

IDENTIFICATION OF BUSINESS AND TECHNOLOGY STRATEGIES BASED ON THE WARD PEPPARD-CASSIDY METHOD

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ABSTRACT

The role of information systems and information technology plays an essential role in an organization, especially in achieving a competitive advantage over competitors, which also applies to the electrical equipment distribution business. Taking advantage of systems and technology requires proper strategic planning to optimize business processes. Electrical appliance distributor companies have utilized technology to support organizational performance. However, problems still occur, such as an unintegrated system that makes it difficult for users to perform data maintenance and retrieve data from several divisions. In addition, the extended data processing time could be faster in monthly reporting. Companies have used technology to assist business processes, but many problems arise from implementing the system. This problem arises because of the misalignment of the application of technology with the company's business processes. Based on these problems, it is necessary to analyze the alignment of technology with organizational strategy using the Ward and Peppard method combined with the Anita Cassidy method. Ward and Peppard help with business and technology analysis from the internal and external sides of the company. Anita Cassidy's approach determines the exact direction and needs of the business. This study aims to improve business strategy and information technology alignment to produce an application development roadmap. The results of this study are roadmaps and application portfolios to be implemented in companies. Thus, the research results in application portfolios can complement existing business processes according to company needs. Then, the results of the roadmap describe the course of the application in line with the company's business strategy so that it can compete competitively in the future.

Keywords: *Strategic Planning, Ward and Peppard, Anita Cassidy, Application Portfolio*

1. INTRODUCTION

Economic conditions and high levels of market uncertainty make companies have to adapt to respond to constant changes continuously [1]. Changes in company conditions need to increase effectiveness, improve capabilities, and deal with environmental changes. In managing change, companies must focus on improving their ability to take advantage of challenges and opportunities. Competency requirements in the digital era require companies to improve their knowledge and skills according to the changing times [2]. Organizations constantly change along with strategic changes, both external and internal. The rapid development of technology plays a crucial role in supporting the

company's internal business processes to realize the company's goals, needs, vision and mission [3]. Technological developments are a trigger to explore potential and improve company performance [4]. Potential solutions from technology can improve business processes [5]. The emergence of information technology (IT) brings added value in supporting operations and management decision-making, especially in electrical equipment.

The electric appliance company is a private institution that supplies equipment for various fields of government. However, the company realizes that technology use has yet to reach an effective and efficient point. The problem is that the system only functions once the data processing time is extended.

The system does not work because it has yet to be integrated, which causes data duplication. The disadvantage of data duplication is a waste of storage space and the emergence of data inconsistencies. The process of sharing data between one division and another becomes hampered, which causes the administrative flow to become complicated. The extended data processing time makes it challenging to obtain real-time data on time. Data maintenance activities also need to be carried out periodically to adjust to the needs of the electrical appliance company's business processes and data repair. However, users find it challenging to integrate data that has yet to be integrated between systems. Things like this are why companies expect strategic planning for information systems and information technology that can help manage business processes. Planning the system can prevent the losses that arise from data repetition. In addition, proper management of information systems and business planning makes the company's vision and mission achievable.

Aligning technology and business strategy is critical in maintaining business value [6]. This alignment took work, both in its conceptualization and in its fulfilment. Therefore, a framework is needed to provide an excellent strategic role for information systems or information technology [7]. The use of Ward and Peppard is a framework that can assess and understand the company's current business position. Ward and Peppard help with business and technology analysis from the internal and external sides of the company. Mandario et al., stated that the technology strategy assessment requires an analysis of business processes, goals, and organizational structure [8]. However, the basis of the strategic planning process is that business directions and needs can drive the demand for appropriate information systems and technologies [9]. The Anita Cassidy method provides steps for planning systems and information technology with alignment to the organization's business strategy. Previous research entitled "Strategic Planning Information System using Ward and Peppard Method with Anita Cassidy Method" states that combining methods can complement business processes to produce a portfolio of applications that suit company needs [10].

The utilization of Ward and Peppard with the Anita Cassidy method is suitable for electrical equipment companies that wish to develop their business processes. Based on the background of the problems described, electrical equipment companies need to align their information technology strategy with their business strategy. Alignment of IT and

business strategies requires the help of the Ward and Peppard method, which focuses on analyzing the business environment (internal and external) and the technological environment (internal and external). The Ward and Peppard method was combined with Anita Cassidy to discuss business goals and directions in more detail. Business mapping uses the help of the Anita Cassidy method, which consists of 4 phases: visioning, analysis, direction, and recommendation. This study aims to improve the alignment between business strategy and information technology to produce an application development roadmap. The result of this research is a description of the information system development roadmap and the application portfolio to be implemented in electrical equipment companies. Thus, combining the Ward, Peppard, and Anita Cassidy methods can complement existing business processes, resulting in a portfolio of applications that suit company needs and can compete in the future.

2. LITERATURE REVIEW

2.1 Business and Technology Strategic Planning

Strategic planning is identifying a system portfolio that aligns with technology and business strategies [11]. Kholodov et al., stated that the business plan is the medium-term operational direction [12]. The essential factor in the strategic planning process is the selection of a methodology that minimizes the risk of failure, ensures the involvement of all parties, and emphasizes the process and the specified goals [13]. Realizing strategic planning becomes a critical challenge for business management. In general, the construction of a strategic planning model analyzes the external environment, internal environment, resource planning, planning processes, information plans, implementation of information plans, and alignment of information plans with business plans in the organization. George et al., stated that strategic planning is a critical issue because it often fails [14]. Organizations often need to pay more attention to application recommendations on strategic information system planning to improve their implementation. Ignoring strategic planning certainly harms the continuity of an organization's business, considering how important this strategy is for management. This strategy is needed to influence the organization to increase its profitability and credibility.

2.2 Ward and Peppard

Ward and Peppard's methodological approach emerged due to past technology investment conditions needing to be more beneficial to the organization's business objectives [15]. The depiction of the Ward and Peppard method is in Figure 1.

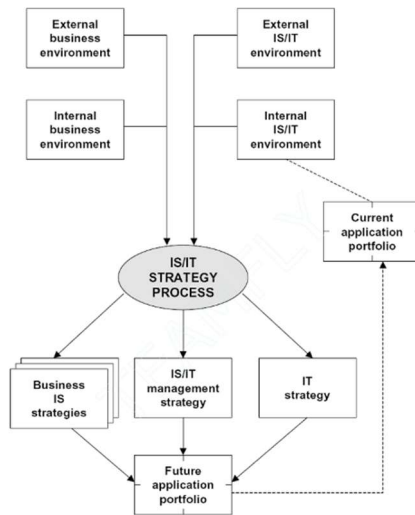


Figure 3.8 The IS/IT strategic model

Figure 1: Ward and Peppard Analysis [16]

The three main goals of efforts to implement technology within the company, namely improving work efficiency by automating processes that manage information, increasing management effectiveness by satisfying information needs for decision-making, and enhancing competitiveness by changing styles and ways of doing business. Figure 1 is a technology strategy framework consisting of the following [17]:

1. Inputs. Discuss internal and external environmental conditions and the central values

in strategic planning. The input component consists of the external business environment (political, economic, social, legal, technology, and market conditions), internal business environment (vision, organizational mission, resources, SWOT, value chain), and external information technology/information system environment (technological developments), and the internal IT/IS environment (McFarlan Strategic Grid).

2. Process. Processing information from the analysis results obtained from the input to produce output.
3. Outputs. The results of the input component will produce several things, namely IS business strategy (company business processes, use of technology), IT/IS management strategy (organizational structure, cost allocation, vendor selection), IT strategy (network topology, information system flow, software, telecommunications equipment, hardware), future application portfolio, current application portfolio.

2.3 Anita Cassidy

Shao stated that system strategy and information technology must align with the organization's business strategy [18]. The foundation of the strategic planning process is that business directions and requirements drive the demand for appropriate information systems and technologies. Anita Cassidy's method provides information system and technology planning steps consisting of 4 phases: visioning, analysis, direction, and recommendation. Anita Cassidy's approach is shown in Figure 2.

Visioning Phase

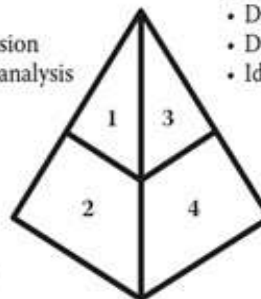
- Initiate and manage the project
- Understand business situation and vision
- Document and confirm the business analysis

Analysis Phase

- Understand current IS situation
- Analyze current IS situation
- Develop recommendations, solution alternatives

Direction Phase

- Develop IS vision and direction
- Develop IS plan
- Identify IS projects



Recommendation Phase

- Develop roadmap
- Develop business case
- Communicate the plan

Figure 2: Anita Cassidy

The stages of the Anita Cassidy method consist of several activities, namely [19]:

1. Visioning Phase. Determine the vision of the activity and develop a project plan with various existing processes. The Visioning Phase focuses more on the state of the organization, not on systems and information technology. For the project plan to be more directed, it is necessary to identify the organization's goals, processes, management, and business direction.
2. Analysis Phase. Identify how the role of existing information systems. The analysis phase documents and analyzes objectively using documentation, interview, observation, and questionnaire techniques.
3. Direction Phase. Establish strategic, and information system objectives summarized in the vision and mission based on analysis and in-depth understanding of all organizational conditions. It is necessary to determine how to measure the value or progress of technology on an ongoing basis, the direction of business applications, technical computer architecture, and technology changes, and how to allocate resources.
4. Recommendation Phase. Produce development roadmaps and information systems projects. The Recommendation phase produces details about the implementation of technology development for the next few years, including a summary of costs, time, and resource requirements.

2.4 Problem Statement

Before planning an information system, it is necessary to define the problem of an electrical appliance company. The main problem that is the main focus of improvement is that the system needs to be integrated, which causes data duplication. The process of sharing data between one division and another becomes hampered, which causes the administrative flow to become complicated. The extended data processing time makes it challenging to obtain real-time data on time. Data maintenance activities also need to be carried out periodically to adjust to the needs of the electrical appliance company's business processes and data repair. However, users find it challenging to integrate data that has yet to be integrated between systems. Therefore, it is necessary to plan an information technology strategy with a business strategy. Ilmudeen stated that aligning technology strategy with business strategy has become a crucial issue for corporate executives [20]. Wadstrom says that in practical terms, strategic planning should offer

organization guidance in balancing technology and business requirements [21].

3. RESEARCH METHODOLOGY

3.1 Data Collection

Data collection meets standards in answering research problem formulation related to strategic planning. This study uses a qualitative method. The data collection methods in this study were interviews and direct field observations. In-depth interviews are obtaining information related to the company's business processes. In addition, to strengthen the results of the interviews, then make direct observations of the company. Observation methods aim to obtain information about places, actors, activities, and time.

3.2 Research Hypothesis

The research hypothesis is a quick answer to a problem that still needs to be verified with data in the field. This study assumes that technology and strategic business planning will produce application candidates and long-term implementation roadmaps. Proposed application candidates can include transactions, stock, finance, human resources, and improving the service quality. Thus, after collecting data, it is necessary to analyze the truth of the formulated hypothesis.

3.3 Research Stages

The stages of IT and business strategic planning development are shown in Figure 3. Figure 3 shows the stages of research for strategic planning. Stages start from [19]:

- a. Problem Identification. Explain the problems found in the business processes of electrical equipment companies, especially in the application of technology.
- b. Data Collections. Stages of data collection by conducting interviews and direct observation of electrical equipment companies.
- c. Visioning Phase. Focus on the state of the organization rather than on information systems and technology. This phase identifies the goals, objectives and business scope (initiate), vision and mission (business review), as well as the value chain (business analysis).
- d. Internal and External Environment Analysis. Identify internal business (SWOT), external business (PEST), internal technology (application candidates), and external technology (trends).
- e. Direction Phase. Identify the development of

- vision and mission (IS Vision), the direction of developing business applications and infrastructure (IS Plan), and risks (IS Project).
- f. Recommendation Phase. Identify the roadmap for the implementation of information systems development.
 - g. Application Portfolio. Identify application proposals for the development of the company's business processes.

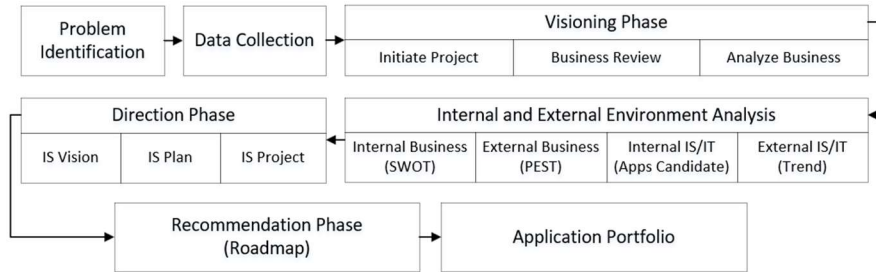


Figure 3: Research Stages [22].

4. RESULT AND DISCUSSION

4.1 Visioning Phase

The purpose of the visioning phase is to determine the vision of the activities and develop project plans with various existing processes [23], [24]. The stages of the visioning phase are:

1. Identify the company's business objectives (initiate project). Romero et al., stated that identifying business objectives helps the planning of the right technology strategy [25]. Establishing good relations by increasing customer satisfaction, supplying quality products, and increasing workplace productivity. The company's business targets are growing demand for new products from customers, improving the quality of products and services, and integrating company information technology. The business scope of the electrical equipment company is as a

distributor that provides electrical components for the government sector.

2. Identifying the vision and mission (business review). Weston stated that vision is an aspirational future to achieve, while the mission is the core of the business [26]. The company's vision is to leverage its global reach and local presence to complete client projects to the best of its ability. The company's mission is divided into 3:
 - Ensuring reliable supply.
 - Providing integrated solutions.
 - Increasing client profitability.
3. Analyses the company's value chain (analyse business).

Firm Infrastructure Management of product storage and parking buildings					
Human Resource Management Recruitment, employee selection, payroll					
Technology Development E-mail, phone					
Procurement Stationery, freight cars					
Inbound Logistics Ordering products from suppliers	Operation Searching for customers, ordering products, negotiating prices, sending products, making invoices	Outbound Logistic Delivery of goods to consumers, making travel documents and invoices	Marketing and Sales Connections, recommendations, direct negotiations	Services Warranty of goods arrived safely. Products according to global standards	

Figure 4: Value Chain

The main activities are divided into ordering and purchasing products from suppliers, preparing the production process before sending goods, sending goods and providing invoices, marketing products, and delivering goods guarantees. Value chain support activities are divided into product storage management, human resources, digital letter and document creation, purchasing of computers and supporting goods.

4.2 Internal and External Environment Analysis

The external analysis looks at the wider business environment that affects business [27]. Then, the internal analysis looks at factors in the industry, such as strengths and weaknesses [28]. The stages of the internal and external environment analysis are:

1. Identify the company's SWOT (internal business). The company's strength is collaborating with the most significant and global independent electricity distributors, the company's name is known to the public, and it already has loyal customers. The company's weakness is that the application of technology still needs to be improved, and the use of centralized applications hinders business processes. Opportunities for electrical appliance companies are track records in various vital sectors and designs according to demand. The threat posed by the company is that many companies are engaged in the same field, forcing the company to adjust to technological developments.
2. Identify PEST (external business). Political factors relate to government regulations related to the distribution of imported products, and economic factors related to development growth will continue to increase and require more electricity supply. Then, socio-cultural and demographic factors are related to dynamic changes in population, age structure, and income. Technological aspects in which electrical equipment companies have implemented applications.
3. Identifies application candidates (internal IS/IT) listed in Table 1. The results of the implementation analysis are in the form of prospective applications/information systems that originate from the company's business problems. After identifying the proposed application, the fourth stage focuses on identifying trends in the company. Technological trends in electrical equipment companies are the use of the web (helping with

marketing), mobile applications (expanding the target market), and blockchain (replicating transaction data and verifying data with each other).

Table 1: Application Candidate

Application	Definition and Feature
Sales	Sales of sales products.
Inventory	Management of product stock, packaging, and office supplies.
Finance	Checking financial statements.
Human Resource Information System (HRIS)	Recording employee data, applying for leave, overtime, and attendance.
E-Procurement	Purchasing company goods from products sold, packaging, and other office supplies.
Company Profile Website	General company information, products sold. The website can be accessed by users/public parties.
Tracking	Track product shipments from the company to the customer.

4.3 Direction Phase

This stage establishes a strategic goal and information system objectives which are summarized in an information system vision and mission based on analysis and in-depth understanding of all organizational conditions [29]. The Direction phase formulates the necessary strategic objectives to assist the business in achieving its goals [30]. The stages of the direction phase are:

1. Develop the vision and mission of an electrical equipment company (IS vision). Development of the company's vision to leverage its global reach and local presence to complete client projects to the best of its ability. Meanwhile, the company's mission is:
 - Ensure reliable supply and best prices for clients with combined experience across power management.
 - Providing integrated solutions for global facilities and operating systems targeting enterprise and infrastructure sectors.
 - Increase client profitability by building all material management from project start to completion.
2. Identifying the direction of business development and technology infrastructure (IS Plan). Madyatmadja et al., stated optimization of information technology to create innovation and improve service quality for customers [31]. The proposed approach for business development is

in Table 2. For the direction of technology infrastructure development, there are additional computers, servers, routers, switches, printers

and smartphones to support the development of the proposed information system.

Table 2: Solution.

No	Objectives	Business Strategy	IS Needs
1	Transaction Ease	Transactions, product discussions, bargains, deliveries, reports	Sales
2	Stock Maintenance	Recording incoming products, outgoing products, making warehouse reports	Inventory
3	Financial Accuracy	Payroll, debt payments, reports	Finance
4	Employee Empowerment	Input new employee data, salary, attendance, recapitulation, application for leave, overtime	HRIS
5	Purchase Accuracy	Input supplier data, product purchases, reports	E-Procurement
6	Service Quality	Input information, question and answer products	Company Profile Website
7	Updated Information	Driver and car data input, shipments, reports	Tracking

3. Identifying risks (IS Project) to anticipate existing risks and determine the right solution. The results of the risk assessment are in Table 3.

Table 3: Risk Register.

No	Risk Identification	Risk Response
1	Internet connection must be stable in making transactions	Sales
2	Difficult to monitor materials taken from the warehouse	Inventory
3	Long waiting time in preparing annual reports	Finance
4	Time is long enough to recap absenteeism and pay employees	HRIS
5	Wrong choice and ordering products from suppliers	E-Procurement
6	Company information is not updated regularly	Company Profile Website
7	It's hard to see the delivery location in real-time	Tracking

Risk identification is documenting any risks that could keep an organization or program from

reaching its objective. It's the first step in the risk management process, designed to help companies understand and plan for potential risks. The Risk Register is used to identify, assess and manage risk to an acceptable level through a process of review and updating. The purpose of a Risk Register is to record the details of all risks along with their analysis and plans for how to deal with them.

4.4 Recommendation Phase

Sardjono et al., stated that as part of strategic management, implementing technology strategy into organizational life is part of the daily decision-making process [32]. The recommendation is a stage to document and summarize all methods that have been carried out previously. Fernandez et al., stated this phase produces details about the implementation of information system development in the next few years, including the implementation time and the resources needed [33]. The process of developing the roadmap has considered the principal risks and business processes in the company. The direction of information system development is shown in Table 4.

Table 4: Roadmap Application

Project	1 st Year				2 nd Year				3 rd Year				4 th Year				5 th Year			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Sales																				
Inventory																				
Finance																				
HRIS																				
E-Procurement																				
Company Profile Website																				
Tracking																				

Table 4 shows the application development roadmap. The application roadmap is divided into three types of implementation sequences, namely short-term (first year), medium-term (second to fourth year), and long-term (fifth year). In the short term, an application will be made soon, namely sales and company profile websites. The medium term is making applications in less than five years, namely inventory, e-procurement, and finance. The long time is taking applications carried out over a long period, namely HRIS and tracking.

4.5 Application Portfolio

The application portfolio is the collection of software applications an organization uses— formulation of application portfolios to meet various business objectives [34], [35]. Feroz et al., stated the business goals are to increase operational efficiency, differentiate markets, streamline costs, or implement digital transformation [36]. Based on the analysis results, the results of strategic planning are categorized based on their contribution to business strategy and their role in business processes. Based on the analysis results, strategic planning results are ranked based on their contribution to business strategy and their role in business processes.

Table 5: Application Portfolio.

Future Application	Existing Business Proses											
	Marketing	Sale	Negotiation	Purchase	New Product	Bill	Financial Statements	Absence	Payroll	Paid Leave	Stock	Delivery
Sales		Replace	Add									
Inventory												Replace
Finance						Replace	Replace					
HRIS								Replace	Replace	Replace		
E-Procurement				Replace	Add							
Company Profile Website	Replace											
Tracking												Retain

Table 5 shows the difference between the old business functions and the proposed new applications. The company maintains one business function, namely shipping. Then, the company will replace several business functions: marketing, sales, purchases, bills, financial statements, absences, payroll, paid leave, and stock. Finally, the company will add new business functions, namely checking new products on e-procurement and selling on sales applications.

5. CONCLUSION

The business process at an electrical appliance distributor company provides electrical component supply services to various sectors in various fields. Based on this, it is necessary to support information systems and information technology, which in the future will be able to realize the digitization of business processes. The combination of the Ward Peppard and Anita Cassidy methods effectively makes an information system strategic plan following the business conditions of an electrical appliance distributor company. Therefore, it is necessary to obtain mature comparative data and see trends in technological developments to carry out the information system strategic planning process. The strategy planning results are in the form of a roadmap

and application portfolio. The application roadmap formulates several timeframes for making applications, divided into short, medium and long-term. There is a company profile website and sales application in the short term. Company profile website for product promotion and contains company information. The sales application helps order products, negotiate prices and track customer transaction shipments. There are inventory, e-procurement, and finance applications in the medium term. The inventory application allows a collection of data on the stock of goods in the company, such as products, packaging for packaging and office supplies. E-procurement application to help purchase products from suppliers, check new product catalogues entered by suppliers, negotiate prices, get delivery receipt numbers, and check bill payments. Finance application to assist with financial reporting, from paying company invoices to suppliers and preparing financial reports to payroll processing. In the long term, there are HRIS and tracking applications. HRIS assists with employee data collection, from attendance, leave requests, and overtime to helping with setting leave allowances and the nominal salary of each position. The tracking application monitors the company's shipments. In addition to the application roadmap, strategic planning produces an application portfolio. The

business function is retained, namely shipping. For business functions that will be replaced, namely marketing, sales, purchases, bills, financial statements, absence, payroll, paid leave, and stock. Business functions will be added, namely checking new products on e-procurement and sales on sales applications. The implication of this research is a complete mapping of applications that will be implemented can support the company's vision and mission so that the architecture can be adapted by the company as soon as possible.

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