The impact of cloud-based solutions on digital transformation of HR practices

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CHRONICLE	ABSTRACT
	The purpose of this study is to determine the impact of cloud-based solutions on the digital transformation of human resource (HR) practices in Jordan. The study is quantitative in nature and the data was gathered from primary sources by gathering the responses from 346 respondents. The SEM technique was used for the purpose of determining the direct effect. The study found that infrastructure as a service, performance as a service and software as a service had significant and positive impact on the digital transformation of the HR practices. The information gathered from the secondary sources was provided with reference and was also well paraphrased to avoid the issue of similarity. The study focused on the public sector which restricts the results of this study to this sector only. On the other hand, only one country was considered in this study i.e., Jordan. The research is considered as the first attempt to examine the impact of cloud-based solutions on the digital transformation of HR practices in a developing country such as Jordan.

1. Introduction

In the contemporary era, the application of cloud-based computing has become common. Basically, cloud-based computing is composed of two sections, first defines the association of web browsers with the users and second refers to payment made for the consumption of computing resources and facilities (Johnson, Lukaszewski, & Stone, 2016). Depending on this, the aim of cloud computing is to promote the use of web browsers in exchange of money from every individual who is associated with any digital gadget (AL-Zyadat et al., 2022; Al-Alwan et al., 2022a; Eldahamsheh et al., 2021; Alshawabkeh et al., 2022). Further, Hamad et al. (2019) defined that the cloud is an ability of the internet to provide certain software that is built for serving various remote areas with spontaneous retrieving capacity. Based on this, the benefits of cloud-based computing indicate that this process assists the users to store wider data in a secure manner for longer-time period and less costly measures. All these features of cloud-computing have gained an immense reputation in the contemporary business and consumer market. The same has been experienced in the context of intra-business processes where the Human Resource of the modern businesses are upgrading themselves with cloud-based computing systems.

The process of data recording and maintenance for the HR department has been a complex yet essential element for any business. In correspondence, the HR has been under intense pressure to cater the heavy processing regarding employee information (AlHamad et al., 2022; Al-Alwan et al., 2022b; Al-Abbadi et al., 2021). For example, performance reviews of employees, timesheet or project submission, vacation requests, tracking office punctuality has always been among the most alarming and determining actions of the HR department. Based on all these determinations, employees are recognized and rewarded. Under this, cloud computing has revolutionary complex HR processes with tools and technology. In simple words, cloud computing has allowed the contemporary HR department to record the data with the use of web browsers and retrieve it spontaneously depending on the requirements (Ziebell et al., 2019). Not only this, cloud-computing has also upgraded the recruiting system as per the modern jobs requirements. Most importantly, the multi-dimensional accessibility to the data of each employee has proved to be a developmental vehicle for multinational organizations. However, along with the positive inputs there are certain negative impacts of cloud-based computing that are indeed triggering the potential of the modern HR departments. This paper is aimed towards the examination of the influence that cloud-based solutions impose on the digital transformation of Human Resource (HR) practices. Specifically, the manufacturing section of Jordan has been selected for the examination of influence of cloud-based computing. Therefore, this study has first outlined the role of cloud-based computing on the HR processes, then its causes and effects are also screened along with the potential drawbacks. Eventually, a recommending paradigm is presented to assist the modern HR processes at the emerging enterprises of Jordan's manufacturing sector. Based on all these discussions, the current study is structured to assess the influence of cloud-based solutions on digital transformation in HR processes of the manufacturing sector.

The motive of this study is centric towards the influence of cloud computing on the HR practices of the manufacturing sector. The positive as well as the negative influence of cloud computing in the context of HR processes acts as the force that legitimate the motive of this study. In simple words, cloud computing has been highlighted as a positive addition to the upgrading economy of the world, but it has certain disadvantages. In association, the induction of cloud-based computing has made it easier for the HR departments to track the performance of each employee whilst the real time monitoring is hardly practiced under this new phenomenon. For illustration, mostly employees are asked to update their performance after they have achieved a certain task. Consequently, the recorded data regarding a performance is not dependent on the real time. In this manner, there are several other crises of cloud computing such as security issues, limited accessibility of data, lack of real time information etc. (Hamad et al., 2019). Hence, it has been outlined that cloud computing is influential in both negative as well as positive direction. Based on this, the current study has aimed to outline the extent of influence in both directions with respect to the HR processes of the manufacturing sector of Jordan so that the negative direction can be addressed. This aspect also denotes the significance of the study as it made efforts to control the influence of cloud-computing and extract the utmost positive determination. In doing so, the study is contributing towards the development of the manufacturing sector of the region that in turn aids economic development. Conclusively, the study is indirectly heading towards the social and economic development of the region.

2. Literature Review and Hypotheses Development

According to Seo et al. (2018), cloud-based computing is the on-demand availability of computing powers without being directly managed by the users. In detail, the concept of cloud-computing has been composed with three objectives namely; data storage, web usage and cost association with every user (Ziebell et al., 2019). As indicated above, cloud computing consists of web-browsers and the cost of using the computer resources, the same is defined in the literature. Technically, wider clouds with diverse functionalities are distributed over multiple locations with central servers. Over this, the organizations are directed to reduce heavy up-front costing for setting IT infrastructures. As cloud computing is backed up sharing of computer resources it makes efforts for the establishment of coherence and economies of scale for the enterprises that associate with it. Contrastingly, Patil et al. (2020) argued that intense dependency on the network connection is practiced while implanting the cloud computing phenomenon. This in turn gives rise to loss of control and security issues as well. Therefore, the practical application of cloud-based computing is obliged to be comprehensively planned and evaluated along with mitigating tools.

Kumar (2019) defined adoption of cloud-computing as a new way of deploying technology over the business operations. Staying connected to the role of cloud-based computing with respect to the HR practices, different studies placed different views. For example, Ali et al. (2018) shed light on the traditional HR practices and compared it with the modern one. The authors illustrated that interactive phone systems were the heart of HR information recording and use of paperwork for filing the entire record at a place. However, all these measures are replaced by digital networking. Similarly, Johnson, Lukaszewski, and Stone (2016) investigated the common impact of digitalization on the current HR practices and listed out less-paperwork, real-time consideration, cost effective HR solutions and easy accessibility as the most important outcomes. Although these findings contradict with the fact that cloud-based solutions are not directed with real-time monitoring processes, this aspect is considered under the umbrella of advantages of digitization. Heading towards the opinions regarding the revolutionised recruitment, Hamad et al. (2019) claimed the role of predictive analytics as the leading vehicle under this domain. Still, the impact of technology is shaping contemporary business as per the dynamics of the environment that must be recorded in future. Yet, the change up to date is complex and requires support from both literature-based explanation and practical experiences.

Now that the literature has revealed the role of cloud-based solutions in transforming the HR processes, the next step is to determine the extent to which this transformation is effective and its significance for the businesses. Under this, the studies of Singh (2019) rectify the issue of real-time and out-dated monitoring of the digitized systems. The author suggested that the programs are indeed designed with the algorithm to intimate an action after it is being accomplished. This gives rise to performance as a service to boost the productivity of employees. Hence, the extent of technology over the HR processes is observed to be intense as well as widely spread. This can be simplified in terms of planning, goal setting, implication and evaluation of the current HR system (Kumar, 2019). On behalf of this, the significance of cloud-based solutions is outlined to be intense as well. However, there is a set of analysts that criticize the shift from human dependencies to the networks (Ziebell et al., 2019; Al-Hawary & Al-Rasheedy, 2021; Al-Hawary et al., 2020; Patil et al., 2020). Subsequently, the significance of digitalization within the context of HR is questionable due to its new technological deployment. In response to this, the current literature is still mining the reasons and possible applications of the diverging nature of technology to boost its positive influence and limit its negative determination.

H₁: *Performance as a service strongly directs the HR practices.*

With deployment of technology over the business practices it is essential to review the effect in the context of the industry being operated (Mohammad, 2019; Al-Hawary & Alhajri, 2020). As this study has targeted the manufacturing sector only, studies related to this sector deploy three outcomes of cloud-based solutions on HR practices. At first, use of statistics is the foremost determination of cloud-based solutions (Singh, 2019). This practice allows the firm to make vigilant decisions based on the analytics of the digital system. For example, the recruitment module of Platanou and Mäkelä (2016) observed that 22 percent of the employees in Jordan leave their job within 45 days of employment. Such statistics assist the region to figure out the possible causes that can be used to control the turnover rate. Secondly, the effort to develop a sense of belonging with the organization (Rad, Diaby, & Rana, 2017). As indicated by Kari and Kleinreesink (2020), every 3 out of 10 new recruits find it difficult to interact with their management. This is the point where cloud-based solutions aid through indirect interactions while the control is also maintained. This gave rise to software as a service to assist employees in addressing their problems at the workplace. Consequently, the employees can focus on their core expertise rather than bothering to interact with their management. Lastly, performance management as highlighted by Ali et al. (2018), Jordan is experiencing an unstable internal environment due to the political and economic pressure. Under such circumstances, monitoring of the performance of each employee is vital to indicate overall efficiency of any firm. Hence, cloud-based solutions assist the manufacturing firms in tracking the performance of their products in an efficient manner.

H₂: *Software as a service significantly influences HR practices.*

On the contrary of listed benefits of cloud-based solution, a set of analysts explored and presented certain drawbacks of this phenomenon that challenges its adaptation. For example, cloud computing threatens security due to intense dependency on the networks and least intervention of humans (Butt et al., 2019). In the same manner, some of the analysts have declared cloud-based solutions as challenges based on five critical issues. First, limitation with respect to storage and backup is experienced by new adopters of cloud-computing (Kari & Kleinreesink, 2020). It is because not every cloud provider deals with equality. Secondly, the induction of cloud computing requires third party intervention for taking care of the data (Khan & Al-Yasiri, 2016). As a result, the control is lost which gives rise to the third challenge namely the security. Cloud hacking has become easier as the data is present in a wide cloud from where all cloud providers can claim it (Singh and Srivastava, 2018). Fourthly, the technical issues require intense dependence on the cloud provider which again threaten the security and control over the sensitive information (Rad, Diaby, & Rana, 2017). Therefore, the infrastructure as a service results in stimulation of the HR practices. All these drawbacks of cloud-based solutions act as challenging forces that limit the adaptation of cloud-computing with respect to business operations. Based on this, the following hypothesis has been drawn.

H₃: *Infrastructure as a service significantly stimulates the HR practices.*

From the review, some of the major observations denote that cloud-based solutions are indeed influential over contemporary businesses with respect to organizational management and operations both. In correspondence, the vital role of cloud-computing in boosting the traditional HR processes has been reviewed. The traditional HR practices are upgraded with efficient data storage and remote accessibility of information. However, the review also indicated the negative influence of cloud-computing in terms of dependency, security and loss of control over the sensitive information. Based on all this discussion, the current study has reviewed and represented theoretical support in the proceeding section.

3. Theoretical Framework

In association with the theoretical framework of cloud-based computing systems two essential frameworks are extracted from the literature. At first, the Technology Organization Environment Framework (TOE) as presented by Benlian et al. (2018) indicate that adoption of IT in any firm is regulated by three groups namely; technology, organization and environment (Mohammad et al., 2022; Al-Abbadi et al., 2022; Khalayleh & Al-Hawary, 2022; Amladi, 2017). In detail, technological context is referred to as innovation and availability of digitalized measures. On the other hand, the organizational context denotes the

characteristics of the firm such as organization's size, structure, type, etc. (Senyo, Addae, and Boateng, 2018). Eventually, the environmental context outlines the dynamics of the surrounding where the business is being operated. Altogether, the TOE framework indicates that technology adaptation is sensitive to the environmental and organizational determination of any business.

Secondly, Actor Network Theory (ANT) is a sociological network theory proposed by Callon and Latour (1981) (Benlian et al., 2018). ANT determines that heterogeneous networks are basically co-extensive networks that yield different actors, and every actor is equally significant in a network (El-Khoury, 2017). On this account, ANT supports the significance of all the actors in the network of cloud-based solutions. Specifically, the challenge of being dependent on network connection and a third party is rectified by ANT with the fact that heterogeneous networks are co-extensive and equally integrated. On behalf of the listed theoretical framework, it has been outlined that adoption of cloud-based solutions is indeed imposed by the dynamics and continuously upgrading environment of the modern world. Moreover, the association of each determinant under this adoption is somewhat positive. Provided, a vigilant control is an obligation to promote effectiveness in the practicable business world.

4. Conceptual Framework

From the literature and theoretical support, it has been determined that cloud-based solution is transforming the HR practices. However, certain drivers are also indicated that stimulate the influence of cloud-computing on the HR processes. For example, the type of technology and its impact on the business outcome is highlighted as the foremost driver of cloud-computing. Moreover, the dependency on the network connection is indicated as another important driver. However, the impact of dependency on network connection is observed as negatively influential on the adoption of cloud-computing. Further, the changing environment and demands of the business is indicated as another critical driver that influences the outcome of cloud computing. Each of the highlighted drivers are supported from the theoretical framework with respect to the TOE and ANT framework. Accordingly, the influence of each driver in shaping the outcome of cloud-based solution for the manufacturing firms in the context of Jordan is analysed in this study. On the basis of this, the following hypothesis and conceptual framework is drawn;
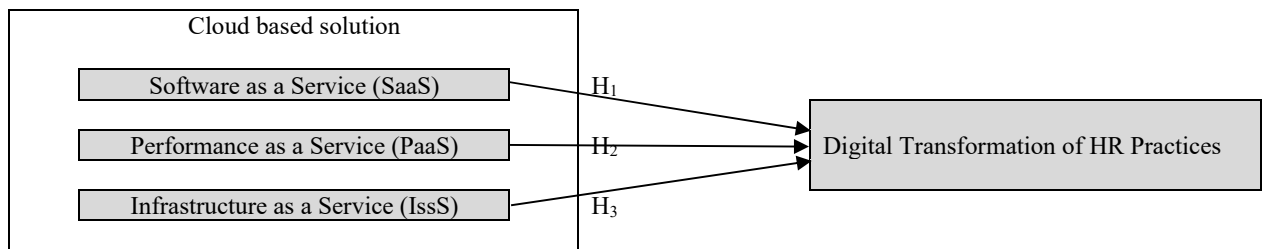

Fig. 1. The proposed method of the study

5. Research Methodology

5.1 Data Collection and Population

In this research paper, the researcher has intended to conduct a survey for the purpose of gathering the responses from the target population. Since the researcher has intended to carry out the study on HR practices in Jordan's public sector therefore, the population is the workers and managers working in the HR department of Jordan's public sector. However, there are numerous workers and managers in this sector and for that purpose, the researcher has decided to restrict the sample to an adequate number of responses as all of them are difficult to be included. Therefore, it can be assumed that the sample size of 384 respondents is an adequate size to conduct this study.

5. Sampling Technique

The researcher has proceeded the sample size calculation and for targeting the desired number of respondents, the researcher has used a particular sampling technique which is essential to be followed. In this regard, the non-probability sampling has been followed by the researcher in which the sub-type of convenience sampling has been considered. With regards to the study of Farrokhi (2012), it can be determined that the non-probability convenience sampling is the type of sampling which is adopted considering the convenience and accessibility factor. In this study, the researcher was able to target the respondents which were easily accessible and available for the survey.

5.3 Research Instrument

In this study, the researcher has used the survey questionnaire for the purpose of gathering the data of this study. Therefore, the survey questionnaire was provided to the target population. For this reason, the self-administered questionnaire was developed for the respondents and the time estimated for the completion of the questionnaire was 15 to 20 minutes. The questionnaires were adopted from the study of Malla et al. (2020).

5.4 Data Analysis Method

It has been argued in the study of Martínez-López (2013) that SEM is regarded as a necessary technique for data analysis which is followed preferably for the analysis of survey responses. In addition to this, the study of Marsh (2014) argues that SEM technique forms the basis with the confirmatory factor analysis (CFA) and exploratory factor (EFA) as the model for measurement. Moreover, the path analysis is yet another dimension of the SEM which has also been included in this study. This study also includes the CFA which is the factor analysis technique while confirming and comprehending that the latent variables are valid for a particular construct. For this purpose, the researcher has used the SmartPLS as the statistical package for the purpose of testing the hypothesis (Afthanorhan, 2013).

6. Results and Analysis

6.1 Confirmatory Factor Analysis

As discussed in the prior section, CFA is regarded as the crucial dimension of the SEM technique which assists in comprehending the structure of latent constructs by understanding the examination among latent variables and constructs. It has been argued in the study of Brown (2012) that assessment of the factors with the help of CFA assists in comprehending the association among latent variables and constructs which further identify the extent to which the constructs are explained by the latent variables. Additionally, the findings of Geldhof (2014) recommend that CFA is supported with certain measures which assist in determining the reliability and validity of the constructs. In this manner, the validation of the constructs has been carried out with the help of discriminant validity, convergent validity, and composite reliability, Cronbach alpha and outer loadings. Therefore, Table 1 depicts the CFA analysis with the measures including outer loading, Cronbach Alpha, convergent validity, and composite reliability. In reference to the Table, the lowest value for the factor loading which is computed is 0.766. Since, the factor loading of all the variables satisfies the threshold therefore, there is no need to remove any variable from the study based on factor loading.

Table 1
Convergent Validity, Composite Reliability and Cronbach's Alpha

Research Construct	Indicators	Factor Loading	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Digital Transformation of HR Practices	DTHR1	0.823	0.905	0.934	0.780
	DTHR2	0.904			
	DTHR3	0.892			
	DTHR4	0.910			
Infrastructure as a Service	IaaS1	0.826	0.849	0.898	0.689
	IaaS2	0.837			
	IaaS3	0.886			
	IaaS4	0.766			
Performance as a Service	PaaS1	0.805	0.895	0.927	0.760
	PaaS2	0.878			
	PaaS3	0.905			
	PaaS4	0.894			
Software as a Service	SaaS1	0.897	0.927	0.948	0.820
	SaaS2	0.930			
	SaaS3	0.899			
	SaaS4	0.896			

The other aspect of the CFA is testing the reliability of variables which is determined by the composite reliability and Cronbach Alpha. Pertaining to the findings of Ahmad, Zulkurnain & Khairushalimi (2016), it can be determined that the threshold for Cronbach Alpha and composite reliability is regarded as 0.6. This implies that the values of latent variables below the threshold must be excluded from the model. With respect to Table 1, it can be determined that the Cronbach Alpha for the Digital transformation of HR practices, infrastructure as a service, performance as a service and software as a service is 0.905. 0.849, 0.895 and 0.927 respectively. Therefore, all the variables are well above the threshold of 0.6, it can be stated that all the variables are reliable with respect to the Cronbach Alpha. Moreover, the threshold for composite reliability is also considered as 0.6. In this manner, the composite reliability for Digital transformation of HR practices, infrastructure as a service, performance as a service and software as a service is obtained as 0.934, 0.898, 0.927 and 0.948 respectively. Since, all the values of composite reliability are also well above 0.6 therefore, it can be stated that all the variables are reliable with respect to the composite reliability. AVE is considered as the measure for the determination of convergent validity in the constructs (Alhalalmeh et al., 2022). On the other hand, the threshold for the convergent validity is 0.5. Therefore, it can be determined with respect to Table 1 that the AVE for Digital transformation of HR practices, infrastructure as a service, performance as a service and software as a service is 0.780, 0.689, 0.760 and 0.820 respectively. Since, all the averages are well above the threshold of 0.5, therefore it can be stated that the constructs possess the convergent validity. Table 2 depicts the discriminant validity of the constructs which are measured with the help of Heterotrait-Monotrait (HTMT) threshold. Pertaining to the study of Franke (2019), it can be determined that the threshold for HTMT is 0.9. With reference to Table 2, all the constructs are distinct based on the highest value of HTMT which is computed to be 0.702.

Table 2
Discriminant Validity

	Digital Transformation of HR Practices	Infrastructure as a Service	Performance as a Service
Digital Transformation of HR Practices			
Infrastructure as a Service	0.702		
Performance as a Service	0.604	0.502	
Software as a Service	0.506	0.430	0.539

6.2 Path Analysis

The path analysis is regarded as the crucial procedure of the CFA which deals with the assessment of specific indirect, direct and total indirect effects. Since, the study does not involve the mediating or moderating variable, therefore, the direct effect assessment has been carried out by the researcher for the purpose of determining the effect. It can be determined with the help of Table 3 that infrastructure as a service has a direct effect on the digital transformation of HT practices based on the value of B= 0.435, p=0.000<0.01. This depicts that the increase in infrastructure as a service will impose a positive and significant effect on the digital transformation of HR practices. On the other hand, the direct effect of performance as a service and digital transformation of HR practices has also been tested which shows the significant effect as B= 0.282, p=0.000<0.01. This depicts that the increase in performance as a service will impose a positive and significant effect on the digital transformation of HR practices. Furthermore, the direct effect of software as a service has also been tested on the digital transformation of HR practices which identified the significant effect of software as a service on the digital transformation of HR practices as B= 0.159, p=0.004<0.01. This shows that the increase in software as a service will impose a positive and significant effect on the digital transformation of HR practices. Additionally, the effects can be determined from the Table 3 provided below:

Table 3
Direct Effect

	Coefficient	T Statistics (|O/STDEV|)	P Values
Infrastructure as a Service -> Digital Transformation of HR Practices	0.435***	8.300	0.000
Performance as a Service -> Digital Transformation of HR Practices	0.282***	4.871	0.000
Software as a Service -> Digital Transformation of HR Practices	0.159***	2.876	0.004
*Significant at 10%; **Significant at 5%; ***Significant at 1%			

6.3 Quality Analysis Model

In addition to the CFA and path analysis, the quality analysis model has also been carried out. Therefore, it can be determined with the help of Table 4 that the variance is digital transformation of HR practices is explained by 50.1% of the variance in the cloud-based solution. On the other hand, this variance has been computed to be 49.7% after the adjustments. This is evident enough to state that there is an impact of cloud-based solutions on the digital transformation of HR practices.
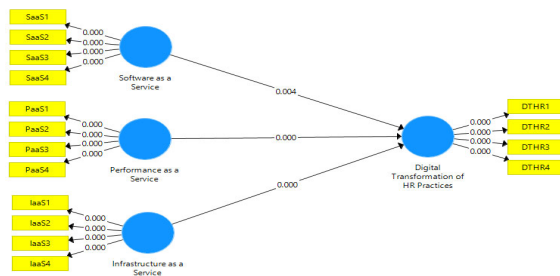

Table 4
Quality of Model

	R Square	R Square Adjusted
Digital Transformation of HR Practices	0.501	0.497

Fig. 1. Measurement Model after Bootstrapping

6.4 Summary of Hypothesis and Discussion

Table 5
Summary of Hypothesis

S. No	Hypothesis	Status
H1	Software as a service significantly influence the HR practices	Accepted
H2	Performance as a service strongly direct the HR practices	Accepted
H3	Infrastructure as a service significantly stimulate the HR practices	Accepted

The above Table 5 depicts the summary of the hypothesis and based on this table, it can be determined that the hypothesis that Software as a service significantly influences the HR practices has been accepted due to the significant effect obtained in the analysis. The study of Khan and Al-Yasiri (2016) argued that the cloud-based solution helps the company to make vigilant decisions based on the analytics of the digital system. On the other hand, the second hypothesis that Performance as a service

strongly directs the HR practices has also been accepted as the significant and positive effect was determined. This also aligns with the study of Patil et al. (2020) which argues that the performance as a service directs the HR practices. Lastly, the third hypothesis which is Infrastructure as a service significantly stimulates the HR practices has also been accepted. Therefore, all the hypotheses in this study have been accepted. This is due to the reason that cloud computing threatens security due to intense dependency on the networks and least intervention of humans (Butt et al., 2019).

7. Conclusion

In the contemporary business environment, the application of cloud-based computing has become a regular practice where the companies like to integrate all their information for the purpose of enhancing their organisational functions. In this manner, this study has focused on determining the impact of cloud-based solutions on the digital transformation of HR practices. For this reason, the public sector of Jordan has been considered. The factors identified for cloud-based solutions include infrastructure as a service, performance as a service and software as a service. The study is quantitative in nature and the data has been gathered through a survey questionnaire. The non-probability convenience sampling has been used by the researcher. The data has been gathered from the employees and managers working in the HR department of the public sector in Jordan. Based on the analysis, it has been determined that the infrastructure as a service has a direct effect on the digital transformation of HR practices. Moreover, the direct effect of performance as a service has also been found significant on the digital transformation of HR practices. Lastly, the effect of software as a service has also been found significant on the digital transformation of HR practices. Therefore, it can be stated that there is an overall impact of cloud-based solutions on the digital transformation of HR practices. In this manner, it is recommended for the companies operating in the public sector of Jordan to focus more on the cloud-based solution for the purpose of enhancing the digital transformation of their HR practices.

8. Managerial Implications, Limitations and Direction for Future Research

The results of this study will help the managers to implement the findings of this study towards the development of cloud-based solutions for enhancing the HR practices. This will help them to enhance the HR practices through digital transformation. This study has determined the impact of cloud-based solutions on the digital transformation of HR practices. However, there are certain limitations of the study which must be considered by the future researchers. Firstly, the study has only considered the cloud-based solution as the factor which affects digital transformation of HR practices. There are several other factors which must also be considered. Moreover, the study has only focused on the public sector of Jordan. The findings from the public sector of other countries in the region would have made significant contributions towards the existing literature.

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