THE IMPACT OF IT GOVERNANCE AND ADMINISTRATIVE INFORMATION QUALITY ON DECISION-MAKING IN THE BANKING SECTOR

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Abstract

This study aims to investigate the impact of the relationship between information technology (IT) governance and administrative information quality on decision-making in the banking industry. The study is motivated by the increasing importance of IT in the banking sector and the need to ensure the quality and reliability of administrative information. The study uses a quantitative research design, and the data was collected from 197 respondents working in different Saudi Arabian banks. This study's findings indicate a significant positive relationship between IT governance and administrative information quality in the banking industry. Furthermore, the study found that administrative information quality significantly impacts decision-making in the banking industry. The study concludes that effective IT governance and the provision of high-quality administrative information are critical factors in improving decision-making in the banking industry. Overall, this study provides valuable insights into the importance of IT governance and administrative information quality in the banking industry and how they can contribute to improved decision-making processes. The findings of this study have implications for banks and their management in terms of developing effective IT governance practices and improving the quality of administrative information.

Keywords: Information Technology, Corporate Governance Principles, IT Governance, Quality of Information, Decision-Making

1. INTRODUCTION

The banking industry is regarded as one of the most significant and delicate economic sectors, and it has a significant impact on the development of national economies since it plays a crucial role in the financial and economic systems and has a positive effect on economic growth by mobilising the necessary savings for economic expansion and distributing experts in a variety of investment and exploitation areas (Alzahrani & Almazari, 2020). Therefore, decision-making effectiveness is critical to success in this banking sector. Financial institutions are expected to make decisions that balance risk and

reward while being consistent with regulatory requirements. Understanding the decision-making processes that enable bank managers to achieve the bank's objectives of providing financial support to businesses and other organisations is critical, given the centrality of banks as a source of funding (Alkhatib & Harsheh, 2012). In addition, information technology (IT) governance and administrative information quality are among the most important factors influencing banks' decision-making. IT governance is critical for decision-making, as it ensures that the organisation has accurate and timely information that can be used to make the right decisions. Administrative information quality is also critical for decision-making, as inaccurate or incomplete information can lead to poor decisions.

Large-scale banking firms worldwide have been the subject of studies demonstrating that decision-making is influenced by IT governance and the quality of administrative information available, and managers are often held accountable for right or poor decisions (Abumandil & Hassan, 2016). The effectiveness of decision-making is significantly influenced by IT governance and the quality of administrative information although the lack of such studies on Saudi banks.

This research has the potential to benefit a wide range of Saudi banking sector employees and management by providing a high-level overview of the interplay between IT governance, administrative information quality, and banking sector decision-making in the country. In addition, it will serve as a resource for numerous industry leaders. This study's findings may serve as a crucial guidepost for policymakers to consider these elements in making better, more long-lasting decisions. Also, the research has the potential to expand our understanding of how IT governance and administrative information quality affect banking sector decision-making.

The main objective of this paper is to explore the relationship between IT governance and administrative information quality and their impact on decision-making in the Saudi Arabian banking industry. This study aimed to fill a research gap since previous studies were limited and mainly focused on developed countries. Only a few studies, such as those conducted by Abumandil and Hassan (2016), Ahmad and Zink (1998), and Beersma et al. (2016), have examined this relationship in developing countries, particularly in the Middle East. Therefore, the research aimed to bridge this gap by examining the effect of IT governance and administrative information quality on decision-making in the banking sector in Saudi Arabia.

The remaining sections of this paper are organised as follows. Section 2 thoroughly reviews the existing literature, highlighting pertinent studies and theories that contribute to understanding the topic. Section 3 outlines the methodology employed in this research, including details about the research design, data collection methods, and analytical techniques utilised. The study results are presented in Section 4, where the findings derived from the data analysis are presented and discussed. In Section 5, a discussion takes place, providing insightful interpretations and implications of the research findings. Finally, Section 6 serves as the paper's conclusion, summarising the key findings and their significance and suggesting recommendations for further research and practical applications.

2. LITERATURE REVIEW

2.1. Decision-making effectiveness

Making decisions is an essential component of the banking industry. Making wise selections has never been more important, given the complexities of the banking industry. To successfully make judgements, managers must take into account, weigh, and evaluate several possibilities or alternatives. Decision-making is a deliberate and iterative process that involves determining, responding to, and choosing amongst options while applying utility functions (Ehsani et al., 2010).

A good decision is made after considering all relevant factors. However, this is contingent on the decision-makers availability of high-quality information (Dean & Sharfman, 1996). Previous research suggested that managers could pick up and effectively handle complex causal systems (Hagmayer & Meder, 2013). The reason for this is that there are a variety of decision-making frameworks that emphasise goal interpretation, planning, and execution, all of which require the use of metacognitive procedures that allow people to exert cognitive control (Haynie et al., 2009). The study will concentrate on how sound decisions are made, with an emphasis on the part played by IT governance and administrative information quality in the background.

Making the right decision from a range of options is the definition of a successful decision. However, to do so, it depends on the quality of the information the decision-maker has access to (Dean & Sharfman, 1996). Earlier studies revealed that managers might successfully learn and manage complicated causal systems (Hagmayer & Meder, 2013). This is because decision-making entails metacognitive procedures that enable people to exercise cognitive control by producing numerous alternative decision frameworks that emphasise interpreting, planning, and implementing goals (Haynie et al., 2009). The literature review will focus on decision-making effectiveness, emphasising the role of IT governance and administrative information quality.

Marwick (2001) investigated the role of technology and knowledge management mechanisms in supporting the organisation's strategic decision-making process. The study emphasised that information and communications technology provided solutions for dealing with knowledge, such as research and classification. The study concluded that there is a need to deal with human knowledge, not with the information used in expert systems and systems based on knowledge, which can support strategic decision-making. In Sweden, Kondratenko (2003) examined the role of thinking systems in supporting decision-making in rural areas in Latvia and Sweden. One of the most important results of the study is that thinking systems can effectively support decision-making because it is part of thinking and decision-making. In the Norwegian context, Kynoe (2007) examined the relationship between the Norwegian government decision-makers

and the organisational intelligence community. The study identified successful criteria to support possible options to support strategic business intelligence. The results indicated that the focus of the strategic business intelligence services provided by the Norwegian Intelligence Service (NIS) and Norwegian Police and Security Intelligence (NPSS) involves supporting the government in shaping Norwegian foreign and security policies. In a study about the administrative employees of the Ministry of Education in the Gaza Strip, Palestine. Another study by Tabash (2008) examined the role of management communication systems and techniques in supporting decision-making. The results revealed that employing modern communication technologies contributes to speeding up the performance of tasks and supporting the decision-making process. In the Jordanian context, Saleh (2009) examined the role of artificial intelligence (AI) in supporting decision-making in Jordanian commercial banks. The findings showed a statistically significant correlation between the application of AI techniques and decision-making effectiveness.

Similarly, Qasim (2011) investigated the effect of strategic business intelligence on the effectiveness of the decision-making process. The study found that managers have strategic business intelligence, reflected in the support and effectiveness of appropriate and influential decision-making to solve many problems. Seitovirta (2011) examined the role of organisational intelligence in decision-making and how to develop a strategic business intelligence function to support decision-making. The study found that strategic business intelligence is key in the decision-making process because it can provide decision-makers with the information necessary to support the decision-making process and increase its effectiveness. In Mosul, Iraq, Al-Abdali et al. (2012) investigated the role of information and communication technology in enhancing organisational intelligence, especially strategic business intelligence. In their study survey, most respondents agreed that information and communications technology could enhance strategic business intelligence.

Business organisations and banks face many challenges in improving decision-making effectiveness related to IT governance, which may lead to failure in the business world. They also face challenges regarding the quality of information and enhancing their competitiveness. Therefore, IT governance is a crucial strategic determinant of the success or failure of the company because of the enormous investments required and the high risks involved in business organisations.

2.2. Information technology governance

Information technology governance refers to the processes and structures organisations implement to guarantee that their IT systems and resources are aligned with their overall business aims, comply with regulatory requirements, and effectively manage risks. Effective IT governance is crucial for organisations of all sizes and industries, as IT is increasingly central to modern business operations (Khamees, 2023).

Due to the various advantages, it can provide to businesses, IT governance is an essential part of good corporate governance. The stability and credibility of financial sectors on both the local and global levels, the promotion of trade cooperation, and the strengthening of the relationship between business enterprises and stakeholders of all groups all contribute to increased profits and efficiency in business performance (Duh & Djokić, 2021). Additionally, IT governance links IT's implementation and operation to an organisation's overarching objectives. Therefore, IT governance has made it easier to keep information in a computer, as well as to retrieve it, organise it, filter it, analyse it, and then broadcast it. Organisations can be more resilient to staff turnover if they have an information management system to collect, categorise, store, and disseminate the best practices across the enterprise (Antunes & Pinheiro, 2020).

In a study by Abu Musa (2005), the researcher analysed and evaluated the intellectual framework of the elements that define the components and dimensions of IT governance in business organisations. Moreover, the researcher developed the balanced scorecard model as a proposed model for evaluating the strategic performance of IT governance. The results showed that IT governance is critical to corporate governance in business organisations. Therefore, appropriately applying the IT governance method requires having a set of essential elements, controls, and standards in business organisations, the most important of which is the application of enterprise resource planning (ERP) systems. In another study by Abdel-Sadeq (2010), the researcher measured the effect of disclosing operational information about the performance of the company's economic unit. The study concluded that disclosing operational performance information should consider the information's contribution to improving investors' ability to generate profits and support the knowledge of dealers in stock markets.

The results of another study by El-Kashef (2008) contributed to building a specific framework for a governance system through which performance and control can be improved within the framework. The framework proposed a strategy that guarantees the company's survival and continuity and provides an early warning of possible crises and methods of tackling them. Accordingly, a framework for an integrated system of governance is formulated, which aims to guarantee a continuous improvement of the company's performance.

Too and Weaver (2014) emphasised that IT governance is vital in supporting and achieving the organisation's goals and implementing business strategies. Weidenmier and Ramamoorti (2006) stated that IT plays a dual role in the company as an engine and driver concerning risk assessment. IT can also be utilised to apply the eight elements of risk management, including goal-setting, internal environment, information and communication, event identification, risk assessment, risk response, control actions, and supervision to mitigate risks. According to the study, IT might raise organisational risks.

Brown (2006) studied the role of IT governance in the company's strategy. The researcher investigated Vasa warship company and focused on four factors of IT governance:
1) adding and providing value to IT;
2) IT risk management;
3) continuous IT control;
4) measuring performance regarding progress in programs and IT activities.

The study emphasised the importance of these factors, including the value and measurement of risk in IT governance. Moreover, Granlund (2007) investigated the problems and obstacles that can arise from applying IT in management accounting to integrate management accounting and IT effectively.

Li et al. (2007) identified the elements of IT governance, including leadership, organisational structures, and control processes, which ensure that IT encourages achieving the goals and strategies of the company. The study concluded that companies are less likely to have fundamental failures in internal control systems related to IT when the managers of the Information Technology Department remain in their position for a more extended period of service. IT governance is the responsibility of the executives and is not an isolated activity; instead, it is a vital part of project management to ensure that the company maintains its operations. Therefore, strategies can be implemented to expand the scope of the company's activities in the future.

Based on the successful implementation of the Australian Bureau of Statistics (ABS) information systems (IS) and IT project, Gregor et al. (2007) investigated the possibility of achieving positive results by implementing IS/IT in government organisations through the ABS case study to understand the mechanisms of applying IS/IT governance. The study proposed a framework for IT governance and its application mechanisms. In the Malaysian context, Ismail (2008) analysed the financial structure, investigated the problems of the IT governance practices, and determined the extent of their impact on information systems in a public university in Malaysia. The results showed that it is essential to establish a joint committee for IT, which reviews the priorities and costs of applying IT governance practices with the participation of all parties, i.e., students, lecturers, and employees.

De Haes and Van Grembergen (2009) investigated the relationship between IT governance practices and the willingness of business organisations to apply IT in the organisation. The results demonstrated a direct relationship between IT governance practices and the extent of progress in the application of IT in business organisations. Moreover, the researchers provided a list of the most important basic practices of IT governance. Consequently, the following null hypotheses are proposed:

H1₀: There is no statistically significant relationship between IT governance and the quality of administrative information.

H2₀: There is no statistically significant relationship between IT governance and decision-making effectiveness.

2.3. Administrative information quality

According to Michnik and Lo (2009), information can be defined as data that an organisation must process to operate effectively. If the data is not processed correctly, the organisation may not have the necessary information to function properly. Gwartney and Lawson (2002) share this view, considering data and information to be similar concepts. According to English (2005), information results from the procedure through which expertise in many areas relevant to executing commercial operations is captured. Managers can make sound

decisions with access to relevant data, which can be presented in easily understandable graphics.

English (2005) suggests that good information can assist an organisation in making effective decisions. However, the absence of information or processed data during all stages of the decision-making process can make it challenging to arrive at accurate decisions. This is due to various factors, such as an increase in the number of options, time restrictions, the complexity of the decision-making process, the possible cost of making the wrong choice, and the requirement to access pertinent information (Buhalis & Law, 2008). In essence, information is only valuable if it contributes to the effectiveness of an organisation's decision-making process. Therefore, the usefulness of information to a specific organisation should be evaluated to determine its value (DeShon & Landis, 1997).

Previous research has demonstrated that adequate information can lead to improved decision-making, increased efficiency, and a competitive advantage for organisations. According to Petter et al. (2013), a significant challenge faced by information users is the quality of information obtained from various sources. This is because many information sources are poorly organised and cannot provide high-quality information (Baars & Kemper, 2008).

Improving the quality of information necessary for decision-making can be determined by various criteria or standards. There is a relationship between improving the quality of information and achieving the most significant expected value and uncertainty (Gorla et al., 2010). Similarly, Khaleel (2009) identified the benefits of corporate governance and how to utilise these pros to improve the quality of information. The results indicated multiple criteria to judge the quality of information considering the application of corporate governance, including legal, regulatory, professional, and technical standards, which can effectively lead to developing the concept of quality of information. In Singapore, Goodwin and Seow (2002) examined the impact of the corporate governance mechanism on the quality of financial reports and the role of managers and auditors in an organisation. The role of the internal audit and audit committees in the governance process has been highlighted in the study to achieve high-quality financial and non-financial reports.

The accuracy, accessibility, timeliness, relevance, completeness, and interpretability of the information received are only a few of the various aspects or dimensions that can be utilised to assess its quality. Information quality is not solely determined by how accurate it is. By comparing measurements, calculations, or specifications from many sources to a reference point or accurate value, accuracy is assessed (Widom, 2005). Making wise decisions requires accurate information. Decision-making becomes imprecise as a result of inaccurate or incomplete information. According to DeLone and McLean (1992), accessibility is the ability of managers to get data when needed. Instead of the material itself, communication routes frequently have an impact on how well information is accessible. Accessibility problems may result from inadequate or insufficient communication channels.

According to Wang and Strong (1996), information should be relevant to the task at hand.

Relevancy was viewed by DeLone and McLean (1992) as a crucial aspect of information quality. Managers believe using pertinent data when making decisions is appropriate (Miller, 2005; Wang & Strong, 1996). The speed at which information is made available to decision-makers is called its timeliness (Schäffer, 2008). Managers may make judgements more quickly the quicker the information is available. Information completeness is the degree to which facts are comprehensive and pertinent to the task at hand (Wang & Strong, 1996): this definition, which is task-oriented, results from the information's intended use by managers. Completeness is regarded as every recorded value for a specific variable in the data-focused perspective (Ballou & Pazer, 1985).

The term "interpretability" describes how simple something is to grasp. The interpretability of data refers to its interpretive semantics in terms of data quality. Interpretability, as defined by Kahn et al. (2002), refers to how well information is communicated in terms of language, symbols, units, clarity of definitions, adherence to technical features, and how well information is represented using appropriate notation.

According to previous studies and the research proposed model, the following hypotheses are proposed:

H3₀: No statistically significant relationship exists between administrative information quality and decision-making effectiveness.
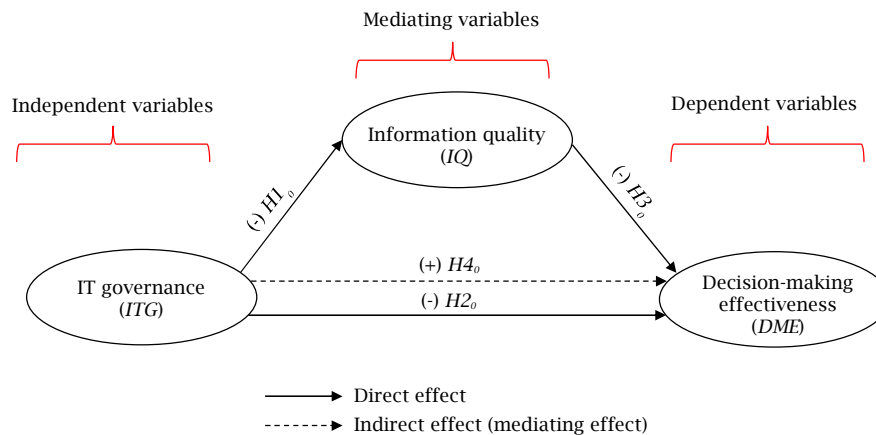
H4₀: Decision-making effectiveness can be affected by the relationship between IT governance and the quality of administrative information.

3. RESEARCH METHODOLOGY

3.1. Overview of the proposed research model

As mentioned above, the models and ideas recommended in the literature served as the basis for the study's hypotheses and the relationships between them. Figure 1 depicts the suggested model. It is clear from a close examination of the suggested approach that IT governance significantly affects the quality of administrative data. While decision-making effectiveness is taken from Abumandil and Hassan (2016), these correlations are derived from Al-Qatamin and Al-Omari (2020). The extended model that has been proposed was created to investigate the connection between IT governance and the calibre of administrative data as well as how this link affects decision-making in Saudi Arabia's banking industry.

Figure 1. The proposed model

3.2. Development of instrument

The deductive research method was used to examine the study's hypotheses and address the research questions. This deductive method was used to examine the relationship between IT governance and the quality of administrative information, in addition to the impact of this relationship on improving decision-making in banks in Saudi Arabia. A multi-item Likert scale was used in the questionnaire created for this research following previous research (Lee et al., 2009). The 5-point Likert scale was used to evaluate the variables, with five representing "Strongly agree" and one representing "Strongly disagree". The questionnaire had to be accurately translated from English to Arabic because the respondents spoke Arabic. In order to assess the accuracy of the translation in a cross-cultural survey, a back translation was done, a technique that has been widely used (Brislin, 1970). The variables of this investigation were measured using validated instruments modified from comparable prior studies. This study follows

the recommendations of Hayduk and Littvay (2012) about item count for each construct, who advised choosing the few best things and that employing a large number of items is rarely justified because adding redundant items reduces the value of the study.

3.3. Sampling and data analysis method

The population of this research consisted of 403 officials working as accountants and programmers in the administrative, finance, and accounting departments, as well as the managers of information systems and the IT professionals in the selected banks in Saudi Arabia. Riyad Bank, Al-Rajhi Bank, the Saudi French Bank, Arab Bank, National Commercial Bank, the Saudi British Bank (SABB), the Saudi American Bank (SAMIA), and the Saudi Dutch Bank are some of these financial institutions.

A stratified sampling technique has been used to ensure that the population sample for this study is representative. Two hundred twelve questionnaires

were dispatched, and 197 sets of responses were collected, of which 190 were helpful for the study. According to Krejcie and Morgan (1970) and Tabachnick and Fidell (2012), the final sample size was appropriate. According to Cable and DeRue (2002)

and Baruch and Holtom (2008), the 93% response rate is above average compared to comparable research reviewed in the pertinent literature. The results of the response rate of the survey are shown in Table 1.

Table 1. The response rate of the survey questionnaire

Respondents	Distributed questionnaires	Returned questionnaires		Incomplete questionnaires		Complete questionnaires	
		No.	%	No.	%	No.	%
Programmers in administrative, financial, and accounting departments	103	89	86	3	3.4	86	83.5
IT managers	18	18	100	2	11.1	16	88.9
IT experts	91	90	99	2	2.2	88	96.7
Total	212	197	92.9	7	3.6	190	89.6

The following equation was used to determine the sample size (Uakarn, 2021).

$$n = \frac{x^2 NP(1-P)}{e^2(N-1) + x^2 P(1-P)} \tag{1}$$

where,
- N — population size;
- n — sample size;
- P — population proportion (50%);
- x^2 — Chi-square for the specified confidence level at 1 degree of freedom;
- e^2 — margin of error.

The data were statistically analysed using SPSS/PC+ software. Other statistical methods were also implemented to analyse and interpret the data in this study as follows:

1) Cronbach's alpha reliability coefficient to test the validity and reliability of the study results to achieve generalisation of the findings;

2) descriptive statistic measures were used to describe the study categories and arrange the study variables according to their importance based on arithmetic averages (means) and standard deviations;

3) the Kruskal-Wallis test was utilised to identify the significance of differences among the respondents at 0.05 significance;

4) analysis of variance (ANOVA) was implemented to test the differences among the respondents;

5) simple regression analysis was used to examine the impact of each variable on the dependent variable. Stepwise regression analysis was used to examine the relationship and identify IT governance,

which can explain most of the variance in the administrative information quality, and the effectiveness of decision-making.

4. DATA ANALYSIS AND HYPOTHESES TESTING

The statistical analysis of the data, including the validity of the study variables and the testing of hypotheses, was carried out using SPSS software. The values of the alpha coefficients and reliability for the variables used in this research are presented in Table 2.

Table 2. Reliability of the study variables

Variables	Alpha	Reliability
The relationship between IT governance and information quality	0.8124	0.9013
The relationship between information quality and decision-making effectiveness	0.7288	0.8233
The relationship between IT governance and decision-making effectiveness	0.7131	0.8353

Cronbach's alpha readings (ranging from 0.7131 to 0.8124) in Table 2 indicate that the values are reliable. This allows for extrapolation of the findings. The descriptive statistics analysis for the variables used in this study is illustrated in the following sections.

To test $H1_0$, the respondents were asked a question consisting of 15 items. The question is referred to by the symbol ($H1$), and the items' symbols ranged from ($H1_1$ to $H1_{15}$), as illustrated in Table 3.

Table 3. The attitudes of respondents regarding the relationship between IT governance and the quality of administrative information

Variable symbol	Accountants and programmers			IT managers			IT experts			Total		
	Arithmetic mean	Std. dev.	Rank	Arithmetic mean	Std. dev.	Rank	Arithmetic mean	Std. dev.	Rank	Arithmetic mean	Std. dev.	Rank
$H1_1$	4.91	0.37	1	4.82	0.39	1	4.63	0.48	3	4.79	0.41	2
$H1_2$	3.07	0.39	13	3.27	0.48	11	3.65	0.51	10	3.33	0.46	11
$H1_3$	3.40	0.60	11	3.11	0.39	13	3.09	0.60	15	3.20	0.53	13
$H1_4$	3.19	0.48	12	3.07	0.41	14	3.14	0.42	14	3.31	0.43	12
$H1_5$	4.80	0.42	2	4.77	0.38	2	4.89	0.34	1	4.82	0.38	1
$H1_6$	4.33	0.57	6	4.09	0.31	7	3.72	0.52	9	4.05	0.47	7
$H1_7$	3.01	0.61	15	3.02	0.52	15	3.32	0.48	12	3.12	0.54	15
$H1_8$	4.67	0.39	3	4.57	0.42	4	4.51	0.41	4	4.58	0.41	4
$H1_9$	4.09	0.54	8	4.05	0.41	8	3.44	0.53	11	3.86	0.49	9
$H1_{10}$	4.15	0.51	7	4.28	0.39	6	4.12	0.41	6	4.18	0.44	6
$H1_{11}$	4.51	0.31	4	4.68	0.33	3	4.71	0.38	2	4.63	0.34	3
$H1_{12}$	3.05	0.58	14	3.17	0.42	12	3.24	0.47	13	3.15	0.49	14
$H1_{13}$	3.61	0.61	10	4.01	0.52	9	4.02	0.38	7	3.88	0.50	8
$H1_{14}$	3.87	0.57	9	3.71	0.51	10	3.91	0.49	8	3.83	0.52	10
$H1_{15}$	4.44	0.42	5	4.36	0.41	5	4.17	0.39	5	4.32	0.41	5

According to the results presented in Table 3, the respondents' answers are consistent regarding the relationship between IT governance and the quality of administrative information. Kruskal-Wallis test, ANOVA, t-test, and F-ratio were utilised to verify the results, as illustrated in Tables 4 and 5.

Table 4. Results of the Kruskal-Wallis test

Variable symbol	Estimates			Kruskal-Wallis (Ka2)	Significance level	Type of difference
	Accountants and programmers	IT managers	IT experts			
$H1_1$	4.91	4.82	4.63	9.133	0.286	Insignificant
$H1_2$	3.07	3.27	3.65	9.044	0.135	Insignificant
$H1_3$	3.40	3.11	3.09	8.149	0.016	Significant (*)
$H1_4$	3.19	3.07	3.14	6.205	0.167	Insignificant
$H1_5$	4.80	4.77	4.89	7.317	0.298	Insignificant
$H1_6$	4.33	4.09	3.72	8.422	0.155	Insignificant
$H1_7$	3.01	3.02	3.32	9.071	0.096	Significant (*)
$H1_8$	4.67	4.57	4.51	6.280	0.201	Insignificant
$H1_9$	4.09	4.05	3.44	7.540	0.116	Insignificant
$H1_{10}$	4.15	4.28	4.12	6.306	0.108	Insignificant
$H1_{11}$	4.51	4.68	4.71	6.704	0.209	Insignificant
$H1_{12}$	3.05	3.17	3.24	7.055	0.044	Significant (*)
$H1_{13}$	3.61	4.01	4.02	7.017	0.201	Insignificant
$H1_{14}$	3.87	3.71	3.91	9.242	0.113	Insignificant
$H1_{15}$	4.44	4.36	4.17	8.165	0.171	Insignificant

*Note: * significant at a 10% level.*

Table 5. Analysis of variance for the statistical significance test

Classes of study	Factors	Average	Std. dev.	Determination coefficient (R^2)	F-test	t-test
Accountants and programmers	B_1	3.94	0.49	0.484		9.95
IT managers	B_2	3.93	0.42	0.583	17.205	8.82
IT experts	B_3	3.90	0.45	0.463		8.07

According to the results, it can be concluded that *H1* is not supported. The characteristics and standards of administrative information quality are affected by the introduction and application of IT governance. This result is consistent with the findings of many previous researchers in this field.

H2 is tested by asking the respondents a question, which is signified by *H2*, and the items' symbols ranged from $H2_1$ to $H2_6$, as illustrated in Table 6.

Table 6. The attitudes of respondents regarding the relationship between IT governance and decision-making effectiveness

Variable symbol	Accountants and programmers			IT managers			IT experts			Total		
	Arithmetic mean	Std. dev.	Rank	Arithmetic mean	Std. dev.	Rank	Arithmetic mean	Std. dev.	Rank	Arithmetic mean	Std. dev.	Rank
$H2_1$	3.17	0.46	5	3.09	0.38	6	3.11	0.51	5	3.12	0.45	5
$H2_2$	4.04	0.42	3	4.11	0.41	3	3.76	0.40	4	3.97	0.41	3
$H2_3$	3.55	0.36	4	3.46	0.46	4	4.01	0.44	3	3.67	0.42	4
$H2_4$	4.73	0.33	1	4.55	0.39	1	4.36	0.41	2	4.55	0.38	1
$H2_5$	3.01	0.52	6	3.11	0.42	5	3.04	0.47	6	3.05	0.47	6
$H2_6$	4.28	0.39	2	4.13	0.44	2	4.47	0.38	1	4.29	0.40	2

According to Table 6, respondents' responses regarding the correlation between IT governance and decision-making efficacy are consistent. As shown in Tables 7 and 8, the Kruskal-Wallis test, ANOVA, F-ratio, and t-test were employed for the results verification.

Table 7. Results of the Kruskal-Wallis test

Variable symbol	Estimates			Kruskal-Wallis (Ka2)	Significance level	Type of difference
	Accountants and programmers	IT managers	IT experts			
$H2_1$	3.17	3.09	3.11	6.015	0.094	Significant (*)
$H2_2$	4.04	4.11	3.76	9.159	0.242	Insignificant
$H2_3$	3.55	3.46	4.01	8.422	0.117	Insignificant
$H2_4$	4.73	4.55	4.36	8.480	0.201	Insignificant
$H2_5$	3.01	3.11	3.04	6.007	0.198	Insignificant
$H2_6$	4.28	4.13	4.47	7.901	0.199	Insignificant

*Note: * significant at a 10% level.*

Table 8. Analysis of variance for the statistical significance test

Classes of study	Factors	Average	Std. dev.	Determination coefficient (R^2)	F-test	t-test
Accountants and programmers	B_1	3.80	0.41	0.566		7.78
IT managers	B_2	3.74	0.42	0.482	17.617	6.19
IT experts	B_3	3.79	0.44	0.461		4.17

The results in Tables 7 and 8 showed that *H2* is not supported, which means that there is a relationship between IT governance and decision-making effectiveness.

H3 is tested by asking the respondents a question, which is signified by the symbol *H3*, and the items' symbols ranged from $H3_1$ to $H3_{11}$, as shown in Table 9.

Table 9. The respondents' attitudes about the correlation between information quality and the effectiveness of decision-making

Variable symbol	Accountants and programmers			IT managers			IT experts			Total		
	Arithmetic mean	Std. dev.	Rank	Arithmetic mean	Std. dev.	Rank	Arithmetic mean	Std. dev.	Rank	Arithmetic mean	Std. dev.	Rank
$H3_1$	4.09	0.58	7	4.27	0.40	6	4.02	0.48	8	4.13	0.49	7
$H3_2$	4.22	0.57	6	4.11	0.52	7	4.31	0.53	6	4.21	0.54	6
$H3_3$	3.05	0.51	11	3.45	0.62	10	3.09	0.60	11	3.20	0.58	11
$H3_4$	3.37	0.62	9	3.82	0.67	9	3.87	0.41	9	3.69	0.56	9
$H3_5$	3.21	0.60	10	3.16	0.53	11	3.35	0.49	10	3.24	0.54	10
$H3_6$	4.91	0.47	1	4.82	0.39	1	4.93	0.42	1	4.89	0.43	1
$H3_7$	4.88	0.39	2	4.54	0.47	3	4.76	0.37	2	4.73	0.41	2
$H3_8$	4.75	0.51	3	4.76	0.42	2	4.63	0.46	3	4.71	0.46	3
$H3_9$	3.54	0.48	8	4.01	0.51	8	4.11	0.50	7	3.89	0.50	8
$H3_{10}$	4.66	0.52	4	4.61	0.35	4	4.37	0.37	5	4.55	0.41	4
$H3_{11}$	4.41	0.47	5	4.56	0.46	5	4.51	0.48	4	4.49	0.47	5

The results presented in Table 9 indicate a high level of consistency among the respondents' answers regarding the relationship between information quality and decision-making effectiveness. To validate these findings, statistical tests such as the Kruskal-Wallis test and ANOVA (including F-ratio and t-test) were employed, and their results are presented in Tables 10 and 11, respectively.

Table 10. Results of the Kruskal-Wallis test

Variable symbol	Estimates			Kruskal-Wallis (Ka2)	Significance level	Type of difference
	Accountants and programmers	IT managers	IT experts			
$H3_1$	4.09	4.27	4.02	8.005	0.255	Insignificant
$H3_2$	4.22	4.11	4.31	6.142	0.139	Insignificant
$H3_3$	3.05	3.45	3.09	9.054	0.086	Significant (*)
$H3_4$	3.37	3.82	3.87	7.192	0.199	Insignificant
$H3_5$	3.21	3.16	3.35	10.121	0.071	Significant (*)
$H3_6$	4.91	4.82	4.93	9.156	0.232	Insignificant
$H3_7$	4.88	4.54	4.76	11.045	0.201	Insignificant
$H3_8$	4.75	4.76	4.63	8.131	0.166	Insignificant
$H3_9$	3.54	4.01	4.11	9.814	0.109	Insignificant
$H3_{10}$	4.66	4.61	4.37	6.555	0.213	Insignificant
$H3_{11}$	4.41	4.56	4.51	7.041	0.204	Insignificant

*Note: * significant at a 10% level.*

Table 11. Analysis of variance for the statistical significance test

Classes of study	Factors	Average	Std. dev.	Determination coefficient (R^2)	F-test	t-test
Accountants and programmers	B1	4.10	0.52	0.431		4.74
IT managers	B2	4.47	0.49	0.539	19.785	7.08
IT experts	B3	4.18	0.47	0.458		5.92

The results in Tables 10 and 11 showed that *H3* is not supported, which means that there is a relationship between the quality of administrative information and decision-making effectiveness.

Finally, *H4* postulates that the relationship between IT governance and the quality of administrative information influences the effectiveness of decision-making. To test this hypothesis, two methods were used, including simple and multiple linear regression. The first method was used to test the impact of IT governance and the quality of information separately on decision-making effectiveness. This was followed by a test of the effect of the relationship between IT governance and the quality of information on decision-making effectiveness using a multiple linear regression model. Table 12 shows the results of the analysis.

Table 12. Regression analysis results

Rank	Variable	Correlation coefficient (R)	The determination coefficient (R^2)	F-test	Standardised regression coefficient (Beta)	t-test
1	*IT governance*	0.526	0.16	14.205	0.07	6.35
2	*Quality of administrative information*	0.633	0.24	17.785	0.16	8.06
3	*Relationship between IT governance and quality of administrative information*	0.723	0.29	15.617	0.35	4.44

5. DISCUSSION

The study's findings do not support $H1_0$, indicating any significant relationship between IT governance and the characteristics and standards of administrative information quality (Abraham et al., 2019; Sofyani et al., 2020). This suggests that other factors may be more influential in shaping administrative information quality. However, the results indicate that IT governance impacts administrative information quality (Abraham et al., 2019; Duan et al., 2019), aligning with previous research (Sofyani et al., 2020) emphasising the influence of IT governance practices.

Regarding the $H2_0$ and $H3_0$, the study's findings do not support a significant relationship between IT governance and decision-making effectiveness, nor between information quality and decision-making effectiveness (Kuziemski & Misuraca, 2020; Young et al., 2019). This suggests that factors beyond IT governance and information quality contribute to decision-making effectiveness within the studied organisations. Future research should explore additional variables to explain decision-making effectiveness (Abu Afifa & Saleh, 2021; Nisar et al., 2021).

These results align with prior studies (Duan et al., 2019; Sofyani et al., 2020), reinforcing the complexity of the relationships between IT governance, information quality, and decision-making effectiveness. The direct impact of IT governance and information quality on decision-making effectiveness may be mediated by other organisational factors like culture, leadership, or individual decision-making capabilities (Awan et al., 2021; El Khatib et al., 2022).

Further research is necessary to explore the intricate relationships between IT governance, information quality, and decision-making effectiveness. Future studies should consider additional variables, alternative measurement approaches, and diverse organisational contexts to comprehensively understand these factors' interplay (Abu Afifa & Saleh, 2021; Suri & Sushil, 2022). This research would contribute to developing nuanced theoretical frameworks and practical insights for organisations enhancing decision-making processes in a technology-driven environment.

6. CONCLUSION

This paper investigated the relationship between administrative information quality and improving decision-making effectiveness, as well as the effect of IT governance on decision-making effectiveness. The study examined the relationship between IT governance, administrative information quality, and decision-making through survey data and statistical analysis in the banking sector. The findings revealed that the relationship between IT governance and the quality of administrative information in an organisation can influence decision-making effectiveness. This relationship was supported by a high correlation coefficient of 0.723 and a determination coefficient (R^2) value. The study demonstrated that the relationship between IT governance and quality of information accounted for 29% of the variance in decision-making effectiveness, confirming hypothesis *H4*. Additionally, a significant positive relationship was found between IT governance and the quality of administrative information, consistent with previous studies. Furthermore, the study concluded that a positive relationship exists between administrative information quality and decision-making effectiveness, along with an interactive relationship between IT governance and effective decision-making.

The implications of these findings were discussed in terms of both theory and practice, emphasising the importance of strong IT governance in improving decision-making in the banking sector. This study contributes to the literature on IT governance and its impact on organisational performance, particularly in the banking sector. The findings hold significant implications for researchers and practitioners, highlighting the need for organisations to prioritise IT governance to enhance administrative information quality and decision-making in their operations.

Based on the study's findings, several recommendations are proposed. Firstly, business organisations in the Saudi Arabian banking sector should leverage the manifold benefits of implementing enterprise resource planning (ERP) systems and IT governance. These benefits encompass various aspects that can significantly contribute to overall functioning and performance. Secondly, Saudi banks must incorporate control principles and IT governance into their future policies. This includes considering these principles in mission statements, organisational structures, and decision-making processes. Adopting a systematic approach to IT governance that aligns with their objectives will facilitate efficient control over IT-related matters. Thirdly, senior management plays a pivotal role in successfully implementing IT projects. Their practical commitment and active participation are vital factors that significantly influence the outcomes of IT initiatives. Recognising and acknowledging this role is essential for achieving desired results and ensuring the seamless integration of IT projects within the organisation.

The study has several limitations to consider. First, the findings may need more generalizability as they are specific to the banking sector. Second, the sample size and selection process could affect the representativeness of the results. Third, relying on self-reported data introduces the possibility of measurement errors or response biases. Fourth, the study design does not establish causality, or

the direction of the relationships examined. Fifth, a single data collection method may overlook essential aspects or perspectives. Finally, the potential for common method bias should be considered. These limitations highlight the need for caution when interpreting the findings and suggest areas for future research, such as longitudinal analysis and diverse data collection methods.

Moreover, the intellectual aspects of IT governance explored in this study can serve as a foundation for further research. It is recommended to conduct additional studies aiming to develop an integrated scientific and philosophical framework for implementing IT governance. Additionally, the advantages and benefits derived from applying IT governance can be employed as comprehensive and practical metrics to assess the performance of economic units within organisations or banks. By implementing these recommendations, business organisations in the Saudi Arabian banking sector can enhance operational efficiency, strengthen IT governance practices, and improve overall performance.

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