International Academic Institute for Science and Technology

International Academic Journal of Organizational Behavior and Human Resource Management
Vol. 1, No. 1, 2014, pp.71-79.

ISSN 2454-2210

International Academic Journal of Organizational Behavior and Human Resource Management

www.iaiest.com

Identify Future Changes of ICT in Human Resources Management : A Delphi Study

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Abstract

In an age of increasing complexity and pace of innovation, futures thinking and foresight are becoming more important and attractive than ever before. This study aimed to identify future Changes of information and communication technology (ICT) affecting on the performance and activities of human resources management(HRM), between now and the 5 years future.

The paper applies the Delphi method and draws on a panel of anonymous experts comprising e-HRM academics and e-HRM practitioners from TUGA Company, in the 2015. After survey theoretical sources, proper understanding of the issues and consult with professors, a questionnaire composed of two parts, designed and distributed among members of the panel and after three rounds and reach a consensus between experts, rounds stopped. Findings indicate that Changes in information and communication technology (ICT) are have implications for HRM in the future. So, organizations have to preparation for future changess in technology, and increased attention to the conduct of research activities in this the field .

Keywords: HRM, ICT, Future Studies, Delphi Method

Introduction

In an age of increasing complexity and pace of innovation, futures thinking and foresight are becoming more important and attractive than ever before. Engaging in strategic foresight supports organizations in maintaining sufficient flexibility for future developments and unforeseen circumstances. While governments and public institutions may employ foresight to prepare for the long-term, companies can equip themselves with capabilities to react to weak signals and to quickly change the course of action according to market demand (Rohrbeck,2010).

Today, we are in the world where information and communication technology (ICT) has been penetrated into almost all activities of human beings. Theoretical and empirical studies have revealed the necessity to adopt and exploit the outcomes of ICT in various organizations. While, internet usage that causes the frequent improvement in information and communication technologies (ICTs) also have been addressed by various scholars. In consequence, ICT and its impact in the social, economic and personal development has become the area of interest for many scientific researchers during recent decades (Moomal& Masrom,2015).

Information technology has had widespread effects on almost every aspect of our society. From the invention of the telegraph to the creation of smartphones, it has changed thewaywe live our lives and do our jobs. For example, technology has altered thewaywe purchase products, communicate with others, receive health care services,manage our finances, and educate our students. It has also had a profound impact on organizational processes, including those in Human Resource Management (HRm)(Parry& Tyson,2011).

Companies are increasingly using information technology (IT) to support Human Resource Management (HRM) processes, often referred to as Electronic Human Resource Management (e-HRM) or Human Resource Information Systems (HRIS) (Marler & Fisher,2013).

Information and communication technology has enhanced the ability of human resource managers to produce reliable data via a human resource management system; this in turn allows human resource professionals to make data-driven decisions and to provide other managers with consultancy based upon this data. This will have a major positive impact on human resource management processes by making them faster, more efficient, cheaper, more accurate, more reliable, more transparent and consistent.

In this study, examines the role and impact that future changes in information and communication technologies can have on human resources management.

The next section introduces the concept and history of e-HRM and summarises the current debate about the extent to which e-HRM is having or will have a transformational impact on HRM. Future studies in general and the Delphi method are then discussed, which leads into the description of the present study‘s data collection. Following the presentation of the study‘s findings, the final section ended with Discussion and Conclusion.

Theoretical basis of research:

E-HRM

According to Ruel et al, (2008) the term e-HRM was first used in the late 1990's when e-commerce was sweeping the business world. e-HRM is internal application of e-business techniques to add value to the management through more effective and efficient information flow and is a way of doing HRM. As information technology improves, organizations especially banks, could manage an increasing number of HRM processes in an effective manner, thereby contributing to the availability of information and knowledge. This in turn has help HRM professionals to play a strategic role in attaining improved competitive advantage. This interaction and intersection between IT and HRM leads to the emergence of HRMS a term used to describe the systems and processes at the intersection between human resource management (HRM) and information technology (IT). It merges all HRM activities and processes with the information technology field while the programming of data processing systems evolved into standardized routines and packages of enterprise resource planning software.
This has been developed since their increased visibility in the late 1990s and were largely used for administrative and data recording purposes and have presently metamorphose into HRM supporting applications for recruitment and selection, flexible benefits, development, e-learning and so on.

The e-HRM is useful in reducing the cost in the organization. e-HRM is using of information technology for both networking and supporting at least two individuals or more than two in their shared performing of Human Resource activities and practices. E-HRM is different from HRIS (Human resource information system) and Virtual Human Resource Management. E-HRM is mediated by information technologies to help the organization to acquire, develop, and deploy the intellectual capital. It is a web-based solution that uses the latest web based application technology it is online and real-time Human Resource Management Solution is possible through e-HRM. The e-HRM technology provides a portal which enables managers, employees and Human Resource professionals to view extract or alter information which is necessary for managing the Human Resource of the organization and for making decisions quickly. The World Wide Web has helped modify many Human Resource processes including human resource planning, recruitment, selection, performance management, work flow, and compensation. These new systems have enabled Human Resource professionals to provide better service to all of their stakeholders (e.g., applicants, employees, managers), and it can reduce the administrative burden in the field. And it is very cost effective(Swaroop,2012).

Research methodology

Delphi Study

The Delphi technique was de- invalid criteria (such as the status of an idea's veloped during the 1950s by workers at the RAND proponent). Furthermore, with the iteration of the Corporation while involved on a U.S. Air Force questionnaire over a number of rounds, the indisponsored project. The aim of the project was the viduals are given the opportunity to change their application of expert opinion to the selection – from opinions and judgments without fear of losing face in the point of view of a Soviet strategic planner – of the eyes of the (anonymous) others in the group. an optimal U.S. industrial target system, with a

Between each questionnaire iteration, controlled corresponding estimation of the number of atomic feedback is provided through which the group membombs required to reduce munitions output by a bers are informed of the opinions of their anonymous prescribed amount. More generally, the technique is colleagues. Often feedback is presented as a simple seen as a procedure to ‘‘obtain the most reliable statistical summary of the group response, usually consensus of opinion of a group of experts . . . by a comprising a mean or median value, such as the series of intensive questionnaires interspersed with average ‘group’ estimate of the date by when an controlled opinion feedback’’ (Dalkey & Helmer,1963).

The Delphi is a well-established methodology in futures research, going back nearly 60 years. As a research instrument, a Delphi is ‘‘a method for structuring a group communication process’’ that allows a panel of experts, who participate anonymously, ‘‘to deal with a complex problem’’ (Linstone &Turoff,1975). A Delphi is particularly helpful when a domain does not lend itself to analytical techniques, but could be better estimated by group judgment. The aim is not to achieve consensus among an expert panel, but to facilitate a structured and systematic group communication process (Linstone &Turoff, 2011).

In its classical procedure a facilitator designs a questionnaire for individual expert input over several subsequent rounds (usually minimum two rounds: first assessment round plus one revision round), allowing the group to reevaluate their judgment in light of aggregated group opinion. Recent attempts have sought to improve the Delphi method. In contrast to the traditional two ‘rounds’, the statistical group opinion in a real-time Delphi is calculated instantly and communicated back to the expert between questions (Gordon&Pease,2006).

Overall, the purpose of the forecasting Delphi study is to obtain consensus from a panel of experts using repeated answers from questionnaires and controlled feedback. The core of the Delphi technique is that a pool of experts deals with a certain problem that lies in the future. For example, forecasting Delphi could be used to forecast future economic, social, labour and organizational conditions to help organization design HRM programs for the next five year or more (Loo,1996).

Data Collection

The process used in this study involved 30 experts: 20 HR and ICT managers from TUGA Company, and 10 academics from universities Iran. In selecting the respondents, the main criterion used was to find respondents who have expertise on e-HRM systems. More specifically, most of the academic members held position of assistant professor or above. Practitioners were mostly e-HRM consultants with business expertise of more than five years.

We followed the approach of three separate stages with answer ranking described in Figure 1. The first stage is labelled as the brainstorming phase, where respondents generate lists of relevant items by replying to research question. In this round, respondents were asked to respond to the following open-ended questions.

Q1: What change(s) in ICT will influence HRM, between now and the 5 year future?

Final responses arrived one weeks after invitation and 93% of invited respondents responded to the first round. At this stage, data was analysed by grouping similar items together. Duplicates were removed and data was reviewed by four researchers participating as panel members.

The second round was conducted describe round two as the narrowing down phase, where respondents were asked to identify items which they considered to be most important from responses to stage one. The panel members were contacted individually by e-mail and paper based questionnaire . In round two, the issues raised in round one were presented and the participants were asked to rank the importance of these issues and introduce additional ones after reviewing their peers‘ suggestions and rationales. For rankings, the participants were asked to rank sevene responses which they considered to be most important from responses to stage one. Response rate for round two was (n=26).

In the present study, the relative importance of each of the items in the instrument was calculated according to the indications of the respondents and all the items formed the basis for round three. the third stage as the ranking stage where respondents are asked to rank items in order of importance from responses to stage two. Third round was conducted 24 respondents participated (response rate 80 %) and ranked the seven most important items based on round two rankings. The analysis of this round forms the basis of the results and findings section that follows, 7 (= completely agree)and 1 (=completely disagree). Consensus was obtained, if the IQR was 1 or below on a 7-point Likert scale (De Vet et al,2005). the IQR was used to measure the degree of consensus among respondents between round two and three.

Level of agreement was assessed as the median value on a 6 point Likert scale ranging from 1 (complete disagreement) to 6 (complete agreement) ,No neutral. the level of consensus was assessed using the interquartile range (IQR). Consensus was defined as $IQR \leq 1$.
Very strong agreement and consensus (median 6, $IQR \leq 1$)
Strong agreement and consensus (median 5, $IQR \leq 1$)
The level of consensus was low ($IQR \leq 1$). (Castillo et al,2013)

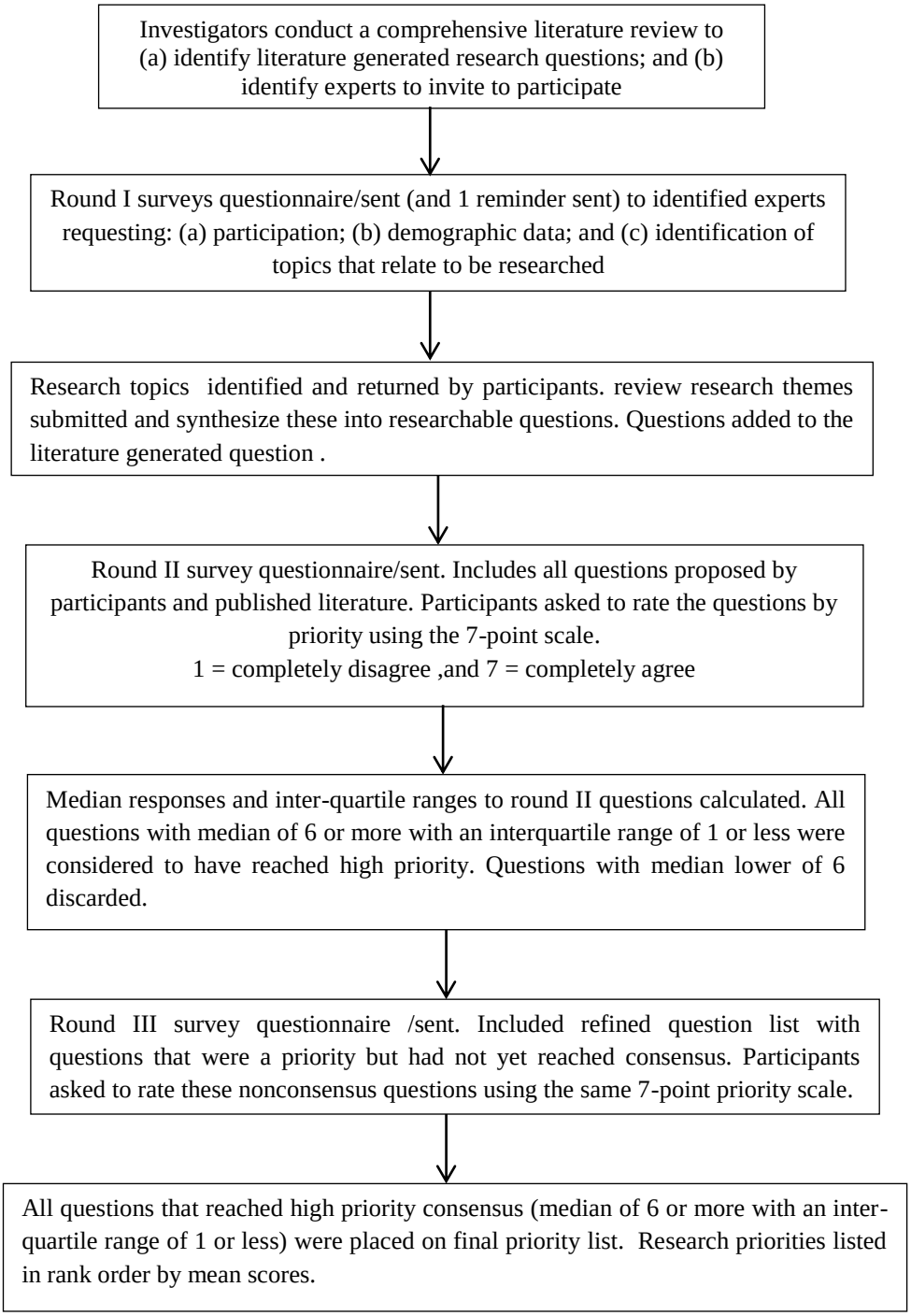

Investigators conduct a comprehensive literature review to (a) identify literature generated research questions; and (b) identify experts to invite to participate
Round I surveys questionnaire/sent (and 1 reminder sent) to identified experts requesting: (a) participation; (b) demographic data; and (c) identification of topics that relate to be researched
Research topics identified and returned by participants. review research themes submitted and synthesize these into researchable questions. Questions added to the literature generated question .
Round II survey questionnaire/sent. Includes all questions proposed by participants and published literature. Participants asked to rate the questions by priority using the 7-point scale.
1 = completely disagree ,and 7 = completely agree
Median responses and inter-quartile ranges to round II questions calculated. All questions with median of 6 or more with an interquartile range of 1 or less were considered to have reached high priority. Questions with median lower of 6 discarded.
Round III survey questionnaire /sent. Included refined question list with questions that were a priority but had not yet reached consensus. Participants asked to rate these nonconsensus questions using the same 7-point priority scale.
All questions that reached high priority consensus (median of 6 or more with an inter-quartile range of 1 or less) were placed on final priority list. Research priorities listed in rank order by mean scores.

Figure 1: Delphi process

Results and findings

RQ1: What change(s) in ICT will influence HRM, between now and the 5 year future?
Of the 24 respondents who completed the final round, the increased use of Web 2.0 (Mean=6.54) was the highest ranked response. Increased use of mobile technology (Mean=6.52) was ranked second and cloud computing (Mean=6.12) was ranked as being the third most important changes in ICT influencing HRM between now and the 5 year future (Table 1- Descriptive Statistics).

Table 1- Descriptive Statistics

Technological changes	Mean	median	Overall rank	IQR	SD
Increased use of Web 2.0	6.54	7	1	1	0.509
cloud computing	6.12	6	3	0.5	0.612
Increased use of artificial intelligence	6	6	4	0.0	0.659
Increased use of mobile technology	6.52	7	2	1	0.588
increasing use of business intelligence	6	6	5	1	0.722
Big data	5.91	6	6	0.5	0.653

From the result of the data analyzed and presented in the table above, it can be observed that the overall, All questions that reached high priority consensus (median of 6 or more with an inter-quartile range of 1 or less) were placed on final priority list. Questions with consenus low priority discarded. Research priorities listed in rank order by mean scores.

Conclusion

This paper explores empirically future changes in information and communication technology (ICT) affecting on human resource management (HRM). The developments on this area will have great impact on the future of the HR field. To shed light on the futures changes of ICT on HRM, this study applied the Delphi method to survey a mixed academic and practitioner panel of e-HRM experts through a three-round issue identification and consensus-building process. The program directors and panel member acknowledged the tremendous influence of ICT on the work of HR professionals and argued that this influence will increase in the future.

We looked what ICT changes will influence HRM and looked for weak signals that might influence HRM in the future. Among the issues raised and later rated in both round two and round three, a acceptable consensus was reached in all areas (IQR $\leq$ 1). Overall, 6 issues received a strong mean ranking of 6 or above and thus emerged as the most critical issues across researched topics.

Main finding in this study was the importance of social media. Increased use of web 2.0 technology was the highest ranked of all answers therefore we suggest this technology will have major impact on HRM in the future. Tim O'Reilley, in 2005, had popularized the term Web 2.0,which covers a wide range of technologies such as, wikis, blogs, pod casts, linked in, Facebook and Twitter. From the perspectives of the Human Resource (HR) professionals, these tools have immense potential to transform the way business is being conducted, leading towards greater credibility. Next issue, Development and extension Mobile applications are recent especially that models of Intelligent type were introduced into organizations. With mobile applications, a repair of a part is as quite easy as because we will be able to have at the same time the same amount of time and an announced problem and generation of an invoice of repair in only one stage[15]. Using cloud computing, the start-up organizations can start their operations from day one itself. Cloud is a logical network of computers with virtualization and storage facilities which provides infrastructure,platforms and software. HR function should go behind infrastructure experts, is going to be decided by the usage of the clouds in the organization. BI applications have been ranked the top technology priority in the 2009 Gartner Executive Programs survey of more than 1,500 chief information officers (CIOs) around the world (Sudhakar,2014). In Big Data, large quantities of data come very quickly from both internal and external sources in the form of both structured and unstructured data. The quantity of data is growing much faster than the technologies in the organizations(Gartner,2009).

Thus, the emerging technologies are bringing new challenges and many changes to the HR function in the IT organizations.

Problems and limitations of research

Our study was not without limitations; however these limitations offer fruitful start for future research. In summary, in this study there were limitations to some of them are mentioned below:

1. Lack of internal investigations in this area
2. The reluctance of some respondents to questionnaire respond to prolong rounds
3. Ignoring research by some members
4. The lack of knowledge complete responders for research topic
5. The little volume of the studied population

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