Analysis of Management Information System Implementation by adopting the HOT-FIT Framework in Higher Education

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ABSTRACT

The purpose of this paper is to determine the implementation of the HOT-FIT framework written by Yusof, et. all, (2006) [19] in tertiary institutions in the industrial era 4.0. Where HOT-FIT framework consists of technological factors, human factors, organizational factors and net benefits and the authors do not add other components. In the technology factor, a network quality component was added, considering that in the industry era 4.0 network quality was one of the important factors in implementing management information systems. Human factors, the authors add user motivation where motivation is the key to successful system implementation in tertiary institutions. The organization factor is added environment, budgeting and supporting where the writer adopts a paper written by Winanti, et. all [10]. Net benefits are broken down into 3 components, including the benefits of implementation can be used as a quality assurance tool, accreditation, and a distinct advantage for universities both materially and immaterially. And in the end satisfaction can be felt by stakeholders

Keywords: implementation, management information systems, higher education, HOT-FIT Framework

INTRODUCTION

Managing a tertiary institution is not easy, because tertiary institutions have many fields and divisions that require maximum handling. The large amount of data that must be managed in tertiary institutions requires special attention for leaders and stakeholders so that tertiary institutions managed still exist in the wider community and continue to evolve with the changing times. Good organization can be seen from the information technology used in improving business performance in organizational management becomes a very important thing because technology becomes a valuable investment for the organization [1]. Including tertiary institutions, the application of technology in all fields including management of management information systems is a necessity. Management Information System at universities to support the implementation of Education and provide effective and efficient information services. All management needs are very time-consuming, energy and mind management. Problems that occur in tertiary institutions are generally limited data management in tertiary institutions, poor documentation, poorly organized document management, poor document management, so quality results in tertiary institutions are difficult to measure when accreditation is not available.

To maximize the quality of data and information available in tertiary institutions to improve the education system and to support decision making in tertiary institutions [2].

Students become the main players of this nation in facing this 4.0 industrial revolution, with guidance from lecturers, support from the government and surrounding communities and with adequate facilities students will be able to face industry 4.0 and bring the nation to an international level. To build high confidence and competitive spirit to compete not only at the national level but also at the global level. In addition to academic degrees, there are four things' students must have to fight in the era of the industrial revolution 4.0 namely competence to interact with various cultures, social skills, new literacy (data, human technology) and lifelong learning [18].

Humans need social interaction in life with various types of activities so that information technology plays a role in realizing both individual and group communication and management information systems become an important factor for stakeholders and for the entire academic community to create universities that excel globally. Utilization of information technology not only serves to build management tasks but also functions to facilitate decision making at various levels of management in a college [3].

Utilization of information and communication technology for management in tertiary institutions supporting institutional strength has become a lifestyle of modern institutions that are the pride of today's society [4]. The implementation of information and computer technology will be more effective in the management of tertiary institutions. A central role is needed in the managerial decision-making process / other decisions in tertiary institutions [5]

The benefits of management information systems include increasing the accessibility of data presented on time and accurately to users, ensuring the availability of quality in utilizing information systems. Also, the management information system is an asset for universities to process various activities in universities so that it can reduce costs and generate income for higher education as one of the excellent services for higher education.

Management information systems are important for higher education to make it easier for higher education to make the right and accurate decisions, which in turn can reduce the risk that the company might get. And can increase the productivity of a company and make the company continue to grow without lagging information so that it can provide the best service to all academic community and stakeholders.

There is still much higher education that has not yet implemented management information systems in the industry 4.0 era. Also, higher education in managing its organization is slow in competing with other universities. There is a government policy that allows foreign parties to set up universities in Indonesia and the issue of higher education is allowed to be led by foreign workers. The era of globalization followed by industry 4.0, higher education must always compete with competitors who come from within the country and from abroad.

RELATED WORK

The information system is a combination of each unit managed by the user in the form of hardware, software, network, and data communication and database so that it can be useful and work optimally [6]. Raymond McLeod Jr. defines Management Information Systems as a computer-based system that provides information for several users who have similar needs. The information describes the company or one of its main systems regarding what has happened in the past, what is happening now and what might happen in the future [7]

According to Bayu, A., & Izzati, S. (2013) factors that determine the success of management information systems include [8]

1) Technological factors, namely the quality of the system, the quality of the information system and the service aspects largely determine customer satisfaction. To achieve customer satisfaction, we have increased use of information systems so that we are more familiar and familiar with the use of information systems and training needs to be done to improve user satisfaction.
2) The human factor that is directly related to the user, the better the quality of the information system used, the employee's performance increases.
3) Organizational factors related to organizational structure, the organizational environment will increase the benefits of the system, which will be achieved through good strategy and management with solid teamwork and effective communication.
4) Benefit factors are achieved through the maximum utilization of management information systems, and the benefits for all sectors to support the right decision making

and making reports that are fast and accurate.

An effective management information system must be able to provide accurate, timely and important data for management planning, analysis, and control to optimize organizational growth. To design a management information system at a tertiary institution, it must understand human capabilities as information processors and recognize the behavior of existing human resources. The ability of users is very important in supporting the implementation of management information systems in a tertiary institution.

Currently, in Indonesia, the industrial era 4.0 has been applied and has felt its influence in the community. All kinds of activities have been started in the form of digitalization.

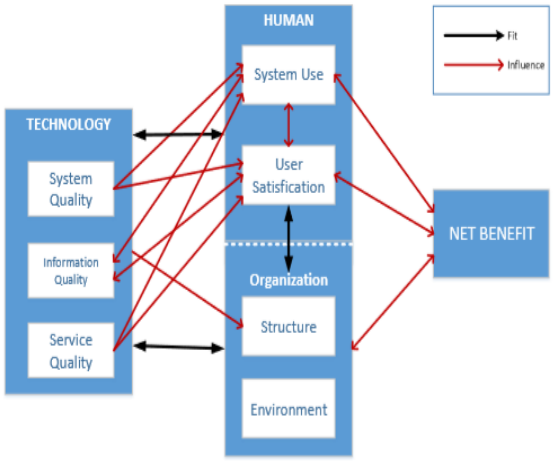

Figure 1: HOT-FIT framework (source:Yusof, et. all, 2006) [19]

According to Yusuf (2006) that information systems are made from two evaluation models for information systems, that model is the IS Success Model (DeLone and Mclean 2004) [20] dan IT Organization-Fit Model (Morton 1990) [21].

METHOD

The methodology used in preparing this paper with the author uses a literature review by gathering some research results both from journals, proceedings, books, and work results. Then the next step is to analyze the factors that determine the success of management information systems in higher education. Given that higher education is the frontline in printing superior human resources and the ability to compete globally.

a. Search Process.

The scope of this paper is to determine the factors that determine the success of the implementation of management information systems in tertiary institutions in the industrial era 4.0, all work is done digitally and well arranged. The process that was first carried out in this literature review was to determine the sources of literature that came from a variety of systematic literature sources, namely sources originating from journals, the results of conferences/proceedings, and other papers relevant to the topic. The source of the literature review is a) Science Direct, b). DOAJ / Directory Open Access Journal, c). IEEEXplore Digital Library, d). Google Scholar e). Springer Link. The sources used to extract the implementation management information system for higher education in the era industry 4.0 and this extraction will be further developed in subsequent research.

To facilitate the search for this paper has the keywords: ("exploration" OR "journey") AND ("factor" OR "elements") AND ("success" OR "Excellence") AND ("information management system" OR "MIS") AND ("higher education" OR "university") AND ("industry 4.0")

b. Data Extractions

This systematic literature review requires exclusion criteria in determining references so that the topic discussed fits the source of the reference and inappropriate topics are not included in this paper. The journals, proceedings, and results of one's papers taken were published from 1962 to 2019 years.

This systematic literature review was carried out to investigate the factors that determine the successful implementation of management information systems in higher education in the industry 4.0 era. The use of technology in management information systems can create new knowledge for universities. The

initial step of the author is to collect several sources of references derived from journals, proceedings, and worksheets by predetermined keywords. After the source of information is found, the writer chooses candidate studies and then comes on selected studies where the reference is used by the author in compiling a systematic literature review based on selected studies specified by the author.

TABLE 1 NUMBER OF STUDIES OF SELECTED SOURCES

Sources	Studies found	Candidate studies	Selected studies
Science Direct	16	12	9
IEEE – Explore	3	3	1
Springer Link	1	1	1
DOAJ	5	2	3
Google Scholar	7	5	7
Total	28	23	21

The papers collected and used as references are papers from 1991 to 2019. The data collected was 28 articles both from journals, proceedings and working papers. Of 28 papers that became candidates' studies were 20 papers and selected studies were 15 papers as shown in table 1 above.

RESULT AND DISCUSSION

Based on the literature review and figure 1: HOT-FIT framework then and the results of the analysis, the implementation of the information system is influenced by several factors, where the authors take from three factors namely technology factor [8, 9, 10] human factor and net benefit [19] then the success factors for the implementation of management information systems in higher education are seen as shown below:

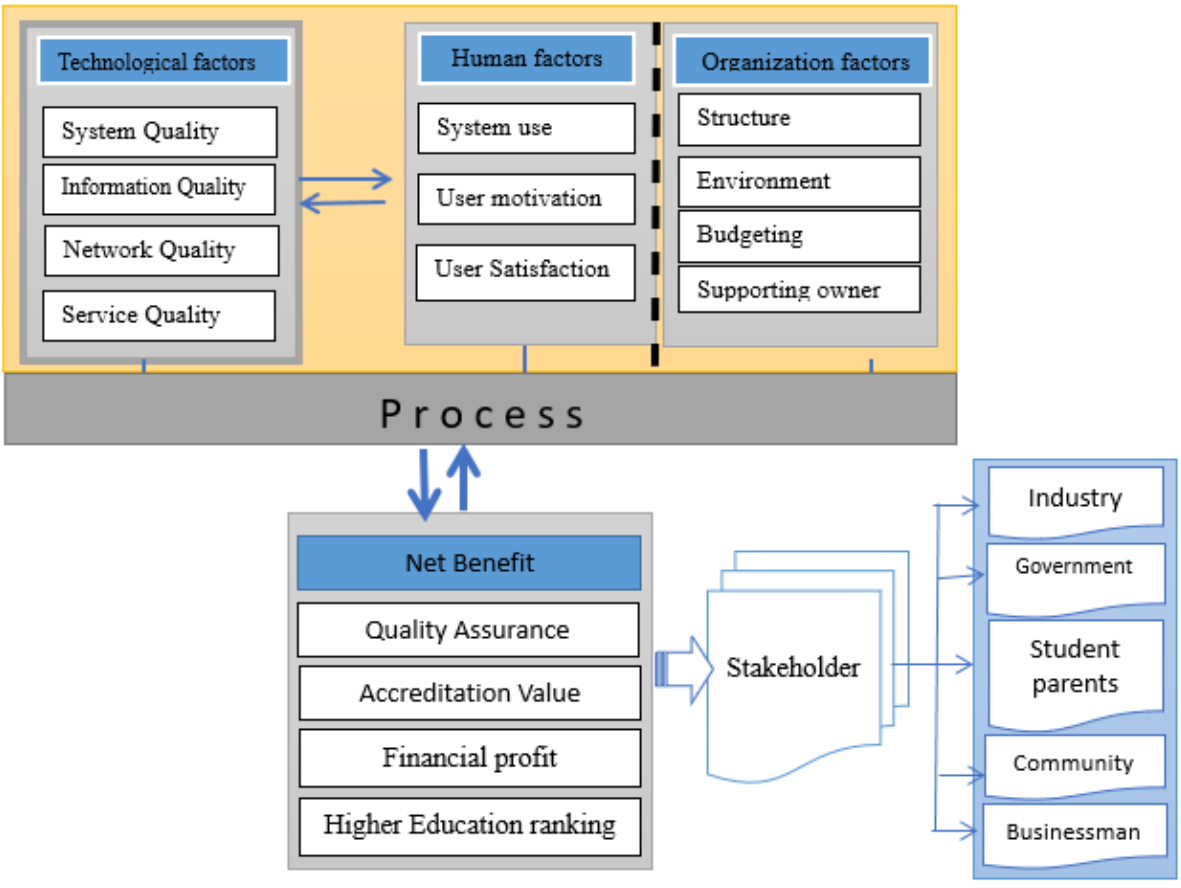

Figure 2: Implementation management information system in higher education

Based on the picture above the authors refer to research conducted by Yusof et all (2006) [19] which consists of 4 main factors in the implementation of management information systems namely technological factors, human factors, organizational factors and net benefit factors. Where in this paper the authors describe the four factors in the form of indicators that can be applied in tertiary institutions. Separating between human and organizational factors in different commands even though the two factors cannot be separated from each other. The human factor tends to be personal where the actors can be leaders, staff, lecturers, students, or the entire academic community in higher education. Whereas organizations tend to be in the form of management systems. These four factors can consist of several indicators including:

1) Technology factors
   The technology used must be adapted to current conditions by utilizing existing sources [11] such as cloud computing, web-based, all activities are already based online and if possible, use Android considering that currently almost everyone involved in university uses Android facilities so that knowledge sharing can be done with media and network technology by utilizing the internet and social media [12]. Mobile/android media [13] through social media such as Facebook, although users need to be careful in using Facebook, especially regarding confidential data [14]. Technological factors consist of indicators:
   a. System quality
      The author adds one indicator in the technology factor, which is network quality indicator. Network quality really determines whether a system / application can run well or not. The obstacle that often occurs in the implementation of management information systems in education is poor / low network quality. Network quality can speed up data transmission and can share hardware devices together. Internet network between users can share files, documents, and knowledge sharing. Lots of providers that offer fast network connections with a variety of conveniences. This shows that one university depends on the quality of its network.
   b. Information quality
      Information Quality relating to the process of information and information produced by the system. The criteria for information quality are completeness, accuracy, ease of reading, timeliness, availability, relevance, consistency, test stand, data input methods, and data quality. The process of good information relating to how the information was obtained, from which sources, how valid the information can be used.
   c. Network quality has become a basic requirement for an institution / organization. Having a good network will make it easier for all services that will be in higher education.
   d. Service quality, the success of an organization, especially in higher education can be measured through the quality of service to students, lecturers, educational staff and even all academic activities. The higher the level of service the higher the level of satisfaction and ultimately have an impact on the level of good performance.
2) Human Resource Factors
   a. System use
      The information system can be used as much as possible by the user, so the system helps speed up work, ease the work of the user and has a high benefit value.
   b. Motivation use
      User motivation to implement information systems must be the main work. At the implementation stage of an integrated information system, activities often occur in parallel between the new system and the traditional system. This makes users reluctant, burdened and not motivated to conduct trial simulations,

implementations to input data on new information systems that are not yet known. The attitude of users towards the implementation of new information systems can be grouped into as follows, (1) Pro-Change Group, (2) Neutral Group, and (3) Resistance Group (resistance) to change.

e. User Satisfaction
People/human factor consisting of a leader who is reliable and forward-looking [10] becomes the main key in the implementation of management information systems. It takes lecturers and staff who have high dedication and loyalty. Students who have the spirit to advance and develop to create superior graduates are accepted and able to work well so that stakeholders feel satisfied with the quality of people who are competent and qualified. The process carried out in the implementation of management information systems in higher education in the industry era 4.0 requires a management information system that is integrated with all departments in higher education, the availability of data mining that can be utilized for the process of implementing management information systems so that a database management system is formed that both to help decision making and benefit stakeholders.

3) Organization factors
   a. Structure
   An organizational structure with a clear job description can help the process of teaching and learning activities in higher education. All academics work according to quality standards set by the tertiary institution.
   b. Environment
   A conducive environment is one factor that can support the successful application of management information systems in tertiary institutions [10]
   c. Budgeting
   The budget that is owned by universities to support the teaching and learning process can help the implementation of a maximum learning process. All activities require sufficient budget to obtain maximum results. Universities that excel in support with sufficient funds. Even a college must have an endowment to continue to exist. Budgets can be obtained from various sources, both internal and external.[10]
   d. Supporting owner
   Support from the owner becomes the most important thing, no matter how good the management information system is designed and proposed but without any support from the owner, it will be in vain. The owner plays a very important role in the implementation of management information systems, even the success of the implementation of the system depends on the owner. Even the owner can be an obstacle to the implementation of the system or be a driver of system implementation. Decision-makers in a university can also be determined by the policy of the leadership. The leadership here can be of various kinds, it can be the chairman of the Foundation, the chancellor for the university, the chairman for the high school and the director for the diploma program. As a decision-maker in the modern era in the digital era all services in the organization are carried out with a global network with the basic concepts of programming text processing, tables, binary arithmetic, digital technology, computer programs, databases, visualization and multimedia software, electronic mail services and other digital facilities [16]. This can facilitate the user in communicating and for the owner himself can be used as a decision-maker. The existence of a reliable analyst, a qualified

programmer, network experts who can analyze the need for network and maintenance that is ongoing and carried out periodically / periodically becomes the thing that determines the successful implementation of management information systems. Even without their existence, the system will not run perfectly, the need for experts who understand the technology [10] in the field of analysis, programmers, network experts, database experts, and reliable maintenance is needed.

4) Benefit
   a. Quality assurance
      Implementation of management information systems can improve the quality of higher education and become a benchmark for the internal quality assurance of higher education. A culture of quality education is built with a clear and proportional division of tasks and responsibilities. The development of information systems based on information technology and communication that is reliable and integrated.
   b. Accreditation
      The advantage that is felt when management information systems are implemented is to be a plus when accreditation.
   c. Profit
      Management information systems that are implemented to the maximum in tertiary institutions can save the operational costs of tertiary institutions and the benefits derived from can be material and non-material.

CONCLUSION

Higher education in the industrial era 4.0 must be able to work quickly, effectively, efficiently, and completely automated to produce graduates who can compete globally. A management information system that can assist universities in completing work in organizations and produce the right decisions, is available. three main factors in the implementation of management information systems include the authors referring to previous research namely Leavitt (1962) [9] and Winanti, Gaol, F.L, Soeparno, H., et.all (2018) [10] namely the factor people, processes, technology which is a major factor in the implementation of management information systems. Whereas two supporting factors consisting of supporting factors from the owner and the presence of experts in the field of ICT become very important considering these two factors will be the driving force and determinant of the successful implementation of management information systems in tertiary institutions in the industrial era.

The goal of implementing a management information system at a tertiary institution is to reduce administrative and academic burdens and to provide better analysis especially in terms of reporting, planning and strategic functions [17].

For universities, management information systems have become a necessity because now all is digital and automatic. It is not uncommon that all work can be done anywhere, anytime regardless of distance and time. Network and internet media make everything easy and fast, including making decisions in a college can be done quickly and accurately because the available data is already in digital and complete form. Higher education institutions in addition to implementing management information systems must also be creative, innovative, so they can compete and become players during intense competition [18]. Industrial Era 4.0 must be responded wisely and intelligently by all groups, especially universities, so as not to be crushed by the flow of change that is so fast and terrible.

The leadership of the tertiary institution is obliged to provide the facilities needed for competency improvement needs ranging from physical facilities in the form of sophisticated equipment in laboratories and workshops to be held, while non-physical facilities in the form of training and certification can be held either

independently or in collaboration with other parties.

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