Strategic Information System Planning for Indonesia Non-franchise Pharmacies Based on John Ward and Factor Analysis Method

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Abstract— **This study aims to produce a strategic planning proposal for the IS / IT of non-franchise pharmacies to be able to compete with franchised pharmacies and to realize the vision, mission, and objectives of the pharmacy. This research was conducted using a mixed-method with a sequential explanatory design. Observation and interview methods are used to formulate the vision, mission, and objectives of the pharmacy. The data obtained is used as a basis for making objective factors in the form of Likert scale questions. The results of the questionnaire were analyzed for validity and reliability using Pearson's Product Moment and Cronbach's Alpha and showed the results of the r-count value of all the questions were positive and greater than the r-table (r-table> 0.457) with a value of α = 0.980, which means the question items in the questionnaire valid and reliable. These questions are then described in the form of a decomposition diagram with the consideration of value chain analysis. The output of the decomposition diagram is used as data for analyzing the company's success factors (CSFs). Quantitative factor analysis was also carried out with the help of statistical applications using Bartlett's Test of Sphericity and the Keizer-Meyer-Olkin (KMO) test. As a result, the chi-square value is 279.591 and the MSA value is 0.738, so it can be concluded that the data has met the requirements for factoring. Based on the factor analysis, 7 (seven) components were also extracted which were then used to compile the application portfolio in the McFarlan quadrant. The Customer Relationship Manager (CRM) application and the Point of Sales (POS) application occupy a strategic position, while the Inventory Module, Finance Module, Sales Module occupy a high potential position.**

Keywords—Critical success factors, Factor analysis, Strategic planning, Information System, Technology system, Value chain

I. INTRODUCTION

Indonesia has the fourth largest population in the world based on the 2020 population census. Unfortunately, with such a large population, it is not balanced with good health services. Data from the World Bank published in 2012 shows a high mortality rate in Indonesia, which is at 7.01 deaths per 1000 population per year. This condition, according to the World Bank, is caused by Indonesia's low commitment to providing health services. Although the Indonesian government has recently allocated a larger budget, the allocation for public health facilities remains quite low. As a result, Indonesia lacks health facilities such as lack of hospital beds. Indonesia also lacks doctors, nurses, and midwives, especially in rural and remote areas [1].

Facing these challenges, the government then issued a policy through Law Number 24 of 2011 concerning the Social Security Administration (BPJS) and appointed PT Askes as the organizer of the social security program in the health sector, and transformed to BPJS Kesehatan. Since January 2014, BPJS Kesehatan began operating, with the National Health Insurance-Indonesian Health Card (JKN-KIS) as it main program. Through this program, health services to the Indonesian people have changed, including services in the provision of drugs. The JKN-KIS program by BPJS provides comprehensive health services to the community. Starting from examinations, administering medical actions, to procuring drugs for patients. However, like other government programs, the JKN-KIS program is also governed by policies to control and ensure the program runs well. One of the policies that later reformed not only health services, but also made significant changes to the pharmaceutical industry, namely the tender policy for drug procurement. Large pharmaceutical industries that have a reputation, have capital, and have collaborated with the government then choose to build their own pharmaceutical businesses by building franchise pharmacies. The franchise pharmacy formed by the pharmaceutical industry will benefit greatly, because only the franchise pharmacy that has collaborated with the government can provide BPJS prescription redemption services. Thus, the pharmaceutical industry through franchise pharmacies will be able to survive because they have pockets of consistent income every year from BPJS.

It is certain that a private pharmacy that is not a franchise for branded pharmaceutical products will have a much different income benefit from its competing franchise pharmacies. The challenge is getting tougher because non-franchise pharmacies are no longer allowed to work with general practitioners as before. Through the Minister of Health Regulation Number 71 of 2013 concerning Health Services in the National Health Insurance, doctors who are already registered in the BPJS doctor list are no longer allowed to advise patients to buy drugs at non-franchise pharmacies who are not holders of BPJS prescription redemption rights. Even most non-BPJS doctors choose to open their own pharmacies and arrange for patients to redeem prescriptions at these private pharmacies because they are more profitable.

Responding to the existing challenges, non-franchise pharmacies must make business innovations to be able to continue to survive in business competition with franchise pharmacies and doctor's private pharmacies. One of the innovations that can be carried out is strategic planning of information systems and information technology. With the narrower scope of marketing of general pharmacies today, a business strategy is needed to create opportunities and find ways that suit consumers' abilities and needs. With the support of appropriate IS / IT strategic planning, it will be able to support pharmacy operations and performance to achieve its vision and mission [2]. Unfortunately, many non-franchise pharmacy businesses do not have a clear vision and

mission, even though the vision and mission can be used to achieve company goals [3]. On the other hand, franchise pharmacies have strategic planning support from existing experts at the franchise brand pharmacy companies, so the franchise pharmacy owner only needs to provide the resources to apply it. This can result in non-franchise pharmacies being left behind if they do not carry out IS / IT strategic planning.

Most of the non-franchise pharmacy companies have not used and utilized information system technology. This resulted in many errors in stock and financial calculations [4]. The result of the many errors is a decrease in the level of consumer trust that will make non-franchise pharmacies fall further behind from competitors [5]. A small numbers of non-franchise pharmacies have implemented an information strategy without strategic planning. The use of information systems without the correct strategic planning of IS / IT can disrupt the service process in general [6]. For this reason, an appropriate IS / IT strategic plan is needed, in order to determine the vision, mission, and objectives, as well as an IS / IT strategic plan so that pharmacies can continue to survive in business competition with franchise pharmacies.

In determining strategic plan, a method or framework is needed to achieve alignment of the IS / IT strategy with the organization's business strategy. Framework or also known as enterprise architecture is seen as a logical and comprehensive approach in defining, designing, and implementing systems and their components simultaneously [7]. The unplanned IS / IT development will produce a low priority scale leads a productivity drop [8].

This study used the John Ward method in preparing a pharmacy strategic plan because it is more suitable for designing IS / IT strategic plans in the short, medium, and long term compared to the Zachman Framework or IT Balance Score Card which are relatively more complex and are intended for the preparation of medium and long terms strategic plans [9]. This method first begins with an assessment to understand the current condition of the internal and external business environment, also the IS / IT environment. This kind of understanding can lead an appropriate future IS / IT strategy [8].

John Ward's framework in this study was developed using the analysis method of Critical Success Factors (CSFs) and value chain analysis. The CSFs analysis aims to extract the pharmacy objectives obtained through observation and interviews into critical goals that must be achieved by the pharmacy. If this critical goal is not achieved, the pharmacy will not be able to survive in business competition with franchise pharmacies. Due to the limited ability of human resources in understanding, compiling, and implementing IS / IT strategic plans, the data which is used as input for the preparation of this strategic planning is limited to the internal components of the pharmacy only. Another consideration of the external component exclusion is the request of pharmacy owners who stated that data from internal pharmacies are sufficient in facing current business competition. The output of this CSFs analysis is a matrix of information needs and a decomposition diagram of pharmacy activities. Through the value chain analysis, the decomposition diagram was grouped into main and supporting activities. The required applications are then mapped based on these activities, so that the application data that is really needed by the pharmacy and its supporting applications will be generated.

These two descriptive qualitative analyzes support each other to produce data that will be used as input for subsequent analyzes, namely factor analysis and future portfolio analysis.

An IS / IT strategic plan which is relevant to the needs of a small-to-medium scale non-franchise pharmacy business is clearly needed in order to increase competitiveness. The modified John Ward framework used in this study will be proposed as a new framework in planning the IS / IT strategy in the future.

II. PREVIOUS RESEARCH

Strategic information system planning is useful for achieving the vision and mission. The use of IS / IT to support business processes does not always go according to plan, there is even a mismatch in business processes [7]. The data from the pharmacy which is processed with SI is an useful information in decision making by the management [10]. A total of 289 people participated in a study, and data were obtained by a structured questionnaire which was completed by a face-to-face interview method. The study shows that most of pharmacists and staff faced 'stock updates' problem. The pharmacists and pharmacy employees who participated in the research believe in the importance of pharmacy information management systems, despite the negative experiences related to the use of the system and see it as an indispensable element in pharmacy services [11]. However, the use of information systems and technology without proper IS / IT strategic planning can disrupt the service process in general [5]. The example is the use of Pharmacy Information System (PIS) at the Ministry of National Health-Riyadh, Saudi Arabia since fifteen years ago has not been going well due to inadequate planning of the system [12].

The IT systems are strategic tools for the development of large enterprises and are increasingly becoming a strategic development tool for small and medium enterprises (SMEs) also. Drechsler and Weißschädel [13] shows that a lack of involvement in the development of IT strategies and the related strategic process planning can cause clear losses in terms of attractiveness and competitiveness. They designed and evaluated an IT strategy development framework for small and medium enterprises (SMEs), including non-franchise pharmacies, to provide a theoretically empirically validated, simplified, and accessible framework to develop an IT strategy for a SMEs. Those strategies were divided into an IT strategy process and an IT strategy plan. The framework was then combined with action research, to design, apply, evaluate, and refine the framework in specific activities of SMEs. The study used Earl and John Ward method to propose IT strategy document information, IT mission and vision, ICT strategy, IS strategy, and IM strategy. Previous studies clearly showed that the use of value chain analysis was very effective as a strategic tool in developing IT / IS strategic planning. Value chain analysis is part of the John Ward method which classifies company activities into main and supporting activities [14].

John Ward method is actually complicated method that can be simplified by using diagram. By classifying the risk categories related to the medication supply chain data into a diagram, we can propose a new modeling approach of the medicines supply chain and risks. By identifying needs and risks to the medicines distribution, we can manage the supply

system better [15]. Strategic planning helps to create the vision toward which the department strives. There are a number of strategic planning tools that can be utilized to further refine and prioritize strategies, including stakeholder analysis, problem reframing, gap analysis, and SWOT analysis [16]. The SWOT and Value Chain method are suitable for companies that already have a vision, mission, goals, and clear objectives in order to maintain an existing business [17]. The most effective approach to identify the information needed by the company in achieving its goals is the Critical Success Factors (CSFs). If the CSFs achievements in a certain area are satisfactory, then the company's success in competing can be guaranteed [7].

Action research which was combined with IS strategic planning analysis using Value Chain and Five Force Porter can be used to produce a blueprint for IS / IT strategic plans of pharmacy in facing the competition of franchised pharmacies. In formulating blueprint, researcher combined qualitative and quantitative methods by using an action cycle, feedback, evidence, and evaluation of previous actions against the current condition by collecting data from interviews and observations [8]. The Likert's questionnaire was used in collecting data and produced blueprint strategy. The blueprint was then tested for its feasibility using Bartlett's Test of Sphericity and Kaiser-Meyer-Olkin test. The qualitative method analyzed data used CSFs, value chain method, and business portfolio analysis.

III. METHODS

This research methods combine qualitative and quantitative statistics to analyze information and technology system needed by pharmacies as shown in Figure 1. In this study, field observation data and interview data from pharmacy owners were used as input. The data is then processed to obtain the vision, mission, and goals of the pharmacy. Another input used is the results of a questionnaire to determine the critical determinants of the success of a pharmacy. The questionnaire data were analyzed qualitatively using Critical Success Factors (CSFs) and also quantitatively using Bartlett's Test of Sphericity and Kaiser-Meyer-Olkin. The results of qualitative analysis were used as a data for compiling the IS / IT requirements matrix and composing a decomposition diagram. From the diagram, the IS / IT needs of each pharmacy activity was extracted for value chain analysis. From the qualitative and quantitative analysis, the critical factors were obtained. Then the results were extracted into business IS strategy, IS / IT management strategy, and IT strategy. Future application portfolios are obtained through factor analysis based on quantitative variance value priorities and value chain analysis priorities.

IV. RESULTS AND DISCUSSIONS

A. Pharmacies's Vision, Mission, and Goal

In running a business, the pharmacy already have a pharmacy business license and be managed by a Pharmacist, whom have practice license. The pharmacy have 14 employees in total, consist of cashier and administration, salespeople, warehouse and household staff, and security officer. The pharmacy does not have an organizational structure, all policies are determined directly by the owner. All service processes are done manually which often results in errors in service, such as product and price errors.

In formulating vision and mission of the pharmacy, questionnaires were distributed to the management and employees. Based on the data analysis, they highly upholds the values of service honesty, focuses on serving quickly,
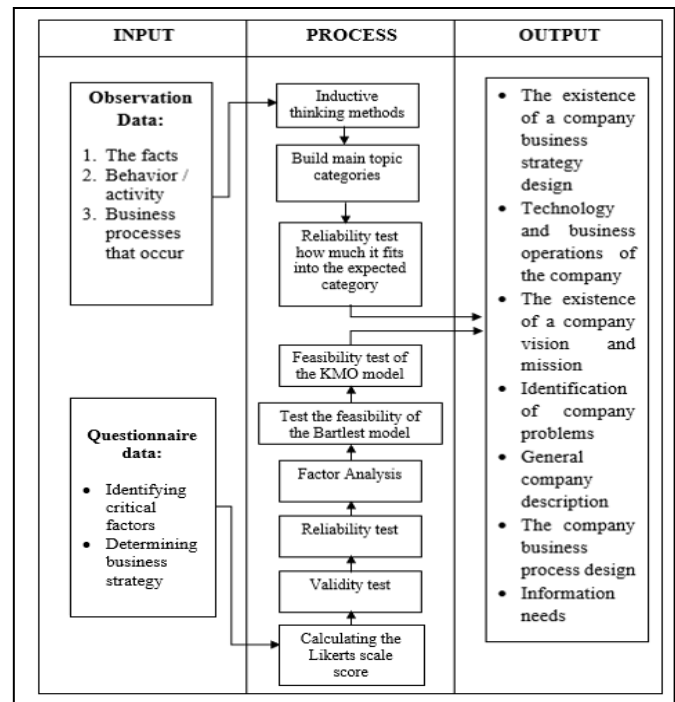

Fig. 1. Research methods combine qualitative and quantitative statistic to analyze information and technology system needed by pharmacies.

encourages employees to make service innovations, while continuing to improve creativity. In the future, they want to become the largest and most comprehensive pharmacy, have a loyal customer network, provides affordable products and services, and continues to innovate additional services. Based on this data, vision, mission, and goals were then proposed. This vision, mission, and goals were then confirmed to the pharmacy owner to be approved.

However, with vision, mission, and goals proposed, they still faced various problems such as lack of promotion, incomplete drug stock, the untidy flow of drug stocks, and tight competition to other pharmacies. Critical success factors were needed in formulating IS strategic planning [16].

B. Value Chain Analysis

Value chain analysis shows the relationship between activities and functions performed in the pharmacy's internal environment [8]. In this analysis, the identification of actors, business processes, and other processes related to the business that takes place in a pharmacy is carried out. The pharmacy value chain activity is shown in Figure 2.

The main pharmacy's activities are:

a. Logistic inbound, which consists of checking, purchasing, and receiving product stocks.
b. Operational, which consists of product inspection and facility maintenance activities.
c. Logistic inbound, such as selling goods and services activity.
d. Marketing, which is not programmed by the pharmacy so that it is not implemented.

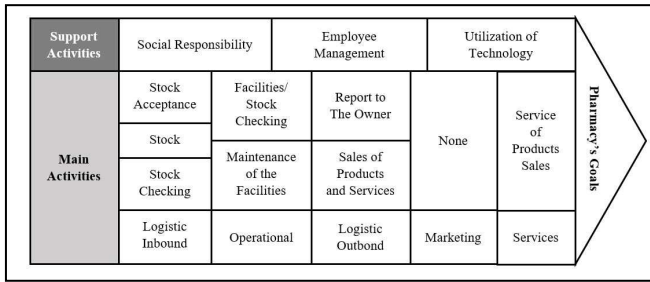e. Services, such as receiving feedback from customers.

Fig. 2. Pharmacies's *value chain* of activites in Porter's diagram [18]

Supporting activities carried out by pharmacies include community service activities by conducting social activities for an unspecified period, providing education and training to employees, employee management, and the use of technology. Overall, based on value chain analysis, pharmacy activities are presented in Table 1.

TABLE 1. VALUE CHAIN ANALYSIS OF PHARMACY INFORMATION SYSTEM REQUIREMENTS

Process	Potential Needs of Information System
Stock procurement	The availability of a system that helps the process of checking goods, such as the amount of stock and barcode scanners to facilitate product input to the stock system.
Sales of products and services	• The availability of a check system for product stock availability, prices, discounts, and similar products that is integrated with a cash register. • Availability of a buyers database who have purchased products / services.
Employee management	• A system that records attendance well, including tardiness. • Availability of electronic pocket book on work rules, rights and obligations of employees, as well as records and employee performance appraisals.
Security monitoring	Availability of pharmacy security systems such as security cameras and important numbers that can be contacted immediately in the event of a security problem.
Maintenanace	• Availability of backup infrastructure in case of damage or disturbance to main equipment. • Availability of daily SOP instruments for the household section in maintaining infrastructure.
Services to consumers	Re-emphasize the importance of smiling, greetings, and the importance of honesty, speed and accuracy of service.
Promotions	• Availability of digital media such as websites and social media as a means of promotion and marketing. • Availability of a member system with voucher and discount benefits.
Utilization of technology	Use of computers and smartphones as business process aids.

C. Data Analysis

Testing of the main objective derived variables was carried out using a questionnaire with open and closed questions. The questionnaire was addressed to 14 employees and 5 pharmacy management. Retrieval of data for the determination of the derivative variables of organizational goals at the management level and pharmacy employees was carried out by interview methods and survey questions.

The variables derived by identifying organizational goals and critical success factors will be arranged into questions in a questionnaire. The questionnaire that was compiled consisted of 2 types, namely (1) a questionnaire for employees consisting of 12 variables with 35 questions, and (2) a questionnaire for management consisting of 15 variables with 43 questions. An example of designing a questionnaire can be seen in Table 2.

TABLE 2. AN EXAMPLE OF A QUESTIONNAIRE QUESTION DESIGN

Getting new customers (T1)
a. Do you agree that using social media as promotional media for pharmacies will reach wider customers?
b. Do you agree that the installation of colorful lights as a medium will attract buyers to the pharmacy?
c. Do you agree that a pharmacy membership program will enable buyers to become regular customers?
d. Do you agree that if a lucky draw is held, buyers will be interested in buying and loyal to using pharmacy services?

Customer caring (T2)
a. Do you agree if existing customers are given special discounts so that they can keep customers buying and using pharmacy services?
b. Do you agree with giving priority to loyal customers to make customers feel special and continue to buy products and use pharmacy services?

The raw data that is processed is data obtained from the conversion of respondents' answers to a Likert scale. The results of data conversion for each item of the objective variable are presented using a bar chart as shown in Figure 3.
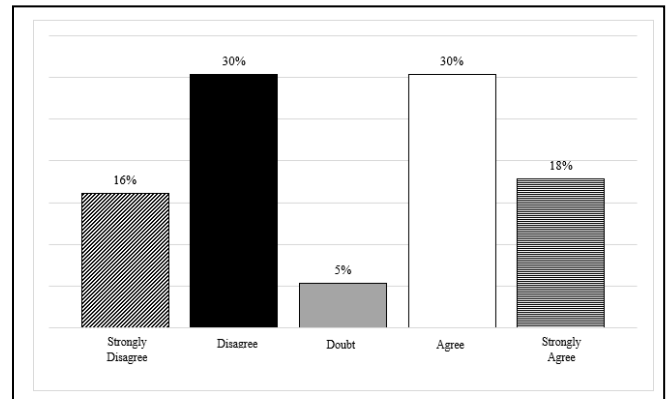

Fig. 3. An example of a converted data bar chart for Goal 1 (T1)

Objective 1 (T1) contains 4 questions. The results of the validity and reliability tests show that all the corrected item-total correlation values of each question point are greater than the r-table (0.457). With these results, all the questions in T1 are valid. In Cronbach's Alpha analysis, a value of 0.980 was obtained, more than 0.6, which means that all the questions in T1 were valid and reliable [19]. An example of the results of the validity test of data that has been converted and processed using a data processing application for Purpose 1 (T1) is presented in Table 3.

TABLE 3. AN EXAMPLE RESULT OF VALIDITY AND RELIABILITY TEST

Variable	r table	Coefficient Alpha	Validity & Reliability
T1_1	0,718		valid, reliable
T1_2	0,879		valid, reliable
T1_3	0,928	0,857	valid, reliable
T1_4	0,844		valid, reliable

Data that have been valid and reliable are then standardized by calculating the average value and standard deviation. The standardized data were then analyzed for factors using Bartlett's Test of Sphericity and Keizer-Meyer-Olkin methods with the Varimax rotation method. This test aims to determine the feasibility of the variables before they are factored in. Based on the results of Bartlett's and KMO tests, the value of the Measure of Sampling Adequacy (MSA) is 0.738 with chi-square approximately 279.591 means that the tested variables have fulfilled the requirements for factor analysis in a fairly good category [11].
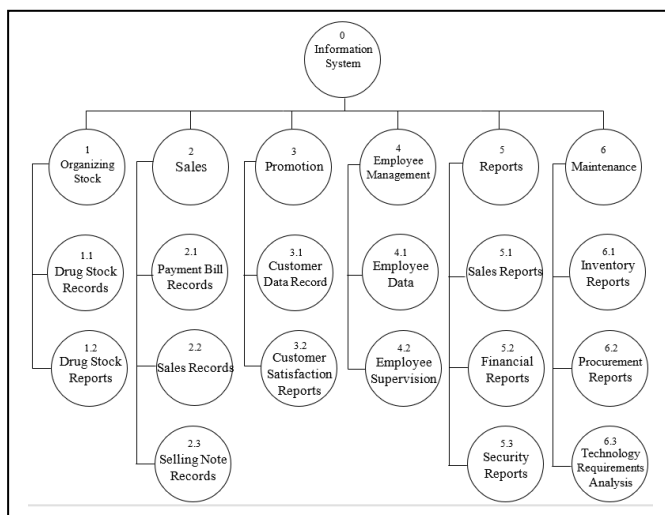

Fig. 4. Decompotition diagram that will be analyzed by CSFs analysis to determine pharmacies success factors

D. Critical Success Factor (CSF) Analysis

After compiling the value chain analysis, the results obtained are reduced to a decomposition diagram as shown in Figure 4. Based on the results of data processing using principal component analysis, the critical success factors of a pharmacy are presented in Table 4.

TABLE 4.   CRITICAL SUCCESS FACTORS OF PHARMACIES

Bussiness Processes	Factors
Promotions	Acquiring new customers (T1)
Reward of loyalty	Looking after old customers (T2)
Excellent service quality	Improve service to customers (T9)
Increase in sales / increase in profit	Provide a digital service system (T6)
Cost efficiency	Increase operating profit (T4)
The same perception of vision, mission, and goals of pharmacies	Develop a work system that is effective and efficient in terms of costs (T10)
Develop employee skills	Increase management productivity (T13)
Performance assessment	Increase employee productivity (T12)
Increase productivity and reduce work errors	Reducing operational work errors (T15)
Improve integrity and solidity	Improve the ability and integrity of employees (T11)
Product stocking	Maintain the availability of drug stocks (T3)
Product quality control	Improve service quality (T5)
Provision of low-quality products	Increase the competitiveness of pharmacies (T14)
Maintenance	Improve the facilities owned (T7)
Security facility	Providing new supporting facilities (T8)
Supporting facilities	Providing new supporting facilities (T8)

E. Future Applications Portofolio

From the results of the mapping of information system requirements, it can be obtained an overview of the contribution of an IS / IT application to the organization and the development of the application in the future. The portfolio is presented in the form of a strategic grid analysis that classifies applications into four segments. Grouping is done because the four segments in the grid each require different planning, development, implementation and operation. Also, each segment has different roles in the business carried out by pharmacies [9, 13].

TABLE 5.   FACTOR ANALYSIS VALUE

Component	Initial Eigenvalues		
	Total	*% of Variance*	*Cumulative %*
1	18.547	52.992	52.992
2	4.031	11.516	64.509
3	3.166	9.047	73.555
4	2.215	6.33	79.885
5	1.74	4.97	84.855
6	1.146	3.273	88.128
7	1.097	3.134	91.262
Component	Rotation Sums of Squared Loadings		
	Total	*% of Variance*	*Cumulative %*
1	6.866	19.617	19.617
2	5.542	15.835	35.453
3	5.426	15.502	50.955
4	4.382	12.52	63.474
5	3.794	10.841	74.315
6	3.292	9.404	83.72
7	2.64	7.542	91.262

In determining which applications fall into the strategic, high potential, key operational, and support categories, factor extraction is carried out using the analysis factor analysis method. The result, obtained 7 (seven) factor components as presented in Table 5.

With the results obtained, the existing components are divided into a McFarlan application portfolio diagram based on the variance value they have. The division is sorted from the highest value to the lowest value and groups the variance values whose ranges are close together into one diagram. Based on the factor analysis that has been carried out that has been synchronized with the CFSs analysis and the questionnaire that has been conducted, a future application portfolio is obtained as presented in Table 6.

TABLE 6.   FUTURE APPLICATIONS PORTOFOLIO BASED ON McFARLAN'S DIAGRAM

Strategic	High Potential
1. Customer Relationship System (CRM), 2. Aplikasi Point of Sale (POS) Application	1. Inventory Module, 2. Finance Module, 3. Sales Module
Key Operational	**Support**
1. Purchasing Module, 2. Fixed Assets Module, 3. Employee Supervision Information System	1. Tax Module, 2. Maintenance Module, 3. Human Resources Module, 4. Employee Attendance Application, 5. Product and Facilities System of Information

F. Conclusion

In the strategic planning of information systems and information technology, three job descriptions are divided, namely: (1) IS / IT policy and strategy planning, (2) IS / IT development, and (3) IS / IT operations and services.

Strategic information systems are designed and integrated with pharmacy business processes and strategic plans, thereby supporting pharmacies in achieving predetermined goals. Information systems and strategic information technology are prepared based on the results of data processing to determine the Critical Success Factor (CSFs) of a pharmacy.

In future portfolios, the Customer Relationship System (CRM) application and POS application occupy a strategic position that will provide direct benefits to pharmacies in order to achieve their goals. Without this application, pharmacies will find it difficult to face competition from other pharmacies, especially franchise pharmacies. Meanwhile, the financial module, inventory module, and sales module application occupy a high potential position which will give a competitive advantage to pharmacies, although it is not a vital factor. This application portfolio will have a significant impact in the next 3 years.

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