

RELIGACIÓN

Revista de Ciencias Sociales y Humanidades

ISSN 2477-9083



NÚMERO ESPECIAL

RELIGACIÓN

Revista de Ciencias Sociales y Humanidades
Vol. 4 • Nº 17 • Número Especial Julio 2019
ISSN 2477-9083

Religación. Revista de Ciencias Sociales y Humanidades es una revista académica de periodicidad trimestral, editada por el Centro de Investigaciones en Ciencias Sociales y Humanidades desde América Latina.

Es una revista arbitrada con sede en Quito, Ecuador y que maneja áreas que tienen relación con la Ciencia Política, Educación, Religión, Filosofía, Antropología, Sociología, Historia y otras afines, con un enfoque latinoamericano. Está orientada a profesionales, investigadores, profesores y estudiantes de las diversas ramas de las Ciencias Sociales y Humanidades.

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Religación. Revista de Ciencias Sociales y Humanidades.- Quito, Ecuador. Centro de Investigaciones en Ciencias Sociales y Humanidades desde América Latina, 2019

Enero - Marzo 2019

Trimestral - marzo, junio, septiembre, diciembre

ISSN: 2477-9083

1. Ciencias Sociales, 2 Humanidades, 3 América Latina

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Modelling of electronic human resource management (E-HRM) issues based cloud computing system by using quantitative technique

Modelado de problemas de gestión de recursos humanos electrónicos (E-HRM) basado en el sistema de computación en la nube mediante el uso de una técnica cuantitativa

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ABSTRACT

The aim of the study is to identify critical factors leading to adopt EHRM based cloud system, and control methods for mitigating eHRM issues by using stepwise regression analysis. Indeed, the results show that a stepwise multiple regression model had the highest squared multiple correlations. The best models among all applied models are presented in the results. Furthermore, we identified the EHRM issues based cloud computing system by using the stepwise regression analysis. Therefore, Table 1 shows E-HRM Issues based cloud computing system identification checklist with control methods based on experienced IT and HR managers by using the quantitative technique. In stepwise regression analysis, the squared multiple correlations are between (0.724-0.262). However, the models estimate the multiple correlations between EHRM issues and control methods (0.851- 0.511), which are high. The factors indicate the goodness of fit, if the model fits perfectly, the model should have the sig. of value less than 0.05 and R2 is greater than 0.2. Consequently, a good model can be used to predict the relationship between the variables; it can be used to predict the numbers of control methods will be useful. Indeed, stepwise regression predicts the level of EHRM issues based on cloud computing with different combinations of control methods

Keywords: Cloud Computing System, Electronic Human Resource Management, Healthcare Organization, Quantitative Technique, Stepwise Regression, Control of Methods

RESUMEN

El objetivo del estudio es identificar los factores críticos que conducen a la adopción del sistema de nube basado en EHRM y los métodos de control para mitigar los problemas de eHRM utilizando el análisis de regresión por pasos. De hecho, los resultados muestran que un modelo de regresión múltiple paso a paso tenía las correlaciones múltiples al cuadrado más alto. Los mejores modelos entre todos los modelos aplicados se presentan en los resultados. Además, identificamos el sistema de computación en la nube basado en problemas EHRM mediante el análisis de regresión por pasos. Por lo tanto, la Tabla 1 muestra la lista de verificación de identificación del sistema de computación en la nube basada en E-HRM Issues con métodos de control basados en gerentes de recursos humanos y de TI con experiencia utilizando la técnica cuantitativa. En el análisis de regresión por pasos, las correlaciones múltiples cuadradas están entre (0.724-0.262). Sin embargo, los modelos estiman las múltiples correlaciones entre los problemas de EHRM y los métodos de control (0.851- 0.511), que son altos. Los factores indican la bondad del ajuste, si el modelo se ajusta perfectamente, el modelo debe tener la firma. de valor menor que 0.05 y R2 es mayor que 0.2. En consecuencia, se puede usar un buen modelo para predecir la relación entre las variables; Se puede usar para predecir el número de métodos de control que serán útiles. De hecho, la regresión por pasos predice el nivel de los problemas de EHRM basados en la computación en la nube con diferentes combinaciones de métodos de control

Palabras clave: Sistema de computación en la nube, Gestión electrónica de recursos humanos, Organización de la asistencia sanitaria, Técnica cuantitativa, Regresión por pasos, Control de métodos

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Recibido: 18/03/2019 Aceptado: 24/06/2019

RESUMO

O objetivo do estudo é identificar os fatores críticos que levam à adoção do sistema de nuvem baseado em EHRM e métodos de controle para mitigar os problemas de eHRM usando a análise de regressão stepwise. De fato, os resultados mostram que um modelo de regressão múltipla gradual apresentou as maiores correlações múltiplas quadradas. Os melhores modelos entre todos os modelos aplicados são apresentados nos resultados. Além disso, identificamos o sistema de computação em nuvem baseado em questões de EHRM usando a análise de regressão stepwise. Portanto, a Tabela 1 mostra a lista de verificação de identificação do sistema de computação em nuvem baseada em problemas do E-HRM com métodos de controle baseados em gerentes experientes de TI e RH usando a técnica quantitativa. Na análise de regressão passo a passo, as correlações múltiplas ao quadrado estão entre (0,724-0,262). No entanto, os modelos estimam as múltiplas correlações entre questões de EHRM e métodos de controle (0,851-0,511), que são altos. Os fatores indicam a adequação do ajuste, se o modelo se encaixa perfeitamente, o modelo deve ter o sig. de valor menor que 0,05 e R² é maior que 0,2. Consequentemente, um bom modelo pode ser usado para prever a relação entre as variáveis; Ele pode ser usado para prever os números de métodos de controle que serão úteis. De fato, a regressão stepwise prevê o nível de problemas de EHRM baseados na computação em nuvem com diferentes combinações de métodos de controle

Palavras-chave: Sistema de Computação em Nuvem, Gestão Eletrônica de Recursos Humanos, Organização de Saúde, Técnica Quantitativa, Regressão Stepwise, Controle de Métodos

Introduction

Currently, there are a number of diseases that have been deemed to have no permanent form of treatment. The support for HR's growing strategic focus is facilitated through the advancement of information and communication technologies (ICT). Technology has had tremendous impact on contemporary organizations' knowledge management and human resource processes and practices (Ghosh and Tripathi, 2018). There are some determinants that influence the adoption of E-HRM. Previous studies show that research work that focuses the influential determinants to adopt e-HRM is limited, especially in developing economy as like Iraq. Healthcare management would have failed if mobile cloud computing technologies did not emerge (Doheir et al., 2017). Cloud computing is the current shift in the way of accessing distributed applications, platforms, and infrastructures globally through the internet. It gives e-HRM the capabilities to develop reusable systems and processes that can attract, develop, maintain, and retain high-performing talent. This cutting edge technology has large implications on organizational sustainability and success in a globally competitive market (Ghosh and Tripathi, 2018).

It is a powerful, trustworthy and easy tool, accessible to a wide range of users. e-HRM is a way to implement HR strategy, policies and practices in organizations by intentionally supporting and/or using web-based channels fully and directly. It concealments all aspects of management of human resources, such as personal management, training, career development, business organization, job descriptions, recruitments, employee personal pages and annual employee interviews (Swaroop, 2012). It highlighted the effect of socio-cultural factors on the adoption of e-HRM technologies and differentiated e-HRM technologies between different levels. These technologies were classified in front and back end systems. The front end or e-HRM is usually web-based and mainly responsible for connecting different actors. This includes human resource portals, self-service systems and interactive voices, and is considered a core e-HRM category. Front-end systems require support from back-end systems such as HR data warehouses or ERP modules for data retrieval, processing and retrieval (Human Resource Information System). They have discovered that the amount expended on training and company performance can be used to expand their back-end HRM when adopting front-end systems (e-HRM) just in the collection of states with subordinate Internet distribution and economic robustness can be the priority high-level organizations, they investigated, to apportion resources to support e-HRM policies. Depending on the cluster in which they operate, they chose to make a difference in how companies decide to adopt HRM-systems. In categorizing the levels of HRM adoption systems, the various national variables such as culture, economic and technological conditions have demonstrated their importance. This deduction is true in view of the educational scenario discussed. Culture and technology and training acceptance are important factors that will help the user of technology achieve the necessary results. It concerns all kinds of HR practices that can be supported by IT, either administrative or transformative; it also concerns any type of IT that can support HRM, Internet, intranet, or complicated ERP systems. It is expected that researchers will explain the match between a type of IT and HR practices (Bondarouk and Ruël, 2009). However, software development projects still fail to deliver acceptable systems on time and within budget. Due to the involvement of risk management in monitoring the success of a software project, analyzing potential risks, and making decisions about what to do with potential risks, the risk management is considered the planned control of risk. Integrating formal risk management with project management is a new phenomenon in software engineering and product management community (Elzamly et al. 2016; A. Elzamly & Hussin 2015). In addition, risk is an uncertainty that can have a negative or positive effect on meeting project objectives (Elzamly and Hussin, 2011b, 2013a). In order to find the relation among EHRM issues based cloud computing and control methods by using different statistical methods like regression analysis. Implementation the stepwise regression analysis are implemented for mitigating EHRM issues and used for fitting models. The different national variables, such as culture, economic and technological conditions proved important in categorizing the level of HRM systems adoption.

However, they introduce stepwise regression approach modelling to mitigate and manage the software design process issues in software project by using proposed controls (Elzamly and Hussin, 2013b; Abdelrafe Elzamly and

Hussin, 2015a; Elzamly et al., 2015, 2016). **The objective of this paper** is to model of Electronic Human Resource Management (E-HRM) Issues Based Cloud Computing System by using quantitative technique for healthcare organizations.

1 Empirical Strategy

This section introduces methods, techniques and tools for analyzing the different elements that drive a model in healthcare organizations to adopt E-HRM cloud computing. The research method was defined as a process for gathering decision-making information and data. Methods can also be a procedure where problems and concerns are systematically solved in scientific studies. The research method aims to describe the research design, the selection of research samples, data collection procedures and the data analysis process. Furthermore, a statement of credibility will ensure that the research actually provides highly reliable and valid data. In addition, the study includes quantitative and qualitative methods that take into account the widely used methods. The quantity method is used in this study to collect data from a wide range by selecting a representative population sample. The quantitative method effectively collects the data required for this research because it reflects the views of different clinical staff in different departments on e-HRM adoption. Use is considered necessary to achieve a valid result using quantitative techniques. In fact, the use of the quantitative method is to facilitate the collection of sufficient data for complementary purposes. Consequently, it is important to limit EHRM methods and approaches to problem control. This research suggests a model for an EHRM-based cloud computing system for healthcare. Use quantitative analytical methods to verify the model. In addition, we have identified issues related to EHRM in all healthcare organization components and obtained data from questionnaires for this study.

A questionnaire is an instrument that the self-reported data collection can be filled by the participants of the research. Additionally, the questionnaire was the most effective and efficient method for collecting the primary data from the sampling of the population. Respondents were presented with various questions that related to EHRM issues and control techniques for mitigating EHRM issues by using scales 1-10. In this study, the point scales for EHRM issues are the following: 'Not very important' equals one and 'Very important' equals ten. Similarly, controls for mitigating EHRM issues were scaled into 'Never' equals one and 'always' equals ten. All questions in the EHRM issues were measured for a ten point Likert scale and controls for mitigating EHRM issues are measured also a ten scales, but with different notations. The IT and HR managers who participated in this questionnaire comprised of from IT and HR managers in healthcare organizations. EHRM issues are involved in healthcare organizations in the Iraqi are identified and classified based on the previous studies. The activities performed by the IT and HR managers were identified to control EHRM issues in the healthcare organizations that are analyzed. In addition, we will predict the EHRM issues depend on controls techniques by regression analysis and quantitative method as well as the prediction of the model between EHRM issue factors and control techniques. Furthermore, the main questionnaire sent to the cloud developers and IT developers in the republic of Iraq for healthcare organizations. The data collection approaches were used a questionnaire for estimating the EHRM issues and controls for mitigating issues in the analyzed healthcare organizations. In addition, the approach to select the sample that referred to as distribution of personal regular sampling for based on HR and IT managers. Further, twenty-five EHRM issues based cloud computing system with four domains and twenty control methods were presented to respondents. Therefore, the targeted data in this study is taken from various HR and IT managers in the healthcare organizations in the Iraq. Indeed, this questionnaire modified by experts and reviewers in the field of cloud computing and security system to measure group HR and IT managers about the relative importance of EHRM issues based cloud system and control methods. A questionnaire was adopted as the tool of the study in order to collect the needed data. Questionnaires were distributed on the sample of the study and questionnaires were retrieved from the respondent which were properly filled and can be statistically processed.

Quantitative techniques are based on statistical methods that deal with accurate measurement about risk or lead to quantitative inputs that help to form a regression model to understand how software project risk factors influence project success (Abdelrafe Elzamly and Hussin, 2015b).

Based on cloud computing and control methods, finding the link between EHRM issues using different statistical methods such as the chi-square (χ^2) technique, regression analysis, and so on. QM can assist managers in estimating hazards (e.g. probability estimates), allowing managers to plan more effectively to avoid risks associated with software projects. (Melo et al., 2013). A crisp relation between variable dependent and independent variables is used to predict (Dom et al. 2012). Therefore, a good model can be used to predict the relationship of the variables; it can therefore be used to predict the number of control methods. Indeed, models of regression and regression predict the level of cloud computing with EHRM issues based on different control methods. Bayesian model of regression. Regression modeling is obviously one of the most widely used techniques for statistical modeling to adapt a reaction variable to the (independent) variables predictor. (Martin et al., 2005). Furthermore, EHRM problems are a dependency variable and independent controls and solutions. However, the development of software with software risk management methodology is rarely found. Thus, it is important to combine between software life cycle with software risk management such as qualitative, quantitative, and mining techniques to help software manager tracking and mitigate software (Elzamly and Hussin, 2011a, 2014b, 2014a, 2016; Elzamly, Hussin and Salleh, 2016). Consequently, a good model can be used to predict the relationship of the variables; it can be used to predict on the numbers of control methods will be useful. Indeed, stepwise regression analysis predicts the level of EHRM issues based cloud computing with different combinations of control methods.

2 The Importance of E-HRM issues based cloud computing system for Healthcare Organizations

Table 1. the importance of E-HRM issues based cloud computing system (N=672)

E-HRM issues based cloud computing system	Mean	Std. Deviation
E-HRM practices and organizational performance	8.37	1.277
Human resource strategy and planning.	8.45	1.165
E-HRM is suitable for human resource professionals.	8.43	1.100
Implementing HR strategies, policies, and practices in organizations.	8.25	1.215
User-friendly interface.	8.21	1.130
The multi-tenancy in the EHRM based cloud.	8.32	1.020
Electronic Human Resource Management Activities (EHRMA)	8.3393	.84869
E-HRM is mediated for helping the organizations to acquire, develop, and deploy the intellectual capital.	8.34	1.041
Access to employee self-service training enrollment and self-development.	8.52	1.018
E-HRM can save costs while maintaining the quality of data.	8.52	.846
Workflow analysis in the business process management and productivity.	8.39	1.333
Attitude towards usage and Behavioral intention to use.	8.43	1.016
Awareness in E-management.	8.48	.926
The Level Awareness of E-HRM and Cloud Computing (LAEHRMCC)	8.4464	.68705
Collaboration of HRM and IT.	8.39	.995
HR activities in the administrative area based on IT	8.55	.963
Sharing of reliable information quickly in IT-based HRM.	8.61	.860
E-HRM tools & techniques are used during selecting process.	8.43	.904
Standardization and decentralization of HR tasks.	8.62	.815
Technological development and electronic instruments are always available.	8.55	1.017
IT and Cloud Computing Infrastructure (ITCCI)	8.5268	.60858
Integral support for the management of human resources.	8.59	.883
The transfer to E-HRM can reduce costs.	8.64	.896
Transparent online recruitment & selection process has been adopted healthcare center.	8.59	.862
Efficiency and effectiveness.	8.50	.824
Regulatory Requirements.	8.61	.817
Portability and Interoperability.	8.61	.772
Communication between the management and the HR department.	8.70	.823
Management Support System and Quality for HRM (MSSQAHRM)	8.6046	.50182

Table 1 displays the means and standard deviations of the 25 constructs' items related to this study. All the descriptive statistics are based on counts received from the participants. Ten-point Likert scale of possible answers to measure each item of the response was used with scale ranges from totally very important (10) to totally not very important (1). As reviewed in table 4.4, the mean of respondents' scores for Electronic Human Resource Management Activities was 83.3%. While descriptive statistics show that this score is high. Respondents' scores for the level awareness of E-HRM and Cloud computing equal 84.4 % which also scored are high. IT and Cloud Computing Infrastructure (ITCCI) respondents' scores 85.2%, which indicates that the scale is reasonably high. Finally, management support system and quality for HRM respondents' scores 86.04, which indicates that the scale is reasonably high.

3 Classification of Control methods for Mitigating EHRM Issues for Healthcare Management

Table 2 Classification of Control methods for Mitigating EHRM Issues (N=672)

	Control Factors for Mitigating EHRM Issues	Mean	Std. Deviation
CoM1	Biometric security system for cloud computing in healthcare organizations.	8.34	.969
CoM2	Data protection in cloud computing system.	8.70	.963
CoM3	Security cloud and IT infrastructure.	8.34	.872
CoM4	Implement automated tools and develop application portability.	8.23	1.119

CoM5	Creating cyber security systems and cryptography approaches.	8.54	.866
	Technological Dimension	8.4286	.64903
CoM6	Developing authentication for the cloud computing.	8.61	.860
CoM7	Decreased effort in management technology in cloud computing.	8.32	.848
CoM8	Composite cloud services.	8.61	.795
CoM9	Cloud deployment and integration system.	8.34	.852
CoM10	Flexibility access cloud storage in cloud system.	8.62	.878
	Organizational Dimension	8.5000	.58963
CoM11	Reducing cost for EHRM services.	8.39	1.081
CoM12	Scalability and capability in the cloud computing.	8.37	.858
CoM13	Flow control for secure cloud computing.	8.38	.858
CoM14	Availability of cloud data.	8.46	.824
CoM15	Cloud data integrity in EHRM system.	8.36	1.275
	Environmental Dimension	8.3929	.63175
CoM16	Trusted for EHRM and cloud services.	8.36	1.060
CoM17	Cloud data privacy.	8.59	.751
CoM18	Create, deploy, develop, implement policies and procedures for the EHRM based cloud computing.	8.46	.756
CoM19	Managing cloud data confidentiality.	8.54	.802
CoM20	Understand EHRM and cloud models and services.	8.80	.812
	legal Dimension	8.5500	.53525

As we see, 85.5% of respondents indicated that the control methods for mitigating EHRM issues of “legal Dimension” are the highest aspects and were important. Aggregating the responses resulted in the following ranking of the importance of the listed aspects of control methods (in order of importance): Legal Dimension respondents’ score 85.5%, organizational dimension respondents’ score 85.0 %, technological dimension respondents’ score 84.2%, and environmental dimension respondents’ score 83.9%.

3.1 EHRM Issue 1: E-HRM practices and organizational performance.

Table 3. Illustrate the Value of Correlation and R Square and Adjusted R Square

Model	R	R Square	Adjusted R Square
17	.747 ^q	.558	.547

q. Predictors: (Constant), CoM16, CoM4, CoM8, CoM15, CoM7, CoM17, CoM14, CoM6, CoM11, CoM20, CoM12, CoM1, CoM5, CoM9, CoM2

r. Dependent Variable: E-HRM practices and organizational performance

Table 4. Illustrate an analysis of variance (ANOVA^a)

Model	Sum of Squares	Df	Mean Square	F	Sig.
17	609.649	15	40.643	55.104	.000 ^r
	483.851	656	.738		
	1093.500	671			

a. Dependent Variable: E-HRM practices and organizational performance

r. Predictors: (Constant), CoM16, CoM4, CoM8, CoM15, CoM7, CoM17, CoM14, CoM6, CoM11, CoM20, CoM12, CoM1, CoM5, CoM9, CoM2

Table 5. Illustrates The Coefficients^a And Distributed T

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
B		Std. Error	Beta			
17		.745	.735		1.014	.311
	CoM16	.351	.047	.291	7.397	.000
	CoM4	-.296	.043	-.260	-6.832	.000
	CoM8	.636	.057	.396	11.082	.000
	CoM15	-.490	.048	-.490	-10.155	.000
	CoM7	.339	.055	.225	6.207	.000
	CoM17	-.499	.058	-.293	-8.559	.000
	CoM14	.576	.057	.372	10.046	.000
	CoM6	.364	.048	.245	7.570	.000
	CoM11	-.256	.038	-.216	-6.639	.000
	CoM20	.252	.050	.160	5.034	.000
	CoM12	-.346	.053	-.232	-6.510	.000
	CoM1	.450	.064	.342	6.980	.000
	CoM5	-.205	.052	-.139	-3.922	.000
	CoM9	.263	.054	.175	4.890	.000
CoM2	-.248	.053	-.187	-4.666	.000	

a. Dependent Variable: E-HRM practices and organizational performance

Table 4.3, 4.4, 4.5 show a significant value of less than an assumed meaning of 0,01, so control methods indicate goodness of fit as CoM16, CoM4, CoM8, CoM15, CoM7, CoM17, CoM14, CoM6, CoM11, CoM20, CoM12, CoM1, CoM5, CoM9, and CoM2 have an impact on the EHRM issue of “E-HRM practices and organizational performance”. Additionally, a multiple correlation value is 0.747, and the value of the square multiple correlation R^2 is 0.558. This is interpreted as a percentage of 55.8 % from the dependent variable of issue “E-HRM practices and organizational performance”. We not reported any control method that has not a relation (no significant). The factors indicates goodness of fit, if the model fits perfectly, models should have the sig. of value less than 0.05 and R^2 is greater than 0.2. However, that model is goodness can be used to predict an issue of “E-HRM practices and organizational performance” (the dependent variable) from independent variables such as control methods: CoM16: “Trusted for EHRM and cloud services”, CoM4: “Implement Automated Tools and Develop Application Portability”, CoM8: “Composite Cloud Services”, CoM15: “Cloud Data Integrity in EHRM System”, CoM7: “Decreased Effort in Management Technology in Cloud Computing”, CoM17: “Cloud Data Privacy”, CoM14: “Availability of Cloud Data”, CoM6: “Developing Authentication for the Cloud Computing”, CoM11: “Reducing Cost for EHRM Services”, CoM20: “Understand EHRM, Cloud Models and Services”, CoM12: “Scalability and Capability in the Cloud Computing”, CoM1: “Biometric Security System for Cloud Computing in Healthcare Organizations”, CoM5: “Creating Cyber Security System and Cryptography Approaches”, CoM9: “Cloud Deployment and Integration System”, and CoM2: “Data Protect in Cloud Computing System” .

3.2 EHRM Issue 2: Human resource strategy and planning.

The results show a significant value of less than an assumed meaning of 0.01, so control methods indicate goodness of fit as CoM14, CoM16, CoM15, CoM9, CoM3, CoM6, CoM17, CoM11, CoM2, CoM18, CoM20, CoM8, CoM4, CoM13, and CoM5 have an impact on the issue of “Human resource strategy and planning”. Additionally, a multiple correlation value is 0.766, and the value of multiple correlation R^2 is 0.586. This is interpreted as a percentage of 58.6 % from the dependent variable of issue “Human resource strategy and planning”. However, that model is goodness can be used to predict an issue of “Human resource strategy and planning” (the dependent variable) from control of methods.

3.3 EHRM Issue 3: E-HRM is suitable for human resource professionals.

The results show a significant value of less than an assumed meaning of 0.01, so control methods indicate goodness of fit as CoM7, CoM20, CoM6, CoM17, CoM14, CoM19, CoM15, CoM2, CoM12, CoM11, CoM13, CoM10, and CoM5 have an impact on the issue of “E-HRM is suitable for human resource professionals”. Additionally, a multiple correlation value is 0.651, and the value of multiple correlation R^2 is 0.424. This is interpreted as a percentage of 42.4 % from the dependent variable of issue “E-HRM is suitable for human resource professionals”. However, that model is goodness can be used to predict an issue of “E-HRM is suitable for human resource

professionals” (the dependent variable) from control of methods.

3.4 EHRM Issue 4: Implementing HR strategies, policies, and practices in organizations.

The results show that the significant value is less than the assumed value at the $\alpha = 0.01$ level of significance, so control methods like CoM6, CoM9, CoM17, CoM19, CoM14, CoM11, CoM4, CoM16, CoM5, CoM13, CoM7, CoM15, CoM10, CoM8, and CoM20 have an impact on the issue of “Implementing HR strategies, policies, and practices in organizations”. Additionally, a multiple correlation value is 0.775, and the value of multiple correlation R^2 is 0.601. This is interpreted as a percentage of 60.1 % from the dependent variable of issue “Implementing HR strategies, policies, and practices in organizations”. However, that model is goodness can be used to predict an issue of “Implementing HR strategies, policies, and practices in organizations” (the dependent variable) from control of methods.

3.5 EHRM Issue 5: User-friendly interface.

The results show a significant value of less than an assumed meaning of 0.01, so control methods indicate goodness of fit as CoM11, CoM7, CoM15, CoM4, CoM12, CoM17, CoM3, CoM8, CoM16, CoM5, CoM2, CoM19, CoM13, and CoM10 have an impact on the issue of “User-friendly interface”. Additionally, a multiple correlation value is 0.803, and the value of multiple correlation R is 0.646. This is interpreted as a percentage of 64.6% from the dependent variable of issue “User-friendly interface”. However, the model is goodness can be used to predict an issue of “User-friendly interface” (the dependent variable) from control of methods.

3.6 EHRM Issue 6: The multi-tenancy in the EHRM based cloud.

The results show a significant value of less than an assumed meaning of 0.01, so control methods indicate goodness of fit as CoM16, CoM7, CoM2, CoM3, CoM4, CoM11, CoM17, CoM14, CoM1, CoM5, CoM12, CoM10, CoM8, CoM9, CoM6, CoM18, CoM20, and CoM13 have an impact on the issue of “The multi-tenancy in the EHRM based cloud”. Additionally, a multiple correlation value is 0.837, and the value of multiple correlation R^2 is 0.701. This is interpreted as a percentage of 70.1 % from the dependent variable of issue “The multi-tenancy in the EHRM based cloud”. However, that model is goodness can be used to predict an issue of “The multi-tenancy in the EHRM based cloud” (the dependent variable) from control of methods.

3.7 EHRM Issue 7: E-HRM is mediated by cloud computing to help the organizations to acquire, develop, and deploy the intellectual capital.

The results show a significant value of less than an assumed meaning of 0.01, so control methods indicate goodness of fit as CoM11, CoM6, CoM4, CoM7, CoM15, CoM9, CoM17, CoM3, CoM12, CoM19, CoM10, CoM8, CoM18, CoM1, CoM2, and CoM13 have an impact on the issue of “E-HRM is mediated for helping the organizations to acquire, develop, and deploy the intellectual capital”. Additionally, a multiple correlation value is 0.790, and the value of multiple correlation R^2 is 0.623. This is interpreted as a percentage of 62.3 % from the dependent variable of issue “E-HRM is mediated for helping the organizations to acquire, develop, and deploy the intellectual capital”. However, that model is goodness can be used to predict an issue of “E-HRM is mediated for helping the organizations to acquire, develop, and deploy the intellectual capital” (the dependent variable) from control of methods.

3.8 EHRM Issue 8: Access to employee self-service training enrolment and self-development.

The results show a significant value of less than an assumed meaning of 0.01, so control methods CoM20, CoM1, CoM12, CoM6, CoM17, CoM3, CoM14, CoM2, CoM9, CoM7, CoM8, CoM5, CoM18, CoM4, and CoM13 have an impact on the issue of “Access to employee self-service training enrollment and self-development”. Additionally, a multiple correlation value is 0.800, and the value of multiple correlation R^2 is 0.640. This is interpreted as a percentage of 64.0 % from the dependent variable of issue “Access to employee self-service training enrollment and self-development”. However, that model is goodness can be used to predict an issue of “Access to employee self-service training enrollment and self-development” (the dependent variable) from control of methods.

3.9 EHRM Issue 9: E-HRM can save costs while maintaining the quality of data.

The results show a significant value of less than an assumed meaning of 0.01, so control methods indicate goodness of fit as CoM6, CoM12, CoM15, CoM7, CoM4, CoM16, CoM18, CoM20, CoM19, CoM14, CoM17, CoM2, CoM10, CoM5, CoM8, CoM1, and CoM11 have an impact on the issue of “E-HRM can save costs while maintaining the quality of data”. Additionally, a multiple correlation value is 0.797, and the value of multiple correlation R^2 is 0.636. This is interpreted as a percentage of 63.6 % from the dependent variable of issue “E-HRM can save costs while maintaining the quality of data”. We not reported any control method that has not a relation (no significant). However, that model is goodness can be used to predict an issue of “E-HRM can save costs while maintaining the quality of data” (the dependent variable) from control of methods.

3.10 EHRM Issue 10: Workflow analysis in the business process management and productivity.

The results show a significant value of less than an assumed meaning of 0.01, the control methods as CoM11,

CoM16, CoM6, CoM18, CoM8, CoM3, CoM15, CoM9, CoM17, CoM19, and CoM2 have an impact on the issue of “Workflow analysis in the business process management and productivity”. Additionally, a multiple correlation value is 0.794, and the value of multiple correlation R^2 is 0.631. This is interpreted as a percentage of 63.1 % from the dependent variable of issue “Workflow analysis in the business process management and productivity”. However, that model is goodness can be used to predict an issue of “Workflow analysis in the business process management and productivity” (the dependent variable) from control of methods.

3.11 EHRM Issue 11: Attitude towards usage and Behavioural intention to use.

The results show a significant value of less than an assumed meaning of 0.01, so control methods indicate goodness of fit as CoM7, CoM8, CoM11, CoM12, CoM17, CoM14, CoM18, CoM1, CoM15, CoM3, and CoM4 have an impact on the issue of “Attitude towards usage and Behavioral intention to use”. Additionally, a multiple correlation value is 0.747, and the value of multiple correlation R^2 is 0.558. This is interpreted as a percentage of 55.8 % from the dependent variable of issue “Attitude towards usage and Behavioral intention to use”. However, that model is goodness can be used to predict an issue of “Attitude towards usage and Behavioral intention to use” (the dependent variable) from independent variables such as control of methods.

3.12 EHRM Issue 12: Awareness in E-management.

The results show a significant value of less than an assumed meaning of 0.01, so control methods indicate goodness of fit as CoM7, CoM11, CoM5, CoM18, CoM8, CoM14, CoM3, CoM4, CoM20, CoM6, CoM16, CoM10, CoM17, CoM9, CoM2, CoM1, and CoM15 have an impact on the issue of “Awareness in E-management”. Additionally, a multiple correlation value is 0.851, and the value of multiple correlation R^2 is 0.724. This is interpreted as a percentage of 72.4 % from the dependent variable of issue “Awareness in E-management”. However, the model is goodness can be used to predict an issue of “Awareness in E-management” (the dependent variable) from control of methods.

3.13 EHRM Issue 13: Collaboration of HRM and IT.

The results show a significant value of less than an assumed meaning of 0.01, so control methods indicate goodness of fit as CoM9, CoM5, CoM14, CoM15, CoM3, CoM7, CoM19, CoM17, CoM1, and CoM18 have an impact on the issue of “Collaboration of HRM and IT”. Additionally, a multiple correlation value is 0.563, and the value of multiple correlation R^2 is 0.316. This is interpreted as a percentage of 31.6 % from the dependent variable of issue “Collaboration of HRM and IT”. However, that model is goodness can be used to predict an issue of “Collaboration of HRM and IT” (the dependent variable) from control of methods.

3.14 EHRM Issue 14: HR activities in the administrative area based on cloud computing & IT.

The results show a significant value of less than an assumed meaning of 0.01, the control methods CoM14, CoM7, CoM3, CoM13, CoM5, CoM15, CoM4, CoM1, CoM18, and CoM6 have an impact on the issue of “HR activities in the administrative area based on IT”. Additionally, a multiple correlation value is 0.703, and the value of R^2 is 0.494. This is interpreted as a percentage of 49.4 % from the dependent variable of issue “HR activities in the administrative area based on IT”. We not reported any control method that has not a relation (no significant). However, the model is goodness can be used to predict an issue of “HR activities in the administrative area based on IT” (the dependent variable) from control of methods.

3.15 EHRM Issue 15: Sharing of reliable information quickly in IT-based HRM.

The results show a significant value of less than an assumed meaning of 0.01, so control methods indicate goodness of fit as CoM4, CoM9, CoM19, CoM12, CoM17, CoM16, and CoM10 have an impact on the issue of “Sharing of reliable information quickly in IT-based HRM”. Additionally, a multiple correlation value is 0.511, and the value of multiple correlation R^2 is 0.262. This is interpreted as a percentage of 26.2 % from the dependent variable of issue “Sharing of reliable information quickly in IT-based HRM”. However, that model is goodness can be used to predict an issue of “Sharing of reliable information quickly in IT-based HRM” (The dependent variable) from control of methods.

3.16 EHRM Issue 16: E-HRM tools & techniques are used during selecting process.

The results show a significant value of less than an assumed meaning of 0.01, so control methods indicate goodness of fit as CoM8, CoM5, CoM10, CoM9, CoM2, CoM7, CoM18, CoM19, CoM3, CoM13, CoM14, and CoM11 have an impact on the issue of “E-HRM tools & techniques are used during selecting process”. Additionally, a multiple correlation value is 0.626, and the value of multiple correlation R^2 is 0.392. This is interpreted as a percentage of 39.2 % from the dependent variable of issue “E-HRM tools & techniques are used during selecting process”. However, that model is goodness can be used to predict an issue of “E-HRM tools & techniques are used during selecting process” (the dependent variable) from control of methods.

3.17 EHRM Issue 17: Standardization and Decentralization of HR tasks.

The results show a significant value of less than an assumed meaning of 0.01, so control methods indicate goodness of fit as CoM16, CoM11, CoM19, CoM10, CoM14, CoM6, CoM2, CoM9, CoM8, CoM3, CoM4,

CoM7, CoM15, CoM1, and CoM12 have an impact on the issue of “Standardization and decentralization of HR tasks”. Additionally, a multiple correlation value is 0.762, and the value of multiple correlation R^2 is 0.580. This is interpreted as a percentage of 58.0 % from the dependent variable of issue “Standardization and decentralization of HR tasks”. However, that model is goodness can be used to predict an issue of “Standardization and decentralization of HR tasks” (the dependent variable) from control of methods.

3.18 EHRM Issue 18: Technological development and electronic instruments are always available.

The results show a significant value of less than an assumed meaning of 0.01, so control methods indicate goodness of fit as CoM11, CoM7, CoM18, CoM3, CoM14, CoM5, CoM10, CoM15, CoM1, CoM2, CoM13, CoM4, and CoM9 have an impact on the issue of “Technological development and electronic instruments are always available”. Additionally, a multiple correlation value is 0.765, and the value of multiple correlation R^2 is 0.586. This is interpreted as a percentage of 58.6 % from the dependent variable of issue “Technological development and electronic instruments are always available”. However, that model is goodness can be used to predict an issue of “Technological development and electronic instruments are always available” (the dependent variable) from control of methods.

3.19 EHRM Issue 19: Integral support for the management of human resources.

The results show a significant value of less than an assumed meaning of 0.01, so control methods indicate goodness of fit as CoM9, CoM16, CoM2, CoM1, CoM3, CoM17, CoM5, CoM15, CoM18, CoM12, CoM11, CoM6, CoM10, CoM13, CoM4, CoM8, CoM19, and CoM20 have an impact on the issue of “Integral support for the management of human resources”. Additionally, a multiple correlation value is 0.818, and the value of multiple correlation R^2 is 0.669. This is interpreted as a percentage of 66.9 % from the dependent variable of issue “Integral support for the management of human resources”. However, that model is goodness can be used to predict an issue of “Integral support for the management of human resources” (the dependent variable) from control of methods.

3.20 EHRM Issue 20: The transfer to E-HRM can reduce costs.

The results show a significant value of less than an assumed meaning of 0.01, so control methods indicate goodness of fit as CoM9, CoM7, CoM19, CoM6, CoM1, CoM3, CoM14, CoM8, CoM18, CoM10, CoM13, and CoM16 have an impact on the issue of “The transfer to E-HRM can reduce costs”. Additionally, a multiple correlation value is 0.649, and the value of multiple correlation R^2 is 0.424. This is interpreted as a percentage of 42.4 % from the dependent variable of issue “The transfer to E-HRM can reduce costs”. We not reported any control method that has not a relation (no significant). However, that model is goodness can be used to predict an issue of “The transfer to E-HRM can reduce costs” (the dependent variable) from control of methods.

3.21 EHRM Issue 21: Transparent online recruitment & selection process has been adopted healthcare centre.

The results show a significant value of less than an assumed meaning of 0.01, so control methods indicate goodness of fit as CoM12, CoM15, CoM18, CoM5, CoM8, CoM13, CoM11, CoM3, CoM7, CoM4, CoM9, and CoM2 have an impact on the issue of “Transparent online recruitment & selection process has been adopted healthcare center”. Additionally, a multiple correlation value is 0.811, and the value of multiple correlation R^2 is 0.657. This is interpreted as a percentage of 65.7 % from the dependent variable of issue “Transparent online recruitment & selection process has been adopted healthcare center”. However, that model is goodness can be used to predict an issue of “Transparent online recruitment & selection process has been adopted healthcare center” (the dependent variable) from independent variables such as control of methods.

3.22 EHRM Issue 22: Efficiency and effectiveness.

The results show a significant value of less than an assumed meaning of 0,01, the controls methods CoM9, CoM7, CoM19, CoM6, CoM1, CoM3, CoM14, CoM8, CoM18, CoM10, CoM13, and CoM16 have an impact on the issue of “The transfer to E-HRM can reduce costs”. Additionally, a multiple correlation value is 0.649, and the value of multiple correlation R^2 is 0.424. This is interpreted as a percentage of 42.4 % from the dependent variable of issue “The transfer to E-HRM can reduce costs”. However, that model is goodness can be used to predict an issue of “The transfer to E-HRM can reduce costs” (the dependent variable) from control of methods

3.23 EHRM Issue 23: Regulatory Requirements.

The results show a significant value of less than an assumed meaning of 0,01, so control methods indicate goodness of fit as CoM10, CoM3, CoM2, CoM6, CoM15, CoM1, CoM12, CoM18, CoM14, CoM7, CoM5, CoM13, and CoM17 have an impact on the issue of “Regulatory Requirements”. Additionally, a multiple correlation value is 0.795, and the value of multiple correlation R^2 is 0.633. This is interpreted as a percentage of 63.3 % from the dependent variable of issue “Regulatory Requirements”. However, that model is goodness can be used to predict an issue of “Regulatory Requirements” (the dependent variable) from control of methods.

3.24 EHRM Issue 24: Portability and Interoperability.

The results show a significant value of less than an assumed meaning of 0,01, the control methods CoM9, CoM3, CoM1, CoM15, CoM13, CoM11, CoM14, CoM10, and CoM16 have an impact on the issue of “Portability and Interoperability”. Additionally, a multiple correlation value is 0.597, and the value of multiple correlation R^2 is 0.357. This is interpreted as a percentage of 35.7 % from the dependent variable of issue “Portability and Interoperability”. However, that model is goodness can be used to predict an issue of “Portability and Interoperability” (the dependent variable) from control of methods.

3.25 EHRM Issue 25: Communication between the management and the HR department.

The results show a significant value of less than an assumed meaning of 0,01, so control methods indicate goodness of fit as CoM10, CoM5, CoM8, CoM1, CoM3, CoM13, CoM6, CoM14, CoM18, CoM7, CoM11, and CoM19 have an impact on the issue of “Communication between the management and the HR department”. Additionally, a multiple correlation value is 0.709, and the value of multiple correlation R^2 is 0.503. This is interpreted as a percentage of 50.3 % from the dependent variable of issue “E-HRM practices and organizational performance”. However, that model is goodness can be used to predict an issue of “Communication between the management and the HR department” (the dependent variable) from control of methods.

3.26 E-HRM Issues based cloud computing system checklists and Control Methods

Table 6. Illustrate the formulas for E-HRM Issues based cloud computing system and control methods

No	E-HRM Issues based cloud computing system	Control Methods for Mitigating EHRM Issues by using stepwise regression
Electronic Human Resource Management Activities(EHRMA)	E-HRM practices and organizational performance.	CoM16, CoM4, CoM8, CoM15, CoM7, CoM17, CoM14, CoM6, CoM11, CoM20, CoM12, CoM1, CoM5, CoM9, CoM2
	Human resource strategy and planning.	CoM14, CoM16, CoM15, CoM9, CoM3, CoM6, CoM17, CoM11, CoM2, CoM18, CoM20, CoM8, CoM4, CoM13, CoM5
	E-HRM is suitable for human resource professionals.	CoM7, CoM20, CoM6, CoM17, CoM14, CoM19, CoM15, CoM2, CoM12, CoM11, CoM13, CoM10, CoM5
	Implementing HR strategies, policies, and practices in organizations.	CoM6, CoM9, CoM17, CoM19, CoM14, CoM11, CoM4, CoM16, CoM5, CoM13, CoM7, CoM15, CoM10, CoM8, CoM20
	User-friendly interface.	CoM11, CoM7, CoM15, CoM4, CoM12, CoM17, CoM3, CoM8, CoM16, CoM5, CoM2, CoM19, CoM13, CoM10
	The multi-tenancy in the EHRM based cloud.	CoM16, CoM7, CoM2, CoM3, CoM4, CoM11, CoM17, CoM14, CoM1, CoM5, CoM12, CoM10, CoM8, CoM9, CoM6, CoM18, CoM20, CoM13
The Level Awareness of E-HRM and Cloud Computing (LAEHRMCC)	E-HRM is mediated for helping the organizations to acquire, develop, and deploy the intellectual capital.	CoM11, CoM6, CoM4, CoM7, CoM15, CoM9, CoM17, CoM3, CoM12, CoM19, CoM10, CoM8, CoM18, CoM1, CoM2, CoM13
	Access to employee self-service training enrollment and self-development.	CoM20, CoM1, CoM12, CoM6, CoM17, CoM3, CoM14, CoM2, CoM9, CoM7, CoM8, CoM5, CoM18, CoM4, CoM13
	E-HRM can save costs while maintaining the quality of data.	CoM6, CoM12, CoM15, CoM7, CoM4, CoM16, CoM18, CoM20, CoM19, CoM14, CoM17, CoM2, CoM10, CoM5, CoM8, CoM1, CoM11
	Workflow analysis in the business process management and productivity.	CoM11, CoM16, CoM6, CoM18, CoM8, CoM3, CoM15, CoM9, CoM17, CoM19, CoM2
	Attitude towards usage and Behavioral intention to use.	CoM7, CoM8, CoM11, CoM12, CoM17, CoM14, CoM18, CoM1, CoM15, CoM3, CoM4
	Awareness in E-management.	CoM7, CoM11, CoM5, CoM18, CoM8, CoM14, CoM3, CoM4, CoM20, CoM6, CoM16, CoM10, CoM17, CoM9, CoM2, CoM1, CoM15

	No	E-HRM Issues based cloud computing system	Control Methods for Mitigating EHRM Issues by using stepwise regression
IT and Cloud Computing Infrastructure (ITCCI)		Collaboration of HRM and IT.	CoM9, CoM5, CoM14, CoM15, CoM3, CoM7, CoM19, CoM17, CoM1, CoM18
		HR activities in the administrative area based on IT.	CoM14, CoM7, CoM3, CoM13, CoM5, CoM15, CoM4, CoM1, CoM18, CoM6
		Sharing of reliable information quickly in IT-based HRM.	CoM4, CoM9, CoM19, CoM12, CoM17, CoM16, CoM10
		E-HRM tools & techniques are used during selecting process.	CoM8, CoM5, CoM10, CoM9, CoM2, CoM7, CoM18, CoM19, CoM3, CoM13, CoM14, CoM11
		Standardization and decentralization of HR tasks.	CoM16, CoM11, CoM19, CoM10, CoM14, CoM6, CoM2, CoM9, CoM8, CoM3, CoM4, CoM7, CoM15, CoM1, CoM12
		Technological development and electronic instruments are always available.	CoM11, CoM7, CoM18, CoM3, CoM14, CoM5, CoM10, CoM15, CoM1, CoM2, CoM13, CoM4, CoM9
Management Support System and Quality for HRM (MSSQAHRM)		Integral support for the management of human resources.	CoM9, CoM16, CoM2, CoM1, CoM3, CoM17, CoM5, CoM15, CoM18, CoM12, CoM11, CoM6, CoM10, CoM13, CoM4, CoM8, CoM19, CoM20
		The transfer to E-HRM can reduce costs.	CoM9, CoM7, CoM19, CoM6, CoM1, CoM3, CoM14, CoM8, CoM18, CoM10, CoM13, CoM16
		Transparent online recruitment & selection process has been adopted healthcare center.	CoM12, CoM15, CoM18, CoM5, CoM8, CoM13, CoM11, CoM3, CoM7, CoM4, CoM9, CoM2
		Efficiency and effectiveness.	CoM8, CoM16, CoM7, CoM19, CoM20, CoM10, CoM14, CoM13, CoM12, CoM2, CoM1, CoM18, CoM3, CoM6
		Regulatory Requirements.	CoM10, CoM3, CoM2, CoM6, CoM15, CoM1, CoM12, CoM18, CoM14, CoM7, CoM5, CoM13, CoM17
		Portability and Interoperability.	CoM9, CoM3, CoM1, CoM15, CoM13, CoM11, CoM14, CoM10, CoM16
		Communication between the management and the HR department.	CoM10, CoM5, CoM8, CoM1, CoM3, CoM13, CoM6, CoM14, CoM18, CoM7, CoM11, CoM19

Table 6 shows E-HRM Issues based cloud computing system identification checklist with control methods based on experienced IT and HR managers by using quantitative techniques (stepwise multiple regression) . The control methods can be used to mitigate and reduce E-HRM Issues based cloud computing. We must specify a model before we start the analysis. The models specification is usually guided by a combination of theory and empirical results from previous studies. In stepwise regression analysis, the squared multiple correlations are between (0.724-0.262) in fact the communalities of the variables. However, the models estimates the multiple correlation between EHRM issues and control methods (0.851- 0.511), which are high. The factors indicates goodness of fit, if the model fits perfectly, models should have the sig. of value less than 0.05 or 0.01 and R² is greater than 0.2. All independent variables had significant and positive coefficients which means that higher level of electronic Human Resource Management activities, the level awareness of EHRM and cloud computing system, IT and cloud computing infrastructure, and management support system and quality for HRM. Further, control methods such as technological, organizational, legal, and environmental dimension are used mosttime to reduce eHRM issues.

3.27 Conclusions

We will identify controls and mitigating methods to reduce critical EHRM issues in healthcare organizations. The results displayed the means and standard deviations of the 25 constructs' items related to this study. Indeed, the results show that stepwise regression models had the highest square multiple correlation R². The best models among all applied models are presented in above results. Furthermore, we identified the EHRM issues based cloud computing system by using the stepwise regression analysis. Therefore, Table 1 shows E-HRM Issues based cloud computing system identification checklist with control methods based on experienced IT and HR managers by using quantitative techniques (stepwise regression). The control methods can be used to mitigate and reduce E-HRM Issues based cloud computing. In the other hand, the squared multiple correlations are between (0.724-0.262). However, the models estimates the multiple correlation between EHRM issues and control methods (0.851- 0.511), which is high. The factors indicates goodness of fit, if the model fits perfectly, models should have the sig. of value less than 0.05 or 0.01 and R² is greater than 0.2. All independent variables had significant and positive coefficients which means that higher level of electronic Human Resource Management activities, the level awareness of EHRM and cloud computing system, IT and cloud computing infrastructure, and management support system and quality for HRM.

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