Information Technology Strategic Planning Process for Institutions of Higher Education in Thailand*

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ABTRACT - This study presents a survey on the status of Information Technology (IT) and IT strategic planning in both public and private higher educational institutions in Thailand. Questionnaires were sent to selected personnel from 18 public institutions and 16 private institutions. A total of 112 persons constituting 82.4 percent of the population responded. The findings revealed that there was great interest in using IT in both academic and administrative areas. One of the problems of IT management in Thai higher educational institutions was determined to be the lack of planning. Some important obstacles encountered when developing plans were financial and IT manpower problems. Nevertheless, the findings of the study identified a major factor in that Thai institutions lack understanding of how to develop an IT strategic plan. The data indicated that only half of the representatives of Thai institutions made use of an IT strategic plan but it seems that even then components and processes of many were incomplete. To support the development of IT strategic planning in Thai institutions, an IT strategic planning process for Thai higher educational institutions was proposed in this study. This process was developed, based on the perceptions of the administrative and the IT professional groups, as well as a review of the literature. It is hoped that this process would be used as a guideline to enable planners to develop IT strategic plans in Thai higher educational institutions.

General Terms - Higher Education, Institutions, Planning, Process, Status, Thailand.
Additional Key Words and Phrases - Information Technology (IT), Development, Private Institutions, Public Institutions, Questionnaires, Strategic Planning.

1. INTRODUCTION

Necessary to the success of the information age, society must constantly evolve to accommodate and keep pace with new technological advancements—advancements that can change the way people live, work, and learn. Today Information Technology (IT) is used in almost all facets of society, and as IT undergoes rapid changes, Rowley, Lujan, and Dolence [6] pointed out that focused attention must be applied to stimulating innovations in pedagogy, research, and management through computer usage. Realizing this, universities have already begun to adopt IT. But to accomplish what Rowley, Lujan, and Dolence have stated, not only do students need to become more highly computer literate, classrooms and laboratories must be designed to accommodate and provide new types of technology; also, the university's administrative system must be modernized and integrated into a single platform, and a network designed to create an interface between the campus and the worldwide community.

IT's role in facilitating university activities focused on both administrative and academic areas, where IT is being used in university management, administrative processes, improvement of research, and the teaching-learning process.

Because IT is rapidly changing with no fixed limits, universities need a strategic IT plan to guide their future development. Such a plan will help universities address the challenges of budget constraints for new or increased investments in IT, better respond to the rapidly changing IT environment, provide technical support for IT, and develop software and tools not only for research but also for the teaching-learning and administrative processes.

If a university has a good strategic plan, then the risk involved in IT decision making can be reduced. However, many universities are unable to create this important strategic plan because they do not have the proper information and experience to strategically plan and utilize IT. Therefore, IT strategic plans must be carefully developed. Thai universities, in particular, are in need of the IT strategic planning process.

The objectives of this study were to describe the current and preferred status of IT and IT strategic planning components and processes in Thai higher education and to develop a proposed IT strategic planning process for Thai higher educational institutions in Thailand.

The expected outcomes of this study were:

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(1) to assess the perceptions of administrator and IT professional in Thai higher educational institutions as to the current and preferred status of IT and IT strategic planning; and

(2) to develop an IT strategic planning process for institutions of higher education in Thailand. This process was intended to provide guidance to Thai higher educational institutions in developing IT strategic plans.

2. RESEARCH DESIGN

This study employed a field survey research methodology. The survey instruments measured the current and preferred status of IT and IT strategic planning perceptions of administrators and IT professionals. Based on the survey information, the data were analyzed and the results used to develop an IT strategic planning process for higher educational institutions in Thailand.

2.1 Research Population and Sample

The research population selected for this study was a finite population that included:

(1) Administrators of Thai higher educational institutions, including (a) the vice-presidents for administration, (b) the vice-presidents for academic affairs, and (c) IT department chairpersons (three persons per institutions).

(2) IT professionals in Thai higher educational institutions, including the computing center directors or Chief Information Officer (one person per institution).

The population frame included both public and private higher educational institutions in Thailand, which were founded before 1995, and are still in existence. Further, they were universities, with a student body of at least 4,000 students. The population was comprised of 34 institutions, including 16 private institutions and 18 public institutions. Thus, the total population was 136 persons (102 administrators and 34 IT professionals). Data obtained from all the respondents were used in this study.

2.2 Instrumentation

Two survey instruments, the administrator's questionnaire and the IT professionals' questionnaire were based on a literature review of institutional strategic planning concepts and components of IT systems. The administrator's questionnaire was developed to obtain the perceptions of administrators regarding the current and preferred status of IT and of IT strategic planning. The IT professionals' questionnaire was developed to obtain background data; it also included all questions presented in the administrators' questionnaire. The questions focused on: (a) the background of the administrators and IT professionals, (b) the background of IT systems and IT strategic planning in higher educational institutions in Thailand as reported by IT professionals, and (c) the perceptions of administrators and IT professionals in Thai higher educational institutions on the current and preferred status of IT and IT strategic planning.

2.3 Research Implementation and Data Collection

The participants selected to answer the questionnaires were administrators and IT professionals in Thai higher educational institutions. All 102 administrators and 34 IT professionals from 34 institutions were requested to complete the questionnaires specified by the researcher. First, the questionnaires were mailed to these two groups. As a follow-up, each respondent was contacted by telephone to make sure the questionnaire was received, fill out, and returned. A total of 112 persons constituting 82.4% of the population responded to the researcher's request. Among them, 83 responses (81.4%) were from the administrative group and 29 responses (85.3%) were from the IT professional group. It was believed that this response rate was sufficient for the study and analysis of the current status of IT and IT strategic planning in Thai higher education in general and the development of an IT strategic planning process.

2.4 Data Analysis

The data were analyzed by SPSS PC program. The current and preferred status were aggregated for each institution to determine a mean and a percentage value for each of sample group and for all the institutions. The independent samples t-test was also used to analyze the significantly different means in some part of data.

3. RESULTS AND DISCUSSIONS

3.1 Demographic Data

The returned responses indicated the work experience and the years served in their current position by respondents. The data gave a clear indication of the respondents regarding their work experience in Thai higher education and years served in their current positions. Most administrators and IT professionals have had at least ten years experience in Thai higher education, and have served in their current position between one and three years.

3.2 Current Status of IT

The organizational structure of IT in Thai higher educational institutions was categorized as centralized, centralized (dual), coordinated, and decentralized. This study found that most Thai higher educational institutions (37.9%) were organized by a coordinated organizational structure. This means that they had institutional level policies, and individual organizational units were authorized to operate their own IT activities under this policy. In addition, some institutions (27.6%) were organized by a centralized structure.

About 76% of the institutions, funding came from allocation or reallocation of the existing operating budget and 72.4% of the institutions were supported by student fees or tuition add-ons. It was found that the areas of computer utilization include applications for instruction, research, and administration. In the

IT administrative area function, 96.6% of Thai institutions implemented IT in their registration systems. Additionally, 93.1%, 75.9%, and 75.9%, respectively of Thai institutions implemented IT in their accounting, personnel, and entrance systems. Second, in the IT academic area function, computer laboratory rooms existed in all Thai institutions. About 97% of Thai institutions had classrooms equipped with IT capabilities, and also had implemented a digital library. Only 27.6% of Thai institutions had equipped their research centers with IT capabilities. Moreover, IT systems were up-to-date and were developed in-house. Changes in user requirements were confronted, as well as the user computer competence during IT system implementation. The availability and capability of IT staff and user competence were important issues in IT functional implementation. As would be expected, the level of staff expertise was one of the critical needs for successful implementation. The study revealed that a computing center existed in all Thai institutions indicating that IT is an important and rapidly expanding tool in Thai institutions. (For more detailed data tables; see [8])

The study indicates that administrators, faculty members, staff, and students in Thai institutions were perceived as enthusiastic about IT utilization. This means that people in Thai institutions were interested and aware of the potential benefits of IT utilities. Software investment was lower than hardware investment in both administrative and academic functions reflecting the ability of institutions to develop some of their own software, while depending on outside vendors for equipment. The use of campus network infrastructures and access, provision of IT training and workshops, and IT support and services were viewed as moderately satisfactory. The availability and capacity of IT manpower and finance are important problems that affect the progress of IT and its implementation in Thai higher educational institutions. Regarding administrators and IT professionals perception of the current status of IT, it was found that there was no significant difference between the means of the administrative and IT professional groups, at a confidence interval of 95%.

All Thai institutions have attempted to update IT, including both hardware and software. Reflecting campuses were under increasing pressure from their constituents, faculty, staff, and students to replace and upgrade out-dated equipment and software. Therefore, because of funding considerations as well as manpower availability, a balance between the economical management and retention of sufficient operating flexibility to deal with innovation and change must be addressed. Not only hardware and software are involved with the current operating IT, but also people. IT training and support is essential for both IT staff and users and must be provided. This will require an expanded institutional-wide training effort to achieve. While currently there is a modest level of training offered, much more must be done to meet the requirements of a rapidly-changing technology. It was believed by administrators and IT professionals that an IT strategic plan was required in Thai institutions for effective IT management.

3.3 The IT Strategic Planning Components

Most current IT strategic planning components in Thai institutions included background, organizational development, IT functional areas, and sub-organizational plans. Only half of the current IT strategic planning included environmental assessment as a component. The study found that changes external to the institution were not an important input to the current strategic planning situation. This was an unexpected finding since environmental scanning is considered to be a basic activity in the development of a strategic plan. The absence of this component could easily affect the success of the final plan since external changes could be occurring that may result in a total redirection of software or hardware utilization. The only reason this component may not be so critical is that many of the plans were relatively short-term covering only a few years.

However, background, environmental assessment, organizational development, IT functional areas, and sub-organizational area plans were preferred as components of the IT strategic planning of Thai institutions. Nevertheless, it was found that the components of background and environmental assessment were preferred at a lower level than other components. It might be because of the lack of understanding by people involved in IT strategic planning. Most IT personnel are not formally trained in management and have to learn on the job. If IT planning is to be strategic, then it must address the external environment, particularly if it is a multi-year plan. In addition, it was found that the preferred level of the IT professionals and the administrators had significantly different means in the components of organizational development, proved by the independent samples t-test. Moreover, the study reflected the fact that organizational development was considered as an important component in both actual and preferred strategic planning.

3.4 The IT Strategic Planning Process

Among the existing IT strategic planning processes in Thai institutions, the responsibility for planning was under: (a) an IT strategic planning committee; and (b) a computer or IT-related center. The first approach, an IT strategic planning committee, had members who typically included the computer or IT-related center director, the vice-president for development and planning, and the dean of the engineering or IT school, with an average membership of 14. In the second approach, a computer or IT-related center approach, the president, the vice-presidents for development and planning, and the IT staff played important roles in the IT strategic planning, apart from the director of computer or IT-related center itself. Another important aspect was that the president, the vice-president for development and planning, the IT staff, the director of the computer or IT-related center, and the computer science or IT-related department chairperson, have been involved in the process at a high percentage, but that students have not been involved. Additionally, most of the steps in the process agreed with the IT and strategic planning literature [1][5] but a lower percentage of respondents agreed with environmental assessment, functional strategic formulation, IT strategies and action plan dissemination, and IT strategic planning process evaluation. This means that in many cases existing IT strategic

planning is not an ongoing process. Therefore, the IT plan will not represent the current situation in planning. A university-wide IT advisory committee is usually responsible for the IT strategic plan review and approval. A formal written IT strategic plan is required by most institutions covering a one-to-three year time frame. This seems to be too little time for a strategic plan and represents more of an operational type of plan.

The preferred IT strategic planning process was in agreement with IT literature [1][6] which would indicate an increasingly better understanding by people in IT strategic planning. The preferred IT strategic planning process for Thai higher educational institutions specifies that an IT strategic planning committee be responsible for IT strategic planning. This committee's members should include the director of computer or IT-related center, the vice-president for development and planning, the IT staff, the vice-president for academic affairs, the president, the dean of the engineering or IT school, the vice-president for administration, with an average of seven or eight members in all. Another important committee should be the university-wide IT advisory committee that is responsible for the review and approval of the IT strategic plan. A formal written plan should be prepared by the IT strategic planning committee. The directors of computer or IT-related centers, the IT staff, the vice-presidents for development and planning, and the computer science or IT-related department chairperson need to get involved in the process. Additionally, the planning process steps which were included in the existing IT strategic planning process at low percentages—environmental assessment, functional strategic formulation, IT strategies and action plan dissemination, and IT strategic planning process evaluation—were in need of strengthening.

However, the researcher agrees with the preferred IT strategic planning process that it would be appropriate to improve the planning process for Thai institutions. IT strategic planning should be under an IT strategic planning committee instead of the computer or IT-related center director as is done at present. The university-wide IT advisory committee should be responsible for the review and approval of the IT strategic plan. A formal written plan should be an output of the planning process. The process should start with an initiation and agreement on IT strategic planning and development of a project plan for implementing the IT plan. Afterwards, the environmental assessment should be implemented to define vision, mission, goals, and objectives and to identify the IT strategic issues in specific functional areas, and then a prioritization of strategies completed according to costs, benefits, and needs. Later, functional strategies should be formulated and reviewed by key stakeholders. After review, the IT strategic plan should be announced and disseminated, and then an action plan should be developed and discussed with key people before dissemination. The final phase should be to execute program implementation and then to evaluate the IT strategic planning process. The last thing is that planning has to provide for the continual implementation of the plan. However, significantly different means were found among the IT professionals and administrators, at a confidence interval of 95%, in the steps of defining vision, mission, goals, and objectives, identifying the IT strategic issues in specific functional areas, inviting key stakeholder group to review IT strategic plan, developing operational strategy, discussing the action plan with key people, executive program implementation, and evaluating IT strategic planning process.

Regarding the obstacles to implementing IT strategic planning in Thai institutions, lack of understanding by people involved in IT strategic planning, IT manpower problems, and financial problems were predicted by most administrators. In general, the IT strategic planning should be developed under institutional strategic planning, but more Thai institutions had IT than institutional strategic plans, as shown by the study. Therefore, knowledge or concepts of strategic planning should be introduced in Thai higher educational institutions. In addition, planning has to be considered, based upon the availability and capability of IT staff and funding.

However, it was agreed that IT is still rapidly expanding and is offering an increasing number of new opportunities at a lower cost. Selection of alternative strategies was a complex and difficult task because of unknowns, uncertainties, and constraints. Therefore, Thai higher education is now in need of more and better strategic planning in order to make correct decisions.

4. DEVELOPMENT OF AN INFORMATION TECHNOLOGY STRATEGIC PLANNING PROCESS

According to this study, evidence was cited that IT strategic plans are now required for IT functions in Thai higher educational institutions. Almost 60% of Thai institutions had IT strategic plans covering a one-to-three-year time period and another 30% were developing IT strategic plans. However, it was found that existing IT strategic planning in Thai higher educational institutions had several weaknesses in terms of both components and processes. This might result from a lack of understanding of the strategic planning process. Therefore, based on these research findings, need exists for additional support to develop an effective IT strategic planning process in Thai institutions.

This section presents the concepts of an IT strategic planning process designed to assist planners in developing an IT strategic plan for Thai higher educational institutions. The proposed process is drawn from the results of this study (based on the preferred status), the IT literature[5], and the strategic planning literature[1]. This study reflected the fact that most Thai institutions preferred producing a formal written plan as an output of the IT strategic planning process. This planning document would enable people to understand where they are now (i.e., what exists), to imagine where they want to be, and to understand how the IT functions have been successfully implemented. The results of the study indicated that strategic planning produces not only a document, but also provides for the continual implementation of the plan. IT strategic planning is long-term and continuous. The study further indicated that all stakeholders, including administrators, faculty, staff members, students, and others who will benefit from the implementation of the plan, should be included in the planning process.

The proposed IT strategic planning process is composed of four major phases. From the literature and the results of study, the process includes: (a) organizing a planning team, (b) fact-finding and trend assessment, (c) determination and dissemination of IT strategies; and (d) implementation and revision of programs (see Figure 1). It is assumed that a larger institutional strategic planning framework exists.

Phase 1: Organizing a Planning Team

Based on the literature [6], IT strategic planning, which is a subset of institutional strategic planning, begins with a review of institutional goals and objectives before initiating any IT strategic planning and an agreement to proceed. This means that after discussions within an institutional policy committee and among the executive officers of a university, agreement should be reached that the interest of the university would be served by having an IT plan. Once that is affirmed, then IT strategic planning activities can be initiated.

First, a university-wide IT advisory committee should be established. Study findings revealed that the president was most frequently the chairman of this committee. This may be because in Thai culture, presidents play roles at the broad institutional level. The task of this committee would be to develop and recommend to the administration approaches to institutional IT problems. It is therefore recommended from the findings that this committee should be composed of the president as chairman, vice-president for administration, vice-president for academic affairs, vice-president for development and planning, senior faculty and staff representatives, and external consultants. The aim being to provide a forum for discussion of IT problems, needs, future planning, and review of an IT strategic plan.

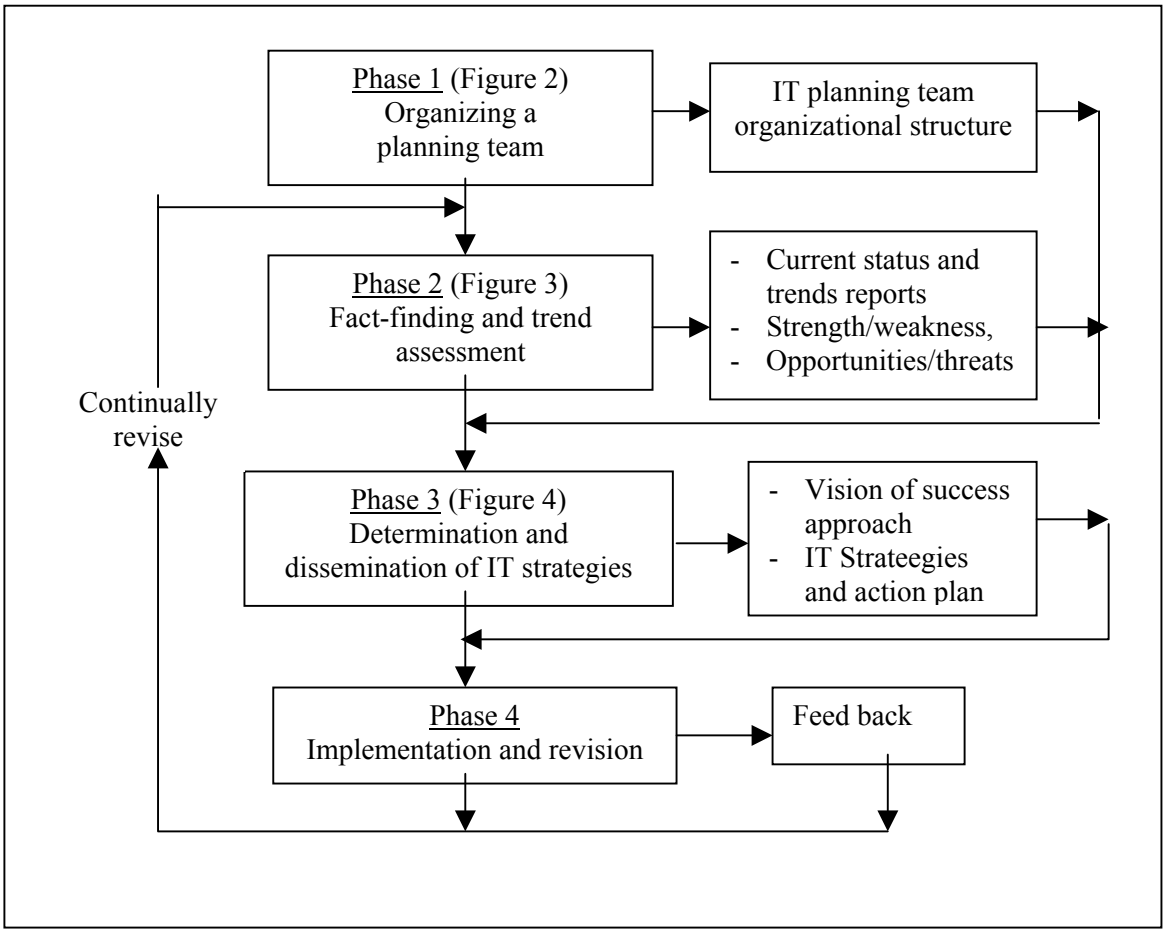

Figure 1. Illustrates A Proposed IT Strategic Planning Process for Institutions of Higher Education in Thailand

Next, an IT strategic planning committee should be established as an IT task group responsible for planning. Based on the study of the preferred IT strategic planning process, the committee should be responsible for IT planning instead of a computing center, as is presently done. This may be because most IT personnel in Thai institutions are not formally trained in managing of IT strategic planning. The proposed committee would include many perspectives and areas of expertise in higher education. Based on the literature [10], it was found that IT functions in higher education could be classified into three major areas: (a) administrative; (b) academic; and (c) infrastructure and access areas. The infrastructure and access area was considered as resource sharing and was thought to be most appropriately developed under the administrative area function since in Thai higher education, the administrative IT function was developed and considered as a core part of the IT systems. Therefore, as shown in Figure 2, this IT task group should have two subgroups: (a) an IT administrative planning group and (b) an IT academic planning group.

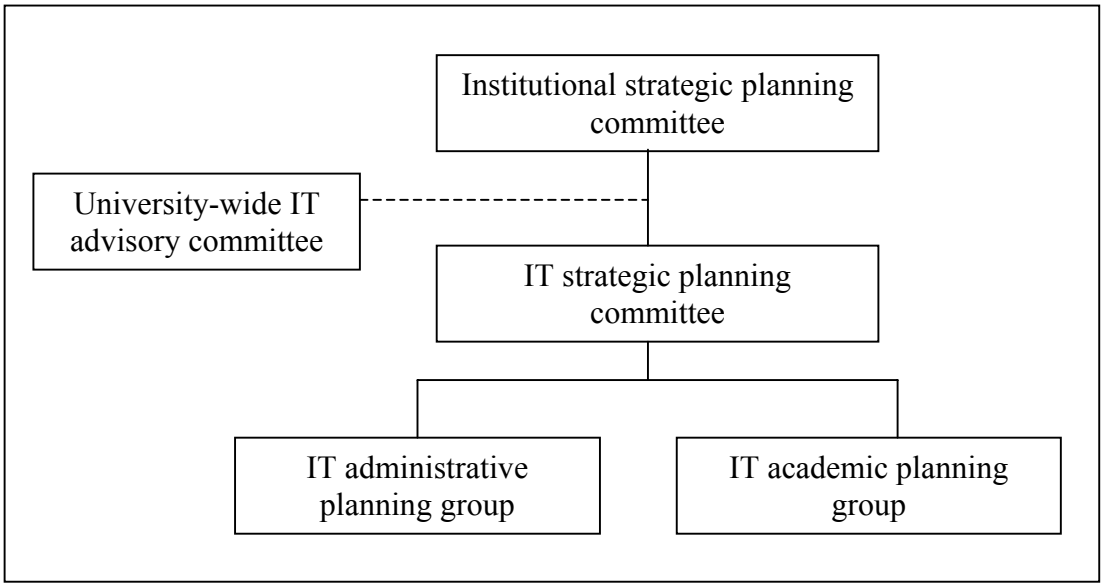

Figure 2. Illustrates IT Planning Team Organizational Structure

Research findings support the preference for an IT strategic planning committee composed of the director of the computing or IT-related center or CIO[1], vice-president for development and planning, dean of the engineering or IT school, vice-president for academic affairs, vice-president for administration, IT staff, external consultants, and the president. Although some institutions include the president in the IT task group, this researcher recommends that the president should not be included in the IT task group since the president is usually chairman of a university-wide IT advisory committee responsible for reviewing and approving an IT strategic plan developed by this IT strategic planning committee. For the same reason, the director of department of academic affairs, director of department of administration, and director of department of development and planning are recommended to replace those vice-presidents in the IT strategic planning committee.

According to the literature [3][9], the IT administrative planning group should be responsible for analyzing the current Administrative Information Systems (AIS). The task of this group should be to develop planning criteria, schedules, user requirements, an information system plan, and an implementation process. High technology is complex and contains many hidden risks. The scope of administrative and user needs, a commitment of time, an inventory of current management processes and systems, realistic budget limits, and a multitude of vendors with differing technologies are important factors in planning for administrative functions.

Secondly, the IT academic planning group should be responsible for analyzing the research and instructional technology of the plan. According to the literature [6], there are three types of computer activities in academic functions: (a) the study of computer science; (b) the use of the computer as a tool for research or problem solving; and (c) Computer-Aided Instruction (CAI). Planning should recognize the implementation of instructional technology required in the development of resource materials and the modification of curricula to incorporate new materials.

Since research findings indicated that presently there was a lack of an effective committee operations in Thai institutions, it is essential that members of these two working groups should be carefully selected. According to the literature [5], in choosing committee members for each group, it is important to identify individuals with: (a) a past history of willingness to invest time and interest in educational administrative matters for the administrative group and in research and instructions for the academic group; (b) a leadership position in the university; (c) a background knowledge of IT; and (d) the influence of a key stakeholder. A secretary should be appointed to serve on each committee. Committee members of these two working groups should be encouraged to inspect the campus as well as other campuses, compare existing technologies, and envision future trends.

Phase 2: Fact-Finding and Trend Assessment.

The purpose of this phase is to evaluate the current status of IT resources, trends and forecasts of demands, and the environment that affects IT resources. This phase was not considered by these surveyed as an important component of the actual process, but in the preferred process and in the literature [4], it is considered to be a critical research activity of the planning process. Therefore, the proposed process should include this component, starting with data collection from constituents—administrators, faculty members, staff members, students—all end users of the administrative information systems and instructional technology.

Based on the literature [1][5][9], Figure 3 presents the scope of three components (back-end, IT systems, and front-end) and

[1] CIO (Chief Information Officer): this position should rank at the vice-president level and report to the Chief Executive Office (president) or to the provost. It's a position that manages administrative computing, academic computing, networking, and telecommunications.

their relationships in Phase 2. The first component—back-end—is the background component that affects the IT systems. This back-end component consists of three major parts.

(1) The existing IT systems that describe the current status of hardware, software, infrastructure and network, users' achievement, and other existing situations of IT systems.

(2) An institutional plan that delineates expected constraints on IT resources and specifies the major decisions and policy as to the direction of institutional technological development.

(3) A university and IT environmental assessment including:

(a) PEST (Political, Economical, Social, and Technological including new and emerging technology);
(b) people (characteristics, attitudes, abilities, and capabilities of people);
(c) organizational structure; and
(d) resources (accounting and financial management, capital asset management, and human resource management). Based on the study, this component was not identified as a critical part in the existing IT strategic planning in Thai higher educational institutions. However, after analyzing respondents' perception of preferred planning components, as well as the strategic planning literature, it was agreed (and is highly recommended by the researcher) that the university and IT environmental assessment must be included as a basic component in IT strategic planning because the environmental changes would easily affect the IT systems utilization.

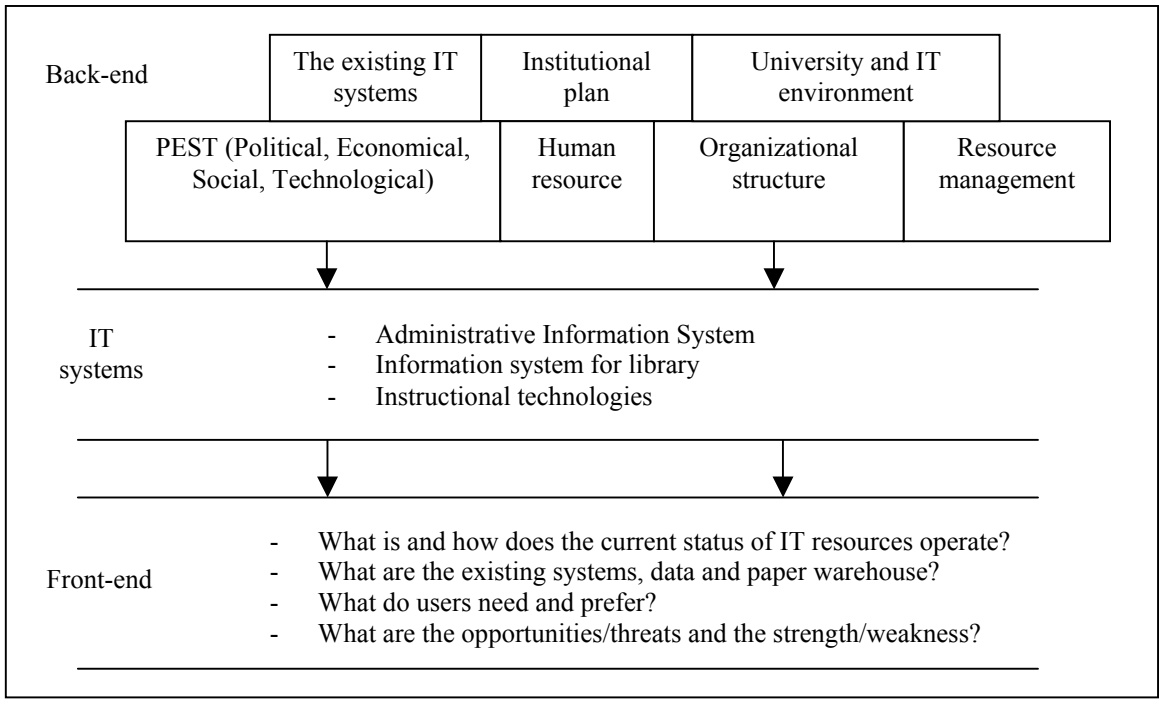

Figure 3. Illustrates Fact-Finding and Trend Assessment (Phase 2)

The back-end component is treated as input because its data affect the current status and trends of IT system implementation on campus.

With regard to the second component, the IT systems include an administrative information system, instructional technology, and the information system used by the library. The IT systems involve input from many parts of the back-end component to produce the output from this process that serve as the front-end component to issues that the university is facing or is expected to face.

Data obtained from this phase would be used to determine the strengths/weaknesses and opportunities/threats, describe what and how the current status of IT resources are operating, determine user needs, and decide how IT can be applied to fulfill these needs. According to the literature [1][4], these data would be obtained through surveys, observations, existing records, and conversations with various individuals at various locations. For example, the IT strategic planning committee might visit all schools and institutes, the dean may extract data from faculty records or student records, as well as conduct formal surveys. The researcher recommends that surveys and structured conversations with selected individuals be conducted because Thai higher education has few records available and there is little sentiment in favor of allowing evaluations by on site observation.

Phase 3: Determination and Dissemination of IT Strategies

As shown in Figure 4, the purpose of the third phase is to build IT strategies. Even though this phase was not considered as a strong component in the actual processes in Thai universities, it was recommended as a preferred process and in the literature [1][6] it is seen as an important component.

Based on the preferred outcome of the study, a vision statement should be developed to express what the institution

desires and sees as the future of technology in the institution and community. Then a mission statement should be prepared to describe the purposes and plans to fulfill the vision of IT in the institution. In addition, goals and objectives should be determined stating what the institution plans to accomplish to achieve the goals.

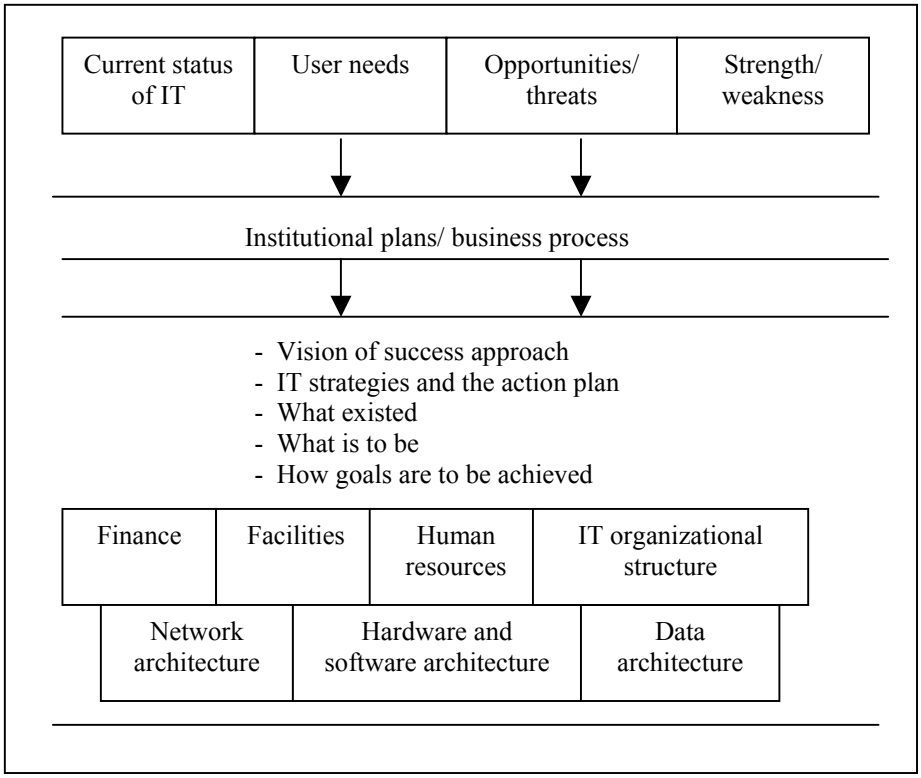

Figure 4. Illustrates Determination and Dissemination of IT Strategies (Phase 3)

According to the preferred process and the literature [1][6], after fact finding and trend assessment, meetings with key people—vice-presidents, deans, directors, and others—should be held to allow people to share their tentative plans and negotiate different points of view and different requirements in order to build a framework of IT strategic objectives. These objectives should then be prioritized by the representatives from all constituencies—faculty, students, staff, library, and the IT organization as well as key financial, academic, and administrative officers—according to costs and benefits. These final strategic objectives should then be disseminated to the university community to ensure that there is sufficient awareness of the strategic benefits to users. Finally, the strategic objectives should be translated into operational strategies for implementation, as shown in Table 1.

Table 1. Shows An Operational Strategies for Implementation

Strategy Areas	Considerations/Tasks
IT Architecture	
Hardware Strategies	- What administrative information systems will be appropriate for use by administrators, faculty, staffs, and students? - What instruction/curriculum will be appropriate for use by faculty and students? - What will be the minimum specifications of functions and capacities for hardware? - What hardware is available in Thailand? - Are companies willing to donate hardware to the institutions? - What maintenance of hardware is provided by vendors?
Software Strategies	- Are other institutions using these software products? - Should the institutions develop their own Administrative information system/instructional technology or buy them? - Is the software user-friendly?

	- How does the software meet administrative/curriculum objectives? - What software is presently in use? - Do vendors provide information and demonstrations of current technology? - Can either vendors or IT-staff maintain and support software implementation?
Networking Strategies	
	- Will the Internet/Intranet be useful for administrators, faculty members, staff, and students? - Do distance learning/remote administrative information systems enable users off-campus to use the IT systems with the same quality and quantity as their peers on campus? - Does the existing network enrich the administrative and learning environment? - How will the networking component of the IT plan be designed and implemented so as to meet the needs of departments, schools, and institutes? - What types of network security should be provided? - How will users access hardware/software? - How will passwords be designed and assigned? - Where and how should the security systems be installed?
New and Emerging Technologies Strategies	
	- How will hardware/software which is intended to be purchased be upgraded and expanded? - Can some people who are interested in new and emerging technologies be asked to investigate and report on it? - What will be the budget for hardware/software? - How to integrate the existing systems with the new ones?
Data Strategies	
	- Does the existing data enable users to meet their needs? - How will data structure be designed and implemented? - What will data structure standards be used? - How will the data structure be implemented?
Human Resource Strategy	
Professional Development Strategies	
	- How can the institution provide training to end users on how to use IT effectively? - How much instructional technology/ administrative information system is needed by administrators, faculty, staff, and students? - What are the opportunities for personnel to attend training/workshop sessions? - What technical support can be provided to maximize the use of hardware/software? - Is the staff competent to benefit from training? - Are there enough staff to do training and advising?
Strategy Areas	Considerations/Tasks
Recruiting IT Staff Strategies	
	- Can the institution hire a full-time IT professional staff? - How should the reward system be designed? - How can the existing IT staff be maintained? - How adequate is the budget for a reward systems?
Financial Strategy	
Funding Strategies	
	- What current fiscal resources are available to fund IT activity? - Are the financial officers involved in the funding process? - How can the institution conduct fund-raising activities to support IT? - What should be done to ensure that the institution allocates sufficient budget to support IT activities? - How can the institution sell outdated technology hardware? - What are alternative techniques for investment/expenditures/reallocation?

Facilities Strategy	
	- Who will allocate and design locations, buildings, rooms, data lines, security, and furniture? - Is it allowable for planners to seek users' opinion about preferred office/classroom layout? - Who will ensure that environmental aspects are considered before establishing facilities?
Organizational Strategy	
	- How will the IT structure be organized? - How will policies and procedures be developed? - What process will be used to recruit or organize the IT planning team? - What are the experience and capabilities of people who will serve as a members of each committee? - How many members will serve on each committee? - How will a balance of persons of varying backgrounds (administrators, operators, and technical persons) serving on committees be attained?
Other Strategy	
Purchasing Strategies	
	- What process will be used to help people understand the rules and regulations involved in purchasing hardware/software? - What research will be done to compare and analyze the prices of the hardware/software to be purchased? - What steps will be taken to ensure that the hardware/software to be purchased will meet the minimum specification of the IT systems?
Marketing Strategies	
	- Will efforts be made to promote the concept that technology can now play a positive role in administrative and academic functions in the institution? - What mechanism will be used to design advertisement of IT within the institution? - What can be done to involve people and increase their awareness of IT being used in the institution?

Table 1 presents examples of tasks, based upon the research findings and literature, that are assigned to a particular IT task group focusing on a specific area. The listed areas are considered to be representative rather than all-inclusive.

Phase 4: Implementation and Revision

Implementation, an important part of planning, is to know when and who is responsible for acting on the plan and what has been and is being accomplished. According to the strategic planning literature, the process should involve input from different sources within the institutions. Thus a need exists for continuous monitoring and for feedback and revision of the IT strategic plan based on changes in the environment. This means that this phase is important for implementation and ongoing review with comments and discussion of the vision and strategies included in the IT strategic plan. Planners should adhere to the vision and mission statements in planning and implementation of goals. There should be a timeline for carrying out the action plan. After implementation, an evaluation should be required to consider how the plan can be improved; revision of the plan should occur at least annually.

This process is designed to support the development of an IT strategic plan in Thai institutions. The process is based on the views of the administrative and IT professional groups in Thai higher educational institutions as well as the literature review [1][5][6][9], and is intended to provide guidance to Thai higher educational institutions in developing IT strategic plans.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

This study has indicated the need to improve IT strategic planning in Thai higher education institutions. Since people often lack understanding of an IT strategic plan and how to plan, knowledge or concepts of strategic planning should be introduced in Thai higher education. Primary tasks will be to define the institution's relationship with its environment, define organizational goals, and identify options. These options depend on inputs from a variety of functional areas and the identification of directions and constraints on administrative and academic activities throughout the entire institution. IT strategic planning is based on the same concept as institutional strategic planning, but IT planning is a subset of the institutional planning system.

It is recommended that IT strategic planning should be developed separately for administrative and academic functions, but that they must share information and resources

of IT and the university environment. Therefore, some members should be in both working groups. According to the case study in Thai higher education, it was found that the director of the computer or IT-related center or CIO is the most important person to be involved in IT strategic planning. The president, the vice-presidents for development and planning, the IT staff, and the dean of the engineering or IT-related school are also important and need to get involved in the process. The working group for IT planning seems appropriately to be a technically oriented group. Therefore, other persons who are volunteers willing to invest their time and who are interested in IT and strategic planning should also be recruited to be members of this working group.

Additionally, planners should recognize that the participative approach is necessary for the planning process, although participation is not common in Thai culture. Thai culture is marked by hierarchical social structures which discourage seniors and their juniors from participating as equals (i.e., as fellow participants). Therefore, Thai institutional culture and the perception of people in Thai institutions are important points to be addressed if planning is to be successful.

Strategic planning for IT utilization should be done at the highest level and should include consideration of institutional goals as well as consideration of program planning and operational requirements at the school and college levels. The framework for planning and the planning process is assumed to be very sensitive and must be implemented by incremental modification of the existing systems, the environment, and recognition of future trends, with a participative approach.

In conclusion, this study should be useful for planners in Thai higher educational institutions to adjust their own proposed IT strategic planning process and to develop their IT strategic planning. Specifically, the study has attempted to address the IT strategic planning concept through a review of literature and using the survey results of current and preferred status involving IT strategic planning in Thailand as a means to assist and extend the planners' view.

5.2 Recommendations for Further Study

A major outcome of this study was the recognition that there is a great deal of additional information required to fully understand, define and implement an effective IT strategic planning process. It is therefore recommended that a series of follow up activities, as shown in Figure 5 should be initiated.
To begin, the university should establish a group of people including persons who are responsible for institutional strategic planning, and others who are volunteers, willing to devote their time and interested in IT and strategic planning, to complete a research study evaluating the current status of all aspects of IT in the university. The outcome of this study would provide the results of an evaluation of IT functions in the university. The information should be sufficient to make an executive commitment to the IT strategic planning initiation. After the executive commitment has been made, preparation for an IT strategic planning study should be done. It is recommended by the researcher that this step should start with seminar sessions or meetings with people to develop an understanding of the knowledge and concepts of strategic planning and the necessity for having IT strategic planning in their university. This means that people would understand the outcomes and benefits of IT strategic planning. Finally, efforts should be made to identify people who are involved with the IT functions and strategic planning in the university itself; it should prepare places and facilities for working on IT strategic planning.

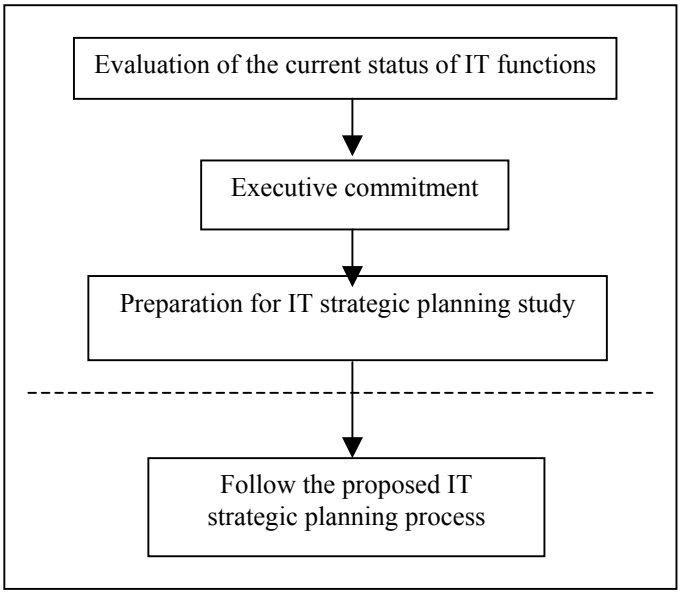

Figure 5. Illustrates A Series of Follow-Up Activities for planning

This series of follow-up activities would be able to provide greater clarification as to the relative merit of IT strategic planning and specific preplanning activities that should be completed before engaging in the planning process. After the preparation phase for an IT strategic planning study, the proposed IT strategic planning process in this study could be followed, but it need not be taken too literally. The proposed process should serve as an illustration of a methodology, not as a definite process or approach to specific situations. It must be reshaped to meet the strategic, organizational, and operational context.

However, specific planning activities in each phase in the proposed planning process were recommended to ascertain their appropriateness in Thai institutions of higher education. The administrators in Thai institutions must be aware that an institutional strategic plan is essential and most important for setting the direction of the institution. The IT strategic plan would be a subset of this institutional strategic plan. In a similar manner, the IT strategic planning team must report to the institutional planning team and must develop a plan following the institutional plan. An IT planning team's organizational structure should be identified by the institutional planning team in Thai institutions. This study also indicated that lack of an effective IT planning committee was confronted in Thai institutions. Therefore, the careful selection of members is an essential requirement to forming an appropriate committee. Additionally, fact-finding and trend assessment should be considered, for example environmental scanning. The data should be obtained through surveys, observations,

existing records, and conversations with various individuals. However, it is recommended that in Thai culture surveys and conversations should be more appropriate, as there are few records available and a lack of openness in allowing observation prevails. After environmental scanning, the IT strategic planning team must develop a vision and mission statement based on the institutional vision attained from meetings of the IT strategic planning team. Actually, the phase of IT strategies' determination and dissemination needs a constituent participation, but participation is not common in Thai culture. Therefore, some additional surveys and conversations with various individuals might be necessary in this step of the process.

While many Thai institutions currently have developed IT plans or are in the processes, there is little systematic study of the merit of IT strategic planning. It is therefore proposed that several institutions that have developed and implemented IT strategic plans, including most of the standard planning components, be intensively studied to document the outcomes that have resulted from these efforts on a number of criteria. In a similar manner, the status of IT operations should be examined to determine outcomes that have been achieved using the same criteria. The object of these examinations is not to compare one institution with another, but to be able to more clearly specify how planning can benefit institutional management of its IT process.

Another recommendation would be to examine the process for IT strategic planning presented in this study. A panel of experts from Thai higher education institutions could be interviewed as to the appropriateness and utility of the process and the model refined. A case study could then be undertaken examining and documenting the actual implementation of the model. This would permit the development and documentation of a model IT strategic planning process that reflects the unique Thai culture and higher educational environment.

Since it was noted that a number of institutions did not employ an environmental assessment as part of their IT strategic planning process, a comprehensive assessment could be completed that could serve as a baseline for all institutions. Several panels of experts from both within and outside higher education could represent all aspects of IT, a variety of disciplines and professions and generalists. Through the use of a Delphi methodology [7,p.285], consensus could be derived as to major trends and events that may occur. A mapping of these would then permit the identification of opportunities, threats and issues that could be used by all institutions to assist in their IT planning efforts.

These studies as well as others could begin to build a firm foundation for future IT strategic planning efforts that should contribute to the effective management of Thai higher educational institutions.

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