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Education Quality Development for Excellence Performance with Higher Education by Using COBIT 5

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***Abstract*—**The purpose of this research is to study the management system of information technology which supports the education of five private universities in Thailand, according to the case studies which have been developing their qualities and standards of management and education by service provision of information technology to support the excellence performance. The concept to connect information technology with a suitable system has been created by information technology administrators for development, as a system that can be used throughout the organizations to help reach the utmost benefits of using all resources. Hence, the researcher as a person who has been performing these duties within higher education is interested to do this research by selecting the Control Objective for Information and Related Technology 5 (COBIT 5) for the Malcolm Baldrige National Quality Award (MBNQA) of America, or the National Award which applies the concept of Total Quality Management (TQM) to the organization evaluation. Such evaluation is called the Education Criteria for Performance Excellence (EdPEx) focuses on studying and comparing education quality development for excellent performance using COBIT 5 in terms of information technology to study the problems and obstacles of the investigation process for an information technology system, which is considered as an instrument to drive all organizations to reach the excellence performance of the information technology, and to be the model of evaluation and analysis of the process to be in accordance with the strategic plans of the information technology in the universities. This research is conducted in the form of descriptive and survey research according to the case studies. The data collection were carried out by using questionnaires through the administrators working related to the information technology field, and the research documents related to the change management as the main study. The research can be concluded that the performance based on the APO domain process (ALIGN, PLAN AND ORGANISE) of the COBIT 5 standard frame, which emphasizes concordant governance and management of strategic plans for the organizations, could reach only 95%. This might be because of some restrictions such as organizational cultures; therefore, the researcher has studied and analyzed the management of information technology in universities as a whole, under the organizational structures, to reach the performance in accordance with the overall APO domain which would affect the determined strategic plans to be able to develop based on the excellence performance of information technology, and to apply the risk management system at the organizational level into every performance process which would develop the work effectiveness for the resources management of information technology to reach the utmost benefits.

***Keywords*—**COBIT 5, APO, EdPEx Criteria, MBNQA.

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I. Introduction

CURRENTLY, higher education institutes in Thailand are alert and specially interested in performance evaluation and the internal quality evaluation of education according to the Office of the Higher Education Commission (OHEC) criteria and the quality evaluation of education according to the Office of National Education Standards and Quality Assessment (ONESQA) criteria [19], and to develop the criteria of education quality for good governance. Such organizations perform the duty as evaluating to support performance in terms of education institute governance and academic confirmation by realizing the benefits of risk management in the organization [4]. Therefore, it becomes the part which has significance in the governance of organizational risks in order to lead to excellence, and to be able to respond to the needs of corporate governance and good governance of performance within the university. Today, risk management is considered as a crucial part, widely used for the purpose of a decrease in the use of resource within the organizations and an increase in the effectiveness and efficiency of strategies, performance, as well as an increase in the credibility of financial report, and to follow the laws and regulations related to organizational risk management. This can be seen from various organizations of Thailand which perform a form of internal control and internal investigation by adhering to the ways of risk management. This is supported by the executive administrators of the organization which would affect the internal control and other systems. The author studied and researched information related to risk management from the internal control system based on the COSO standard, Committee of Sponsoring Organizations of the Treadway Commission [6] and the COSO-ERM (Enterprise Risk Management) [3], which compared to the crucial ISO 31000:2009 [12] and the risk management guidelines on principles and implement of risk management), which consists of the Context Establishment, Risk Identification, Risk Analysis, Risk Evaluation, Risk Treatment Additional Activities, Communication and Consultant, and Monitoring and Review [14].

The researcher will analyze and compare this information, and then apply COBIT 5 to improve and standardize the process of IT planning and auditing.

This is regarded as strategic management which has to supervise according to the COSO standard that consists of five main topics. These include Control Environment, Risk Assessment, Control Activities, Information and

Communication, and Monitoring, which are considered the world standard used as a reference at the organizational level by commercial banks or security corporates, as well as leading companies all over the world [1].

The COSO will be the framework and tool to effectively audit and control processes in all levels by focusing on improving university policies and regulations.

The researcher compared this to the educational management system through higher education, which were, the study of risk management ways of higher education.

To study and compare the development of educational qualities by COBIT 5 for excellent performance, and to study the problems and obstacles of the auditing process of information systems.

Universities of today have developed their standard quality of governance and instruction by adhering to the ITIL Standard [13], focusing on management by providing services using the information technology system (IT Service Management). Therefore, the researcher working in the higher education institute is interested in conducting the research by applying COBIT 5 [9] for governing IT by evaluating and analyzing the process in accordance with the strategic plans for information technology throughout all universities, as well as those in the Bangkok countryside, which are ranked to be among the top five private universities in the country between 2013 and 2015. The study has been carried out and extended until today, comparing with the system of excellent educational quality criteria of the Office of the Higher Education [4].

The criteria have been developed from the performance excellence program, the researcher can conclude the results from the case study of the university that it could be done based on the domain process of APO (Align, Plan and Organize) of the COBIT 5 standard frame to be in accordance with the strategic plan of the organization only 95%, as it still has some restrictions, which include the limitation of organizational cultures. Therefore, the researcher studied and analyzed the overall image of governance on the information technology of the university under the organizational structures to be able to conduct the study in accordance with all domains of APO (ALIGN, PLAN AND ORGANISE), which would affect the given plan and strategies to be able to develop the performance based on the good governance of information technology starting from the infrastructure information technology, and to create the concordant plans and strategies [2]. And finally, it would ensure a result where the governance on information technology is aligned with the overall direction for the university. Most importantly, if the risk management system was applied to every performance process, it would help develop the effectiveness of performance and resources management on information technology, ensure the most effective for service and managing education, and support all operations and processes of the university more efficiently. Whether the expectation of the university, as said above, would be evaluated based on the criteria and level, as much as being self-evaluated would depend on the selection of the appropriate standard and practical methods, or which practical framework to employ to support the visions, strategies, and missions of the university. Hence, the researcher studied the risk management on information technology connected with the processes and principles of COSO-ERM and COBIT 5, according to the ways of policies determination for risk management, and perception on purposes of the university, understanding of conduction, risk evaluation, plan and control, in order to reduce the risks in the organization by the principles of risk evaluation to be able to become the method of risk management for the organization as a whole. For this research, it emphasizes the study of the risk management plan in terms of information technology by the crucial methods, which is, the organizational plan and organizational management of APO based on the standard frame of COBIT 5, which covers strategies, techniques, and ways that enhance information technology to reach the standard purposes of a university for the success of its strategic visions. The APO domain consists of communication and management, which include 13 processes of information technology based on the domain of APO, as shown in the Table I as follows:

TABLE I
PROCESS FOR GOVERNANCE OF ENTERPRISE IT (ALIGN, PLAN AND ORGANIZE)

APO 01	Manage the IT Management Framework
APO 02	Manage Strategy
APO 03	Manage Enterprise Architecture
APO 04	Manage Innovation
APO 05	Manage Portfolio
APO 06	Manage Budget and Costs
APO 07	Manage Human Resources
APO 08	Manage Relationships
APO 09	Manage Service Agreement
APO 10	Manage Suppliers
APO 11	Manage Quality
APO 12	Manage Risk
APO 13	Manage Security

According to the table mentioned above, starting from the management of infrastructure on information technology, it must be in accordance with the work plan and strategy, management of organizational architecture, innovative management, budget and cost management, personnel management, relationship management, service agreement management, and quality management. The crucial point at the center of this research is risk management at every step of plan, and security management, including the risk investigation of conduction, as well as following and monitoring the various risks to remain at an acceptable level. Eventually, these will enhance the qualities through management information technology, which is in accordance with the orientation of the university as a whole.

This would help perceive the results after the research that according to the risk management policies of each institute, had been the most successful at the national level, and how that university managed strategies, techniques, processes and methods [18]. This would be referred, based on the criteria of

ONESQA and OHEC by comparing with the criteria of education quality for excellence performance of all five universities selected for this study. The researcher used them for comparison benchmarking to study the most appropriate operational methods that result in best practices, by emphasizing the risk management policy in terms of information technology [14].

II. Purposes

1. To study and compare the development of educational quality for excellence performance by using COBIT 5 in terms of information technology of autonomous universities in central and greater Bangkok;
2. To study the problems and obstacles of the investigation process of the information technology system;
3. To propose ways to improve performance by applying the COBIT 5 standard to the university for the information technology service.

III. Conceptual Framework

According to this study, the researcher set the hypothesis based on the management frame of information technology by COBIT 5 [10], and then integrated with the criteria and methods of good performance which would lead to excellence, as shown in Fig. 1 below:

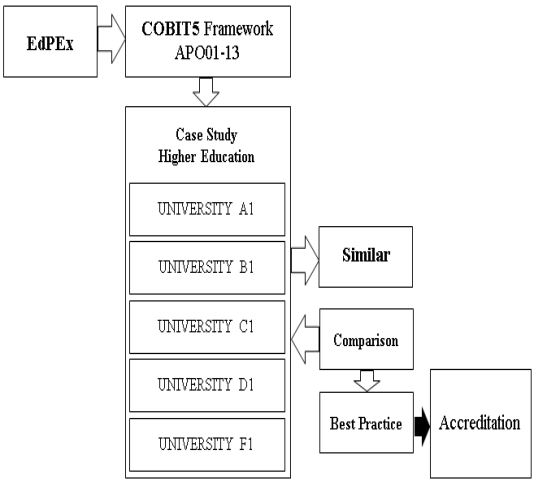

Fig. 1 Connection of the conceptual framework compared with the criteria and methods of best performance to lead to excellence

Regarding the action research for studying and comparing the use of the risk management system in terms of information technology at the level of higher education; this is the study process methods used for planning and managing the organizations based on the APO domain of the COBIT 5 standard framework to manage and control the information technology project to support the service [7]. The researcher emphasized the qualitative research methodology, together with some parts of quantitative research only. The research results were divided into the study results of data collection for fact findings, activities conducted relating to IT Governance and Current Activities, the results of the APO01-13 domain assessment, risk management results for the standard of information technology based on risk management and quality assurance, as the criteria of evaluation.

IV. Research Methodology

Concerning population, this included the administrators, involved with the information technology directly, who were specific persons [5]. The interviews were conducted through executives and groups of administrators holding the chief level positions within the organization, as well as collecting data from the operational officers. The population groups used for this research have been listed, as shown in the Table II below:

TABLE II
Groups of Population Used for Data Collection

University	Total numbers of interviewees for data collection		
	Groups of top manager	Groups of middle manager	Groups of practitioner
University A1	3	3	5
University B1	3	3	5
University C1	3	2	7
University D1	2	4	5
University F1	3	3	7
Total	14	15	29

The researcher created instruments for qualitative research then consulted with a research advisor to examine the accuracy and appropriateness of language use and the conciseness of the questions. Then, the researcher made the necessary improvements and adjusted the research instruments. The research instruments were then examined for validity by three experts involved in the knowledge field of information technology use and risk management, in order to make any final adjustments based on the recommendations of these experts. Finally, the researcher presented the revised research instruments to collect the real data from the given sample group, which included top managers, middle managers, and practitioners of information technology in the five higher education institutes selected for the study. The instruments used for this research included two interview forms, which were, the questionnaire asking about the general status of the interviewees, and Participatory Action Research (PAR), which was in accordance with the methods and concepts of the field of study by focusing on the data collection. The researcher was part of the organization, and hence, conducted the interview by using two types of in-depth interviews. Firstly, individual in-depth interview; questions and discussion between the interviewer and interviewee, which allowed the researcher to obtain detailed and complete answers, providing a deeper explanation of the reasons for individual behaviors, attitudes, needs, beliefs, values, and personalities in various aspects. And secondly, Focus Group Discussion; the interview and discussion of specific issues inviting participants to come together as a group of two to seven members, giving them the opportunity to exchange attitudes and discuss various points as needed. After which, an attempt is made to find a conclusion to perceive new concepts

which use the technique of content analysis by organizing the information group according to various points, and analyzing the causes and reasons by using the purposes and concepts of the research as the frame to analyze the management forms on information technology based on the COBIT 5 standard frame [10]. The aim is to study the scope of the processes of information technology in terms of plan and organizational management based on the APO domain (ALIGN, PLAN AND ORGANISE) focusing on governance at the upper level, strategic management based on policy and the main goals at the organizational level, as well as to conduct an analysis of the status of the interviewees and the conclusions of the interview forms employing the processes based on risk management of each university [8]. The researcher included the information to benchmark the study in line with best practices that would lead to excellence [14]. The results can considered as part of the development of the university to implement world class systems.

V. Research Results

According to the conclusion of the research results in terms of Policy, Strategy, Control Self-Assessment: CSA, Risk Management, and Quality Assurance, Education Criteria for Performance Excellence EdPEx of OHEC, specifically, focuses on information technology terms by comparison, based on the case study of five universities from the organizations related to the performance of information technology. The research was carried out by evaluating and comparing the risk management [17], as well as following the risk management evaluation standard, including following the results of improvement through risk management evaluation based on internal control and risk management reporting [11]. The internal control by self-assessment was compared with the criteria of quality assurance towards the given organization. The public university was required to report to the various committees based on the structure of the management system of each university, in order to annually present crucial management information.

The research results, based on the case study, are in line with the direction of the development of information technology system, the support of the management system and services to students. These were compared with the excellence criteria of risk management in terms of information technology.

TABLE III
Comparison of the Risk Management in Terms of Information Technology with the Excellence Criteria

Risk Management	IT
(EdPEx Criteria) Section 1 Organization Leading	
Risk management was used as the management instrument for the whole organization. The data collection was only IT, considered as the first factor which would lead the organization to the correct orientation.	The administrator emphasizes investment in IT, and focuses on bringing the IT system into use in terms of management and service, and the budget was given to support the IT reliably and cost-effectively
(EdPEx Criteria) Section 2 Strategies	
Risk management on IT was used to examine the strategic plan of IT considering global changes for thorough preparation.	The development and introduction of a strategic plan for IT, and an IT Master plan for the short- and long-term.
(EdPEx Criteria) Section 3 Customers(Students/stakeholders)	
Risk management is a mechanism for supporting customers by focusing on the significance of IT serving the students	This focused on IT system development, support of the services for students/lecturers, service users and management system of the university to be amenable for all stakeholders, as well as the orientation to be continued in line with stakeholders' needs, namely, and predicting future needs and expectations.
(EdPEx Criteria) Section 4 Measurement of analysis and knowledge management	
The risk management of data and information, the readiness of use, properties of hardware, and software, as well as the readiness of use in states of emergency.	The creation of a risk plan for emergency states, in terms of information reservation, information and technology within the organization and various emergency plans in IT to support operations, and apply successful strategies to knowledge management, systematically and continuously, as well as employ the foresight gained that can develop the organization appropriately. Based on the TQA criteria.
(EdPEx Criteria) Section 5 Personnel	
The emphasis on personnel being trained of IT to be able to use the system effectively. The organization needs to plan improvements according to changes for all personnel, based on the orientation and strategies of the organization.	There exists hardware and software to support the operation of personnel.
(EdPEx Criteria) Section 6 Operation	
Risk management is a tool to help examine and investigate the IT operational process.	The development of the IT system was used to support and be the instrument to help operate both student services and management. This is the change based on the organizational orientation.
(EdPEx Criteria) Section 7 Result	
The use of risk management as the instrument to help evaluate the results of the education quality criteria for excellence performance.	The effectiveness resulting from empirical objectivity. The results of delivering IT to support the operation of the organization based on the quality criteria for education excellence performance.

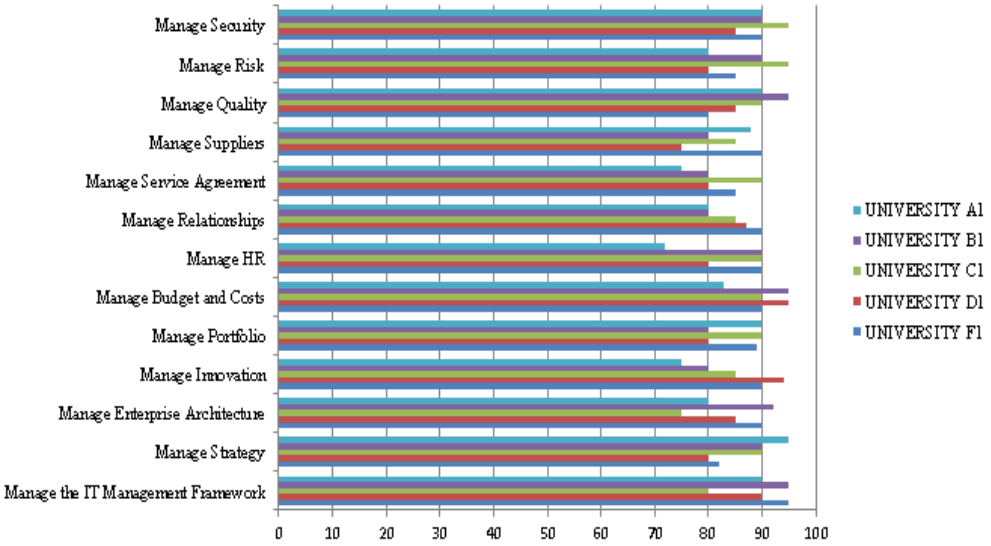

Fig. 2 Standard system of university performance

According to the study, the researcher can make a results conclusion based on the case study of the university that can be performed concordant to the domain process of APO01-13 (ALIGN, PLAN AND ORGANISE) of the standard framework of COBIT 5, in accordance with the strategies setting for the organization, with an accuracy of no more than 95%. This is because there were still some restrictions that include policies, organizational cultures, personnel, etc. Hence, the researcher studied and analyzed the overall picture of governance towards the information technology system of the university under the organizational structures to be able to conduct the analysis in accordance with the APO domain (ALIGN, PLAN AND ORGANISE). The researcher included information for comparison, which allows for the consideration of various aspects based on the education criteria for excellence performance (Table III). These will affect the development of the given plans and strategies for best performance in accordance with the methods of good corporate governance in terms of the information technology infrastructure and will ensure all systems follow the same orientation for the university as a whole. If there is an application of risk management in every performance process, it will result in the development of relevant strategies that will be able to manage the resources of information technology to ensure the utmost effectiveness.

Concerning this research, the qualitative research used is based on the interview method, including secondary data analysis obtained from the focus group discussion activity for the purpose of determining the orientations and strategies for performance plan according to the model design in terms of information technology, both for the short- and long-term plans, as well as the information technology strategy developed based on the plan. Moreover, the researcher analyzed the case from the basic overall picture of governance in terms of information technology within the organization covering infrastructure and infrastructure layers at the level of software application in the organization, and the level of the process development plan of university performance which must be in accordance with the strategic plans of all five universities. Hence, this research aims to provide solutions based on an analysis of the performance of the chosen universities, as well as to cultivate the perception of governance for information technology based on the basic concepts and connecting the technologies of all affiliated universities to align to the same standards and systems within the organization in order to bring group management into a single center. The management group expects that it will be able to use the mutual benefits and resources to attain the utmost benefits. When bringing the plan frames and organization management to be evaluated based on the process of information technology according to the COBIT 5 standard of the APO01-13 domain (ALIGN, PLAN AND ORGANISE), it helps perceive that every university could achieve the expected purposes. Based on the findings of the case study of the five chosen universities, the perception is that all universities similarly focus on the risk management process of information technology, but differ according to the information technology policies which are developed by IT for to support management and services and the infrastructure of governance of the university and instruction based on the mission of each university [16]. Hence, the framework of performance through information technology or the method of performance differs, although not remarkably, as all universities are education institutes and tend to operate under the same rules, regulations and contexts, including the steps of performance and co-ordination among organizations within the university, as well as the work team of each organization, performance methods, and governance process, etc. Therefore, investment in infrastructure and the application of software systems, considered as the base for information technology, work to ensure effectiveness in achieving the main goals of the universities and to combine the relationship of the

information technology system to one another based on the performance plans, as well as back office system to support the front office, through the case study of the five chosen universities in order to implement a system to benefit from the existing data base quickly and effectively. This is in accordance with the aspects of the Shared Service Center (SSC) and the Information Technology Infrastructure Library (ITIL) [15], and in agreement with management through the information technology system in the private system [3], which view these as management tools emphasizing cost reduction and enhancing service potential through the mutual management of various departments in the organization, such as the financial, information technology, registration, human resources, or faculty departments, etc. These are considered the back office processes that support operations based on the conceptual frameworks and affect the standard creation of the information technology system to develop the standards to achieve greater excellence [13].

VI. Research Discussion

According to the findings of this research, this paper aims to propose applicable forms of information technology management to maximize the potential of higher education institutions. Universities should have standard forms for the clear operation of information technology, as well as standardized indicators and good references, which will be operated and linked together with the risk management system in order to improve the work process. Especially, it is necessary to determine the methods of risk management on Big Data and Analytics, which have to be applied as a part of the policies on information technology management and risk management, and have to be inserted in every step of the COBIT 5 standard framework. However, the main function is to transfer knowledge to personnel within organizations so as to assess and understand problems and find ways to manage crisis situations, as they happen, as well as to build standard systems in universities which are accepted as the universal standard on information technology.

Moreover, organizations should consider the following methods to reduce the level of risk to an acceptable level, which can be done by revising and following the results continuously. The systems should focus on development in accordance with the standards of universities in terms of: 1) Process, 2) Culture, Ethics, and Behavior, 3) Organizational Structures, 4) Information, 5) Principles and Policy, 6) Skills and Competence, and 7) Service Capability. Such factors have to be integrated mutually with the strategies in order to achieve the goals at an organizational level. These factors are vital to drive the basis of the Shared Service Center (SSC) for mutual services starting with the development of the infrastructure layer and linking it to the standards of ITIL and ISO 20000 for IT Service Management, ISO/IEC 17799:2000 ISO 17799 and 27000 for Security, CMMI for Software Development, and ITIL. These systems are linked to the 4th Section, measurement, analysis, and knowledge management of data and information technology. Universities must develop and apply systematic methods for managing knowledge assets and Big Data. These consist of 1) characteristics of information, 2) availability of data and information, 3) characteristics of hardware and software, 4) availability of emergency case for risk management plan and operation according to the evaluation process and revision of risk management plan to control communication process to the standards of the EdPEx criteria determined by the Office of the Higher Education Commission, which emphasizes the results of the student services process, effectiveness of work process, supply chain management, and strategies implementation. For universities that apply these standard systems, it is important to evaluate them constantly as a crucial administration tool for effectively managing the university systems to ensure that the data and information, the software and hardware necessary for personnel, collaborations, and all stakeholders. Moreover, these systems are regarded as the standard used and approved by large, global organizations for effective and sustainable operation.

VII. Recommendations

Universities should develop and apply methods to create environments that enhance the establishment of IT innovation for managing instructions to become a crucial strategic process. This helps identify the level of development that reflects the advancement of various dimensions according to the Balanced Scorecard principle for decision making where operation orientation is focused on strategic operation or intelligent risk, as a management tool. Therefore, further research should indicate the strategies which use IT to support the potential of university administrations, the development of personnel on critical thinking, and the development of various innovations such as academic service, good management, risk management analysis, monitoring analysis, and other dimensions relevant to the process, in order to create the benefits and increase the value to personnel, instruction, and communication linked through all systems within the university. Moreover, it should communicate in a way that improves work-flow systems, the development of thinking and the lifelong learning as a process integrated with the development of information technology that can emerge through new innovations, new roles and services, as well as new opportunities in order to gain competitive advantage among universities both locally and internationally. This will allow to support future change and to evaluate developments and outcomes of technological advancements, as well as successes which identify the potential and capabilities of the university to ensure sustainable development and growth.

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