

Information System Planning for Emerging Start-up Company: A Case from Software House

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Abstract - The use of IS believed to bring positive impact on the productivity and competitiveness of the organization. Most organizations in all sectors of industries, commerce, and government become fundamentally dependent on the use of information system especially startup companies. Start-up companies are considered to be an important element in a successful economy. Start-up companies tend to create a high-tech and innovative product and grow by aggressively expanding their business in the highly scalable market. The failure of a startup company is mostly caused by self-destruction rather than the competition. This study is aimed to develop a strategic information system planning model for a start-up company. The strategic information system planning in this study is expected to obtain the application roadmap that is aligned with business and company's strategy. The object of the study is one software house company in Bandung, Indonesia.

Value Chain and SWOT Analysis are used to gain the internal value of the company, Delphi method is used to gain the consensus from the stakeholders about the priority of each IS project that should be taken into consideration. Data gathering is done by interviewing the stakeholder of the company. The strategic plan that is proposed in this research consists of the initial value chain, analysis of the legacy system, consensus result of the high priority IS project plan, application portfolio and the proposed roadmap for the project to be implemented.

From the result, it is known that billing system and integrated payment method is considered as the priority for the company, therefore, the two project are planned immediately. The proposed IS strategic plan can be used for software house company, but it is needed further development to generalize the framework for another emerging start-up company.

Keywords – *Portfolio, Roadmap, Software House, Start-up Company, Strategic Information System Planning*

I. INTRODUCTION

Information system (IS) development has been increasing rapidly for decades [1]. IS is implemented due to its main capabilities in collecting, processing, distributing, and sharing data in an integrated and timely manner [2]. Moreover, the use of IS is believed to bring positive impact on the productivity and competitiveness of the organization [2]. Therefore, the most organization in all sectors of industries, commerce, and government become

fundamentally dependent on the use of information system [3].

Due to many advantages can be obtained through IS implementation, many organizations senses the pressure to leverage their investment towards information system [4]. Furthermore, the decision-making and expenditure of funds related to technology and information system become quite unpredictable [4]. It can be argued that the decision-related information system should be well planned. It is because, although many information system investments are considered expensive, the successful implementation is not a guarantee [5], [6]. The unsuccessful implementation can be in the form of usage stoppages after the implementation, failure to realize project benefit, and failure in obtaining anticipated goals through the information system implementation [5], [7]. Therefore, many organizations are now searching a method for information system planning that will maximize their strategic effectiveness [8]. Thus, the importance of strategic information system planning is dramatically increased [4], [9] for an organization that implement IS.

Strategic information system planning is a process to identify and create the portfolio of computer-based application to be implemented and used in an organization to maximize organization's effectiveness that is designed align with the organization's business plan and goals [8], [10]. According to Min, Suh, and Kim [8], only a few of planned applications were actually developed. It is because there were some general problems in strategic information system planning, such as lack of support for information technology architecture, lack of attention towards information system opportunities, duration of planning, and lack of support for business process re-engineering [8].

Actually, the strategic planning activities towards IS are much similar with organizational system strategic planning [11]. According to Min, Suh, and Kim [8], to develop a strategic plan for the organization, there are three questions needed to be answered: 1) What is the organization's current status at the present?; 2) What is the objective to take in the future?; 3) What the implementation should be taken to reach the objective?. Therefore, it can be argued that the strategic information system planning should be designed based on those three questions. Thus, this study is aimed to develop a strategic information

system planning model for an organization that answers the three important questions in strategic planning such as the objective of the organization, the current information system status, and the path should be taken to reach the objective. The strategic information system planning in this study is expected to obtain the application roadmap that is aligned with business and company's strategy.

The object of this study is a start-up company, especially software house. According to Archibald, Thomas, Betts, and Johnston Thoman & Johnston [12], start-up companies are considered to be an important element in a successful economy. Start-up companies tend to create a high-tech and innovative product and grow by aggressively expanding their business in the highly scalable market [13]. Moreover, the failure of a startup

1. Product research: involves all activities which are related to product vision development, fundamental research and initial feasibility check.
2. Component procurement: covers the procurement activities of the component which involves the selection, purchase, adaptation, verification, and validation of component.
3. Product Development: comprises the actual software development process including requirements engineering, software design, software development, code documentation, verification, and validation.
4. User documentation involves the creation of software functionality document and properties for end-users. The result of this activity is usually in the form of text files.
5. Production and packaging: in this activity, software

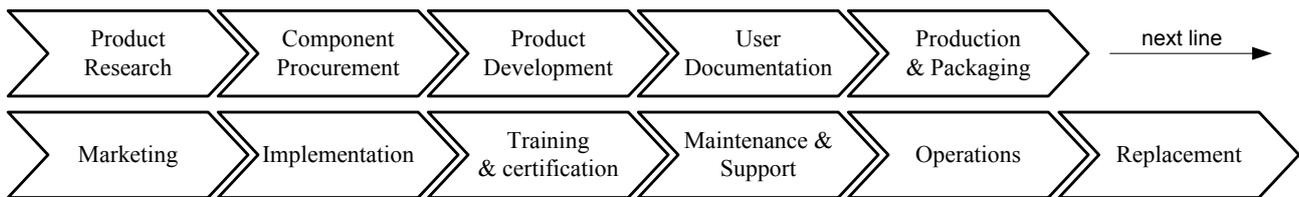


Fig. 1. Software Valu Chain [16]

company is mostly caused by self-destruction rather than the competition [13]. Therefore, it is important to identify the strategies that lead to the success of the start-up company and enhance the chance of their long-term survival [12]. Since the realization of information system has become one of strategic importances in an organizations, research focusing on strategic information system planning is needed [14] both in the established organization and start-up company. The planning incorporating the focus in finding information system application that will enhance competitive advantage of the organization. The research is needed to support start-up company to guide them in taking a decision and avoid a choice that could lead to business failure [13].

II. METHODOLOGY

The purpose of this research is to develop the IS strategic plan for the organization. The object of the study is one software house company in Bandung, Indonesia. The IS planning method is based on the research from Cassidy [15].

A. Visioning

In this phase, the internal business process of the object study is identified. The output from this phase is value chain analysis. The value chain that is used in this study is the value chain for software industry developed by Pussep, Widjaja, Schief, Buxmann, & Wolf [16]. The further explanation of each activity in software value chain according to Pussep, Widjaja, Schief, Buxmann, & Wolf [16] is as follows:

6. Selling and marketing: It covers all activities to provide a means for buyer to purchase the product including activities to persuade them to do so, such as promotion and sales activities.
7. Implementation: Covers the installation, configuration, and adaptation of the product. As an addition, the activities related to project selection, project prioritization, project run activities including meeting and project timeline creation were added into this activities.
8. Training and Certification: the activities of training users and third-party firms.
9. Maintenance and Support: in this activity, the bug fix activity was performed. Moreover, this activity also involves requirements engineering, software design, software development, verification, and validation of the updated product.
10. Operation ensures the execution and management of a product on an information system during actual usage by customers.
11. Replacement: comprises the sub-activities migration and shut-down. Primarily, replacement deals with the decision if a legacy system shall be replaced by an alternative system.

After the value chain is identified, the next step is to identify the Strength, Weakness, Opportunities, and Threat (SWOT) of the organization. In this research, the SWOT analysis is gained from the framework that is proposed by Mazdeh, Moradi, and Mazdeh [17].

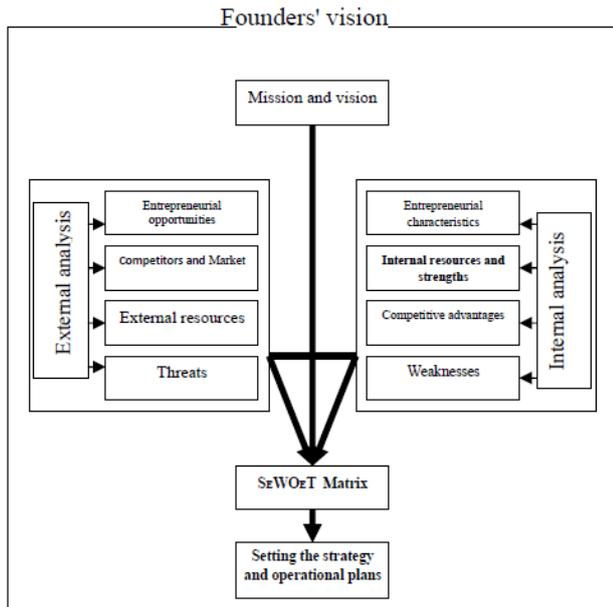


Fig. 2. SWOT Analysis Step

B. Analysis

In this phase, the current information system is listed and identified. The data is gained from an interview with the stakeholder of the company, in this case, the stakeholder is the Chief Executive Officer (CEO), Chief Technology Officer (CTO), and Chief Operation Officer (COO) of the company. The current IS system will be listed and analyzed for the next phase. After current IS is identified then the next step is to plan the need of IS for the company.

C. Direction

In this phase, all the IS plan is identified and prioritized. This phase started with identifying whether the IS plan is exactly as the needs. So, it can be identified the risk from the proposed plan. To prioritized the information system, Delphi method is used. Delphi method is used to gain a consensus among the stakeholder about what IS project that should be chosen first for the next development. The consensus rate is set to 60% for this research.

D. Recommendation

In this phase, the proposed plan then transform into the portfolio, cost estimation, and time window of each IS plan. In this phase, the proposed plan then transform into portfolio using McFarlan quadrants. The McFarlan quadrants consist of 4 classification which are strategic, key operational, high potential, and support. The classification is based on the interview with the three chief officers. After the portfolio is designed, the next step is to create the time window of each IS plan.

III. RESULTS AND DISCUSSION

In this section the result of data gathering will be presented, the analysis is presented according to the IS strategic planning method by Cassidy [15]. The object of the study is located in Bandung, Indonesia. The company is established in 2007, the company focused is giving the

best IT/IS solution in the broad range of work, such as in a hospital, logistic company, school, and event organizer.

A. Visioning

In this phase, the internal business process of the object study is identified. The output from this phase is value chain analysis. The result of value chain analysis according to the object's of this study can be seen in Table I.

TABLE I. VALUE CHAIN ANALYSIS

Value Chain Category	Activities at Software House
Product Research	<ul style="list-style-type: none"> Product vision development Fundamental Research Algorithm Technology selection
Procurement Component	<ul style="list-style-type: none"> Template selection on the internet/ online market Payment through online payment gateway
Product Development	<ul style="list-style-type: none"> Software design coding Subsystem testing Subsystem integration System testing
User Documentation	<ul style="list-style-type: none"> Software requirement specification documentation Business processes documentation User manual documentation
Production & Packaging	<ul style="list-style-type: none"> Upload the system into "live" environment Business processes documentation
Selling & Marketing	<ul style="list-style-type: none"> Selling Marketing fulfillment response Order handling Contact/lead/ prospect Customer interaction management Customer management
Implementation	<ul style="list-style-type: none"> Project selection & prioritization Project run (including meeting & project timeline creation) Installation Customization Business process re-engineering
Training & Certification	<ul style="list-style-type: none"> Training needs analysis Apply to training provider
Maintenance & Support	<ul style="list-style-type: none"> Problem handling Service quality management Service problem management Resource trouble management Product vision development
Operation	<ul style="list-style-type: none"> Resource meditation & reporting Customer QoS/SLA management Manage billing event Charging Bill invoice management Bill payment & receivables management Bill inquiry handling Manage balance development
Replacement	<ul style="list-style-type: none"> Data back up Data migration Data cleansing

After the value chain is identified, the next step is to identify the SWOT of the company. The SWOT analysis is conducted by interviewing the founder and owner of the company. The vision the organization is to be a reliable partner for customers in realizing business benefits through

the implementation and support of IT / IS (Information Technology / Information System). The mission of the organization is to develop and provide IT / IS implementation and support services with the most effective way without compromising the quality of service.

In the internal analysis, in order to extract the internal strength of the company the company status needs to be evaluated. The evaluation result from entrepreneurial characteristics, the creativity and innovation from the organization are considered as ordinary because there is no innovation yet to be made by the organization. The evaluation result from internal resources and abilities, the human resource from the company has appropriate skill to do the job. Current employee of the company are 8 person, the evaluation result from competitive advantage characteristic, the competitive advantage of the company is the willingness of the CEO to accommodate the sharing process between the employees to preserve the knowledge within the company by conduction sharing session right after the project is finished. Another competitive advantage from, the company is the experience from all member for financial system software. The weakness for the company is the availability of financial resources and the number of employees that involved in the specific field of the solution.

The evaluation result from external analysis, the technology, social, economic, and political variables need to be identified in order to know the opportunities and threats for the company. The evaluation result from entrepreneurial opportunities, there are a lot of opportunities for the company to expand the business abroad by joining the outsourced/offshore project. The company can give a lower price for the same service because the cost of the project can be reduced by leaning the manpower. The company also can penetrate to niche segment to gain more market share by giving made to order/custom software and application. From competitors and market state, the main competitor of the company is another software house that specialized in custom needs of information system solution. From external resources, the external resources that affect the company performance are the competition between software house companies and regulation from the government. Competition between software house companies is considered the main threat from the owner because there is a lot of software house companies, especially in Indonesia. The threats that company possesses are the probability of the lifespan of the company. Many start-up software house companies cannot last because there is a pressure from the bigger companies. Table 2 shows current SWOT for the company.

B. Analysis

In this phase, the current information system is listed and identified. After current IS is identified. From the interview with the CEO of the company, a current information system that is used in the company is an internal portal to communicate between employees. The portal consists of dashboard system that summarizes

current project status and the designated timeline for such project. Current team list that involves in the new project is also available on the portal. From the interview, it is known that the company needs an additional information system to help the organization in managing the billing and marketing.

TABLE II. SWOT MATRIX

Internal	Strength <ul style="list-style-type: none"> • Appropriate skill of the employees • Willingness to share knowledge • Expert in financial system application 	Weakness <ul style="list-style-type: none"> • Financial Resource • Limited market
External	Opportunity <ul style="list-style-type: none"> • Joining outsource/offshore project • Affordable • Penetrate to niche segment • Made to Order / Custom software 	Threat <ul style="list-style-type: none"> • Specific Market • Government Regulation • Competition with other software house company

C. Direction

In this phase, all the IS plan are identified and prioritized. This phase started with identifying whether the IS plan is exactly as the needs. So, it can be identified the risk from the proposed plan. To prioritize the information system, Delphi method is used.

The Chief Executive Officer feels that the payroll management for the company is not organized very well. The payroll and allowance for the employee are not well managed. In the company, there is a lack of information about what are the current skill and certification from each employee. Information about the current skill and certification can help the company to build a sustainable and competitive organization by planning the right training and right workforce for maintaining the best service from the company to the customer. Human resource system can help the organization to tackle such problem.

Billing systems are needed because the billing and invoice to customer is generated manually and not integrated within the portal,. The Chief Operational Officer (COO) of the company feels that the billing process is time-consuming and it can delay the project because the billing process must be done in the office and cannot remotely access anytime and anywhere. Integrated payment gateway with the third party company such as financial technology company is considered important because with the integrated payment method the company can give flexibility for the customer to pay for the services provided by the company. Business intelligence is needed to identify the possible market that the company can enter and to analyze the current trend and past trend of the demand from the potential customer.

Software that is developed by the company is Software As A Service (SAAS). Therefore, it is needed constant communication between the company and the customer to gain best used. Hence, the customer can gain the benefit from such a system. Therefore, the customer relationship system is considered as important for the company.

From all the possible information systems, all the chief officer is asked to prioritize which information system project that needs to be executed immediately. This information can be a basis for creating the company portfolio and long-term plans.

Delphi method is used in the form of a questionnaire. The consensus of each stage is set to 60%. The respondent are the chief executive officer, chief operational officer, and chief technology officer. The consensus is obtained after 3 iterations, the result of the prioritized information system is shown in Table 3.

TABLE III. DELPHI RESULT

No.	Information System
1	Billing System / Invoice Management
2	Integrated Third Party Payment
3	Business Intelligence
4	Customer Care System
5	Payroll Management
6	Skill and Competency Management

D. Recommendation

In this phase, the proposed plan then transform into portfolio using McFarlan quadrants. The McFarlan quadrants consist of 4 classification which are strategic, key operational, high potential, and support. The classification is based on the interview with the three chief officer. Table 4 shows the future application portofolio for the company.

TABLE IV. FUTURE APPLICATION PORTOFOLIO

Key Operational <ul style="list-style-type: none"> • Customer Care System • Integrated Third Party Payment 	Strategic <ul style="list-style-type: none"> • Billing System / Invoice Management • Business Intelligence
Support <ul style="list-style-type: none"> • Payroll Management 	High Potential <ul style="list-style-type: none"> • Skill and Competency Management

From the result, it is known that billing system and business intelligence are classified into strategics, it is because the billing system takes a part as the important role in the main activity process. Business intelligence can measure and analyze the current market hence it is considered as strategic tools for the company.

Customer care system and integrated payment method are considered as key operational because they can help the organization to gain advantage and can give the customer desired satisfaction if the system is going to be implemented. Payroll management is classified as potential support because it can help the company to manage the payroll activities in the system but is not a core operation

of the company. Skill and competency management is classified as high potential because in the future the skill and competency of each employee will play an important role in the success of the company. It is because, in the software house company, the skill of the employee determine the capabilities of the company. After the portfolio is created, the next step is to create the roadmap for each project for the company. Table 5 shows the roadmap for each IS project.

TABLE V. ROADMAP

	2017	2018	2019	2020	2021
Billing System / Invoice Management					
Integrated Third Party Payment					
Business Intelligence					
Customer Care System					
Payroll Management					
Skill and Competency Management					

IV. CONCLUSION

The purpose of this research is to develop the IS strategic plan for the organization. The object of the study is one software house company in Bandung, Indonesia. The IS planning method is based on the research from Cassidy [15]. The strategic plan consists of the initial value chain, analysis of the legacy system, consensus result of the high priority IS project plan, application portfolio and the proposed roadmap for the project to be implemented. From the result, it is known that billing system and integrated payment method are considered as the priority for the company, therefore, the two project are planned immediately. The proposed IS strategic plan can be used for software house company, but it is needed further development to generalize the framework for another emerging start-up company.

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