Going paperless: executive information system toward digitalized universities management

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Abstract. This research aims at investigating how Executive Information System (EIS) can be used as a device to support paperless system toward digitalized universities management and to what extent EIS success as a management tool. The case study was conducted on EIS in a private university in Bandung. This research used quantitative method by adopting DeLone and McLeans Information System (IS) Success Model (2003). The variables used are the System Quality (SQ), Information Quality (IQ), Use (U), User Satisfaction (US), Service Quality (SEQ) and Net Benefit (NB). Questionnaires were distributed to 100 respondents. Interview and data retrieval from the related division was conducted to support data analysis. The result of study indicated that the success of EIS was significantly influenced by all variables. The positive correlation between all variables and significance influence discovered that EIS was recommended in the universities management. The highest positive correlation and influence was showed by the variable of IQ that influenced US by 66.5%. It means that the company with the development of accurate, consistent and well-integrated EIS gained high levels of trust and satisfaction among users. The research provide information and recommendation to build EIS as one of paperless system toward digitalized university.

1. Introduction
Many studies showed that the use of paper is not only costly, but environmentally detriment as well [1]. The pulp and paper industry holds a strong presence in the environmental issue, as it consumes around 40 percent of the world's commercially cut timber [2]. Paperless system offers organizations many benefits including increased environmental benefits by reducing waste disposal costs and environmental impact [3]. Additionally, paperless system can increase employee efficiency, productivity, information security paper, printing cost savings; timesaving, storage cost savings, efficient file retrieval, and enhanced customer service [2, 4].

Combining hi-tech advances with today’s focus on “Going Green” and budgetary saving makes digitalized management seem more of a viable way of doing universities management [5]. Digitalization in universities means the transformation of the university environment toward strategy for ensuring sustained competitive advantage in the digitally connected world [1]. Executive Information System (EIS) is used as business tool in a digital environment [3]. EIS can be defined as computerized system that provides information summary for managers and executives on the overall performance of the organization [4], [5], [6], [7]. EIS can support them in decision-making process, solving the problem and determining critical success factor [6], [7]. EIS is seen feasible and practical to be applied in addressing management issues in education fields [7], [8].
Along with the growing popularity of EIS utilization in most companies, there are many research claimed that EIS was effective as a business management tool. Most of research provided evidence that EIS is excellent management tools, which is critical for decision making, problem solving and creates competitive in the management of a commercial company [9], [10], [11]. Unfortunately, there is very limited information available on EIS in universities management. There was a research studied that EIS is considered as necessary elements of education business [8]. However, the research did not describe to what extent EIS success in universities management.

In addition, most of research described about digitalization in universities highlighted Management Information System in general [12], [13], [14]. EIS as one of information system in universities was rarely presented specifically in the past reported research. In the other hand, more and more universities start to use EIS as the stage toward paperless system implementation as well as shifting toward digitalization. The research, it is expected will in some way address this imbalance. Hence, the main purpose of the research is to investigating how Executive Information System (EIS) can be used as a modern device to support paperless system toward digitalized universities management. Additionally, this research will provide a comprehensive literature concerning to what extent EIS success as a management tool in it.

2. Methods
The research was done on the EIS of Universitas Komputer Indonesia. A questionnaire were distributing to 100 persons as the total population of EIS users on February 1, 2018. A census survey was performed to design data sampling considering the population is not so large. Each Statement on the questionnaire was given a score according to the Likert scale. Additionally, interviews with EIS operator and collection of related reports / documents was conducted for completing data analysis.

The regression linear and T test was performed to analyze the questionnaire data. DeLone and McLean (D&M) IS Success Model was used to measure six dimensions of IS success as showed in figure 1 such as system quality, information quality, use, user satisfaction, individual impact and organizational impact [15]. The statements on the questionnaire arranged based on indicator from the previous research [16], [17], [18], [19].

Several initial hypothesis can be arranged from model DeLone and McLean (figure 1) as follows:

- H1a. Information quality will have a positive impact and significant toward use
- H1b. Information quality will have a positive impact and significant toward user satisfaction
- H2a. System quality will have a positive impact and significant toward use
- H2b. System quality will have a positive impact and significant toward user satisfaction
- H3a. Service quality will have a positive impact and significant toward use
• H3b. Service quality will have a positive impact and significant toward user satisfaction

Furthermore, after information quality, system quality and service quality already obtained, the study will be continued to find the relations between intention to use, user satisfaction and net benefits with below hypothesis:

• H4a. The use will have a positive impact and significant toward user satisfaction and vice versa
• H4b. The use will have a positive impact and significant toward net benefit
• H5a. The user satisfaction will have a positive impact and significant toward net benefit
• H6. Net benefit will have a positive impact and significant toward use and user satisfaction

The validity test was performed by using Pearson Correlation

\[ r = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{\sqrt{[n\Sigma x^2 - (\Sigma x)^2][n\Sigma y^2 - (\Sigma y)^2]}} \]  

Remarks:
\[ r_{xy} = \text{The correlation coefficient is sought} \]
\[ x = \text{Total item score} \]
\[ y = \text{Amount of total score (all of item)} \]
\[ n = \text{Number respondent} \]

While reliability test was performed by using Cronbach Alpha formula

\[ ri = \left( \frac{k}{k-1} \right) \left( 1 - \frac{\sum b^2}{\sigma^2} \right) \]  

Remarks:
\[ ri = \text{Instrument reliability} \]
\[ k = \text{Total Question} \]
\[ \sum b^2 = \text{Number of grain variants} \]
\[ \sigma^2 = \text{Total Varian} \]

3. Analysis and results
The D&M IS Model has been widely used to measure the dimensions of EIS success in previous research [16], [17], [18], [19]. The measured dimension success were:

• Information quality is to measure output from the information system also means perceived information quality. Six scales of measurement including: completeness, precision, reliability, currency and format of output [20], [21].
• System quality is to measure system performance in terms of the ability of hardware, software, and the procedure of IS which means perceived system quality. Indicators used to measure it such as system flexibility, system integration, time to respond, error recovery, convenience of access, and language [21].
• Service Quality is to compare costumer’s expectation for the service and real service. According to D&M (2003), there are 3 components that influents service quality such as assurance, system empathy, system responsiveness [21].
• User satisfaction is to measure respond and feedback of user after use the information system. Two component that influence user satisfaction are repeat purchase and repeat visit [21].
• Net benefit is to measure benefit obtained by individual and organization after using information system. This measurement using perceived usefulness with several components such as speed of accomplishing task, job performance, effectiveness, ease of job, and usefulness in work [21].
Validity test conducted by Pearson Correlation (formula 1). The result showed that all data were valid. Reliability test was measured by formula (2) by Cronbach Alpha. The result in Table 1 showed that the value of r count > r table (0.6), therefore data were declared reliable.

The result of data analysis indicated that the success of EIS is influenced by information quality, system quality, service quality, user satisfaction and net benefit. The quality of result has positive correlation with satisfactory level of EIS users. This similar relations showed by the previous research confirmed the variables above affected the success of EIS [22].

| Variables                      | Cronbach Alpha | Interpretation |
|--------------------------------|----------------|----------------|
| Information quality            | 0.876          | Reliable       |
| System quality                 | 0.894          | Reliable       |
| Service quality                | 0.833          | Reliable       |
| Intention to use               | 0.838          | Reliable       |
| User satisfaction              | 0.893          | Reliable       |
| Net Benefit                    | 0.950          | Reliable       |

The result showed in table 2 as follows:

a. Information Quality has significant influence toward use; The result proves that the hypothesis H1a is acceptable, wherein t statistic 7.071 > 2.639 t table with df (n-k) = 90 - 6. Positive impact show that the influence is unidirectional, means if information quality increases then use also increases.

b. There were not found much research about information quality, because it is considered as a component of user satisfaction, rather than being evaluated as independent construct [23]. The result of the study is in line with the prior study which found that information quality is has significant influence to use. A study found that the information quality has stronger impact on use [24].

c. Information Quality has significant influence toward user satisfaction; the result proves that the hypothesis H1b is acceptable, wherein t statistic > t table with coefficient value 0. Positive impact show that the influence is unidirectional means if information quality increases then user satisfaction increases.
satisfaction also increases. The prior study of showed the similar result that the company with accurate, consistent and well-integrated Information quality gained high levels of trust and satisfaction among costumers [23]. Another research also indicated that academic information system quality has a significant impact on user satisfaction [24].

d. System quality has significant influence toward use; The result proves that the hypothesis H2a is acceptable, wherein t statistic > t table with coefficient value 0. Positive impact show that the influence is unidirectional, means if system quality increases then use also increases.

e. System quality has significant influence toward user satisfaction; The result proves that the hypothesis H3a is acceptable, wherein t statistic > t table with coefficient value 0. Positive impact show that the influence is unidirectional, means if system quality increases then user satisfaction also increases.

f. Service Quality has significant influence toward use; The result proves that the hypothesis H3a is acceptable, wherein t statistic > t table with coefficient value 0. Positive impact show that the influence is unidirectional, means if Service Quality increases then use also increases.

g. Service Quality has significant influence toward user satisfaction; The result proves that the hypothesis H3b is acceptable, wherein t statistic > t table with coefficient value 0. Positive impact show that the influence is unidirectional, means if service quality increases then user satisfaction also increases.

From table 3, it can be seen that the highest influence of each indicator is showed by information quality to user satisfaction by 66.5%. The percentage number is represented the extent of EIS success as management tool in digitalized university.

4. Conclusion

From the result of this research, it is expected that organization can calibrate information to reflect necessary improvements. All variables measured showed significant influence, it proves that EIS success is determined by the System Quality (SQ), Information Quality (IQ), Use (U), User Satisfaction (US), Service Quality (SEQ) and Net Benefit (NB). The highest percentage that represent the extent of EIS success as management tool is 66.5%.

The highest positive correlation and influence showed among the variables means that the company with the development of accurate, consistent and well-integrated EIS gained high levels of trust and satisfaction among users. The research provide information as consideration to shifting conventional management to digital management in the universities, especially in paperless system building.

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