BI | - | | |
| PEOU | 0,661 | - | |
| PU | 0,739 | 0,738 | - |

## Descriptive statistics

The descriptive analysis provides an overview of the numerical data collected, laying the groundwork for further interpretation. This analysis primarily examines the mean and standard deviation for each construct under study. Presenting these statistical measures allows for the identification of constructs with the highest and lowest mean values, highlighting variations in respondents' perceptions. The primary goals of this analysis are twofold: first, to determine the central tendency of responses, as indicated by the mean values; and second, to assess the variability within the dataset, as represented by the standard deviation. A lower standard deviation reflects a high level of consensus among respondents, indicating strong agreement with a particular statement. In contrast, a higher standard deviation suggests a wider range of opinions, reflecting differing views on the same statement (Hair *et al.*, 2019).

For this study, a 7-point Likert scale was used, where a score of 7 indicates strong agreement and a score of 1 represents strong disagreement. Table 5 provides the calculated mean and standard deviation for each construct, offering insight into respondents' overall tendencies and the consistency of their responses.

**Table 5**
*Descriptive statistics on each component scale*

| Component | Mean | Standard Deviation | Level |
|---|---|---|---|
| PU | 5.42 | 1.02 | High |
| PEOU | 5.16 | 0.94 | High |
| BI | 5.44 | 1.07 | High |

Table 5 reveals that, on average, all 3 constructs evaluated among auditors employed at Big Four auditing firms in Palestine received high ratings, with an overall mean score of 5.34. Each construct scored within the high range, with mean values ranging from 5.16 for the PEOU construct to 5.44 for the PU construct.

## Evaluation of the structural model

Henseler *et al.* (2009) categorize acceptable values for the coefficient of determination ($R^2$) as follows: $R^2$ values of 0.67 or higher are considered substantial, values between 0.33 and 0.67 are classified as moderate, and values ranging from 0.19 to less than 0.33 are deemed weak.

**Table 6**
*Results of Coefficient of Determination $R^2$ Analysis*

| Component | R square | R square adjusted |
|---|---|---|
| BI | 0.539 | 0.527 |
| PEU | 0.622 | 0.591 |
| PU | 0.706 | 0.678 |

As shown in Table 6, the $R^2$ adjusted values provide insights into the explanatory power of the model concerning various constructs. For BI, the adjusted $R^2$ value is 0.527, indicating that 52.7% of the variance in BI is explained by the predictor variables. PEOU has an adjusted $R^2$ value of 0.591, suggesting that 59.1% of its variance is accounted for by the predictors. Finally, PU shows an adjusted $R^2$ value of 0.678, which means that 67.8% of the variance in PU is explained by the predictor variables. These adjusted $R^2$ values reflect the robustness of the model in explaining the variances in the respective constructs despite the adjustments for the number of predictors.

## Hypothesis testing

For hypothesis testing, path coefficients were utilized to evaluate the hypothesized relationships. The analysis followed the approach recommended by Hair *et al.* (2019), employing the bootstrapping technique to generate reliable estimates. The results, presented in Table 7 and Figures 2 and 3, include numerical data for beta coefficients, standard deviations, and p-values based on a two-tailed test.

The results, presented in Table 7 and Figures 2 and 3, include numerical data for beta coefficients, standard deviations, and p-values based on a two-tailed test. As shown in Table 7, and figures 2 and 3, the hypothesis testing results reveal significant insights into the relationships among the variables. Hypothesis H1, which posits a relationship between PU and BI, is strongly supported with a beta coefficient of 0.715, a t-value of 9.650, and a p-value of 0.000. This indicates a statistically significant positive association between PU and BI. Similarly, H2, which proposes a link between PEOU and BI, is also supported, with a beta coefficient of 0.640, a t-value of 6.157, and a p-value of 0.000. These

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findings confirm the hypothesized relationship between PEOU and BI, albeit with a smaller effect size compared to H1.

**Table 7**
*Result of the hypothesis testing*

| | Hypothesis | Path coefficient | T statistics | P values | Accepted/ rejected |
|---|---|---|---|---|---|
| H1 | Perceived Usefulness -> Behavioral Intention | 0.715 | 9,650 | 0.000 | Accepted |
| H2 | Perceived Ease of Use -> Behavioral Intention | 0.640 | 6,157 | 0.000 | Accepted |

**Figure 2**
*Model Fit Estimation Using the Bootstrapping Procedure (PU – BI)*

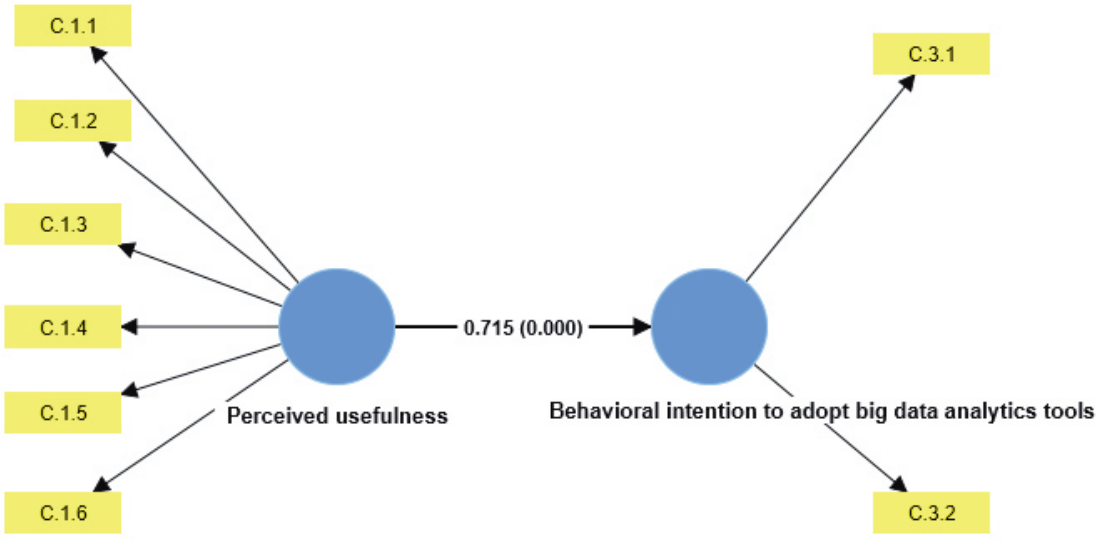
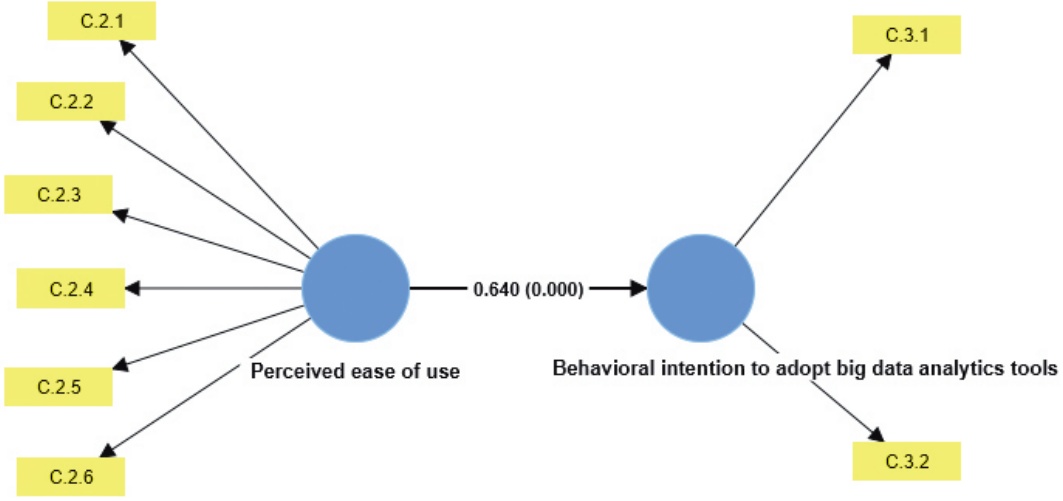



**Figure 3**
*Model Fit Estimation Using the Bootstrapping Procedure (PEOU – BI)*



## Interview analysis

The second phase of this study involved semi-structured interviews with external auditors at the managerial level or above (managers to partners), who had also participated in the questionnaire phase (nine auditors). This qualitative phase aimed to deepen the understanding of the quantitative findings, particularly regarding how PU and PEOU impact the BI of BDA adoption in auditing. Additionally, it explored the factors influencing BDA adoption and its evolving role in modern auditing practices. The qualitative analysis revealed several key themes, shedding light on the auditors' perceptions of BDA integration into their work. These themes also provided further explanation for the quantitative results and highlighted the practical challenges and opportunities associated with BDA adoption.

### *Perceived usefulness*

A major theme emerging from the interviews was the significant influence of PU on auditors' intention to adopt BDA technologies. The interviewees consistently highlighted the practical benefits of BDA, including enhanced audit quality, efficiency, and strategic insights.

Enhanced Audit Capabilities: BDA was seen as a transformative tool that improves audit processes by enabling more efficient analysis of large datasets. For instance, Auditor 6 shared, "We extensively utilize BDA for risk assessment, transaction testing, and fraud detection. This approach enables us to efficiently analyze large datasets, identify patterns, and focus on areas with higher risks, thereby contributing to improved audit quality." Similarly, Auditor 3 emphasized that BDA tools "allow us to analyze vast datasets more efficiently, leading to more accurate and insightful audit results."

Strategic Decision-Making: Several auditors highlighted how BDA supports better decision-making and risk identification. Auditor 8 explained, "The insights gained from BDA allow us to make more informed decisions, identify risks more effectively, and offer more strategic advice to our clients." This demonstrates that PU extends beyond efficiency, influencing the value-added services that auditors can provide to clients. These qualitative insights align with the quantitative results, where PU significantly impacted BI ($\beta = 0.715$, $p < 0.001$). This confirms that auditors are more likely to adopt BDA when they perceive clear benefits like enhanced efficiency and fraud detection.

### *Perceived use of use*

The ease of using BDA tools also influenced adoption, with PEOU linked to user-friendliness, system integration, and training effort. Survey results showed a positive PEOU rating (mean = 5.16) but a weaker effect on BI than PU. Interviewees reinforced that while ease of use matters, perceived usefulness remains the stronger motivator.

Ease of Integration: Auditors noted that tools that integrate seamlessly with existing systems are more likely to be adopted. For example, Auditor 8 stated, "Tools which are user-friendly and integrate well with our existing systems are more readily adopted." This emphasizes the importance of ensuring that BDA tools do not disrupt existing workflows.

Learning Curve and Simplicity: Tools that require minimal training or effort to use were seen as more appealing. Auditor 9 explained, "If it is easy to use, it will increase my intention to adopt." Similarly, Auditor 4 observed, "The simpler the BDA tools are, the more likely they are to be perceived as useful and be fully utilized." These comments highlight that the ease of use directly impacts adoption rates, particularly among auditors who are less familiar with advanced technologies.

### *The evolving role of BDA in Auditing*

The interviewees expressed a strong belief in the growing importance of BDA in the auditing field. Several auditors described BDA as a

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cornerstone of modern auditing practices, particularly in dynamic markets such as Palestine.

Increasing Integration: BDA is becoming more widely integrated into auditing workflows, particularly for larger clients or industries with extensive datasets. Auditor 7 noted, "BDA became a critical function within the audit of banks and insurance clients starting in 2021 and forward."

Future Potential: Many auditors anticipated that BDA would continue to evolve and play an increasingly central role in auditing. Auditor 9 shared, "BDA is fast becoming a cornerstone in modern auditing practices. As these technologies advance, I expect they will become more integrated into our everyday auditing practices, further enhancing our ability to provide high-quality, insightful audit services."

## Analysis of the results

The primary research question and sub-questions and their related hypotheses served as a basis for determining the relationship between PU, PEOU, and auditors' BI to adopt BDA in developing countries such as Palestine. Path analysis confirmed that PU has a stronger influence on BI than PEOU, a finding reinforced by qualitative insights. Interviewees noted that while ease of use is beneficial, BDA's perceived usefulness in enhancing efficiency and accuracy is the key adoption driver. They also highlighted the need for better training and integration, which, though not measured quantitatively, could impact long-term adoption. These findings support TAM's predictions while suggesting that contextual factors may also shape adoption decisions.

Sub question 1 examined the relationship between PU and auditors' BI to adopt BDA. According to Davis (1989) PU is defined as the degree to which an individual believes that using a system will enhance their job performance. The path analysis revealed that PU was a strong and statistically significant predictor of BI. As a result, the hypothesis related to Sub-question 1 was supported. The positive relationship between PU and BI indicated that higher levels of PU were associated with an increased intention to adopt BDA. These findings suggest that PU is the most influential factor for auditors when deciding whether to adopt BDA in developing countries such as Palestine.

Sub question 2 addressed the relationship between PEOU and auditors' BI to adopt BDA. According to Davis (1989), PEOU reflects an individual's belief that a system will be easy to learn and require minimal effort to use. The path analysis revealed a significant correlation between PEOU and BI, leading to the acceptance of Sub-question 2's hypothesis. However, the findings indicate that PEOU is not a primary factor for auditors when deciding whether to adopt BDA in developing countries such as Palestine. Among the two independent variables in the TAM, PU demonstrated a stronger statistical significance than PEOU in predicting BI.

The interview phase provides rich insights into the factors influencing BDA adoption, as well as its perceived benefits and challenges. The findings suggest that PU and PEOU are critical determinants of BDA adoption, with client characteristics and task specificity also playing a role. However, barriers such as data compatibility and industry-specific constraints highlight the need for continued innovation and support to enhance the adoption of BDA tools. Overall, the interviews confirm that BDA is becoming an indispensable component of modern auditing, offering transformative benefits that are expected to grow in significance over time.

The findings provide practical insights for audit firms adopting BDA. Since PU is the strongest predictor of adoption, firms should emphasize its benefits, such as risk assessment, fraud detection, and efficiency, through training, case studies, and pilot projects. As PEOU also influences BI, firms should ensure user-friendly tools, seamless software integration, and ongoing technical support. Addressing barriers like cost and expertise gaps through gradual adoption, partnerships, and upskilling can further drive adoption, enhancing audit effectiveness in a data-driven environment.

While PU and PEOU significantly influence adoption, these perceptions may evolve. With increased familiarity, ease-of-use concerns may decline, while new challenges like data security, cost, and regulations may arise. Advancements in AI and automation could also reshape perceived usefulness, altering adoption drivers. Future research should examine these shifts and identify emerging factors influencing long-term adoption.

### Interpretation of the results

This study's findings highlight th*et al*l participating auditors from Big 4 firms in Palestine had prior knowledge of or experience with BDA, suggesting positive perceptions of the technology, which may have influenced their BI to adopt it. User attitudes have been shown to shape perceptions and BI (Dixit and Prakash, 2018). While the TAM is widely regarded as the leading framework for studying technology adoption, alternative models have also been utilized (Davis *et al.,* 1989; Verma *et al.,* 2018; Demoulin and Coussement, 2020; Grimaldo and Uy, 2020). The TAM, adapted from the Theory of Planned Behavior (TPB) and the Theory of Reasoned Action (TRA), has been found to predict actual behavior more effectively than its predecessors (Davis, 1989). However, as Diop *et al.* (2019) cautioned, BI does not always translate into actual adoption.

Examining the interview responses from auditors working in Big Four firms in Palestine offers valuable perspectives on their adoption of BDA tools in auditing processes. These insights are particularly relevant when viewed through the lens of the TAM.

The questionnaire results confirm that PU positively influences BI to adopt BDA. Interviewees reinforced this, noting that while PU drives adoption, practical barriers such as cost and efficiency concerns can limit implementation.

This aligns with TAM's proposition that PU significantly shapes users' attitudes and intentions toward adopting technology (Davis, 1989; Brock and Khan, 2017). Furthermore, the interviewees' responses resonate with findings from Grimaldo and Uy (2020), who demonstrated a positive and direct correlation between PU and the intention to use technology. The potential of BDA tools to enhance business insights and improve decision-making processes further supports this positive relationship (Adrianto, 2018). PEOU also emerged as a significant factor influencing the adoption of BDA. Interviewees noted that BDA perceived as easy to use and flexible would likely encourage auditors to adopt them due to their efficiency and time-saving benefits. Conversely, if the BDA are perceived as complex, auditors may be reluctant to use them.

These findings support TAM's assertion that PEOU influences BI (Davis, 1986). The interviewees' observations are also consistent with prior studies emphasizing PEOU's importance in shaping technology adoption behaviors (Al Amin *et al.,* 2020; Cabrera-Sánchez and Villarejo-Ramos, 2020; Olufemi, 2018).

## Conclusions

The findings of this study have important implications for auditors in Big 4 firms operating in developing countries, particularly in Palestine. In today's competitive environment, large organizations increasingly rely on BDA to enhance decision-making, efficiency, and market position. However, auditors have been slow to adopt BDA due to nuclear adoption criteria and various implementation challenges (Abu Al Rob *et al.,* 2024b; Olufemi, 2018). Understanding factors like PEOU and PU provides valuable insights for practitioners, helping them overcome adoption barriers. If auditors in large firms fail to adopt BDA, they risk falling behind in a profession that increasingly depends on data-driven insights. This study reinforces TAM's applicability in auditing by focusing specifically on PEOU and PU, isolating them from external influences.

From a practitioner's perspective, the findings indicate that auditors' perceptions stron-

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gly influence their intention to adopt BDA. The results confirm TAM as an effective model for measuring technology adoption in BDA and auditing within Palestine. Hypothesis testing and interview findings suggest that auditors value BDA's ability to simplify tasks and enhance performance, making it crucial for audit firms to emphasize these benefits to encourage adoption. The study also found that PEOU had less impact on auditors' BI than PU, indicating that ease of use alone is not a decisive factor unless auditors perceive BDA as beneficial. As PU increased, so did auditors' intention to adopt BDA, reinforcing the idea that perceived usefulness is the primary motivator. Auditors in large firms who recognize the practical benefits of BDA are more likely to adopt and utilize the technology. This relationship between usefulness and adoption aligns with the growing trend of organizations implementing BDA (Bumblauskas *et al.*, 2017; Dagilienė and Klovienė, 2019; Abu Al Rob *et al.*, 2024a).

This study supported the TAM by identifying significant relationships between PEOU, PU, and BI to adopt BDA. However, its focus on auditors from Big Four firms in Palestine limits the generalizability of the findings to other contexts. Additionally, the study only examined two TAM variables (PEOU and PU), excluding external factors like self-efficacy or training, which may also influence BDA adoption. Finally, relying solely on the TAM framework may have overlooked insights th*et al*ternative theories could provide for understanding technology adoption in auditing.

The study found that PEOU and PU significantly influenced auditors' BI to adopt BDA. However, it recommended that future research broaden the scope to include auditors from different regions and sectors, incorporate additional external variables (e.g., self-efficacy or training) to better understand factors influencing BI, and explore alternative frameworks like the Unified Theory of Acceptance and Use of Technology (UTAUT) to provide deeper insights into technology adoption in auditing. Moreover, Long-term BDA adoption may be influenced by regulatory changes and technological advancements beyond PU and PEOU. As firms integrate data analytics, future research should assess whether auditors' perceptions of usefulness remain stable or evolve. Practical implications include training investments for firms, supportive policies from regulators, and user-friendly solutions from technology providers.

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