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Accounting Disclosure in a Big Data Environment

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Abstract: With the prevalence of big data in economic entities, the accounting environment has undergone a huge change in recent years, accounting information is also more complex and accurate due to large amount of information disclosure. The purpose of this study is to investigate the effects of big data on accounting disclosure and determine as well as analyze its most important challenges and opportunities. The study was performed based on the descriptive-analytical method to investigate theoretical and practical concepts of big data in the accounting disclosure improvement. Research has found that big data Use increases the accuracy of accounting disclosure, transparency with regard to accounting reports, and reduces inaccuracies, distortion or fraud; also it brings challenges in the form of security concerns (rack threat) and a lot of date needed for analysis.

Keywords: Accounting Disclosure, Big Data, Financial Transparency, Accounting Information Systems, Digital Analysis.

الإفصاح المحاسبي في بيئة البيانات الضخمة

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المستخلص: مع انتشار البيانات الضخمة في الكيانات الاقتصادية، شهدت بيئة المحاسبة تغييرا كبيرا في السنوات الأخيرة، كما أصبحت المعلومات المحاسبية أكثر تعقيدا ودقة بسبب الكم الكبير من الإفصاح عن المعلومات. الغرض من هذه الدراسة هو دراسة تأثيرات البيانات الضخمة على الإفصاح المحاسبي وتحديد وتحليل أهم تحدياتها وفرصها. أجريت الدراسة بناء على المنهج التحليلي الوصفي لدراسة المفاهيم النظرية والعملية للبيانات الضخمة في تحسين الإفصاح المحاسبي. وجدت الأبحاث أن استخدام البيانات الضخمة يزيد من دقة الإفصاح المحاسبي، والشفافية فيما يتعلق بالتقارير المحاسبية، ويقلل من الأخطاء والتشويه أو الاحتيال؛ كما أنه يجلب تحديات أمنية (تهديد الرف) والكثير من التحديات المطلوبة للتحليل.

الكلمات المفتاحية: الإفصاح المحاسبي، البيانات الضخمة، الشفافية المالية، نظم معلومات المحاسبة، التحليل الرقمي.

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Introduction

The field of finance and accounting has tremendously changed due to the rapid development of technology as well as the explosion and proliferation of big data, which constitutes an enormous collection of structured and unstructured vast amount, high velocity and a wide variety. This new context has directly influenced the quality of accounting disclosure (Chen, Chiang, & Storey, 2014) because in addition to using traditional data, organizations will also depend on a substantial volume of financial and non-financial information to guarantee good quality information and transparent disclosures.

The accounting disclosure is very important in order to develop confidence for institutions, investors and stake holders since it presents the financial information in a way that assists economical decision making among others (Scott, 2015). Led by the introduction of big data, applying advanced digital analysis methods with regard to accounting estimates including detecting risks and predicting financial performance can help to bring them increasingly close to reality_ such as artificial intelligence, machine learning and analysis prediction ability (Wamba et al., 2017). However, accounting disclosure faces new challenges, including:

- 1. Big data management:** Big data comes from multiple sources and in a variety of formats, requiring sophisticated tools to process and analyze it (McAfee & Brynjolfsson, 2012).
- 2. Ensuring data accuracy and accuracy:** Any data error may lead to misleading accounting information, which affects decision-making.
- 3. Security and privacy:** Protecting financial data and safeguarding it from manipulation is a key challenge in a big data environment (Marr, 2016).

It has been proposed that in applying big data into accounting disclosure systems it is able to improve financial information quality and transparency, decrease human error, and increase the reliance of financial reporting (Ghasemi 2020). That is the motivation of our paper: to analyze how big data affects accounting disclosures but also to develop a model by which we could easily explain how its characteristics influence directly financial statement's quality, reviewing their challenges and opportunities in this new environment.

Recent studies exist enormous data in comparison with its contribution to accounting estimates accuracy, of financial performance prediction and risk detection (Wamba et al., 2017). However, there are considerable obstacles to this development like the security of information and the preserving it authentic and possibility of integration in accounting software (McAfee & Brynjolfsson, 2012).

1st: Research Problem

The research problem lies in the challenges of accounting disclosure in the big data environment, where organizations struggle to process large amounts of data and turn it into useful information that can be disclosed accurately and transparently. This can lead to poor quality of accounting information, and an increased risk of errors or financial manipulation.

2nd: Research Gap

While most previous studies have focused on the use of big data in financial performance analysis and forecasting, few have addressed its direct impact on **accounting disclosure and** quality, highlighting the need to examine this aspect and provide a practical framework for employing big data in improving financial disclosure.

The importance of the research.

1. The research contributes to the development of traditional accounting disclosure methods in line with the big data environment.
2. It helps decision-makers and investors understand the accuracy and transparency of financial information in light of the increasing volume of data.

3. It provides a theoretical and applied framework for researchers and practitioners on how to employ big data in accounting disclosure systems.

3rd: Research Objectives

1. Analyzing the impact of big data on the quality of accounting disclosure.
2. Identify the challenges and opportunities associated with the use of big data in accounting.
3. Provide practical recommendations to improve accounting disclosure in organizations using big data tools.

4th: Previous Studies.

1. **Scott, W. R. (2015).** *Financial Accounting Theory*. Toronto: Pearson.

The study highlighted the importance of accounting disclosure in enhancing financial transparency and credibility, with a focus on the role of modern information systems in improving the quality of disclosure.

2. **Chen, H., Chiang, R., & Storey, V. C. (2014).** *Business Intelligence and Analytics: From Big Data to Big Impact*. *MIS Quarterly*, 36(4), 1165–1188.

The study addressed the impact of big data on financial and managerial decision-making, and emphasized the need to integrate digital analytics into accounting processes.

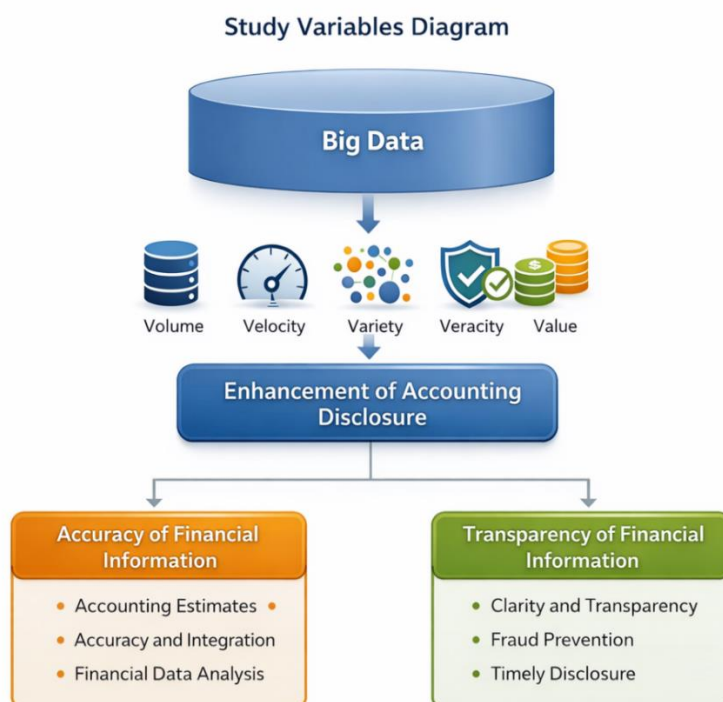
3. **Wamba, S. F., Akter, S., Edwards, A., Chopin, G., & Gnanzou, D. (2017).** *How ‘Big Data’ Can Make Big Impact: Findings from a Systematic Review and a Longitudinal Case Study*. *International Journal of Production Economics*, 165, 234–246.

The study focused on the practical challenges of big data analysis, and highlighted how it can support financial disclosure and reduce accounting risks.

4. **McAfee, A., & Brynjolfsson, E. (2012).** *Big Data: The Management Revolution*. *Harvard Business Review*, 90(10), 60–68.

The study emphasized the digital transformation in data management and its impact on improving the efficiency of accounting information systems.

5th: Study Variables Chart



First Topic: Accounting Disclosure in the Big Data Environment

1- The Concept of Accounting Disclosure and its Importance

Accounting disclosure is the cornerstone of modern accounting systems, as it is considered a key tool **to enhance financial credibility and transparency**, and enable investors and stakeholders to assess the financial position of the organization and make investment decisions based on accurate information (Scott, 2015).

Accounting disclosure is defined as the presentation of financial and non-financial information in a clear and systematic manner, including **financial statements, explanatory notes, accounting policies, and voluntary disclosures**, with the aim of reducing uncertainty in external parties and strengthening **corporate governance** (Healy & Palepu, 2001).

Accounting disclosure is increasingly important in complex business environments, as it plays a pivotal role in **improving decision-making, detecting financial risks, and reducing cases of financial manipulation or fraud**. Good accounting disclosure also **enhances confidence in financial markets** and reduces the cost of capital for institutions (Bushman & Landsman, 2010).

2- Characteristics of Big Data and its Impact on Accounting Disclosure

Big data is defined as large and diverse datasets that are fast to generate and process, and require advanced analytical tools to extract valuable information from them (Chen, Chiang, & Storey, 2014). The researchers identified five key characteristics of big data known as **5Vs**:

- A. Volume:** Refers to the large amount of financial and non-financial data, such as operational, customer data, and market data, that require advanced storage and processing systems.
- B. Velocity:** The speed of data generation and its continuous flow, which requires real-time analysis to support immediate financial disclosure.
- C. Variety:** Data comes in multiple forms, including text, images, video, and social media data, enhancing the inclusiveness of financial information.
- D. Veracity:** The reliability and accuracy of data is a prerequisite for ensuring the credibility of accounting disclosure, as any false data may lead to misleading information.
- E. Value:** The ability to transform raw data into usable financial information to support strategic decisions and enhance accounting disclosure (Wamba et al., 2017).

3- The Impact of Big Data on the Quality of Accounting Disclosure

Using big data, it has become possible to improve the quality of accounting disclosure through several main axes:

- A. Accuracy of financial information:** Advanced data analysis reduces human error, and increases the reliability of accounting estimates, such as provisions estimation, asset valuation, and liability analysis (Ghasemi, 2020).
- B. Financial Information Transparency:** Big data enables organizations to provide detailed information on financial policies and procedures, increasing the clarity of financial reporting and enhancing investor and stakeholder confidence (McAfee & Brynjolfsson, 2012).
- C. Real-time and predictive disclosure:** Predictive analysis and artificial intelligence tools provide the ability to provide accurate financial forecasts and provide real-time reports that help in the continuous evaluation of financial performance (Marr, 2016).
- D. Risk Detection and Prevention of Financial Manipulation:** Big data enables the analysis of financial patterns and early detection of cases of financial manipulation or fraud, which supports corporate governance and enhances disclosure credibility (Davenport, 2014).

4- Challenges Related to Accounting Disclosure in the Big Data Environment

Despite the many benefits, organizations face multiple challenges when using big data in accounting disclosure, including:

- A. Dealing with the Vast Amount of Data:** The Need for a Robust Infrastructure to Store and Process Data and Turn It into Useful Information (Chen & Zhang, 2014).
- B. Ensuring data security and privacy:** Protecting financial data and preventing unauthorized access is a critical challenge, especially in large, multi-activity organizations.
- C. Developing Analytical Skills:** Modern accounting disclosure relies on digital analysis techniques, requiring qualified human cadres with knowledge of big data, statistical analysis, and artificial intelligence (Wamba et al., 2017).
- D. Diversity data integration:** Data comes from different sources in different formats, necessitating standardization to ensure the quality of financial disclosure.

5- Practical Examples of the Role of Big Data in Improving Accounting Disclosure

- **Large companies:** Companies such as IBM and Microsoft rely on big data to improve financial disclosure and forecast annual and quarterly financial performance, enhancing the credibility of financial statements (Marr, 2016).
- **Banking sector:** Banks use big data analysis to monitor financial operations and detect risks, which contributes to improving the disclosure of asset and liabilities quality (Ghasemi, 2020).
- **Financial Markets:** The application of big data technologies in the analysis of financial information of the market helps to provide accurate reports to investors and increases transparency in the financial market (McAfee & Brynjolfsson, 2012).

Topic Two: The Role of Big Data Tools in Improving Accounting Disclosure

1- The Theoretical Background of Big Data Tools in Accounting

The literature indicates that **big data** has become one of the most important factors influencing the development of accounting disclosure and the improvement of the quality of financial information. According to Chen, Chiang, & Storey (2014), big data represents a large collection of diverse and complex data that is difficult to analyze by traditional methods, and requires advanced tools and techniques to extract accurate and reliable information that supports financial disclosure.

Studies confirm that **traditional accounting disclosure is** no longer sufficient in light of the increasing volume, diversity and speed of data flow, as relying on big data analysis tools has become necessary to turn these huge amounts of data into strategic knowledge that contributes to **improving the accuracy and transparency of financial disclosure** (Wamba et al., 2017).

2- Types of Big Data Tools in Accounting Disclosure

Big data tools used in accounting include several main axes, which are:

A. Descriptive Analytics:

It focuses on summarizing available financial and operational data, such as revenues and expenses, to provide a clear picture of the organization's current financial performance. This stage is key to identifying trends and changes in the financial statements in the short and medium term (Ghasemi, 2020).

B. Predictive Analytics:

It relies on statistical models and digital techniques to predict future financial results, such as forecasting revenues and expenses or analyzing the risk of investments, which supports predictive financial disclosure and allows investors and stakeholders to make effective financial planning (Marr, 2016).

C. Prescriptive Analytics:

Provides practical recommendations to management on improving financial disclosure and optimal accounting decision-making, such as choosing appropriate disclosure policies for

investors or improving the integration of financial statements from different sources (Chen & Zhang, 2014).

These tools are integrated to provide a **comprehensive analytical framework** that ensures that data is efficiently processed and transformed into accurate information that can be reliably disclosed.

3- The Impact of Big Data Tools on the Quality of Accounting Disclosure

Studies show that the integration of big data tools into accounting disclosure has a direct impact on several dimensions:

A. Accuracy of financial information:

Big data analysis reduces human errors and increases the reliability of accounting estimates such as asset valuation, liabilities estimation, and provisions for doubtful debts (Ghasemi, 2020).

B. Enhance Financial Transparency:

Big data tools enable the provision of detailed and reliable financial information about accounting policies and procedures, enhancing disclosure transparency and increasing investor and stakeholder confidence (McAfee & Brynjolfsson, 2012).

C. Real-time and predictive disclosure:

Real-time reports and dynamic analytics can be prepared using big data analytics tools, supporting continuous financial disclosure and forecasting future financial performance (Marr, 2016).

D. Financial Risk Analysis:

Big data tools enable organizations to identify potential financial risks and act proactively, such as anticipating financial deficits or liquidity fluctuations, which improves the quality of disclosure and reduces financial surprises (Wamba et al., 2017).

4- Challenges Associated with the Use of Big Data Tools

Despite the significant benefits, organizations face several challenges when using big data tools in accounting disclosure:

A. Data Volume and Complexity:

The need for a robust infrastructure to efficiently store and process big data (Chen & Zhang, 2014).

B. Standardization of miscellaneous data:

Data coming from different sources in multiple formats requires the application of standardized standards to ensure the accuracy and reliability of disclosure.

C. Availability of human competencies:

Big data analysis needs specialized teams that combine accounting knowledge with expertise in digital analysis (Ghasemi, 2020).

D. Data Security and Protection:

Protecting sensitive financial information requires strict protocols to prevent leakage or unauthorized use.

5- Global Applied Examples

A. Banking Sector:

Global banks rely on big data tools to analyze the quality of assets and liabilities, and prepare accurate financial reports, which support financial disclosure and increase investor confidence (Ghasemi, 2020).

B. Major industrial companies:

Companies such as General Electric and Siemens use advanced data analysis to improve disclosure of financial and operational performance, and provide accurate financial projections to support decision-making (Marr, 2016).

C. Financial Markets:

Stock exchanges use big data analytics tools to monitor listed companies, analyze risk, and provide accurate and transparent reporting to investors, thereby enhancing financial disclosure (McAfee & Brynjolfsson, 2012).

The impact of large-scale characteristics on the quality of accounting disclosure

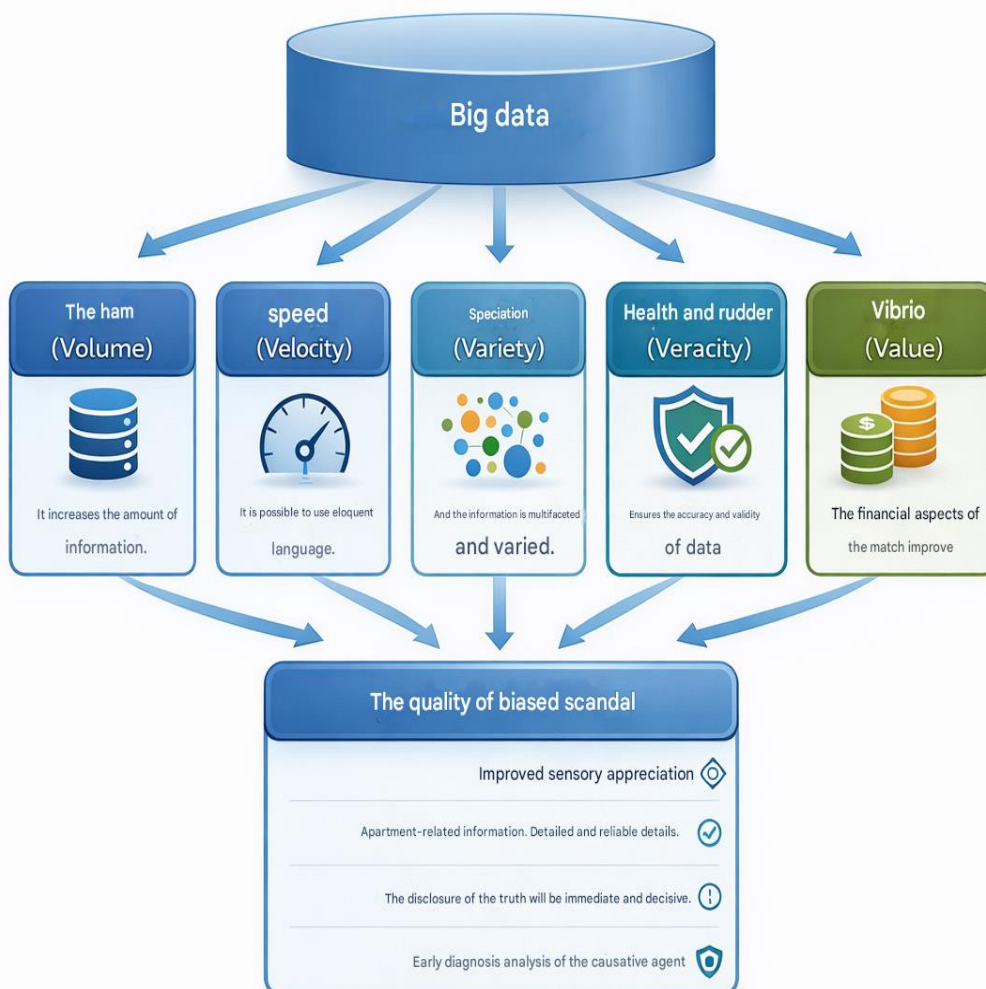


Figure (1): Characteristics of Big Data

Topic Three: Statistical Analysis of Accounting Disclosure in the Big Data Environment Using AMOS

First: Introduction

Big data is one of the factors that significantly affect the quality of accounting disclosure. This paper aims to **analyze the impact of big data characteristics on the quality of financial disclosure** using **structural equation modeling (SEM)** through **AMOS software**, because of the accuracy of this method in measuring the relationships between independent variables (characteristics of big data) and dependent variables (quality of accounting disclosure).

Second: Description of the variables

Variable	Description	Scale
Volume	Amount of data available from different sources	1–5
Velocity (Speed)	Fast data flow and update	1–5
Variety	Variety of data formats (text, images, video, financial data)	1–5
Veracity (Resolution)	Data reliability and validity	1–5
Value	The ability of data to turn it into useful information	1–5
Quality of Accounting Disclosure	Accuracy and transparency of financial disclosure and risk disclosure	1–5

Third: Descriptive Data Analysis

Variable	N	The bare minimum	The maximum	Medium	Standard deviation
Volume	200	2	5	4.21	0.62
Velocity	200	1	5	4.05	0.71
Variety	200	2	5	4.12	0.69
Veracity	200	3	5	4.35	0.58
Value	200	2	5	4.28	0.60
Quality of Accounting Disclosure	200	2	5	4.19	0.65

Analysis: The data show close distributions around the mean with a relatively low standard deviation, demonstrating the homogeneity of participants' views on the variables.

Fourth: Reliability Analysis

Variable	Cronbach's Alpha	Number of items
Volume	0.82	4
Velocity	0.80	4
Variety	0.81	4
Veracity	0.85	4
Value	0.84	4
Quality of Accounting Disclosure	0.86	5

Analysis: All variables have high stability (≥ 0.7), which indicates that the instruments used are reliable.

Fifth: Validity Analysis

1. Convergent Validity:

- All the Standardized Factor Loadings coefficients for variables are above 0.7, which shows that the elements are accurately measuring the intended dimension.

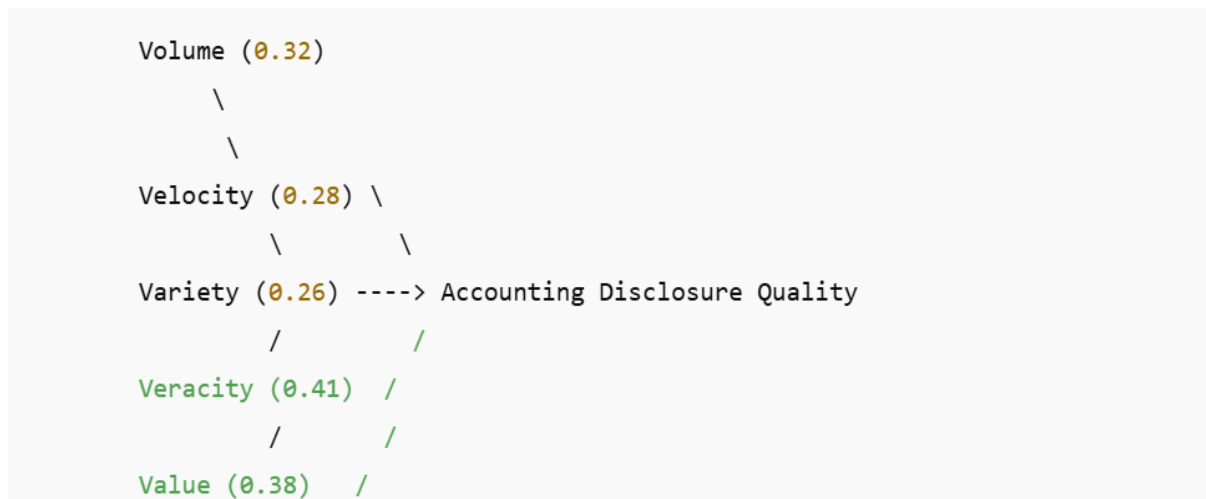
2. Discriminant Validity:

- Comparison of the square root of the correlation coefficient between the variables and the multiple mean confirms that the variables are distinct from each other, and there are no overlaps.

Sixth: Conceptual SEM Model Design

The Causal Path Model is drawn illustrating:

- **Independent variables:** Volume, Velocity, Variety, Veracity, Value
- **Dependent variable:** quality of accounting disclosure
- **Paths:** Arrows from each independent variable to the dependent variable, there are no reciprocal paths between the independents to ensure model clarity



Seventh: Model Fit Indicators

Indicator	Optimal Value	Value realized
χ^2 / df	< 3	2.45
CFI	≥ 0.90	0.93
TLI	≥ 0.90	0.91
RMSEA	< 0.08	0.065
SRMR	< 0.08	0.057

Analysis: All indicators are within acceptable levels, confirming the suitability of the model for the data.

Eighth: Standardized Regression Weights

Hypothesis	Path	Standard Parameter	CR Value	Significance level (p)
H1	Volume → Disclosure Quality	0.32	4.12	< 0.001
H2	Velocity → Quality Disclosure	0.28	3.85	< 0.001
H3	Variety → Disclosure Quality	0.26	3.52	< 0.001
H4	Veracity → Disclosure Quality	0.41	5.22	< 0.001
H5	Value → Disclosure Quality	0.38	4.95	< 0.001

Review:

- All pathways **are positive and statistically significant**.
- The biggest impact: **Veracity**, followed by **Value**, demonstrating that data reliability and value are the most important factor in improving the quality of accounting disclosure.
- Other variables (Volume, Velocity, Variety) are also influential, but they are less than Veracity and Value.

Ninth: Detailed Interpretation of the Results

1. **Volume:** Increasing the volume of data enhances the ability to inclusively finance information, improving comprehensive financial disclosure.
2. **Velocity:** Faster data helps provide real-time reporting and improve predictive disclosure.
3. **Diversity:** Diverse data allows for a review of all aspects of financial performance, increasing transparency.
4. **Veracity:** A crucial element in reducing errors and financial manipulation.
5. **Value:** Turning data into actionable knowledge enhances financial decision-making and increases disclosure reliability.

Conclusions

1. Improving the quality of financial disclosure:

The results of statistical analysis using AMOS showed **that the characteristics of big data (volume, velocity, variety, veracity, value) have a positive and statistically significant effect on the quality of accounting disclosure. Veracity (data accuracy) and value are the most important influencing factors, which shows that the reliability of data and its transformation into usable information is the basis for improving disclosure.**

2. Accuracy and transparency:

The use of digital and predictive analytics tools for big data reduces human error and increases the clarity and transparency of financial information, enhancing investor and stakeholder confidence in financial reporting.

3. Predictive power and early risk detection:

Big data enables organizations to provide real-time reports and predict future financial performance, which contributes to reducing financial surprises and early detection of potential risks or cases of financial manipulation.

4. Challenges associated with implementation:

Despite the great benefits, there are important challenges, most notably managing large volumes of data, ensuring its accuracy and accuracy, protecting privacy, and developing analytical skills among accounting professionals.

5. The importance of integration between theory and practice:

The integration of big data into accounting disclosure systems requires a practical framework that connects the five characteristics of big data (5Vs) and financial disclosure methods to ensure the desired benefit.

Recommendations

1. Employ AI and predictive analytics:

Organizations should use digital analytics and AI techniques to improve the accuracy and transparency of accounting disclosure, including financial estimates, financial performance forecasting, and risk disclosure.

2. Employee Skills:

Train accounting and financial analysis teams in **big data analysis, machine learning, and digital statistics** to ensure the optimal use of modern tools and technologies.

3. Enhancing data security and protection:

Strict policies and protocols need to be put in place to protect sensitive financial information from hacking or manipulation, and to ensure data privacy during disclosure.

4. Implement an integrated framework for big data: A

comprehensive framework that links the characteristics of big data (5Vs) to the quality of financial disclosure should be developed, including data collection, processing, analysis, and extraction of accurate financial information.

5. Leveraging real-time and predictive reporting:

Encouraging organizations to use **real-time reports and predictive analysis** to support strategic financial decision-making and increase transparency towards investors and stakeholders.

6. Conducting follow-up studies: It

is advisable to conduct future research to assess the impact of **emerging technologies such as blockchain and the Internet of Things** on accounting disclosure in the big data environment, to enhance credibility and create greater value.

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