

Analysis of Success Factors Implementation of Computer-Based Management Information System in Higher Education

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ABSTRACT

Information is a very important asset. It is not enough if physical capabilities coupled with auxiliary equipment are simply relied upon in information management. The purpose of this study is to identify what factors influence the successful implementation of computer-based management information systems in universities. Quantitative approaches are used in this study. The population in this study is administrative employees who are civil servant (ASN) faculties of the State University of Malang. Sampling using proportional random sampling techniques using the Slovin formula, a sample of 161 employees was obtained. The data analysis used is a factor analysis with the help of SPSS 24. The results of this study are: (1) factors in the successful implementation of computer-based management information systems in universities, namely hardware, procedures, software, databases, telecommunication networks, and brainwave; (2) the most dominant factor is the hardware factor; and (3) the degree of inclination of each factor, namely the first hardware, the second procedure, the third software, the fourth database, the fifth telecommunications network, and the sixth brain wave.

Keywords: management information system, ICT, higher education

1. INTRODUCTION

The rapid development of science and technology influences the organization's overall activities [1]. The need for data and information by an organization is important so that the goals or targets set by the organization can be achieved [2]. Everyone in the organization wants to get information about everything quickly and precisely, so it takes an information system that uses technology to meet everyone's needs [3].

In the implementation of management operations, information is a very important asset. This is as stated by Kanter [4], which states that "Information is the stuff of paperwork system just as the material is the stuff of production system", therefore the information must be managed properly. Information is the result of the process of processing data presented in various forms to give a certain meaning or meaning to its users, therefore the reliance of humans or organizations on information is very large, therefore improvement of the quality of information must be carried out [5]. McLeod dan Schell [6] good information must have timely, accurate,

complete, and relevant criteria. It is not enough if physical capabilities coupled with auxiliary equipment are simply relied upon in information management.

The fulfillment of good information management should be supported by high-speed tools and very accurate in processing data [7]. Reliable data processing tools are computers, computers are a series of electronic devices that can carry out work systematically, based on the commands entered, and can store and present explanations when needed.

The capabilities required are not only computer speed but also the accuracy and durability of processing large amounts of data [5]. A computer-based Management Information system (MIS) is a computer technology used to support information systems, so that time produces faster information that has a high level of accuracy [8], [9].

With the development of increasingly advanced technology, MIS in an organization is supported with the help of tools and computer devices. A network with the help of computer tools and devices that are sufficient for

its users consisting of interconnected systems called computer-based MIS. The use of computers in completing work done becomes faster and more time-efficient [10].

The use of an electronic or computer-based driver's license is also guaranteed by Law of the Republic of Indonesia Number 11 of 2011 about Electronic Information and Transactions "Electronic System Operation is the use of electronic systems by state administrators, individuals, business entities and/or the public" [11]. Employees in theoretically improving their performance, assisted by the application of computer-based driver's licenses to an organization that provides many conveniences [3], [12]. A system for managing information to make decisions can be called a driver's license. The input of the right information is one that influences the right decision making [10], [13].

Implementation of computer-based driver's licenses in support of the effectiveness of organizational personnel performance, the support of several components is needed in a directional way [7]. The management of higher education institutions can be seen from various angles, in various aspects, both in terms of knowledge and information management and information technology management and systems [14]. It is important for higher education institutions in this case in Universitas Negeri Malang (UM) to best manage your information.

View roles of the UM as a large organization and serve many people, whether students, lecturers, alumni, or the community. UM should have adequate facilities and personnel in carrying out computer-based driver's licenses [5]. Computer-based MIS applications contribute significantly to improving employees' performance effectiveness, as computer-based MIS can help obtain information and solve employee tasks more accurately and quickly [15], [16]. One of the main benefits of the development of information systems is the improvement of effectiveness [9], [17].

If the UM lacks adequate facilities and personnel in carrying out computer-based driver's licenses, employee performance can run less effectively. Based on the above exposure, research is needed on the analysis of the success factor of the implementation of computer-based management information systems in the environment at the UM. This research becomes very urgent considering the study of the success factors of the implementation of computer-based management information systems to see how to realize the implementation of good computer-based management information systems.

2. METHOD

Quantitative approaches are used in this study. The population in this study is administrative employees who are civil servants (ASN) working in environmental

faculties of the UM. The population in the study of 258 employees, then sampled using proportional random sampling techniques using the Slovin formula, obtained the results of a sample of 161 employees.

For the collection of research data, instruments are used in the form of questionnaires (closed). The data analysis technique used is factor analysis. Factor analysis is a statistical technique for identifying small amounts of factors that can represent a set of interconnected latent variables [18]–[20]. Factor analysis is used because this study aims to identify what factors influence the successful implementation of computer-based management information systems in universities [21]–[23]. All the data in this study researchers used the help of the SPSS 24.0 program.

3. RESULTS

Based on a factor analysis test conducted using the SPSS 24.0 program generates and finds 6 groups that can be viewed in Table 2. The six groups were subsequently named as new factors according to the item of the grouping statement. The results of the analysis also obtained the Kaiser Meyer Olkin (KMO) Measure of Sampling Adequacy of 0.784 and Bartlett's Test of Sphericity of 5482,341 with a significant amount of 0.000 as in Table 1. Based on Table 1 KMO values greater than > 0.5 then it means that the analysis of factors is precise. This also has a large and significant impact on Bartlett's Test of Sphericity, so this factor analysis can be justified.

Table 1 Test Results of KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.784	
Bartlett's Test of Sphericity	Approx. Chi-Square	5482.341
	df	.622
	sig.	.000

Based on the number of eigenvalue coefficients of ≥ 1 can be identified as many as 6 factors and the cumulative percentage is 76.64%. The results of this analysis can be used to interpret emerging factors so that this study can explain the success factor of the implementation of computer-based management information systems in universities. The results of the factor analysis can be seen in Table 2.

Table 2 shows grouping statement items after rotating and followed by naming each factor's new concept as a variable. The naming of these factors, based on the rationalization of the grouping of statements as well as the factors. Table 2 shows hardware factors consisting of items 2, 3, 5, 8, and 17. The item indicates a relationship with the hardware. This factor is the first factor in the successful implementation of computer-based management information systems in universities.

Table 2 Factor Analysis Results

Item Code	Descriptors	Loading Factor	Eigen Value
Item2	The input device in the form of a keyboard and mouse provided is already capable	0.542	32.720
Item3	The CPU-supplied processing device is capable of	0.610	The first factor is the hardware factor
Item5	The available memory capacity (RAM) is already capable (with sufficient memory capacity can run several programs smoothly)	0.515	
Item8	Memory capacity (hard disk) as a data storage device provided is already capable	0.644	
Item17	The output device in the form of monitors, printers, and speakers provided is already capable	0.782	
Item13	There are clear written procedures regarding the management information system	0.738	19.226
Item23	Computer-based management information system usage procedure makes it easy to carry out work	0.565	The second factor is the Procedure factor
Item25	Data processing implemented based on applicable rules	0.726	
Item26	Employees conduct operations by the rules.	0.628	
Item1	The operating system used in the computer device is adequate.	0.796	14.644
Item6	Presentation processing software is used according to your needs. (example Ms. Power Point)	0.622	The third factor is the Software factor
Item7	The browser software used as needed. (example Mozilla Firefox)	0.532	
Item9	Word processing software is used according to your needs. (example Ms. Word)	0.755	
Item27	Spreadsheet software used as needed. (example Ms. excel)	0.510	
Item32	Statistical data processing software used according to your needs. (e.g. SPSS, Calculator)	0.548	
Item4	The data collection system implemented makes it easier to obtain completeness of data	0.672	9.591
Item16	Back up data capacity as a provided data storage device according to your needs.	0.806	The fourth factor is the Database factor
Item18	Data is stored on the computer from access of employees or others who are not interested in data (there is a system password for each employee of interest)	0.744	
Item19	Data processing results stored in files are neatly maintained	0.624	
Item21	By using a computer-based Management Information System whose confidentiality is guaranteed	0.571	
Item22	Well-integrated data storage	0.648	
Item30	Stored data preserved from computer virus attacks	0.689	
Item10	Internet technology implemented according to the needs of	0.713	5.612
Item20	The network implemented makes it easier to distribute data	0.866	The fifth factor is the telecommunication network factor
Item28	Communication channels in the form of telephones make it easy to distribute data	0.512	
Item29	Telecommunication network activity continues smoothly despite bad weather	0.547	
Item31	Telecommunication applications are always well connected	0.592	The sixth factor is the Brainware factor
Item11	Employees can operate all applications on a computer	0.741	
Item12	Officers in charge of studying and analyzing problems arising in the information system by their expertise	0.864	
Item14	Employees who are in charge of the creation of programs using a programming language or package programs according to their expertise	0.875	
Item15	Leaders can prepare long-term plans as well as short-term plans in the implementation of computer-based management information systems	0.553	The sixth factor is the Brainware factor
Item24	Leaders can prepare budgets 1 year for hardware maintenance, software, training, maintenance, and others	0.662	

The procedure factor consists of items 13, 23, 25, and 26. The item indicates a relationship with the procedures for implementing computer-based management information systems in universities. This factor is the second factor in the successful implementation of computer-based management information systems in universities. The software factor consists of items 1, 6, 7, 9, 27, and 32. The item indicates the relationship with the software. This factor is the third

factor in the implementation of computer-based management information systems in universities. Database factors consist of items 4, 16, 18, 19, 21, 22, and 30. The item indicates a relationship with the information system database. This factor is the fourth factor in the successful implementation of computer-based management information systems in universities. Telecommunication network factors consist of items 10, 20, 28, 29, and 31. The item indicates a connection with

the telecommunications network. This factor is the fifth factor in the successful implementation of computer-based management information systems in universities. Brainware factors consist of items 11, 12, 14, 15, and 24. The item indicates a connection with brainwave. This factor is the sixth factor in the successful implementation of computer-based management information systems in universities.

The dominant factor is the factor that has the most frequency of strongly agreed statements in each group of factors. This is because employees feel strongly agree that the group of factors can determine the successful implementation of computer-based management information systems in universities. The most dominant factor in the implementation of computer-based management information systems in universities is the hardware factor. This is because the hardware factor is a factor that has a high variance value compared to other factors. This can be seen in Table 3.

Table 3 Ranking of Factor Analysis Results

Rank	Factor	% Variance
1	Factor Hardware	21.52%
2	Factor Procedure	16.60%
3	Factor Software	14.08%
4	Factor Database	10.39%
5	Factor Telecommunication Network	8.84%
6	Factor Brain ware	5.21%
Total		76.64%

Table 3 shows that hardware factors have the highest rate of variation to the successful implementation of computer-based management information systems in universities at 21.52%. The procedure factor has a high degree of variation to the successful implementation of computer-based management information systems in universities of 16.60%. The software factor has a high level of variation to the successful implementation of computer-based management information systems in universities of 14.08%. The database factor has a high level of variation to the successful implementation of computer-based management information systems in universities of 10.39%. Telecommunication network factors have a high level of variation to the successful implementation of computer-based management information systems in universities of 8.84%. Meanwhile, the brainwave factor has a less high level of variation to the successful implementation of computer-based management information systems in universities by 5.21%.

As for the results of the dominance of factor analysis, it can be seen in Figure 1. Based on Figure 1, the dominant factor that determines the successful implementation of computer-based management information systems in universities is the hardware factor

with a percentage of 32.16%. The procedure factor with a percentage of 25.74%. Software factor with a percentage of 18.22%. Database factor with a percentage of 10.27%. Telecommunication network factor with a percentage of 8.16%. Brainware factor with a percentage of 5.45%.

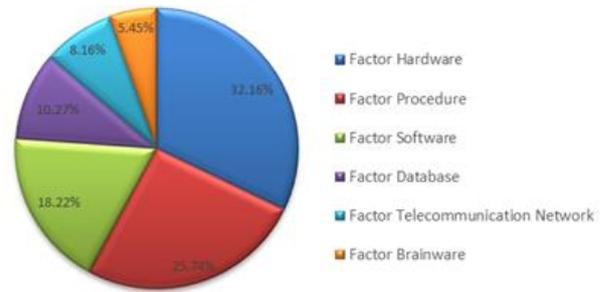


Figure 1 Most Dominant Factor Tendencies

4. DISCUSSION

Data and information need by an organization are important so that goals or targets set by the organization can be achieved [2]. Everyone in the organization wants to get information about everything quickly and precisely, so it takes an information system that uses technology to meet everyone's needs [3]. Computers in management information systems can be useful tools for processing data, can absorb inputs and outputs, have high speed, high precision, and can store commands to solve problems [24]. The implementation of a good driver's license will provide benefits namely: (a) higher efficiency; (b) supervision can be carried out in an orderly manner; (c) lower costs; (d) fewer errors; (e) facilitate the planning, organizing of operational and distribution activities; (f) information-based policies are easier to create; and (g) business officers may be reduced in use [4], [25], [26].

Based on the results of the study, the most dominant factor in the successful implementation of computer-based management information systems at unfortunate public universities is the hardware factor. This means that the hardware, whether input tools, CPU, or output tools provided by the institution have supported or worked on its functions in the implementation of computer-based management information systems [27]. Hardware is utilized to carry out data storage tasks, data entry, counting, monitoring, storage, and expenses (presentations or demonstrations) results [6]. Hardware is the most concrete factor, meaning it exists in the form of all visible facilities. Hardware can be defined as all devices in a data processing implementation.

The second factor is the procedure of implementing computer-based management information systems. The procedure is a physical component because the procedure is provided in physical form such as manuals and instructions [28]. There are three types of procedures

required, including: (1) instructions for the user, (2) instructions for input preparation, and (3) operating instructions for employees [16], [17]. The third factor is software, software provided by institutions in the form of software systems, and application software capable of supporting the implementation of computer-based management information systems [4]. System software serves to control the system that is on the computer. The operating system used is the operating system created by Microsoft namely Microsoft Windows, there are also other operating systems namely Linux, Android, iOS, and Mac OS X. Application software serves to help solve relative problems, application software namely Presentation, Browser, Word Processor, Spreadsheet, Statistics, and Utility [15].

The fourth factor is the database, the database is a group of information stored in a computer with a system so that it can be checked using the program to obtain information from the database [4]. Databases are utilized to store information or integration data well in the computer. Database activities include data collection, data storage, maintaining and conducting data integrity testing, data maintenance, data organizing data security, and data search [24]. These activities must be properly integrated to support the implementation of computer-based driver's licenses [29], [30]. The fifth factor is the telecommunication network, telecommunication is the exchange of information in any form (text, data, voice, image, video, and audio).

Telecommunications networks are a collection of appropriate hardware and software, which are set up to communicate various information from one place to another [31]. Elements in telecommunication network namely computers, communication channels, and telecommunication software [32]. The sixth factor is Brain ware, Personnel is one of the most important parts in the implementation of an information management system [33]. This means that personnel of both computer operators, system analysts, programmers, data entry personnel, and information system managers can support the implementation of computer-based management information systems at the college level [34].

A computer-based MIS raises the possibility to resolve physical limitation issues to perform its tasks only in a designated place or location [5], [25]. There are notebook computers as well as desktop computers, high-speed modems, organizational internet-intranets, and many other forms of computer technology. Members of the organization or employees can do their jobs at any place and time. Data processing using computer-based management information systems will improve the organization's ability to manage management activities, so that information users feel there is an increase in the value of information that can be [29], [35].

5. CONCLUSION

Based research analysis shows that, (1) factors of successful implementation of computer-based management information systems in universities, namely hardware, procedures, software, databases, telecommunications networks, and brainware; (2) the most dominant factor is the hardware factor; and (3) the trend level of each factor, namely, the first hardware, the second procedure factor, the three software factors, the four database factors, the five telecommunications network factors and the six brain ware factors.

The hardware factor as the dominant factor that influences the successful implementation of computer-based management information systems in college, characterized computer-based driver's licenses raises the possibility to resolve physical limitation issues to perform their tasks only in a designated place or location. The absence of notebook computers as well as desktop computers, high-speed modems, organizational internet-intranets, and many other forms of computer technology influence the successful implementation of computer-based management information systems in universities.

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