



أهمية اتخاذ القرار في تحسين الذكاء الاصطناعي بالتطبيق على صناع
القرار في البنوك الخاصة في اليمن

**The Importance of Decision Making in Improving the Artificial
intelligence by Applying to Decision-Makers
in the Private Banks in Yemen**

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الملخص:

هدفت هذه الدراسة إلى التعرف على أهمية صناعة القرار في تحسين الذكاء الاصطناعي من خلال تطبيقها على متخذي القرار في البنوك الخاصة في اليمن. ولتحقيق أهداف الدراسة تم استخدام المنهج الكمي، وذلك باستخدام الطريقتين الوصفية والتحليلية. تكون مجتمع الدراسة من قيادات البنوك الخاصة في اليمن، وتحديدًا تلك الموجودة فروعها الرئيسية بالعاصمة صنعاء، ويشغلون المناصب الإدارية التالية: المدير العام، مساعد المدير العام، مدير القطاع، ومدير الإدارة. ونظراً لصغر حجم مجتمع الدراسة، فقد تم استخدام أسلوب المسح الشامل، وكانت الاستبيانات هي الأداة الأساسية لجمع البيانات. تم توزيع 239 استبانة، وتم جمع 219 استبانة صالحة للتحليل (نسبة الاستجابة 92%). تم تحليل البيانات باستخدام الطرق الإحصائية المناسبة ضمن برنامج SPSS v26، كما تم تطبيق نمذجة المعادلات الهيكلية (SEM) باستخدام برنامج Amos v26. وخلصت الدراسة إلى وجود تأثير إيجابي لصناعة القرار على الذكاء الاصطناعي في البنوك الخاصة في اليمن. وقدمت الدراسة عدداً من التوصيات منها: الاهتمام بصناعة القرار من خلال النظر في أبعاده (الجودة - الفعالية - القبول)، مع التركيز بشكل خاص على فعالية القرار. وهذا أمر بالغ الأهمية بالنظر إلى تأثير عملية صنع القرار على جميع العمليات والوظائف الإدارية، خاصة في ظل تحديات الذكاء الاصطناعي المتنوعة والمتعددة التي تواجهها البنوك في البيئة اليمنية غير المستقرة.

الكلمات المفتاحية: التحول الرقمي، إدارة التغيير، التكنولوجيا، نموذج كوتر المكون من ثماني خطوات.

Abstract:

The objective of this study is to determine the impact of change management on digital transformation initiatives in Yemeni telecom sector. A quantitative approach with analytical and deductive methods was adopted to examine the relationship and determine the impact between change management and digital transformation. The study targeted a population of 902 managers and team leaders in the sector. A questionnaire was developed and distributed to a stratified sample of 226 respondents. The random sample was 25% of each stratum. The questionnaire items were designed to measure the change management dimensions (Change Urgency, Visionary Coalition, Empowerment and Sustainability) and digital transformation dimensions (Technology, Processes, People, Culture and Business Model). The results generated show a highly significant positive relationship between effective change management practices and the successful implementation of digital transformation initiatives (substantial positive coefficient B of 0.786, R^2 of 0.62 and high t-value of 29.34, and the extremely low p-value below 0.001). In conclusion, this study indicates that digital transformation initiatives require practicing proper and structural change management practices.

Keywords: Digital Transformation, Change Management, Technology, Kotter's Eight-Step Model.

1.0. Introduction

Artificial intelligence is one of the most recent branches of science and engineering. The phrase was first used in 1956, when activity started to pick up after World War II. AI is the topic that is regularly brought up today as

the "field I would like to be in" by scientists from various fields, along with molecular biology. A physics student would fairly believe that Galileo, Newton, Einstein, and the rest had already claimed all the best concepts. On the other hand, there are still a few full-time Einsteins and Edisons available in AI. Today, a

wide range of subfields are included under the umbrella term "AI," from the general (learning and perception) to the specific (playing chess, proving mathematical theorems, writing poetry, navigating a crowded street, and diagnosing diseases). The early years of artificial intelligence saw several minor triumphs. It was astounding anytime a computer accomplished anything remotely brilliant, given the archaic machines and programming tools of the period and the fact that only a few years previously computers were considered to be entities that could perform arithmetic sums and nothing more (Russell and Norvig, 2010).

Nowadays, artificial intelligence is experiencing rapid expansion, with recent advancements in technologies such as machine learning, reasoning, planning, and thinking capabilities. It is extensively utilized in many industries, including healthcare, defense, and transportation sectors, where automation plays a crucial role. AI proves to be a valuable tool in managing both natural and man-made disasters, alongside its applications in other domains. Furthermore, the involvement of AI agents in organizational decision-making is rapidly increasing. These agents offer advantages in decision-making processes due to their objectivity, efficiency, and superior information processing abilities, devoid of human shortcomings like fatigue or self-interest. Employee perception of artificial intelligence leaders within organizations, however, can be less positive because to their perceived lack of fairness and justice. In addition, Vroom and Yetton (1973) proposed a leadership model that highlights the social processes involved in decision-making. Their model specifically addresses the leader's decision on the extent and manner of subordinate participation in the decision-making process. This normative model serves as a guide for leaders in making choices that contribute to success within an organizational context, considering the impact of specific develop behavior or leadership style on the organization (Erffmeyer, 1983). Based on the foregoing, this study aims to discover the importance of decision making in improving

the artificial intelligence by applying to decision-makers in the private banks in Yemen.

1.1. Statement of the problem

Digital innovations in the modern banking landscape are no longer subject to the discretion of financial institutions; Instead, they have become essential for financial institutions to cope with an increasingly competitive market and changing customer expectations (De Oliveira Santini, 2018; Eren, 2021; Hua et al., 2019; Rajaobelina and Ricard, 2021; Valsamidis et al., 2020). In the era of modern banking, many new digital technologies have been driven by artificial intelligence (AI) as the main driver (Dobrescu, 2018), leading to innovative disruptions in banking channels (e.g. ATM, online banking, mobile banking mobile). and services (such as check imaging, voice recognition, and chatbots) and solutions (such as AI investment advisors and AI credit locators). AI in banking is being applied across the board, with uses in the front office (voice assistants and biometrics), middle office (anti-fraud risk monitoring and complex legal and compliance workflows), and back office (credit underwriting with smart contract infrastructure). Banks are expected to save \$447 billion by 2023, by employing artificial intelligence applications. Nearly 80% of banks in the USA are aware of the potential benefits provided by AI (Digalaki, 2022). Indeed, the emergence of artificial intelligence has generated a wealth of opportunities and challenges (Malali and Gopalakrishnan, 2020). In the banking context, the use of artificial intelligence has led to smoother sales and has guided the development of effective customer relationship management systems (Tarafdar et al., 2019). While the focus in the past was on automating the credit scoring, analytics, and granting process (Mehrotra, 2019), capabilities have evolved to support internal systems and processes as well (Caron, 2019).

For the banking sector in Yemen, banks have to deal with the development of artificial intelligence in a very quick way to face the different challenges that war has caused. Economic Studies and Forecasts, a unit of the Ministry of Planning and International Cooperation, reported in 2018 that economic losses in Yemen exceed the average losses

witnessed in conflicts within the region and the world. These losses can be attributed to the war, which was accompanied by the closure of some air and land ports, the restriction of the movement of foreign trade, the faltering of oil and gas production, which represented the lifeblood of the national economy, and the complete cancellation of the national economy. The country's legal system. Moreover, there is a severe liquidity crisis in the financial system and the public budget, which has worsened since 2016. This crisis has led to most state employees not receiving their salaries, as well as the failure of public service initiatives and the cessation of public services. Many economic projects. According to the monthly exchange rate data issued by the Central Bank of Yemen (2018), the dollar exchange rate in the parallel market witnessed a noticeable increase from about 215 riyals/dollar in March 2015 to 485 riyals/dollar in April 2018, which led to a cumulative change rate of 6.125%. This increase is primarily due to factors such as flow restrictions, the depletion of Yemen's foreign exchange reserves, and the subsequent division of monetary authority. Exchange rate volatility rose by 61% between September 2016 and March 2018, compared to 41% between March 2015 and September 2016, when foreign reserves were depleted and central bank activities and central bank operations were transferred to Aden. While the recent \$2 billion deposit played a crucial role in stabilizing exchange rate fluctuations, maintaining the benefits of this deposit requires additional donor support, the resumption of exports, and the unification of the Central Bank of Yemen.

Based on the above discussion, the problem issues were clarified, and gaps were identified. In response to the recommendations of previous studies, this paper aims to identify the importance of decision-making in improving artificial intelligence by applying it to decision-makers in private banks in Yemen.

1.2. Objectives of the study

This paper aims to verify the importance of decision making (quality - effectiveness - acceptance) in improving the artificial intelligence (user- systems- devices) by

applying to decision-makers in the private banks in Yemen.

1.3. Questions of the study

In light of the discussion outlined in the problem statement and previous studies, this paper aimed to address the following questions: In light of the discussion contained in the problem statement and previous studies, the following main question will be answered.

1. Is there a statistically significant importance of decision making (quality - effectiveness - acceptance) on artificial intelligence in private banks in Yemen?

This question will be examined by:

- Is there a statistically significant importance for making decisions according to the standards of quality, effectiveness and acceptance regarding artificial intelligence in private banks in Yemen? The following questions branch out from the main question??
- Is there a statistically significant importance for making decisions according to quality standards regarding artificial intelligence in private banks in Yemen?
- Is there a statistically significant significance for making decisions according to acceptance criteria regarding artificial intelligence in private banks in Yemen?

1.4. Hypotheses of the study

It is hypothesized that

H: There is no statistically significant significance for decision-making according to the criteria of quality, effectiveness and acceptance of artificial intelligence in private banks in Yemen

Ha: There is a statistically significant importance of the quality of decision-making on artificial intelligence in private banks in Yemen.

Hb: There is no statistical significance for decision-making according to operational standards regarding artificial intelligence in private banks in Yemen.

Hc: There is no statistical significance for making decisions according to acceptance criteria regarding artificial intelligence in private banks in Yemen

Significance of the study

The paper's contribution encompasses both theoretical and practical perspectives. From a theoretical standpoint, this paper adds to the existing corpus of knowledge for a number of reasons. Firstly, it proposes an artificial intelligence model consisting of three dimensions (user- systems- devices) for private banks in Yemen. Secondly, it examines the significant impact of decision-making on artificial intelligence. Moreover, this study investigates how private banks in Yemen handle administrative choices (quality, effectiveness, and acceptability) and artificial intelligence (user- systems- devices).

On the other hand, from the practical perspective, the paper will assist private banks in Yemen in promptly manage artificial intelligence development. Moreover, decision-makers will utilize the information of the paper to implement appropriate communication structures and conduct routine drills. The personnel team in charge of artificial intelligence will be well-informed and prepared to handle artificial intelligence development on all fronts.

1.5. definitions of terms

- 1.5.1. **Decision-making:** It is the learned habitual response pattern exhibited by an individual when confronted with a decision situation; it is not a personality trait, but a habit-based propensity to react in a certain way. (Scott and Bruce, 1995)

Operational definition: It is the selection of the appropriate alternative, and its implementation in a timely manner, taking into account the acceptance of those concerned with this decision through their conscious awareness of the importance of this decision.

- 1.5.2. **Artificial intelligence:** Russel and Norvig (2016) defined AI as the art of building robots that carry out tasks that, when carried out by people, need intelligence.

Operational definition: it is the practice of designing machines to carry out tasks requiring intelligence as reflected by the

systems, people, and tools that are employed.

1.6. Literature review

Artificial intelligence (AI) is the capability of a system to correctly interpret external information, learn from that data, and use that learning to accomplish specific objectives and tasks through flexible adaptation, according to Haenlein & Kaplan (2019, p. 5). The theory was developed in 1956 by the founders of artificial intelligence (AI), Marvin Minsky, John McCarthy, Herbert Simon, Allen Newell, Claude Shannon, and Nathaniel Rochester. According to their definition, artificial intelligence (AI) is "the ability of machines to understand, think, and learn in a similar way to human beings, indicating the possibility of using computers to simulate human intelligence" (Pan, 2016).

According to A. Mellit, S.A. Kalogirou, (2008), in terms of learning, reasoning, and self-correcting, Numerous AI systems have been mathematically categorized into the following three groups:

Artificial Narrow Intelligence (ANI): ANI systems, often referred to as weak AI, are a subset of AI that can only concentrate on a single functional area and is programmed to carry out a single task. Even though such systems are capable of doing hundreds of thousands of computations per second, they are limited by the performance standards established by their designers.

Artificial General Intelligence (AGI): This phrase, often known as "human-level AI," refers to as AI systems that can do all kinds of human tasks and can mimic humans in every way. Alan Turing, who developed the Turing test to evaluate probability, was the one who initially proposed the hypothesis that these kinds of "thinking machines" existed. This test orchestrates a conversational text exchange between a human tester, other humans, and the potential AI system. The AI system under investigation is made to mimic and act like a person. Because it did not fully satisfy the requirements for whether the human tester could discriminate between test participants and recognize the AI system inside the text exchange, the AI system failed the test.

Furthermore, the Turing test, sometimes referred to as the Imitation Game, is now widely acknowledged as a benchmark for future AGI system advancements. However, given the speed at which computers are being produced, not every proponent of AI thinks that such a test is sufficient. This is because they want to construct AI using intellectual tools rather than intellectual monuments.

Artificial Super Intelligence (ASI): It's projected that ASI systems will be the type of AGI that advances quickly to the point where it will be feasible for them to replace people in practically every field, including cognitive thinking and social skills. Additionally, they symbolize the kind of AI that, in accordance with the singularity idea, would eventually "take over" humanity. In fact, it is argued that humans won't be aware of the advancement of ASI systems until after they have incorporated them into daily life, indicating that the singularity can be closer than previously believed.

Machine learning (ML): ML is a subfield of artificial intelligence that enables the creation and development of algorithms that can learn to complete jobs without explicit developer instruction. For machine learning to function as diversely as possible, clean and relevant data is required. Forecasting research is becoming more frequently employing ML algorithms, which can learn vast amounts of data from many sources initially, then focus on anticipating data inputs. The most important stage in teaching computers to analyze enormous quantities of data for trends and make data-driven predictions about future employment is machine learning (ML). It exemplifies its significant utility in structural health control for a range of applications, including structural risk detection and diagnosis, structure strength prediction, system reliability and durability assessment, and infrastructure maintenance, according to H. Salehi and R. Burgueno (2018). Many studies have examined the artificial intelligent in terms of organizations, users and equipment, and linking it to many variables such as leadership, leadership skills and managerial decision-making processes, data-driven, Efficiency of

administrative systems, human Resources Management, organizational crisis and behaviors during crises. In addition, there are different models of artificial intelligence which have various dimensions. Pia Weber and Guillaume Noizet (artificial intelligence an approach for decision-making in crisis management, 2018) aimed by his paper: finding out what matters most in crisis management decision-making processes, determining the capabilities and constraints of human and artificial intelligences, and determining how artificial intelligence can influence key decision-making features are the first three goals. Decision-making procedures in an unpredictably brief amount of time. An interpretivist qualitative method has been used to direct these efforts. Interviews were conducted with crisis management and consulting professionals as well as AI researchers and engineers. Additionally, notes at a symposium on artificial intelligence were collected. As a result, it has been discovered that making judgments in emergency situations requires both thoroughness and quickness. The two decision parameters short- and long-term impacts also required to be included, as evidenced by the empirical findings, because decision-making is not only about the decision-making process itself, but also about the viability and long-term implications of judgments made. We established the functions of intuition and reason, as well as the capabilities and bounds of both human and artificial intelligence. A model for "successful decision-making in crisis situations" could then be constructed. Finally, the findings demonstrate that using AI in crisis management has several advantages, creating a high likelihood that AI will materially alter the situation.

On decision making, there are many studies that cast a light on this topic from different directions. Tawwaf and Alarshani (2021), aimed to identify the importance of crisis management in improving the effectiveness of administrative decisions by applying to decision-makers in the public Electricity Corporation. The study employed a descriptive analytical approach, and due to the small size

of the study community, a comprehensive survey method was utilized. The primary tool for data collection was a questionnaire, and the collected data were analyzed using appropriate statistical methods within the SPSS program. The study revealed a significant and strong direct relationship between crisis management and the effectiveness of administrative decisions. Alkhawani (2020) looked examined the influence of decision-making on the relationship between transformational leadership style, organizational culture, and crisis management as well as the impact of crisis communication strategy in Yemeni firms. The study used a self-administered questionnaire as its study method and utilized the crisis management model developed by Mitroff et al. (1988); Peason, Mitroff (1993) and Amos v25's structural equation modeling analysis of the survey. The results showed that crisis management was significantly influenced by decision-making, crisis communication approach, and transformational leadership style. The outcome also showed that corporate culture and transformational leadership style both significantly impacted decision-making. Furthermore, the results showed that decision-making mediated the association between transformational leadership style, organizational culture and crisis management.

2.0. Methodology

2.1. Study design

The purpose of this paper is to investigate importance of decision making according to the criteria of (quality - effectiveness - acceptance) in improving the artificial intelligence (user-systems- devices) by applying to decision-makers in the private banks in Yemen, with a focus on the interaction between exogenous and endogenous variables. Therefore, the quantitative research is the best technique to explain the connections between measurably different variables (Sekaran & Bougie, 2016). The quantitative method entails gathering, analyzing, and interpreting data in order to relate factors brought up by the questions or hypotheses. More crucially, the quantitative research technique employs accepted methodologies for statistical testing, validity testing, and reliability testing (Creswell, 2014). Therefore, this paper applied the quantitative approach because by using the quantitative approach, studies can examine the significance among and between the study's variables and are able to generalize the results to the whole population.

2.2. Population and sample of the study

The targeted respondents are the employees who are working in private banks in Sana'a which are 17 banks. These banks are as shown in the next table. **Table 1 private banks in Yemen**

NO.	Bank's Name	Establishment Date
1	Saba Islamic Bank	1997
2	Yemen Commercial Bank	1993
3	Arab Bank	1972
4	Rafidain Bank	1982
5	Al-Amal Microfinance Bank	2008
6	Yemen Islamic Bank	1995
7	Shamil Bank of Yemen & Bahrain	2002
8	Al-Kuraimi Microfinance Bank	2010
9	Cooperative and Agricultural Credit Bank	1982
10	Qatar National Bank	2007
11	International Bank of Yemen	1979
12	Tadhamon Bank	1996
13	Yemen and Gulf Bank	2000
14	Yemen Bank for Reconstruction and Development	1962

Source: Yemeni Banks Association, <https://yemen-yba.com/>

The decision was made to solicit responses only from employees of private banks since this paper is concerned with the

decision-making that is related to artificial intelligence in the private banks. Respondents were selected from (General Manager- Assistant General Manager- Sector Manager- Department Manager.

In the present research, Census was conducted with a total of 239 participants. It should be indicated that the number of questionnaire forms distributed was 239, of which only 231 were returned. To have a proper distribution for sample size, the following table shows the number of

employees occupying the following positions such as General Manager, Assistant General Manager, Sector Manager and Department Manager in the main branches of private banks in Sana'a, depending on the banks themselves.

Table 2 number of employees in private banks in Yemen

NO	Banks	General Manager	Assistant Manager	General Manager	Sector Manager	Department Manager
1	National Bank of Yemen	-	-	-	-	-
2	United Bank Limited	-	-	-	-	-
3	Yemen Commercial Bank	1	2	-	-	12
4	Arab Bank	1	1	-	12	-
5	Rafidain Bank	1	-	-	-	4
6	Al-Amal Microfinance Bank	1	2	-	-	12
7	Saba Islamic Bank	1	2	-	2	17
8	Yemen Islamic Bank	1	-	-	-	7
9	Shamil Bank of Yemen & Bahrain	1	2	-	2	14
10	Al-Kuraimi Microfinance Bank	1	2	-	-	12
11	Cooperative and Agricultural Credit Bank	1	2	-	7	33
12	Yemen Bank for Reconstruction and Development	1	2	-	2	11
13	Qatar National Bank	1	-	-	-	5
14	Yemen Kuwait Bank	-	-	-	-	-
15	International Bank of Yemen	1	2	-	-	27
16	Tadhamon Bank	1	2	-	2	9
17	Yemen and Gulf Bank	1	1	-	-	9
	Total	14	18	-	15	184
	Total summation	231				

2.3. Instrument of the study

A survey questionnaire was conducted to collect the data. A questionnaire is a revised set of inquiries that participants must answer in writing, frequently from a limited set of possibilities. Typically, questionnaires are designed to collect a lot of quantitative information. They might be delivered to the respondents through mail, email, or physical delivery. Compared to surveys, interviews and observations are frequently more expensive and time-consuming, but they also have a far larger chance of non-response and non-response inaccuracy, Sekaran and Bougie (2016). On a seven-point Likert scale, these questions in the paper's questionnaire were evaluated. The survey asked about decision making, and artificial intelligence. The questionnaire was divided into three sections each of which has its items. The first section focuses on demographic and related information about respondents consisting of six items including, **gender, age, educational qualification, years of service, job title, and**

workplace bank. The second section is measuring artificial intelligence including **user, systems, devices**, while the third section is measuring decision making that includes **quality, effectiveness, and acceptance**. All of the measuring items used in the current paper were taken from the 40-items meant for investigations. This paper, however, adopts questions that have gained a lot of confirmation from other studies. On a seven-point Likert scale, the following responses are given: 1. Strongly Disagree, 2. Fairly Disagree, 3. Disagree, 4. Neutral, 5. Agree, 6. Fairly Agree, and 7. Strongly Agree.

2.3.1. Decision making:

The decision-making measurement, which consists of 18 questions, was modified from AlHussayen (2009), Shank (2018), Nooman (2017), Alkhawlani (2020), and Tawwaf & Alarshani (2021). It evaluates three aspects of decision-making: acceptability, efficacy, and quality. These tools, which were initially derived from Vroom & Yetton (1973)

and other earlier studies like Erffmeyer (1983), investigations. The eighteen items are used in the majority of earlier presented as follows:

No.	Items	Resources	
Quality			
1	The available information is accurate.	Vroom & Yetton model (1973), adapted from Erffmeyer (1983), Alhussayen (2009), Shank (2018), Nooman (2017), Alkhawliani (2020), Tawwaf&Alarshani (2021)	
2	The problem is identified by analyzing the internal and external environment in order to take the right decision regarding it.		
3	The bank's management takes its decisions in a timely manner.		
4	A large number of suitable alternatives are available to decision makers.		
5	The Bank's management classifies the available alternatives according to their importance.		
6	The method of comparison between the available alternatives is used when making a decision.		
7	The Bank's management provides decision makers with appropriate information to make effective decisions.		
8	The bank's management uses appropriate administrative methods in decision-making.		
Effectiveness			
9	The bank's management seeks to take decisions with less risk.		
10	The Bank's management evaluates the implementation of the administrative decisions taken according to their advantages and disadvantages.		
11	The administrative decisions taken achieve the objectives for which they were set.		
12	There is complementarity between the decisions that are made.		
13	There is harmony between administrative decisions and the general policy of the bank.		
Acceptance			
14	The Bank's management consults with specialists when making its decisions.		
15	The bank's management participates in decision-making with employees and experts.		
16	The decisions taken depend on an information network that includes all departments and sections of the Bank.		
17	There is a unit in the bank that provides decision makers with appropriate and accurate information.		
18	The bank's management sets clear plans and mechanisms to follow up on the implementation of the decision.		

Table 3 Decision making Measurement items

2.3.2. Artificial intelligence:

A twenty-item artificial intelligence assessment was modified from Salih (2009), Alshaymatu (2020), and Alsharari (2021). The user, systems, and device aspects of artificial intelligence are measured. The majority of

earlier investigations have used these instruments, which were originally designed to be weak artificial narrow intelligence (ANI), including Salih (2009), Alshaymatu (2020), and Alsharari (2021). The twenty items include:

Table 4 Artificial intelligence Measurement items

No.	Items	Resources	
User			
1	The bank has many experts and technicians to develop the bank's business.	Salih (2009), Alshaymatu (2020), Alsharari (2021)	
2	The bank's employees are trained to keep pace with modern technological developments.		
3	The customer can stop or cancel his subscription to the bank's electronic channel.		
4	The bank provides search and indexing capabilities for data in an attractive way for users/customers.		
5	Customers can easily obtain banking services.		
6	Customers can deal with the banking services provided easily.		
Systems			
7	The e-mail provided through the banking service channel is the secure means of correspondence between the bank and the customer.		
8	The bank always grants a Visa card to companies and individuals.		
9	The bank performs electronic transfers daily.		
10	The customer can easily issue a check book through the bank's electronic channel.		
11	The systems maintain the confidentiality of accounts and documents.		
12	The bank card is always available through the ATM.		

13	IVR is always available.
14	The bank provides the service of inquiring about currency rates electronically on an ongoing basis.
15	The smart card provides more security and protection for customers.
16	The Bank always offers the Platinum MasterCard to its customers.
Devices	
17	The bank is interested in introducing new and advanced equipment.
18	The bank has modern technological devices.
19	The Bank uses modern and advanced technological software.
20	The bank's management takes advantage of the systems to improve the banking services provided to the customer.

3.0. Findings and discussion

3.1. Respondent profile

According to **Respondent profile**, the majority of private banks managers were males with total number of 182 out of 219 accounting for approximately 83.1% while the rest were female with only (16.9%). The most common age of the respondents was between 30 and 39 years, accounting for 51.1% of the participants. This was followed by respondents aged 45 years and over, which represented 27.9% of the sample. The highest educational level held by top management of private banks were bachelor degrees, accounting for 64.4% of the individuals. This was followed by master degrees, (which represented 23.7% of the group). The majority of respondents have occupations other than those specified. Among these occupations, Department Manager is the most common, with 173 respondents, representing 79.0% of the sample. This is

followed by Sector Manager, with 26 respondents, representing 11.9%. Among the respondents who are top managers, the majority of participants (53.40%) have more than 15 years of experience in the banking sector. Additionally, 23.7% of the respondents have served between 11 and 15 years. This shows that the majority of survey respondents have employment history and could be considered experienced with crisis situations. According to workplace affiliation, the most common respondents were from Cooperative and Agricultural Credit Bank representing 39 respondents or 17.8% of the sample. They were followed by 30 respondents working at International Bank of Yemen representing 13.7%. Table 5 shows demographic characteristics of the respondents

Table 5 demographic characteristics of the respondents

Variables	Items	Frequency	Percentage
Gender	Male	182	83.1
	Female	37	16.9
	Total	219	100.0
Age	Less than 25 years	4	1.8
	25- to 34 years	42	19.2
	35 to 44 years	112	51.1
	45 years and over	61	27.9
	Total	219	100.0
Academic qualification	Diploma or less	19	8.7
	Bachelor's	141	64.4
	M.A.	52	23.7
	Ph.D.	7	3.2
	Total	219	100.0
Years of service in the banking sector	5 years and less	26	11.9
	From 6 to 10 years	24	11.0
	From 11 to 15 years	52	23.7
	More than 15 years	117	53.4
	Total	219	100.0
Job title	General Manager	3	1.4
	Assistant General Manager	17	7.8
	Sector Manager	26	11.9
	Department Manager	173	79.0
	Total	219	100.0

Workplace bank	Yemen Islamic Bank	8	3.7
	Yemen Commercial Bank	14	6.4
	Arab Bank	14	6.4
	Yemen and Gulf Bank	10	4.6
	Al-Amal Microfinance Bank	14	6.4
	Yemen Bank for Reconstruction and Development	14.0	6.4
	Tadhamon Bank	14	6.4
	Al-Kuraimi Microfinance Bank	13	5.9
	International Bank of Yemen	30	13.7
	Saba Islamic Bank	22	10.0
	Qatar National Bank	5	2.3
	Cooperative and Agricultural Credit Bank	39	17.8
	Rafidain Bank	5	2.3
Shamil Bank of Yemen & Bahrain	17	7.8	
Total		219	100.0

3.2. Alpha Cronbach’s (Reliability analysis) for Questionnaire Items:

The most popular approach, Cronbach's Alpha coefficient, was employed to determine internal consistency (Sekaran, 2003). Cronbach's Alpha values range from 0 to 1, and

a value of 0.6 or below often denotes internal consistency dependability that is less than excellent (Hair et al., 2018). Table 6 displays the Cronbach's Alpha coefficient for each of the variables that were assessed.

Table 6 Summary Statistics of Reliability Analysis

Constructs	Cronbach’s Alpha
Artificial intelligence	0.953
Decision making	0.968

As explained above in table 5, the result of Cronbach’s Alpha is ranged between 0.968 and 0.953 which are within the recommended value of reliability, according to (Hair et al., 2018). In addition, the study used correlation

coefficients between dimensions and variables, and between each item of the questionnaire and its variable. For more, the following table 7 shows the results of the correlation coefficients between dimensions and variables.

Table 7 correlation coefficients between dimensions and variables

Correlation of Decision-making				
Dimensions	quality	effectiveness	acceptance	decision-making
Quality	1	.785**	.861**	.933**
Effectiveness	.785**	1	.852**	.931**
Acceptance	.861**	.852**	1	.963**
decision-making	.933**	.931**	.963**	1
Correlation of Artificial intelligence				
Dimensions	User	systems	devices	artificial intelligence
User	1	.824**	.775**	.939**
Systems	.824**	1	.634**	.896**
Devices	.775**	.634**	1	.896**
artificial intelligence	.939**	.896**	.896**	1

The above table shows that the correlation values between dimensions and variables were at high values, and all the correlation coefficients of each dimension with its variable are statistically significant at the level of significance (0.005). This indicates that there is an internal consistency of the study tool and its validity to measure what it was prepared for.

3.3. Descriptive Analysis:

The researcher can have a thorough understanding of how the survey respondents replied to the questionnaire items by using the descriptive statistic of variable mean and standard deviation (Sekaran & Bougie, 2010). The predicted range is not exceeded by the values of mean or standard deviation (Sekaran

& Bougie, 2010). The researcher can get a clear sense of how survey respondents have answered to the survey's questions using the descriptive statistic of variable through mean and standard deviation (Sekaran & Bougie, 2010). The descriptive statistic was used to

Variables	N	Mean	Std. Deviation
Quality	219	5.13	1.26
Effectiveness	219	5.21	1.29
Acceptance	219	5.087	1.29
DM	219	5.14	1.24
User	219	5.17	1.27
Systems	219	4.97	1.25
Devices	219	5.38	1.44
AI	219	5.17	1.24

According to the results shown in Table 8, all Variables had high means. The AI variable had the highest mean with a value of 5.17, amongst all other factors and value of 1.24, for standard deviation. This result of mean suggested that top management of the private banks in Yemen have highly emphasized and given more attention to the AI. The standard deviation for the AI variable was 1.24, indicating that the respondents' ratings of AI had relatively no spread or dispersion to a certain extent. According to the dimensions of AI, the devices dimension had the highest mean with a value of 5.38, amongst all other dimensions and value of 1.44, for standard deviation. On the other hand, the Systems dimension had the lowest mean with a value of 4.97, above the mid-point of 4.40 amongst all other dimensions and values of 1.24, for standard deviation.

The next highly rated factor from the perspective of top managers in private banks in Yemen was DM, with a mean value of 5.14 and a standard deviation value of 1.24. These results show that mean values of the DM stands is a second highly rated factor acceding the average of seven-point Likert scale. The standard deviation of the DM was 1.24, which was considered low value, therefore no spread or dispersion of data. According to the dimensions of DM, the effectiveness dimension had the highest mean with a value of 5.21, amongst all other dimensions and value of 1.29, for standard deviation. On the other hand, the acceptance dimension had the lowest mean with a value of 5.087, amongst all other

make sure that the mean and standard deviation of the data was usually as predicted and that no entries were outside the expected range. Table 8 presents the result of descriptive statistics.

Table 8 The result of descriptive statistics.

dimension and value of 1.29, for standard deviation.

In conclusion, the results indicated that the participants' evaluation of the variables of the current study was above average, indicating positive perceptions of the measures being examined. Furthermore, the outcome demonstrated that all of the standard deviation values for the variables were adequate. The sample data is more reliable, in particular, if the standard deviation is smaller than the mean values (Sekaran & Bougie, 2010). The sample data is therefore significant for achieving the objectives of the current investigation.

3.4. Structural Equation Modeling (SEM)

The structural equation modeling (SEM) technique, as described by Hair et al. (2010), enables the examination of distinct relationships for each dependent variable within a given set. According to Byrne (2013), SEM is a multivariate statistical technique used to examine the direct and indirect routes among exogenous and endogenous latent variables. Many statisticians and researchers, like Hair et al. (2010) and Kline (2015), have shown that SEM outperformed regression when determining the mediating effect of a study variable. Khine (2013) further has shown how SEM offers explicit estimations of the factors governing error variance. Measurement error cannot be evaluated or corrected using other multivariate approaches. Additionally, SEM techniques include both observable and latent (unobserved) variables. Additionally, SEM can

estimate the direct and indirect impacts of study variables and test models with multivariate linkages (Hair et al., 2010). Moreover, structural equation modeling (SEM) is becoming a method of preference for theory creation and testing (Hair et al., 2014). There seems to be consensus in the SEM literature among practitioners and theorists that there are processes involved in testing SEM models. According to Hair et al. (2018), these processes are model formulation, identification, estimating, evaluation, and revision.

The confirmatory factor analysis is used to determine latent variables in the model specification, which is the first stage. Identifying the causal connections between the latent variables is followed by the definition of the measurement and structural models. The suggested model, which consists of one exogenous construct (DM) and one endogenous construct (AI), served as the basis for the model specification. DM is formulated as an exogenous construct, while AI is formulated as endogenous constructs. The use of structural relationships is required to specify the structural model based on the measurement model, which calls for the use of single-headed arrows for the predicted causal linkages between the external constructs (DM) and the endogenous constructs (AI). Quality, efficacy, and acceptability are the three variables used to

evaluate the exogenous concept DM. Three dimensions are used to quantify the endogenous construct, AI, which stands for user, systems, and devices.

3.5. Testing the validity of the hypothesis

The hypothesis (H) states that There is a statistically significant importance of decision-making (quality - effectiveness - acceptance) on artificial intelligence in private banks in Yemen. The hypothesis has three sub-hypotheses which are:

Ha: There is a statistically significant importance of the quality of decision-making on artificial intelligence in private banks in Yemen.

Hb: There is a statistically significant importance of the effectiveness of decision-making on artificial intelligence in private banks in Yemen.

Hc: There is a statistically significant importance of the acceptance of decision-making on artificial intelligence in private banks in Yemen.

To verify the validity of the hypothesis, a structural model was made for the relationship between decision-making and artificial intelligence, as shown in the following figure:

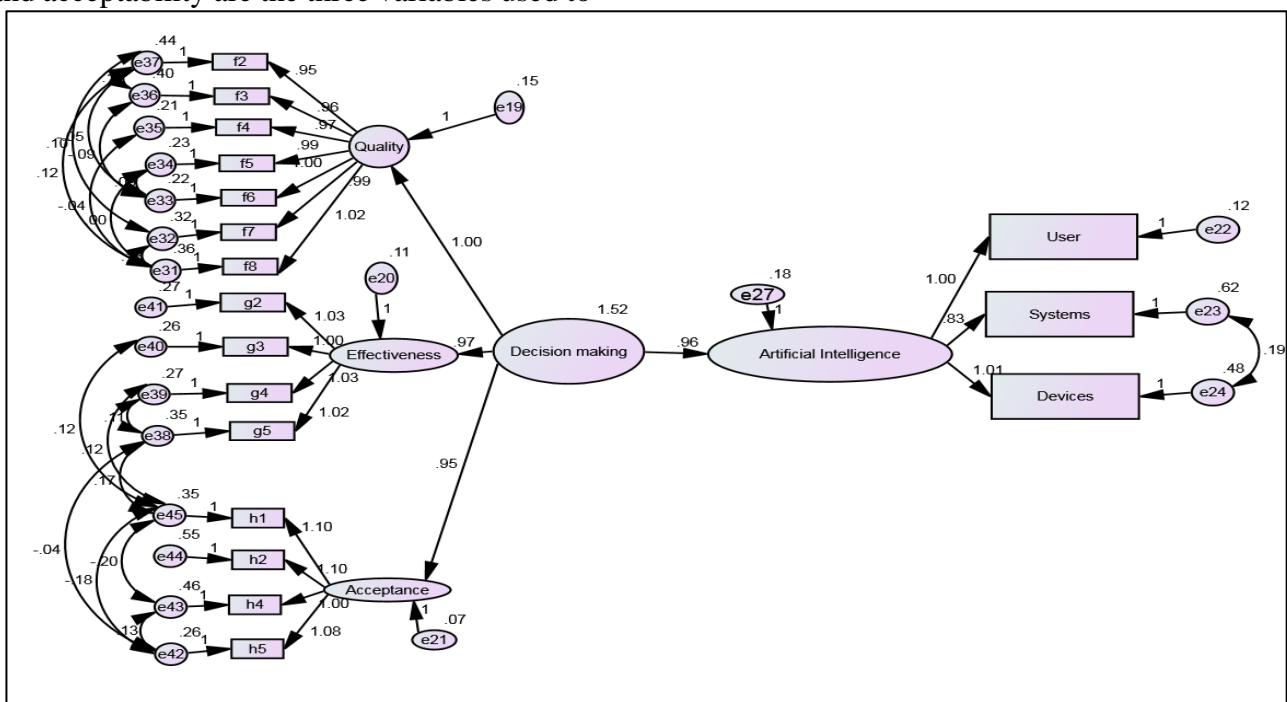


Figure 1 the relationship model between DM and AI

Table 9 the fit result of the relationship between DM and AI

Measurement indicators	CMIN/Df	RMSEA	GFI	AGFI	CFI	NFI	IFI	TLI
Level of Acceptable	< 5	0.05 to 0.08	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)
Level of Excellence	< 2	≤ 0.05	≥ 0.90	≥ 0.80	≥ 0.90	≥ 0.90	≥ 0.90	≥ 0.90
Index Value	2.26	.084	.876	.813	.974	.954	.974	965

Table 10 Pathways testing the impact of DM on AI

(***) Statistically significant at a level of significance less than (0.001)

IDV		D.V	Estimate β	S.E	C.R	P	Result
DM	---->	AI	.956	.046	20.8	***	Strong

From the above figure 1 and tables (9, 10), it is clear that:

1. All indicators of conformity came close to the excellent values, which indicate the acceptance of the model of the relationship between decision-making and artificial intelligence.
2. There is a positive impact of decision-making on artificial intelligence in private banks in Yemen, where the value of (β) (.956), the critical ratio (CR) shown in Table (4.11) has a value of (20.8), which is a significant value at the level of significance (***), and this confirms that the effect is statistically significant.

According to that, the decision-making coefficient (.956), which indicates that an increase of (.956) units in decision-making contributes to an increase of (.956) units in artificial intelligence.

The findings of the most previous studies suggested that artificial intelligence could enhance decision making success, such as Eriksson & Djowein (2020). However, the second study objective of the current study is to examine the effect of decision making on artificial intelligence in private banks in Yemen.

The result that obtained through applying SEM using Amos v26, illustrated that decision-making in term of quality, effectiveness, and acceptance had a significant impact on artificial intelligence according to the result shown in Table 4.11. Thus, objective one has been achieved.

The result of this study confirmed that there is a positive impact of decision-making on artificial intelligence in private

banks in Yemen, where the value of (β) (.956), the critical ratio (CR) shown in Table (4.11) has a value of (20.8), which is a significant value at the level of significance (***). This confirms that the effect is statistically significant, and the hypothesis H2 is accepted.

According to the systems theory, the transformation process involves recognizing the value that an organization contributes through the inputs it receives. This process helps identify the resulting products or services that the market will receive as a result of the organization's efforts. Understanding the interconnectedness and impact of various components within an organization is crucial for gaining practical knowledge about it. This perspective was highlighted by James G. in 2008. In general systems theory, an organization is perceived as a system that involves inputs, processes, and outputs, as well as interactions and exchanges with the environment.

The results of this study corroborated those of Eriksson & Djowein (2020), who discovered that the use of AI will improve decision-making speed and accuracy if it is trained on high-quality data. The importance of artificial intelligence programs and their connection to the effectiveness of administrative systems for managing human resources were among the results made by Al-Azzam (2020).

4.0. Conclusion and Recommendations

All the objectives of the current paper have been successfully achieved. Several

recommendations of this paper are explained below.

Firstly, in terms of the paper's scope, this paper focused on analyzing the conceptual framework for artificial intelligence in private banks in Yemen specifically during the ongoing challenges. To enhance the generalizability of this study, future research could consider including individual private banks as separate entities within the study. Furthermore, it is important to acknowledge that, decision-making, and artificial intelligence might be perceived differently within each individual private bank, as these factors can vary across different organizations. Moreover, the results of this study cannot be generalized in a wider context across the organizations in Yemen or in the other countries since the data collected for this study were limited to private banks in Yemen. Different cultures and different educational environments may furnish different impact of exogenous to endogenous variables. A highly recommended avenue for further study, particularly within the same sector as this study, would be to investigate the same variables from the perspective of subordinates' opinions. This approach could yield additional insights and potentially uncover different results.

Secondly, in terms of methodology, this study adopted a cross-sectional design. It is important to note that a cross-sectional approach captures a snapshot of the research variables at a specific point in time. However, changes in artificial intelligence practices and experiences may vary over time as leaders accumulate artificial intelligence -related knowledge and experience. Moreover, the questionnaires do not contain qualitative data hence; the interviews of the sampled managers in the organizations would have improved the study quality to achieve a more comprehensive overview of the assessed interactions in this research, future research studies should include both quantitative and qualitative information. This will provide a more holistic understanding of the topic.

Thirdly, it is important to note that other organizational factors or contingency factors would also play significant mediating roles in

the relationship between decision making and artificial intelligence. Hence, future studies should consider incorporating other factors as mediators or moderators, such as fuzzy logic, in order to provide a more comprehensive analysis. Therefore, it is recommended to examine artificial intelligence as independent variable which will enhance knowledge in decision making field.

Finally, regarding the R-Squared value, the predictors in the study model accounted for 40% of the total variance in artificial intelligence as an endogenous variable. This implies that the model can explain 40% of the variance, while the remaining 60% could be attributed to other factors. Therefore, future studies could consider this recommendation for further exploration.

References

- [1] A. Mellit, S.A. Kalogirou, Artificial intelligence techniques for photovoltaic applications: areview , Prog. Energy Combust. Sci. 34 (5) (2008) 574–632
- [2] Al Khalifa, Sh. Mohamed Hamad Mohamed Abdulla, (2021). Crisis management and strategic resilience: the moderating role from e-reading The state of government authorities in the Kingdom of Bahrain, Doctor of Philosophy, Brunel Business School, Brunel University London.
- [3] AL-ariki, Ghadah (2019), The impact of crisis management on employees Performance in Yemeni oil and gas companies. Degree of Master of Business Administration. The School of Business. Lebanese International University. Yemen.
- [4] Alkhawlan, Mohammed (2020), factors influencing crisis management in Yemeni organization; the mediating effect of decision making. Doctor of philosophy. University Utara, Malaysia.
- [5] Al-Shamsi, Abdulmoghith Yahya Ali Mohammed, 2023. Impact of Strategic Management on Achieving Competitive Superiority through Crisis Management: A Field Study at Operating Banks in Yemen. A Thesis, University of Science and Technology, Yemen.
- [6] Awang, Zainudin, 2016. Structural Equation Modeling Using Amos, <https://www.researchgate.net/publication/299440807>
- [7] Bahadir Sahin Among Crisis Management Organizations: A Comparative Among Crisis Management Organizations: A Comparative

- Perspective., 2009. University of Central Florida, Doctoral Dissertation.
- [8] Blenko, M.W., Mankins, M.C. and Rogers, P., 2010. The decision-driven organization. *Harvard Business Review*, 88(6), pp.54-62.
- [9] Bowers, M. R., Hall, J. R., & Srinivasan, M. M. (2017). Organizational culture and leadership style: The missing combination for selecting the right leader for effective crisis management. *Business Horizons*, 60(4), 551-563.
- [10] Brehony, N. (2015). Yemen and the Huthis: Genesis of the 2015 Crisis. *Asian Affairs*, 46(2), 232-250.
- [11] Bundy, J., Pfarrer, M. D., Short, C. E., & Coombs, W. T. (2016). Crises and crisis management: Integration, interpretation, and research development. *Journal of Management*, 43(6), 1661-1692. Retrieved from https://media.terry.uga.edu/socrates/publications/2017/09/Crises_and_Crisis_Management_JOM_2017.pdf.
- [12] Caron, M.S. 2019. The transformative effect of AI on the banking industry. *Banking & Finance Law Review* 34 (2): 169–214.
- [13] Coombs, W. T. (2007a). Protecting Organization Reputations During a Crisis: The Development and Application of Situational Crisis Communication Theory. *Corporate Reputation Review*, 10(3), 163-176.
- [14] Crandall, W.R., Parnell, J.A., and Spillan, J.E. (2010). *Crisis management in the new strategy landscape*. Los Angeles: Sage.
- [15] Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches*: Galifornia: Sage publications.
- [16] De Oliveira Santini, F., W.J. Ladeira, C.H. Sampaio, and M.G. Perin. 2018. Online banking services: A meta-analytic review and assessment of the impact of antecedents and consequents on satisfaction. *Journal of Financial Services Marketing* 23 (3): 168–178.
- [17] Digalaki, E. 2022. The impact of artificial intelligence in the banking sector & how AI is being used in 2022. <https://www.businessinsider.com/ai-in-banking-report?r=US&IR=T>
- [18] Dobrescu, E.M., and E.M. Dobrescu. 2018. Artificial intelligence (Ai)-the technology that shapes the world. *Global Economic Observer* 6 (2): 71–81.
- [19] Eren, B.A. 2021. Determinants of customer satisfaction in chatbot use: Evidence from a banking application in Turkey. *International Journal of Bank Marketing* 39 (2): 294–331.
- [20] Fearn-Banks, K. (2016). *Crisis communications: A casebook approach*: Routledge, New Jersey.
- [21] H. Salehi, R. Burgueno, *Emerging artificial intelligence methods in structural engineering*, *Eng. Struct.* 171 (2018) 170–189, <https://doi.org/10.1016/j.engstruct.2018.05.084>
- [22] Haenlein, M., & Kaplan, A. (2019). *A Brief History of Artificial Intelligence: On the Past, Present, and Future of Artificial Intelligence*. *California Management Review*, 61(4), 5-14. doi: 10.1177/0008125619864925
- [23] Hair, J.F., Black, W.C., Babin, B.J. & Anderson, R.E. (2010). *Multivariate Data Analysis (7thEd)*. Englewood Cliffs, NJ: Prentice Hall.
- [24] Herbane, B. (2013). Exploring Crisis Management in UK Small- and Medium-Sized Enterprises. *Journal of Contingencies and Crisis Management*, 21(2), 82-95.
- [25] Hua, X., Y. Huang, and Y. Zheng. 2019. Current practices, new insights, and emerging trends of financial technologies. *Industrial Management & Data Systems* 119 (7): 1401–1410.
- [26] ILO. (2016). Yemen damage and needs assessment crisis impact on employment and labour market. Retrieved from https://www.ilo.org/wcmsp5/groups/public/arabstates/ro Beirut/document/publication/wcms_501929.pdf
- [27] J. S. Chou, M. Y. Cheng, and Y. W. Wu, “Improving classification accuracy of project dispute resolution using hybrid artificial intelligence and support vector machine models,” *Expert Systems with Applications*, vol. 40, no. 6, pp. 2263–2274, 2013, doi: 10.1016/j.eswa.2012.10.036]
- [28] Klee, R. (1999). (Ed.). *Scientific inquiry: Readings in the philosophy of science*. New York: Oxford University Press
- [29] Lyon, D.W., Lumpkin, G.T. and Dess, G.G., 2000. Enhancing entrepreneurial orientation research: Operationalizing and measuring a key strategic decision making process. *Journal of management*, 26(5), pp.1055-1085.
- [30] Malali, A.B., and S. Gopalakrishnan. 2020. Application of artificial intelligence and its powered technologies in the indian banking and financial industry: An overview. *IOSR Journal of Humanities and Social Science* 25 (4): 55–60.
- [31] Mehrotra, A. (2019, April). Artificial Intelligence in Financial Services–Need to Blend Automation with Human Touch. In 2019 International Conference on Automation, Computational and Technology Management (ICACTM) (pp. 342–347). IEEE.

- [32] Michell, J. (1997). Quantitative science and the definition of measurement in psychology. *British Journal of Psychology*, 88,355–386.
- [33] Mostafa, M. M., Sheaff, R., Morris, M., & Ingham, V. (2004). Strategic preparation for crisis management in hospitals: empirical evidence from Egypt. *Disaster Prevention and Management: An International Journal*, 13(5), 399-408.
- [34] Noizet, Guillaume, Pia Weber (2018). Artificial Intelligence an approach for decision-making in crisis management. Master's Thesis in Business Administration. Department of Business Administration, UMEA University.
- [35] Pan, Y. (2016). Heading toward artificial intelligence 2.0. *Engineering*, 2(4), 409-413.
- [36] Prenatt, D., Ondracek, J., Saeed, M. and Bertsch, A., 2015. How Underdeveloped Decision Making and Poor Leadership Choices Led Kodak into Bankruptcy. *Inspira: Journal of Modern Management & Entrepreneurship*, 5(1), pp.01-12.
- [37] Rajaobelina, L., and L. Ricard. 2021. Classifying potential users of live chat services and chatbots. *Journal of Financial Services Marketing* 26 (2): 81–94.
- [38] Ritchie, B. W., Bentley, G., Koruth, T., & Wang, J. (2011). Proactive crisis planning: lessons for the accommodation industry. *Scandinavian Journal of Hospitality and Tourism*, 11(3), 367-386.
- [39] Rousaki, B., & Alcott, P. (2006). Exploring the crisis readiness perceptions of hotel managers in the UK. *Tourism and Hospitality Research*, 7(1), 27-38.
- [40] Russell SJ, Norvig P (2016) Artificial intelligence: a modern approach. Pearson Education Limited, London
- [41] Saaty, T.L., 2008. Decision making with the analytic hierarchy process. *International journal of services sciences*, 1(1), pp.83-98.
- [42] Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach*: New Jersey, John Wiley & Sons.
- [43] Sfakianaki, E., Iliadis, T., & Zafeiris, E. (2015). Crisis management under an economic recession in construction: The Greek case. *International Journal of Management and Decision Making*, 14(4), 373-389.
- [44] Spillan, J. E., Parnell, J. A., & de Mayolo, C. A. (2011). Exploring crisis readiness in Peru. *Journal of International Business and Economy*, 12(1), 57-83.
- [45] Tarafdar, M., C.M. Beath, and J.W. Ross. 2019. Using AI to enhance business operations. *MIT Sloan Management Review* 60 (4): 37–44.
- [46] Tawwaf and Alarshani (2021), The Importance of the Crisis Management in Improving the Effectiveness of Administrative Decisions by Applying to Decision-Makers in the Public Electricity Corporation. *Aledari journal*, 163, p 13- 42. Arabic
- [47] The Central Bank of Yemen, monthly exchange rate data (2018).
- [48] The Ministry of Planning & International Cooperation. (2016). *Yemen Socio-Economic Update: Overall Socioeconomic Developments (Situation Report No. 20)*. Retrieved from https://reliefweb.int/sites/reliefweb.int/files/resources/yseu20_english_v8_fin1.pdf
- [49] The Ministry of Planning and International Cooperation Sector of Economic Studies and Forecasts (2018), Issue (34) June.
- [50] UNDP. (2013). *Multi-dimensional Livelihoods Assessment in Conflict Affected Areas*. Retrieved from http://www.ye.undp.org/content/yemen/en/home/library/crisis_prevention_and_recovery/multidimensional-livelihoods-assessment-in-conflict-areas_inyem.html.
- [51] UNDP. (2015). *Rapid Business Survey Impact of the Yemen crisis on private sector*. Retrieved from <https://www.humanitarianresponse.info/en/operations/yemen/document/rapid-business-survey-impacts-yemen-crisis-private-sector-activit>.
- [52] Valsamidis, S., Tsourgiannis, L., Pappas, D., & Mosxou, E. 2020. Digital banking in the new Era: Exploring customers' attitudes. In *Business performance and financial institutions in Europe* (pp. 91–104). Springer, Cham.
- [53] Van Riel, A.C., Lemmink, J. and Ouwersloot, H., 2004. High-technology service innovation success: a decision-making perspective. *Journal of Product Innovation Management*, 21(5), pp.348-359.
- [54] Wilson, L., Abaja, P. O., & Waiganjo, M. (2012). The influence of strategic factors on effective crisis preparedness. *Asian Journal of Business and Management Sciences*, 2(11), 25-41.
- [55] Wooten, L. P., & James, E. H. (2008). Linking crisis management and leadership competencies: the role of human resource development. *Advances in Developing Human Resources*, 10(3), 352-379.
- [56] Yu, C. H. (2006). *Philosophical foundations of quantitative research methodology*. Lanham, MD: Rowman and Littlefield.
- [57] Zhang, L., & Myers, C. A. (2010). Exploring the underlying relationship between crisis management (cm) and corporate social responsibility (csr). In *2010 3rd International Conference on Information Management, Innovation Management and Industrial Engineering*, 2, 305-310. IEEE.