

# ASSESSING HEALTHCARE PROVIDERS' ACCEPTANCE OF THE HOSPITAL MANAGEMENT SYSTEM IN A PRIVATE HOSPITAL IN SELANGOR, MALAYSIA

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## ABSTRACT

**Introduction:** In the current technological era, the implementation and use of information and communication technology are crucial for productivity and organizational management in the health sector. This study aimed to investigate factors influencing staff acceptance of the Hospital Management System (HMS) using the Unified Theory of Acceptance and Use of Technology (UTAUT) in a private hospital in Selangor, Malaysia. **Methods:** Semi-structured interviews were conducted with 25 healthcare professionals, including doctors, nurses, and administrative staff, to explore their experiences and perceptions of the HMS. Data collection was performed through interviews and observations and analyzed using thematic analysis with ATLAS.ti. **Results:** The study identified five key themes influencing HMS acceptance: performance expectancy, effort expectancy, social influence, facilitating conditions, and behavioral intention. Participants emphasized the importance of system reliability, speed, and user-friendly interfaces for efficient workflow. Peer support and a technology-promoting organizational culture positively influenced system use. Comprehensive training and continuous technical support were crucial for user confidence. Despite recognizing the system's benefits, participants highlighted challenges such as inadequate system integration and the need for simultaneous digital and traditional record-keeping. **Conclusion:** Addressing these issues and tailoring the HMS to meet specific departmental needs can enhance user satisfaction and system effectiveness. The study underscores the importance of understanding user needs and providing robust support systems to facilitate the successful implementation and adoption of HMS in healthcare settings.

**Keywords:** Information technology, health management system, acceptance, perceptions, system performance.

## Introduction:

Hospital Management Systems (HMS) have the potential to significantly reduce documentation errors and enhance communication between departments and management within healthcare facilities (Liew & Lee, 2016). These systems play a crucial role in improving the overall quality of healthcare services (Reddy, Dourish, & Pratt, 2019). The increased performance and efficiency brought about by HMS have led to widespread adoption and implementation in the healthcare sector. HMS is recognized for several advantages, including reducing the need for physical data storage, improving the speed and reliability of information retrieval, and enhancing data security (Kilsdonk, Peute, & Jaspers, 2017). Secured by access-controlled systems, HMS helps prevent data breaches and ensures the confidentiality of patient and staff information (Paré & Trudel, 2015). However, despite these advantages, there remains a consistent need to understand and improve staff acceptance of HMS to ensure successful implementation and continuous improvement.

Studies have shown that system delays and unsuccessful implementations of HMS are often due to issues with staff acceptance (Venkatesh & Bala, 2008). Therefore, fostering a positive attitude towards HMS among staff through effective training and support is essential (Davis, 1989). Understanding the factors that influence staff acceptance is critical for the successful integration of HMS into daily healthcare operations (Venkatesh & Bala, 2008; Davis, 1989). The COVID-19 pandemic and subsequent lockdowns have accelerated the digital transformation of healthcare systems, including Malaysia (Chen et al., 2024a; Abdalqader et al., 2020a; Abdalqader et al., 2020b). The Ministry of Health Malaysia has been moving towards the digitalization of the healthcare system, emphasising the use of ICT, social media, and digital tools (Marzo et al., 2024; Chen et al., 2023; Marzo et al., 2022). This transition highlights the growing importance of HMS in the healthcare sector. By examining the experiences and perceptions of end users, particularly doctors and nurses, this research seeks to identify key acceptance factors that can inform future HMS implementations. This understanding can benefit the hospital by improving HMS acceptability, ultimately enhancing the efficiency and effectiveness of healthcare delivery.

Each research study, uniquely executed for specific organisations, can produce beneficial results for growth. This study is particularly beneficial for the hospital in question, as it aims to improve the HMS and raise crucial questions regarding system enhancements and user acceptance. End users are pivotal, as their understanding of the system's processes and navigation is essential for efficient document management (Ammenwerth & Rigby, 2016). When end users navigate the system correctly, it leads to efficient work processes, benefiting both the users and the organisation in terms of cost and time savings (Ben-Zur & Matz, 2021).

The study also benefits IT experts by identifying necessary potential changes in the HMS, particularly towards the front desk system. Understanding required acceptance factors among different user groups before implementing HMS can enhance future implementations, ensuring that the system meets user needs effectively (Paré & Trudel, 2015). HMS carries several notable advantages: it helps reduce the volume of physical data and storage space requirements by archiving data offsite for safe storage (Kilsdonk, Peute, & Jaspers, 2017); successful HMS can quickly and reliably retrieve information, crucial for large-scale service delivery (Paré & Trudel, 2015); and access-controlled

systems ensure data security, minimising errors, and breaches, thus safeguarding patient and staff information (Kilsdonk, Peute, & Jaspers, 2017).

This qualitative study aimed to explore the factors that affect the acceptance of HMS among staff in a private hospital in Malaysia, using the Unified Theory of Acceptance and Use of Technology (UTAUT). By identifying the elements critical for the successful acceptance of HMS, this research aims to address issues that may influence system acceptance. The UTAUT model is a widely used and trusted tool for assessing technology acceptance (Venkatesh et al., 2003), making it suitable for this study's objectives.

## **Theoretical Background**

This section presents an overview of the Unified Theory of Acceptance and Use of Technology (UTAUT) model and its constructs, which was developed by Venkatesh et al. (2003) for understanding system acceptance in the healthcare sector (Figure 1). Several models have been developed to predict factors that lead to the acceptance of HMS. Among them, UTAUT is considered highly effective for understanding the intention and actual use of such systems. UTAUT provides a comprehensive framework for analysing user behaviour and is a convenient instrument for measuring acceptance success. The model suggests four key predictive factors: performance expectancy, perceived ease of use, social influence, and facilitating conditions.

### **I. PERFORMANCE EXPECTANCY**

Performance expectancy, also known as perceived usefulness, refers to the degree to which users believe that utilising a given system will help them achieve gains in job performance. According to Venkatesh et al. (2003), performance expectancy is defined as “the degree to which an individual believes that using the system will help him or her to attain gains in job performance.” This construct has roots in several theories, including perceived usefulness from the Technology Acceptance Model, extrinsic motivation from the motivational model, relative advantage from innovation diffusion theory, and outcome expectations from social cognitive theory.

### **II. PERCEIVED EASE OF USE**

Perceived ease of use, also known as effort expectancy, describes the degree of ease associated with the use of the system. Its root constructs are derived from TAM and TPB, including complexity and ease of use. Meta-analyses have revealed that perceived ease of use has a significant impact on older individuals' intentions to use HMS. Venkatesh et al. (2013) define perceived ease of use as the degree of ease related to the application of a specific system.

### III. SOCIAL INFLUENCE

Social influence refers to the degree to which individuals perceive that important others believe they should use the new system. This construct includes social factors, subjective norms from TRA and TAM, and image. Meta-analyses indicate that social influence has small effect sizes, which aligns with other studies that have not found a strong relationship between social influence and intention.

### IV. FACILITATING CONDITION

Facilitating conditions refer to the degree to which individuals believe that an organisational and technical infrastructure exists to support the use of the system. Root constructs include perceived behavioural control, facilitating conditions, and compatibility. Meta-analyses have shown that facilitating conditions have the least impact on technology usage intentions, as noted by Venkatesh et al. (2003).

In this qualitative study, UTAUT provides a useful lens through which to explore and understand the factors that influence staff acceptance of HMS in a private hospital in Malaysia. By examining these constructs, the study aims to gain deeper insights into the behavioural intentions of healthcare professionals towards the system, thus contributing to better implementation and user engagement strategies.

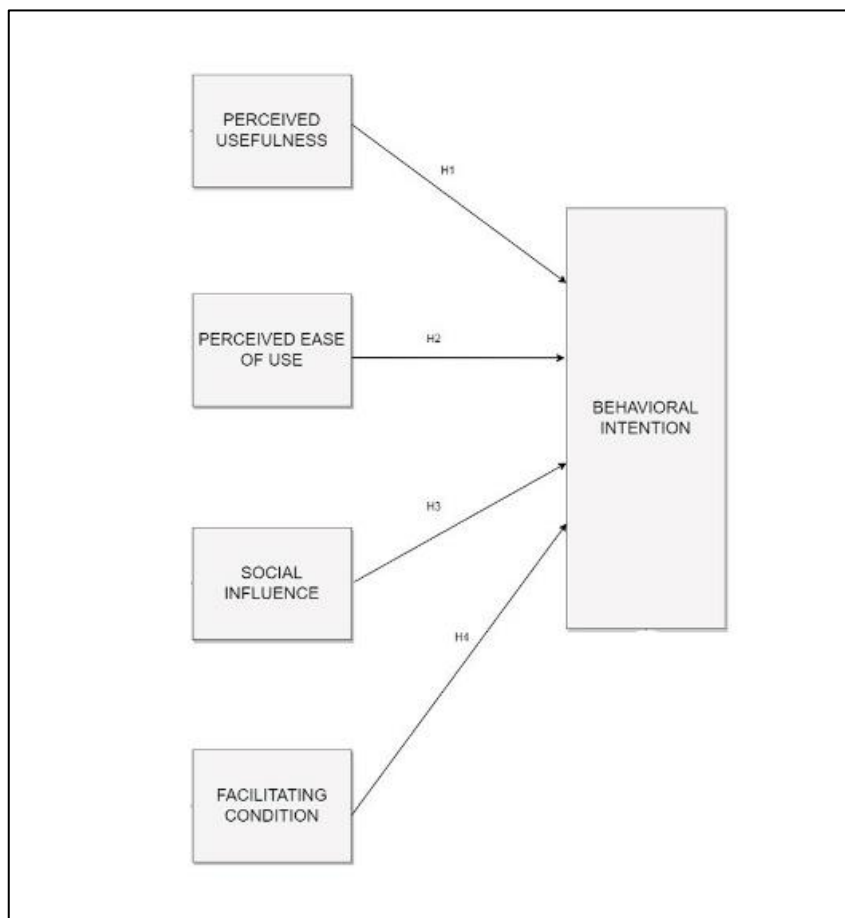


Figure 1. UTAUT model (Venkatesh et al., 2003).

## **Methods:**

### *Research Design*

This study employed a qualitative research design to explore the factors affecting staff acceptance of the HMS at a private hospital in Shah Alam, Selangor, Malaysia.

### *Setting and Participants*

The study was conducted at a private hospital in Shah Alam, Selangor. Participants included nurses and doctors who regularly use the HMS in their daily work. The selection of these participants was based on their direct interaction with the system, ensuring they had relevant and practical experience.

### *Data Collection*

A questionnaire was used to collect sociodemographic information from each participant, including age, gender, level of education, employment information (such as position, role, and duration of employment), family income, and marital status.

Data were collected through semi-structured interviews and unstructured observations. The interviews targeted department leaders, doctors, and nurses, focusing on their experiences and perceptions of the HMS. Interviews lasted between 30 minutes and an hour and were conducted in the doctors' or management offices. An electronic recording device was used to capture all spoken responses. Unstructured observations were also conducted to gain a deeper understanding of the real-world use of the system.

The principle of saturation guided the sample size, continuing data collection until no new themes or insights emerged. This approach ensured comprehensive and credible findings by focusing on the depth and richness of the data. Data saturation is reached when there is enough information to replicate the study (O'Reilly & Parker, 2012; Walker, 2012) when the ability to obtain additional new information has been attained (Guest et al., 2006), and when further coding is no longer feasible (Guest et al., 2006)

### *Data Analysis*

The collected data were analyzed using both inductive and deductive methods, employing the constant comparative analytic approach. Transcriptions of interviews and observational notes were analyzed using ATLAS.ti qualitative data analysis software. The analysis involved identifying key themes and patterns related to the challenges and successes experienced by HMS users. Secondary data from books, reports, articles, journals, and historical documents were also reviewed to contextualize and support the findings.

### *Ethics consideration*

Ethical approval was obtained from the Ethics Committee of Management and Science University. Informed consent was obtained from all respondents before distributing the questionnaire.

## Results:

### *Sociodemographic Profile*

This study included a group of healthcare professionals with varying roles and experience levels. A total of 25 participants, including doctors, nurses, and administrative staff from a private hospital participated in the study. The diverse demographic characteristics of these participants provided a comprehensive understanding and broad perspective on different users' experiences and interactions with the HMS. The participants reported their sociodemographic characteristics, such as age, gender, level of education, employment information, family income, and marital status.

### *Acceptance of HMS*

The findings were grouped by nuclei of meaning, resulting in five categories as follows: category 1) 'performance expectancy'; 2) 'effort expectancy'; 3) 'social influence'; 4) 'facilitating conditions'; and 5) 'behavioral intention'.

### *Performance Expectancy*

This theme explores the participants' perceptions of how the performance of the HMS influences their work efficiency and overall user experience. Participants consistently emphasized the critical role of system performance in facilitating efficient work processes. The reliability and speed of the HMS were crucial factors affecting productivity:

"The system needs to be up all the time; any downtime severely impacts our work." (P4)

"When the system is slow, it delays everything, from patient check-ins to accessing records." (P7)

### *Effort Expectancy*

This theme delves into the participants' views on the ease of use of the HMS and how it influences their acceptance of the system.

Participants valued a simple and intuitive interface, and while some initially found aspects of the system challenging, they reported that these challenges became manageable with practice. The simplicity of the user interface and the learning curve were critical factors in the user experience:

"The system is straightforward; I don't need extensive training to navigate it." (P12)

"Initially, it was tough, but with practice, it became easier." (P3)

### *Social Influence*

The influence of peers and organisational culture played a significant role in the adoption and use of the HMS. Colleagues provided support and encouragement, while the hospital's culture of promoting technology positively affected user attitudes:

"We often help each other out with any issues we face with the system." (P8)

"Our management promotes the use of technology, which motivates us to adapt." (P19)

#### *Facilitating Conditions*

This theme addresses the resources and support systems available to users, which are essential for the effective use of the HMS. Comprehensive training was crucial for users to gain confidence in using the HMS and continuous technical support was necessary to address any problems promptly:

"The training sessions were very helpful in getting us up to speed." (P4)

"Whenever there's a problem, the IT team is quick to assist." (P10)

#### *Behavioural Intention*

Various factors influenced participants' intentions to continue using the HMS. Positive experiences with the system reinforced their intention to use it regularly. Despite some challenges, users were willing to adapt due to the overall perceived benefits:

"I find the system very helpful, so I am inclined to use it regularly." (P17)

"There are some issues, but the overall benefits make it worthwhile." (P12)

#### **Discussion:**

Based on the UTAUT model, this qualitative study conducted at a private hospital in Shah Alam, Selangor, sheds light on the multifaceted factors influencing the acceptance and use of the HMS by healthcare professionals. The thematic analysis has revealed critical insights into user experiences and perceptions, highlighting areas of both strength and concern. These five themes are performance expectancy, effort expectancy, social influence, facilitating conditions, and behavioral intention.

One of the most prominent themes emerging from the study is performance expectancy, which is consistent with previous studies (Taylor & Todd, 1995; Davis, Bagozzi, & Warshaw, 1989). Participants consistently emphasised the crucial role of system performance in facilitating efficient work processes. The reliability and speed of the HMS were particularly significant, with users noting that any downtime or slow performance severely impacted their productivity and the overall workflow in the hospital. A recurring sentiment among participants was the necessity for the HMS to be consistently operational. As one participant noted, "The system needs to be up all the time; any downtime severely impacts our work". This highlights the critical dependence on HMS for daily operations, where any interruption can lead to significant workflow disruptions, delayed patient care, and increased frustration among staff (Davis, Bagozzi, & Warshaw, 1989). Moreover, the speed of the system was highlighted as a determinant of productivity. "When the system is slow, it delays everything, from patient check-ins to

accessing records". This statement reflects the direct impact of system performance on various tasks, from administrative duties to clinical functions, emphasizing the need for a fast and reliable HMS to maintain efficiency and effectiveness in healthcare delivery (Davis, Bagozzi, & Warshaw, 1989).

The effort expectancy theme revealed that the ease of use of the HMS is a significant factor in its acceptance by users. Hospital staffs valued a simple and intuitive interface, which minimized the need for extensive training and facilitated smoother interaction with the system (Hsu & Lu, 2004). A participant shared, "The system is straightforward; I don't need extensive training to navigate it". This highlights the importance of designing user-friendly systems that cater to the practical needs of healthcare professionals who may not have advanced IT skills (Moon & Kim, 2001). However, some users initially found certain aspects of the HMS challenging. "Initially, it was tough, but with practice, it became easier". This statement indicates that while initial hurdles exist, ongoing use and familiarity with the system can mitigate these challenges. It also suggests that continuous support and training are essential to help users overcome the learning curve associated with new technology (Moon & Kim, 2001).

The role of social influence was evident in the adoption and use of the HMS. The influence of peers and organizational culture played a significant role, with colleagues providing support and encouragement, which positively impacted users' attitudes towards the system (Venkatesh, Morris, Davis, & Davis, 2003; Ajzen, 1991). "We often help each other out with any issues we face with the system". This peer support is crucial in fostering a collaborative environment where users feel comfortable seeking assistance and sharing knowledge about the HMS. Additionally, the hospital's culture of promoting technology adoption significantly influenced user attitudes. "Our management promotes the use of technology, which motivates us to adapt". This statement underscores the importance of a supportive organizational culture that encourages the use of technology and fosters a positive attitude toward new systems (Venkatesh, Morris, Davis, & Davis, 2003). When management actively promotes and supports technology adoption, it can enhance user acceptance and integration of the HMS into daily routines (Ajzen, 1991).

Facilitating conditions emerged as a critical theme, emphasizing the availability of resources and support systems necessary for effective HMS use. Comprehensive training programs and ongoing technical support were highlighted as essential for building user confidence and ensuring smooth system operation. "The training sessions were very helpful in getting us up to speed". Effective training equips users with the necessary skills and knowledge to navigate the system, reducing initial resistance and enhancing user proficiency (Thompson, Higgins, & Howell, 1991). Continuous technical support was also deemed crucial for addressing any problems promptly. "Whenever there's a problem, the IT team is quick to assist". The availability of responsive technical support ensures that users can quickly resolve issues, minimizing downtime and maintaining productivity. It also reinforces the importance of having a robust support infrastructure to address user concerns and technical challenges promptly (Rogers, 2003). Despite the availability of training and support, the study also highlighted a lack of supporting infrastructure in the hospital, which hinders optimal use of the HMS. This includes issues such as inadequate integration with other systems, and requiring users to record information both digitally and traditionally, leading to increased workload and frustration. Addressing



these infrastructural gaps is crucial for enhancing the overall user experience and ensuring seamless integration of the HMS into existing workflows (Thompson, Higgins, & Howell, 1991).

Other than healthcare for diseases, HMS is also very important for disaster management as community resilience depends on resources, including healthcare facilities and systems like HMS (Chen et al., 2024b; Irasanti et al., 2023). During disasters, efficient and effective healthcare delivery becomes even more critical, and a well-functioning HMS can ensure that healthcare providers can manage increased patient loads, track resource availability, and maintain communication between different departments and external agencies (Chen et al., 2024c).

The behavioural intention theme explored the factors influencing participants' intentions to continue using the HMS. Positive experiences with the system reinforced users' intentions to use it regularly. "I find the system very helpful, so I am inclined to use it regularly". Positive interactions and perceived benefits of the HMS play a significant role in encouraging continued use and acceptance of the system (Venkatesh & Bala, 2008). However, the study also revealed challenges that impact behavioural intention. Participants expressed frustration with the system's lack of integration, leading to duplicate work and inefficiencies. This was particularly evident among nurses and doctors who reported that the HMS was not user-friendly and lacked adequate support. "There are some issues, but the overall benefits make it worthwhile". Despite these challenges, users were willing to adapt due to the perceived overall benefits of the system, highlighting the importance of addressing user concerns to enhance acceptance and satisfaction.

Furthermore, understanding the importance of HMS aligns with the Sustainable Development Goals (SDGs), particularly Goal 3 (Good Health and Well-being) and Goal 9 (Industry, Innovation, and Infrastructure). The efficient use of HMS can significantly improve healthcare delivery, which is crucial for achieving these SDGs. Medical students' and healthcare professionals' knowledge regarding SDGs can further enhance their commitment to integrating sustainable and innovative practices in healthcare settings (Ghazi et al., 2020), ensuring that technological advancements like HMS are effectively utilized to improve health outcomes and community resilience.

### **Strengths, Limitations, and Recommendations**

One of the notable strengths of this study is its qualitative approach, which provided in-depth insights into the experiences and perceptions of healthcare professionals regarding the HMS. The use of thematic analysis allowed for the identification of key themes that influence HMS acceptance and use, offering a comprehensive understanding of user interactions with the system. Additionally, the diverse participant pool, including doctors, nurses, and administrative staff, contributed to a broad perspective on HMS use across different roles and experience levels within the hospital.

Despite its strengths, this study has several limitations. First, the sample size was relatively small, with 25 participants, which may limit the generalizability of the findings. The study was also conducted at a single private hospital in Shah Alam, Selangor, which may not reflect the experiences of healthcare professionals in other settings or regions.

Furthermore, the reliance on self-reported data may introduce biases, as participants might have provided socially desirable responses or may not accurately recall their experiences. To enhance HMS acceptance and use, several recommendations are proposed. Improving system performance by ensuring reliability and speed is critical, as is simplifying the user interface to reduce complexity and better meet user needs. Fostering a supportive organizational culture that promotes technology adoption and provides peer support can positively influence user attitudes. Comprehensive training and continuous technical support are essential for building user confidence and proficiency. Addressing infrastructure gaps, such as inadequate system integration, will enhance efficiency and reduce frustration. Finally, engaging with users to gather feedback and tailor the HMS to their specific needs will make the system more relevant and user-friendly, thereby increasing acceptance and satisfaction.

### **Conclusion:**

This qualitative study examined the experiences and perceptions of healthcare professionals regarding the HMS in a private hospital, identifying five key themes: performance expectancy, effort expectancy, social influence, facilitating conditions, and behavioral intention. Performance expectancy emerged as crucial, with participants stressing the importance of reliable and efficient system performance for daily operations. The system's reliability and speed were noted as significant factors affecting productivity and workflow. Effort expectancy revealed that ease of use is a major determinant of user acceptance. Participants valued a straightforward and intuitive interface, though some initially found it challenging but manageable over time. Social influence underscored the significant role of peers and organizational culture in encouraging HMS use. Colleagues provided vital support, and a culture promoting technology adoption positively influenced user attitudes. Facilitating conditions highlighted the importance of resources and support systems, such as effective training programs and ongoing technical assistance, in facilitating HMS use. Behavioral intention focused on factors influencing the willingness to use the HMS. Positive user experiences reinforced the intention to continue using the system, while challenges were mitigated by the perceived overall benefits. In summary, the study identified critical factors influencing HMS acceptance and use among healthcare professionals. Key recommendations include improving system performance, simplifying the user interface, fostering a supportive organizational culture, providing comprehensive training, and addressing infrastructure gaps. These insights are valuable for hospital management to optimize HMS implementation and utilization, ultimately enhancing user satisfaction and system effectiveness.

### **Conflicts of Interest**

The authors declare no conflicts of interest.

## References

- Abdalqader, M. A., Baobaid, M. F., Ghazi, H. F., Hasan, T. N., Mohammed, M. F., Abdalrazak, H. A., ... & Jun, H. C. W. (2020a). The Malaysian Movement Control Order (MCO) impact and its relationship with practices towards coronavirus disease 2019 (COVID-19) among a private university students in Selangor. *Malaysian Journal of Public Health Medicine*, 20(2), 49-55.
- Abdalqader, M., Shebl, H., Ghazi, H., Baobaid, M. F., Jun, H. C. W., Hasan, T. N., ... & Ads, H. O. (2020b). The facts about Corona virus disease (COVID-19): the current scenario and important lessons. *Global Journal of Public Health Medicine*, 168-178.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211.
- Ammenwerth, E., & Rigby, M. (2016). Evaluation of health information systems: From theory to practice. *International Journal of Medical Informatics*, 92, 1-7.
- Ben-Zur, H., & Matz, A. (2021). Evaluating hospital management systems: A case study in healthcare facilities. *Journal of Healthcare Engineering*, 2021, 1-14.
- Chen, H. W. J., Marzo, R. R., Sapa, N. H., Ahmad, A., Anuar, H., Baobaid, M. F., ... & Abdalqader, M. A. (2023). Trends in health communication: social media needs and quality of life among older adults in Malaysia. In *Healthcare*, 11(10), 1455.
- Chen, H. W. J., Naidu, J. R., Najimudeen, M., Ruhi, S., Marzo, R. R., Al-Mahdi, A. Y., ... & Abdalqader, M. A. (2024a). A Post-Pandemic Insight on The Covid-19 and Pregnancy In Malaysia. *Journal of Angiotherapy*, 8(2), 9454.
- Chen, H. W. J., Marzo, R. R., Htay, M. N. N., Abdalqader, M. A., Baobaid, M. F., Naidu, J. R., ... & Attalla, S. M. (2024b). TOWARDS SUSTAINABLE COMMUNITY: SOCIAL RESPONSIBILITY AND COMMUNITY RESILIENCE IN FLOOD DISASTER MANAGEMENT. *Malaysian Journal of Public Health Medicine*, 24(1), 131-141.
- Chen, H. W. J., Marzo, R. R., Htay, M. N. N., Ruhi, S., Abidin, S. M. Z., Nelson, A. A., ... & Salim, A. (2024c). Positive Coping and Community Resilience in Disaster Management for Flooding in Malaysia. *Journal of Angiotherapy*, 8(2), 1-10, 9464.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340.
- Ghazi, H. F., Abdalqader, M., Baobaid, M. F., Hasan, T. N., Mohammed, M. F., Shebl, H. A., ... & Ads, H. O. (2020). Knowledge Regarding Sustainable Development Goals (SDG) among Medical Students at a Private University in Shah Alam, Malaysia. *Global Journal of Public Health Medicine*, 196-202.
- Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. *Field Methods*, 18(1), 59-82.
- Hsu, M.-H., & Lu, H.-P. (2004). Why do people use technology? A critical review of technology acceptance model. *International Journal of Human-Computer Studies*, 62(3), 335-361.
- Irasanti, S. N., Respati, T., Januarita, R., Yuniarti, Y., Chen, H. W. J., & Marzo, R. R. (2023). Domain and perception on community resilience: comparison between two countries. *Frontiers in public health*, 11, 1157837.
- Kilsdonk, N., Peute, L. W., & Jaspers, M. W. (2017). Systematic review of factors influencing the implementation of health information technology in healthcare settings. *Journal of the American Medical Informatics Association*, 24(1), 96-112.
- Liew, C. L., & Lee, K. L. (2016). The role of health information systems in improving healthcare services. *Health Information Science and Systems*, 4(1), 22.
- Marzo, R. R., Chen, H. W. J., Abid, K., Chauhan, S., Kaggwa, M. M., Essar, M. Y., ... & Lin, Y. (2022). Adapted digital health literacy and health information seeking behavior among lower income groups in Malaysia during the COVID-19 pandemic. *Frontiers in public health*, 10, 998272.
- Marzo, R. R., Jun Chen, H. W., Ahmad, A., Thew, H. Z., Choy, J. S., Ng, C. H., ... & Elsayed, M. E. (2024). The evolving role of social media in enhancing quality of life: a global perspective across 10 countries. *Archives of Public Health*, 82(1), 28.
- Moon, J. W., & Kim, Y. G. (2001). Extending the TAM for a world-wide-web context. *Information & Management*, 38(4), 217-230.
- O'Reilly, M., & Parker, N. (2012). Unsatisfactory saturation: A critical exploration of the notion of saturated sample sizes in qualitative research. *Qualitative Research Journal*, 1-8.

- Paré, G., & Trudel, M.-C. (2015). The role of data security in the adoption of health information systems. *Journal of Health Management*, 17(4), 45-67.
- Reddy, M. C., Dourish, P., & Pratt, W. (2019). Health IT as a socio-technical system: An approach for integrating technology and human factors. *Journal of Biomedical Informatics*, 90, 103-110.
- Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.
- Taylor, S., & Todd, P. A. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research*, 6(2), 144-176.
- Thompson, R. L., Higgins, C. A., & Howell, J. M. (1991). Personal computing: Toward a conceptual model of utilization. *MIS Quarterly*, 15(1), 125-143.
- Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision Sciences*, 39(2), 273-315.
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425-478.
- Walker, J. L. (2012). The use of saturation in qualitative research. *Canadian Journal of Cardiovascular Nursing*, 22(2), 37-46.