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THE EFFECTS OF TASK-TECHNOLOGY FIT ON USE AND USER PERFORMANCE IMPACTS: THE CASE OF THE HUMAN RESOURCE MANAGEMENT INFORMATION SYSTEM IN THE MALAYSIAN PUBLIC SECTOR

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Abstract

The successful implementation of information systems (IS) in organisations depends on the ability of the IS to assist users in performing their tasks by fulfilling their expectations and delivering the desired results. This paper describes the research on how well the Human Resource Management Information System (HRMIS) assists users in performing their tasks. The objective of this research is to identify gaps in HRMIS with regards to user needs in order to use HRMIS to assist them in performing their tasks and formulate recommendations to bridge the said gaps. Data was collected using a mixed methods approach of qualitative and quantitative methods. The quantitative data is being prepared for analysis and will be analysed using SPSS and AMOS. Content analysis was conducted on the open-ended responses which are being theme coded in SPSS for analysis. Content analysis will be conducted on the qualitative data upon its transcription and summarisation.

Keywords: Information System (IS), Human Resource Management Information System (HRMIS), Task-Technology Fit (TTF), Government agency, Human Resource (HR), modules, submodules.

1 INTRODUCTION

This study is set in the context of provision of government services in Malaysia. In this era of science and technology, the challenge of globalisation brings with it multiple changes within and beyond Malaysian borders. These changes include stiffer international competition, advancement of information and communication technology (ICT), knowledge-based society, knowledge-economy (k-economy) and demands from the public for a more efficient as well as effective government service. These challenges demand efficient and effective delivery systems from the public sector. Emphasis has been put on human resource development and the advancement of ICT, designed to enhance service delivery and reduce the cost of operation. ICT developments “are transforming the way services are delivered and business are done” (Osman 2000). The public sector in Malaysia requires a sizable manpower which now has exceeded 1.2 million in number. As a result, work performance is an important factor in determining that service delivery meets the expectations of public sector clients. The service delivery system in place could no longer support the demands of the unprecedented changing environment (Osman 2000). Therefore “the Malaysian Public Service embarked on numerous reform efforts and launched the electronic Government (eG) to reinvent the operations of the Government, both internally and in terms of the delivery of the services to the people” (MSC.COM 2003).

One of the projects under the eG flagship is the Human Resource Management Information System (HRMIS) that “aims to digitise all available data and information on Government personnel to enable the various agencies and departments to respond quicker to the changing environment” (MSC.COM 2003). HRMIS was designed not only to enhance efficiency and effectiveness in the management of human resources but also to bring about leaner and flatter organisational structures in the public sector (Adam 1999). HRMIS was meant to support the Human Resource Management (HRM) functions “in an integrated environment to meet the objective of” right-sizing the Malaysian civil service, automating and consolidating HRM functions and planning among agencies (Mohd Yusof 1998).

A total of 618,619 establishment data and 459,130 personnel data from 600 government agencies were entered into the HRMIS database by end 2007 (Malaysian Administrative Modernisation and Management Planning Unit 2008). Up to 30 June 2009, only 249,875 out of 1.2 million potential users were actually using the system (Public Service Department Malaysia 2009). Only 4 out of 12 HRMIS modules are actively being used, one of which is prominently ahead of the rest (Public Service Department Malaysia 2009). As of 30 June 2009, only 9 out of 38 parent agencies have achieved the target of entering at least 90% of their personnel records while only 7 parent agencies have achieved the target of entering at least 90% of their service profile (Public Service Department Malaysia 2009).

HRMIS is the system of choice in this research because “HR is the most dynamic of all resources” (Osman 2000) and acts as the engine that operationalise all other resources in organisations. The HRMIS project was the most massive and extensive project under the eG initiative (MSC.COM 2003). It will cover the direct and indirect effects of task-technology fit (TTF) of HRMIS on user performance impacts. This research will contribute to the body of knowledge in three ways: theoretical contribution to the information systems success literature, contribution to the field of Human Resource Information Systems (HRIS), and contribution to resolving the low use of HRMIS in the Malaysian public sector. This research will study the users and non-users who are supposed to use HRMIS, in the context of implementation of HRMIS by their agency, to uncover specific contributing factors to the under-utilisation of HRMIS. IS scholars have been examining questions of use and non-use of IS for many years, and this study will draw on and extend their work.

2 LITERATURE REVIEW AND THEORETICAL MODEL

The researcher used established models of IS use and non-use as references in formulating the theoretical model for this study, mainly the Theory of Reasoned Action (TRA) of Ajzen and Fishbein (1980), the Theory of Planned Behaviour (TPB) proposed by Ajzen (1991), the IS Success Model of DeLone and McLean (1992 updated 2003), the Technology-to-Performance Chain (TPC) of Goodhue and Thompson (1995); and the research model of Baker, Al-Gahtani and Hubona (2007) involving the moderating effects by external factors on the operation of the TPB. In addition, other models such as the Theory of Achievement Motivation by Atkinson (1964), perceived self-efficacy of Bandura (1982), system-to-value chain by Doll and Torkzadeh (1998) and the two levels of analysis with regards to IS use as conceptualised by Jaspersen, Carter and Zmud (2005) were also given due consideration.

In selecting the most fruitful relationships to focus on for the present research, the researcher noted that the three major quality dimensions in the updated DeLone and McLean IS Success Model (2003) have been extensively researched. In fact, DeLone and McLean summarised these studies and came-up with a ten-year update from which they formulated their updated DeLone and McLean IS Success Model in 2003. On the other hand, limited research has been done on TTF and its antecedents. Even though Goodhue and Thompson (1995) have done some work on the influence of TTF, very little is understood with regards to the effects of TTF on IS utilisation and performance impacts. Research has yet to be done on the effects of TTF in the context of Ajzen's (1991) model of TPB. In addition, no study has been done on the effects of the TTF of HRMIS on individual user performance impacts. Therefore, this research will pursue explanations of the effects of TTF on performance impacts with regards to HRMIS as reflected in Figure 1.

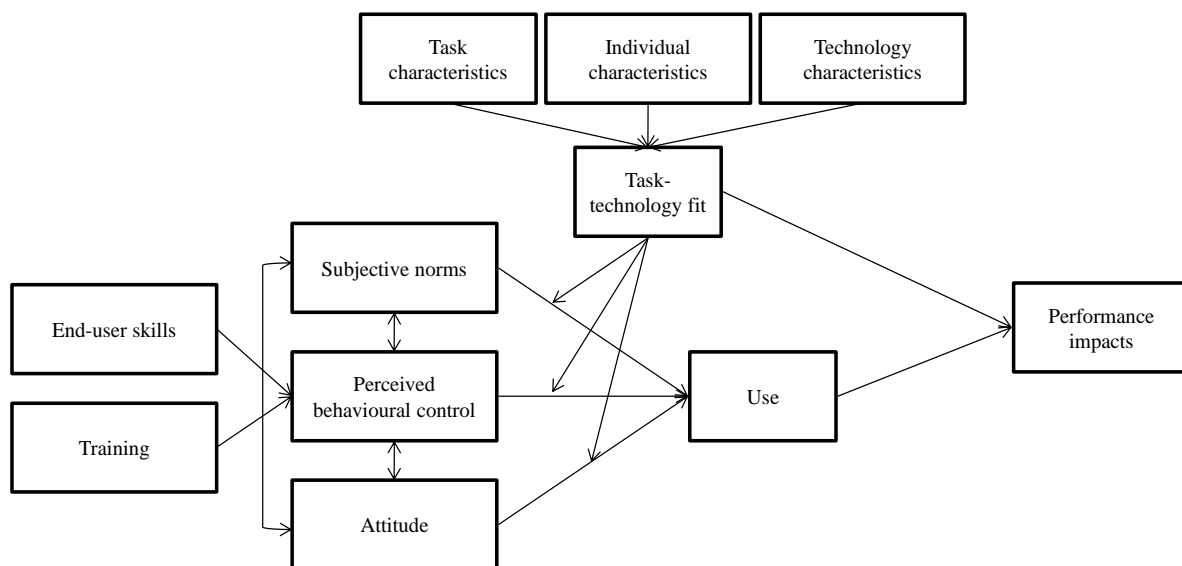


Figure 1. *Theoretical model – The effects of Task-Technology Fit on IS use and individual performance impacts*

In relation to the theoretical model to be tested, the main research question is:

What is the role of task-technology fit in use and performance impacts for individual users following organisation implementation of HRMIS?

Research conducted by Goodhue and Thompson (1995) focused on user evaluations of the influence of TTF on utilisation of IS and the perceived performance impacts and found the relationship between TTF and utilisation was particularly ambiguous (Dale and Ronald 1995). Moreover, research has not been done to study the influence of TTF in the context of models, such as the TPB, which are used to explain the implementation and use of IS. Therefore, research on the effects of TTF on a specific model that explains the implementation and use of IS should further explanations regarding the influence of TTF as well as explanations of implementation, use and performance impacts.

The implementation and use of IS has been widely researched from various aspects in developed nations. However, there has been very limited research of this sort in developing countries such as Malaysia. In order to measure-up to the challenges of globalisation, there is a need to better understand the factors influencing the successful implementation and use of IS in Malaysia. This research is also important because there hasn't been any formally documented study on the performance impacts of any IS in Malaysia after its implementation. This research will identify the antecedents influencing TTF that will enable TTF to be applied in the implementation phase of HRMIS. Consistent with the suggestion of Goodhue and Thompson (1995), this research will serve as a diagnostic tool to identify gaps in HRMIS with regards to user needs. Specifically, Goodhue and Thompson (1995) posit that user involvement potentially affects the fit of the system to the tasks to be performed (Dale and Ronald 1995). Considering that the pilot agencies assisted in the development of HRMIS, the TTF of HRMIS is expected to better fit the task needs of the pilot agencies. As a result, gaps are expected to emerge particularly more in the implementing agencies compared to the pilot agencies. The eventual prevailing gaps will enable the system administrator to identify and take appropriate remedial actions with regards to the TTF of HRMIS such as system evolution, training improvement, etc. This is similar to two of the paths of HR technology implementation in the field of e-HRM observed by Foster (2009) and referred to as enhancement and transformational (Foster 2009). The enhancement approach involves improving the system with additional functionality resulting in evolutionary impact on the HR delivery system. While the transformational approach involves restructuring the HR delivery system through greater use of information and generating new kinds of information to provide data of better quality for managers to strategically act upon. This innovation can potentially lead to diffusion in the form of social change, defined by Rogers (2003) "as the process by which alteration occurs in the structure and function of a social system" (Rogers 2003).

3 RESEARCH METHODOLOGY

The information gathered includes details about the history of HRMIS, its use and non-use patterns, earlier research on individual user behaviour with regards to various IS and studies based on the related models. The literature review covered important references in understanding about HRMIS and its utilisation as well as factors influencing individual user behaviour towards IS. Background information and data were obtained from references in the form of journals, books, reports, bulletins, articles, etc.

The majority of past research in user behaviour towards IS, TTF and self-efficacy has been done using the quantitative method. Davis (1989), Goodhue and Thompson (1995), Goodhue (1995), Doll and Torkzadeh (1998), Karahanna, Straub and Chervany (1999), Karahanna and Straub (1999), Fortin (2005), Seyal and Rahman (2007), Gopi and Ramayah (2007), Baker, Al-Gahtani and Hubona (2007) and Mohamad Hsbollah and Md. Idris (2009) used the quantitative method, while Lamb and Kling (2003); and Foster (2009) conducted their respective researches using the qualitative approach. A mixed research approach was adopted by Bandura and Beyer (1977), Bandura (1977), and Davis, Bagozzi and Warshaw (1989). This research used a mixed methods approach of quantitative and qualitative methods.

The quantitative method will test the hypotheses across models to estimate the variances explained in, and the effects of the variables outlined in Figure 1 on, the use of HRMIS and individual performance impacts. The qualitative method will explain the differences in the antecedents influencing TTF, use and performance impacts across agencies. Primary information and data from users were collected using questionnaires. Relevant staff of the HR and the IT Divisions of the sampled agencies were interviewed to gather information on actions taken to address predictors of TTF of HRMIS as well as predictors of use and perceived behavioural control in developing and implementing HRMIS including its continued maintenance across agencies.

One of the challenges that emerged before HRMIS was that even though the use of HRMIS was made compulsory through a government directive in the form of a service circular issued on 8 June 2005, the multiplicity of services involved in the HRMIS implementation seemingly created a constraint in standardising the use of HR applications. Agencies that had already internally developed their own HR application apparently demonstrated a certain level of resistance towards the use of HRMIS. As a result, the commitment of the top management of the agencies was considered essential in ensuring the successful implementation of HRMIS. Towards this end, the proponents of HRMIS argued that the benefit of HRMIS has to be embraced at all levels.

3.1 Qualitative Study

In the qualitative study, interviews were conducted with:

- the relevant staff of the HR Divisions in the participating pilot agencies to gather information on how antecedents of TTF of HRMIS, use and performance impacts were addressed in developing and implementing HRMIS in their respective agencies;
- the relevant staff of the HR Divisions in the participating implementing agencies to gather information on how antecedents of TTF of HRMIS, use and performance impacts were addressed in implementing HRMIS in their respective agencies; and
- the relevant staff of the IT Divisions in the participating pilot and implementing agencies to gather information on the technical aspects of how antecedents of TTF of HRMIS, use and performance impacts were addressed in developing and implementing HRMIS in their respective agencies including its continued maintenance, improvements, evolution, etc.

3.2 Quantitative study

The quantitative study will test the following hypothesis about the relationship between TTF and HRMIS use and individual user performance impacts:

- H₁: Task-technology fit of HRMIS has a direct effect on performance impacts of the individual users
- H₂: Task-technology fit of HRMIS has an indirect effect on performance impacts of the individual users through their use of HRMIS
- H₃: The relationships of subjective norms, perceived behavioural control and attitude of individual users with their use of HRMIS are influenced by the task-technology fit of HRMIS
- H₃₁: The task-technology fit of HRMIS moderates the relationship between the subjective norms of the individual users and their use of HRMIS
- H₃₂: The task-technology fit of HRMIS moderates the relationship between the perceive

behavioural control of the individual users and their use of HRMIS

H₃₃: The task-technology fit of HRMIS moderates the relationship between the attitude of the individual users and their use of HRMIS

The variety in Government agencies and system functions as well as the multiplicity of tasks and types of users helped enable the generalisability of the findings of this research. This research can be generalised to a population of individual actual and potential HRMIS users in Government agencies. The sample frame for the quantitative study consists of HRMIS users in the six hundred government agencies implementing HRMIS. There exists the possibility that, (1) the potential users in the pilot agencies would be more familiar with HRMIS and better able to adopt the new system compared to their colleagues in the implementing agencies; and (2) in greater detail, HRMIS would better fit the tasks of the ten pilot agencies compared to that of the implementing agencies. In order to avoid bias in this research, the sample was drawn from three pilot agencies and three implementing agencies, which will be referred to as participating agencies. Considering that every participating agency consists of large numbers of staff and to make it more manageable in size, the research targeted the HR Divisions in the participating agencies and respondents ranging in the organisational hierarchy from the support group right up to the management and professional group who are likely to be the major end-users of HRMIS at their respective agencies. The major end-users are those who are the daily hands-on users of HRMIS. In order to enable participation of HRMIS leading agencies in the sample, non-probability sampling was used. Specifically, the efficiency of obtaining information was enhanced by using convenience sampling. This is an effective way of obtaining information in a quick and inexpensive manner (Cavana, Delahaye et al. 2001).

The selection of the participating agencies took into account (1) the number of HR personnel in the agencies in order to improve the prospect of obtaining the required number of potential respondents, (2) the achievements of the respective agencies in utilising HRMIS to obtain a corresponding proportion of agencies that recorded from high to low utilisation of HRMIS as that of the overall data update status, and (3) the varied kinds of services offered in the Malaysian public sector as that represented by the ten pilot agencies selected for the HRMIS project.

The status of data (personal record (PR) and service profile (SP)) update in HRMIS was taken to reflect the extent to which HRMIS is utilised in the respective agencies. The status of PR and SP data update in HRMIS of all agencies is graded from 'A' to 'D' based on their progress of updating the PR and SP data in HRMIS. Up to 30 June 2009, the public sector PR update status showed that 23.68% of the Government agencies achieved grade A, 68.42% achieved grade B and 7.90% achieved grade C without any achieving grade D. This gives a ratio of grades A:B:C:D on PR update status of 2.997:8.661:1:0. Whereas the public sector SP update status showed that 18.42% of the Government agencies achieved grade A, 26.32% achieved grade B, 39.47% achieved grade C and 15.79% achieved grade D, giving a ratio of grades A:B:C:D on SP update status of 1.167:1.667:2.500:1 (Public Service Department Malaysia 2009). Therefore, the participating agencies for this research were selected representative of the ratio of the PR and SP data update status in HRMIS, resulting in 2 participating agencies representing those achieving grade A, 3 participating agencies representing those achieving grade B and 1 participating agency representing those achieving grade C with regards to their respective PR data update status. Similarly, 1 participating agency representing those achieving grade A, 2 participating agencies representing those achieving grade B, 2 participating agencies representing those achieving grade C and 1 participating agency representing those achieving grade D with regards to their respective SP data update status. This is summarised in Table 1.

GRADE	OVERALL PR DATA UPDATE STATUS			OVERALL SP DATA UPDATE STATUS		
	%	RATIO	NUMBER OF SELECTED PARTICIPATING AGENCIES	%	RATIO	NUMBER OF SELECTED PARTICIPATING AGENCIES
A	23.68	2.997	2	18.42	1.167	1
B	68.42	8.661	3	26.32	1.667	2
C	7.90	1	1	39.47	2.500	2
D	0	0	0	15.79	1	1

Grade A = 90% - 100% Completed
Grade B = 80% - 89% Completed
Grade C = 50% - 79% Completed
Grade D = 1% - 49% Completed
Source: Public Sector HRMIS Data Update Status Until 30 June 2009 (Public Service Department Malaysia 2009)

Table 1. Number of participating agencies according to their data update status

This sampling design enabled the researcher to obtain a potentially rich variety of views and insights from the respondents of multiple levels in the organisational hierarchy resulting in a wide range of information. The participants were from various levels in the organisation, with every member at every level having his own inter-related separate role/job function and hence effectively avoiding any bias. Duplication was also avoided as every staff is dedicated to a particular agency and no staff member in any agency can, at the same time, also be posted to another agency, i.e. work in two separate agencies, at any one time.

Primary information and data was obtained using a questionnaire. The questionnaire was distributed online via SurveyMonkey using the staffs' e-mail providing a link to the questionnaire in the body of the e-mail, with the permission from the management of the respective agencies. Technical assistance from the IT Division of these agencies was sought in the event of any eventualities. The major end-users were informed prior to the date that they have to complete the online questionnaire. This method enabled the researcher to target the respondents who are the likely users of HRMIS. This method was used by Mohamad Hsbollah and Md. Idris (2009) in their investigation of the perception of lecturers at The Northern University of Malaysia regarding the adoption of e-learning as a teaching tool (Mohamad Hsbollah and Md. Idris 2009). At least two hundred individual responses were targeted to be achieved. The demographic description of respondents will be summarised to reflect the generalisability of the data.

The questions revolved around the dimensions of HRMIS and their respective elements in order to measure the fit of the system to the tasks to be performed. The questions were close-ended. The questionnaire was developed using guidelines and selected survey instruments from Ajzen and Fishbein (1980); Karahanna et. al. (1999), Doll and Torkzadeh (1998); Baker et. al. (2007), Mohamad Hsbollah and Md Idris (2009); Goodhue and Thompson (1995); McGill and Klobas (2009); and Goodhue (1995). Instead of accepting the wordings and scales as they were, the instrument was modified to reflect the focus of this research on the TTF of HRMIS, system use and individual user performance impacts.

4 DATA COLLECTION

The instrument was tested using a pilot study. The pilot study was conducted at an agency that has a large number of HR personnel, totalling 548, to enable a comprehensive pilot study to be done.

Following the pilot study, improvements were made to the interview instrument and the questionnaire in preparation for the final study.

The subjects for the qualitative method were selected using the judgement sampling technique as the required information can only be provided by certain individuals. As the final study progressed, a few subjects recommended other experts as additional subjects for the study and as a result, the sampling technique used for this method amounted to snowball sampling.

In the quantitative method, the questionnaire was tested in two stages before administering it to the potential respondents. In the first stage, the questionnaire was personally tested by the researcher and the second stage was simultaneously carried out at the IT Divisions in all participating agencies involving a total of 597 test respondents. The researcher had the opportunity to observe the responses and also took the initiative to get feedback on the survey from some of those in communication with him as well as from some interviewees. Based on their feedback, improvements were made to the questionnaire before administering it to the final potential respondents. The survey e-mail was sent by SurveyMonkey for the researcher to 546 potential respondents. At the end of the survey, a total of 263 respondents completed their questionnaires while 23 others partially completed them.

5 RESULTS

The interviews will be transcribed for analysis. The final data, collected through the questionnaires, will be analysed through Structural Equation Modeling (SEM). Content analysis on the open-ended responses was done to categorise them into themes and coded in SPSS for analysis. The respondents were quite open in responding to the open-ended question leading to good insights. Their comments covered a wide spectrum of user issues from testing and implementation strategies to systems design, module details as well as input methods and human behaviours. Most of the suggestions relates to systems functionality, data updating and accessibility, systems design, user-friendliness and accessibility to the application. Contrary to the majority of respondents, there were also a number of respondents who didn't think HRMIS needed any improvement.

6 PLANS FOR COMPLETION AND CONCLUSION

The quantitative data is being cleaned-up in preparation for analysis using SPSS and AMOS. The interview summaries will be presented to the respective interviewees for validation. All data will be collectively analysed to identify new aspects of existing antecedents of TTF and new variables affecting TTF that will further explanations on the influences of TTF of HRMIS on its use and user performance impacts. Recommendations will be formulated to address gaps that emerge between the functional abilities of HRMIS and the actual user needs as well as recommendations to improve the HRMIS implementation strategy to be make it more user-oriented.

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