World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
Vol. 30, January, 2024
ISSN: 2749-3628,

THE INTERACTIVE EFFECT OF ENVIRONMENTAL UNCERTAINTY ON THE RELATIONSHIP BETWEEN HR 4.0 COSTS AND OPERATIONAL PERFORMANCE

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Article history:

Received: 28th November 2023
Accepted: 26th December 2023
Published: 30th January 2024

Abstract:

This study aimed to verify the relationship between human resource costs and operational performance, with environmental uncertainty as a modified variable of the relationship, and in light of the Fourth Industrial Revolution (4.0) and using the quantitative methodology was tested two hypotheses The study used a questionnaire, was distributed to a sample of size, (136), Categories covered by the sample Production and operations managers Planning managers Expert executives and managers of units and divisions, In the companies operating in the energy sector (oil and gas) for the southern region and using the statistical program (SPSS), the results showed a significant relationship between the cost of human resources and operational performance at the level of (0.05), as well as the existence of a significant impact of environmental uncertainty at the level of (0.05) for the relationship between the cost of human resources and operational performance, which requires the departments of companies operating within the aforementioned sector to adopt ways to confront environmental uncertainty, In a way that keeps work going on in these companies.

Keywords: human resources, industrial revolution, operational performance, Environmental uncertainty

1-INTORDUCTION

The achievement of efficiency and effectiveness of human resources necessarily requires higher levels of continuous growth associated with environmental uncertainty surrounding the environment, has explained, (WU, 2011), that environmental uncertainty affects positively with some dimensions, human resources has sought many studies to study the impact based on the theory of situational through the study of the role of the modified number of variables, including environmental uncertainty, Environmental uncertainty appears when information related to environmental factors is characterized by unreliability when making decisions and predicting their outputs, or in the event of the inability to predict environmental variables that can be reflected in the behavior of the organization. (Vazquez, 2011), researchers have agreed, that working individuals are an important resource and have a fundamental and active role in the success of the organization, and that the disclosure of information related to this resource, Technological and economic developments have worsened the belief that the level of knowledge assets gives an indication of the potential for future profitability using the technologies of the Fourth Industrial Revolution 4.0. It can help achieve future profits. There are two approaches to measuring human resources: the value-based measurement approach and the cost-based measurement approach. (Sharma &Shukla , 2010) ,through two hypotheses, the current study seeks to test the relationship between human resources costs 4.0 and operational performance, supported by a theoretical aspect that examines how human resources costs are measured and what is their impact on the company's operational performance in light of the factor and the interactive variable represented

2-Theoretical Framework and Hypotheses

2-1Human Resources Analytics in Light of The Fourth Industrial Revolution (4.0)

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Today, the number of human resources analytics is increasingly firmly established with a positive impact on the results of actions and a strong impact on the adoption of operational and strategic decisions and comprehensive integration with data and information technology infrastructure (van den & Bondarouk, 2018), digital development and robots have led to the emergence of industry (4.0), in manufacturing environment (Matt et al, 2020). And the industry (4.0), to the fourth industrial revolution, which is the name given by the World Economic Forum in Davos-Switzerland in 2016, which represents the last link in the series of industrial revolutions that are currently underway. For example, artificial intelligence, physical computer systems, big data and the cloud in the occurrence of destructive changes in the power of the business, and it is described as a social and technical revolution (Sony & Naik 2020), with the emergence of big data and digital technologies in human resources scenarios (Edwards, 2019) and my results In the fourth industrial revolution, the need and the possibility of building useful analytical capabilities for human resources has received increasing attention, Kryscynski et al., 2017), in particular, big data can be applied to all stages of the recruitment process and the planning and management of the entire workforce. (Isson & Harriott, 2016; Anssari, M. A. A., & Al-Tamimi, S. A. 2023).

In addition to attraction, acquisition, development and retention, the last area for possible experimental innovation is artificial intelligence, since the first application of artificial intelligence in human resources management focuses on the effect of expert systems in job evaluation, taking into account the performance and psychological results, the potential of artificial intelligence can be explored today. According to the number of different scenarios, this includes predicting the period, searching for the candidate, employee lists, analyzing the morale of human resources and obtaining resume data with the extraction of information and self-service for the employee (Strohmeier & Piazza, 2015; Anssari, M. A. A. 2023) and can be implemented around human resources. And the framework is established to show how to integrate artificial intelligence applications and applications to enhance the basic dimensions and processes of human resources management (Guo, & Chen, 2018), which includes human resources planning, recruitment, selection, training and development, performance management, and salary evaluation. , and employee relations management (Gerhart, & Wright, 2006), including artificial intelligence-enhanced processes for recruitment, selection, numbers, training, performance management, advancement, retention and employee benefits(Cappelli, 2018). (Upadhyay & Khandelwal, 2018), despite the increasing interest in the quality of artificial intelligence enhancement for human resource management, the progress of artificial intelligence in human resource management is still very slow due to the number of obstacles such as concerns about privacy, continuous maintenance and development capabilities, and the lack of proven applications. (EY, 2018), in addition to that, the application of algorithms for people management requires many organizational and practical complications, (Gal & Stein, 2017). (Tambe, & Yakubovich ,2019)), and several challenges have been identified (complexity of human resources, limitations of assumptions small data sets, ethical and legal restrictions and potential negative reactions of employees) and the effect of digital technologies is of particular importance in web-based applications and systems for human resource management, especially the development of professional social networks, gradually from text-based systems to text-based systems. Diagrams, which integrate advanced presentation capabilities capable of representing people's experience using effective and informative diagrams. (Margherita, 2022). And despite the revolution brought about by technology in practice, digital transformation requires essential human skills to ensure the usability and efficiency of applying digital technologies (Sakurada et al, 2020). In this sense, the motive of action needs to adapt to us, it is related to that. Considering the importance of workforce in the success of digital transformation, it is necessary to understand the vision of traditional human resources management, which is the process of managing people in units and includes all the techniques used to manage people and keep them up-to-date, qualified, and consistent according to the expectations of stakeholders, (Gooderham et al., 2019). It also includes determining the organizational structure and improving communication, and developing ethical and social principles, including the changes that have occurred (4.0) and it is necessary to understand how applications affect human resources management, including the application of digital technologies to their tasks. The development of a new concept through the application of emerging technologies in the industry (4.0), in the human resources sector, which makes the majority flexible, and ensures the well-being of employees (Mazurchenko, & Mar., 2019), before the labor market and the extraction of human resources to carry out new tasks, therefore HRM) 4.0) to the creation of a digital culture for digital people trained to use the appropriate digital tools to increase productivity (Kumar, 2018), the new models related to HRM 4.0 will have important consequences for training the required competencies, new job descriptions (Ana, et al, 2019) The new talents in the future require the development of more strategic, coordinated and creative activities, and the least number of repetitive and easy activities that allow people to express their skills in activities that add more value (Flores, et al, 2020), so they can become tasks that are completed in a form Traditional and automated, and can analyze a large amount of data quickly, intelligently and accurately, the digital technologies

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coming from the industry (4.0) are employed, before the industries that operate in the digital era in human resource management tasks to improve the management process, big data and artificial intelligence help in resuming the selection process. as well as the option of personal files of high probability to meet the requirements of the job(Silva, et al. 2022), and this indicates that the application of the fourth industrial revolution in the field of human resources management requires the availability of high skills and competences capable of applying these technologies, and this may require additional tasks in training and developing resources in order to obtain the qualifications required for this application.

2-2 Operational Performance

It represents the operational performance of scales of operational efficiency and effectiveness within the organization, and is the essential indicator that reflects the ability of unity and the extent of success achieved in exploiting the material, human, technical and informational resources available to it, and excels in flexibility, creativity, sharing knowledge and skills, agreement with organizational goals, focusing on Responsiveness and quick responses to changes that occur.

The actions and needs of the market. (Al-Yasiri & Al-Fatiawi, 2016 ; Al Sabti, A. A. A., & Anssari, M. A. A. 2022), performance measurement is used to achieve strategic, informational, administrative, development and financial goals (Aguinis, 2009) and the difference of studies in the quality of operational performance measurement is the measurement method, using unidimensional variables (Rahman et al, 2010), others are measured based on several dimensions (Lim, et al, 2012) and some studies have relied on the study of the effect on one of the operational performance dimensions, such as quality (Boon-itt, 2011), delivery and sufficiency (Danese & Romano, 2011), and some studies have discussed the role of modification for a number of variables, including environmental uncertain uncertainty (Wong et al, 2011 ; Alshawi, E. J., Al-Tamimi, S. A., Anssari, M. A. A., & Hanoon, M. F. 2023), and these studies are based on the positional theory which indicates the absence of a similar method or theory in all situations (Wu, 2013), and the differentiation in the company's performance may be due to the possession of people with special skills and abilities, who are able to use the company's resources, and suggested (Pfeffer) in 1998, Human resource management strategies that enhance performance (Ahmad & Schroeder, 2003), These include (security of employment selective recruitment of new employees, compensation, training, reduction of differences in wages exchange of information, and performance calendar) but until the company realizes a continuous of competitive advantage, then the things that depend on it in carrying out activities in the field of business, must serve to provide results. Or unique services that are different from competitors, in relation to each other Differentiation strategies with human resource strategies, and that these strategies have positive effects on performance, and the results of many studies have confirmed that human resource strategies, which include human resource costs, have a great impact on organizational and operational performance, and many have expressed the interest between human resource strategies and black fund performance (Kutaula , 2012 ; Al-Tamimi, S. A., & Al Anssari, M. A. 2022). The researchers found that employing strategic human resource practices is positively related to both financial and operational performance (Ahmad & Schroeder, 2003). And the tendency of the present study is to use the al-Manhaj al-Qaim ali al-Kalfa, because it fits the sample of the study, and based on that, the following main hypothesis is derived:

H1: There is a statistically significant effect relationship between the cost of human resources 4.0 and operational performance, and the following sub-hypotheses are rejected.
H11: There is a statistically significant relationship between recruitment and employment and operational performance.
H12: There is a statistically significant effect relationship between training and development and operational performance.
H13: There is a statistically significant effect relationship between compensation and operational performance.

2-3 Environmental Uncertainty

Environmental uncertainty is an important factor in studying and explaining why projects employ different management accounting techniques, as environmental uncertainty is one of the main dimensions of the external environment. (Abdel-Kader & Luther, 2008), refers to environmental uncertainty as "difficulty predicting possible changes in the environment" (Chanhell, 2007), and it may lead to the lack of sufficient information among decision makers, regarding the environmental factor or most of the causes of the occurrence. Wang & Huyuh, 2013). The employment of the term environmental uncertainty means the absence of information, so if the information increases, the environmental uncertainty decreases, and it is one of the most important external challenges that the project management must deal

World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
Vol. 30, January, 2024
ISSN: 2749-3628,

with, which includes a strong group characterized by complexity, interference, speed of change, and instability, which constitutes.

Specifically, the ability to research a competitive advantage, since environmental uncertainty is the main problem facing projects, which is the lack of necessary information to face the conditions and prevailing conditions in the business environment, which is in constant change, and the problem of environmental uncertainty has a direct effect on the effectiveness of decision-making in the project. As the lack of information about the external environment appears in the form of difficulties in evaluating the results related to project decisions, it also shows the difficulty of predicting the environment that is constantly changing and the behavior of competitors, so the projects that seek to compete must adapt to the surrounding environment, because the degree of clarity and ambiguity of environmental variables Actions affect the effectiveness of legal decisions, and environmental uncertainty includes many external factors such as action.

Equipment, customer requirements, tastes, globalization, activities of competitors in the market and production, information technology, government policies and economic systems. According to that environmental uncertainty is considered as an important requirement that helps in the selection of technologies, administrative accounting, as projects adapt to environmental uncertainty through the employment of flexible technologies and supporting the ability to respond quickly. (Dess et al, 2007) that the projects that perceive the highest level of environmental uncertainty use more complex and sophisticated management accounting techniques than the projects that perceive the low level of environmental uncertainty.

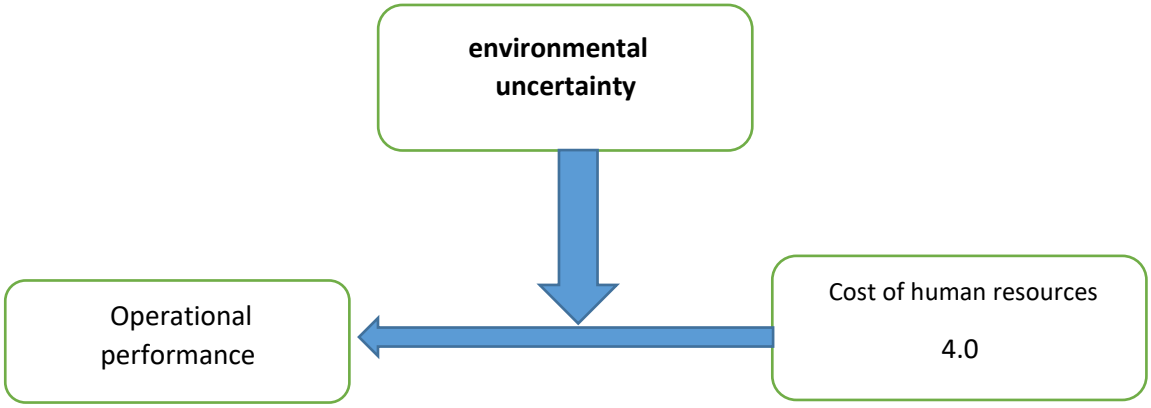
As seen by (Prihastiwi & Sholihin, 2018), the trust of small and medium-sized projects in management accounting techniques is related to environmental assurance, as those projects can expect and control external environmental uncertainty through internal processes, including management accounting techniques. It should be noted that the employment of advanced manufacturing technology (AMT) is allowed for companies by operating with high energy and competitive industries, this requires companies to rely on non- financial measures, in terms of their ability to measure factors that cannot be measured through a system capable of evaluating financial performance. (Ong & Teh, 2008).

Also, the diversity of the workforce is considered as one of the important conditional factors in the units, which is likely to affect the decision and use of the performance evaluation system. (Abdel-Maksoud, et al, 2005), we can say that it requires units to deal with environmental uncertainty by using several methods, including reducing environmental uncertainty to a minimum during the verification process, commitment and applying appropriate procedures in practice, as well as obtaining The necessary information through which it is possible to predict the situation of uncertainty and work on finding appropriate solutions for it, also requires the employment of various financial and non-financial performance measures in Measuring and evaluating performance, which helps competition in practice, and diversity in the workforce.

which provides different and desirable specialties in practice, since all of this can help in dealing with environmental uncertainty, it's no secret that hiring advanced technology and diversity in the workforce and recruitment or training requires a certain amount of effort, whether it's a job-specific task or not? and development, and this leads to the existence of a relationship and effect of human resources on operational performance Due to the lack of environmental certainty, and based on that, the following hypothesis is derived:

H2: There is an impact relationship between the costs of Human Resources 4.0 on operational performance with the presence of environmental uncertainty as an interactive variable.

The hypothetical outline of the study can be explained as follows.



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Available Online at: https://www.scholarexpress.net
Vol. 30, January, 2024
ISSN: 2749-3628,

The hypothetical outline of the study

3- Methodology

3-1 Participants and Procedures

It represents the energy sector (oil and gas), the ratio exceeds 90% of the revenues of the Iraqi state, therefore, the study of the costs of this sector is one of the most important things due to its implications on the revenues and the economic performance in general and the operational performance in particular, the application of this study to foreign companies In the oil and gas sector in the southern region, the data was collected from the sample of the production and operations managers, planning managers, executive managers, experts and managers of the units and branches during the questionnaire (59), paragraph and based on the five-point Likert scale, to determine the answers of the sample. (I strongly agree.... No, I strongly agree), and 150. forms were distributed, including 136 valid forms, that is, 91%.

3-2 Measures

Human Resources Cost, 4.0 To establish this variable, a few studies tried to test this variable empirically, and there is a lack of agreement between the researchers on the dimensions, and the scale was relied on (Al-Batayna, 2016), and the dimensions are measured, representing recruitment and employment, training, development, and replacements, for the purpose of verifying The effect of this independent variable, this measure includes 33 items specific to the variable aforementioned.

Operational performance, to realize the effect of the dependent variable, the theme of hiring a scale in the test has been proven to be active in several studies, including a study (Mohammed, 2013), this scale has proven its effectiveness in testing two dimensions: effectiveness and efficiency. This scale includes 18 items that test the two aforementioned dimensions.

Environmental uncertainty to verify the effect of this interactive variable, a measure was used, the effectiveness of which has been proven by many studies, including study (Shu-Hsien & Ta-Chien, 2007) has confirmed that this scale is active in the next test of ambiguity and complexity including this scale of 16 items, similar to the above-mentioned scale.

The theme of determining the variable of age, job, years of experience, salaries of foreign workers and company policy in contracts as a control variable based on my group of previous studies (Strobl et al, 2020).

The classification of the age variable for the study sample while focusing on four main categories (1-≥30, 2-50-31, 3-≤50), and regarding the job variable, the measurement is based on 1-unit manager 2-branch manager 3-executive manager 4-Expert, 5-Planning manager, 6-Production and operations manager, and the variable measurement of the number of years of experience 1-(1-5), 2-(5-10), 3-(10-15), 4-(15 and more) , the estimation of the amount of salaries of foreign workers during (1- (1000-3500 $), 2- (4000-6500 $), 3- (7000-9500 $),4-further more

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The company's policy regarding contracts for foreign workers was also measured through: 1- The company's policy is based on updating the contracts with foreign workers and replacing them with new contracts. 2- The company's policy is based on renewing foreign workers contracts annually.

4-Results

4-1Validity and reliability of the questionnaire:

First: the scale is valid:

1- Internal consistency

Internal consistency means the extent to which each item of the questionnaire is consistent with the dimension to which it belongs. The internal consistency of the questionnaire was calculated by calculating the correlation coefficients between each item and the total score for the sub-dimension to which it belongs. In addition to finding the correlation coefficients between each sub-dimension and the total score of the main dimension to which it belongs.

Table (1) shows the correlation coefficients between each item of human resources costs and the total score for the same sub-dimension to which the item belongs and between each sub-dimension and the total score of the main dimension. It turns out that all correlation coefficients are significant. The level of significance accompanying the correlation coefficients was less than the level of significance specified for the test, and therefore we conclude that the dimension is true to what it was measured.

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Table No. (1): Correlation coefficients between each item of human resources costs, the sub-dimensions, and the total score for that dimension. Table No. 1: Correlation coefficients between each item of human resources costs, the sub-dimensions, and the total score for that dimension.

The main dimension and its coding	The sub-dimension and its symbols.	Paragraph and its coding	Pearson correlation coefficients	
Cost HR x1	Recruitment and Recruitment X11	X111	0.690**	0.898**
		X112	***0.662	
		X113	**0.729	
		X114	**0.529	
		X115	*0.628	
		X116	**0.734	
		X117	**0.625	
		X118	**0.632	
	Training and development X12	X 121	**0.736	0.953**
		X 122	**0.756	
		X 123	**0.602	
		X 124	**0.278	
		X 125	**0.723	
		X 126	**0.453	
		X 127	**0.764	
		X 128	**0.479	
		X 129	**0.853	
	Compensation X13	X 131	**0.301	
		X 132	**0.278	
		X 133	**0.418	
		X 134	**0.660	0.953**
		X 135	**0.731	
		X 136	**0.903	
		X 137	**0.870	
		X 138	**0.876	

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Available Online at: https://www.scholarexpress.net
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note. It indicates the level of significance associated with the correlation coefficient SKMA less than
Table No. 2: Correlation coefficients between each item of Operational performance, the sub-dimensions, and the total score for that dimension. Table No. 1: Correlation coefficients between each item of human resources costs, the sub-dimensions, and the total score for that dimension.

Table 2: Correlation coefficients between each item of operational performance and its sub-dimensions and the negative score for that dimension.

The main dimension and its coding	The sub-dimension and its symbols.	Paragraph and its coding	Pearson correlation coefficients	
operational performance	Effectiveness, Y1	Y 11	**0.876	0.777**
		Y 12	**0.852	
		Y 13	**0.818	
		Y 14	**0.546	
		Y 15	**0.677	
		Y 16	**0.564	
		Y 17	**0.504	
		Y 18	**0.511	
	Efficiency Y2	Y 2 1	**0.457	0.639**
		Y 2 2	**0.468	
		Y 2 3	**0.629	
		Y 2 4	**0.512	
		Y 2 5	**0.235	
		Y 2 6	**0.471	
		Y 2 7	**0.504	
		Y 2 8	**0.453	
		Y 2 9	**0.429	
		Y 2 10	**0.504	

Table No. 3: Correlation coefficients between each item of Environmental uncertainty the sub-dimensions, and the total score for that dimension. Table No. 1: Correlation coefficients between each item of human resources costs, the sub-dimensions, and the total score for that dimension.

Table 3: Correlation coefficients between each item of environmental uncertainty and its sub-dimensions and the total score for that dimension

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The main dimension and its coding	The sub-dimension and its symbols.	Paragraph and its coding	Pearson correlation coefficients	
Environmental uncertainty X2	Mystery X21	X 211	0.472**	0.803**
		X 212	0.422**	
		X 213	0.432**	
		X 214	0.472**	
		X 215	0.553**	
		X 216	0.664**	
		X 217	0.752**	
		X 218	0.424**	
	Complexity X22	X 221	0.572**	0.743**
		X 222	0.337**	
		X 223	0.679**	
		X 224	0.577**	
		X 225	0.591**	
		X 226	0.472**	
		X 227	0.432**	
		X 228	0.412**	

note. It indicates the level of significance associated with the correlation coefficient SKMA less than

2- Construct Validity

The constructive validity dimension is one of the measures of the validity of the tool, which measures the extent to which the goals that the tool wants to reach are achieved and shows the extent to which each dimension of the study is related to the total score of the questionnaire items.

Table 4 shows that all correlation coefficients in all dimensions of the questionnaire are statistically significant because the level of significance associated with their correlation coefficients with the total score of the questionnaire items is less than the level of significance specified for the test.

Table 4: Correlation coefficients between each dimension of the study and the total score of the questionnaire items

Dimensions	Pearson correlation coefficient
Cost of human resources	0.638**
Operational performance	0.827**
Environmental uncertainty	0.576**

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The Stability of The Questionnaire

The stability of the questionnaire means that the questionnaire gives the same results if it is repeated several times in a row. The stability of the study questionnaire was found by calculating the Cronbach's alpha coefficient, summarized in Table No. 5.

Table 5: Results of Cronbach's alpha coefficient and self-honesty

Dimensions of the study	Number of paragraphs	The value of the Cronbach's alpha coefficient	Self-honesty
Cost of human resources	25	0.85	0.92
Operational performance	18	0.72	0.85
Environmental uncertainty	16	0.68	0.82

It is clear from the results of Table 5 that the value of the Cronbach's alpha coefficient is high for each dimension, as it reached 0.85 for human resource costs, while it reached 0.72 for operational performance, and it reached 0.68 for environmental uncertainty. We also note that the value of self-honesty appeared high to exclude the study if it reached 0.92. 0.85,0 and 0.82 respectively for the mentioned dimensions.

4-2 Hypothesis Testing

For the purpose of testing the study hypotheses, a linear regression model and path analysis method were estimated using the dependent variables represented by operational performance, the independent variable represented by human resources cost, and the interactive variable represented by environmental uncertainty using the statistical program SPSS. The two hypotheses H1 and H2 were tested and the results of the analysis showed a significant influence relationship between the sub-dimensions of cost. Human Resources 4.0, which includes recruitment, recruitment, training and development, and compensation for operational performance, as shown in Table 6.

Table (6) Results of estimating the linear regression model between the recruitment and employment variable and the operational performance variable.

variable	*Appreciation*		Sig	R^2	Adjusted R^2	F
Fixed limit	$\widehat{\beta_0}$	1.757	0.000	*0.25*	0.246	*45.069*
Recruitment and recruitment	$\widehat{\beta_1}$	0.548	0.000			

The source was prepared by the researcher based on the outputs of the SPSS V 22 program

We notice from Table 6 that the coefficient of determination R^2 = o.25 for the model reached 25%, which indicates that the model was able to explain 25% of the changes in the dependent variable and the recipient. Of the changes, 75% are due to other variables that were not included in the model and were combined with the random error term. In addition, the model appeared significant. You notice that the hidden significance (Sig=0.000) resulting from the test *F* value is less than the significance level specified for the test $\alpha = 0.05$, It is clear that the recruitment and recruitment variable has a direct impact on the operational performance variable, amounting to 0.548, with a significance level sig=0.000 less than 0.05.

Table (7) Results of estimating the linear regression model between the training and development variable and the operational performance variable.

variable	*Appreciation*		Sig	R^2	Adjusted R^2	F	Sig
Fixed limit	$\widehat{\beta_0}$	*2.614*	0.000	*0.14*	0.135	*22.085*	*0.000*
training and development	$\widehat{\beta_1}$	0.322	0.000				

The source was prepared by the researcher based on the outputs of the SPSS V 22 program

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We notice from Table (7) that the coefficient of determination R^2 = o.14 for the model reached 25%, which indicates that the model was able to explain 14% of the changes in the dependent variable and the recipient. Of the changes, 36% are due to other variables that were not included in the model and were combined with the random error term. In addition, the model appeared significant. You notice that the hidden significance (Sig=0.000) resulting from the test *F* value is less than the significance level specified for the test $\alpha = 0.05$, It is clear that the recruitment and recruitment variable has a direct impact on the operational performance variable, amounting with a significance level sig=0.000 less than 0.05.

Table 8: Results of estimating the linear regression model between the Reparations variable and the operational performance variable

variable	*Appreciation*		Sig	R^2	Adjusted R^2	F	Sig
Fixed limit	$\widehat{\beta_0}$	*3.149*	0.000	*0.073*	0.066	*10.579*	*0.001*
Reparations	$\widehat{\beta_1}$	0.156	0.001				

The source was prepared by the researcher based on the outputs of the SPSS V 22 program

We notice from Table (8) that the coefficient of determination R^2 = 0.073 for the model reached 25%, which indicates that the model was able to explain .7.3 % of the changes in the dependent variable and the recipient. Of the changes, 92.7 % are due to other variables that were not included in the model and were combined with the random error term. In addition, the model appeared significant. You notice that the hidden significance (Sig=0.000) resulting from the test *F* value is less than the significance level specified for the test $\alpha = 0.05$, It is clear that the recruitment and recruitment variable has a direct impact on the operational performance variable, amounting, with a significance level sig=0.001 less than 0.05.

As for testing the second hypothesis regarding the existence of an impact relationship between human resource costs and operational performance in the presence of environmental uncertainty as an interactive variable, it was used Johanson-Neyman to test this hypothesis, and the results were as shown in Table(9) below.

Table (9) the interactive effect of environmental uncertainty and the relationship between human resource costs and operational performance.

Variable	Coeff.	Se	t	p	LLCI	ULCI
constant	2.3423	0.0463	50.5896	0000	1.2324	
Cost of human resources	0.3769	0.1413	2.6670	0.0518	-0.0035	
Environmental uncertainty	0.7761	0.112	6.3614	0000	0.6392	
Int_1	0.2812	0.0861	3.2659	0.000	-0.0332	

The source was prepared by the researcher based on the outputs of the Johanson-Neyman

From the table above, the results indicate the presence of an influence relationship between the independent variable and the direction of the dependent variable, which is operational performance, in the presence of environmental uncertainty as an interactive variable, Where the value(β)of the variable(Int-1) was estimated at 0.2812 likewise for value (t-test =3.2659) this indicates acceptance of the second hypothesis as shown in the figure(1) below .

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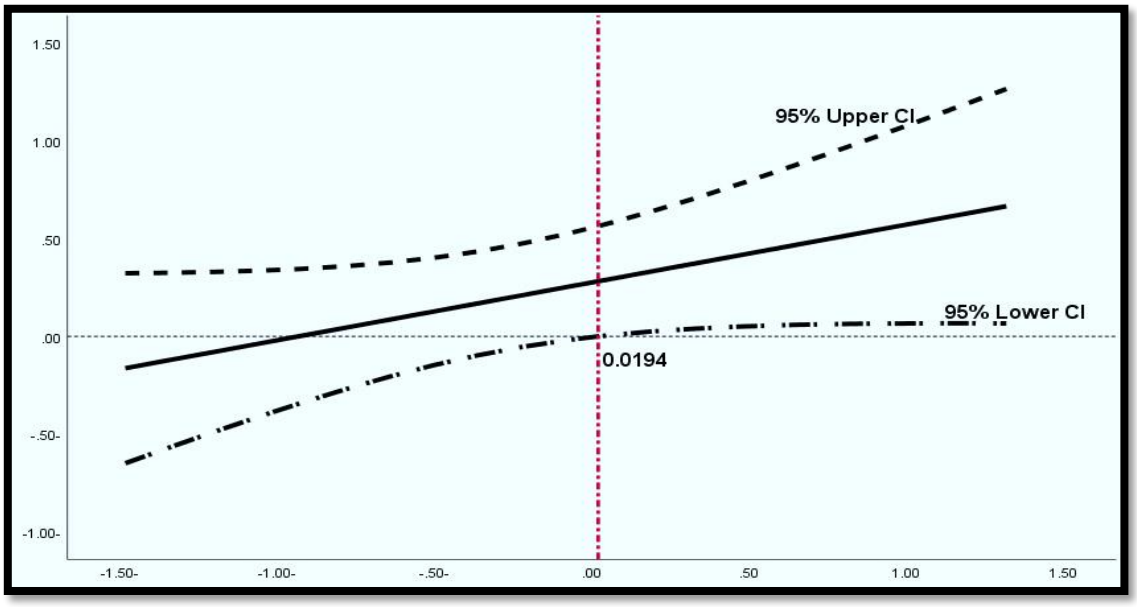

Figure (1) Interactive effect of environmental uncertainty

5-DISCUSSION

This study seeks to investigate the impact of human resource costs in light of the Fourth Industrial Revolution (4.0), on operational performance in the presence of the interactive effect of environmental uncertainty, by surveying the opinions of a number of planning, production and operations managers, executive directors, experts, and division and unit officials. Within the energy sector (oil and gas), the results, as shown in Tables 6,7,8, confirm the direct positive effect of the relationship between human resource costs (4.0), with its sub-dimensions of recruitment and employment, training and development and compensation, and operational performance. It was also found that there is an effect Direct and indirect impact of the interactive variable, represented by environmental uncertainty, on the relationship between human resource costs and operational performance. The results of the analysis revealed the role of the Fourth Industrial Revolution (4.0).

in influencing the costs of human resources, as it was found that it will lead to major changes in the nature of the work of working individuals, including the use of artificial intelligence, which can help in predicting work turnover and improving the process of planning, hiring, training and development, etc., and a large volume of data can be analyzed. Data quickly and accurately, and the new models will have important consequences for training in required competencies and new job profiles. The results indicate that this digital transformation requires additional costs, as the use of artificial intelligence and expert systems at work requires preparing individuals who have qualifications that enable them to use these technologies, and this matter requires organizing development courses and programs that qualify them to use these technologies, which is expected to lead to increase productivity and achieve value at work. In a world characterized by complexity and rapid change, represented by environmental uncertainty, which requires the use of all means that can confront environmental uncertainty, or mitigate its effects, the technologies of the Industrial Revolution (4.0) can help in alleviating or treating cases of environmental uncertainty. In view of the importance of the oil sector in the Iraqi economy, whose revenues constitute more than 90%, the matter requires searching for means that would develop those revenues and reduce the costs associated with those generated revenues and lead the administration to carry out activities that would achieve a high percentage of the achieved revenues.

This is done by linking the returns achieved from human resources, of which the percentage of foreign workers constitutes a large percentage of those resources, with the costs of those resources, and within the framework of the Industrial Revolution (4.0), considering that this comparison is one of the performance evaluation indicators, and based on the results achieved, the administration can take Special decisions regarding foreign workers in particular, whether to renew or update contracts, as it deems appropriate, and it should be noted that previous studies were limited to their impact on some variables, as some of them studied the impact of human resources accounting, and focused on the approaches that measure the value of human resources (Kahla et al, 2021), while other studies focused on studying the effect Environmental uncertainty as a factor modifying the relationship between human resources flexibility and human resources sustainability (Al-Sakarta, 2018), and there are studies that focused on human resources management

World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
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in light of (4.0), (Silva et al, 2022), and other studies attempted to study the emergency effects of environmental uncertainty on The relationship between supply chain integration and operational performance (Che, Yew. et al ,2011). While the current study attempts to fill the knowledge gap by studying the impact of environmental uncertainty as an interactive factor in the relationship between human resource costs in light of the technologies of the Fourth Industrial Revolution and knowing its repercussions on operational performance, that is, the current study attempted to collect the variables referred to in previous studies, for the purpose of arriving at knowledge (4.0), the impact played by industrial technology, it affects the costs of human

resources, and then studies that impact on operational performance in the presence of the interactive factor represented by environmental uncertainty. Future studies can study the impact of the Metaverse on the costs of human resources, given that the Metaverse is one of the technologies of the Industrial Revolution (4.0), and its application requires the availability of skills, experience, and qualifications by the resources Humanity for the purpose of its application.

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