Strategic Management: Building Frame Work IT Governance In University Environment

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Abstract: *IT-Governance Issues in Higher Education environment is not just a matter of website development, but involves the application and infrastructure are far more complex, as well as adequate management context. Because it is uncertain if an institution only buys applications and infrastructure, without adjustment of management, it is unlikely to succeed.*

This model can be considered in implementing IT-Governance IT Governance is a model such as COBIT, ITIL, COSO, ISO / IEEC, etc. All these models are usually nice to be developed within the company, but not necessarily the best when developed in the higher education environment.

Trends and issues in tertiary education in Indonesia in recent years faced with the problem (1) loss of confidence in the benefits of higher education, (2) changing patterns of potential interest to students majoring in vocational; (3) increased competition among universities; (4) the cost of education very high; (5) the number of opening a community college which is geographically closer to students and low-cost, (6) the increasing concern for more effective education management

Keywords: *Higher Education, IT-Governance, Models, Infrastructure, University, Environment.*

1. Introduction

Adoption of the concept of IT Governance in view of the institution will avoid giving the perspective of a more comprehensive and integral. This perspective, as one example, will make us more objective in looking at e-governance initiatives were the best institutions, not just a rating on the website of the most interesting and most consistently managed.

The website is just one single application in e-governance institutions, and not necessarily an objective existence of the website is a priority. The existence of this model also helps IT Governance initiatives from the middle management level is adjusted with the concept of priority objective assessment of existing resources and capabilities.

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2. Literature Review
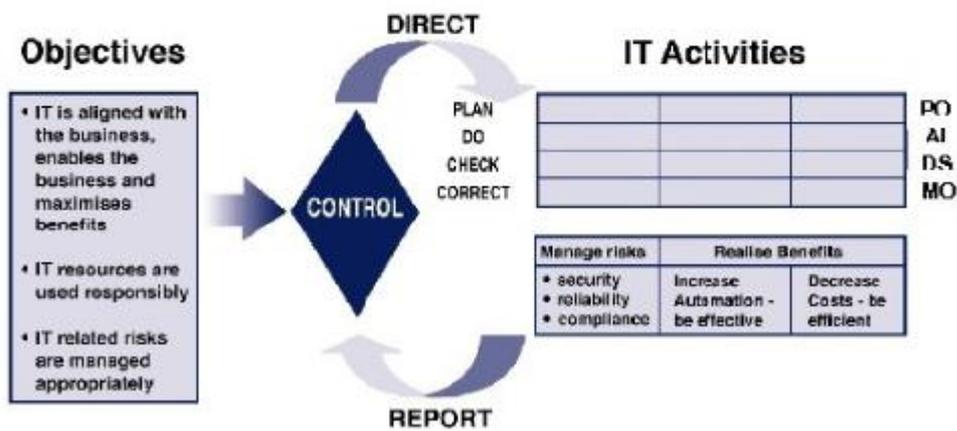
Picture 1: ISACA IT Governance Model

(https://present5.com/cobit-framework-isaca-pr-5-th-symposium, 2020)

Characteristics Higher Education

(Paul Hagua, Julia Cupmen, Matthew Harrison, Oliver Truman.,2016). Identified five characteristics inherent in an educational institution:

1. The Nature of the service act

Services produced by educational institutions leading to more intangible things - people-based - rather than things that are physical-based equipment. In the service process also involves the actions of the intangible.

2. The Relationships with customers

Educational services involving consumer relationships that lasted longer and be formal and conducted continuously (continuous). Students as consumers have a relationship "membership" ("membership" relationship) with the

university. This allows the formation of high customer loyalty (the student) and improves services to consumers (the university).

3. The level of customization and judgment in service delivery.

The customization level of education varies greatly. Tutorial with little or guidance of individual participants would be more easily customized than education with many participants. The more services offered customization makes consumers have a high level of expectation on the quality of services, particularly related to the quality of the teaching staff. If so, problems will arise is the possibility of a relationship between the quality and level of service. The more variety of services offered, a possible decrease in the higher quality.

4. The nature of demand relative to supply.

In the services sector, there is widespread demand (such as electricity) and demand narrow (such as hotel rooms). The level of supply to meet fluctuating demand is very different. Increasing demand for electricity will be easier and faster to be overcome by increasing production capacity, if still prepare, compared with an increased demand for hotel accommodation. In the world of education, the demand associated with the narrow demand. Thus, bidding will be difficult to manage, because it is associated with a shortage of faculty and courses offered.

5. The method of service delivery.

Method of service depending on the service outlet (single or multiple) and the nature of the interaction between consumers and service providers. Consumers have come to the service provider and vice versa. In education services, educational institutions generally require the consumer to come to campus. But, technological developments, will enable distance learning.

3. General Scope of Control Requirements

3.1. Organization and Management

Controls to test the effectiveness of management and organization of organizational structure in order to supervise and control reporting requirements. Ensure the enforcement of management policies and procedures. The organizational structure should show lines of responsibility and authority are clear of the top layer to the bottom layer.

One of the reasons for weak internal controls is a weak assignment of responsibility. Description of work in each work unit must clearly define the responsibilities of the work unit head unit should be given adequate authority to enforce it. The head-unit head unit must be eligible to supervise workers in critical positions for maintaining effective internal controls. Organizational and management boundaries here are associated with IT operations.

3.2. Procedures and Policies

In many organizations, the policy must be approved by the council of top-level management, who meet periodically in certain time duration. For this reason, the policy is a general statement that does not require constant updates. Standards are a more detailed requirement statement approved by the management organization for

supporting the above policy. These standards can be updated regularly because the management is always there every day. Guidelines (guidelines), as standard, approved by management but not necessarily implemented. Procedures are activities that must be done to meet the standards and guidelines set by management.   To give an illustration, a policy may be a statement, "The organization will maintain the highest standards for the overall IT system." One of the many standards that will support this policy may state, "Password all systems within the organization must be a minimum of 8 characters, must expire every 60 days or less, and must be protected by encryption standards set by the management.

Guidelines related to these standards may be declared, "If the system is capable, user passwords must use a combination of alphanumeric characters." Procedures related to standards and guidelines above may declare, "All system administrators need to deploy automatic controls to ensure that all users who enter a password of no less than 8 alphanumeric characters, that all user passwords expire in 60 days, and that the files which contain the user password is encrypted using xx Encryption Standard. " Policies and procedures are to be audited to provide information on whether that is running currently are still in accordance with policies and procedures that have been determined.

3.3. Project Management, Development, and Maintenance Software

An existing software development company that developed the insourcing (done internally by a part of management) or outsourced (done by other companies). Even now many companies that convert the system to an open architecture client/server environment that uses software vendor Maintained running Commercial-Off-The-Shelf (COTS). Key controls over software development and maintenance in the context of e-government is a set of clear standards of project management, as well as programming standards.

These standards can be applied with ignoring whether companies developing custom software using all the modules developed by yourself or use an off-the-shelf spreadsheet for example.

Some general standards that are audited in this area are:

 a. Project management standards

 b. Acquisition of software standards

 c. System development and programming

 d. Software testing

 e. Software maintenance

3.4. Safety Data

Safety data to give attention to the appropriate controls for data input, processing, and output. Risks in this area, including one entered in the system, inconsistency of data changes, and loss or destruction of data due to damage hardware, software bugs, fraud, employee error or natural disaster. Policies describe the data input controls on inputs. To verify the control data during processing and output phases will be reviewed where the system stores data and file system functions. The file system includes master files, transaction files, parameter files, and temporary files.

a. Input Control

The control program for verifying whether the data input correctly in the data fields in the correct data format and that the data is invalid. Courses can give a chance to reject certain data outside the allowable range. Controls ensure the completeness of the inclusion of all required data in the field, whereas control the validity of comparing the number of accounts with a number of files with a valid account to ensure that the files (accounts) exist. Controls reporting to produce a printout of transactions and enables users to verify the total revenue generated by the original document.

b. Processing Control

The risk of safety data during processing include operator error, program error, fraud, malfunction of equipment, and viruses. Program bugs can cause the elimination or modification of data that is not true, as well as possible errors in data writing of a master file or an error in calculating. Fraud can also occur during processing if the user is using another program jointly. Equipment malfunction may produce an error in writing to the disk, and head damage can destroy all data stored on the disk. Calculation errors can also occur because of damage to memory chips. Power supply, system shutdown, and overheating CPU or other components in the system board can be another form of malfunction of this equipment. the virus can cause a lot of system problems.

c. Output Control

Output control is applied to the printout and outputs that are stored on disk. This control is intended to ensure data integrity. This control of which may reduce the risk of destruction of the printout from users who do not have the authority.

3.5. Security

Security control is a high priority in IT Audit. In the PC era, today, the safety factor is far more complex than the mainframe era, because in the era of mainframes the only hacker with a very high skill that can make trouble for the security, because the mainframe was developed specifically by each company, while the era of PCs using the open-system paradigm. Security controls are divided into three areas:

a. Computer Operation

Security of computer operations starting from the computer room. The room should be kept clean to prevent the risk of fire. Physical security of the area consists of the use of locks on doors, fire alarms, fire extinguishers, and intruder detection devices; proper exit signs, and use UPS. Access to the computer room must be restricted, and visitors must sign a log that records the time entry and leave the computer room. Control operations also include controls for the functions of a computer operator, does not perform functions such as programming or not allowed to

access the supervisor manuals, source code, compilers, file-altering utilities, or another tool that can access the program or modify files.

b. Access Security

The objective of the access security is to prevent unauthorized access authorities own a number of programs and data. Authentication and authorization are security key elements of the access. Authentication is the identification of individuals who tried to log on to the system. Authorization is a limitation of user rights in accordance with its password.

c. Security Program

Security program includes control over events that are not allowed to change the application programs, operating system programs, and data files. The audit will determine the security level of the program through observation, inspection, review, and tests of controls. An audit also made on the procedures and standards that may have been set by the company, whether an employee has been carrying out and following standard procedures.

d. Emergency Procedure

Emergency procedures for the areas of IT should be coordinated with the overall part of the company. Plans for various emergency situations that might like fires, floods, earthquakes, tornadoes, or terrorist threat is required to prevent data loss disaster and restore operations as quickly as possible. The audit will determine whether the plan has been prepared has been comprehensive and tests conducted in accordance with the schedule.

4. Possible Use Of Information Technology In Higher Education

In his study of the purpose of exploiting IT in several leading American Higher Education, (Alavi and Gallupe, 2013) found some purposes the use of IT, namely (1) improve the competitive positioning, (2) improve the brand image; (3) increased elevate the quality of learning and teaching; (4) increase student satisfaction, (5) increase revenues, (6) broadening the base of the students; (7) improving the quality of service, (8) reduce operating costs, and (9) to develop new products and services. IT can be used in a university environment, among others, Campus-Wide Information System (CWSIS), the Internet, and multimedia. With IT, information about the university and its activities can be accessed by internal and external users. Such information can range from news about campus development, the teaching-learning activities - that can be packaged in the application of learning management systems, inventory universities, research activities, to alumni data. In short, the CWIS can help the process before the registration of students, support the process of learning and teaching and research (including lecture notes and assignments and provides contact between lecturers and students), until the student graduated. CWIS can also facilitate the coordination and management of universities (Maden K, 2016).

In addition, the use of CWIS can also change the management structure (McClintok, 2017). The use of IT will

produce optimal results in a relatively flat organizational hierarchy, which has a staff that is flexible, highly educated, have a high sense of responsibility and able to work well in teams (Classen, 2015). Further strategic decision making can also be done quickly as all supporting data used for the consideration available. The approach which allows access to information and transparency of this process can reduce the 90% administrative employees (Arthur A, 2015) because the employee as a mediating function is replaced by IT. Internet technology has enabled the possible conversion of the former CWIS-based local networks into a web-based. This web-based CWIS makes it easier for users and makes use of a range of overcoming the limits of space and time. The development of mobile telecommunication technology with SMS (short message service) and WAP (wireless application protocol) further enrich the types of user interfaces that can be used. This made the information and services provided by Higher Education can be accessed and performed anytime and anywhere (ubiquitous). It also allows for the implementation of distance learning quality. Mode of interaction with the help of IT can be done synchronously (at the same time) and asynchronous (at different times).

Further, the Internet also facilitates different relationships, both within and outside the university environment, even with institutions abroad. Oluwaseun J. Adeyemi, Segun I. Popoola, Aderemi A. Atayero, David G., and Afolayan (2019),. Research collaboration, for example, can easily be done with the help of the Internet. Multimedia help creates a fun learning environment (Amanda Gailey, 2018). Multimedia will make the learning process more attractive

5. Utilization of IT Challenges

In this regard, full support from top management is necessary, both in providing funds and in leadership (leadership). This shows that the management of the total cost of ownership (TCO) needs to be repaired. TCO includes acquisition costs, control costs, and operations costs.

Second, the lack of full commitment and support from top management will be an obstacle in the utilization of IT at Higher Education. The attitude of "do it to me" is one form of lack of commitment. In many studies of IT utilization, top management commitment has always been critical success condition (Mohapatra, Sanjay, Choudhury, Anupam, and Ganesh, K.,2017)

Third, concerns about the changes also became another obstacle. In many studies found, resistance to change is one of the obstacles of change (Krause, Ryan, Semadeni, Matthew, Withers, and Michael, 2015). There are many reasons why someone becomes concerned about the changes, including the loss of a sense of security and a major entry barrier associated with the level of skill.

Diffusion of innovation theory can explain this phenomenon well, according to (Tarkenton and Fran, 2015) diffusion of an innovation speed is influenced by four elements, namely (1) the characteristics of innovation; (2) communication channels used to communicate the benefits of innovation; (3) time since the innovation introduced and (4) social system where the innovation diffuses. Therefore, the evolutionary approach is often more desirable and

more appropriate than a revolutionary approach (Dedehayir, Ozgur, Ortt, Roland J., Riverola, Carla, Miralles, Francesc, 2017)

In this context, motivation is also an important issue. In many cases, companies change, reward systems (rewarding system) also improved to motivate the involvement of all stakeholders.

Therefore, the fourth, the involvement of all stakeholders is another challenge that must be taken into account. There was never any substantial changes without the involvement of all parties. In this case, in addition to rewarding a good system, good leadership is essential. Involving all stakeholders is not easy in this problem. Level of awareness of different capabilities and makes the involvement of all parties in the Higher Education - which is loosely coupled - to be very heavy. Therefore, communication with all parties is very important. However, the benefits and opportunities IT usage in Higher Education must always be raised in advance. Communication is also necessary to ensure the line between business strategy and IT strategy.

The involvement of all parties not only in the early stages of implementation but until the process of IT utilization constantly. Here, cultural change is also needed, namely a digital culture. Without the involvement of all parties and cultural changes, the benefits of IT can not be exploited optimally
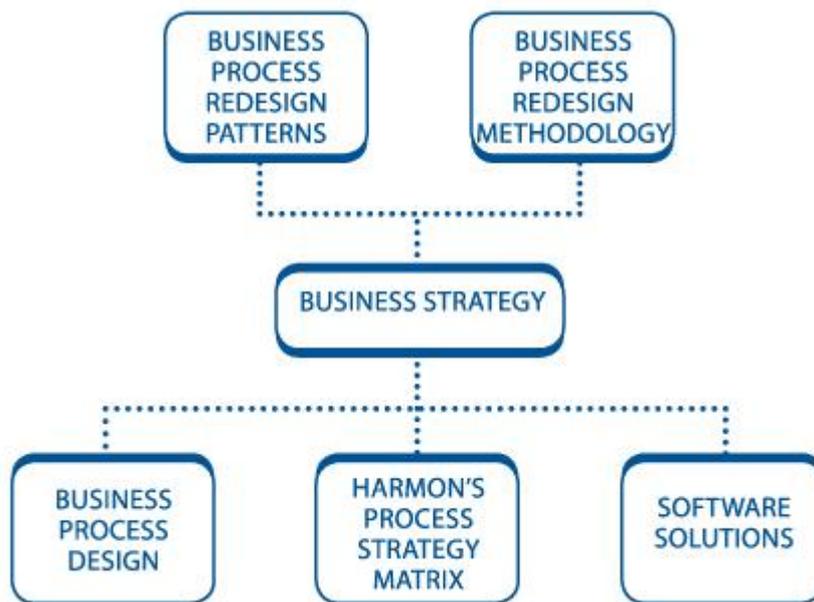
Picture 2: Model Change Business Process

(https://kfknowledgebank.kaplan.co.uk/acca/chapter-9-business-process-change, 2020)

6. FrameWork IT University Governance

Frame Work of Higher Education IT-governance proposed in this research is based on the concept of IT

Management's Concern. The results of this research divide Management's IT Concern in several groups as shown by the table below:

Table 1: Management's IT Concern

Group	Management Concern
Enterprise Packaged Solutions	• Failure to meet user requirements • Failure to integrate • Not compatible with technical infrastructure • Vendor support problems • Expensive/complex implementation
Client-Server Architecture	• Failure to coordinate requirements • Access control problems • Not compatible with technical infrastructure • End-user management problems • Control of software versions • High costs of ownership
Works Group & GroupWare	• Quality control • Access control • Informal Procedures • Data integrity • Configuration control
Management	• IT Initiatives in line with Business Strategy • IT policies and corporate governance • Utilising IT for competitive advantage • Consolidating the IT infrastructure • Reducing the cost of IT ownership • Acquiring and developing skills
Internet/ Intranet	• Unauthorised access to the corporate network • Unauthorised access to confidential messages • Loss of integrity - corporate transactions • Leakage of confidential data • Interruption to service availability • Virus infection

7. Conclusion

IT Governance Frame Work Development in Higher Education environment would produce a more IT-governance has a beneficial value in real terms, while still accommodating the existing resource limitations. This concept also provides a more objective perspective in viewing IT-Governance initiatives in the university environment at every level of bureaucracy.

Despite the many changes that can be done with the help of IT, however, challenges or obstacles to be overcome to create conditions conducive to optimizing the utilization of IT in Higher Education. Optimizing the use of IT will also require changes in mindset from deductive to inductive, and in line between top management (or business strategy) and management of IT (or IT strategy). This also means that investment in IT must be followed by corrective measures and adjustments to the quality of people, processes, and organizations.

The existence of a conceptual framework of control IT-governance in higher education environment will be the guide on any risks that may be encountered in the implementation of IT-Government of Higher Education environment and will assist universities in preparing the scale of IT-Governance development priorities.

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