



(REVIEW ARTICLE)



Evaluation of hospital management information systems using the HOT-Fit Method: A literature review

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World Journal of Advanced Research and Reviews, 2023, 19(03), 685–693

Publication history: Received on 01 August 2023; revised on 13 September 2023; accepted on 15 September 2023

Article DOI: <https://doi.org/10.30574/wjarr.2023.19.3.1844>

Abstract

The Hospital Management Information System is part of the Health Information System and is considered very important because it is able to integrate the entire process flow of Hospital services in several form.

Objectives: Updating the literature review regarding the evaluation of Hospital Management Information Systems using the HOT-Fit method.

Methods: Article searches were conducted using two languages through three database sources ScienceDirect, PubMed, and Google Scholar using the keywords “evaluating” AND “hot-fit” AND “hospital information system”. There were a total of 68 article findings, but only 6 articles met the inclusion criteria.

Results: There are four total studies that comprehensively discuss each aspect of the human, organization, technology, and net benefit components, while the other two studies have aspects that are not the focus of evaluating the hospital management system. From the results found that each aspect is interconnected with each other, both positive and negative.

Conclusion: The implementation of aspects of each HOT-Fit component does not have to be carried out entirely because it takes into account the needs and conditions of the hospital, but the more complete the aspects that are the focus of the evaluation, the more detailed the results obtained regarding the implementation of the hospital management information system.

Keywords: Evaluation; Hospital; Health; Management Information System; HOT-Fit Method

1. Introduction

Management information System Hospital or commonly known SIMRS is part of the System Health information. System Health information be one of the 6 "building block" or the main component in a country's health system viz on the 6th subsystem regarding "Management, Information and Regulation Health" [11]. Health Information System is a process applied to helps improve efficiency and effectiveness of health care organizations in carrying out its functions and achieve its goal [2]. Objectives of implementing the Information System Hospital Management viz increase efficiency, effectiveness, professionalism, performance, and access and Hospital services [9].

Use of technology in health service system in Indonesia Initially limited to data recording patient. But as it develops information technology, utilization Technology in health has become widespread. However, the application of the system current hospital management information not yet fully integrated [4]. That matter due to several constraints, such as resource gap (resources human, financial, technology, and etc.), knowledge of IT is still lacking, expertise in the

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organization, and etc. Apart from that, management commitment who is still low and has a lazy attitude inside accept change especially in IT use can also be an obstacle which is often experienced in implementation Home Management Information System Sick.

Hospital management is trying evaluate and develop health management strategy for improve health services especially in providing information quick and precise. Evaluation carried out to improve quality and developing System administration Hospital Management Information, then coaching and supervision stages considered very important. Evaluation is considered very important to ensure the system is running smoothly smooth, effective use, and positive impact on its users [2]. Evaluate too carried out to find out which system at this point it can work well or not compared to that system previously [7].

The most frequent method used to evaluate implementation of Management Information Systems Hospital namely the HOT-Fit method. In general, models HOT-Fit consists of three components important, namely Human, Organization, and Technology which will come later generate profits (Net Benefit) [12]. Based on this, researchers are interested to analyze in more depth every important component of the HOT-Fit method and identify what the components are has been implemented in the process evaluation of Information System implementation Hospital management. The purpose of This research is to update literature review on system evaluation Hospital Management Information using the HOT-Fit method.

2. Material and methods

The research is classified as a qualitative study utilizing the literature review method and employing a descriptive analysis approach. Data collected through three database sources: ScienceDirect, PubMed, and Google Scholar. The article can be used using language Indonesian or English. Keywords used in article searches namely: "evaluating" AND "hot-fit" AND "hospital information system". Search articles are conducted in two languages and limited in the last five years (2018 - 2023). Articles used in the form of original article, full text, and open access. Search results return 6 article on Scienedirect, 2 articles on PubMed, and 60 articles on Google Scholar, so that the total of all articles namely 68 articles. Extraction and identification data can be seen in Figure 1 Prism Flow Diagram.

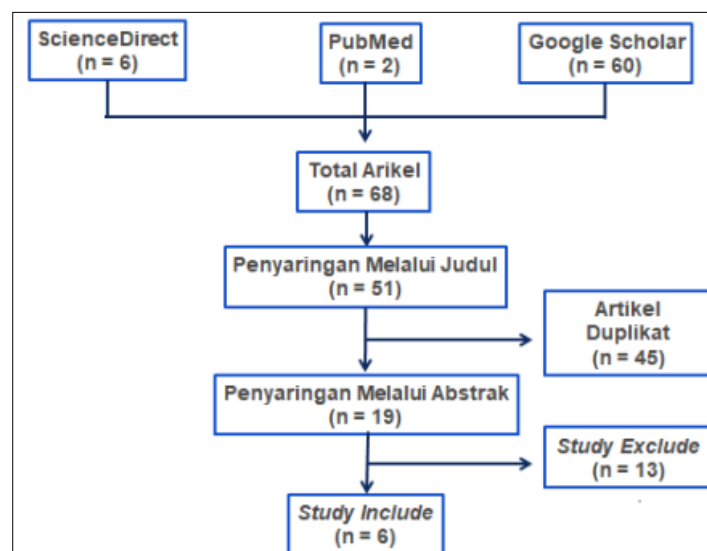


Figure 1 Prism Flow Diagram.

3. Results and discussion

Based on the collected and analyzed articles, the findings are presented as follows:

Based on the 6 articles presented in Table 1, the discussion will now focus on analyzing each component in the Framework HOT-Fit Model.

Table 1 List of Articles

No.	Author	Title	Method	Result
1	Oktaviana et al. [8]	Evaluasi Sistem Informasi Manajemen Rumah Sakit (SIMRS) RSUD Gambiran Kediri Menggunakan Framework Human, Organizational, and Technology-FIT (HOT-FIT) Model	Framework HOT-Fit Model	<p>Human Component:</p> <ol style="list-style-type: none"> 1. System Use There are unfulfilled user expectations on the system display. 2. User Satisfaction There are things that are not satisfactory from the system, such as the system is still slow in processing work. <p>Organization Components:</p> <ol style="list-style-type: none"> 1. Top Management Support Top Management fully supports the provision of SIMRS in hospitals by approving the system procurement budget. 2. Environment Top Management holds meetings every three months or six months to discuss the system, but during system implementation, the organization did not involve users directly in coordination meetings related to SIMRS development. <p>Technology Components:</p> <ol style="list-style-type: none"> 1. System Quality System response time is still not fast in processing data and displaying information on the screen. 2. Information Quality Information on the system is still inaccurate due to user input errors. 3. Service Quality When a problem occurs in the system, the vendor's problem-solving actions are still not fast. <p>Net Benefit Components:</p> <p>The implementation of the system provides sufficient efficiency in recording patient data into the system, but to date not all installations can record it in the system.</p>
2	Vantissha et al. [10]	Assessing Hospital Management Information Systems Success Using Human Organization and Technology Fit Model	Framework HOT-Fit Model	<p>Human Component:</p> <ol style="list-style-type: none"> 1. System Use The use of the system affects the net benefit and system development. 2. User Satisfaction User satisfaction affects the net benefit and system use. <p>Organization Components:</p> <ol style="list-style-type: none"> 1. Organizational Structure Organizational structure affects the organizational environment and net benefits. 2. Environment Organizational environment influences the net benefit.

				<p>Technology Components:</p> <ol style="list-style-type: none"> 1. System Quality System quality affects system development, system use, and user satisfaction. 2. Service Quality Service quality influences organizational structure, system use, user satisfaction, and system development. <p>Net Benefit Components:</p> <p>Net benefit is influenced by the use of the system, user satisfaction, organizational structure, and organizational environment.</p>
3	Ariantoro [3]	Evaluasi Penggunaan Aplikasi SIM-RS Menggunakan Metode Hot-Fit	Framework HOT-Fit Model	<p>Human Component:</p> <ol style="list-style-type: none"> 1. System Use Use of the system has no effect on net benefit. 2. User Satisfaction Satisfaction with system use influences net benefit. <p>Organization Components:</p> <ol style="list-style-type: none"> 1. Top Management Support or organizational structure Organizational structure has no effect on net benefits. 2.Environment The organizational environment is related to net benefits. <p>Technology Components:</p> <ol style="list-style-type: none"> 1. System Quality System quality has no effect on net benefit. 2. Information Quality Information quality has no effect on net benefit. 3. Service Quality Service quality influences net benefit. <p>Net Benefit Components:</p> <p>Net benefit is influenced by satisfaction with system use, organizational environment, and service quality. Meanwhile, net benefit is not influenced by system use, organizational structure, system quality, and information quality.</p>
4	Khotimah [5]	Evaluasi Sistem Informasi Manajemen Menggunakan Model HOT-Fit Fasilitas	Framework HOT-Fit Model	<p>Human Component:</p> <ol style="list-style-type: none"> 1. System Use System usage is not affected by information quality and system quality but is influenced by service quality. The use of the system affects the benefits provided. 2. User Satisfaction There are things that are not satisfactory about the system, such as the system is still slow in processing work. <p>Organization Components:</p>

		Kesehatan X di Yogyakarta		<p>1. Organizational Structure Organizational structure affects the benefits obtained.</p> <p>Technology Components:</p> <p>1. System Quality System quality does not affect system usage.</p> <p>2. Information Quality The quality of the information has no effect on the use of the system.</p> <p>3. Service Quality Service quality affects the use of the system.</p> <p>Net Benefit Components: The benefits obtained are influenced by the use of the system and organizational structure.</p>
5	Abda'u et al. [1]	Evaluasi Penerapan SIMRS Menggunakan Metode Hot-Fit di RSUD Dr. Soedirman Kebumen	Framework HOT-Fit Model	<p>Human Component:</p> <p>1. System Use (System Use or PS) There is a negative relationship with leadership support and user satisfaction. There is a positive relationship with the quality of the system.</p> <p>2. User Satisfaction (User Satisfaction (KP) There is a negative relationship between KP and PS, meaning that the higher the user satisfaction, the less significant the effect on system use. There is a positive relationship between KP and NB, meaning that the higher the user satisfaction, the higher the net benefit.</p> <p>Organization Components:</p> <p>1. Environment (Operating Structure or SO) There is a negative relationship between SO and KP, meaning that the better the operating system does not significantly affect user satisfaction.</p> <p>2. Top Management Support (Leader Support or DP) There is a negative relationship between DP and PS, meaning that greater leadership support will not have a significant effect on system use.</p> <p>Technology Components:</p> <p>1. System Quality (System Quality or KS) There is a positive relationship between KS and PS or the better the quality of the system, the better the use of the system. There is a positive relationship between KS and KP or the better the quality of the system, the better the user satisfaction.</p> <p>2. Information Quality (Information Quality or KI) There is a negative relationship between KI and KP, meaning that the higher the quality of information, the customer satisfaction does not have a significant effect on user satisfaction.</p> <p>3. Service Quality (Service Quality or TOS)</p>

				<p>There is a positive relationship between KL and KP, meaning that the better the quality of service provided, the customer will be satisfied.</p> <p>4. Facility Conditions (KF)</p> <p>There is a negative relationship between KF and NB, meaning that the better the condition of the facilities will not have a significant influence on the net benefit.</p> <p>Net Benefit Components:</p> <p>There is a positive relationship with user satisfaction.</p> <p>There is a negative relationship with the condition of the facility.</p>
6	Khotimah [6]	Evaluasi Sistem Informasi Manajemen Rumah Sakit Rajawali Citra Yogyakarta Menggunakan Model Human Organization Technology Fit (HOT-Fit)	Framework HOT-Fit Model	<p>Human Component:</p> <p>1. System Use</p> <p>The use of the system affects the net benefit.</p> <p>2. User Satisfaction</p> <p>User satisfaction influences system use and net benefit.</p> <p>Organization Components:</p> <p>1. Organizational Structure</p> <p>Organizational structure affects the organizational environment and net benefits.</p> <p>2.Environment</p> <p>Organizational environment influences the net benefit.</p> <p>Technology Components:</p> <p>1. System Quality</p> <p>System quality does not influence the use of SIMRS but does influence user satisfaction.</p> <p>2. Information Quality</p> <p>Information quality has no effect on system use and user satisfaction.</p> <p>3. Service Quality</p> <p>Service quality influences the use of information systems and user satisfaction.</p> <p>Net Benefit Components:</p> <p>Net benefit is influenced by the use of the system, user satisfaction, organizational structure, and organizational environment.</p>

3.1. Human Components

Components assessed through humans include system use and user satisfaction.

3.1.1. Use of the system or system use

This aspect relates to the output of information systems, usually in the form of reports as a form of evaluating the success of a system. In addition, this aspect can also be assessed through indicators, such as users can believe and accept that the system is easy to use, users have expertise in using the system, users attend training provided, and overall the application meets user expectations.

Based on (Oktaviana et al., 2022), there are still user expectations that have not been met, (Abda'u et al., 2018) states that system use has no effect on leadership support and user satisfaction, (Ariantoro, 2021) states system use does not have an effect on net benefits which is in contrast to (Vantissha et al., 2022), (Khotimah, 2021a), and (Khotimah, 2021b) which actually state that the use of the system affects net benefits.

3.1.2. User satisfaction or user satisfaction

This aspect is a form of overall evaluation of the user's experience when using an information system and is still related to knowledge of system usability and user attitudes that can be influenced by user characteristics. Indicators in assessing aspects of user satisfaction include a high level of user satisfaction but still need development on the system so that it is better, the appearance of the system is attractive, and the data obtained is valid and easy to understand.

Based on (Oktaviana et al., 2022) and (Ariantoro, 2021) it was found that there were still things that were not satisfactory from the system, such as the system was still slow in producing jobs. Articles (Vantissha et al., 2022) (Ariantoro, 2021), and (Khotimah, 2021b) state that user satisfaction affects net benefits. Articles (Abda'u et al., 2018) state that user satisfaction has no effect on system use, this is in contrast to articles (Vantissha et al., 2022) and (Khotimah, 2021b) which state that system use affects system use

3.2. Organization Components

The organizational component consists of organizational structure and organizational environment. Usually the organizational structure can also be in the form of Top Management Support.

3.2.1. Organizational structure

Consists of type and size, culture, politics, hierarchy, autonomy, planning and control systems, strategy, management and communication, leadership, and support. Indicators for assessing aspects of organizational structure, including experience and educational background are things that need to be considered by managers system, improve communication throughout the organization, implement support from all parties, especially top management, and provide infrastructure facilities to support system implementation.

Based on (Oktaviana et al., 2022) states that top management provides full support for system provision, (Vantissha et al., 2022) and (Khotimah, 2021b) states that organizational structure influences organizational environment and net benefits, (Abda'u et al., 2018) states that organizational structure has no effect on the use of the system, and (Ariantoro, 2021) states that organizational structure has no effect on net benefits where it is the opposite of the results (Vantissha et al., 2022), (Abda'u et al., 2018), and (Khotimah, 2021b) who found that organizational structure has an influence on net benefits.

3.2.2. Organizational environment or environment

This aspect can be analyzed through sources of financing, government, politics, localization, competition, inter-organizational relations, and communication. The evaluation indicators consist of implementing the application, receiving support and assistance from all work units, support from the government, and improving communication between all parts of the organization. Based on (Oktaviana et al., 2022) states that the Hospital holds meetings every three months or six months to discuss the system, but the organization has not yet involved system users in system development coordination meetings, (Vantissha et al., 2022), (Ariantoro, 2021), and (Khotimah, 2021b) revealed that the organizational environment influences net benefits. Meanwhile, (Abda'u et al., 2018) did not find a relationship between the organizational environment and user satisfaction. The article (Khotimah, 2021a) does not discuss aspects of the organizational environment in his research.

3.3. Technology Components

Technology includes several aspects, namely system quality, information quality, and service quality.

3.3.1. System quality or system quality

System quality measures the features integrated in an information system including system performance in its use both in terms of ease and flexibility of the system. The assessment indicators include ease of use of the system, guidance on system use, system speed or responsiveness, use of a mobile-based system, simple system appearance, the system rarely experiences errors, and data confidentiality and security is guaranteed.

Based on (Oktaviana et al., 2022) stating that the system response time is still not fast enough in processing data and displaying information on the screen, (Vantissha et al., 2022) states that system quality influences system development, and (Ariantoro, 2021) states that the quality of the system has no effect on the net benefit. The points of difference in this aspect lie in the articles (Khotimah, 2021a), (Khotimah, 2021b) and (Vantissha et al., 2022), (Abda'u et al., 2018). In (Khotimah, 2021a) and (Khotimah, 2021b) stated that system quality has no effect on system use and user satisfaction, but in (Vantissha et al., 2022) and (Abda'u et al., 2018) found that system quality effect on the use of the system and user satisfaction.

3.3.2. Quality of information or information quality

This aspect relates to information produced by the hospital management information system, a subjective measure of information quality using criteria in the form of completeness of information, accuracy, readability, timeliness, relevance, consistency and reliability. The indicators used in assessing this aspect include speed of response to user commands, all information is easy to understand, the information shared is complete and detailed, the language used is consistent, and the existing data is valid.

Based on (Oktaviana et al., 2022), it was found that the information in the system was still not accurate due to user input errors, (Ariantoro, 2021) stated that the quality of the information had no effect on the net benefit, (Khotimah, 2021a) and (Khotimah, 2021b) agree that information quality has no effect on system use, (Abda'u et al., 2018) and (Khotimah, 2021b) also agree that information quality has no effect on user satisfaction, while (Vantissha et al., 2022) does not discuss the environment. organization.

3.3.3. Service quality or service quality

This aspect relates to the support of all the support provided by the hospital management information system service provider. The assessment indicators that are usually used consist of if the application experiences problems in maintenance, the manager provides clear information, excellent service, focus and accuracy from the system developer.

Based on (Oktaviana et al., 2022) stating that when problems occur in the vendor's problem handling action system it is still not fast, (Ariantoro, 2021) states that service quality has an effect on net benefit, (Vantissha et al., 2022) found an influence between service quality with other aspects, namely organizational structure, system use supported by research (Khotimah, 2021a) and (Khotimah, 2021b), user satisfaction supported by research (Abda'u et al., 2018) and (Khotimah, 2021b), as well as system development.

3.4. Net Benefits

A hospital management information system can provide benefits to its users, both managers, system developers and all related departments. The benefits provided by a system can be positive or negative so that it can be assessed from direct benefits, work effects, efficiency, effectiveness, quality of decisions, and the risk of errors. The higher the positive impact provided, the more successful the information system implemented will be.

Based on (Oktaviana et al., 2022), it was found that the implementation of the system is quite efficient in recording patient data into the system, but not all installations can record it in the system. According to (Vantissha et al., 2022) stated that net benefit is influenced by several aspects, including, use of the system which is supported by research (Khotimah, 2021a) and (Khotimah, 2021b), user satisfaction which is supported by research (Ariantoro, 2021), (Abda'u et al., 2018), and (Khotimah, 2021b) but contrary to research [3], the organizational structure supported by research (Khotimah, 2021a) and (Khotimah, 2021b) but contrary to research (Ariantoro, 2021), organizational environment supported by research (Ariantoro, 2021) and (Khotimah, 2021b). Apart from that, research results (Ariantoro, 2021) found that net benefits are not influenced by system quality and information quality but are influenced by service quality.

4. Conclusion

The results of the literature review study shows that there is a relationship from every aspect of the human component, organization, technology, and net benefits. The relationship that is formed can be positive or negative. Positive relationship shows that there is an interplay effect aspect, whereas if the relationship negative indicates that both aspects do not influence each other. Although each component has its own aspect but not closing there may be aspects that are not become the focus of evaluation of information systems hospital management. That matter because evaluation is also necessary taking into account the needs and conditions of hospital. However, more complete aspects that are the focus of the evaluation then the results obtained will be more detailed related to the implementation of information systems hospital management.

Compliance with ethical standards

Acknowledgements

This article did not receive assistance from the government, private companies, or non-profit organizations.

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