Linking Artificial Intelligence Use to Improved Decision-Making, Individual and Organizational Outcomes

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Abstract

Artificial Intelligence (AI) plays a significant role at the organizational and operational levels. Managers of companies started to employ AI in decision-making to achieve their operational goals. However, not all managers have the same adaptability to this new technology. Therefore, the present study investigates the impact of utilizing AI on the decision-making process. It also aimed to examine the impact of improved decision-making on three dependent variables: Organizational Performance (OP), Individual Productivity (IP), and Organizational Culture (OC). Statistical Package for Social Sciences (SPSS) software was used to analyze the obtained data and test the hypotheses. The sample of this study included 133 participants working in Saudi organizations, selected from different levels of management (i.e., top managers, middle managers, first line managers, and non-managerial employees). The results of the study showed that AI plays a significant role in the process of decision-making. The results also revealed a positive direct relationship between improved decision-making and organizational performance, individual productivity, and organizational culture. Based on the results of this study, some implications and recommendations were provided concerning the relationship under investigation.

Keywords: Artificial intelligence (AI), Organizational performance (OP), Individual productivity (IP), Organizational culture (OC)

1. Introduction

Artificial Intelligence (AI) introduces the idea of making computers act like humans, and so many AI devices have been common in the business world (Pelau, Dabija & Ene, 2021). The obsession that AI would replace tasks that humans do can be considered these days (Lindebaum, Vesa, & Den Hond, 2020), while others think not (De Cremer & Kasparov, 2021). Schneider and Leyer (2019) argue that the artificial and human intelligence interaction should assist managers in making the right decisions and generate a culture of the standard management of organizations, as it unravels the complicated decisions managers should take.

Artificial Intelligence is now considerably used in the fields of business and management. Different organizations are keen to employ AI in their businesses due to its potential to revolutionize the way of learning, living, discovering, communicating, and working (Goralski & Tan, 2020). In addition, there is ample evidence that AI plays an effective role in management and organizational performance (Hashem & Alqatamin, 2021; Almutairi, Yamin, Halikias & Abi Sen, 2021).

Decision-making processes are vital to organizational performance and productivity, so it is not surprising that numerous studies have sought to improve decision-making quality by utilizing technology to extend human capabilities. Recent developments in AI have made this goal possible in various applications. For example, the newly created Intelligent Decision Support Systems (IDSS) are progressively utilized to assist the decision-making process in different areas such as marketing, command and control, healthcare, cybersecurity, and finance (Phillips-Wren, 2013).   In addition, technology aids decision-making, especially during analysis and investigation. It can assist human decision or judgment by selecting and locating relevant information and supportive data, providing problem-solving models under different circumstances, showing the results to

decision-makers, and helping interpret those results (Tweedale et al., 2008). The decision-maker still plays a vital role in the process of decision-making despite the emergence of Decision Support Systems. These systems have been extended to include broader types of technological support, such as Business Intelligence Analytics (BIA), containing merits to interact with the decision-maker. BIA is widely used today due to its ability to deal with distributed data and massive databases (big data). This system has long been viewed as an effective system to be embedded into the workplace to align the decision styles of users (Phillips-Wren, Iyer, Kulkarni, & Ariyachandra, 2015).

Research has examined factors other than AI capability and improved decision-making that affect individual productivity and organizational performance, such as CEO characteristics, leadership styles, and individual differences (Bajaba, Le, Bajaba & Hoang, 2022b; Fuller, Bajaba, & Bajaba, 2022), but this study aims to develop a theoretical foundation for understanding and to interpret how AI capability impacts improved decision making, individual productivity, organizational performance, and organizational culture. Therefore, the research will study how AI is linked to essential workplace outcomes such as individual performance, organization performance, organization culture, and improved decision making. In addition, the research will explore more theories on AI capability using the recent research by (Mikalef & Gupta, 2021), who studied "Artificial intelligence capability: Conceptualization, measurement calibration, and empirical study on its impact on organizational creativity and firm performance" and another recent research conducted by (Cao, Duan, Edwards, & Dwivedi, 2021) on "Understanding managers' attitudes and behavioral intentions towards using artificial intelligence for organizational decision-making."

2. Theoretical Background and Hypothesis Development

2.1 AI Capability and Improved Decision Making

Modern organizations are investing in technological and information systems advancements to achieve their strategic goals within a controlled environment (El Khatib & Al Falasi, 2021). Managers of those organizations believe that new technologies would improve their decision-making process and foster suitable plans for the organization's operations. However, the use of AI in the process of decision-making is associated with risks and benefits and exposes the technology users to these factors. Some managers have little or no understanding of AI use and fail to get its benefits, which would affect the company's strategic plans (Mikalef & Gupta, 2021).

Solanki et al. (2021) assure that AI is a process used to execute highly effective activities and tasks that need advanced mental abilities. It aims at understanding how people think to make decisions that help solve problems and construe them to equivalent computer processes in an orderly and logical manner (Poola, 2017). However, although AI benefits to reap accurate decisions, there still be intangible processes for customers to believe in decision-making across smart applications due to the fears that employees could not work or process data of those applications properly (Chitturu, Lin, Sneader, Tonby, & Woetzel, 2017).

Several studies (Bejger & Elster, 2020; El Emary, Al Otaibi & Al Amri, 2020; Stone et al., 2020) conducted a study to examine the impact of AI on decision-making in the UAE government. The researcher found that utilizing AI is highly effective and correlated to reducing costs, improving service quality, and increasing transaction efficiency. In addition, Claude and Combe (2018) studied the impact of AI in improving organizational decision-making. The results revealed that AI is highly effective in obtaining intelligent decisions, especially in knowledge-intensive companies.

El Emary et al. (2020) critically reviewed the effect of AI on the quality of decision-making. The researchers reviewed several studies and found that AI practices positively correlate with decision-making accuracy regardless of the organization structure. Based on the results mentioned above, the present study sheds light on the impact of utilizing AI on supporting decision-making and productivity in Saudi organizations. Therefore, the present study comes up with the following hypothesis:

H1. AI has a direct positive relationship with improved decision-making.

2.2 Improved Decision-Making and Individual Productivity

One of the most critical challenges that companies face nowadays is the need to improve individual/employee productivity. Sels et al. (2006) defined individual productivity as the evaluation of workers' efficiency in the workplace. individual productivity can be assessed using different methods, such as the individual's output or the number of services or contributions provided by an individual in a specific period. Therefore, evaluating individual productivity has become essential for the company's success and achieving its objectives (Hanaysha, 2016). Furthermore, in an attempt to increase the productivity of individuals in their workplace, individuals should be mentally and emotionally involved in situations encouraging them to contribute to achieving goals and

share responsibilities (Abdulai & Shafiwu, 2014). Therefore, it is highly recommended for managers to involve individuals/employers in the decision-making process.

The individuals' participation in decision-making may take the form of speaking about themselves in work-related matters. It also involves sharing thoughts and ideas about work matters through face-to-face contact with their managers (Tchapchet, 2013). Basahal, Jelli, Alsabban, Basahel and Bajaba (2022) state that clear communication between managers and employees, along with time spent on personal evaluations of employees, can lead to improvements in employee productivity through the involvement of employees in the decision-making process concerning their future at the company, which then affects the performance of the organization. This means that employees can participate in the decision-making process to reduce their uncertainty and be recognized for their contributions to the company as a whole.

Several studies (Dede, 2019; Ezeanloue & Ezeanyim, 2020; Umar & Said, 2019) studied the relationship between employees' participation in decision-making and productivity. Umar and Said (2019) found that employees' involvement in decision-making positively affects their morale and significantly influences their effort to achieve maximum growth and development. Likewise, Nwosu, Okoh and Goodluck (2020) found that employees' participation in decision-making significantly affected their productivity and commitment to their organizations. The previous literature that studied employees' involvement in decision-making and its impact on individual productivity has shown a positive relationship between both variables. Therefore, the present study hypothesizes the following:

H2. Improved decision-making has a direct positive relationship with individual productivity.

2.3 Improved Decision-Making and Organizational Performance

Organizational performance is a very important element in determining the success of modern businesses in encountering global competition (Okoya, 2013). Opara (2021) defines organizational performance as the firm's ability to achieve subjective and objective outcomes based on strategic actions. Organizational performance is used as a benchmark in an industry or comparing a firm's performance with others in the same industry using specific parameters such as profit level, market share, financial results, and quality of services and products.

According to previous studies (Ojokuku & Sajuyigbe, 2014; Abdulai & Shafiwu, 2014; Valeri, Matondang, and Siahaan, 2020; Kim & Beehr, 2020), improved decision-making could take different forms such as consultative participation, work decisions involvement, informal participation, representative participation, short-term participation, and employee ownership.

Alhawamdeh and Alsmairat (2019) conducted a systematic review of the impact of improved decision-making on organizational performance. Ijeoma (2020) assessed the impact of employees' participation in decision-making in the governmental sector and found a positive relationship between both variables. Libia's (2018) study revealed that private firms need to show higher levels of employees' commitment toward decision-making and performance enhancement. Based on the results of the previous literature that examined the relationship between improved decision-making and organizational performance. They stated that improved decision-making assists decision-makers in providing timely information, which in turn helps in obtaining more accurate strategic decisions. The present study formulates the following hypothesis:

H3. Improved decision-making has a direct positive relationship with organizational performance

2.4 Improved Decision-Making and Organizational Culture

Organizational culture is considered the building block of any modulation and business environment that includes various backgrounds of organizational members, who affect the characteristics and behaviors of leadership (Jalal, 2017). According to Schneider, Ehrhart and Macey (2013), organizational culture includes the members' norms and values experienced in their workplace. These norms and values form members' behaviors and adaptations to obtain efficient organizational results (Basahel & Alshawi, 2014). In addition, organizational culture refers to the way organizational members interact with each other and other stakeholders (Simoneaux & Stroud, 2014).

The present study examines the relationship between improved decision-making and organizational culture, which is considered as the main contribution of it. It is worth mentioning that very few studies have been conducted to study the relationship between the variables in general and in the Saudi context in particular. However, the researcher reviewed several studies investigating the inverted relationship between organizational culture and decision-making. For example, Al-Zufairi and Alenezi (2021) found a significantly positive relationship between organizational culture and decision-making in one academic institution (Kuwait University). The results showed that the quality of decision-making improves the relationship between administrative people

and their employees. They also mentioned that this friendly relationship between two parties leads to university productivity and growth.

Similarly, Callahan (2014) emphasizes the significant role of organizational culture on improved decisions in corporate groups, while Fusch and Gillespie (2012) indicate that organizational culture results in improved decisions and the relationships between employees as they are recognized as important members of the organization. The results of Jalal's (2017) study revealed that decision-making is highly influenced by organizational culture, especially with diversity in the organization itself, which would enrich the quality of decision-making. The results also depicted that organizational culture helps improve communication between members, exchanging ideas and values, teamwork, and enhances productivity. Unger, Rank and Gemünden (2014) found a significant relationship between organizational culture and the financial performance of the corporate group. After a thorough review of literature on the relationship between organizational culture and improved decision-making, the present study formulates the following hypothesis:

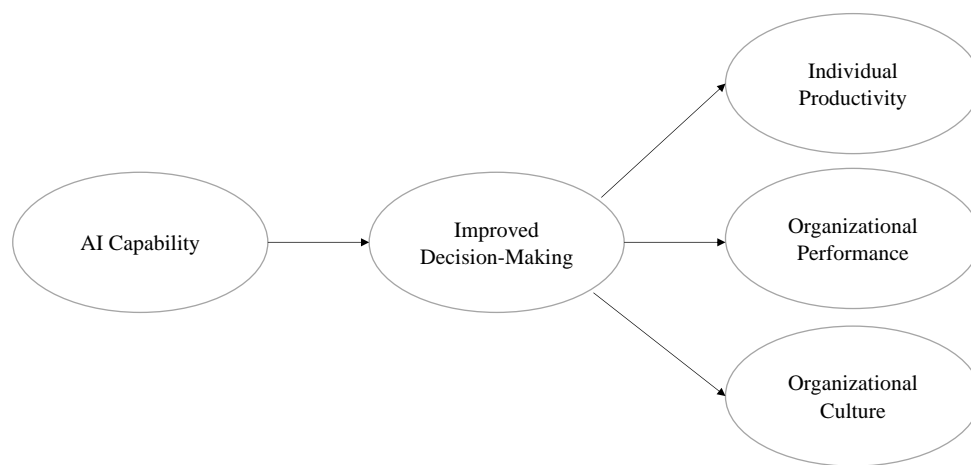**H4.** Improved decision-making has a direct positive relationship with organizational culture.

Figure 1. Conceptual Model

3. Research Methods

3.1 Sample Selection

The target population of this study included employees working in Saudi organizations. The participants were selected from different levels of management (i.e., top managers, middle managers, first line managers, and non-managerial employees). The sample size was (133) participants who were purposively selected to participate in the present study. The previously selected categories are thought to be involved in the use of AI and decision-making.

3.2 Survey Instruments

The instrument used in this study was a structured questionnaire adapted from Mikalef and Gupta (2021). The questionnaire is based on a five-point Likert scale. The questionnaire contained two main sections: Section A asked about demographic information such as gender, age, years of experience, field of work, job level, current business department, and total AI experience. Section B contained (69) items distributed to (5) dimensions as follows: organizational productivity (5) items, organizational performance (5) items, organizational culture (4) items, and improved decision-making (4) items. The AI capability dimension contained (51) items distributed to (4) sub-dimensions: tangible capability (16) items, human skills (14) items, intangible capability (16) items, and organizational creativity (5) items.

3.3 Reliability and Construct Validity of the Questionnaire

3.3.1 Reliability

Tables 1 and 2 show the reliability test results by the method of Alpha Cronbach's for the dependent and independent variables dimensions and sub-dimensions. Regarding the dependent variables, it is found that the coefficients came in the range (.798 – .861), which is high (>0.70) (George & Mallery, 2003). These values are acceptable and satisfactory for getting the questionnaire reliability. Regarding the independent variable's

dimensions and sub-dimensions, it is found that the coefficients came in the range (.796 – .931), which is high (>0.70) (Cronbach, 1951). These values are acceptable and satisfactory for getting the questionnaire reliability.

Table 1. Reliability test by Cronbach's Alpha method for dependent variables

Dimension	No. of Items	Cronbach's Alpha
Individual Productivity (IP)	5	.818
Organizational Performance (OP)	5	.861
Organizational Culture (OC)	4	.846
Improved Decision Making (IDM)	4	.798

Table 2. Reliability test by Cronbach's Alpha method for independent variables

Dimension	Sub-dimension	No. of Items	Cronbach's Alpha
Tangibility	Data	6	.796
	Technology	7	.891
	Basic Resources	3	.810
Human Skills	Technical Skills	7	.931
	Business Skills	7	.919
Intangible	Inter-Departmental Coordination	1	-
	Organizational Change Capacity	6	.875
	Risk Proclivity	3	.837
Organizational Creativity		5	.924

3.3.2 Construct Validity

Table 3 shows that all Pearson correlation coefficients between each statement and their dimensions came in the range (.687 – .873), which are positive, high, and statistically significant at level (0.01). This means that the statements in each dependent variable (dimension) well measure what is intended to measure, and these variables enjoy a high level of construct validity. Table 4 shows that all Pearson correlation coefficients between each sub-dimension and their dimensions came in the range (.678 – .968), which are positive, high, and statistically significant at level (0.01). This means that the sub-dimensions in each independent variable (dimension) well measure what is intended to measure, and these variables enjoy a high level of construct validity.

Table 3. Construct validity for dependent variables

Dimensions	Items	Pearson Correlation	p-value
Individual Productivity (IP)	IP1	.687**	<0.0001
	IP2	.808**	<0.0001
	IP3	.761**	<0.0001
	IP4	.848**	<0.0001
	IP5	.701**	<0.0001
Organizational Performance (OP)	OP1	.800**	<0.0001
	OP2	.767**	<0.0001
	OP3	.873**	<0.0001
	OP4	.829**	<0.0001
	OP5	.740**	<0.0001
Organizational Culture (OC)	OC1	.796**	<0.0001
	OC2	.802**	<0.0001
	OC3	.863**	<0.0001
	OC4	.851**	<0.0001
Improved Decision Making (IDM)	IDM1	.767**	<0.0001
	IDM2	.849**	<0.0001
	IDM3	.822**	<0.0001
	IDM4	.734**	<0.0001

Table 4. Construct validity for independent variable (AI)

Dimension	Sub-dimension	Pearson Correlation with dimension	Pearson Correlation with total AI
Tangibility	Data	.905**	.841**
	Technology	.948**	.894**
	Basic Resources	.865**	.857**
Human Skills	Technical Skills	.958**	.888**
	Business Skills	.955**	.930**
Intangible	Inter-Departmental Coordination	.718**	.678**
	Organizational Change Capacity	.968**	.892**
	Risk Proclivity	.888**	.843**
Organizational Creativity		-	.815**

3.4 Data Collection

The research instrument has been designed online using google forms and distributed to (300) participants of Saudi organizations to achieve the objectives of the present study. In addition, an invitation letter has been sent to the concerned population. As a result, the researcher received (133) filled questionnaires out of (300), which constitutes around (44%) of the overall population. This percentage is acceptable and is considered a representative sample size. The received responses have been inserted into SPSS analysis software to tabulate and present the findings of the present study.

4. Data Analysis and Findings

The software IBM SPSS v 24 was used to conduct the statistical analysis.

4.1 Results

This study aims to explore the effect of AI on organizational decision-making and to explore the impact of AI on individual productivity, organizational performance, and organizational culture. To achieve these objectives, the researchers used both descriptive and inferential statistical methods, which are suitable for such studies to achieve their objectives.

4.1.1 Analysis of Dimensions to Study Participants' Attitudes Toward Dependent and Independent Variables

Table 5 shows the mean, standard deviation, response level, and rank for each statement in the dimensions of dependent variables. Generally, the participants in this study have a positive attitude toward the statement and therefore have a positive attitude toward the total score of dimensions of dependent variables. It is found that the participants have a positive attitude toward (Individual productivity) in the organizations and institutions where they work, with a mean (3.92) and level of response (Agree). The participants have a positive attitude toward (Organizational performance) in the organizations and institutions where they work, with a mean (3.75) and level of response (Agree). Moreover, the participants have a positive attitude toward (Organizational culture) in the organizations and institutions where they work, with a mean (3.68) and level of response (Agree). Also, they have a positive attitude toward (Improved decision-making) in the organizations and institutions where they work, with a mean (3.91) and level of response (Agree).

Table 6 shows the mean, standard deviation, response level, and rank for each statement in the dimensions and sub-dimensions of independent variables. Generally, the participants have a positive attitude toward the statement and, therefore, toward the dimensions and sub-dimensions of independent variables.

It is found that the participants have a positive attitude toward (Tangible) with a mean (3.70) and level of response (Agree); (Technology) with a mean (3.74) and level of response (Agree), and (Basic resources) with a mean (3.66) and level of response (Agree).

The participants have a positive attitude toward (Human skills) with a mean (3.68) and level of response (Agree) since they have a positive attitude toward each of (Technical skills) with a mean (3.72) and level of response (Agree), and (Business skills) with a mean (3.64) and level of response (Agree). Furthermore, the participants have a positive attitude toward (Intangible) at the organizations and institutions where they work with a mean (3.72) and level of response (Agree). Furthermore, since they have a positive attitude toward each (Inter-departmental coordination) with a mean (3.69) and level of response (Agree), and (Organizational change capacity) with a mean (3.78) and level of response (Agree), and (Risk proclivity) with a mean (3.68) and level of response (Agree).

The participants have a positive attitude toward (Organizational creativity) with a mean (3.72) and level of response (Agree).

Table 5. Mean, standard deviation, and rank for the dependent variables.

Dimensions / Statements	Mean	SD	Response Level	Rank
Individual Productivity (IP)	**3.92**	**0.87**	**Agree**	
IP1. I do a large amount of work each day.	3.92	0.90	Agree	2
IP2. I accomplish tasks quickly and efficiently.	3.88	0.84	Agree	4
IP3. I have a high standard of task accomplishment.	4.02	0.83	Agree	1
IP4. My work outcomes are of high quality.	3.92	0.90	Agree	3
IP5. I always beat our team targets.	3.86	0.85	Agree	5
Organizational Performance (OP)	**3.75**	**0.96**	**Agree**	
OP1. Compared to our key competitors, our organization is more successful.	3.82	0.89	Agree	1
OP2. Compared to our key competitors, our organization has a greater market share.	3.79	0.98	Agree	2

	Mean	SD	Response Level	Rank
OP3. Compared to our key competitors, our organization is growing faster.	3.73	0.99	Agree	3
OP4. Compared to our key competitors, our organization is more profitable.	3.73	1.02	Agree	4
OP5. Compared to our key competitors, our organization is more innovative	3.68	0.92	Agree	5
Organizational Culture (OC)	**3.68**	**0.98**	**Agree**	
OC1. The vision and mission of the company are always carried out well by the organization and obeyed by all company elements of the company.	3.77	0.85	Agree	1
OC2. There is trust in the leadership.	3.74	0.96	Agree	2
OC3. There is a fair, equitable, and professional division of work.	3.56	1.08	Agree	4
OC4. A conducive and homely work environment.	3.65	1.02	Agree	3
Improved Decision Making	**3.91**	**0.82**	**Agree**	
IDM 1. AI is believed to be able to help organizational employees to make better decisions and improve creativity.	3.93	0.95	Agree	2
IDM 2. AI-based expert systems in a support role can help users make good decisions.	3.98	0.84	Agree	1
IDM 3. This insight gained through AI-based knowledge creation can be useful in understanding a firm's current position against competitors.	3.89	0.77	Agree	3
IDM 4. This insight gained through AI-based knowledge creation can caution marketers to remain alert about their brands and identify fake news that can cause harm to the brand.	3.83	0.72	Agree	4

Table 6. Mean, standard deviation, and rank for the independent variables

Statements	Mean	SD	Response Level	Rank
Tangible	**3.70**	**0.87**	**Agree**	
(1) Data	**3.71**	**0.88**	**Agree**	
D1. We have access to very large, unstructured, or fast-moving data for analysis	3.80	0.70	Agree	1
D2. We integrate data from multiple internal sources into a data warehouse or mart for easy access	3.71	0.88	Agree	2
D3. We integrate external data with internal to facilitate a high-value analysis of our business environment	3.65	0.90	Agree	6
D4. We have the capacity to share our data across business units and organizational boundaries	3.71	0.98	Agree	4
D5. We are able to prepare and cleanse AI data efficiently and assess data for errors	3.68	0.88	Agree	5
D6. We are able to obtain data at the right level of granularity to produce meaningful insights	3.71	0.91	Agree	3
(2) Technology	**3.74**	**0.87**	**Agree**	
T1. We have explored or adopted cloud-based services for processing data and performing AI and machine learning	3.73	0.84	Agree	4
T2. We have the necessary processing power to support AI applications (e.g., CPUs, GPUs)	3.83	0.90	Agree	1
T3. We have invested in networking infrastructure (e.g., enterprise networks) that supports efficiency and scale of applications (scalability, high bandwidth, and low latency)	3.76	0.86	Agree	3
T4. We have explored or adopted parallel computing approaches for AI data processing	3.70	0.88	Agree	5
T5. We have invested in advanced cloud services to allow complex AI abilities on simple API calls (e.g., Microsoft Cognitive Services, Google Cloud Vision)	3.65	0.95	Agree	7
T6. We have invested in scalable data storage infrastructures	3.81	0.78	Agree	2
T7. We have explored AI infrastructure to ensure that data is secured from end to end with state-of-the-art technology	3.70	0.87	Agree	6
(3) Basic Resources	**3.66**	**0.87**	**Agree**	
BR1. The AI initiatives are adequately funded	3.76	0.85	Agree	1
BR2. The AI project has enough team members to get the work done	3.63	0.87	Agree	2
BR3. The AI project is given enough time for completion	3.60	0.90	Agree	3
Human Skills	**3.68**	**0.85**	**Agree**	
(1) Technical Skills	**3.72**	**0.84**	**Agree**	
TS1. The organization has access to internal and external talent with the right technical skills to support AI work.	3.62	0.91	Agree	7
TS2. Our data scientists are very capable of using AI technologies (e.g., machine learning, natural language processing, deep learning)	3.66	0.88	Agree	5
TS3. Our data scientists have the right skills to accomplish their jobs successfully.	3.79	0.82	Agree	1

TS4. Our data scientists are effective in data analysis, processing, and security.	3.79	0.77	Agree	2
TS5. Our data scientists are provided with the required training to deal with AI applications.	3.77	0.84	Agree	3
TS6. We hire data scientists that have the AI skills we are looking for.	3.77	0.81	Agree	4
TS7. Our data scientists have suitable work experience to fulfill their jobs	3.64	0.85	Agree	6
(2) Business Skills	**3.64**	**0.86**	**Agree**	
BS1. Our managers are able to understand business problems and direct AI initiatives to solve them.	3.65	0.88	Agree	2
BS2. Our managers are able to work with data scientists, other employees, and customers to determine opportunities that AI might bring to our organization.	3.65	0.83	Agree	3
BS3. Our managers have a good sense of where to apply AI.	3.62	0.91	Agree	6
BS4. The executive manager of our AI function has strong leadership skills.	3.67	0.81	Agree	1
BS5. Our managers are able to anticipate the future business needs of functional managers, suppliers, and customers and proactively design AI solutions to support these needs.	3.60	0.90	Agree	7
BS6. Our managers are capable of coordinating AI-related activities in ways that support the organization, suppliers, and customers.	3.65	0.82	Agree	4
BS7. We have strong leadership to support AI initiatives, and managers demonstrate ownership of and commitment to AI projects.	3.65	0.90	Agree	5
Intangible	**3.72**	**0.82**	**Agree**	
(1) Inter-Departmental Coordination	**3.69**	**0.79**	**Agree**	
Please indicate to what extent do departments (e.g., marketing, R&D, manufacturing, information technology, and sales) within your organization	3.69	0.79	Agree	
(2) Organizational Change Capacity	**3.78**	**0.82**	**Agree**	
OCC1. We are able to anticipate and plan for the organizational resistance to change	3.71	0.80	Agree	6
OCC2. We consider the politics of the business reengineering efforts	3.80	0.78	Agree	2
OCC3. We recognize the need for managing change	3.85	0.86	Agree	1
OCC4. We are capable of communicating the reasons for change to the members of our organization	3.75	0.88	Agree	5
OCC5. We are able to make the necessary changes in human resource policies for process reengineering	3.78	0.78	Agree	3
OCC6. Senior management commits to new values	3.76	0.82	Agree	4
(3) Risk Proclivity	**3.68**	**0.84**	**Agree**	
RP1. In our organization, we have a strong proclivity for high-risk projects (with chances of very high returns)	3.65	0.85	Agree	3
RP2. In our organization, we take bold and wide-ranging acts to achieve firm objectives	3.71	0.87	Agree	1
RP3. We typically adopt a bold, aggressive posture in order to maximize the probability of exploiting potential opportunities	3.69	0.80	Agree	2
Organizational Creativity (ORC)	**3.72**	**0.82**	**Agree**	
ORC1. Our organization has produced many novels and useful ideas (services/products).	3.83	0.78	Agree	1
ORC2. Our organization fosters an environment that is conducive to our own ability to produce novel and useful ideas (services/products).	3.72	0.84	Agree	2
ORC3. Our organization spends much time for producing novel and useful ideas (services/products).	3.65	0.79	Agree	5
ORC4. Our organization considers producing novel and useful ideas (services/products) as important activities.	3.68	0.85	Agree	4
ORC5. Our organization actively produces novel and useful ideas (services/products).	3.71	0.86	Agree	3

4.1.2 Testing Research Hypotheses

In this part, the researcher will use simple linear regression to study the direct effect of every single independent variable on a specific dependent variable.

H_1 AI has a direct positive relationship with improved decision-making.

To test the first main hypothesis, the researcher used simple linear regression to study the individual effect of AI capability as a total score on the dependent variable (Improved decision-making). The results came as follows:

Table 7. The effect of AI capability on improved decision making

Model	B	R	R^2	T-test for coefficients	Sig.
AI Capability	.052	.539	.291	7.32	<0.0001

Dependent variable: Improved Decision Making

The previous table shows the results of simple linear regression for the effect of AI on improved decision-making. The results reached that the regression model is significant with R^2 (.291), and the coefficient of the independent variable (AI) is significant (T=7.32) with sig. (<0.0001). So, there is sufficient evidence to accept the first hypothesis, i.e., AI has a direct positive significant relationship with improved decision making.

H$_2$ Improved decision-making has a direct positive relationship with individual productivity (IP)

Table 8. The effect of improved decision making on individual productivity (IP)

Model	B	R	R^2	T-test for coefficients	Sig.
Improved Decision Making	.413	.325	.106	3.94	<0.0001

Dependent variable: Individual Productivity (IP)

The previous table shows the results of simple linear regression for the effect of improved decision making on individual productivity. The results reached that the regression model is significant with R^2 (.106), and the coefficient of the independent variable (Improved decision making) is significant (T=3.94) with (sig. < 0.0001). So, there is sufficient evidence to accept the second hypothesis, i.e., improved decision making has a direct positive significant relationship with individual productivity.

H$_3$ Improved decision making has a direct positive relationship with organizational performance (OP)

Table 9. The effect of improved decision making on organizational performance (OP)

Model	B	R	R^2	T-test for coefficients	Sig.
Improved Decision Making	.781	.526	.276	7.08	<0.0001

Dependent variable: Organizational Performance (OP)

The previous table shows the results of simple linear regression for the effect of improved decision making on organizational performance. The results reached that the regression model is significant with R^2 (.276), and the coefficient of the independent variable (Improved decision making) is significant (T=7.08) with (Sig. < 0.0001). So, there is sufficient evidence to accept the third hypothesis, i.e., improved decision making has a direct positive significant relationship with organizational performance.

H$_4$ Improved decision making has a direct positive relationship with organizational performance (OP)

Table 10. The effect of improved decision making on organizational culture (OC)

Model	B	R	R^2	T-test for coefficients	Sig.
Improved Decision Making	.504	.402	.162	5.03	<0.0001

Dependent variable: Organizational Culture (OC)

The previous table shows the results of simple linear regression for the effect of improved decision making on organizational culture. The results reached that the regression model is significant with R^2 (.162), and the coefficient of the independent variable (Improved decision making) is significant (T=5.03) with (Sig. < 0.0001). So, there is sufficient evidence to accept the fourth hypothesis, i.e., improved decision making has a direct positive significant relationship with organizational culture.

Table 11 and Figure 1 (Conceptual model) show the results summary of simple linear regression for the direct effects of independent variables on the dependent variables. The first hypothesis (H$_1$), which studied the direct effect of AI on IDM, is supported. Also, the second hypothesis (H$_2$), which examined the direct effect of IDM on IP, is supported. The third hypothesis (H$_3$), which studied the direct effect of IDM on OP, is supported. Finally, the fourth hypothesis (H$_4$), which studied the direct effect of IDM on OC, is supported.

Table 11. Summary results of hypotheses testing

Hypotheses	Hypothesized Direct Effects	Regression coefficient	Empirical evidence
H$_1$	AI → Improved Decision Making	.052**	Supported
H$_2$	Improved Decision Making → Individual Productivity (IP)	.413**	Supported
H$_3$	Improved Decision Making → Organizational Performance (OP)	.781**	Supported
H$_4$	Improved Decision Making → Organizational Culture (OC)	.504**	Supported

4.1.3 The Relationship Between Variables (Dependent and Independent)

The researcher used Pearson correlation coefficients to study the relationship between the variables as total scores, and the results are as follows:

Table 12. Pearson correlation coefficients between total AI capability and dependent variables

Variables	1	2	3	4
1. Individual Productivity (IP)	1			
2. Organizational Performance (OP)	.341[**] .000	1		
3. Organizational Culture (OC)	.094 .284	.520[**] .000	1	
4. Improved Decision Making (IDM)	.325[**] .000	.526[**] .000	.402[**] .000	1
5. AI Capability	.236[**] .006	.445[**] .000	.545[**] .000	.539[**] .000

**. Correlation is significant at the 0.01 level (2-tailed).

Table 12 shows the correlation coefficient matrix for the relationship between total AI capability and the three dependent variables as totals. The results show statistically significant positive correlations between total AI capability and each IP, OP, and OC, amounting to 0.236**, 0.445**, and 0.545**, respectively, since the p-values are (<0.05) for each correlation coefficient. The table also shows the correlation coefficients between improved decision-making (IDM) and each IP, OP, and OC. The results show that there are statistically significant positive correlations between total improved decision making (IDM) and each of IP, OP, and OC, amounting to 0.325**, 0.526**, and 0.402**, respectively, since the p-values are (<0.05) for each correlation coefficient. Moreover, a statistically significant positive correlation exists between total AI capability and improved decision making (IDM), amounting to 0.539**.

4.1.4 Summary of Results

The sample consists of 133 employees working in Saudi organizations from different levels of management (i.e., top managers, middle managers, first line managers, and non-managerial employees). The results revealed that the majority, 77.4% are male, 45.1% of the participants are in the age group (26 – 35 years), and 38.3% of participants have (4 – 10 years) of experience. Moreover, 44.4% of participants work at other institutions (Oil & Gas, Transport, Industrials, Basic Materials, etc.), 26.3% work at health care institutions, and 41.4% are regular employees. Moreover, it is found that 36.8% of participants have (more than four years) of AI experience, and 31.6% have (less than one year).

The participants agree and have a positive attitude toward individual productivity (IP), organizational performance (OP), and organizational culture (OC). The participants agree and have a positive attitude toward (Improved decision-making) in the organizations and institutions where they work. The participants agree and have positive attitudes toward tangible, human skills, intangible, and organizational creativity (ORC). In addition, the findings accept the first main hypothesis; AI has a direct positive relationship with improved decision-making. It also accepted the second main hypothesis; improved decision-making has a direct positive significant relationship with individual productivity. The third main hypothesis is; improved decision-making has a direct positive significant relationship with organizational performance. The fourth main hypothesis, improved decision making, has a direct positive significant relationship with organizational culture.

The results showed statistically significant positive correlations between total AI capability and each IP, OP, and OC, amounting to 0.236**, 0.445**, and 0.545**, respectively, since the p-values are (<0.05) for each correlation coefficient. Furthermore, there were statistically significant positive correlations between total improved decision making (IDM) and each of IP, OP, and OC, amounting to 0.325**, 0.526**, and 0.402**, respectively, since the p-values are (<0.05) for each correlation coefficient. There was also a statistically significant positive correlation between total AI capability and improved decision making (IDM), amounting to 0.539**.

5. Discussion

In previous studies, leadership styles and individual differences have been studied in relation to individual productivity and organizational performance (Althnayan, Alarifi, Bajaba, & Alsabban, 2022; Bajaba, Bajaba & Fuller, 2022a). However, in this study, the use of AI capability and improved decision-making are examined as key factors affecting individual productivity, organizational performance, and organizational culture. The results of this study revealed that there is a positive relationship between AI and improved decision-making, and this

supports the first hypothesis of the study. It seems that leadership in Saudi organizations started to believe in the significance of AI in decision-making. This result is in line with the previous studies that studied this relationship (Bejger & Elster, 2020; El Emary et al., 2020; Stone et al., 2020). The use of AI to improve decision-making is expanding in Saudi organizations, which could be attributed to several reasons. One reason is that AI applications may provide many opportunities for organizations, reduce administrative burdens, and increase business control. In addition, using AI could help exploit limited resources and control complex activities under complex circumstances/conditions.

The results also supported the second hypothesis concerning the direct positive relationship between improved decision-making and individual productivity. This result concurs with previous studies (Dede, 2019; Ezeanloue & Ezeanyim, 2020; Umar & Said, 2019). This result implies that improved decision-making does increase individual productivity. Involving employees in the decision-making process helps them to put in more effort and working hours to achieve the organization's goals since they start to recognize their influential role in the formulation of administrative decisions of the organization.

Concerning the third hypothesis, the results showed a direct positive relationship between improved decision-making and organizational performance. This result is consistent with the results of some previous studies (Alhawamdeh & Alsmairat, 2019; Ijeoma, 2020; Libia, 2018). It is apparent that improved decision-making enhances relationships between employees in the organization, thus, increasing its productivity and overall performance. The increase in productivity resulted from the employee's participation in decision-making, representing their overall satisfaction with the organization.

In addition, the results of this study supported the fourth hypothesis that improved decision-making has a direct positive relationship with organizational culture. This result corresponds with the studies of (Al-Zufairi & Alenezi, 2021; Callahan, 2014; Fusch & Gillespie, 2012; Jalal, 2017; Unger et al., 2014). The obtained result concerning this hypothesis indicates that improved decision-making plays a vital role in all aspects of organizational culture. Culture influences the interaction between the staff member, the types and methods of decision-making, the adopted leadership styles to handle changes, the attitudes, and the overall productivity of the organization, taking into consideration its vision and mission.

5.1 Theoretical Contributions of the Study

The results obtained from this study would theoretically contribute to the body of literature in this field. This study provides a primary framework and good literature foundation upon which future research will be based upon. It also suggested a unique theoretical framework in which organizational culture was the study's main contribution. The findings of this study would be of great benefit for researchers and academicians as it provides more insights and information about the impact of AI on improved decision-making on the one hand. Further, the impact of decision-making on three dependent variables (organizational performance, individual productivity, and organizational culture). Furthermore, the present study adds to the literature by empirically examining the relationship between AI and improved decision-making, which enriches the researchers' knowledge of this discipline. Finally, there will be an opportunity to duplicate the study in a similar industry or different industries in the Kingdom of Saudi Arabia.

5.2 Practical Contributions of the Study

The results of the present study could also provide practical contributions to the business field. Managers of organizations could utilize the results of this study to broaden their knowledge and understanding of the role of AI in improving decision-making and the role of that improved decision-making on OP, OC, and IP. Understanding AI's role would contribute to making changes and achieving organizations' goals effectively and more flexibly. The utilization of AI in the decision-making process is a sign of a successful business strategy to achieve productivity, profit, and growth. To keep improving the previous targets, managers are required to analyze the advantages and disadvantages of employing AI in decision-making and try to exploit the advantages of such utilization. Besides the practical contributions of the present study, several implications can be obtained, which can be summarized as follows: 1) the utilization of AI has a significant role in improving decision-making, 2) improved decision-making has a significant impact on organizational performance, 3) improved decision-making has a significant impact on organizational culture, 4) improved decision-making has a significant impact individual productivity.

6. Limitations and Recommendations for Further Research

This section provides some study limitations that should be considered in future research on this discipline. First, the study focused on Saudi organizations; non-Saudi organizations have not been included in this study. Second,

this study was methodologically limited due to its reliance on a quantitative research design. Future research is highly recommended to employ qualitative research instruments such as semi-structured interviews due to their importance in getting more in-depth responses from the participants and adding more valuable information to the study. Third, Data collection was also limited in this study since data were collected over a specific period of time (cross-sectional). Thus, future research is recommended to collect their data over different periods of time (longitudinal) to enrich the outcomes of their studies. The fourth is that future research may examine whether there are mediation and moderating effects between the relationship of artificial intelligence with the outcome variables in this study (e.g., Kumar, Dwivedi, Y. & Anand, 2021). Finally, further research is recommended to expand the sample size, concentrating on multiple variables, using a mixed research methodology.

7. Conclusion

The results obtained from this study would be significant in many ways. This study would enrich the literature concerning this topic by providing more insights into the effect of AI and improved decision-making. The results obtained from this research contribute to understanding how AI can boost the productivity and performance of employees. In addition, the findings of this study would provide valuable information for leaders and experts about the pros and cons of adopting AI. It also raises awareness among employees at different management levels about the impact of AI on their performance and productivity. Finally, this research could be a reference for those interested in such topics. It could also be a starting point for future research to investigate the relationship between AI and work outcomes since it will provide the empirical nature of data.

Acknowledgments

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