

# Exploring the Influence of Innovative Computing and Business Intelligence on Human Resource Management Performance with Information Technology as a Mediator: An Analytical Study at the Central Bank of Iraq



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**Abstract** This analytical study aims to explore the influence of innovative computing and business intelligence on human resource management performance with information technology as a mediator in the Central Bank of Iraq. Regarding the collection of data distributed to the respondents, the researchers adopted the quantitative approach through a questionnaire that included 30 items. The sample of this study consisted of 232 employees working in the Human Resources Department at the Central Bank of Iraq in Baghdad. The adopted sampling technique was simple random sampling. The Smart PLS 4 computer program was used for data analysis, and the structural equation modeling (SEM) technique was used. The results of hypothesis testing found that innovative computing and business intelligence significantly influence human resource management performance at the Central Bank of Iraq. The results showed that information technology has an intermediary role, and that this intermediary role leads to a significant improvement in the relationship between innovative computing and human resource management performance, as well as between business intelligence and human resource management performance.

**Keywords** Innovative computing · Business intelligence · Human resource management performance · Information and Information Technology

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## 1 Introduction

Human resource management is considered the most important competitive advantage for organizations [23]. In addition to the above, the continuous modern technological developments have directed the attention of organizations to try to exploit advanced technology to improve organizational performance [2]. In the Central Bank of Iraq, human resources are managed on a regular basis, as is the case in other organizations [21]. The important question arises: Are innovative computing and business intelligence technologies being used to improve human resource management performance? Returning to the literature, as far as researchers know, there is only one study that addressed this issue [6]. Although this study was conducted in Jordan, the Central Bank of Iraq has similar concerns regarding compliance with regulations, such as banking secrecy and anti-money laundering rules. The previous study was conducted in Jordan, so it was necessary to conduct a similar study in Iraq [17]. This is aimed at consolidating the importance of seizing the opportunities of technological progress to develop the performance of human resources management [22].

Innovative computing, business intelligence and human resources management have become vital topics in today's epoch and in the context of developing countries [24]. The purpose of this research is to investigate the impact of innovative computing and business intelligence on human resources management performance with the mediation effect of information technology at Central Bank of Iraq. The importance of this research can be summarized in four points. First, banks are one of the largest organizations in every country and investing in proper management within this organization has a direct impact on the health of the countries' economy. Second, Central Bank of Iraq is responsible for taking care of commercial banks within Iraq and spread security and stability in the general monetary policies hence investigating what enables the Central Bank to perform better is important to the overall monetary stability of Iraq. Third, Central Bank of Iraq is an example of a developing country hence researches focusing on that perspective are still limited in number. Fourth, up to the researcher's knowledge, this study is the first in investigating these four concepts in one model in the context of Iraq.

Traditional HRM systems face challenges due to changes in business environments [12], emphasizing the need for innovative computing technology and business intelligence [15]. The study addresses the lack of research on the relationship between innovative computing and business intelligence on HRM system performance. Five objectives have been developed to achieve the research aim, focusing on the establishment of a theoretical framework and the examination of the direct and indirect impacts of innovative computing and business intelligence on HRM performance.

In response to the rapid changes in the business environment, organizations are under pressure to adopt innovative computing technologies and business intelligence to enhance decision-making [38], enhance operational effectiveness, and overall performance [1]. Therefore, attention should be paid to the HRMS, with an emphasis on the importance of introducing innovative computing and business intelligence to improve performance [30]. Given the importance of information technology for the

successful adoption of innovative computing and business intelligence, the presence of information technology as a mediating variable for improving HRMP is of utmost importance [12].

The current study makes several contributions to the field of HRM in the banking sector, highlighting the importance of innovative computing and business intelligence in improving HRMP. It also provides banking managers with some practices they can employ to leverage modern information technology to improve performance.

The results of the current study enhance understanding of human resource management systems (HRMS) in developing countries, using an approach that combines innovative computing, business intelligence, and HRMS [11].

## 2 Literature Review and Hypotheses Development

Organizations that operate according to proactive policies towards creating and promoting equal opportunities will be forced to focus on improving the performance of human resources management [31]. Also, developing HRM will contribute effectively to improving the quality of employees and improving practices for performing tasks [7]. However, there is a dearth of literature addressing this role in central banks. However, we have observed insufficient attention paid by previous literature to such a vital topic at the level of central banks in developing countries [28]. Therefore, this study focused on trying to bridge the gap by focusing on the banking sector as a fundamental pillar for the development of the economy of developing countries [8, 16]. Innovative computing systems are referred to as modern systems that provide the latest graphic services aimed at enhancing the performance of HRM [32]. The rapid qualitative leap in information technology leads to the necessity for organizations to adopt the latest available technologies if those organizations want to enhance their competitive advantage [10]. Business intelligence focuses on using data to create a model that provides services to bank managers at the predictive level through data analysis. This helps enhance and support decision-making, identify the best customers, and design services [14].

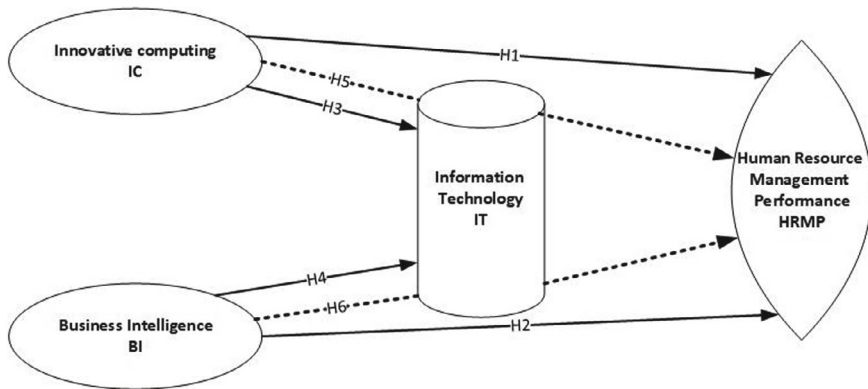
Organizational success is directly affected by improving human resource management performance through several factor [13]. The most important of these factors are innovative computing, business intelligence, and the role of information technology as an intermediary [9]. Moreover, innovative computing and business intelligence can enhance the competitive advantage of organizations through accurate and timely information to support decision makers in human resource management [3].

Human resources management is a major focus in successful organizations, as it is one of the most important departments in terms of organizing activities and distributing tasks. Successful HRM focuses on methods of hiring and retaining highly experienced and skilled employees who are able to contribute to achieving the organization's goals [18]. Therefore, organizations in the era of rapid technology focus on innovative computing systems and business intelligence systems in most practices [27].

Recent years have witnessed increasing interest by organizations in focusing on the use of modern technologies to improve HRMP [25]. As a means of improving the performance of HRM in organizations, many methods have been used [5]. Human resource management performance is measured by the achievement of results, in terms of the contribution made by HRM that enhances the growth and development of organizations, contributes to enhancing the skills of employees, and adapts to innovative practices, which contributes to employee retention and raising the level of productivity, thus enhancing the performance of HRM [19]. In fact, the performance of human resources management essentially focuses on the extent to which the organization is able to achieve its goals. Despite this fundamental importance, there is still a clear lack of research that focuses on the measures and indicators that can be measured to provide a clear picture and tangible understanding of human resources management performance [34]. Therefore, the situation requires increased attention and greater focus on conducting comprehensive studies to develop the field of human resources management performance, and focusing on using advanced measures to achieve this goal [33].

This study examines the impact of innovative computing and business intelligence on the performance of human resource management with the information technology mediator in CBIs. The development of innovative computing systems and business intelligence applications has large influence on company management [12]. It is widely recognized that changes caused by the development and implementation of modern technologies affect employee management in banks as the human resources are the main power that runs these companies. As the banks in Iraq possess and adopt many modern systems, this study is important to analyze its impact on the everyday banking management. This study is conducted based on the Central Bank of Iraq as the monitoring and controlling of all the commercial banks in Iraq [4].

The current study includes a number of hypotheses, as shown in Fig. 1, which presents the conceptual framework of the study and clearly shows the hypotheses of the current study.



**Fig. 1** Research model and Hypotheses

### **3 Methodology**

#### ***3.1 Research Philosophy and Approach***

The current study relied on the quantitative approach, which relies on collecting digital data related to the impact of innovative computing, business intelligence, and information technology on the performance of human resources management in the Central Bank of Iraq. In the next step, the data were statistically analyzed with the aim of determining the correlations and relationships between the variables. This methodology is consistent with the problem of the current study, its objectives, and its questions. In addition, this methodology is characterized by shortening the time and reducing costs. The questionnaire was used to collect data from the respondents, and the form was judged based on specialized experts. In addition, the questionnaire was based primarily on pre-established standards. The questionnaire was distributed via e-mail, in addition to conducting some interviews. The statistical programs SPSS and AMOS were used.

The final model of the study is based on the post-positivist philosophy, which focuses on understanding variables and the relationships between them. This philosophy emphasizes objectivity and minimizing bias, and the researcher's personal opinion does not interfere with the results of data analysis. In other words, this philosophy minimizes the role of subjective interpretations. The strategy adopted in this research is survey-based, with a structured questionnaire as the primary means of data collection to ensure consistency and comparability of responses. Initially, a pilot study was conducted with 20 participants to gather feedback on the importance of the topic, allowing for modifications to the final survey instrument.

#### ***3.2 Research Design and Data Collection***

This study of the Central Bank of Iraq was carried out through a quantitative research design. Using the survey method, a questionnaire was developed, and data were collected from a sample of 232 employees, involving middle and high management levels. The results of the study were analyzed using SPSS and AMOS programs. The study model was tested through Structural Equation Modeling and the measurement model was assessed through Confirmatory Factor Analysis (CFA). Additionally, several validity and reliability tests were conducted to confirm the robustness of the model in the context of the Central Bank of Iraq.

**Table 1** Respondents characteristics frequency analysis

	Category	%		Category	%
Academic qualification	First degree	38.5	Working Years	1–5	18.3
	Higher degree	33.5		6–10	35.7
	Diploma degree	14		11–15	31.7
	Higher diploma	14		16–20	11.3
Computer major	Computer science	40		21- above	3
	Computer engineering	30	Job	Analysis	38.3
	Information Technology	30		Programming	36.7
			Management	25	

**Table 2** Descriptive Statistics

Variable	Mean	Standard deviation
Innovative Computing (IC)	3.55	0.65
Business Intelligence (BI)	2.56	0.50
Information Technology (IT)	2.90	0.89
Human Resource Management Performance (HRMP)	3.71	0.66

## 4 Results

### 4.1 Descriptive Statistics

In order to understand and analyze the characteristics of the respondents, see Table 1.

Table 2 shows the descriptive statistics of the study’s constructs range from 2.56 to 3.71. The lowest mean is that of the “business intelligence” construct (2.56), whereas the highest mean is that of the “HRMP” construct (3.71). The standard deviation ranges from 0.50 to 0.89. The lowest standard deviation is that of the “business intelligence” construct (0.50), whereas the highest standard deviation is that of the “IT” construct (0.89). It’s also worth mentioning that, the total mean for all the constructs is greater than the theoretical mean which is 2.50, thus indicating that the degree of agreement is mostly above the midpoint see Table 2

### 4.2 Correlation Analysis

Pearson’s correlation coefficient was used to assess the correlation between the study variables, as shown in Table 3. One of the key purposes of correlation analysis is

**Table 3** Correlations among the Variables

	IC	BI	IT	HRMP
IC	1			
BI	0.178*	1		
IT	0.284**	0.574**	1	
HRMP	0.454**	0.631**	0.465**	1

Notes \*p < 0.05; \*\*p < 0.01; IC = Innovative computer; BI = Business Intelligence; IT = Information technology; HRMP = Human resource management performance

to determine the strength and direction of the relationship between two variables. Correlation coefficients range from -1 to +1, where 0 indicates the absence of a correlation. Variables with a correlation coefficient more than +0.50 are considered strongly correlated, while variables ranging between +0.50 and +0.99 are strongly correlated, and those between +0.10 and +0.49 are weakly correlated. Moreover, the results of correlation analysis presented in Table 3 reveal that innovative computing has a strong positive correlation with business intelligence, human resource management performance, and information technology. In addition, business intelligence has a strong positive correlation with human resource management performance and information technology. In addition, human resource management performance has a strong positive correlation with information technology.

### 4.3 Regression Analysis

To analyze the data and evaluate the effect of Innovative Computing and Business Intelligence on Human Resource Management Performance with Information Technology as a Mediator, a hierarchical regression analysis was conducted using SPSS V26. Initially, the relationship between independent variable Innovative Computing (IC) and dependent variable Human Resource Management Performance (HRMP) was assessed. The results indicate that the coefficient value of IC is 0.664, the t-value is 8.058, and the p-value is 0.000. Since the p-value is lower than 0.05, it can be concluded that Innovative Computing has a significant effect on Human Resource Management Performance. The results also found that Technology and Business Intelligence have positive impact on Human Resource Management Performance. Furthermore, the results found that overall model is significant and that Innovative Computing, Business Intelligence and Technology have positive impact on Human Resource Management Performance.

The third regression analysis was to evaluate the mediating effect of Information Technology based on Baron & Kenny method. Accordingly, the hierarchical regression analysis was performed in four steps. In the first step, the relationship between independent variable Innovative Computing (IC) and mediating variable Information Technology (IT) was assessed. The results indicate that the coefficient value of IT is

**Table 4** Hypothesis testing

Hypothesis	Path	$\beta$	S. E	T-value	P-value	Result
H1	IC $\rightarrow$ HRMP	0.664	0.013	8.058	0.000	Accepted
H2	BI $\rightarrow$ HRMP	0.655	0.019	8.403	0.000	Accepted
H3	IC $\rightarrow$ IT	0.636	0.032	8.167	0.000	Accepted
H4	BI $\rightarrow$ IT	0.643	0.033	7.125	0.000	Accepted
H5	IC $\rightarrow$ IT $\rightarrow$ HRMP	0.582	0.027	7.170	0.000	Accepted
H6	BI $\rightarrow$ IT $\rightarrow$ HRMP	0.184	0.013	10.821	0.000	Accepted

0.582, the t-value is 7.170, and the p-value is 0.000, thus indicating that Innovative Computing has a significant effect on information Technology. In the second step, the relationship between the independent variable Innovative Computing (IC) and the dependent variable Human Resource Management Performance (HRMP) was analyzed, which indicates that Innovative Computing has significant effect on Human Resource Management Performance. In the third step, the relationship between mediating variable Information Technology (IT) and dependent variable Human Resource Management Performance (HRMP) was analyzed. The result shows that the coefficient value of IT is 0.554, the t-value is 6.637, and the p-value is 0.000, thus indicating that Information Technology has significant effect on Human Resource Management Performance. In the fourth step, the relationship between Innovative Computing (IC) and Human Resource Management Performance (HRMP) was analyzed when Information Technology (IT) is controlled, by which the p-value is 0.000 and less than 0.05. However, the value of ( $\beta_1$ ) is lower than before ( $0.609 < 0.664$ ), thus indicating that Information Technology is a partial mediator between Innovative Computing and Human Resource Management Performance. Table 4 shows the results of hypothesis testing.

## 5 Discussion

The goal of the research is to determine the extent influence of innovative computing and business intelligence on the human resource management performance. The banking sector in Iraq is taken as a reference for this research. The central bank of Iraq is chosen as a case study. The researcher is interested to study the influence of innovative computing and business efficiency on human resource management performance with respect to business intelligence as an independent variable and information technology as a mediating variable. The results provide anecdotal evidence that human resource management performance has a significant impact on information technology with a value of (0.231,  $p < 0.001$ ). Human resource management performance has a significant impact on the use of business intelligence with a value of (0.217,  $p < 0.001$ ). Business intelligence has a significant impact on innovative computing with a value of (0.229,  $p < 0.001$ ). Furthermore, this study reveals that

information technology mediates the relationship between human resource management performance and innovative computing at central bank of Iraq with a value of (0.0836,  $p < 0.001$ ). Information technology also mediates the relationship between human resource management performance and business intelligence with a value of (0.0713,  $p < 0.001$ ).

This study was conducted to examine the effect of innovative computing and business intelligence on human resource management performance and the mediating role of information technology in the Central Bank of Iraq. As per the analysis, there is a positive significant effect of innovative computing on human resource management performance. The result is in agreement with who stated that banks doing well systematically identify, organize, develop, use and update their core competences [36]. There is also a positive significant effect of business intelligence on human resource management performance. This is in accordance with the findings of [12, 35].

Furthermore, there is a positive significant mediating effect of information technology on the relationship between innovative computing and human resource management performance. The result is in line with the findings of who revealed information system strategy has moderating effect on the relationship between information technology and human resource management strategy [20, 26, 29, 37].

Additionally, there is a positive significant mediating effect of information technology on the relationship between business intelligence and human resource management performance. This is in agreement with the findings of who found that information and technology had a great impact on the banking sector in Jordan [12] where technology development, training and infrastructure had significant relationship with performance.

## ***5.1 Theoretical Implications***

The current study makes a clear contribution to knowledge enrichment by focusing on the impact of innovative computing and business intelligence on human resource management (HRM) performance, in addition to measuring the mediating role of information technology in the context of the Central Bank of Iraq. Both innovative computing and business intelligence are contemporary approaches that can have a positive impact on HRM performance. Furthermore, HRM performance depends on the exploitation of modern, advanced information technology, as the latter plays a vital and crucial role as a link between innovative computing, business intelligence, and HRM performance.

The results demonstrate that innovative computing and business intelligence can be used to improve human resource management performance, as confirmed by human resource management officials at the Central Bank of Iraq. This research is one of the first attempts to examine the impact of innovative computing and business intelligence on the performance of human resource management, with a focus on information technology as a mediating variable in the banking sector of Iraq. In

addition, previous studies on human resource management performance that consider information technology as a mediating variable are scarce. These two theoretical contributions create a valid research framework and model that lead to research development in the future banking sector and other financial sectors in Iraq.

## ***5.2 Practical Implications***

In terms of theoretical contributions, the current study has several contributions, including: First, it expands the available knowledge on the impact of innovative computing on human resource management performance, including exploring this impact at the Central Bank of Iraq. Second, it contributes to the human resources and business intelligence literature by providing empirical evidence on the impact of business intelligence on human resource performance in the banking context of Iraq. In addition, this study contributes to a positive understanding of the role of information technology in the banking sector in developing countries. This is particularly true given the scarcity of literature examining the role of computing and business intelligence in improving human resource management performance in developing countries.

The results show that improving HR performance requires investment and focus on innovative computer systems. Therefore, bank managers should ensure that computer systems are deployed across all HR departments. Furthermore, investing in business intelligence data analysis capabilities yields significant returns on HR performance.

## ***5.3 Future Research***

The current study needs to be expanded to be more comprehensive, as it is currently limited to the Central Bank of Iraq. Therefore, future researchers are advised to expand the scope to include many banks across developing countries. Comparative studies can also be conducted between private and public sector banks. Furthermore, researchers are encouraged to conduct qualitative studies that explore similar topics through interviews, focus groups, or open-ended questionnaires to enrich the existing quantitative studies.

## **6 Conclusion**

The results of the current study demonstrated a positive impact of innovative computing on human resource management performance, while business intelligence had a lesser impact. The results also demonstrated that information technology plays a mediating role between innovative computing, business intelligence,

and human resource management performance, consistent with the resource-based perspective. Years of security and political instability in Iraq have placed the Iraqi banking sector in need of reform and restructuring. The Human Resources Department at the Central Bank is responsible for developing workforce capabilities to meet organizational needs. Innovative computing, which leverages new technologies, can enhance operations and services. Meanwhile, business intelligence systems leverage data to support decision-making. This research aims to provide insights to the Central Bank of Iraq's management, helping it allocate resources and investments in innovative computing and business intelligence technologies to improve human resource management performance. These technologies are expected to create a competitive advantage through the effective use of information technology.

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