



The Impact of Information Technology Infrastructure Flexibility and Behavioral Biases on Investment Decision Making

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ABSTRACT

Understanding the effects of information technology infrastructure flexibility (ITIF) and behavioural biases on investment decisions will help investors make more informed choices. Due to a lack of investment and decision-maker biases, Iraqi universities' IT infrastructure is not well developed, resulting in low performance. However, few studies look into the causes of this phenomenon. This study aimed to investigate the impact of ITIF and behavioural biases on investment decision making and their impact on organisations' performance. A total of 209 valid responses from decision-makers in private universities of the Republic of Iraq are analyzed. A set of statistical analyzes are performed with SmartPLS software. The results show that there is a significant impact of ITIF factors and behavioural biases on investment decision making. Also, investment decision making influences organizational performance. The research confirms the significance of ITIF and behavioural biases as critical indicators of organizational strategic decision making.

KEYWORDS

Behavioral Biases, Information Technology, Infrastructure Flexibility, Investors' Decision-Making

INTRODUCTION

Most new organizations use information technologies to accomplish their activities. IT's importance stems from its role as one of the main tools employed in the service activities of business organizations (Jabbouri et al., 2016). Customers' needs are constantly changing, resulting in a short product life cycle that necessitates a shift in these technologies (Chung et al., 2003). The concept of information technology infrastructure flexibility (ITIF) comes from a need to have IT that can face the rapid technology changes (Nurshuhada & Hafez, 2011). Since IT infrastructure is so essential in transmitting knowledge, many businesses put a lot of money into it (Hou, 2019). Few studies have examined ITIF as a dependent variable (Anwar et al., 2018). The organizations' possession of immutable infrastructure will impede the organization's performance of its activities and increase costs and the inability to meet

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customers' needs (Makhloufi et al., 2018). Also, the lack of flexibility of information technology will lead to delays in the completion of new projects and a decline in the organisation's performance (Masa'deh, 2013). The importance of understanding the effect of ITIF cannot be overstated. It aids in rationalising investor decisions and determining which aspects should be considered when deciding whether to invest in information technology that aid in productivity and effectiveness. The link between IT investment and a firm's performance has been discussed in the scientific literature (Bardhan et al., 2013; Lee et al., 2016). The study conducted by (Harris & Katz, 1991) revealed a relationship between companies' performance and the level of investment intensity in information technology. Some researchers argue that IT investment relates indirectly to a firm's performance through contextual factors (Bharadwaj, 2000; Campbell, 2012).

Decisions in general, and investment decisions in particular, are influenced by many factors, the most important of which is biased behavior (Kartini & Nahda, 2021).

Bias is defined as making unfair judgments due to personal beliefs and opinions. Irrational attitudes or behaviours that may unintentionally affect the human decision-making process are known as behavioural biases (Shaikh et al., 2019). The topic of investor behavioural biases is one of the topics that have attracted many researchers recently (Isidore R. & P., 2019). The availability of information is a prerequisite for rational decision-making (Al-Sabaawi and Dahlan, 2018, 2019). Generally, people make poor decisions due to a lack of information (Kumar & Goyal, 2016). Behavioural biases in investment decision-making are considered irrational (Jhandir & Elahi, 2014). Some studies have found that investors with limited knowledge are more vulnerable to problems (Madaan & Singh, 2019). Investors often face uncertainty resulting from the quality and quantity of available information (Fernández *et al.*, 2011). Most of the scientific studies related to behavioural finance have indicated behavioural biases among various investors. However, limited studies show the impact of ITIF on the decision to invest in technologies (Anwar & Masrek, 2015).

Similarly the effects of herding bias among individual investors got limited attention in the literature (Fernández et al., 2011); (Kumar & Goyal, 2015). In a developing country like Iraq, such research is scarce (Zahera & Bansal, 2018). Therefore this study attempts to find the effects of ITIF and herding bias on the investment decision making process and firm's performance in the Iraqi context.

The research aims to answer a set of questions: Do flexible information technologies affect investment decision? Do behavioural biases affect the decision to invest in information technology? Does the decision to invest in technologies affect the performance of organizations? The rest of the study is organized as follows. Section 2 discusses the theoretical background of the study. Section 3 explains the research methodology. The data analysis results are presented in section 4. The discussion and conclusion are presented in section 5 and section 6.

RELATED WORK

The term infrastructure in a technical context refers to the components of networks and platforms of technical architecture (Ness, 2005). The Information Technology (IT) infrastructure consists of two main parts: the technical infrastructure and the human structure (Chanopas et al., 2006). Infrastructure is discussed in two levels. The primary technical components represent the first. The second is represented by the resources and administrative aspects affecting the infrastructure's design (Duncan, 1995). The IT infrastructure is the foundation for IT capabilities that enable the development of technical applications and support organisations' activities (Anwar & Masrek, 2014). Information technology infrastructure is a factor in the success of organizations (Mohamad et al., 2017).

Many studies adopt the technical viewpoint of infrastructures, such as hardware, software, and communication technologies (Duncan, 1995). Others believe that information technology infrastructure is a multi-faceted term that includes, in addition to the technical side, human aspects such as expertise and skills (Isal et al., 2016). Flexibility means, in the administrative literature, the ability of a resource

to produce more than one product (Duncan, 1995). It can be used for a variety of tasks, responsiveness to change, or able to be easily transformed (Nurshuhada & Hafez, 2011).

Information technology infrastructure flexibility (ITIF) is defined as the ability of infrastructure to adapt to environmental changes in a way that enables organizations to develop and implement technologies rapidly (Tafti et al., 2013) (Benitez, Ray, et al., 2018). ITIF can support a variety of existing technologies and users easily and quickly (Chung et al., 2003). It facilitates information sharing, develops information systems, and ensures continuity of information technology operations with minimal time and effort (Anwar & Masrek, 2013). ITIF can be expressed as the degree to which information technology resources can be shared and reusable (Duncan, 1995); (Chung et al., 2003); (Isal et al., 2016). ITIF aims to make technologies mobile, agile, and responsive to change (De Leeuw & Volberda, 1996). The ITIF brings many benefits to organizations, including increasing structural flexibility through the decentralization of decision-making (Benitez, Ray, et al., 2018). It enables managers to analyze customer data and identify new products (Chung et al., 2003). Besides, it allows organizations to communicate flexibly with other organizations, and quickly integrate their capabilities into the supply chain (Bush et al., 2010; Mohamad et al., 2017). ITIF is a factor in IT success when undertaking technical change processes (Nurshuhada & Hafez, 2011). Flexibility is the degree to which an organization has various actions that enable it to implement to increase management control capacity and improve the controllability of its environment. (Byrd & Turner, 2001; Fochmann et al., 2016; Menon & Shah, 2019).

ITIF Factors

The ITIF of business applications is determined by IT infrastructure compatibility, modularity, accessibility, continuity, and IT personnel.

Compatibility

It means the ability of technology to share information through any of the organisation's technologies (Chung et al., 2003). Compatibility facilitates the exchange of diverse forms of information across organizational units (Anwar & Masrek, 2013).

Modularity

Modularity is defined as the ability to easily add, modify, or remove technical components (Anwar & Masrek, 2014). Modularity provides an organization with the ability to quickly create and modify software applications to support the product development process with ease (Masrek & Jusoff, 2009). Modularity is an effective way to deal with complex situations (Zhang et al., 2009). This feature makes it easy for organizations to make necessary changes in the technologies used in information systems (Anwar & Masrek, 2013).

Connectivity

Connectivity is defined as technical components' ability to communicate with each other inside and outside the organization (Benitez, Ray, et al., 2018). The connectivity characteristic relates to the network infrastructure within the organization (Anwar & Masrek, 2014). The connectivity enables communication with the information system anytime, anywhere (Nurshuhada & Hafez, 2011). In addition to a rapid response to changes in the organization's strategy (Chung et al., 2003), the electronic link allows authorized users to access the databases via the internal network (Anwar & Masrek, 2013).

IT Continuity

It is the ability of information technology to provide services to users without disruption (Chanopas et al., 2006). Technology disruption may be caused by various reasons, such as obsolescence in software and hardware or information security problems such as piracy (Anwar & Masrek, 2013).

IT Personnel

The human information technology infrastructure represents a layer of information technology infrastructure, represented by the knowledge and experience of information technology personnel, through whom technologies are linked to services (Chanopas *et al.*, 2006). To achieve the IT infrastructure's flexibility, the IT personnel must have the ability to adapt to any technology (Anwar & Masrek, 2014).

IT Infrastructure Investment Decisions

Despite the diversity of theories related to finance, the theory of classical finance and the behavioral finance theory are among the theories that most dealt with investment decisions.

Classical financial theory is based on the main idea that investors are rational when making investment decisions and assumes that investors have sufficient knowledge and information to make these decisions, and operate in an environment of complete certainty (Katper *et al.*, 2019), and conduct business without being subject to bias (Chandra, 2008).

The rational investor, as defined by Thaler, is that person who makes decisions within acceptable parameters, and works to constantly correct his beliefs by obtaining information related to the investment field (Isidore R. & P., 2019).

On the other hand, the behavioral finance theory is a different approach from classical finance, and it can be defined as the study of how psychological factors affect the investment decision-making of investors (Katper *et al.*, 2019), the behavioral theory in finance argues on realistic behavior, as well as that individuals are irrational (Zahera & Bansal, 2019). In their study of individuals' investment behavior Chitra & Jayashree (2014) found that the results are opposite to those of the traditional finance theory, as they concluded that investors do not always act rationally when making investment decisions.

Based on the above, the current research relied on behavioral finance as it is more realistic and closely related to the behavioral biases facing investment in IT infrastructures.

Behavioral Biases and Investment Decision Making

Bias is defined as making unfair judgments due to personal beliefs and opinions (Shaikh *et al.*, 2019). The studies have identified many behavioural biases. However, the current study adopted the most cited behavioural biases to be included in the proposed model.

Overconfidence

Overconfidence is a psychological characteristic of individuals' investment decisions (Madaan & Singh, 2019). Overconfidence is defined as a situation in which people are highly optimistic about returns and believe they have enough information to make correct investment decisions. (Zahera & Bansal, 2018). Which makes them ignore the investment risk (Kumar & Goyal, 2015). Overconfidence is also defined as individuals' confidence in their abilities to face complex situations without thinking about unexpected circumstances (Kusnandar *et al.*, 2019).

Representativeness

Representation is a cognitive bias whereby individuals classify current situations based on past experiences in case of uncertainty (Raut *et al.*, 2018). Representation bias occurs when an investor tends to buy stocks that have desirable advantages, such as high profits (Antony & Joseph, 2017). People tend to be interested in recent events (Ogunlusi & Obademi, 2019).

Disposition Effect

The effect of the action is investors' orientation to avoid realized losses in expectations of realized gains (Pelster & Hofmann, 2018). This behaviour aims to maximize profits and delay losses as much as possible (Zahera & Bansal, 2019). The behaviour's effect is that investors tend to sell stocks that

have good returns and keep poorly performing stocks, believing that the latter will increase in value. (Toma, 2015). Profit investors prefer to sell their investments to avoid the state of remorse associated with the possibility of a decrease in the value of investments (Rubaltelli et al., 2005). One of the reasons leading to poor investment performance is the disposition effect (Dhar & Zhu, 2006).

Herding

The phenomenon of pastoralism is represented by the perpetrators' failure to act rationally; when making investment decisions and prefer to imitate other investors' opinions to make their investment decision. (Madaan & Singh, 2019). Herding refers to the situation wherein rational people start behaving irrationally by imitating others' judgments while making decisions (Kumar & Goyal, 2015). Investment decision-makers face many limitations that may reduce the investment decision's effectiveness, and among those, determinants are related to the uncertainty resulting from the cognitive limitations (Fernández *et al.*, 2011).

Mental Accounting

Mental accounting is defined as the method that investors use to increase profits and reduce risks by distributing investments in various investment portfolios, depending on their mental accounts (Zahera & Bansal, 2018). It is the set of cognitive processes that investors use to organize and evaluate financial activities (Thaler, 1999).

Organizational Performance

Organizational performance is defined as the organisation's degree of success in achieving financial and marketing objectives (Harsasi & Minrohayati, 2017). Organizational performance is the sum of the achievements related to an organizational objective that has been achieved in the organization during a specific period (Nikpour, 2017). The research gap of the current study is represented by the scarcity of studies conducted to measure the impact of the dimensions of the ITIF on investment decision-making, particularly in private universities and developing countries such as Iraq. Similarly, only a few studies have looked into the effect of the ITIF on technology investment decisions (Anwar and Masrek, 2015). Similarly, the literature on the effects of herding bias among individual investors has been sparse (Fernández et al., 2011; Kumar and Goyal, 2015a). Such research is scarce in a developing country like Iraq (Zahera and Bansal, 2018a). As a result, the purpose of this research is to evaluate the influence of ITIF and herding bias on investment decision-making and firm performance in the Iraqi context.

THEORETICAL MODEL AND HYPOTHESIS

The proposed model's theoretical foundations are based on behavioural finance theory and Information technology infrastructure flexibility. Based on the literature's theoretical review, the model is shown in Figure 1 was designed to test the relationships between variables. Highly flexible information technology requires more significant financial investment than inflexible technologies (Zhang et al., 2008). Prior research has highlighted the relationship between behavioural biases and decision making. Due to a lack of complete information, individuals use brief information to adopt simple pattern pathways that lead to poor decision-making (Madaan & Singh, 2019). Lin (2012) suggested that investors commit behavioural biases due to a lack of technical expertise and confidence in their abilities in better decision making about investments (Jhandir & Elahi, 2014). Therefore, behavioural biases play an important role in individual investors' financial decision-making (Siefert & Siefert, 2015). Researchers found deviations in investor behaviour from rational decisions, contrary to standard financial theory, represented by cognitive errors and biases affecting investment decision-making (Kumar & Goyal, 2016). The results show that the investors who suffer from these biases cannot

make rational decisions, and ultimately their return is less than what they expect it to be (Zahera & Bansal, 2018). Depending on the previous studies author hypothesize the following.

A study found that the IT infrastructure's modularity affects the strategic alignment between information technology and business (Chung et al., 2003b), which can be considered one of the strategic decisions. The study conducted by (Kong *et al.*, 2011) found that modularity in the green manufacturing of products can reduce investment in new products (Kong *et al.*, 2011). It enables the organization to quickly respond to changes in strategy (Isal *et al.*, 2016). This discussion proposes the following hypothesis:

H1: IT modularity will positively affect investment decision-making.

The researchers' findings (Li, 2017) indicated that compatibility in electric vehicle charging standards would reduce the duplication of investment by car companies in charging stations. The flexibility of the organizational structure is an essential aspect of the flexibility of the information technology infrastructure. The compatibility of information technologies enables investors to quickly respond to the available opportunities and make investment decisions promptly due to the adoption of the decentralized pattern (Benitez, Ray, et al., 2018). Based on these previous arguments, the author hypothesis that:

H2: IT compatibility has a positive impact on investment decision making.

The interconnected information technology infrastructure enables information to be provided to investment decision-makers and shared across the supply chain, facilitating cooperation with partners (Benitez, Ray, et al., 2018). Technical connectivity is one of the dimensions of great importance in the work of organizations. It is because of its role in facilitating sharing resources and information technology (Chung et al., 2003). It is likely to influence the investment decision. Therefore, the author hypothesizes that:

H3: There is a positive relationship between IT connectivity and investment decision making.

The information technology continuity characteristic is one of the characteristics of great importance for organizations. To ensure the continuity of information technologies in activities, organizations must work on updating technologies and taking care of information security by installing anti-virus software and firewalls (Anwar & Masrek, 2013). Therefore, organizations invest in these technologies to ensure continuity, and depending on that, the investment decision in technologies is affected by the technology's ability to achieve continuity. Depending on the above, the following hypothesis can be formulated:

H4: The IT continuity influences the investment decision investment.

Information technology personnel should possess the ability to identify technologies that are compatible with the information systems used in the organization (Anwar & Masrek, 2014). Besides, he found (Zhang *et al.*, 2009) an information technology response that has a mediating role in influencing two dimensions of the ITIF: modularity and information technology personnel's skills. They considered modularity and IT personnel skills, as they are the least studied dimensions of ITIF (Masa'deh, 2013). Based on the above, the following hypothesis can be presented:

H5: The IT personnel skills influence decisions.

Investor overconfidence is one of the topics that have been studied in many studies on the behavioural finance aspect (Mumtaz et al., 2018). Economic theories confirm that individuals make rational decisions when practising investment activity, but the reality indicates otherwise (Qasim et al., 2019). When investors are overconfident, they are often more exposed to risk and make irrational decisions (Qasim *et al.*, 2019). When investors are overly confident, they are often more exposed to risk and make irrational decisions due to their beliefs rather than evaluating information (Qasim *et al.*, 2019). Overconfidence is a common bias among investors that makes them very confident in their expertise, which leads to ignoring investment risks (Kumar & Goyal, 2015). Overconfidence bias is a problematic issue when making an investment decision because of the potential for financial losses (Tjandrasa & Tjandraningtyas, 2018). Uncertainty is an essential factor affecting overconfidence (Ancarani et al., 2016). Based on the previous discussion, the author suggests the following hypothesis:

H6: Overconfidence has a positive effect on decision investment.

The main problem with representation bias is that investors generalize their findings to many situations with little information (Katper et al., 2019). They are using mental acronyms, which are termed affect heuristic, that cause an individual to make decisions quickly based on emotional aspects. (Tsohou et al., 2015). The findings of a study (Khan) conducted on investors in the stock market in Pakistan indicate that investors may face a representation bias due to being affected by recent information and misinterpretation of available opportunities (Khan, 2020). It leads to the hypothesis:

H7: Representativeness has a positive effect on decision investment.

Investors' tendency to sell high-yielding stocks and retain low-performing stocks due to higher prices later is known as the disposition effect (Toma, 2015). According to some reports, not all investors have an equal impact on the disposition effect. On the other hand, wealthier investors are less affected by this effect (Isidore and Christie, 2019). Risk aversion is one of the reasons for the disposition effect. For this reason, investors retain losing stocks for more extended periods than winning stocks (Khan, Azeem, and Sarwar, 2017). It leads to the following hypothesis:

H8: Disposition effect is positively associated with investment decision making.

Many influential investors in the market confirm that their decisions are influenced by other investors (Fernández *et al.*, 2011). There is a positive relationship between investor insecurity and herd behaviour, which is described as imitating other investors' decision. Investors may use grazing to address the problem of uncertainty when they behave in an irrational manner (Fernández *et al.*, 2011). The study conducted by Qasim *et al.* (2019) in the Pakistan context to test the relationship between investment decision-making and herding behaviour showed that herding behaviour significantly affected the investment decisions. Based on these arguments, researchers hypothesized:

H9: The herding effect has positively related to investment decision making.

Mental accounting helps investors manage and organize their portfolios in various accounts (Ritter, 2003). Mental accounts aim to increase returns and reduce risk (Zahera & Bansal, 2018). The main idea of mental accounting is that investors separate investments into separate accounts, then apply probability theory to each account (Shukla et al., 2020). Therefore, researchers hypothesized that:

H10: Mental accounting positively affects the investment decision making.

The study conducted by (Harris & Katz, 1991) revealed a relationship between companies' performance and the level of investment intensity in information technology. The study's findings (Turedi & Zhu, 2019) indicated that an effective decision-making structure positively affects the productivity of the organization. The results of a case study conducted by (Ijeoma, 2020) at Port-Harcourt on managers and employees working in a group of government-owned companies revealed that employee participation in decision-making had had a role in improving organizational performance. The above discussion leads to the following hypothesis:

H11: There is a positive relationship between investment decision making and organizational performance.

RESEARCH METHODOLOGY

Survey Questionnaire Design

As shown in Table 1 the measurement items for the study constructs were derived from previous research. Three experts from an Iraqi public university who specialises in technology investment were consulted to ensure the study's reliability. The specialists checked the instrument's content validity and offered feedback. Based on the expert's recommendations, the instrument was updated.

Figure 1. The Proposed Research Model

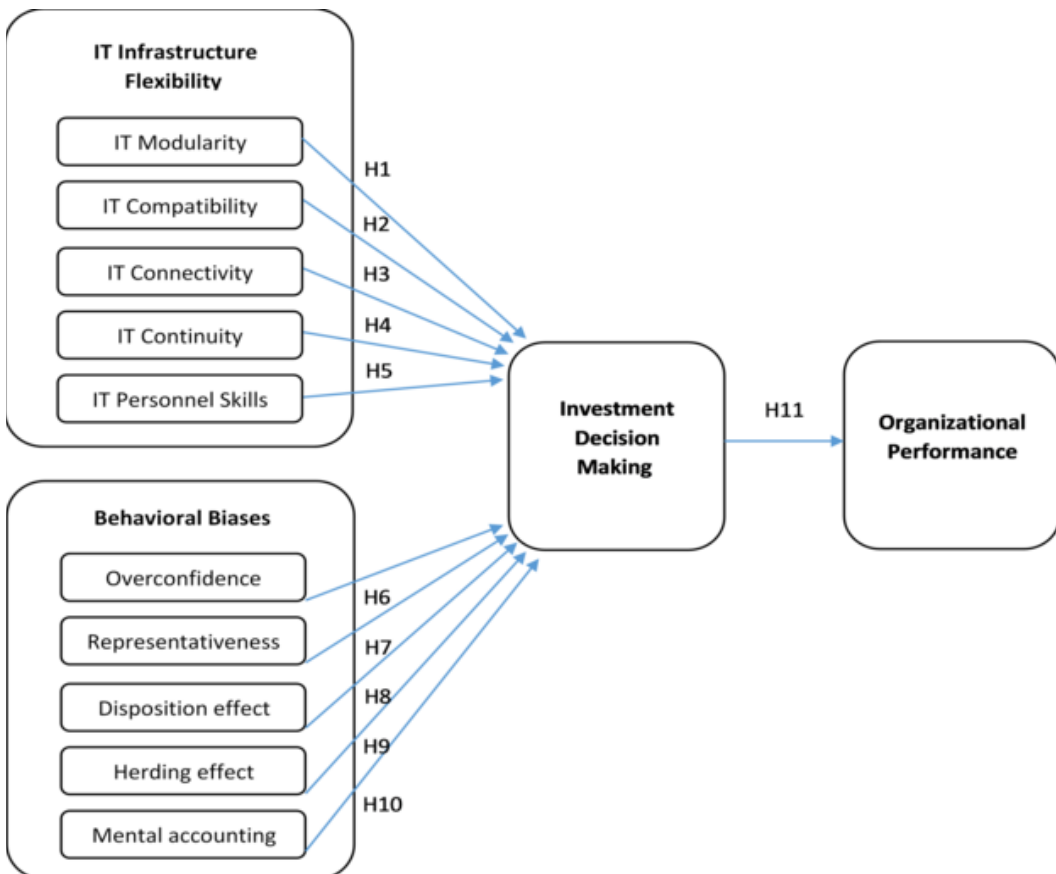


Table 1. Study scale sources

Dimensions	Items	Sources
IT Modularity	5	(Benitez, Ray, et al., 2018)
IT Compatibility	5	(Benitez, Ray, et al., 2018)
IT Connectivity	9	(Benitez, Llorens, et al., 2018) (Tallon et al., 2011)
IT Continuity	4	(Masa'deh, 2013)
IT personnel skills	4	(Benitez, Ray, et al., 2018); (Isal et al., 2016)
Overconfidence	5	(Antony & Joseph, 2017)
Representativeness	5	(Katper <i>et al.</i> , 2019)
Disposition effect	4	(Goo et al., 2010)
Herding effect	5	(Kengatharan & Kengatharan, 2014)
Investment Decision Making	4	(Gill et al., 2018)
Organizational performance	5	(Masa'deh, 2013)

The possible responses to each question were calculated using a five-point Likert scale. Since it is the most accessible method of data collection, the authors used online questionnaire. The researchers upload the instrument to Google Forms, the most used online platform for quantitative data collection.

Data Collection

The current research takes a quantitative approach using the cross-section method and relies heavily on an electronic questionnaire to collect primary data. The subjects in this research are Iraqi private universities. The list of universities was compiled using information from the Iraqi Ministry of Education's website. On the website, there are 18 private universities listed. There were a total of 274 decision-makers. The contact information for the respondents was collected from the university's website. A total of 240 respondents were randomly selected and contacted by email, linked to a Google form survey included in the email. A total of 224 responses were collected over two months (between 01-Feb-2021 and 01-Apr-2021), with 209 valid responses being held for further study. During the data screening process, the remaining 15 responses were discarded. The data was analysed using SmartPLS tools. The data was then analysed, allowing a final model to be developed. This study's primary data analysis approach was the Partial Least Square (PLS) technique of Structural Equation Modeling (SEM). The following section summarises the study's results.

DATA ANALYSIS AND RESULTS

Demographic Analysis

Table 2 shows the demographic details of the respondents. It indicates that 64.1 percent of university officers are male, and 35.9% are female, indicating that male officers make the majority of investment decisions. Similarly, 45.3 percent of respondents are over 45 years old, while 23.4 percent are between 35 and 44. The remaining respondents are between the ages of 25 and 34. It means that senior officers make the majority of investment decisions. Also, 12.9 decision-makers have more than 30 years of experience, according to the decision-makers experience standard. Similarly, 9.1 percent have 11-20 years of experience, while the remainder has 1-20 years. According to the classification review, the overall response rate is 28.7% for the position of registrar. Similarly, 14.8 percent serve as purchase officers and 20.1 as treasurers. Furthermore, 18.7% are IT administrators and technology officers. Finally, 17.7% are working as IT directors.

Table 2. Demographic analysis of the respondents

Demographics	Categories	Frequency	Percentage
Gender	Male	134	64.1
	Female	75	35.9
Age	25-34 years	69	33.1
	35-44 years	49	23.4
	More than 45 years	91	43.5
Experience	1-10 years	118	56.5
	11-20 years	45	21.5
	21-30 years	19	9.1
	More than 30 years	27	12.9
Designation	Registrar	60	28.7
	Purchase officer	31	14.8
	Treasurer	42	20.1
	IT Managers	17	8.1
	Chief technology officers	22	10.6
	IT Directors	37	17.7

Measurement Model

The validity of the scale has been verified in the current research by calculating the average extracted variance (AVE). The measure is valid if the (AVE) value is greater than 0.5. The results in Table 3 and Table 4 indicate that all the scales used to measure the variables are valid and suitable for research presentations. To check the scale's stability, the composite reliability (CR) has been used, and its value is acceptable when it exceeds 0.7. The values in Table 3 and Table 4 indicate that the scale has high stability. Table 3 and Table 4 shows the outer loading of the items of the measurement with the factors that belong to it. All outer loadings exceed the expected value of 0.7, which indicates the availability of the study scale's convergent validity. The previous results indicate that the scale is reliable and stable. The difference in measure between constructs is known as discriminant validity. The square root of AVE's evaluated value was compared to the intercorrelations between the latent variable and other latent variables to determine discriminant validity. The results of Fornell-criterion Larcker's test are shown in Table 5.

Table 6 illustrates the value of the coefficient of determination shows that the independent variables explain 41.6% of the change in the adopted variable represented by investment decisions, the value of the determination coefficient also shows that the independent variable represented by investment decisions explains 0.396 of the impact on the adopted variable represented by the organizational performance.

Structural Model

The study hypotheses are tested and evaluated after ensuring that the proposed study model conforms to the investigated sample data and achieves the desired reliability and validity. The bootstrapping procedure in SmartPLS software is applied, and T-values and P-values are calculated. Table 7 displays the test findings. Table 7 illustrates the hypothesis testing results. Except for the two hypotheses, most of the study hypotheses are acknowledged (H3 and H9). The following section goes through hypotheses in depth.

Table 3. Construct reliability and validity for the ITIF dimensions

Construct	Items	Outer loading	Composite Reliability	Cronbach's Alpha	AVE
		>0.7	>0.7	>0.6	>0.5
IT Modularity	ITMO _1	0.747	0.934	0.906	0.780
	ITMO _2	0.846			
	ITMO _3	0.737			
	ITMO _4	0.709			
	ITMO _5	0.816			
IT Compatibility	ITCM _1	0.825	0.824	0.700	0.609
	ITCM _2	0.769			
	ITCM _3	0.746			
IT Connectivity	ITCN _1	0.819	0.896	0.845	0.685
	ITCN _2	0.750			
	ITCN _3	0.751			
	ITCN _4	0.730			
	ITCN _5	0.791			
	ITCN _6	0.737			
IT Continuity	ITCT _1	0.711	0.901	0.855	0.695
	ITCT _2	0.790			
	ITCT _3	0.726			
IT Personnel Skills	ITPS _1	0.911	0.894	0.844	0.680
	ITPS _2	0.863			
	ITPS _3	0.866			

DISCUSSION

The current expansion of investment in ITIF enables organizations to face better future changes (Chanopas *et al.*, 2006). To test the first hypothesis of the role of model IT in making investment decisions, the following discussion may be put forward. Table 7 shows that modularity has a significant impact on investment decisions, depending on the value of ($p = 0.003$) and the degree of response ($b = 0.213$). Since modularity in IT is the ability to add and modify software and hardware (Chung *et al.*, 2003), substantial investment in information technologies enables organizations to better cope with future conditions (Chanopas *et al.*, 2006). It means that investors are considerate of modularity. In information technology, because of its role in reducing costs in the long run.

The second hypothesis analysis results show that information technologies with high compatibility affect investment decision. It means that investors in the private universities subject to research consider the amount of compatibility that will be achieved between the information technology infrastructure before making an investment decision, which is consistent with the study indicated. (Zhang *et al.*, 2008) That SMEs focus on technologies that achieve tremendous flexibility to ensure a response to environmental changes. Despite the importance of the connectivity feature in information technology, the third hypothesis test results indicated that there was no significant relationship between connectivity as a dimension of the flexibility of the IT infrastructure and investment decisions. Perhaps the reason

Table 4. Construct reliability and validity for the behavioural biases

Construct	Items	Outer loading	Composite Reliability	Cronbach's Alpha	AVE
		>0.7	>0.7	>0.6	>0.5
Overconfidence	OVEB_1	0.853	0.906	0.863	0.708
	OVEB_2	0.863			
	OVEB_3	0.817			
	OVEB_4	0.757			
Representativeness	REPR_1	0.772	0.915	0.877	0.729
	REPR_2	0.902			
	REPR_3	0.818			
	REPR_4	0.814			
Disposition effect	DISE_1	0.807	0.901	0.855	0.696
	DISE_2	0.828			
	DISE_3	0.824			
Herding effect	HERE_1	0.829	0.934	0.906	0.780
	HERE_2	0.881			
	HERE_3	0.705			
	HERE_4	0.724			
	HERE_5	0.864			
Mental accounting	MENA_1	0.892	0.940	0.914	0.795
	MENA_2	0.825			
	MENA_3	0.790			
Investment Decision Making	INDM_1	0.846	0.943	0.919	0.805
	INDM_2	0.902			
	INDM_3	0.799			
Organizational Performance	ORPE_1	0.864	0.919	0.882	0.740
	ORPE_2	0.917			
	ORPE_3	0.719			
	ORPE_4	0.797			
	ORPE_5	0.837			

for this is due to investors' low interest in the delivery of information technologies. Perhaps the reason for this is what (Zhang *et al.*, 2009) has indicated that the widespread use of the Internet has reduced the costs of investing organizations in technologies that require connectivity achievement.

It is clear from Table 7 that the fourth hypothesis is fulfilled by relying on the value of the thousand, which is 0.005, and this means that the investment decision taken by the investors takes into account the ability of technology to continue working without interruptions and this is consistent with the general trend of investing in technologies. The fifth hypothesis results indicate an influence relationship for workers' skills in the investment decision, as shown in Table 7. This hypothesis supports this hypothesis, which indicates that the investment decision-making in the

Table 5. Discriminant validity Fornell-Larcker

	ITMO	ITCM	ITCN	ITCT	ITPS	OVEB	REPR	DISE	HERE	MENA	INDM
ITMO	0.836										
ITCM	0.327	0.858									
ITCN	0.374	0.406	0.707								
ITCT	0.225	0.348	0.37	0.752							
ITPS	0.345	0.294	0.391	0.403	0.899						
OVEB	0.353	0.792	0.432	0.294	0.351	0.865					
REPR	0.363	0.473	0.459	0.533	0.403	0.468	0.805				
DISE	0.356	0.281	0.281	0.378	0.396	0.363	0.473	0.852			
HERE	0.262	0.228	0.329	0.379	0.351	0.469	0.492	0.432	0.806		
MENA	0.286	0.241	0.132	0.335	0.182	0.402	0.306	0.591	0.458	0.861	
INDM	0.236	0.205	0.228	0.449	0.203	0.458	0.329	0.395	0.249	0.232	0.812

Table 6. The R² of the dependent variables

Construct	Code	R ²	Level of Explanatory Power
Investment Decision Making	INDM	0.416	Moderate
Organizational Performance	ORPE	0.396	Moderate

Table 7. Summary of Hypotheses Testing

Hypothesis	Description			b	T- values	P -values	Sig. level	Results
H1	ITMO	→	INDM	0.213	2.807	0.003	***	Supported
H2	ITCM	→	INDM	0.209	2.412	0.008	*	Supported
H3	ITCN	→	INDM	0.006	0.062	0.475	NS	Not Supported
H4	ITCT	→	INDM	1.397	2.610	0.005	**	Supported
H5	ITPS	→	INDM	0.217	2.465	0.007	*	Supported
H6	OVEB	→	INDM	0.418	6.098	0.000	***	Supported
H7	REPR	→	INDM	0.262	3.393	0.000	***	Supported
H8	DISE	→	INDM	0.173	2.695	0.004	**	Supported
H9	HERE	→	INDM	-0.030	0.350	0.363	NS	Not Supported
H10	MENA	→	INDM	0.455	6.533	0.000	***	Supported
H11	INDM	→	ORPE	0.217	3.166	0.001	***	Supported

(Note: * p < 0.10, ** p < 0.05, ***p < 0.01, NS: Not significant)

researched universities is affected by qualified human cadres' availability to deal with technologies. Behavioural finance studies the irrational aspects of making investment decisions associated with a lack of information (Madaan & Singh, 2019). Table 7 show the existence of a significant effect between overconfidence and the behaviour of investment decision-making depending on the P-value of 0.000, which supports the sixth hypothesis of the research hypotheses. This result agrees with

the study (Qasim *et al.*, 2019), which indicates that excessive bias in confidence positively affects an investment decision. It means that the investor who has excessive self-confidence depends on his confidence in his information and experience, without regard to the available information. It leads to increased investment because they get more returns than before (Zaiane, 2013). Representation bias is one of the behavioural bias common among investors. The results of the analysis showed that this type of bias affects investment decisions in the private universities under study, and this means that investors make their investment decisions based on the returns made recently without taking into account the average return on investment for a time series of years, and perhaps the reason for this is due to the investor's observation of an increase in community members' interest in enrolling and registering in these universities. This result is consistent with the study's findings (Antony & Joseph, 2017), and thus the seventh hypothesis is accepted. The eighth hypothesis indicates the existence of a relationship to the effect of behaviour on investment decision-making behaviour. The hypothesis test results indicated a significant impact relationship, which shows that investors in Iraqi civil universities do not dispose of their investments when losses are realized. This result is consistent with a study (Kalunda & Mbaluka, 2012) Conducted on investors on the Nairobi Stock exchange. It concluded that the decisions of investors were affected by the disposition effects. The results showed that the ninth hypothesis that aims to test the effect of grazing bias on investment decision-making behaviour was not accepted. This result was inconsistent with some studies and these studies (Qasim *et al.*, 2019), which means that investors do not imitate others when they decide to invest in Private universities due to the availability of information about the returns type of investment. It is inconsistent with a study that found that investors in organizations operating in uncertain environments doubt their information and believe that others have better information (Fernández *et al.*, 2011).

The tenth hypothesis was formulated to verify the existence of the impact relationship of mental accounting on the behaviour of investment decision-making. It is evident from the analysis results that the moral relationship according to the value (p-value) and this indicates that investors in private universities in Iraq are interested in organizing their investment portfolios in various accounts to increase Returns and reduce risks. This result is consistent with the findings of a study (Antony & Joseph, 2017) conducted in Kerala, which shows that investors are affected by mental accounting. The eleventh hypothesis is supported by empirical evidence that includes testing the relationship between investment decisions and organizational performance. The statistical analysis results indicate that the investment decision in general significantly affects the performance of the private universities that are being researched. This result is consistent with several studies, including a study by (Bojja & Liu, 2020), which indicated that investment decisions in Information technology had had a positive impact on hospital performance.

With respect to internal validities, the findings of this study might not be affected since it is a cross-sectional study where the data was collected at one point of time instead of multiple data at multiple times. Further to this rationale, no experiment was performed on the respondents where two different groups are involved at different point of times so there are less chances of threats to internal validities on the results. Since the proposed model is linear and does not include any control variable, an omitted variable bias may be occurred which can cause statistical problems. Moreover, a selection bias may also be risen due to the survey mode because the respondents, who did not provide feedback on the online questionnaire, might not have checked their emails in spam. Therefore, results should be interpreted with caution.

This study adopted simple random sampling technique to collect the data. Normally, the researchers adopted this sampling technique because of generalizing the results. Thus, the biggest advantage of simple random sampling technique is the generalizability of results over a large population. However, corresponding to the external validites, this study's results might be affected because the data was collected from the decision-makers of Iraqi private universities only. Further, a large portion of male respondents (although selected with simple random sampling technique) can

unintentionally influence the results. Thus, the results of this research can only be generalized to other identical situations and settings.

CONCLUSION

One of the most important choices made by investors to maximise returns is the investment decision. Due to the size of the invested funds relative to the rest of the assets, the process of investing in information technology is a significant aspect. This study aims to evaluate the influence of ITIF and herding bias on investment decision-making and firm performance in the Iraqi context. A quantitative data collection is performed to obtain the opinion of investor in Iraq. Based on the results, it can be concluded that investment decision-making is affected totally by the information technology infrastructure's flexibility. The more flexible technologies, the more excellent investment decision-making is due to the investors' desire to reduce the amounts invested in the medium term. However, the possibility exists that existing investments in flexible technologies would outnumber those in less flexible technologies. On the other hand, the results showed that the investment decision is affected by behavioural biases. The greater the behavioural biases, the more likely it is that an investment decision will be made based on the investors' disparity in coping with the available data. The more information is available and analyzed objectively, the more objective the investment decision is. Finally, the results show that investment decision affects organizational performance. There are some limitations to the current study. This study did not address all the behavioural biases. It was limited to the most cited determinants that are considered the most important and agreed upon by many researchers' views. Investment decisions were not divided into sub-variables, as they were dealt with in one dimension, as is the case with organizational performance. Finally, this study did not examine the relationships between the independent variables represented by behavioural biases and the ITIF. This study proposes conducting future studies that examine the relationship between behavioural biases and ITIF and its impact on investment decisions. Finally, there is a limited body of research on biases, such as the endowment effect, the house money effect, self-attribution bias, recency, and conservatism. These are places where further research is required. However, having this constructive comment, the authors have highlighted this in the limitation of the study and emphasizes on the importance of having control variables in this context for future consideration.

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APPENDIX: QUESTIONNAIRE

Table 8.

Construct	Items	ITIF dimensions
IT Modularity	ITMO1	Our university has great speed in developing new business applications.
	ITMO2	Our university employs reusable software extensively to develop new software systems.
	ITMO3	University IT staff use pre-oriented technical tools to create software applications.
	ITMO4	Functions can be quickly added to critical software applications based on end-user requests.
	ITMO5	Our university is able to easily handle differences in data formats.
IT Compatibility	ITCM1	Our university is able to easily employ and use software applications across multiple platforms.
	ITCM2	Our university provides multiple interfaces (such as web access) to external end users.
	ITCM3	The data obtained is immediately available to all employees of the university.
IT Connectivity	ITCN1	Our university has electronic links and communications throughout the organization.
	ITCN2	Our university connects with business partners through electronic channels (e-mail sites, wireless devices, electronic data exchange)
	ITCN3	All remote, branch and mobile offices are connected to the central office of the university.
	ITCN4	Our bandwidth capabilities provide access to a large variety of data types including text, audio, and graphics.
	ITCN5	Authorized data can be accessed by third parties through IT networks, regardless of location.
	ITCN6	Remote users can seamlessly access central data in our information systems.
IT Continuity	ITCT1	Plans to confront technical disasters are ready for application at the university.
	ITCT2	Data is backed up appropriately.
	ITCT3	Hardware and software can be used simultaneously by a large number of users.
IT Personnel Skills	ITPS1	University IT staff have the ability to work effectively in cross-functional teams.
	ITPS2	The university's IT staff can develop appropriate technical solutions.
	ITPS3	Our IT staff have the ability to work collaboratively in a project team environment.

Table 9.

Construct	Items	Behavioural biases
Overconfidence	OVEB1	I feel more confident in my investment decisions than I do in the views of my colleagues.
	OVEB2	I have specific skills and experience about investing.
	OVEB3	I have complete knowledge of investment methods.
	OVEB4	I feel good about my previous investment decisions.
Representativeness	REPR1	Compared to competitors, our IT department responds more quickly to changing customer needs.
	REPR2	Compared to our competitors, our IT department responds more quickly and effectively to competitors' changing strategies.
	REPR3	We are able to develop our information technology and market new educational services faster, compared to our competitors.
	REPR4	The relationship with our partners has increased due to the IT response to market changes through collaboration.
Disposition Effect	DISE1	I prefer selling profitable stocks for gains when I need the money.
	DISE2	When the stock market index is rising for a while, I will continue to hold unprofitable shares and will not immediately sell or buy other shares.
	DISE3	I feel sorry for the high price of the shares I sold.
Herding Effect	HERE1	Other investors' decisions about choosing types of stocks influence my investment decisions.
	HERE2	Other investors' decisions about stock size influence my investment decisions.
	HERE3	The decisions of other investors to buy and sell stocks affect my investment decisions.
	HERE4	I usually respond quickly to changes in other investors' decisions and track their reactions in the stock market.
	HERE5	I invest in stocks based on the recommendations of my friends.
Mental Accounting	MENA1	I hesitate to sell stocks that made high profits in the past, even though their prices are currently low.
	MENA2	When investing, I don't care about the performance of my portfolio as a whole but I do care about the return on each account individually.
	MENA3	I take care of dealing with each account in the investment portfolio separately.
Investment Decision Making	INDM1	I take into consideration the levels of risk related to certain stocks before investing in them.
	INDM2	When investing, I trust my inner feelings.
	INDM3	I make all my investment decisions on my own.
Organizational Performance	ORPE1	Over the past three years, our organization's financial performance has been impressive.
	ORPE2	During the past three years, the financial performance of our organization has outperformed that of competitors.
	ORPE3	Over the past three years, our organization's income increase has been phenomenal.
	ORPE4	Over the past three years, the profitability of our organization has been higher than that of our competitors.
	ORPE5	During the past three years, our organization's sales growth has outpaced competitors' sales.