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Mediating Effect of Organizational Readiness for Adoption and Moderating Effect of HR Staff Expertise and Top Management Commitment on HRIS -Research on Energy Sector

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ABSTRACT

In the 21st century, global progress is increasingly intertwined with technological advancements. Organizations aspiring to achieve success or already achieving it recognize the importance of embracing the latest innovations. The primary aim of this study is to assess and scrutinize the connection between "Innovation Diffusion and HRIS" while considering the mediating impact of "Organization's Readiness for Adoption" and moderating effects of Top Management Commitment and HR Staff Expertise within K-Electric. This research is rooted in the "Diffusion of Innovation" theory formulated by Everett M. Rogers in 1962. To accomplish this, several hypotheses have been formulated to empirically test the constructs related to "Diffusion of Innovation and HRIS." Primary data was collected through a survey questionnaire utilizing a 5- point Likert scale, reaching a sample size of 371. Additionally, peer-reviewed journals served as a secondary data source. The statistical analysis of the collected data was conducted using "Smart PLS." The results show the positive effect of Innovation diffusion on HRIS with the presence of mediating variable. Whereas with moderating variables there is a negative impact on HRIS. Based on these findings, it is recommended that regulatory bodies ensure the successful implementation and integration of HRIS within organizations. Furthermore, it is advised to provide comprehensive training sessions to end-users of the innovation, supported by ongoing encouragement from higher management.

Introduction

The evolution in the 21st century is patently due to the endless development and growth in science and technology. The pace of transformations and modifications has greatly and vastly impacted the means of life, the social and economic state of the world, and the customs by which things are done

in organizations. Berman and Colleagues (2015) stated that, headships in corporations must be attentive and aware of the evolving expansions, possible shifts of standards, and modifications in the perspectives of HRM (Ahmed & Ogalo, 2019). A number of studies in the area of HRM have laid emphasis on creativeness and invention. Researchers and specialists propose that HRIS,new surf of technology in HRM can escalate or generate significance and worth of HRM in gaining competitive edge (El-Ghalayini , 2016).

E-business is evolving and as a result HR and HR experts are confronted with the question of carrying out in means that are in link or track with the corporation. Functions of HR can turn out to be serious participants in the way leading on the way to success, but for that there is a need and requirement for HR to modify its emphasis, tasks, roles and responsibilities (Ruël, Bondarouk, & Looise, 2004). The HRIS technology is the remarkable development for the HRM system (Al-Dmour , Obeidat, Masa'deh , & Almajali, 2015). It is proficient of assisting and inventing HR tasks to successfully address the HR essentials of the administrations over and done with internet based channels, and likely to offer planned and well-organized methods of undertaking things for HR authorities and experts (Patel, 2015). In K-Electric, SAP has been implemented few years ago for the billing purpose to ensure zero human error. "SAP IS-U" is the software which has been used in K-Electric to make sure that no human mistake or involvement should be present in utility bills of their customers as they are a power generation organization (K-Electric, 2017). After the successful implementation of SAP software in the company, K-Electric is focusing on improving customer service more, launching mobile applications and portals for their consumers 0(K-Electric, 2019).

Literature Review

Relative Advantage

Relative advantage, a key characteristic of innovation, measures the extent to which a new solution surpasses existing alternatives in terms of appeal, effectiveness, and overall benefit. This concept, underscored by studies such as that of Hsbollah & Idris (2016), is pivotal in shaping the adoption rate of innovations. Specifically in the realm of HRIS (Human Resource Information Systems) applications, relative advantage elucidates the perceived advantages over other systems. Notably, Al-Dmour et al. (2015) highlight how HRIS applications are anticipated to offer substantial benefits and effectiveness compared to traditional HR systems, thus influencing adoption decisions positively. Common benefits emphasized in previous research include enhanced accuracy, improved data accessibility, and significant cost savings, all of which are indispensable for the smooth functioning of HR departments, encompassing tasks such as planning, forecasting, and monitoring (Al-Dmour, Love, & Al-Zu'bi, 2013).

Moreover, indicators such as financial profitability, time savings, and cost effectiveness serve as tangible metrics to gauge the level of relative advantage offered by HRIS adoption. By embracing HRIS technology, organizations can streamline administrative tasks, simplify workflows, and provide decision-makers with enhanced information, ultimately boosting the efficiency of HR departments (Huy, Rowe, Truex, & Q. Huynh, 2012). Additionally, HRIS adoption facilitates quicker and more cost-effective recruitment processes, a commonly cited benefit in literature. Importantly, the time saved from data handling can be redirected towards strategic decision-making and policy formulation, as noted by researchers (Boston University School of Public Health, 2019). As awareness of the benefits of HRIS applications grows among Pakistani administrations, it is likely to foster a positive environment for increased adoption rates, potentially

revolutionizing HR management practices in the country.

Compatibility

Compatibility, as a characteristic of innovation, refers to the extent to which a new system or technology aligns with the needs, culture, and values of an organization and its individuals. While sometimes conflated with relative advantage, it differs in nature, focusing on the perception of fit rather than purely economic benefits. Factors influencing compatibility include societal and cultural beliefs, organizational requirements, familiarity with the innovation, and alignment with business strategies. Past research underscores the pivotal role of compatibility in distinguishing adopters from non-adopters of innovations, emphasizing its significance in adoption decisions (Ruël, Bondarouk, & Looise, 2004).

According to Everett M. Rogers, compatibility comprises two dimensions: alignment with individual beliefs and alignment with practical application. When individuals perceive an innovation as compatible, resistance diminishes, and commitment increases, positively influencing adoption decisions (Jabeur, Mohiuddin, & Karuranga, 2013). In the context of HRIS adoption, compatibility is crucial for implementing significant organizational modifications effectively. Businesses must prioritize compatibility to ensure smooth transitions and mitigate negative impacts on both organizational culture and individual lives (O. Martins & Oliveira, 2008). Organizations fostering a culture of change acceptance and supporting employee learning are more likely to successfully adopt HRIS, as compatibility plays a pivotal role in adoption outcomes.

Complexity

It is defined as to which extent innovation is challenging and tough to comprehend and practice. Those innovations are speedily adopted which are not difficult to practice and understand as compared to the challenging one. Everett M. Rogers has entailed the complexity factor in a negative relation with the adoption process of an innovation because a complexity factor creates hurdles and obstacles in the adoption process of an innovation or technology (Musa (PhD), Ezra (PhD), & Monsurat, 2015).

Many researchers have claimed it as an opposite of ease of usage because previously complexity has been discussed as how much a particular innovation is easy and stress-free to use and how much it is free of physical, mental and psychological effort because innovations with complex nature and features are expected to be adopted less. When an innovation is user friendly in genre, it then becomes very easy to adopt and accept it (Al-Dmour, Love, & Al-Zu'bi, 2013).

It is always hard to adopt the innovation which is relatively difficult, challenging and complex in nature to understand, use and practice since it takes too much of time, cost, more efforts and skills along with technical expertise and professionalism to get acquainted and familiar to the innovation. Presence of complexity factor in any innovation or technology leads towards ambiguity in the effective and efficacious implementation and perhaps risk of adoption of an innovation arises. When an innovation or technology is perceived as a complex, then resistance and hostility is automatically created between innovation and its potential adopter due to lack of expertise, abilities and acquaintance (SH Teo & Pian, 2003).

Organizational Readiness for Adoption

Organizational readiness talks about the level of monetary and high-tech capitals present in an

organization, which take in setup, applicable structures, and practical expertise. Though, the particular description of organizational readiness varies between the writings, altogether settled that it has a resilient and strong impact on the adoption of technologies of an organization (Al-Dmour , Obeidat, Masa'deh , & Almajali , 2015).

Willingness of an organization to adopt change is mainly affected by the resource competences of the organization. These competencies are comprised of: availability of financials in the organization, support of management to adopt the new change, readiness of human capital and the competitive position along with the attitude of the organization towards the adoption of change (Yousef Obeidat, 2013).

Financials in the organization in the adoption of any change, refers to the presence of financial and monetary competencies of the particular organizations, which is comprised of cost and budget of the new particular innovation, required improvements and developments down the road, and the cost of using it on a continue basis. Financial factor is one of the most fundamental and essential factor for adopting any changes in the organization because it indicates whether any change in organization should be adopted or not, or in case of acceptance of adoption, it helps to get to know the scale at which the change must be adopted(Beagles, Provan, & Leischow, 2011).

Change can only be successful when it is supported by the top and upper management of the organization, whether the change is at departmental level or at organizational level. It is one of the most important and essential factor while adopting a change because support of upper management gives confidence, commitment and motivation to the workforce. A survey has been carried out in past, and one of the respondent of the survey said that, "A change option cannot be optional for senior staff. They must lead or get out of the way. The new system will ultimately have to stand on its own feet, but every new system needs support and nurture" (M. HEATHFIELD, 2019).

Readiness of human capital for change adoption depicts the concept proposed in change model by "Kurt Lewin" in 1950s who is a German-American psychologist. This factor is very critical for the successful adoption of change within an organization. Understanding the current behavior of individuals, making strategies of change accordingly and then unfreezing the current culture to make the individuals motivated for the adoption, sometimes become very challenging but when it is handled tactically and technically, it then results in an efficient and effective change within an organization (A. Ruona & Choi, 2011).

Along with these factors, one of the most important factors is competitive standing and place of the organization. It has become necessary for the organizations, to be highly competitive in market to lead the market and earn high profits by retaining existing customers and approaching new ones. Effective and efficient change can help the organizations to become highly competitive in market. This supposition is used to conclude whether the organization has essential characteristics and features obligatory to adopt Human Resource Information System (HRIS) (Al-Dmour, Love, & Al-Zu'bi, 2013).

HR Staff Expertise

(Nasim Qaisar, 2018)The conventional use of computer technology was initially focused on information processing but evolved into information systems. Effective management of information and human resources is crucial for organizational benefits, yet many organizations have not fully utilized Information Technology (IT) in their HR departments. The HR Information System (HRIS) emerged in the 1960s, automating employee record-keeping, but HR was not

initially recognized as strategically important. Slow HRIS adoption is attributed to user adaptability issues and a lack of staff with necessary skills. Some organizations use limited computerized HR systems due to insufficient HR staff skills. The strategic advantages of HRIS require active involvement and expertise of HR professionals. HR personnel are responsible for optimizing HRIS use for organizational performance. Examining the moderating role of HR staff expertise in the relationship between HRIS adoption and organizational performance is crucial in management research.

The study aimed to investigate the adoption of HR Information System (HRIS) and its impact on organizational performance, with a focus on the moderating effect of HR staff expertise. Conducted in the natural environment of private sector organizations in the capital city of Pakistan, the study utilized a mono-method approach involving survey techniques to collect data from organizations employing any form of HR computerization. Out of 140 questionnaires distributed, 63 usable surveys were received, reflecting a 45% response rate. The findings highlighted that, in Pakistan, only 60 companies were using HRIS applications, indicating a prevalent use of manual or makeshift systems for employee record management in many organizations. The non-probability sampling method involved approaching managers in HR departments through professional connections.

The study revealed a positive relationship between the extent of HR Information System (HRIS) adoption and organizational performance, particularly in subjective performance measures. It also examined the role of HR staff expertise in this relationship, confirming hypothesized effects. Notably, HR staff expertise directly influenced organizational performance, but no significant moderating effect was found. The study underscores the valuable contribution of information systems implementation in the literature, emphasizing the benefits for organizations that adopt a holistic HRIS approach.

Top Management Commitment

(Ann Gaceri Kaaria, 2018) Globalization has led to a shift in management cultures, with globalized competition becoming the norm in many industries. To compete effectively on a global scale, firms need to coordinate their activities globally, necessitating a global information management strategy. The strategic and operational importance of information technology in business is undeniable, and companies worldwide are investing significantly in global e-business, e-commerce, and other IT initiatives to transform into global business leaders. As a result, there is a real need for business managers and professionals to understand how to manage this vital organizational function.

The study used a census method, employing both qualitative and quantitative data collection approaches. The target population included 165 chief executive officers, directors of human resources, and deputy directors of human resources from pure and strategic commercial state corporations in Kenya. In total, 55 interviews were conducted, involving 48 respondents. The study revealed that top management plays a moderating role in the relationship between the human resource information system and the organizational performance of commercial state cooperation.

Human Resource Information System (Hris)

World has been progressing very rapidly day by day. Many advancements, development and innovations have become an essential and vital part of our daily lives. Technology is one of the most notable and worth mentioning progression that has taken place in past few decades all around

the globe especially for the organizations who are striving to lead the market (AlDmour , Obeidat, Masa'deh , & Almajali , 2015).

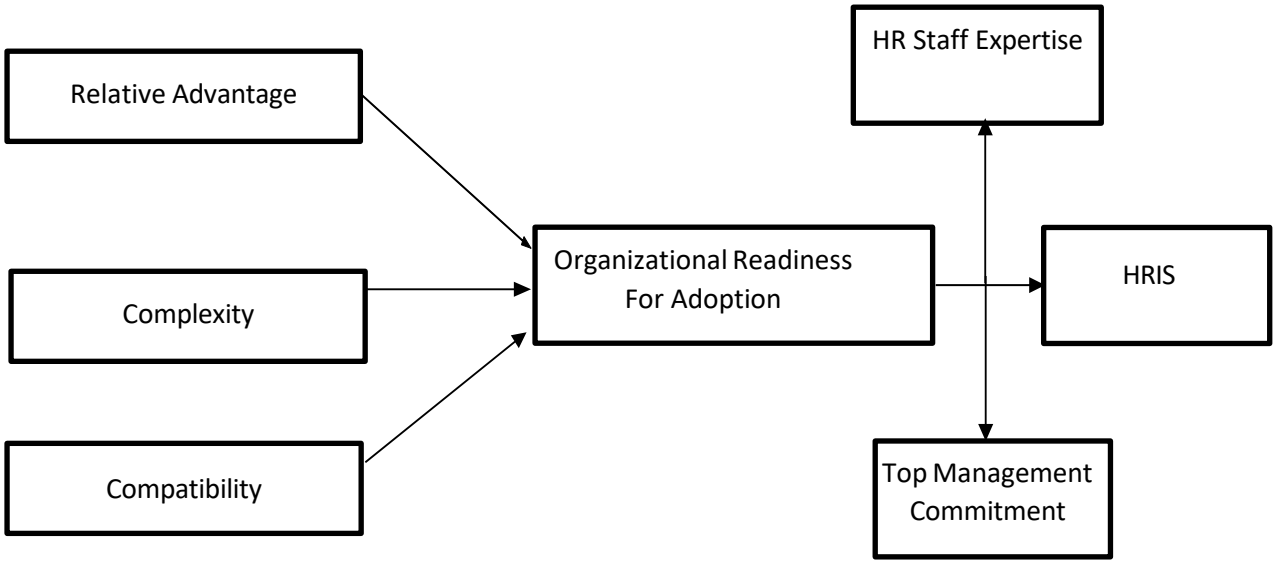
It has been stated by (Md. Kassim, Ramayah, & Kurnia, 2012) that, "the most salient factor impacting organizations and employees today is technological change. This can be seen in areas such as computer-supported-work-at-home, overall changes in labor force skills, and changes in organizational structure, and organization of work".

In today's world, when competition has increased along with advancements of technologies, organizations greatly rely and depend upon its human resource (HR). This has made the organizations to invest in their human resource (HR) due to its increased significance all around the globe, which has moved the curve of human resource on the way to technological HR, like HRIS (Human Resource Information System) (Batool, Sajid, & Raza, 2012).

A connection of HR & Information Technology (IT) through software is called the HRIS. It may possibly be observed as a technique or approach for organizations, through software, to cope and control its activities such as HR, administration, the payroll (Batool, Sajid, & Raza, 2012). The HR responsibility inside an organization is reflected and considered extremely critical. The Human Resource Information System can be consumed inside the department to aid HR personnel and executives advance their efficiency and the outcome of their work (Al-Shawabkeh , 2015). It is a system which is considered as a part of Management Information System (MIS) of an organization. It has been invented to help the HRD to perform well than before. This is the reason that an organization depends and relies on its HRIS to improve and increase its efficiency and effectiveness (Jabeur, Mohiuddin, & Karuranga, 2013).

Due to the increased significance and importance of HRIS, many of the researcher and authors have discussed and mentioned it in their works in past few decades. HRIS has been discussed and researched widely in different contexts, but very rarely in the context of adoption of HRIS in organizations especially in developing countries (Dileep Kumar & Pandya, 2012). This paper is examining and investigating the adoption of HRIS within the organization, as well as, analyzing the relationship, association and link with "Diffusion of Innovation" and HRIS in the similar organization.

Conceptual Framework



Details of Framework

Independent Variables

- Relative Advantage
- Compatibility
- Complexity

Mediating Variable

- Organizational readiness for adoption

Moderating Variables

- HR Staff Expertise
- Top management commitment

Dependent Variable

- HRIS (Human Resource Information System)

Hypothesis

H1: There is any relationship between relative advantage and HRIS with the mediation effect of organizational readiness for adoption.

H2: There is any relationship between compatibility and HRIS with the mediation effect of organizational readiness for adoption.

H3: There is any relationship between complexity and HRIS with the mediation effect of organizational readiness for adoption.

H4: There is any relationship between relative advantage and HRIS with the moderation effects of HR staff expertise and top management commitment.

H5: There is any relationship between compatibility and HRIS with the moderation effects of HR staff expertise and top management commitment.

H6: There is any relationship between complexity and HRIS with the moderation effects of HR staff expertise and top management commitment.

Research Method

Primary Source of Data: Data collected firsthand by the researcher, such as through surveys or experiments, ensuring reliability and trustworthiness.

Research Population: The study focuses on K-electric, with a total population size of 10,398 as of June'18.

Sampling Technique: Non-probability convenience sampling is utilized, selecting

respondents based on accessibility and willingness to participate.

Research Sample: Raosoft software is employed to calculate the sample size accurately for the study.

Research Philosophy: Positivism is adopted, emphasizing hypothesis development and data collection for quantifiable research findings.

Research Approach: Deductive research approach is chosen to test hypotheses, assessing their validity and rationality.

Research Design: The study employs a quantitative research design, involving the systematic analysis of measurable data using statistical methods.

Survey Instrument: A survey questionnaire is utilized, comprising demographic questions and inquiries related to "Diffusion of Innovation" and HRIS, sourced from published studies.

Data Analysis

For hypothesis testing, multiple regression analysis is conducted due to the presence of mediating and moderating variables.

To assess the relationship between variables, correlation analysis is employed.

Reliability Analysis: Cronbach's Alpha is calculated to assess the consistency and reliability of variables, with a value of 0.7 and above indicating reliability.

Measurement model

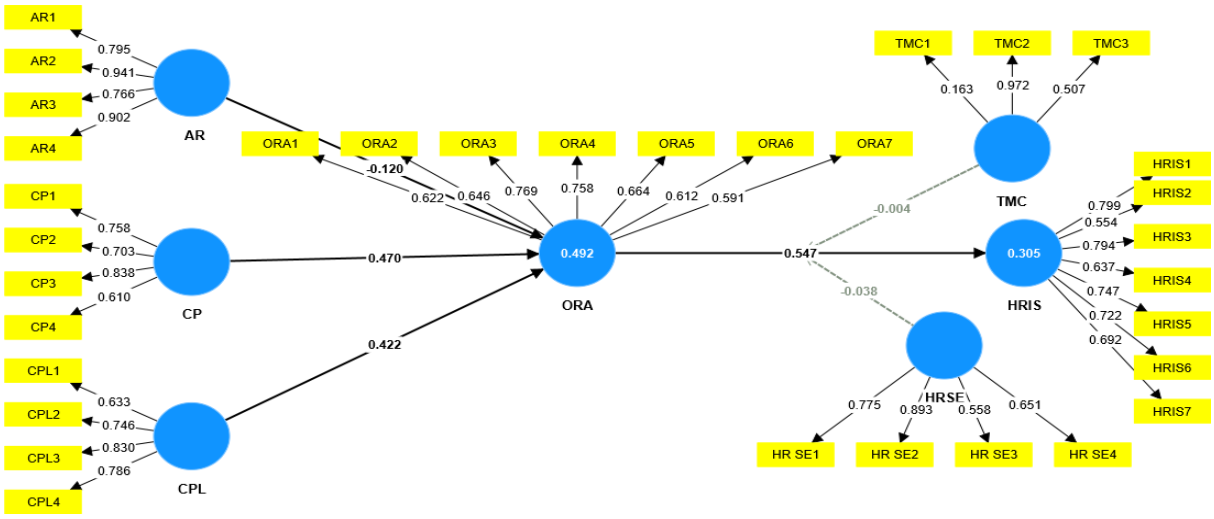


Figure 1

In this study, data analysis was conducted through the partial least square-structure equation model (PLS-SEM) technique. PLS-SEM has gathered considerable attention from scholars in the fields of management and social sciences (Kashif et al., 2018; Umrani et al., 2020). Scholars have emphasized the utility of PLS-SEM in handling complex models (Becker et al., 2012) and managing diverse constructs, including reflective models (Henseler et al., 2018). Furthermore, as

highlighted by Chin et al. (2003), PLS-SEM is robust in measuring unobservable variables and does not require data normality. Consequently, hierarchical latent models have gained popularity in recent years (Johnson et al., 2012). Additionally, PLS-SEM is deemed promising for testing mediation-based models (Hair et al., 2019).

Following the recommendations of Anderson and Gerbing (1988), our study adopted a two-stage procedure for data analysis: the measurement model and the structural model. The measurement model evaluated the psychometric properties of the conceptual framework, while the structural model confirmed the significance of the hypothesized associations. The outcomes of the measurement model, explain individual item loadings, CR, AVE, and R-square. In accordance with Hair et al. (2014), individual loadings were expected to be 0.5 or above.

Consistent with Nunnally and Bernstein (1994), a CR score of 0.70 was considered sufficient. Results in Figure 1 and Table 1 show that CR values ranged from 0.704 to 0.905. According to Hair et al. (2014), the AVE should be 0.7 or above. Table 1 and Figure 1 indicate that AVE values ranged from 0.506 to 0.730. Thus, this study affirmed the internal consistency, validity, and reliability of the measures and the conceptual model. Discriminant validity of the measures was also examined to ensure their distinctiveness within the framework (Duarte and Raposo, 2010). Following the recommendations of Fornell and Larcker (1981) and Chin (1998), we compared each latent construct against the reflective loadings of other constructs. Results in Table 2 demonstrate that all latent variables are "unique and distinct" as the square root of AVE is greater than the correlating scores.

Table 1: Measurement Model

Constructs	Item	Loading	Cr	Ave	R-Square
Relative advantage					
	AR1	0.795	0.915	0.73	
	AR2	0.941			
	AR3	0.766			
	AR4	0.902			
Compatibility					
	CP1	0.758	0.82	0.536	
	CP2	0.703			
	CP3	0.838			
	CP4	0.61			
Complexity					
	CPL1	0.633	0.838	0.566	
	CPL2	0.746			
	CPL3	0.83			
	CPL4	0.786			
HR Staff Expertise					
	HR SE1	0.775	0.876	0.506	
	HR SE2	0.893			
	HR SE3	0.558			
	HR SE4	0.651			
Human Resource Information System					
	HRIS1	0.799	0.816	0.533	0.305
	HRIS2	0.554			

	HRIS3	0.794			
	HRIS4	0.637			
	HRIS5	0.747			
	HRIS6	0.722			
	HRIS7	0.692			
	ORA1	0.622	0.849	0.548	0.492
	ORA2	0.646			
	ORA3	0.769			
	ORA4	0.758			
	ORA5	0.664			
	ORA6	0.612			
	ORA7	0.591			
Top Management Commitment					
	TMC1	0.163	0.704	0.610	
	TMC2	0.972			
	TMC3	0.507			

Table 2: Discriminant Validity

Heterotrait-monotrait ratio (HTMT) – Matrix

	AR	CP	CPL	HRIS	HRSE	ORA	TMC	HRSE x ORA	TMC x ORA
AR									
CP	0.372839								
CPL	0.417823	0.473207							
HRIS	0.301196	0.405016	0.608339						
HRSE	0.079939	0.131598	0.128723	0.09448					
ORA	0.21797	0.740225	0.687225	0.62883	0.126556				
TMC	0.071565	0.098798	0.070666	0.13401	0.06936	0.11286			
HRSE x ORA	0.057806	0.045215	0.160234	0.04848	0.095684	0.08906	0.045337		
TMC x ORA	0.139591	0.097752	0.057183	0.05407	0.069801	0.04835	0.206682	0.0851047	

Structural Model

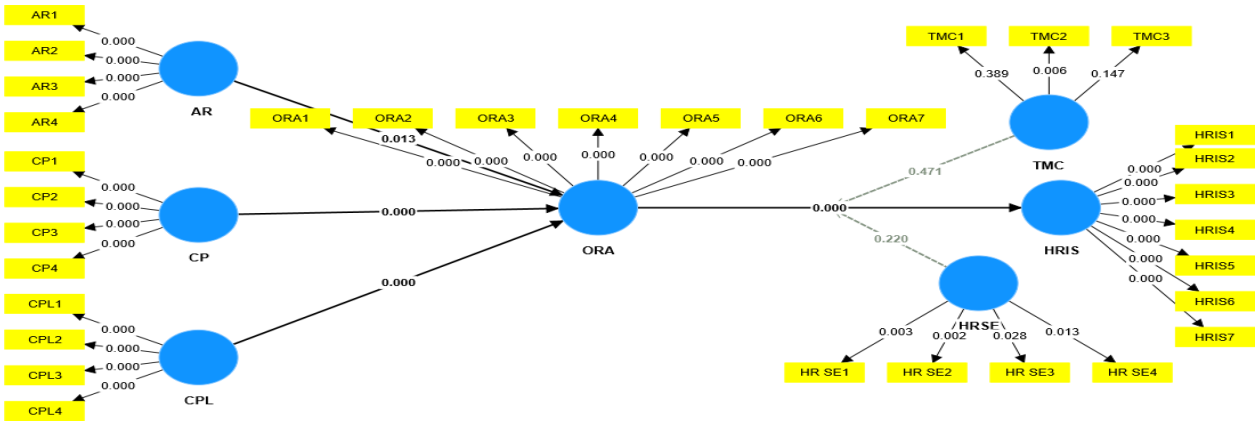


Figure 2

Table 3:

ReIationship	B	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Decision
AR -> ORA	-0.120	0.053	2.227	0.013	Accepted
CP -> ORA	0.469	0.052	9.016	0.000	Accepted
CPL -> ORA	0.422	0.049	8.548	0.000	Accepted
HRSE -> HRIS	0.031	0.070	0.445	0.328	Rejected
ORA -> HRIS	0.546	0.037	14.418	0.000	Accepted
TMC -> HRIS	-0.038	0.061	0.632	0.263	Rejected
HRSE x ORA -> HRIS	-0.038	0.049	0.772	0.220	Rejected
TMC x ORA -> HRIS	-0.003	0.050	0.072	0.471	Rejected

The data revealed the positive relationship of relative advantage on HRIS because there p-value is less than 0.05 (β -0.120, t 2.227, p < 0.013). Also, the data revealed significant relationship among compatibility and HRIS (β 0.469, t 9.016, p < 0.000). There is also a positive relationship between complexity and HRIS (β 0.422, t 8.548, p < 0.000). In parallel, the mediating impact of organizational readiness for adoption on HRIS also has the positive relationship. This study analyzed the moderating effects of Top management commitment and HR staff expertise on relationship between three dimensions of Innovation Diffusion and HRIS firm. The data revealed that the moderation effect of HR SE weakens the effects of innovation diffusion (β -0.038, t 0.772, p > 0.220) on HRIS. Similarly, the moderation effect of TMC also weakens the effects of innovation diffusion (β -0.003, t 0.072, p > 0.471).

Discussion on Results

The main objective of this research is to analyze the relationship between “Diffusion of Innovation and HRIS (Human Resource Information System)”. “Everett M. Rogers”, in his theory has defined and explained five main attributes of an innovation that are needed to influence the decision of adoption of the consumer or adopter for any specific innovation. From those five variables we have taken three characteristics for our research by using different statistical tests.

The demographic data is showing that majority of the employees in KE are from the age group between 20 years to 40 years which can be seen in figure 25. Moreover, figure 26 is showing that majority of the employees in KE are experienced between the years of 1 to 10 years. Last demographic data which is shown in figure 27 depicts that KE mostly prefer employees with the degree of bachelors and masters.

After analyzing the relationship between variables, it has been found that there is a low or small degree of correlation between majority of the variables and some of the variables have moderate or medium degree of correlation among them. Furthermore, it can be seen in the results that all of the null hypotheses are rejected because obtained significance values are smaller than alpha level, which shows that all of the pre-mentioned independent variables have significant relationships with the dependent variable in the presence of the mediating variable and insignificant

relationships with the presence of moderating variables.

Suggestions for Policy Makers

The "Human Resource" department stands out as one of the most critical and indispensable components in any organization, especially in the current era of digitalization where manual work is nearly obsolete worldwide. While HR professionals in developed countries effectively leverage Human Resource Information Systems (HRIS) for their daily tasks, their counterparts in developing countries, such as Pakistan, are still in search of innovative solutions like HRIS to enhance their efficiency.

Despite the evident benefits of HRIS, limited research has been conducted in the past to understand why its adoption is slow in developing countries. This study aims to address this gap, focusing on the case of K-Electric, which utilizes the "SAP" module for HRIS. The following suggestions and recommendations are presented for consideration by policy makers and the regulatory body, NEPRA:

- Implement HRIS in organizations operating on a large scale, particularly in developing countries. Provide comprehensive training sessions for end-users of the software.
- Ensure continuous support from management and co-workers.
- Clearly communicate the benefits of using HRIS to employees, the ultimate users of the system.
- Establish a system for constant monitoring and timely response to queries.
- In conclusion, it can be asserted that innovations like HRIS contribute significant value to organizations when properly implemented and executed.

Limitations of The Study

While conducting this research, some of the limitations that came in the way are;

Time Duration

This research has been conducted in a limited time span. Availability of more time could have resulted in more credible research.

Resources

This study has been limited to Karachi only due to the lack of resources. More resources could have helped in conducting this research in different cities of Pakistan.

Sample Size

Sample size of this research is small and limited. Large sample size could have given more authentic and convincing results.

Suggestions for Future Research

This research can be conducted in other cities of Pakistan, as it is limited to Karachi.

Future researchers can conduct this research in other sectors also, as this research is limited to one

sector that is power and energy.

This study is limited to one specific mediating variable. There are many variables present which can be taken as a mediator in the future researches.

Large sample size can be taken as this research has been conducted in a limited sample frame.

Data has been collected from KE which is in the vicinity of Pakistan. In future, MNCs can also be preferred for this purpose.

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