THE INFLUENCE OF DATA MINING ON ACCOUNTING INFORMATION SYSTEM PERFORMANCE: A MEDIATING ROLE OF INFORMATION TECHNOLOGY INFRASTRUCTURE

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Abstract

The current study aimed at examining the influence of data mining (information and communication technologies (ICTs), knowledge management (KM), data warehousing (DW), and data mining (DM) on performance and outcomes of accounting information system (AIS) application through a mediating role of information technology (IT) infrastructure. Through adopting a quantitative approach, a questionnaire was distributed on 143 individuals working within food manufacturing organizations in Jordan; primary data were screened and analyzed depending on SPSS version 27. Results of the study matched what came along with Zhang (2021) and indicated that there is a positive relationship between data mining and AIS performance in terms of the fact that data mining along with its strategies (prediction, classification, collecting, and distributing) had the ability to ease the process of managing huge amount of data and transfer it to AIS application for better processing in accounting means. However, this relationship, as according to Kim (2020), was attributed to a well-built IT infrastructure that appeared to be the main and most important aspect that played a role in determining the level of performance of both data mining and AIS applications. In conclusion, the current study summed up that adopting technology means generating more data, the more data an organization gets the more it needs to improve its data organization, storage, classification, and analysis. This can only come from organizational vigilance and total awareness of technology and how it can improve organizational ability to generate well-built information that helps in decision-making.

Keywords: Data Mining, AIS, Accounting Performance, Classification, IT Infrastructure, Prediction

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1. INTRODUCTION

Accounting information stemming from the accounting system, as well known, must be of high quality according to the qualitative characteristics of the accounting information so that stakeholders can adopt it in order to make different decisions according to the needs of each of them. In addition, accounting information is an important element of production that has an important role in determining the effectiveness and efficiency of establishments. Therefore, Tsapani, Tenidou, Pappas, and Valsamidis (2020) stated that organizations have sought to design and build advanced systems in order to control the vast amount of information necessary to manage the facilities, in order to ensure that good and accurate information reaches all administrative levels in the appropriate and timely manner, in order to use it when making rational decisions.

From another perspective, Gejing and Yang (2019) argued that information systems play a vital role in supporting the activities of the organization, whether their activities are aimed at achieving profits or not. Now, with the advancement of science and our entry into the era of information technology, all organizations have begun seeking various ways to obtain the latest scientific findings of advanced technologies that may help them delve into the world of globalization and to enter and compete in global markets. It has become necessary for the mechanisms of accounting information systems (AIS) to be modernized in various ways technological methods and means to meet the desires of stakeholders in general, and the management's desires for investment in particular.

Zhang (2021) stated that two decades ago organizations computerized their accounting information systems in an accelerated and sophisticated manner in order to keep pace with the globalization world in light of the rapid technological development. The researcher will seek through this research to identify accounting information systems and their impact on making investment decisions in light of computerized accounting systems, perhaps contributing in shedding light on new facts and thus suggesting appropriate recommendations. With the course of time, many technological ideas have entered the world of accounting as an approach to increase the efficiency of accounting systems and guarantee their ability to support all activities within the organization especially in decision-making (Al-Odat, 2013). Among such IT ideas is data mining which entered the field of accounting launching from its ability to deal with data, classify it, manage it and process it in a way that can give finite and valid information (Kim, 2020).

Based on the above argument, the current study aimed at examining the influence of data mining on the performance of AIS applications through the mediating role of IT. Reaching such aim depended on the following objectives:

- Identify the applicability of data mining within accounting activities;
- Highlight how data mining is interconnected with AIS applications;
- Realize the importance of IT infrastructure in supporting the relationship between data mining and AIS applications;
- Based on the main aim of the study, the researcher was able to create the following model of study, from which hypotheses were derived.

The current paper followed the logical sequence of notions' appearance. The structure of this paper is as follows. Section 1 presents the introduction of the literary gap while Section 2 reviews the relevant literature. Section 3 analyses the methodology that has been used to conduct empirical research while Section 4 deals with the SPSS results of the study and the description of developed tables. Section 5 discusses the results of the study followed by Section 6, which gave out the conclusion of the paper.

2. LITERATURE REVIEW

2.1. Data mining

Data mining has been defined varied by different researchers. For Gandy (2019), data mining is a process that involves identifying patterns, correlations, and anomalies within the volume of data sets for purposes of predicting outcomes. Leskovec, Rajaraman, and Ullman (2020) add that a broad range of techniques can then be utilized to make sense of this information to cut costs, reduce risks, improve customer relationships, and increase revenues. In a similar definition, Ping (2021) sees data mining or knowledge discovery of databases as a process involving identifying meaningful patterns in large databases or mining or extracting knowledge from large sets of data. In the same vein but within the context of computer science, Meiryani, Suzan, Tsudrajat, and Daud (2021) conceptualize data mining as a semi-automatic or automatic technical process that involves analyzing large volumes of scattered data to turn it into useful knowledge and make sense of it through discovering useful and interesting relationships and patterns. The consensus is that data mining focuses on revealing correlations, patterns, and anomalies in large volumes of data to predict results.

Data mining is closely related to knowledge management (KM) and business intelligence (BI) (Chitra & Subashini, 2013). Data mining links these two, however, while knowledge management focuses on creating, developing, and implementing knowledge in an attempt to improve the firm's performance, business intelligence focuses on applications and technologies that help collect, retrieve and analyze data in an attempt to make business decisions in an efficient manner (Wu, 2021). Papík and Papíková (2021) also emphasize that knowledge management deals with human subjective knowledge while data mining serves as a business intelligence tool for managing knowledge.

These two classes of data mining depend on the specific tasks to be achieved: predictive tasks and descriptive tasks. Descriptive data mining encompasses the characterization or review of common things of data particularly in the data repository (i.e., the data's general properties). Data mining techniques associated with descriptive mining include summarization, clustering, sequence pattern, and association rule mining. Predictive mining focuses on the implementation of present data aimed at creating predictions. These techniques predict the behavior or new data set by performing inference on the data set. Data mining techniques associated with predictive mining include time series analysis, prediction, regression, classification, and regression. Classification is aimed at assigning an attribute of a class to a new set of records. It determines the object's class based on its attributes by deriving a model. It creates a collection of records with their sets of attributes.

Prediction tasks are useful in predicting possible values of future data or missing data. It encompasses creating a model for predicting new data set values by developing models based on the existing data. Time-series analysis constitutes a sequence of events with one event or more preceding events determining the next event. This model reflects measured processes and encompasses methods for assessing time-series data used for extracting useful statistics, rules, trends, and patterns.

Association reveals connections or associations among item sets. It reveals relationships between objects. For this reason, association analysis is commonly used in advertising, direct marketing, catalog, design, and management. Clustering is useful in identifying similar data objects. Similarities may be revealed based on factors such as responsiveness to certain actions, purchase behavior, or geographical locations. Summarization is data generalization aimed at yielding a smaller set of aggregated relevant data. An example is the summation of customer shopping into total spending, total products, and offers used (Kwak, Shi, & Lee, 2021).

As revealed in the extant literature, data mining is related to accounting in several ways. For example, based on The American Institute of Certified Public Accountants (AICPA), data mining is one of the techniques shaping the accounting profession. Similarly, data mining has also been identified by the Institute of Internal Auditing (IIA) as one of the key research priorities in accounting (Amani & Fadlalla, 2017; Kadam & Raval, 2014). Reinforcing this view, Pulakkazhy and Balan (2013) held that the data mining technique is by nature interdisciplinary as it combines multiple fields, accounting, machine learning, visualization, information science, statistics, and database management. Pulakkazhy and Balan (2013) added that there are vast data mining applications in the finance and accounting profession. For example, data mining techniques and artificial neural networks are used to develop financial distress prediction techniques/models as demonstrated by Yang, Adomavicius, Burtch, and Ren (2018). In this study, Chen and Du (2009) demonstrated the feasibility of using the financial distress prediction model for predicting bankruptcy to empirically examine 68 Taiwan listed firms and 37 ratios. Data mining is also used in accounting and finance as an application for detecting fraudulent financial transactions or statements. Several attempts have also been made to use data mining techniques to develop models for predicting fraud occurrence in accounting (Gejing & Yang, 2019). Elsewhere, the use of neutral network data mining systems has been documented in the extant literature for predicting stock market prices, portfolio management, firm's financial performance, going concern reporting, and customer credit risk estimation (Amani & Fadlalla, 2017).

A literature review by Amani and Fadlalla (2017) revealed that areas in accounting that have benefitted from data mining are compliance and assurance with particular benefits as business health, fraud detection, and forensic accounting. Reinforcing this view, Gejing and Yang (2019) observed that the data mining process has been used widely by internal auditors and forensic accountants to evaluate metadata and data sets with a view to discovering trends, anomalies, and patterns to help provide a prediction for future events and answer business queries. Gejing and Yang (2019) further opined that data mining software encompasses software to classify, relate, partition, analyze and explore data sets used for developing different models for purposes of achieving business objectives. In the same vein, some companies develop models, including classification, predictive, and exploration models to identify vendors, types of transactions, or personnel associated with purchasing fraud. Furthermore, a variety of business applications in accounting uses data mining for the prediction and classification of events, including predicting firm's bankruptcy.

2.2. The way data mining supports AIS performance

Data mining can support AIS performance in several ways. For example, according to Wu (2021), data mining techniques can be used to access data available in AIS. The necessity of data mining for AIS has grown because of the increasing digital data acquisition that resulted in the increase in the volume of data stored in data warehouses, databases, and other forms of data repositories (Wang, 2021). Also, it was argued that data mining tools can be used to extract valuable information that could be hiding in the overwhelming volume of data as these tools can help lessen information poor problems and data-rich problems. These data could be useful in AIS (Zoto, 2014).

In another study, Min (2021) argued that the rise of AIS in firms has led to the growth of accounting-relevant data. This has led to the increase in the complexity of data analysis for accounting reasons. While it is possible to undertake a basic data analysis using simple tools such as reporting, query, spreadsheets, and database systems, it is preferable to utilize specific tools associated with data mining for this purpose. According to Min (2021), knowing basic information technology and statistics tools afforded by data mining may help accountants to forecast future financial situations and explain accounting events.

According to Rong (2021), as an interdisciplinary science that stands between information technology and statistics, data mining can support AIS through its associated techniques, including association rule mining, classification, and clustering. As demonstrated by Sanad and Al-Sartawi (2021), these data mining techniques can support AIS by detecting fraud in the complexities of financial data and large data volumes.

Data mining techniques can also be employed to help assess the data quality in AIS as demonstrated by Zoto (2015). In this study, Zoto (2015) demonstrated that data mining techniques could be used to evaluate data quality in AIS. Zoto (2015) did this by deriving the best factors thought to affect data quality in AIS. Next, data mining techniques were explored with the focus on the accurate rates of using each data mining technique to evaluate the quality of data in AIS. Accordingly, data mining techniques, namely logistic regression, decision tree, and neural network, were used to evaluate the accuracy of information captured in AIS, namely training, standards, and policies applied, strategic vision, managerial staff commitment, cost/benefit analysis, and characteristics of AIS.

2.3. ICTs role in better AIS performance

Information and communication technologies (ICTs) have played a major role in creating an efficient system of accounting and increasing the performance of an organization. For many years ICTs have been used to create, augment the reliability of accounting information as well as organizational performance. More often than not accounting system will include the software fundamentals and hardware equipment that are used in the recording of the accounting information (Ganyam & Ivungu, 2019).

According to Al-Dmour (2019), some companies have experienced challenges in using ICTs as a result of the nature of technology that keeps on evolving. Each year new things continue to come up daily. The major challenge includes computer language, which poses challenges to users and requires a high level of training before they are used. The other challenge has been the problems with adjusting to frequent changes. Some of the workers would lose interest, which will end up reducing their morale at work. Other workers will see it as a specific task so as to maintain relevance something that would give them a focus on the job. From a bigger perspective, there are some challenges in measuring the benefits and costs of ICTs on the performance of an organization. Even though ICTs have been reported to bring many positive changes within an organization, the use of technology by employees has not been easy. Different employees are forced to follow the trends hence being forced to increase their amount of investment (Haleem & Kevin, 2018).

The adoption of ICTs in accounting practice has made the accounting practice easier by changing the operations of accounting practices from the traditional methods that were time-consuming and less efficient, into modern effective methods. Before the introduction of ICTs, daily records were kept by humans. Some vital documents such as financial statements and statements of financial position and comprehensive income were done manually. In other words, ICTs adoption has made changes in the organization influencing the accounting system as well as the performance of an organization. Today, for a company to stay relevant and competitive, it has to use accounting decisions and plans (Adenike & Adewoye, 2018).

2.4. The way knowledge management supports AIS performance

For some time now, knowledge has played a vital role in achieving and building outstanding performance in an organization. Knowledge is considered to be the latest factor of production that is recognized as a vital resource for establishing wealth in the community and it is a key source of competitive advantage within an organization (Ibrahim, Ali, & Besar, 2020).

The entire world has experienced different forces that reshape management and economies requiring a change in the strategies of an organization. Some of these most vital forces include a high level of complexity, globalization, increased competition, new technology, and shifts in political and economic structures. These powers influence an organization creating a need for fast adaptability and responding rapidly, taking effective and serious initiatives that will call for continuity. As a result, there has been an emergence of different concepts that tend to improve and develop the performance of an organization (Abubakar, Elrehail, Alatailat, & Elçi, 2019).

In this case, knowledge management is a vital input of development and change today. It is a marker of a huge jump in the performance level of different organizations and institutions. Different studies in this field have reported that the use of knowledge management in an organization led to the achievement of numerous gains like increasing efficiency and effectiveness, improving performance, increasing productivity and creativity (Al Duwailah & Hashem, 2019). Knowledge management in an organization has improved the process of decision-making, achieved competitive advantage, and increased the responsibility to the changing surrounding environment (Soto-Acosta, Popa, & Martinez-Conesa, 2018). There are several organizations that do neglect the value of knowledge management and its relevance in increasing the performance of a company. Different employees fail to realize the relevance of knowledge management, the dimensions of knowledge, and how the dimensions influence the work. It is for these reasons that make many organizations fail while reducing the potential to satisfy the most basic challenge and difficulties that are faced in environments that surround the organization (Razzaq et al., 2019).

2.5. Data warehousing influence on results of AIS performance

Data warehousing is developed to analyze the needs of the customer and be able to cope with the competition from the global market by retailers. Today, data warehousing has been introduced to different organizations and industries. Data warehousing has been built for decisions that are made at the level of an enterprise to be able to store a summary of historic data that is consolidated from different systems of operations. To implement data warehousing strategies, an organization requires time as well as strong financial standings. To build data warehousing, it would take up to three years and it will cost between $2 million and $3 million (Kwarteng & Aveh, 2018).

The process of retailing is data-intensive and hence calls for a more developed extensive data warehousing that is used in analyzing the needs of the customer to cope with the competitive market of retailers. Different businesses in the market do put competition and pressure on the retailing industry. Further, the customers with more knowledge of markets, services, products, will become more sophisticated holding greater expectations (Tajvidi & Ahmadi, 2021). To be able to compete favorably, different companies introduce paradigms of marketing like relational marketing and database marketing. The reason behind introducing these concepts is to address the relevance of satisfying the experience of customers and the implementation of huge warehousing by the available business. Different types of data warehousing projects are linked to the activities of marketing to play the role of increasing relevant role in the organization becoming a competitive tool of business (Kim, 2019) In this case, an increase in data warehousing will lead to success in evaluating the payback. All the researchers and practitioners have ended up addressing the relevance of measuring the effect of information systems in the form of organizational performance. As many organizations implement data warehousing, it becomes vital to measure the payback period of data warehousing. As the trend increases, the research in this field helps to measure the impact of data warehousing on the performance of the organization (Binh, Tran, & Nga, 2020).

A well-built IT infrastructure is important for data mining. Investment in IT infrastructure improves the accuracy and efficiency of work activities (Toklu & Prashad, 2020). Data mining techniques are of different sizes requiring robust ICT systems, including client/server, mainframe, and PC platform. These applications may range in size requiring critical technological drivers. The system may require a more powerful ICT system if the number of processed queries is high. Again, the ICT system should be powerful if the size of the database is large and involves processing and maintaining large volumes of data. Relational database management and storage technology are adequate for data mining techniques and applications not exceeding 50 gigabytes. This infrastructure, however, must be enhanced significantly in order to support larger data mining applications. Extensive indexing capabilities may be added to improve the performance of the query. Massively parallel processors (MPP) and other new hardware architectures can be used to add and help achieve improvements in order-of-magnitude in query time (Huang, 2018).

Sudha and Manikandasaran (2020) propose the procedure for adopting IT that involves four steps. The first step is technology investment and identification. This includes learning about the new technology and how to apply it. The second step is experimentation, learning, and adapting. This includes creating awareness among the user about the new technology and what is aimed at solving it. The third stage is management control and rationalization. This encompasses staff upgrading to acceptable levels of knowledge to allow them to control the technology. The last stage is a transfer of knowledge, which includes spreading its associated benefits.

Based on the literature review above, the following hypotheses were developed:

H1: There is an influence of data mining utilization on AIS performance.

H2: There is an influence of data mining utilization on IT infrastructure.

H3: There is an influence of IT infrastructure on AIS performance.

H4: There is an influence of data mining utilization on AIS performance that is attributed to IT infrastructure.

3. RESEARCH METHODOLOGY

3.1. Methodological approach

In order to reach the objectives of the study and realize its aim, a quantitative approach was adopted. This approach was defined by Yu et al. (2020) as one of the measurement methods that are used in scientific research and studies, to test hypotheses, and then apply the acquired theories and concepts on the ground for scientific research. Some experts in scientific research liken the quantitative method to being the big map used by desert goers to reach their goal, discover a specific area, or to reach a specific place, as well as the map to clarify the relationship between one place and another.

3.2. Population and sampling

The population of the study consisted of all financial and accounting managers within food manufacturing organizations in Jordan. A convenient sample of 160 individuals was chosen to represent the study population.

3.3. Study tool

A questionnaire was adopted to be the study tool. The questionnaire was built on 5-point Likert scale and was divided into two main sections. The first took into perspective demographics of the study sample (gender, age, experience, and qualification), while the other section contained variables related to data mining usability in AIS applications including (information and communication technologies (ICTs), knowledge management (KM), data warehousing (DW), and data mining (DM)). Due to COVID-19 pandemic, the questionnaire was distributed online through Google forms, after the application process researcher was able to retrieve 143 properly filled questionnaires, which gave a response ratio of 89.3% as statistically accepted.

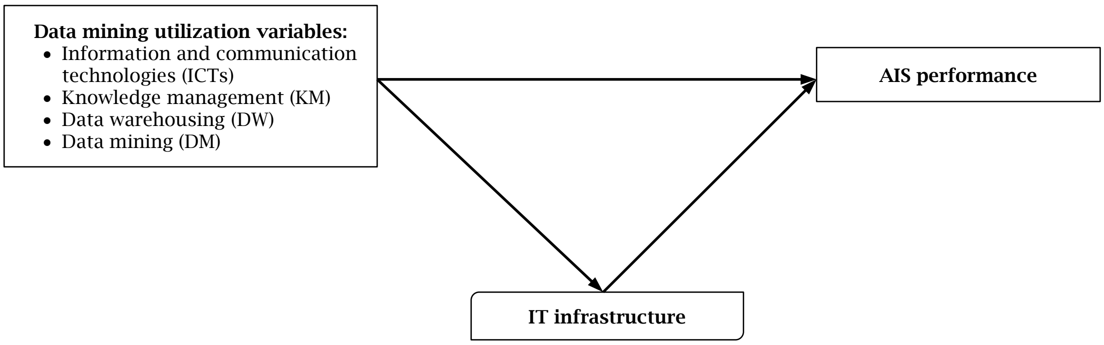
3.4. Data screening and analysis

SPSS was used in order to screen and analyze the gathered data. Cronbach's alpha was adopted in order to verify the study tool's reliability. The alpha value = 0.948, which is an excellent ratio, being higher than the acceptable percentage of 0.60 (Sekaran & Bougie, 2019). Following statistical methods were used: mean and standard deviation, frequency and percentage, structural equation analysis.

3.5. Research model

As it can be seen from Figure 1 below, the relationship between the study variables appear from the interconnectedness between arrows describing the hypotheses of the study. Based on Figure 1, the study hypothesize that data mining along with its variables has a statistical influence on both AIS performance and IT infrastructure, however, this statistical significance is mediated by the existence of IT infrastructure.

Figure 1. Study model



4. RESULTS

4.1. Demographic results

Demographics of the study sample was calculated, as it can be seen from Table 1 below, majority of individuals who responded to the questionnaire were males forming 69.2% of the sample compared to females who only appeared forming 30.8% of the total. Regarding age ranges, it was seen through analysis that majority of respondents were with the age range of 28–33 years old forming 43.4% of the total sample who held BA degree forming 78.3% and had an experience of more than 6 years with more than half of the sample forming 60.8% of the total sample.

Table 1. Sample analysis according to answers

	Frequency	*Percent*
Gender		
Male	99	69.2
Female	44	30.8
Age		
22–27	28	19.6
28–33	62	43.4
34–39	37	25.9
40+	16	11.2
Education		
BA	112	78.3
MA	26	18.2
PhD	5	3.5
Experience		
0–2	18	12.6
3–5	38	26.6
6+	87	60.8
Total	143	100.0

4.2. Questionnaire results

In testing individuals' responses to the questionnaire statements, Table 2 below indicated that individuals had positive attitudes regarding statements of the questionnaire as the mean of all statements scored higher than the mean of scale 3.00. Looking deeper into analysis, one can see that the highest statement in terms of mean was articulated "the organization makes sure that IT infrastructure is well-built and supported" scoring mean of 3.81/5.00 compared to the least positively answered statement which was articulated scoring mean of 3.09/5.00 but still positive as it was higher than mean of scale.

Table 2. Mean and standard deviation of sample responses to questionnaire (Part 1)

Data mining utilization variables	*Mean*	*Std. Deviation*
Information and communication technologies (ICTs)		
The organization is always equipped with the best ICTs.	3.46	1.413
Is it important to have well-built ICTs devices and networks?	3.39	1.306
Data mining is supported by ICTs in order to give a good performance	3.37	1.191
All software will not be useful if ICT was not good enough.	3.36	1.224
Knowledge management (KM)		
Employees have all the needed knowledge regarding the use and application of AIS.	3.33	1.174
Employees share the needed information that is related to data warehouses.	3.19	1.192
There is a good level of experience among employees regarding data mining in accounting.	3.17	0.981
Knowledge sharing is an essential step towards better AIS performance.	3.14	0.924
KM is a vehicle to share corporate knowledge so that the employees may be more effective and be productive in their work.	3.25	0.930
Data warehousing (DW)		
The amount of data available cannot be controlled without data mining and DW.	3.43	0.960
DW can process, collect and manage data from varied sources.	3.28	1.010
DW can provide meaningful business insights.	3.33	1.019
DW is typically used to connect and analyze business data from heterogeneous sources.	3.36	0.983
DW is a blend of technologies and components, which aids the strategic use of data.	3.13	1.194

Table 2. Mean and standard deviation of sample responses to questionnaire (Part 2)

Data mining utilization variables	*Mean*	*Std. Deviation*
Data mining (DM)		
DM in accounting finds anomalies, patterns, and correlations within large data sets to predict outcomes.	3.09	1.210
DM uses a broad range of techniques.	3.43	1.147
DM in accounting can increase revenues, cut costs, improve customer relationships, reduce risks, and more.	3.39	1.048
In accounting, DM can dig through data to discover hidden connections and predict future trends.	3.34	1.068
DM is based on knowledge discovery in databases.	3.31	1.022
AIS performance		
AIS is the main accounting tool that the organization depends on.	3.52	0.926
AIS proved its good performance during the COVID-19 pandemic.	3.31	0.913
AIS performance should be always ready and well-built in order to face sudden risks.	3.25	1.129
AIS applications performance depends highly on the nature of data provided.	3.25	1.091
If the data is not well-built, the information given by AIS will not be valid.	3.45	1.012
IT infrastructure		
The organization gives extra attention to IT infrastructure.	3.22	0.967
There is always follow up for all IT devices and networks in order to ensure the performance of accounting applications.	3.66	1.169
There is an ongoing update to all software and devices that are used in order to mine data and collect it.	3.62	1.149
The organization makes sure that IT infrastructure is well-built and supported.	3.81	1.034
IT base in the organization is the main backup for accounting activities.	3.61	1.068
IT storage and warehouses are always available when they are needed.	3.57	1.247

Table 3 below gave a general indication of respondents' attitudes towards variables of study in general, it can be seen from Table 3 that all variables were positively answered as they have scored higher than the mean of scale 3.00, however, IT infrastructure appeared to have the highest mean scoring 3.52/5.00. This was seen to be statistically positive and it showed that respondents managed to deal with the statements of the questionnaire and understood its meaning as all statements were related to the main topic of the study.

Table 3. Mean and standard deviation of variables

Variables	*Mean*	*Std. Deviation*
ICT	3.3951	1.13111
KM	3.2168	0.89710
DW	3.3063	0.86425
DM	3.3105	0.94666
AIS performance	3.3552	0.86347
IT infrastructure	3.5828	0.93403

4.3 Hypotheses testing

Before starting structural analysis, the proposed study model must be validated by a set of indicators to check the suitability of the model of this study, as follows:

Table 4. Fit model

Indicator	*AGFI*	x^2/df	*GFI*	*RMSEA*	*CFI*	*NFI*
Value recommended	> 0.8	< 5	> 0.90	≤ 0.10	> 0.9	> 0.9
References	Shevlin and Miles (1998)	Tabachnick and Fidell (2007)	Miles and Shevlin (1998)	MacCallum Browne, and Sugawara (1996)	Hu and Bentler (1999)	Hu and Bentler (1999)
Value of model	0.896	4.686	0.922	0.087	0.934	0.918

The results in Table 4 shows that the above indicators have passed the values recommended by the relevant references, this leads to the hypotheses testing.

Structural equation analysis is used to test the research hypotheses. The hypotheses will be accepted if the p-value is less than 0.05.

Table 5. The results of testing hypotheses

			Total effect	*Indirect effect*	*Direct effect*	*T-value*	*P*	*Decision*
IT infrastructure	<---	Data mining	0.633		0.633	8.801	*H2*	accept
AIS performance	<---	Data mining	0.848	0.22	0.628	8.917	*H1*	accept
AIS performance	<---	IT infrastructure	0.347		0.347	5.892	*H3*	accept

H1: There is an influence of data mining utilization on AIS performance.

Table 5 shows that (*Direct effect* = 0.628; $P < 0.05$; $P = 0.000$). This means that there is an influence of data mining utilization on AIS performance.

H2: There is an influence of data mining utilization on IT infrastructure.

Table 5 shows that (*Direct effect* = 0.633; $P < 0.05$; $P = 0.000$). This means that there is an influence of data mining utilization on IT infrastructure.

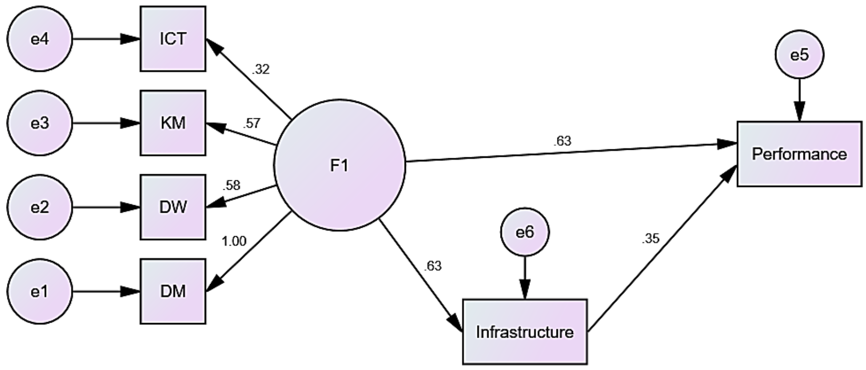
H3: There is an influence of IT infrastructure on AIS performance.

Table 5 shows that (*Direct effect* = 0.347; $P < 0.05$; $P = 0.000$). This means that there is an influence of IT infrastructure on AIS performance.

H4: There is an influence of data mining utilization on AIS performance that is attributed to IT infrastructure.

Table 5 shows that (*Indirect effect* = 0.22; $P < 0.05$; $P = 0.000$). This means that there is an influence of data mining utilization on AIS performance that is attributed to IT infrastructure.

Figure 2. Path analysis



5. DISCUSSION

The current study aimed at examining the influence of data mining on AIS performance: the mediating role of its infrastructure, for that sake, variables of data mining including (information and communication technologies (ICTs), knowledge management (KM), data warehousing (DW), and data mining (DM)) were chosen in order to represent their influence on AIS applications through the mediating role of IT infrastructure. The study was able to reach the following results:

- There is an influence of data mining utilization on AIS performance.
- There is an influence of data mining utilization on IT infrastructure.
- There is an influence of IT infrastructure on AIS performance.
- There is an influence of data mining utilization on AIS performance that is attributed to IT infrastructure.

The study demonstrated the ability of data mining in the accounting service through its direct impact on AIS such as bankruptcy prediction using capital market data, where big data in the context of accounting and finance is well suited for applications of data analysis tools such as data mining through access to similar forecast rates in periods. Different time periods correspond to what was indicated by both Amani and Fadlalla (2017) and Lin, Ke, and Tsai (2017). The study also confirmed that the use of data mining in the field of accounting is a good way to predict bankruptcy using traditional analysis of reference, logarithm, or multiple discriminatory analyses. The study also found that due to advances in computer technology, it is easier to apply data mining techniques in accounting in other accounting and financial contexts such as auditor changes, audit opinion forecast studies, weak internal control studies, dividend distributions, and market return variables.

The study, with all its variables, was able to prove the main hypothesis, which is that there is a positive relationship between data mining and applications of accounting information systems. This relationship was proven through the study to be supported by the extent of development and robustness of the organization's technological infrastructure, as both variables (systems accounting information and data mining) depend on their outputs on technology in all its forms, this dependence comes through the development and modernization of the devices used, the communication network, the available internet networks, and the users' experience in dealing with applications related to data mining and the growth of accounting information.

That is, the study was able to prove that the technological development in the infrastructure greatly contributes to making the applications of accounting information systems able to employ and benefit from the data that are excavated, and thus give the desired results in a highly effective way and in a manner that is enough to serve the organization which was agreed on by Tsapani et al. (2020).

On the other hand, the study found, through the results obtained, the existence of a statistically significant agreement on the possibility of using data mining strategies to evaluate and improve managerial accounting practices, and the results indicated the importance of integration between data mining strategies and the practice of managerial accounting using accounting information systems in improving the financial performance of the organization, and the results demonstrated the importance of the direct impact of the technological infrastructure on the results of data exploration and the impact that extends to the financial and operational performance of the organization as appeared by Gejing and Yang (2019) and Al-Odat (2013). In general, it has been proven that there is integration between data mining strategies and management accounting practices in improving the performance of accounting information systems.

6. CONCLUSION

Success in the current business environment requires understanding the role of modern technological methods and how to apply them in managerial accounting practices, in particular, because of the importance of this in improving the financial and operational performance of the organization. The study has shown that one of the most important methods of data mining is the most sophisticated and deepest impact on the outputs of accounting information systems through classification control, forecasting, data analysis, and discovery of relationships between them. It has also been found that there is a great benefit from data mining in the field of accounting information systems outputs, provided that the technological infrastructure is strong, modern, sophisticated, and able to absorb the huge amount of information that can be produced by the organization.

The importance of the current paper stems from the fact that data mining today is considered to be one of the most influential aspects in the IT world; it is the mainstream in collecting, organizing, classifying and interpreting data that would help complete functions of AIS and its applications. For future research, it is recommended to examine how data mining would help complete functions of expert systems for top management.

However, the current research was limited to the reached population and sample due to COVID-19 pandemic health precautions, as it was highlighted before. The current study would be more deeply investigated if it was conducted based on a qualitative approach, but since it was hard to conduct interviews with the sample and meet them in person, the quantitative approach was more suitable. Another limitation appeared to be organizations that approved to cooperate in conducting the current study, in addition to the availability of sample individuals and their cooperation level.

Based on the above mentioned, the current study recommends the following. Organizations must focus on gathering between data mining and AIS application, this focus comes from training employees on how to get the most of data mining and employ it in AIS outcomes. Such fields are in constant development and updating, it is recommended that organizations keep attending conferences, seminars, and workshops that are related to AIS application and the use of data mining in that field.

REFERENCES

1. Abubakar, A. M., Elrehail, H., Alatailat, M. A., & Elçi, A. (2019). Knowledge management, decision-making style and organizational performance. *Journal of Innovation & Knowledge*, *4*(2), 104–114. https://doi.org/10.1016/j.jik.2017.07.003
2. Adenike, A. T., & Adewoye, J. O. (2018). Investment in accounting information system and sales growth: An investigation of Nigeria small and medium enterprise. *Journal of Accounting and Taxation, 10*(6), 71–77. https://doi.org/10.5897/JAT2018.0299
3. Al Duwailah, F. Y., & Hashem, T. N. (2019). The impact of knowledge management on CRM approaches. *Management and Organizational Studies, 6*(1), 19–30. https://doi.org/10.5430/mos.v6n1p19
4. Al-Dmour, A. (2019). The impact of the reliability of the accounting information system upon the business performance via the mediating role of the quality of financial reporting. *The International Journal of Accounting and Business Society, 26*(1), 78–111. https://doi.org/10.21776/ub.ijabs.2018.26.1.5
5. Al-Odat, A. M. T. (2013). *The adoption of data mining technology within accounting information systems in publicly listed companies in Jordan* (Doctoral dissertation, University of Tasmania). Retrieved from https://cutt.ly/jIbMsPq
6. Amani, F. A., & Fadlalla, A. M. (2017). Data mining applications in accounting: A review of the literature and organizing framework. *International Journal of Accounting Information Systems, 24*, 32–58. https://doi.org/10.1016/j.accinf.2016.12.004
7. Binh, V. T. T., Tran, N.-M., & Nga, N. T. H. (2020). Impact of accountant resource on quality of accounting information system: Evidence from Vietnamese small and medium enterprises. *ACRN Journal of Finance and Risk Perspectives, 9*, 1–14. https://doi.org/10.35944/jofrp.2020.9.1.001
8. Chen, W.-S., & Du, Y.-K. (2009). Using neural networks and data mining techniques for the financial distress prediction model. *Expert Systems with Applications, 36*(2), 4075–4086. https://doi.org/10.1016/j.eswa.2008.03.020
9. Chitra, K., & Subashini, B. (2013). Data mining techniques and its applications in banking sector. *International Journal of Emerging Technology and Advanced Engineering, 3*(8), 219–226. Retrieved from https://tarjomefa.com/wp-content/uploads/2018/05/9087-English-TarjomeFa.pdf
10. Cockcroft, S., & Russell, M. (2018). Big data opportunities for accounting and finance practice and research. *Australian Accounting Review, 28*(3), 323–333. https://doi.org/10.1111/auar.12218
11. Gandy, O. (2019). Data mining, surveillance, and discrimination in the post-9/11 environment. In K. Haggerty & R. Ericson (Eds.), *The new politics of surveillance and visibility* (pp. 363–384). University of Toronto Press. https://doi.org/10.3138/9781442681880-016
12. Ganyam, A. I., & Ivungu, J. A. (2019). Effect of accounting information system on financial performance of firms: A review of literature. *Journal of Business and Management, 21*(5), 39–49. Retrieved from https://www.iosrjournals.org/iosr-jbm/papers/Vol21-issue5/Series-7/F2105073949.pdf
13. Gejing, X., & Yang, L. (2019). Research on the impact of Internet evolution on accounting information system based on data mining. *Journal of Physics: Conference Series, 1345*(5), 052055. https://doi.org/10.1088/1742-6596/1345/5/052055
14. Haleem, A. H., & Kevin, L. L. T. (2018). Impact of user competency on accounting information system success: Banking sectors in Sri Lanka. *International Journal of Economics and Financial Issues, 8*(6), 167–175. https://doi.org/10.32479/ijefi.7212
15. Huang, Y. (2018). Impacts of big data on data mining research: An empirical study of Chinese journals. *Proceedings of the 3rd International Conference on Crowd Science and Engineering* (pp. 1–5). https://doi.org/10.1145/3265689.3265706
16. Hu, L.-t., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1–55. https://doi.org/10.1080/10705519909540118
17. Ibrahim, F., Ali, D. N. H., & Besar, N. S. A. (2020). Accounting information systems (AIS) in SMEs: Towards an integrated framework. *International Journal of Asian Business and Information Management (IJABIM), 11*(2), 51–67. https://doi.org/10.4018/IJABIM.2020040104

18. Kadam, S., & Raval, M. (2014). Data mining in finance. *International Journal of Engineering Trends and Technology, 16*(8), 377–381. Retrieved from https://studylib.net/doc/12932226/data-mining-in-finance--sahil-kadam---manan-raval
19. Kim, K. I. (2019). A study on the important factors for accounting information quality impact on AIS data quality outcomes. *Journal of Convergence for Information Technology, 9*(12), 24–29. https://doi.org/10.22156/CS4SMB.2019.9.12.024
20. Kim, K. I. (2020). Accounting information processing model using big data mining. *Journal of Convergence for Information Technology, 10*(7), 14–19. https://doi.org/10.22156/CS4SMB.2020.10.07.014
21. Kwak, W., Shi, Y., & Lee, C. F. (2021). Data mining applications in accounting and finance context. In C. F. Lee & J. C. Lee (Eds.), *Handbook of financial econometrics, mathematics, statistics, and machine learning* (pp. 823–857). https://doi.org/10.1142/9789811202391_0021
22. Kwarteng, A., & Aveh, F. (2018). Empirical examination of organizational culture on accounting information system and corporate performance: Evidence from a developing country perspective. *Meditari Accountancy Research, 26*(4), 675–698. https://doi.org/10.1108/MEDAR-01-2018-0264
23. Leskovec, J., Rajaraman, A., & Ullman, J. D. (2020). *Mining of massive data sets* (3rd ed.). Cambridge University Press. https://doi.org/10.1017/9781108684163
24. Lin, W.-C., Ke, S.-W., & Tsai, C.-F. (2017). Top 10 data mining techniques in business applications: A brief survey. *Kybernetes, 7*, 1158–1170. https://doi.org/10.1108/K-10-2016-0302
25. MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods, 1*(2), 130–149. https://doi.apa.org/doi/10.1037/1082-989X.1.2.130
26. Meiryani, Suzan, L., Tsudrajat, J., & Daud, Z. M. (2020). Los sistemas de información contable como factor crítico de éxito para mejorar la calidad de la información contable [Accounting information systems as a critical success factor for increased quality of accounting information]. *Revista Espacios, 41*(15). Retrieved from http://www.revistaespacios.com/a20v41n15/a20v41n15p02.pdf
27. Min, R. (2021). Application of data mining technology in management accounting from data flow perspective. *Proceedings of 2021 Third International Conference on Inventive Research in Computing Applications (ICIRCA)* (pp. 1156–1159). IEEE. https://doi.org/10.1109/ICIRCA51532.2021.9544629
28. Papík, M., & Papíková, L. (2021). Application of selected data mining techniques in unintentional accounting error detection. *Equilibrium. Quarterly Journal of Economics and Economic Policy, 16*(1), 185–201. https://doi.org/10.24136/eq.2021.007
29. Ping, W. (2021). Data mining and XBRL integration in management accounting information based on artificial intelligence. *Journal of Intelligent & Fuzzy Systems, 40*(4), 6755–6766. https://doi.org/10.3233/JIFS-189509
30. Pulakkazhy, S., & Balan, R. S. (2013). Data mining in banking and its applications — A review. *Journal of Computer Science, 9*(10), 1252–1259. https://doi.org/10.3844/jcssp.2013.1252.1259
31. Qatawneh, A. M., & Bader, A. (2020). Quality of accounting information systems and their impact on improving the non-financial performance of Jordanian Islamic banks. *Academy of Accounting and Financial Studies Journal, 24*(6), 1–19. Retrieved from https://www.abacademies.org/articles/quality-of-accounting-information-systems-and-their-impact-on-improving-the-nonfinancial-performance-of-jordanian-islamic-banks-9758.html
32. Qatawneh, A., & Bader, A. (2021). The mediating role of accounting disclosure in the influence of AIS on decision-making: A structural equation model [Special issue]. *Journal of Governance and Regulation, 10*(2), 204–215. https://doi.org/10.22495/jgrv10i2siart2
33. Razzaq, S., Shujahat, M., Hussain, S., Nawaz, F., Wang, M., Ali, M., & Tehseen, S. (2019). Knowledge management, organizational commitment and knowledge-worker performance: The neglected role of knowledge management in the public sector. *Business Process Management Journal, 25*(5), 923–947. https://doi.org/10.1108/BPMJ-03-2018-0079
34. Rong, H. (2021). Data information gain method of accounting computerization based on data mining. *Proceedings of 2021 International Conference of Social Computing and Digital Economy (ICSCDE)* (pp. 113–116). IEEE. https://doi.org/10.1109/ICSCDE54196.2021.00035
35. Sanad, Z., & Al-Sartawi, A. (2021). Financial statements fraud and data mining: A review. In A. M. Musleh Al-Sartawi, A. Razzaque, & M. M. Kamal (Eds.), *Proceedings of EAMMIS 2021: Artificial intelligence systems and the Internet of things in the digital era* (pp. 407–414). Springer. https://doi.org/10.1007/978-3-030-77246-8_38
36. Sekaran, U., & Bougie, R. (2019). *Research methods for business: A skill-building approach*. Hoboken, NJ: John Wiley & Sons.
37. Shevlin, M., & Miles, J. N. V. (1998). Effects of sample size, model specification and factor loadings on the GFI in confirmatory factor analysis. *Personality and Individual Differences, 25*(1), 85–90. https://doi.org/10.1016/S0191-8869(98)00055-5
38. Soto-Acosta, P., Popa, S., & Martinez-Conesa, I. (2018). Information technology, knowledge management and environmental dynamism as drivers of innovation ambidexterity: A study in SMEs. *Journal of Knowledge Management,* 22(4), 824–849. https://doi.org/10.1108/JKM-10-2017-0448
39. Sudha, S., & Manikandasaran, S. S. (2020). Asynchronous password-based authentication and Service_Provider_ID module for secured cloud environment. *International Journal of Computer Theory and Engineering, 12*(4), 85–91. https://doi.org/10.7763/IJCTE.2020.V12.1269
40. Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston, MA: Pearson.
41. Tajvidi, E., & Ahmadi, P. (2021). The impact of business-IT coordination culture on the performance of accounting information systems considering the dynamics of the environment. *International Journal of Finance & Managerial Accounting, 6*(21), 39–51. Retrieved from https://ijfma.srbiau.ac.ir/article_17232.html
42. Toklu, H. Z., & Prashad, R. (2020). Research and data mining during the COVID-19 pandemic. *HCA Healthcare Journal of Medicine, 1*(5), 1. https://doi.org/10.36518/2689-0216.1197
43. Tsapani, E., Tenidou, E., Pappas, D., & Valsamidis, S. (2020). Knowledge mining from accounting data as imechanism for decision support. *Journal of Engineering Science and Technology Review, S1*(2020), 112–177. Retrieved from http://www.jestr.org/downloads/SpecialIssue2020/fulltext23SE.pdf

44. Wang, D. (2021). Massive data mining for intelligent accounting informationization on hospital financial management system. *Proceedings of 2021 Third International Conference on Inventive Research in Computing Applications (ICIRCA)* (pp. 1546–1549). IEEE. https://doi.org/10.1109/ICIRCA51532.2021.9544873
45. Wu, Q.-F. (2021). Distance teaching method of accounting informatization course based on big data mining. In W. Fu, S. Liu, & J. Dai (Eds.), *Proceedings of International Conference on E-Learning, E-Education, and Online Training* (pp. 155–166). Springer. https://doi.org/10.1007/978-3-030-84383-0_14
46. Yang, M., Adomavicius, G., Burtch, G., & Ren, Y. (2018). Mind the gap: Accounting for measurement error and misclassification in variables generated via data mining. *Information Systems Research, 29*(1), 4–24. https://doi.org/10.1287/isre.2017.0727
47. Yu, F., Haynes, S. E., Teo, G. C., Avtonomov, D. M., Polasky, D. A., & Nesvizhskii, A. I. (2020). Fast quantitative analysis of timsTOF PASEF data with MSFragger and IonQuant. *Molecular & Cellular Proteomics, 19*(9), 1575–1585. https://doi.org/10.1074/mcp.TIR120.002048
48. Zhang, X. (2021). Application of data mining and machine learning in management accounting information system. *Journal of Applied Science and Engineering, 24*(5), 813–820. Retrieved from http://jase.tku.edu.tw/articles/jase-202110-24-5-0018.pdf
49. Zoto, E. (2014). Data quality and accounting information systems. *Perspectives of Innovations, Economics and Business (PIEB), 14*(1), 34–41. https://doi.org/10.15208/pieb.2014.04
50. Zoto, E. (2015). Data quality in accounting information systems: Comparing several data mining techniques. *Journal of Multidisciplinary Engineering Science and Technology (JMEST), 2*(5), 1155–1162. Retrieved from http://www.jmest.org/wp-content/uploads/JMESTN42350765.pdf
51. Zoto, E., & Tole, D. (2014). The main factors that influence data quality in accounting information systems. *International Journal of Science, Innovation & New Technology, 1*(9). https://doi.org/10.15208/pieb.2014.04