The Application of Integrated Executive Information System

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Abstract. The objective of this research is to analyse necessities that faced to build integrated information system for a higher education institution, obstacles that encounter when building a system by utilising consultant service from external and internal, and benefits that perceived by a higher institution after owning the integrated information system according to the needs of the higher institution. The method used in this research was quantitative analysis towards information system application which is owned and the development that undertake related to the integration of university information system. The analysis result shows that integrated executives information system would make easier to search for a data and taking decisions based on authorisation level and their respective interest. Build information system by utilising consultant service or by an internal team highly depends on the level of necessities from each higher institution regarding the information access that needed, internal team capacities and the budget owned. Building information system internally needs longer time but it possesses the ease if requiring an addition or changing the content in the future.

1. Introduction
Information technology keeps improving rapidly. These improvements have changed the way human work where previously they work slowly and inefficient, now they become faster and more efficient as well as effective. If previously a job for data input and analysis require several days to process the data manually before the conclusion and suggestion could be taken, then by utilising an information system whose job could be done in a count of hours or even minutes. With the development of information technology nowadays people obtain the easiness in inputting, saving and processing a data in order to generate an information that can be used, accurate and helpful for taking business decisions with the high level of easiness to use and taking decisions in a high speed. A higher institution is one of the non-profit institutions that need an aid in information technology to support daily activities in operating higher institution. The modernization of higher education (HE) has forced the institutions to store, manage and use existing information and knowledge stores in a better way in order to meet new accountability, effectiveness and efficiency requirements [1]. Successful management of today’s education systems requires effective policy-making and system monitoring through data and information[2]. The application of integrated executive information system will have big impact on managerial decision.

Management systems can be classified as managerial support systems (MSS), management information systems (MIS) and decision support systems (DSS). The first one is dedicated to long-term planning; the second and third one is dedicated to a shorter period and they function as monitor and control of the organization; the third one is specifically dedicated to non-structured problems [3]. In a
general sense, the term information system (IS) refers to a system of people, data records and activities that process the data and information in an organization, and it includes the organization’s manual and automated processes. In a narrow sense, the term information system (or computer-based information system) refers to the specific application software that is used to store data records in a computer system and automates some of the information-processing activities of the organization. Computer-based information systems are in the field of information technology [4]. The information system is made up of five components: hardware, software, data, people, and process. People and process, are really what separates the idea of information systems from more technical fields, such as computer science [5]. It is of utmost importance to improve the management systems alongside with improving the information system by applying the modern principles and methods of management and computer science, cybernetics, operational research and econometrics on the one hand, and by informatics and its most efficient methods of data collecting, data verifying, data transmitting, storing and processing on the other hand [6].

The integrated executives information system in Universitas Komputer Indonesia starts during the implementation of institutional accreditation for the first time in 2015. At that time universities already owned several information systems that built for the university interests, but they still stand alone and unable to meet the majority of needs that related to the institution accreditation data support. Therefore, during the implementation of institution accreditation, the weakness in information technology site that applied in the university become one of the assessor's concern due to Universitas Komputer Indonesia is a university which based on information technology but has weaknesses at data storage and integrated information system that available.

After the implementation of accreditation has completed and although Universitas Komputer Indonesia has achieved the category very good of institution accreditation (B level), at that time Rector see the importance of building an integrated executive information system according to the higher institution necessities in that time or in the future and to utilise the integrate information system in order to obtain the excellent institution accreditation target (A) in the next 5 years.

Research Objectives is to analyse the needs in building integrated executive information system for a higher institution, to find out the problems that encounter when building a system by utilising consultant service from external and internal, to know the performance of the integrated executive information system. The respondents are all of the system user in each study program department and section head.

2. Research Method

This research used quantitatives and qualitatives analysis towards the implementation of the integrated information system at Universitas Komputer Indonesia by conducting an analysis for the background of an integrated information system, existing information system condition that owned in 2015, the needs of integration and challenges while building an integrated system internally and obstacles that faced in the implementation, and measuring the performance of the integrated executive information system. The quantitative analysis is conducted to measure the performance of the system implementation, and qualitative analysis is using to describe the existing previous condition and the process of the research.

The establishment of integrated executive information system was delivered by Rector in the meeting with the dean, head of study program, directorate, and head of a division. The university perceives the needs to generate information system which could be relied on, and far better than the one that had been owned at that time.

In the beginning, the Rector decided to invite firms that are considered to have capabilities and competencies in the information technology site especially integrated information system design of a higher institution to develop the information system in Indonesia Computer University. At the first meeting amongst writers, the university information technology staffs and representatives from firms whom will build the information system for Indonesia Computer University, we saw that the system offered are not only expensive but also the module inside the system is very rigid following the template that they have previously, and the system seems to be unsuitable for the information system that we need. Moreover, if one day our university wanted to generate a further development for the existing system, the development could not be done except by involving the firm. Although we were aware that
the university necessities keep expanding and the rapid improvement in technology information site requires many adjustments in the future. Information systems are not equal in different organisations [7]. Therefore, the Management Information System has to be tailored for each organization. Besides that, the lecturer and university information technology staffs feel capable to build the system which is similar to the one that was offered by the consultant firm. As a result, the writer met the Rector and convey that the university dynamic information system is better to be built by lecturer and university IT staffs at Universitas Komputer Indonesia. After several discussions, the Rector finally agreed that the integrated executive information system will be built by the internal team.

The next step that was taken by the Rector was creating the integrated university information system team and assigned a team to build the system within 6 months. Subsequently, the rectors appointed the writer as the head of Universitas Komputer Indonesia integrated information system team. Our first question is what kind of information system that the Universitas Komputer Indonesia need in to support the university activities. Moreover, the team also identified an existing condition for the information system that has been owned.

3. Results and Discussion

Information system management in Universitas Komputer Indonesia is under Information Communication Technology Directorate. The Directorate develop a learning activities information system at university environment progressively according to the needs at that time.

Initially, information system in Universitas Komputer Indonesia that has been developed until 2015 includes students registration system, selection, the operation of teaching and learning process, and the observation of teaching and learning process system. Facilities and information system that used by the university in the learning process are as follows:

A. Hardware (KRS/study plan card, online score, and online college server; database server; finance server; Oracle; and finance server); each server is different and has separate storage location.

B. Computer Laboratories (consist of 16 computer laboratories and the total number of computers are 616 unit with various specifications)

C. License software from several software providers.

D. E-learning facility. This facility is available at http://kuliahonline.unikom.ac.id/ and is provided for the lecturer and students. E-learning facilities for the lecturer are lecturer’s room, new classes, read and reply contacts. Lecturer’s room contains various facilities such as materials, examinations, discussions, announcements, assignments, list of students and their achievements. In the lecturer’s room, the lecturer could provide the course materials to be downloaded by the students, giving assignments, reading a question and reply it, and distributing assignments result. While students may utilise this facility for asking a question, downloading materials, submit assignments and view their assignments result. E-learning facility is a complementary of face to face teaching and learning activities.

E. Online access to the library: through http://lib.unikom.ac.id/ site and to access the e-library is by going through http://elib.unikom.ac.id/ site.

F. Information system for new student’s admissions. This information system is used as a front page when the student candidate wanted to apply to become a student in UNIKOM. The system is a web-based system. This site enables candidates to apply in order to become a new student from wherever they are. Furthermore, all announcements of new student admissions are delivered on this site (such as the results of the entrance tests, important dates for new student admissions). This information system could be accessed through http://pmb.unikom.ac.id.

G. Course Evaluation Information System (SIMEP) (http://simep.unikom.ac.id) Complementary lectures process information system. Comprise: Custody site (Course Plan Fill-ing) (http://perwalian.unikom.ac.id); Online lectures site (http://kuliahonline.unikom.ac.id); Online score site (http://nilaionline.unikom.ac.id); Digital Library site (http://elib.unikom.ac.id); Lectures evaluation information system (http://simep.unikom.ac.id).

H. Alumni Tracer Study information system. Can be accessed on http://alumni.unikom.ac.id and http://survey.alumni.unikom.ac.id.
I. Information system and facilities that are used in finance administration. Finance information system in terms of students, the student could access those finance information system on the online auto-debit website service in http://autodebet.unikom.ac.id. Auto-debit is a facility that provided by UNIKOM in partnership with BNI.

J. University, faculties, directorate, course programme, student unit activity website

K. Internet facility that available are 35 MBPS

3.1 Development of Universitas Komputer Indonesia Executive Information System

Based on the data above the information systems which are owned by the university were a lot and most of them have been utilised in supporting university activities, but the system that owned and utilises by each department has different separate server, and the data accuracy still categorised as low, therefore the data that owned by one department may be different with the others and this situation often occurs. Problems that faced are (1) The previously owned hardware especially the server have different storage locations and the memory capacities is very limited, (2) some owned data did not match one part and the other parts, (3) lecturer staff and employees did not understand who is the one that responsible for the data input, update, and review, (4) University business process have not been well illustrated, hence management coordination and information system utilisation become inadequate. As a result, those data might be less reliable for taking decisions by the university leader, and it needs time to re-process those data before it can be used for making decisions. Additionally, to access each system the user has to log in to each of the systems.

After the team has been formed and done the evaluation towards the existing condition, Integrated team invite all parts, dean, head of study programme, direcorate and division head in Universitas Komputer Indonesia afterwards to identify what they need in order to accelerate their daily tasks activities. We ask for written suggestions from all parts, directorate, course programme, and faculties related to the information system that owned at that time and suggestions that they expect. The first obstacles that faced are not all parts understood their jobs clearly from our team and tend to be slow when expressing about what they really need including their suggestions time target. Several times of meetings and clarifications need to be done with all parts that are related to ensuring that their needs could be understood by the formulator team clearly, hence information systems that have been built are the one that is needed and corresponding with the user expectation. After obtaining preliminary illustration related to the necessities that needed by each part, there is a discussion with the team whether all of the demand would be built in the same time with 6 months or done progressively. Which one that is going to be done first and which one that would be done on the next stage.

Considering that the integrated executive information system starts from the needs that felt to be important when the institutional accreditation occurred. Therefore, it has been decided that the first thing to be done is all necessities which related with institutional accreditation and study program accreditation, and next thing to be done is the one that related with the needs of faculties, directorate, division and student affairs. Moreover, the developments are undertaken from the information system that already exists before and integrates it with the new information system that is going to be built.

Information system analysis is done by conducting an analysis towards the existing system and the system that is going to be built with the server requirements and another supporting hardware that might be needed. The additional information system that would be built and consideration of the shift in the system requirements and devices are expected to be able to adopt the change that occurs in the next 10 years. Based on the analysis above, the team started to organize the desired system design in the form of blueprints, prototype development, full design and construction system.

The team attempt to retain the existing information system and adding the new information system that needed according to their importance and next carry out developed integration between the old and new systems. In the new system, authorisation to input data is given according to the most related part for that data, while validation review is done by the head of each study program. The one who could see and utilise the data is adjusted with tiered authorisation from each study program and faculty, for example the Rector can see all data on the Executive Information System, the dean could see the data from the information system on their own faculty, the head of study programme may see the data of
their study programme, and lecturer or employees might see and edit their personal data only. To enter
the integrated system each person only inputs their password once in the University Executive
Information System, and afterwards, the person could access all data depends on the authorisation level
that was given to him/her. This system is built in order to gain outstanding data and information, can
meet the civitas academic demand, facilitate staff when working which affect the work effectiveness
and efficiency at the University.

The Executive Information System that was built by the Integrated Information System Team of
Indonesia Computer University, as shown in Figure 1.

Figure 1. Executive Information system of Universitas Komputer Indonesia

Executive information system contains content such as a front display, students, alumni, new
student admissions, lecturer, academic, evaluation, employees, questioner, tracer study, strategic plan,
borang accreditation, online lectures, asset, research institution & community service, quality assurance
and security & cleaning service. All of those contents can be access according to the needs and
authorisation level that was given to each lecturer staff or employees.

The information system is created to be flexible if in the future the system needs to change or
adapt depends on the consideration of the changes of priority level. Recently the system that has been
built already used by most of the stakeholder that related based on their authorisation. However, the
system still has a problem in several data updates where the data needed an update from the lecturer and
employees first, especially if it is related to teaching data, research and community service from each
lecturer that is inputted by the relevant lecturer, consequently if there is a lecturer that absent the
data become out of date. Good output information comes from a good input data. Data update need
involvement and review from all related parts to ensure that the information obtained is accurate and
can be used for making management decisions or as a valid data source for the interest of higher
institution Tridarma. Three issues concerning data are addressed: 1) Availability and accuracy of data
for new research and re-analysis while protecting human subjects, 2) Problems with the estimation of
indicators based on flawed or non-generalizable data, and 3) The use of data to develop models for
projecting the future, the assumptions on which those models are based, and assessment of the accuracy of past projections [8].

Compare to the condition before the integration has been performed, the system owned nowadays seems to be benefiting all sides in the university environment to support daily activities and to give convenient for the leader and all departments that related in doing an evaluation and taking decisions. These results are the same as the research that conducted by [9] which concluded that there are qualitative and quantitative benefits for the system integration. The quantitative benefits are: shorter/reduced steps in business processes, time taken to process one application/record, less complaints from members of the public, number of applications/ records processed over a period, less complaints from end-users, reduced number of errors, reduced software development time/effort, reduced maintenance, reduced number of IT personnel. The qualitative benefits are improved working procedures, better communication with other related organisations, job satisfaction, redefine job specification, improved data accessibility, One-stop service, more friendly public service.

The successful of Integrated Information System Application in Universitas Komputer Indonesia measuring based on Delone and Mclean Assessing Information Technology (IT) Project Success Criteria [10] which stated that IT project should be evaluated according to six criteria: (1) system quality: the project team supplying the system must be able to assure the client that the implemented system will perform as intended, (2) information quality: the information generated by the implemented IT must be the information required by users and be sufficient quality that it is “actionable”, (3) use: once installed the IT system must be used, (4) user satisfaction: once IT system is complete, the project team must determine user satisfaction, (5) individual impact: all system should be easy to use and should supply quality information, (6) organizational impact: the supplier of the system must be able to determine whether it has a positive impact throughout the client organization.

Respondents are all of the Dean, Study Program Head, Directorate and Division Head, and Section Head in Universitas Komputer Indonesia. Based on measurement data by using ordinal scale: 1 (very poor), 2 (poor), 3 (good), 4 (very good), 5 (excellent) as shown on Table 1, we found that the implemented system perform very good (95%), the information generated by this executive information system is required by all users and has sufficient quality that it is “actionable” (85%), this system is useful as a problem-solving, decision aiding and it is used by the costumer (89%), the user satisfaction by using this integrated information system (80%), the information is more retrievable – more affordable for the user (84%), and the university executive information system has positive impact on organizational operation (87%).

Based on the above findings, we can concluded that the application of Executive Information System in Indonesian Computer Information System success in its implementation. The successful implementation influenced by the team communication, management commitment and also user involvement [11]. The EIS successful implementation also depend on how well the implementation of the technology development process and the users involvement [12].

Even though the performance is as our expectation but the management is still need to continue improving this system based on the user suggestion, for example to make it more integrated for all activities, automatically updated data, and reward and punishment policy for the active/passive user. Up to this time contents change and addition towards the system that has been built are continue to be done in order to complete and adopt necessities that needed by faculties, study program, directorate, division, or administration and finance site.

We can concluded if the university has sufficient resources especially for information technology expert team, better if they built the executive integrated information system inhouse by themselves because it is more flexible, easy to modify, cheaper and make the team proud. University will save a lot of money if the system is developed by university own team. Other benefit it is easier when the system need to modify or need more development in the future (Figure 2).
Figure 2. The Performance of the Executive Information System Measurement Data

4. Conclusion
A higher institution needs to generate an integrated Executive Information System to simplify academic civitas to search a data and taking decisions according to the authorisation level and individual interest. The better information system that has been built the more effective and efficient the management decisions making. Building information system by using consultant service or with an internal team is highly dependent on the level of needs at each higher institution about the information access that require, internal information technology team capacity and the budget owned. Building an information system internally need longer time but has the privileged if the information system needs an addition or changing content and adjustment in the future. Integrated Information system application has benefited Universitas Komputer Indonesia on daily activities.
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