

HOSTED BY



ELSEVIER

Contents lists available at ScienceDirect

Asia Pacific Management Review

journal homepage: www.elsevier.com/locate/apmr

Impact of human resources information systems in the military environment

Mohd Azmi Arifin, Farzana Parveen Tajudeen*

Department of Operations and Management Information Systems, Faculty of Business and Accountancy, University of Malaya, Malaysia

ARTICLE INFO

Article history:

Received 16 August 2019

Received in revised form

10 December 2019

Accepted 19 February 2020

Available online xxx

Keywords:

Military

Information systems

HRMIS

Impact

Malaysia

ABSTRACT

The use of information systems (IS) in the security and defence organisations is widespread, but studies highlighting their effectiveness in use are lacking. This paper aims to address this gap by zooming into the Malaysian Armed Forces (MAF) to identify the factors that influence the personnel in using the system. It also aims to examine the impact of Human Resource Management Information Systems (HRMIS) on MAF personnel. This study reveals that there were seven factors that influenced the personnel's use of the HRMIS, and the system also had some positive impact on the personnel. Studies looking at the implementation of the IS often involve organisations, with little attention given to the security and defence organisations such as the armed forces. In that regard, the findings of this study are significant because they are derived directly from the system users. This study also contributes to the literature by providing evidence of the use of the IS in a setting that is rarely ventured into by researchers.

© 2020 College of Management, National Cheng Kung University. Production and hosting by Elsevier Taiwan LLC. All rights reserved.

1. Introduction

The advent of the information and communication technology (ICT) and its widespread usage today has dramatically changed the lives of the individuals and the way organisations work. From the individual perspective, ICT usage has allowed employees to interact with their colleagues more efficiently by being able to share relevant information more speedily, such as in a matter of seconds (Jorgenson & Vu, 2016). From the organisational perspective, ICT usage has certainly improved the effectiveness of many organisations in terms of their planning, processing of information and in decision making.

Despite this being the case, the implementation of the IS in most organisations is not as easy as it was expected because it involves various challenges and obstacles. Specifically, innovation diffusion or any new innovative technology adoption is slower or more difficult across the public sector than in the private sector (Nam, 2019). These challenges and obstacles can be attributed to a variety of sources such as users, organisations, technologies, and

environments (Alharthi, Krotov, & Bowman, 2017; Savoldelli, Codagnone, & Misuraca, 2014).

The use of ICT is also prevalent among the public sector of Malaysia. As a channel for communication and for conducting internal administrative works that involves the government, ICT is implemented by the Public-Sector ICT Strategic Plan (Malaysian Administrative Modernization and Management Planning Unit, 2016). This implementation is meant to support the ICT application involved in the National Transformation Programme of Malaysia and in particular, to improve the impact of the public sector agencies and their service delivery and IS. The importance of the ICT has also been recognised and duly enforced by the Malaysian National Defence Policy (Malaysian Ministry of Defence, 2010) which had stipulated that ICT usage is compulsory within the Malaysian Armed Forces as a means to achieve information dominance, and this usage needs to happen at every level of the Malaysian Armed Forces (MAF). In fact, the Fourth Dimension MAF (4DMAF) plan had postulated the strategy of having a capability-based approach that focusses on utilising ICT to promote information operations efficiency (Manuri, 2015).

To ensure that there is a systematic and competitive human resource management within the Malaysian Ministry of Defence, the MAF has also embarked on implementing the Human Resources Management Information System (HRMIS) in August 2013

* Corresponding author.

E-mail addresses: ltkolazmi@siswa.um.edu.my (M.A. Arifin), farzanatajudeen@um.edu.my (F.P. Tajudeen).

Peer review under responsibility of College of Management, National Cheng Kung University.

(Malaysian MINDEF Internal Audit, 2017). The objectives of developing the HRMIS within the MAF are similar to those objectives held by the Malaysian Public Services; the HRMIS is expected to enable the accurate planning of the workforce, to automate the operations' processes of human resource management, and to promote a paperless environment (Malaysian Public Service Department, 2011).

Based on an internal audit conducted in 2016, it was found that the level of usage of the HRMIS by the MAF personnel had not reached the optimum level (100 per cent usage) set by the top authorities in the MAF (Malaysian MINDEF Internal Audit, 2017). It was further found that some of the personnel involved had a preference for manual methods instead of the HRMIS. Such a situation seemed to have obstructed the effective implementation of the HRMIS hence it also affected the objectives set for the procurement of this system.

To understand how the implementation of the HRMIS can be better facilitated at the MAF, the current study aims to identify the relevant factors that could influence the HRMIS usage and what impact the system might have on the personnel in the MAF. It is hoped that the outcome of this study would shed light on the necessary measures to be taken by the MAF in overcoming the shortcomings of the HRMIS application, thereby finding the appropriate approach to increase the use of the HRMIS.

2. Literature review

Over the last two decades, the level of ICT usage among government employees has been increasing (Romdhane, 2013). ICT has changed the way services are provided; it improves productivity and service quality whilst also reducing operating costs (Zainol, Fernandez, & Ahmad, 2017). At the organisation level, the use of technology such as social media (driven by ICT advancement) helps organisations to understand the needs of their customers, hence be better prepared to address the needs of these customers (Tajudeen, Jaafar, & Ainin, 2018). Information Systems (IS) has continued to make a significant impact on employees and organisations as a whole. While IS was once used primarily to automate manual processes, today it is transforming the nature of work, and in many cases, the quality of the products and services offered (Stair & Reynolds, 2018).

The implementation of the new technology and IS has been explored quite widely. Yu, Lin, and Liao (2017) found that successful technology adoption was influenced by users' digital skills and information literacy. Whereas Choshin and Ghaffari (2017) found that user satisfaction, infrastructure, costs, and system performance, were factors that could determine the success of e-commerce technology adoption. In another study, Yusof & Aziz (2015) found that the use of HRMIS was beneficial to users, especially in information management and job monitoring. Related to this, Ibrahim & Yusliza (2015) noted three factors that would determine successful HRMIS implementation which include: user attitude, readiness for change, and technology readiness. Likewise, Sappri, Baharudin, and Raman (2016) found that user involvement and self-readiness was a key factor for user satisfaction and net benefits.

From the perspective of the application, HRMIS has been noted to speed up the work process and efficiency, thereby reducing bureaucracy (Laudon & Laudon, 2018). Most users tend to assume that this application is ergonomic, and the scale of its use is simple to moderate. Nonetheless, the implementation of the HRMIS certainly requires organisational support, and this can be achieved through continuous training or more online support (Intra et al., 2016).

A similar study by Shahibi, Saidin, and Izhar (2016) looked at the

effect of the HRMIS on the employees of the Human Resource Department, Kuala Lumpur City Hall, Malaysia. They found that the employees were satisfied with the system usage, especially in its information quality. However, this study also revealed that the level of usage was still not satisfactory, with 29 per cent of the respondents found to never use the system.

The measurement of an organisation's success rate in technology adoption can be done through a technology-organisation-environment (TOE) framework that explains the three key factors influencing the implementation of technological innovation: technological, organisational and environmental factors (Yeh & Chen, 2018). In contrast, the measurement of an individual's success rate in technology adoption is evaluated through context, attitude and behavioural factors. Most research focussing on the individual context have used theories such as: Theory of Planned Behaviour (TPB), Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Model of PC Utilisation (MPCU), Motivational Model (MM), and TAM Extension and Updated Information System Success Model (ISSM) (Dwivedi, Rana, Jeyaraj, Clement, & Williams, 2017; Dwivedi, Rana, Jeyaraj, Clement, & Williams, 2019).

The updated ISSM model by DeLone and McLean (2003) provides an understanding of the system usage and its subsequent impact on the organization. The impact is defined as the extent to which information systems can impact the individuals, groups, organisations, industries, and nations. Based on ISSM, the current study will investigate the antecedents of HRMIS usage and its impact on (MAF) personnel. The ISSM seems to be the most suitable model to use as the theoretical lens for this study, as it emphasizes on information system success within organizational settings and also focuses on the impact in terms of individual (personnel) benefits.

3. Methodology

To accomplish the aim of this study, a qualitative approach encompassing two FGDs and two personal interviews was applied. These two approaches were the most appropriate for examining personal feelings and the underlying behaviours of individuals who form part of the human resource of the Malaysian Armed Forces (MAF). The combination of the FGDs and interviews would help to validate the issues that emerged in the FGDs (Lambert & Loisele, 2008; Morgan, 1996). The rationale for using the FGD was due to its appropriateness for identifying various perspectives within an organisation so as to gain better insights about the issues being examined (Hennink, 2014). Similarly, the interviews were used as an approach to gather practical insider knowledge on particular issues which may be difficult or impossible to obtain from other accesses (Bogner, Littig, & Menz, 2009; Mann, 2016).

In this study, after reviewing the literature on Information system adoption and impact, the general questions for focus group discussions and interviews were developed (Appendix 1 and 2) The primary objective of these sessions is to have an open discussion and obtain as much information as possible regarding the use and impact of HRMIS in MAF. The information collected should also provide the best answer to the research question under investigation (Rosenthal, 2016). At the same time, these questions must ultimately help achieve research objectives (Barbour & Morgan, 2017; Hennink, 2014). Therefore, when designing focus group questions and interviews, the above points are always taken into consideration. Also, the questions posed in focus groups and interviews must meet the nature and principles of each of these methods (Carey & Asbury, 2016). The questions developed were designed to fulfil the so-called questioning route by which they

help trigger the memories or thoughts of the participants (Krueger & Casey, 2014).

The respondents for the FGD were selected through purposive sampling involving one MAF unit from Kuala Lumpur and one MAF unit from Sungai Besi. These two units are among the biggest units in the MAF that have widely used the HRMIS since 2016 (Malaysian MINDEF Internal Audit, 2017). The first FGD involved 11 personnel who used HRMIS, and the second FGD involved six personnel. All the participants were of various ranks from the administrative departments who have experience in using the HRMIS. Unit A is under the MAF Headquarters that manages trunk communications and also a service provider for the Signals Dispatch Services (SDS) whereas Unit B is a unit of the Army's central workshop that maintains communications' equipment. These units were selected based on the size of the unit, the availability of the personnel as well as the consent given by the respective Commanding Officers of the unit. The FGD for Unit A was conducted on April 30, 2018, and the activity lasted for about an hour. The FGD for Unit B was conducted on July 8, 2018, and it lasted approximately 45 min. The respondents were numbered accordingly, i.e., A1, A2 until A11 and B1, B2 until B6.

The respondents were asked for their consent to use their data verbally, and all agreed. The participants were then asked about their views about the HRMIS systems. The respondents also responded by giving their views about the advantages and disadvantages of the system in terms of performance, ease of use, support, and so on. Following their voluntary input, the respondents were also asked if they had any suggestions to improve the system. Malay language was used as the medium for the interaction. All interactions were audio recorded with the consent of the respondents.

Following the FGD, interviews were also conducted with two senior officers of the MAF, who were the ICT Project Manager and the Navy ICT Project Manager. The two interviews took place on July 15th, and 17th, 2018 and both lasted approximately for half an hour. The aim was to gather their expert views on the technical aspects, and development of the HRMIS at the MAF headquarters, and the MAF service levels. They were selected based on their knowledge on the development of the HRMIS, and also their availability for the interview. They explained in detail about the HRMIS, especially the implementation process. They were asked about the constraints and issues that had been raised by the participants in the FGD. The respondents also gave their views as a user of HRMIS. The interviews were also conducted in Malay language and audio recorded with the consent of the interviewees (1 and 2).

Data were then transcribed verbatim in Malay and then translated into English. The translation transcripts were verified by a bilingual expert before they were processed for comparison and the thematic analysis as recommended by Jukic, Gagliardi, Fagnani, Venturini, and Orlandoni (2017). In the analysis, the meaning units (message units) were identified, and similar ones were first coded together. These codes were then categorised according to the characteristics and dimensions identified in the scope of the technology adoption study. From the category, the appropriate theme was then selected. Based on the themes, the factors were identified.

Studies (Lincoln & Guba, 1985) suggest that validity for a qualitative study can be determined through credibility, dependability, transferability, and confirmability. Credibility refers to the systematic process of obtaining data for analysis. This helps to verify the accuracy of the study so that nothing is left out (Miles, Huberman, & Saldana, 2014). The credibility of this study was determined by ensuring that transcripts were produced verbatim from the recordings. The transcripts were also verified with the

respondents. Dependability refers to the consistency of the research process; it should be reasonably stable over time, and across researchers and methods (Cash & Snider, 2014). Dependability in this study was determined by ensuring that all steps in this study are systematically recorded and stored, which begins with conceptualizing the study, data collection, data analysis, and reporting the results. The context in this study was consistently emphasised where the respondents and the organisation were operated in general military settings.

Transferability refers to how the results may be applied to other settings (Bengtsson, 2016). All these steps adhered to in this study helped to ensure the transferability. Confirmability refers to the confirmation of the results by the respondents involved, and it fulfilled the study context (Au, Lo, Cheong, Wang, & Van, 2016). For this study, confirmability was ensured by determining that the interviews followed a common interview protocol and can be easily verified by other researchers.

4. Research results

Based on the FGDs and interviews conducted, the factors influencing the HRMIS usage among the MAF personnel were identified. By using the constant comparison method as proposed by Strauss and Corbin (2008), the final list of factors was identified. After referring to the related literature, the factors were specified with appropriate names. The section below further elaborates in detail the factors which were discussed in the FGDs and the interviews.

4.1. Focus group discussion

The outcome generated from the two FGDs were analysed, and the following sub-sections outline the seven factors detected, based on the frequency it appeared.

4.1.1. System quality

According to the output of the respondents gathered from the FGDs, the system quality of the HRMIS was among the factors that affected the use of the HRMIS. In this regard, system quality refers to the system's technical characteristics, its accessibility and usability to users (McKnight, Lankton, Nicolaou, & Price, 2017). Cohen, Coleman, and Kangethe (2016) found that the system quality of the Hospital Information System (HIS) had significantly affected user satisfaction, which encouraged the system usage. In the current study, the respondents in the FGDs felt that the system quality of the HRMIS was good, hence it encouraged them to use the system more readily. Some evidence is provided.

"I have a view on the HRMIS. I think that this system is best to use in the MAF as it eases our administration and it saves time as well. For example, as I am a clerk; I will check the documents of each personnel. For me, it makes my task easier because it's online. When I open the system, all personal details will appear. I do not need to look at a manual (hardcopy) anymore. By using the online system, I can see all the details and have all the requirements." (Respondent B2)

However, some respondents felt that the quality of the system could have some problems.

"...data is not saved and need to repeat. When I spoke with the Staff of Signal Directorate, he notifies me there is no update whereas I have updated the data already. I'm not sure what's going on, maybe the system is slowly updating." (Respondent A2)

4.1.2. Information quality

The second factor that emerged from the FGDs was information quality of the HRMIS which refers to the information characteristics such as relevance, timeliness, completeness, accuracy, understanding, and accessibility of the system output (Sharma, Gaur, Saddikuti, & Rastogi, 2017). This factor plays an important role in ensuring that an IS continues to be used. This will also increase user satisfaction (Almaiah & Alismaiel, 2018). End-user satisfaction, it has been claimed, influences the usage of a system even more. The results drawn from the FGDs showed that the information quality of the HRMIS played a vital role in enhancing user acceptance of the system.

"it's a good system because when we go to the hospital, we can check on HRMIS for our data, where all of the information for our GL are complete as in our records." (Respondent A1)

"Information can be accessed when it needs to be used and it always available." (Respondent B4)

4.1.3. Service quality

The third factor to emerge from the respondents' contribution was service quality which refers to the responsiveness, convenient operating hours, reliability, and easy communication of the service providers (Sharma et al., 2017). It is also an important factor for ensuring that the user continues to use the IS because of user satisfaction. Almarashdeh (2016) found that service quality had the highest share in influencing user's satisfaction and acceptance of the system. In this regard, most of the respondents also mentioned the quality of the service provided by the HRMIS' technical support.

"If we have a problem with the system, it will be referred to the HRMIS team. We can refer to it by telephone, as stated in the booklet or manual. Often, they will guide in the phone first; if the problem cannot be resolved, they will send their nearest staff to handle it." (Respondent B2)

4.1.4. ICT infrastructure

The fourth factor in line was ICT infrastructure which refers to the physical assets an organisation possesses, including any hardware and software that can be used to support technology usage (Li, Dai, Gershberg, & Vasarhelyi, 2018). According to Ahmadi, Nilashi, Shahmoradi, and Ibrahim (2016), ICT infrastructure is one of the most highly cited factors to affect the adoption process. ICT comprises tangible resources such as hardware and software. Bhattacharjee and Hikmet (2016) had suggested that ICT infrastructure plays an important role in motivating organisational IT usage. In this study, majority of the respondents highlighted the importance of the infrastructure and its influence on the HRMIS usage. They were of the opinion that the existing infrastructure was inadequate, hence affecting the HRMIS usage among the MAF personnel.

"I suggest adding more terminal and increase the speed of the network so that more user can use it." (Respondent A9)

4.1.5. Security

The fifth factor identified from the FGDs was security. In this regard, security refers to the extent to which one believes that the HRMIS is secure for transmitting sensitive information (Ahmadi

et al., 2016). Vacca (2017) had highlighted that information security is a major concern of many organisational managements. Security solutions based on technical aspects alone are insufficient for protecting corporate data. It would seem that successful information security depends on appropriate user behaviour while using the IS. In this study, most of the respondents were confident of the security features available in the HRMIS.

"I feel the information in this system is secure because each user has their username and password to update their documents. The document administrator only monitors to determine the data is the same as in the document." (Respondent A7)

4.1.6. Commander support

The sixth factor was traced to commander support, which is similar to top management support. It clearly points to the degree of understanding the top management places on the importance of the IS function, and the extent top management is involved with IS activities (Lin, 2014). Top management support is critical in organisational behaviour (Zhang, Wei, & Zhou, 2018). Organisations that have top management support for new technology were more likely to adopt the system (Giotopoulos, Kontolaimou, Korra, & Tsakanikas, 2017). In this study, all the respondents were aware that they need to use the HRMIS as a directive was already given by the Commanding Officer (CO). They highlighted that the CO's support had motivated them as personnel to use the system.

"I think there is an instruction from higher headquarters that directs the use of HRMIS by ensuring the updating of data to achieve one hundred per cent. The CO also has issued instructions so that the system is used as in the orders." (Respondent A3)

"The CO put the usage instruction in Part One Orders, which need to be abided by all personnel in this unit." (Respondent B2)

4.1.7. Training

The last factor that was identified from the FGDs was training. Technical training which provides users with sufficient knowledge about the system is important for ensuring the success of its implementation. Limbu, Jayachandran, and Babin (2014) mentioned that technical training has a significant relationship with system usage. In the current study, most of the respondents also felt that training on HRMIS use could help to facilitate the personnel to understand the modules in the HRMIS. Nonetheless, some of the respondents felt that even though there were training provided, they were inadequate.

"I have attended HRMIS courses, just one week and only taught personal details module even though there are many other modules available. What I learned is just to key-in personal data during the week-long course. The course duration is not enough because the system has a lot of modules; there is a duty module; a posting module and others. All I have learned was just personal details module." (Respondent B2)

4.2. Interview

In order to get more in-depth information about the implementation of the HRMIS, two interviews were also conducted. All the factors derived from the FGDs were explained to the two interviewees, and their opinions were then sought further.

From the interviews, it was noted that the system quality of the HRMIS and its development had been enhanced to enable it to be accessed through various types of web browsers. Evidence is drawn from Interviewee 1:

"So, the contractor has taken the initiative to create what is called multi-platform integration through their R&D. The response given by the contractor is that HRMIS can be opened and used using any web browser. The user needs to download "IE tab software" to allow other web browsers other than IE. Just open HRMIS and get the best possible display quality. The instructions are included in the "IE tab" download in the MAF HRMIS user manual." (Interviewee 1)

Information quality in the HRMIS allows information to be accessed and processed quickly, especially in the planning process, which involved the personnel. This is explained clearly by Interviewee 2.

"Previously, if we want to know the statistics of our personnel, we need to calculate it one by one, how many in 2018, how many in 2019, but with the HRMIS we just need to click, and the system will display a statistic, how many personnel retiring in 2019, how many officers still in service." (Interviewee 2)

In terms of service quality, when a user experienced a problem with both the technical use and issues, the user can get it by contacting the technical assistance provided to handle the matter. Interviewee 2 verified this:

"We have a team called the RMN HRMIS team. Users can WhatsApp anytime 24/7. For example, if the system down, they will assist immediately." (Interviewee 2)

The lack of ICT infrastructure to support the HRMIS was acknowledged by Interviewee 1.

"Access bandwidth is great, but when it is about to access the system, it is slow due to the computer component itself. According to bandwidth allocation, MAF has 154 sites across Malaysia within MindefNet network. For bandwidth allocation, we take into account the number of users, as well as other system being used by the units. These are the two main factors how we allocate for bandwidth. And then, out of the way, we're going to review usage levels every year. If underutilised, we will reduce the bandwidth for that particular unit and will allocate the said bandwidth to the unit that needs extra bandwidth." (Interviewee 1)

The security aspect of the system was also explained by Interviewee 2.

"This system is located in a secured infrastructure with a firewall and has been endorsed by CDOC (Cyber Defence Operation Centre). At the same time, we are testing HOI (HRMIS on Internet). While this has been outstanding due to security issues, the issues have been overcome and we will open HRMIS on the Internet soon." (Interviewee 2)

The factor related to commander support was endorsed by Interviewee 2.

"If we realise, the Royal Malaysian Navy's (RMN's) top management is playing an important role, not only play a role but 100 per cent support for system usage. For example, the Chief of Navy

provided 100 per cent support to ensure ICT culture in the RMN." (Interviewee 1)

The training factor was also supported by Interviewee 1.

"... at the same time, we have conducted about 64 training sessions throughout the country as well as a session for senior officials in the formation." (Interviewee 1)

The gap distancing the HRMIS usage by personnel is also due to the users' lack of technical knowledge, and it was explained by Interviewee 1 as follows:

"The step the user follow may be incorrect. The user key-in the data and did not click SAVE. After that, he just logged out. So now the process is incomplete and the data not saved to the system." (Interviewee 1)

The result of this study showed that the HRMIS system quality, information quality and security were moderately acceptable, but the usage of the HRMIS was hindered by poor ICT infrastructure and the lack of adequate training for the personnel at the MAF units. Another factor uncovered was the importance of commander support to use the HRMIS, which is similar to top management support. The other factor revealed by the current study involved training, which is essential for end-users in order to increase the productive use of the system as well as users' confidence in it (Limbu et al., 2014; Mirzajani, Rosnaini, Ayub, & Wong, 2016). Further, ICT infrastructure was also mentioned as it provides the platforms and technologies for sharing the system used (Ahmadi et al., 2016). Nonetheless, this study showed that infrastructure needs to be improved to enhance the HRMIS usage. Similarly, the security factor was equally important when a system that is introduced involves access to classified data (Ahmadi et al., 2016; Lu, Yu, Liu, & Wei, 2017). Table 1 shows the various themes that were derived from the FGD and Interviews and the appropriate names that were given after referring to the literature. The next section will discuss the impact of HRMIS on MAF personnel.

4.2.1. Personnel benefits

The impact of using the IS within an organisation can be measured accordingly through: consumer impact, workgroup impact, societal impact, inter-organisational impact or industry impact (DeLone & McLean, 2003; Stair & Reynolds, 2018; Valacich & Schneider, 2017). In the context of this study, the benefits of using the IS at the individual level (personnel benefit) is examined. The results drawn from the FGDs and interviews noted that the personal benefits of using the HRMIS could be divided into three categories: job performance, productivity, and decision making.

4.2.1.1. Job performance. Job performance refers to employees' behavioural efficiency that contributes to organisational goals; it consists of task performance and contextual performance (Singh, 2016). Job performance also relates to actions and behaviours deemed important for the achievement of organisational objectives (Lee & Lee, 2018). An organisation that uses the IS in its operations tend to benefit from the work efficiency of its employees. In this study, the respondents stated that the HRMIS helped them to enhance their job performance.

Table 1
Factors influencing HRMIS usage.

Themes	Category/Factor
System functionality, poor system reliability, poor system quality (Unit A), easy to use, system reliability, poor system quality, poor system reliability (Unit B)	System quality
Easy to use, system functionality, system reliability, system integration (Interviewee 1), system reliability, system functionality (Interviewee 2)	ICT infrastructure
Infrastructure, poor infrastructure, lack of infrastructure (Unit A), infrastructure, poor infrastructure, lack of infrastructure (Interviewee 2)	
Instruction to use (Unit A), instruction to use, top management support (Unit B)	Commander support
Instruction to use (Interviewee 1), instruction to use, top management support (Interviewee 2)	
Basic HRMIS training (Unit B)	Training
Basic HRMIS training (Interviewee 1), train the trainer, basic HRMIS training (Interviewee 2)	Security
Username and password (Unit A), username and password (Unit B)	
Username and password (Interviewee 1), username and password (Interviewee 2)	Information quality
Information quality (Unit B)	
Information quality (Interviewee 1), information quality (Interviewee 2)	Service quality
Technical support (Unit A)	
Technical support (Interviewee 1), technical support (Interviewee 2)	

"I used the HRMIS regularly, and I think this system provides many facilities to ease my tasks and allow me to improve my daily job performance." (Respondent A11)

"I think the system is good as it enhances our skill in using a systematic way of managing our data compared to manual methods." (Respondent B2)

4.2.1.2. Work productivity. Work productivity refers to employees' capacity to perform their job effectively and efficiently (Bautista, Rosenthal, Lin, & Theng, 2018). It also refers to the amount of useful production contributed by the individual or organisation in optimising the specific technology (Valacich & Schneider, 2017). This study found out the using HRMIS has improved their productivity. This was noted from the FGDs.

"This system is good because it enables us to finish our work faster and can complete more tasks in terms of updating personal details, applying for leave etc." (Respondent A3)

"By using the HRMIS, it speeds up and simplifies my work, so it saves my time. Therefore, I can complete more work within a shorter period." (Respondent B3)

4.2.1.3. Decision making. Decision-making refers to the optional process made either by a manager or superior in formalising a decision (Yu et al., 2018). Technology enables individuals with authority in any organisation to make quick and accurate decisions by using readily available information and timely data (Stair & Reynolds, 2018). In this study, the respondents also asserted that the HRMIS helped them with decision making.

Table 2
Personal benefits of HRMIS usage.

Themes	Category/Factor
Speed up tasks (Unit A), enhance skill using the system (Unit B)	Job performance
Improve works process (Interviewee 1), improve works process, personal management (Interviewee 2)	Work productivity
Finish more tasks (Unit A), finish more tasks (Unit B)	
Complete more tasks (Interviewee 1)	Decision making
Decision making (Unit A), decision making (Unit B)	
Decision making (Interviewee 1), decision making (Interviewee 2)	

"This system is good; we can look online on the personal details and list of posts. For example, we can also nominate personnel to attend the course by looking at the personnel course data." (Respondent A9)

"This system will simplify my job as it does not need to run here and there to get the officer's signature for approval since all officers can access the system. All officers can make immediate decision to approve or not to any leave application by personnel." (Respondent B6)

Table 2 illustrates the themes derived from FGD and interviews on MAF personnel benefits.

5. Discussion

The adoption of the HRMIS by organisations seemed to be on a continuum, with some organisations having fewer obstacles in its implementations and others having more difficulties, especially when it concerns end-users. Based on the data gathered from the FGDs and interviews, the findings showed that the personnel of the MAF had some interesting information with regards to the HRMIS implementation. Three important factors were found to influence the adoption of the HRMIS, and they include system quality, service quality, and information quality. This outcome is consistent with earlier studies (McKnight et al., 2017; Salleh, Zakaria, & Abdullah, 2016). Increased system quality is expected to lead to greater user satisfaction and system utilisation, both of which would positively impact on the individual's productivity. This has been confirmed by Cohen et al. (2016). Service quality is also important, but this comes in the form of characteristics such as accuracy, technical skills, dependability, and responsiveness. This was endorsed by

Almarashdeh (2016). The importance of service quality can be seen through the desirable features of the system output such as the management web reports, and web interfaces. These desirable features include relevance, comprehensibility, accurateness, conciseness, completeness, currency, timeliness, and usability. Previous IS researchers tend to focus on measuring the quality of the system output rather than the quality of the system performance (DeLone & McLean, 1992). Supporting the current study's findings, Laumer, Maier, and Weitzel (2017) also maintained that the quality of the information is an important factor for determining end-users' satisfaction, which in turn, influences the implementation of the system.

ICT infrastructure was also identified as an important factor which supported the HRMIS usage among the military personnel in the MAF. Inevitably, ICT infrastructure refers to the various technologies that served as the foundation for any IS (Lin & Lin, 2008). According to Ahmadi et al. (2016), IS infrastructure is one of the most important factors in the adoption process. It includes tangible resources, including hardware and software. This is also supported by Bhattacharjee and Hikmet (2016), and Limbu et al. (2014). The latter had even suggested that adequate ICT infrastructure motivates IT usage and increases user satisfaction.

Apart from the above, commander support, where commander as the lawful authority to perform his/her duties; or to direct, coordinate and control forces under him/her (Malaysian Army Manual, 2009) is also relevant in influencing the usage of the HRMIS. This has been noted by Lin (2014) who mentioned that top management which engages in IS activities tend to positively influence their employees, as has been detected by Ahmadi et al. (2018) and Zhang et al. (2018). They found that top management support is important for the introduction of any IS. In brief, it is imperative that organisations intending to introduce technology implementations are backed by top management support (Giotopoulos et al., 2017). Top management support not only develops a positive attitude but also increases user satisfaction in using the IS (Wang & Song, 2017).

Training is an additional factor that may motivate the military personnel to use HRMIS. It involves the transferring of necessary knowledge of the IS concepts, technical skills, organisational skills and specific IS products (El-Kassar & Singh, 2018; El-Masri & Tarhini, 2017). Thus, technical training which provides users with adequate system knowledge is compulsory for the successful implementation of any IS. This outcome was also confirmed by previous studies (Marakarkandy, Yajnik, & Dasgupta, 2017; Mirzajani et al., 2016).

Security is another crucial factor when a system uses a networking platform that involves access to classified data (Ahmadi et al., 2016; Lu et al., 2017). Information security within an organisation has been an issue continuously addressed by ICT security experts (Vacca, 2017). User behaviour has been mentioned as one of the critical factors affecting security (Warkentin, Sharma, Gefen, Rose, & Pavlou, 2018), hence users need to have trust in the privacy and security of e-Government services. In this study, the same issue was highlighted by the MAF personnel. They were concerned about user identifications and passwords. Nonetheless, they were also confident with these security features.

Further to the factors influencing the HRMIS usage, the impact of the system on the MAF personnel benefits were also detected. The outcome derived from the FGDs and interviews endorsed three relevant benefits: job performance, work productivity, and decision making. This implies that the effective implementation of appropriate technology can increase long-term benefits to organisations, thereby reducing operating costs in terms of labour payroll followed by optimal resource usage (Valacich & Schneider, 2017;

Wang, Kung, & Byrd, 2016). Stair and Reynolds (2018) had maintained that effective technology usage within organisations improved productivity. The implementation of a good IS promotes employees' skills, thereby facilitating the management's planning, monitoring and decision-making processes (Laudon & Laudon, 2018).

6. Conclusion

This study had focussed on the usage of the HRMIS among the MAF personnel in Malaysia. Using the FGDs and interviews, data were analysed, and the factors influencing the HRMIS usage were identified. Based on these factors, the MAF would be in a better position to implement the appropriate measures so as to increase the usage of the HRMIS. This study was also able to show that the HRMIS implementation also brought about personal benefits for the personnel.

From the practical viewpoint, the findings derived may be applicable to other systems, for instance, other government agencies. From the academic perspective, the findings can be used by future studies, particularly those focussing on security and defence organisations. Additionally, the factors detected in this study form an integrated framework which can be further tested by future studies to examine the use and impact of IS in another similar organisational setting.

Like all research conducted, some constraints also prevailed in this study. Given that this study focussed on a military environment with unique characteristics and cultures, the findings might not be generalised to other organisation settings with different characteristics. Further, this study had only applied the data obtained from two FGDs and two individual interviews. Reinforcements can be made by increasing the number of respondents for the interviews. In addition, this study had engaged the human resource management system (HRMIS) as a review. Future studies may consider using other IS such as control systems and commands, training systems or a logistics system to generate more interesting findings. This study also used a qualitative approach; hence, future studies may consider validating the findings through an empirical study using a quantitative method.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of competing interestCOI

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix 1. Focus Group Agenda Planner

Appendix 2. Interview Questions

Estimated Time	Agenda Item
0:00–0:10	Introduction a. Moderator' introduction. Background and experience. b. Purpose. To get users' insights on HRMIS usage and discuss their feedback on this system. c. Use of data. This data will be used to find out the factors why the HRMIS is still not widely used in the MAF units. d. Anonymity. Participant identities will not be shared.
0:10–0:15	Warm-Up a. Audit by Malaysian Armed Forces HQ in September 2016 found the usage of the HRMIS was unsatisfactory. b. Weaknesses identified in the audit was the non-optimum system usage by users, whereby they were still using the manual method.
0:15–0:20	Writing Option a. Write your recent experience in using HRMIS.
0:20–1:30	Question Period a. What are your impressions of the HRMIS system? (1) What are the system's strengths? (2) What are the system's weaknesses? b. What do you suggest in improving the system? c. System characteristics and usage. (1) Performance. Does it speed up and ease the work process? (2) Ease of use. Is it easy to use? (3) Network access. Is the network easy to access? (4) Hardware. Is there enough computer? (5) Technical support. If there is a technical problem who should you contact? (6) Training. Is the training provided sufficient? (7) Usage instruction. Is there any instruction to use the system? (8) Security. Is it secure?
1:30–1:40	Summary a. Clarify and summarise. b. Strengths of HRMIS. c. Weaknesses of HRMIS. d. Final opinions if available.
1:40–1:45	Thank you/wrap up.

1:	What is your name, and when did you hold this appointment?
2:	Could you explain your duties briefly?
3:	Could you explain what HRMIS is?
4:	Is the implementation of MAF HRMIS is on schedule as it stated in planning?
5:	So far, what is the status of the implementation of this system?
6:	So far, do you think that the objectives of this project have been achieved?
7:	How is the infrastructure for this system determined?
8:	Is there adequate training for users and system administrators?
9:	Are users and units given enough time to make changes from manual methods to HRMIS?
10:	Is the location of the Army unit affecting the use of HRMIS?
11:	What if the unit failed or did not use this system?
12:	Are users provided with technical assistance if there is a problem while using this system?
13:	Regarding security, is the system secure?
14:	How does the contractor demonstrate the performance of this project?
15:	In your view, what is the acceptance level of users toward this MAF HRMIS system?
16:	Is there an issue of using a web browser in a hospital?
17:	Are there other unexpected problems in implementing this system?
18:	What is the future planning for Malaysian Armed Forces HQ to manage the implementation of this system?
19:	Is there any consideration to enable this MAF HRMIS to be accessed through a smartphone?
20:	As a user, could you explain your experience in using this system?
21:	Does it help significantly in day-to-day work?
22:	Are you experiencing problems such as missing data, not being updated, and so on?

References

- Ahmadi, H., Nilashi, M., Shahmoradi, L., & Ibrahim, O. (2016). Hospital Information System adoption: Expert perspectives on an adoption framework for Malaysian public hospitals. *Computers in Human Behavior*, 67, 161–189.
- Ahmadi, H., Nilashi, M., Shahmoradi, L., Ibrahim, O., Sadoughi, F., Alizadeh, M., & Alizadeh, A. (2018). The moderating effect of hospital size on inter and intra-organizational factors of Hospital Information System adoption. *Technological Forecasting and Social Change*, 134, 124–149.
- Alharthi, A., Krotov, V., & Bowman, M. (2017). Addressing barriers to big data. *Business Horizons*, 60(3), 285–292.
- Almaiah, M. A., & Alismaiel, O. A. (2018). Examination of factors influencing the use of mobile learning system: An empirical study. *Education and Information Technologies*, 24(1), 885–909.
- Almarashdeh, I. (2016). Sharing instructors experience of learning management system: A technology perspective of user satisfaction in distance learning course. *Computers in Human Behavior*, 63, 249–255.
- Au, M. L., Lo, M. S., Cheong, W., Wang, S. C., & Van, I. K. (2016). Nursing students' perception of high-fidelity simulation activity instead of clinical placement: A qualitative study. *Nurse Education Today*, 39, 16–21.
- Barbour, R. S., & Morgan, D. L. (2017). *A new era in focus group research: Challenges, innovation, and practices*. England: Palgrave MacMillan.
- Bautista, J. R., Rosenthal, S., Lin, T. T. C., & Theng, Y. L. (2018). Predictors and outcomes of nurses' use of smartphones for work purposes. *Computers in Human Behavior*, 84, 360–374.
- Bengtsson, M. (2016). How to plan and perform a qualitative study using content analysis. *NursingPlus Open*, 2, 8–14.
- Bhattacharjee, A., & Hikmet, N. (2016). Reconceptualizing organizational support and its effect on information technology usage: Evidence from the health care sector. *Journal of Computer Information Systems*, 48(4), 69–76.
- Bogner, A., Littig, B., & Menz, W. (2009). *Interviewing experts*. England: Palgrave MacMillan.

- Carey, M. A., & Asbury, J. (2016). *Focus group research*. New York, NY: Routledge.
- Cash, P., & Snider, C. (2014). Investigating design: A comparison of manifest and latent approaches. *Design Studies*, 35(5), 441–472.
- Choshin, M., & Ghaffari, A. (2017). An investigation of the impact of effective factors on the success of e-commerce in small- and medium-sized companies. *Computers in Human Behavior*, 66, 67–74.
- Cohen, J. F., Coleman, E., & Kangethe, M. J. (2016). An importance-performance analysis of hospital information system attributes: A nurses' perspective. *International Journal of Medical Informatics*, 86, 82–90.
- DeLone, W. H., & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information Systems Research*, 3(1), 60–95.
- DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems*, 19(4), 9–30.
- Dwivedi, Y. K., Rana, N. P., Jeyaraj, A., Clement, M., & Williams, M. D. (2017). Re-examining the unified theory of acceptance and use of technology (UTAUT): Towards a revised theoretical model. *Information Systems Frontiers*, 1–16.
- Dwivedi, Y. K., Rana, N. P., Jeyaraj, A., Clement, M., & Williams, M. D. (2019). Re-examining the unified theory of acceptance and use of technology (UTAUT): Towards a revised theoretical model. *Information Systems Frontiers*, 21(3), 719–734.
- El-Kassar, A., & Singh, S. K. (2018). Green innovation and organizational performance: The influence of big data and the moderating role of management commitment and HR practices. *Technological Forecasting and Social Change*, 144, 483–498.
- El-Masri, M., & Tarhini, A. (2017). Factors affecting the adoption of e-learning systems in Qatar and USA: Extending the unified theory of acceptance and use of technology 2 (UTAUT2). *Educational Technology Research & Development*, 65(3), 743–763.
- Giotopoulos, I., Kontolaimou, A., Korra, E., & Tsakanikas, A. (2017). What drives ICT adoption by SMEs? Evidence from a large-scale survey in Greece. *Journal of Business Research*, 81, 60–69.
- Hennink, M. M. (2014). *Focus group discussions: Understanding qualitative research*. New York, NY: Oxford University Press.
- Ibrahim, H., & Yusliza, M.-Y. (2015). User characteristics as antecedents of techno stress towards EHRM: From experts' views. *Procedia - Social and Behavioral Sciences*, 172, 134–141.
- Intra, G., Alteri, A., Corti, L., Rabellotti, E., Papaleo, E., Restelli, L., ... Viganò, P. (2016). Application of failure mode and effect analysis in an assisted reproduction technology laboratory. *Reproductive BioMedicine Online*, 33(2), 132–139.
- Jorgenson, D. W., & Vu, K. M. (2016). The ICT revolution, world economic growth, and policy issues. *Telecommunications Policy*, 40(5), 383–397.
- Jukic P, N., Gagliardi, C., Fagnani, D., Venturini, C., & Orlandoni, P. (2017). Home Enteral Nutrition therapy: Difficulties, satisfactions and support needs of caregivers assisting older patients. *Clinical Nutrition*, 36(4), 1062–1067.
- Krueger, R. A., & Casey, M. A. (2014). *Focus groups: A practical guide for applied research*. California, CA: SAGE Publications, Inc.
- Lambert, S. D., & Loiselle, C. G. (2008). Combining individual interviews and focus groups to enhance data richness. *Journal of Advanced Nursing*, 62(2), 228–237.
- Laudon, K. C., & Laudon, J. P. (2018). *Management information systems: Managing the digital firm*. England: Pearson Education Limited.
- Laumer, S., Maier, C., & Weitzel, T. (2017). Information quality, user satisfaction, and the manifestation of workarounds: A qualitative and quantitative study of enterprise content management system users. *European Journal of Information Systems*, 26(4), 333–360.
- Lee, Y., & Lee, S. W. (2018). The effect of Facebook use on office workers' job performance and the moderating effects of task equivocality and interdependence. *Behaviour & Information Technology*, 37(8), 828–841.
- Li, H., Dai, J., Gershberg, T., & Vasarhelyi, M. A. (2018). Understanding usage and value of audit analytics for internal auditors: An organizational approach. *International Journal of Accounting Information Systems*, 28, 59–76.
- Limbu, Y. B., Jayachandran, C., & Babin, B. J. (2014). Does information and communication technology improve job satisfaction? The moderating role of sales technology orientation. *Industrial Marketing Management*, 43(7), 1236–1245.
- Lin, H.-F. (2014). Understanding the determinants of electronic supply chain management system adoption: Using the technology-organization-environment framework. *Technological Forecasting and Social Change*, 86, 80–92.
- Lin, H., & Lin, S. (2008). Determinants of e-business diffusion: A test of the technology diffusion perspective. *Technovation*, 28, 135–145.
- Lincoln, Y. S., & Guba, E. G. (1985). Establishing trustworthiness. *Naturalistic Inquiry*, 289–331.
- Lu, J., Yu, C. S., Liu, C., & Wei, J. (2017). Comparison of mobile shopping continuance intention between China and USA from an espoused cultural perspective. *Computers in Human Behavior*, 75, 130–146.
- Malaysian Administrative Modernization and Management Planning Unit. (2016). *Pelan strategik ICT sektor awam 2016-2020*. Kuala Lumpur, KL: Malaysian administrative modernization and management planning unit (MAMPU).
- Malaysian Army Manual. (2009). *Individual leadership training*. Kuala Lumpur: KL: Malaysian Army Training Command Headquarters.
- Malaysian MINDEF Internal Audit. (2017). *Pemerhatian audit terhadap pengurusan sistem maklumat pengurusan sumber manusia angkatan tentera Malaysia (HRMIS ATM)*. Kuala Lumpur, KL: Malaysian Ministry of Defense.
- Malaysian Ministry of Defence. (2010). *National defence policy*. Kuala Lumpur, KL: Percetakan Haji Jantan Sdn Bhd.
- Malaysian Public Service Department. (2011). *HRMIS: Transformation of the Malaysian public sector human resource management of the 21st century*. Kuala Lumpur: KL: Jabatan Perkhidmatan Awam Malaysia.
- Mann, S. (2016). *The research interview: Reflective practice and reflexivity in research process*. England: Palgrave MacMillan.
- Manuri, I. (2015). Knowledge management strategy in the Malaysian Armed Forces: Towards next-generation knowledge-centric organization. *The Journal of Defence and Security*, 5(2), 216–223.
- Marakarkandy, B., Yajnik, N., & Dasgupta, C. (2017). Enabling Internet banking adoption: An empirical examination with an augmented technology acceptance model (TAM). *Journal of Enterprise Information Management*, 30(2), 263–294.
- McKnight, D. H., Lankton, N. K., Nicolaou, A., & Price, J. (2017). Distinguishing the effects of B2B information quality, system quality, and service outcome quality on trust and distrust. *The Journal of Strategic Information Systems*, 26(2), 118–141.
- Miles, M. B., Huberman, A. M., & Saldana, J. (2014). *Qualitative data analysis: A methods sourcebook*. Arizona, AZ: SAGE Publications.
- Mirzajani, H., Rosnaini, M., Ayub, A. F. M., & Wong, S. L. (2016). Teachers' acceptance of ICT and its integration in the classroom. *Quality Assurance in Education*, 24(1), 26–43.
- Morgan, D. L. (1996). Focus groups. *Annual Review of Sociology*, 22(1), 129–152.
- Nam, T. (2019). Determinants of local public employee attitudes toward government innovation. *International Journal of Public Sector Management*, 32(4), 418–434.
- Romdhane, S. B. (2013). Impact of information technology on the performance of Tunisian banks: A stochastic frontier analysis with panel data. *Asian Academy of Management Journal of Accounting and Finance*, 9(2), 95–125.
- Rosenthal, M. (2016). Qualitative research methods: Why, when, and how to conduct interviews and focus groups in pharmacy research. *Currents in Pharmacy Teaching & Learning*, 8(4), 509–516.
- Salleh, M. I. M., Zakaria, N., & Abdullah, R. (2016). The influence of system quality characteristics on health care providers' performance: Empirical evidence from Malaysia. *Journal of Infection and Public Health*, 9(6), 698–707.
- Sappri, M. M., Baharudin, A. S., & Raman, S. (2016). The moderating effect of user involvement and self-readiness and factors that influence information system net benefits among Malaysian public sector employees. *International Journal of Applied Engineering Research*, 11(8), 9659–9673.
- Savoldelli, A., Codagnone, C., & Misuraca, G. (2014). Understanding the e-government paradox: Learning from literature and practice on barriers to adoption. *Government Information Quarterly*, 31, 563–571.
- Shahibi, M. S., Saidin, A., & Izhar, T. A. T. (2016). Evaluating user satisfaction on human resource management information system (HRMIS): A case of Kuala Lumpur city Hall, Malaysia. *International Journal of Academic in Business and Social Sciences*, 6(10), 95–116.
- Sharma, S. K., Gaur, A., Saddikuti, V., & Rastogi, A. (2017). Structural equation model (SEM)-neural network (NN) model for predicting quality determinants of e-learning management systems. *Behaviour & Information Technology*, 36(10), 1053–1066.
- Singh, K. (2016). Influence of internal service quality on job performance: A case study of royal police department. In *6th international research symposium in service management, IRSSM-6 2015, 11-15 August 2015* (Vol. 224, pp. 28–34). Kuching, Malaysia: UiTM Sarawak. *Procedia - Social and Behavioral Sciences*.
- Stair, R. M., & Reynolds, G. W. (2018). *Principles of information systems*. Massachusetts, MA: Cengage Learning.
- Strauss, A., & Corbin, J. (2008). *Basics of qualitative research*. California, CA: Sage Publications.
- Tajudeen, F. P., Jaafar, N. I., & Ainin, S. (2018). Understanding the impact of social media usage among organizations. *Information & Management*, 55(3), 308–321.
- Vacca, J. R. (2017). *Computer and information security handbook*. Massachusetts, MA: Morgan Kaufmann Publisher.
- Valacich, J., & Schneider, C. (2017). *Information systems today: Managing in the digital world*. New York, NY: Pearson Education.
- Wang, Y., Kung, L., & Byrd, T. A. (2016). Big data analytics: Understanding its capabilities and potential benefits for healthcare organizations. *Technological Forecasting and Social Change*, 126, 3–13.
- Wang, G., & Song, J. (2017). The relation of perceived benefits and organizational supports to user satisfaction with building information model (BIM). *Computers in Human Behavior*, 68, 493–500.
- Warkentin, M., Sharma, S., Gefen, D., Rose, G. M., & Pavlou, P. (2018). Social identity and trust in internet-based voting adoption. *Government Information Quarterly*, 35(2), 195–209.
- Yeh, C. C., & Chen, Y. F. (2018). Critical success factors for adoption of 3D printing. *Technological Forecasting and Social Change*, 132, 209–216.
- Yu, T. K., Lin, M. L., & Liao, Y. K. (2017). Understanding factors influencing information communication technology adoption behavior: The moderators of information literacy and digital skills. *Computers in Human Behavior*, 71, 196–208.
- Yusof, M. M., & Aziz, K. A. (2015). Evaluation of organizational readiness in information systems adoption: A case study. *Asia-Pacific Journal of Information Technology and Multimedia*, 4(2), 69–86.
- Zainol, Z., Fernandez, D., & Ahmad, H. (2017). Public sector accountants' opinion on impact of a new enterprise system. In *Paper presented at the 4th information systems international conference 2017, 6-8 November 2017, Bali, Indonesia*.
- Zhang, Y., Wei, Y., & Zhou, G. (2018). Promoting firms' energy-saving behavior: The role of institutional pressures, top management support and financial slack. *Energy Policy*, 115, 230–238.