Adoption of Smart Systems and The Health Workers' Sustainable Job Performance: The Role of Attitude towards Smart Systems, Technology Readiness, Perceived Usefulness and Practicality of Medical Applications

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ABSTRACT

Theoncept of sustainable job performance is at growth stage and researchers have been trying to conceptualize sustainable job performance and struggling to understand how the smart workplace predicts sustainable job performance. In this context, the purpose of this study is to examine the influence of attitude towards smart systems, technology readiness, perceived usefulness and the practicality of medical applications on the adoption of smart systems and the health workers' sustainable job performance. Data was collected from 217 health workers working in hospitals and health centers in Saudi Arabia. Structural Equation Modeling (SEM) with Amos 16 was used to analyze the data. The results of the study indicated that the adoption of smart systems mediates the relationships between the attitude towards smart systems, technology readiness, perceived usefulness and the practicality of medical applications and the health workers' sustainable job performance. The findings of this study will be helpful for policy makers and the management of organizations in the health sector for adopting practices based on the smart workplace and in achieving the health workers' sustainable job performance.

KEYWORDS: Sustainable job performance, Health workers, Smart system adoption, Technology adoption, Mobile Applications.

INTRODUCTION

The health sector in Saudi Arabia has been facing multiple challenges, such as the growing population from 33.5 million in mid-2018 to 39.5 million by 2030, showing an increase of elderly people to 1.96 million in mid-2018 to 4.63 million by 2030, prospectively. Considering these challenges, the Ministry of Health has decided to transform the health sector and adopted the Health Sector Transformation Strategy. The main goals of this strategy is to improve life expectancy in Saudi Arabia to 80 years by 2030, improve healthcare by providing better

services and improve value by reducing cost and improving outcomes, among others. Therefore, to achieve these goals, according to The Ministry of Health (MoH) (2019) there is a need to "Ensure a broad-based, highly educated, skilled and highly productive healthcare workforce, staffed increasingly by Saudi citizens". In addition, the Strategy states that there is a need to harness technology, the internet and mobile telephony, computational power and interoperability, big data and analysis to improve patient access, education and involvement in protecting and promoting their health, to drive quality and efficiency gains and to build a learning health system" (p.13).

Limited research has been done to understand what technology-related factors are important to harness technology, internet and mobile telephony within the health sector, and what is the effects of these factors on employee productivity. Therefore, this study has identified important factors which can be considered to be vital in harnessing the technology, internet and mobile telephony in the context of the Saudi health sector. Therefore, the purpose of this study is to examine the influence of Attitude towards Smart System (ATSS), Perceived Usefulness of medical applications (PUMA), Perceived Practicality of medical applications (PPMA), Technology Readiness (TR), Adoption of Smart System (ASS) on Health Workers' Sustainable Job Performance (HWSJB).

LITERATURE REVIEW

Human sustainability is a growing concept and researchers have been focusing on exploring how to manage human resources for sustainability. In this context, Pfeffer (2010) proposed the term "social sustainability" and explained that organizational activities and different management practices influence the employee's sustainable job performance. Taris et al. (2015) explained that high employee performance may negatively affect their health and wellbeing. Therefore, some attention should be placed on the employees' wellbeing and health for better future performance (Van der Heijden et al., 2020). Also, researchers should study sustainability and job performance together as sustainable job performance (Ji et al., 2021). In understanding the concept of employees' sustainable job performance, few researches have taken the initiative to combine the terms, sustainability and employees job performance. In this context, Ji et al. (2021) have placed considerable efforts to conceptualize the term, employees' sustainable job performance, and argued that employee performance and well-being are two main elements of employees' sustainable job performance.

De Jonge and Peeters (2019) explained that to achieve sustainable job performance, organizations should adopt a sustainable work system, and this will also help them achieve long -term human sustainability. In this context, Kira and Lifvergren (2014) explained that the preservation of non-renewable resources and the re-generation of renewable resources are the key elements in a sustainable work system. Also, the employees need adequate job and personal resources and recovery opportunities to fulfill job demands (De Jonge, Demerouti, & Dormann, 2014). Therefore, the smart system is one of the job resources to provide a sustainable work system, which then helps employees achieve sustainable job performance. In this case, Chan (2012) suggested that the smart system improves the service quality and enables employees to make effective decision.

Simmonds and Bhattacherjee (2015) explained that smart system helps employees to perform complex tasks effectively and work as an important tool for team or groups to achieve their project goals (Agius, 2012). In addition, Luxton et al. (2011) pointed out that the smart system is helpful for health practitioners in improving operations and efficiency, such as the use of applications in measuring behavioral tendencies is an example of smart technologies as they

are easy to use and compatible to user needs (Alyammahi, 2018). Therefore, smart technologies help employees be more productive, effective and creative. In addition, Alawadhi et al. (2012) argued that among different smart technologies, mobile technology is the most effective since its helps employees and customers to effectively communicate with each other.

Mobile technology is a critical element in smart technology where employees can download different applications onro their mobile phone and use it for various purposes, such as networking, performing job tasks and self-development. Relatively, Weichhart et al. (2016) suggested that organizations should use mobile applications to improve direct communications with stakeholders. In addition, Kaur and Rani (2015) have highlighted that conventional a work system is no longer effective for healthcare. The incorporation of modern technology based on the smart system is vital; these include cloud computing, mobile applications and electronic medical record database. However, organizations and employees can effectively use these technologies only if they are ready to use and adopt such technologies. Contextually, Wang et al. (2016) explained that technology readiness influence individual behavior in technology adoption. In addition, Lin and Chang (2011) highlighted that technology readiness positively influence the employees' attitude towards technology adoption, and many studies have found that modern technological infrastructure in the organization encourage employees to adopt modern technologies (Alyammahi, 2018). Furthermore, Elliott, Meng, and Hall (2012) also found that technology readiness positively predicts adoption of new technology.

Alyammahi (2018) explained that positive attitude and the perceived importance of technology encourage employees to adopt technology. In other words, when employees perceived that using smart system will be helpful in performing job tasks and also important for sustainable job performance, they will develop a positive attitude towards smart systems. In this context, Hsu and Lin (2016) pointed out that the adoption of smart systems depends on the individuals' attitudes towards smart systems. In other words, when employees possess a positive attitude towards smart systems, they will be more inclined to adopt the smart system. Furthermore, Eom, Choi, and Sung (2016) suggested that ease-of-use and usefulness develop the attitude towards the adoption of smart systems. Park et al. (2022) explained that perceived ease-of-use and usefulness are critical elements in the technology acceptance model, and perceived usefulness play an important role in basic technology acceptance. In addition, Kim, Jo, and Lee (2019) stated that perceived ease-of-use and usefulness positively influence the use of artificial intelligence. In addition, Abolfotouh et al. (2019) found that healthcare workers tend to use the smartphone when they perceive its practical and useful. Therefore, based on the above discussion, this study proposed the following hypothesis:

Hypothesis:

H1: Adoption of Smart System (ASS) mediates the relationship between Attitude towards Smart System (ATSS) and Health workers Sustainable Job Performance (HWSJB).
H2: Adoption of Smart System (ASS) mediates the relationship between Perceived usefulness of medical applications (PUMA) and Health workers Sustainable Job Performance (HWSJB).
H3: Adoption of Smart System (ASS) mediates the relationship between Perceived practicality of medical applications (PPMA) and Health workers Sustainable Job Performance (HWSJB).
H4: Adoption of Smart System (ASS) mediates the relationship between Technology Readiness (TR) and Health workers Sustainable Job Performance (HWSJB).

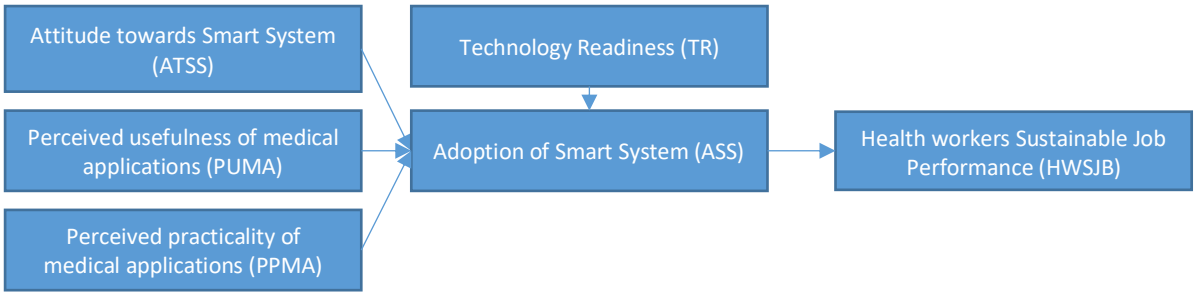

Figure 1: Conceptual Framework

METHODOLOGY

As this is largely quantitative research, probability sampling method was used to select the sample. In this case, Bhatti and Sundram Kaiani (2015) suggested that probability sampling method is useful when the nature of study is deductive. Therefore, in probability sampling method, simple random sampling was used to target the sample. 500 questionnaires were distributed to health workers working in various hospitals and health centers in Saudi Arabia. 226 completed questionnaires were returned and out of those, 9 questionnaires were discarded due to incomplete responses. The remaining 217 completed questionnaires were used in analysis. Structural Equation Modelling (SEM) with Amos-16 was used to analyze the data. According to Bhatti and Sundram Kaiani (2015), SEM is the most appropriate technique to be used to examine the relationships among independent and dependent variables, more specifically when the model is based on mediation. Measurement and structural model fit was obtained with path analysis to examine the strength of the relationship and mediation proposed in the model.

Measurements

The perceived usefulness of the medical application scale was measured using five items adopted from Abolfotouh et al. (2019). The scale items include, 1. "Medical apps on the smartphone improve my tracking of patient condition and performance," 2. "Medical apps on the smartphone save the time and efforts of healthcare provider," 3. "Medical apps on the smartphone rapidly retrieve the information from the patient," 4. "Medical apps on the smartphone allow the healthcare provider to follow-up the patient's condition from outside of the hospital," and 5. "Medical apps on the smartphone enable the healthcare provider to get the information from the patient quickly (through the software)". The perceived practicality of the medical application scale was measured using five items adopted from Abolfotouh et al. (2019). The scale items include, 1. "Learning to operate and use medical apps on the smartphone would be easy for me" 2 "I would find it easy to get medical apps on the smartphone to do what I want it to do," 3. "My interaction with medical apps on the smartphone would be clear and understandable," 4. "I would find the medical apps on the smartphone to be flexible to interact with," and 5. "It would be easy for me to become skillful at using medical apps on the smartphone".

The attitude towards the smart system was measured using five items adopted from Alyammahi (2018). The scale items includes, 1. "Using smart systems is important to your job," 2. "Using smart systems is relevant to your job," 3. "Using smart systems is helpful," 4. "Using smart systems is practical," and 5. "I like the idea of using smart systems". The adoption of smart systems was measured using five items adopted from Alyammahi (2018). The scale items include, 1. "On average, how frequently do you use the smart system for workplace duties?" 2. "On average, how much time do you spend per week using smart systems for job-related work?" 3. "Can you please

indicate your level of usage of smart systems?" 4. "How many different applications of smart systems do you use?" and 5. "Do you use the sophisticated features of smart systems?".

Technology Readiness was measured using five items adopted from Cheung and Vogel (2013). The scale items include, 1. "My organization is ready to use smart systems," 2. "The organization is mature in terms of technology to adopt smart systems," 3. "The organization uses updated technology," 4. "The organization is technologically sophisticated to use smart systems," and 5. "The organization is up-to-date regarding modern technology". Finally, sustainable job performance was measured using 10 items developed by Ji et al. (2021). For every scale item, the sentence will start with "During my entire career, I will be able to," followed by the following scale items, 1. "continuously achieve the objectives of my job," 2. "permanently meet the criteria for my job performance," 3. "continuously demonstrate expertise in all job-related tasks," 4. "persistently perform well in the overall job by carrying out tasks as expected," 5. "continuously fulfill all the requirements of my job," 6. "permanently be competent in all areas of my job," 7. "persistently manage more responsibility than typically assigned," 8. "organize and plan well to achieve objectives of my work in a sustainable way," 9. "organize and plan well to meet deadlines of my work in a sustainable way," and 10. "permanently be suitable for my job".

ANALYSIS AND RESULTS

Table 1. Reliability of the Scale

Constructs	Internal Consistency
Attitude towards Smart System (ATSS)	0.62
Perceived usefulness of medical applications (PUMA)	0.64
Perceived practicality of medical applications (PPMA)	0.69
Technology Readiness (TR)	0.72
Adoption of Smart System (ASS)	0.77
Health workers Sustainable Job Performance (HWSJB)	0.79

Table 1 shows that the reliability of all scales is above then 0.6 (Hair et al., 2007) which indicates that all scales have higher internal consistency level.

Table 2: Demographic profile

Demographics	No. of Supervisor/Managers	Percentage
Gender		
Male	105	48.3
Female	112	51.6
Age		
18-28 years	75	34.5
29-39 years	128	58.9
40 and above	14	6.4
Education		
Diploma	89	41.0
Graduates	101	46.5
Masters	25	11.5
Others	2	0.09
No. of years Experience		
less than 5	91	41.9
6-10	88	40.5
11 and above	38	17.5

Notes for the Model

Table 3. Computation of degree of freedom (Default Model)

Number of distinct sample moments	1158
Number of distinct parameter to be estimated	297
Degree of freedom (1158-297)	861

Table 4. Measurement Model fit

Overall Model Measure	Overall Model Score	Acceptable Model Fit	Acceptable Baseline
CFI	0.927	Passed	≥0.90
AGFI	0.871	Passed	≥0.80
RMSEA	0.011	Passed	< 0.10
CMIN/DF	1.67	Passed	< 3
TLI	0.941	Passed	≥ 0.89
IFI	0.962	Passed	≥ 0.90

Table 5. Structural Model fit

Overall Model Measure	Proposed Model	Acceptable Model Fit	Acceptable Baseline
CFI	0.958	Passed	≥0.90
AGFI	0.871	Passed	≥0.80
RMSEA	0.022	Passed	< 0.10
CMIN/DF	1.97	Passed	< 3
TLI	0.951	Passed	≥ 0.89
IFI	0.943	Passed	≥ 0.90

Table 6. Summary of Effects

Variables	Direct Effects	Indirect Effects	Total Effects
ATSS --> ASS	0.128	--------	0.128
PUMA --> ASS	0.201	--------	0.201
PPMA --> ASS	0.287	--------	0.287
TR --> ASS	0.193	--------	0.193
ASS --> HWJP	0.277	--------	0.277
ATSS --> HWJP	0.187	--------	0.187
PUMA --> HWJP	0.197	--------	0.197
PPMA --> HWJP	0.022	--------	0.022
TR --> HWJP	0.017	--------	0.017
ATSS --> HWJP	--------	0.479	0.479
PUMA --> HWJP	---------	0.349	0.349
PPMA --> HWJP	---------	0.481	0.481
TR --> HWJP	---------	0.399	0.399

Table 7. Result of Analyses and Hypotheses

	Hypotheses	P-value	t-value	Accept or Reject
H1	Adoption of Smart System (ASS) mediates the relationship between Attitude towards Smart System (ATSS) and Health workers Sustainable Job Performance (HWSJB).	0.032	2.97	Accept
H2	Adoption of Smart System (ASS) mediates the relationship between Perceived usefulness of medical applications (PUMA) and Health workers Sustainable Job Performance (HWSJB).	0.022	3.64	Accept
H3	Adoption of Smart System (ASS) mediates the relationship between Perceived practicality of medical applications (PPMA) and Health workers Sustainable Job Performance (HWSJB).	0.017	4.87	Accept
H4	Adoption of Smart System (ASS) mediates the relationship between Technology Readiness (TR) and Health workers Sustainable Job Performance (HWSJB).	0.041	3.19	Accept

The results of this study indicated that Adoption of Smart System (ASS) mediates the relationship between Attitude towards Smart System (ATSS), Perceived usefulness of medical applications (PUMA), Perceived practicality of medical applications (PPMA), Technology Readiness (TR) and Health workers Sustainable Job Performance (HWSJB). Therefore, H1, H2, H3, H4 is accepted.

DISCUSSION

Past researchers have been frequently using the term "sustainability" and "job performance", but limited research has been done to study these two terms together (Ji et al., 2021). In addition, De Jonge and Peeters (2019) argued that the health workers' sustainable job performance is beneficial for employees and organizations, therefore, researchers should empirically examine the factors that effects the employees' sustainable job performance (Ji et al., 2021). Therefore, the purpose of this study is to examine the influence of smart system adoption, attitude towards smart system, technology readiness, perceived usefulness and perceived practicality of medical applications on health workers' sustainable job performance.

The findings of this study indicated that adoption of the smart system mediates the relationship between attitude towards smart system, and these findings are consistent with Alyammahi (2018) and Hsu and Lin (2016) in which they suggested that the individual's positive attitude towards the smart system may encourage them to adopt the smart system. Therefore, when individuals think positively about smart systems and technologies, there is a high chance for them to adopt the smart system that will further help them improve their job performance and well-being, which is collectively referred to as sustainable job performance. In contrast, when individuals have a negative attitude towards smart systems and technologies, they may be less inclined towards the adoption of the smart system. In this modern era, it would be difficult for any employees to improve job performance without adopting smart systems. For instance, since the spread of Covid-19, the health sector shifted their workload to smart systems, which included mobile applications, such as apps that help book appointments for PCR tests, managing medical reports, self-examination and reporting systems through mobile apps, among others. In this situation, if health workers display negative attitudes towards these technologies, it will be difficult for them to adopt smart systems and achieve sustainable job performance. Therefore, a positive attitude towards smart systems is considered the first stage in smart system adoption towards achieve sustainable job performance.

The findings of this study also indicated that technology readiness positively influences smart system adoption, which helps health workers to achieve sustainable job performance. These findings support the viewpoints of Want et al., (2016) and Lin and Chang (2011) in which they argued that technology readiness provide opportunities and encourage employees to adopt smart systems. A point of consideration is that when organizations do not have technological infrastructure and resources, employees may not feel encouraged to adopt smart systems. In addition, the lack of technological readiness, such as poor technological infrastructure or the lack of technological skills may become challenging for employees to perform job tasks using smart systems. This possible scenario could result in employees preferring to perform job tasks without technology or smart system. Therefore, when health workers find good technological infrastructure and better resources to use smart systems, they are more likely adopt smart systems to achieve sustainable job performance.

Past studies have well-documented the importance of Technology Adoption Model (TAM), but this study examine the importance of two of the most important elements of TAM, which are ease-of-use and usefulness in a slightly different direction. This study used these elements in the context of mobile applications; specifically, the perceived usefulness of mobile applications and the perceived practicality of mobile applications. Since the usage of mobile applications has been growing, organizations have been introducing different applications for employees to adopt and perform job tasks, but the main focus is the employees' perceptions about these mobile applications. If employees perceived that these mobile applications are useful and practical, they tend to adopt these mobile applications as part of smart system adoption and to achieve sustainable job performance. The findings of this study also indicated that the health workers' perceived usefulness of mobile applications and perceived practicality of mobile applications encourage them to adopt smart system to improve well-being and job performance, which definitively referred to as sustainable job performance. These findings are consistent with Abolfotouh et al. (2019) and Kim et al. (2019) in which they explained that employees tend to use the smartphone when they perceived its use to be useful and practical.

THEORETICAL AND PRACTICAL IMPLICATIONS

As do all quantitative studies, this study eludes to several theoretical and practical implications. From a theoretical point-of-view, firstly, this study empirically examined the concept of sustainable job performance and tested the measurement scale of sustainable job performance as developed by Ji et al. (2021). Empirical results of the current study will support the conceptualization and literature of sustainable job performance. Secondly, the findings of this study provide empirical support of the mediating role of smart system adoption between the positive attitudes towards smart systems, perceived usefulness and practicality of mobile applications, technology readiness and sustainable job performance. Lastly, the findings of this study strengthen the body of knowledge by empirically testing the relationships among these variables. From a practical point-of-view, this study suggests that management and policy makers should provide appropriate technological infrastructure and resources in the hospitals and health centers to ensure technology readiness. This will encourage employees to adopt the smart system and achieve sustainable job performance. In addition, management of healthcare units and organizations should ensure that mobile applications designed and developed for healthcare workers are useful and practical because when health workers perceived that these applications to be useful and practical, they tend to adopt these applications, hence adopting the smart system and achieve sustainable job performance.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

There are several limitations in this research, which give cause to invite future researchers to further validate the current research findings. Firstly, the current research focuses only on the health sector, which makes these findings less applicable in other settings, such as in the tourism and hospitality, banking and higher education sectors. Therefore, future researchers should examine these variables within various other settings to further validate the current results. Secondly, the current study's findings are based on a limited data set; therefore, future researchers should collect data from larger sample sizes and compare the results. Thirdly, the current research is limited to a few variables, which included ease-of-use, usefulness, attitude towards technology, when there are many other organizational factors, individual factors and environmental factors that need to be explored in order to better understand sustainable job performance. Therefore,

future researchers should examine environmental, organizational and individual factors, as well and explain how these factors influence sustainable job performance of employees. Lastly, the current study did not explore the role of demographics in sustainable job performance and the smart workplace. Future researchers should explore how gender, age group and educational level contributes to the adoption of smart systems and sustainable job performance.

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