

Strategic Planning of Information System using Ward and Peppard in the Ministry of Health, Timor Leste

Fernao Dos Santos, Nilo Legowo



Abstract: *The increase of public services based on information and communication technology (e-Government) requires a government organization to have IS / IT strategic planning. One of the benefits of IS and IT strategic planning is that e-Government development becomes more targeted, effective, efficient and transparent to support good and clean governance. Ministry of Health Department ICT Timor Leste has also implemented the IS/ IT in carrying out its duties and services, but the use of IS in the office has not been done fully or fully implemented, and there are still many activities that are done conventionally which consequently make the office cannot achieve optimal target and performance. The purpose of writing this Thesis is intended to carry out strategic planning in the operational process of public services to find out the deficiencies that occur in the process of public service, then plan the system strategies and technologies that can improve the system that has been built at the ICT Department of the Ministry of Health of Timor Leste. The method used is the method of analysis, field study methods, and literature study methods. The method used is based on the concept of Ward and Peppard. the analytical methods used are SWOT analysis, PEST analysis, critical success factors analysis, IT Balanced Scorecard analysis and Mc Farlan's Strategy Grid Analysis. Strategic planning is made and developed from existing IS / IT at the time the research was conducted to fit the direction of organizational development. From the research carried out, an information system strategy and public service operational process technology planning was produced in detail with the aim of helping to facilitate the managers and staff of the Department of ICT in the Ministry of Health to be able to manage their operational processes properly and be able to achieve optimal targets and performance.*

Keywords: *IS Strategic, Planning, Ward and Peppard, Ministry of Health, Timor Leste.*

I. INTRODUCTION

Strategic Planning for Information Systems and Information Technology [SI / IT] is very important to determine the success of an Information and Information

Technology system. Strategic planning can work effectively, if it implements sustainable strategic planning to ensure business processes that are compatible with changing technology. The benefits of Strategic Planning are to align the direction and priorities of IS / IT in accordance with business priorities, create effective and efficient management, and identify IS / IT opportunities for increasing business value. The Ministry of Health Office of the Dili ICT Department is a vertical agency responsible for the duties and functions of the Dili Ministry of Health Ministry of ICT based on the Ministry of Health's policy of the head of the provincial office and the law. Department of ICT The Ministry of Health of Timor Leste has not fully utilized Information Technology to achieve its objectives optimally, this is allegedly due to imperfect business strategies, IS / IT system strategies, human resources, and funds. The Ministry of Health is responsible for 1 national hospital, 65 public health centers, 5 referral hospitals, and 181 post yandu located throughout the country. With a population of 1,047,632, 13 districts and 65 sub-districts. Based on the problem, strategic issues and attention to the goals and targets that have been set, then there are long-term strategies and policies that require technology and information systems to achieve more optimal.

II. LITERATURE REVIEW

2.1 Understanding of Organization and Information System

Information systems [SI] are computer applications to support the operation of an organization: the operation, installation, and maintenance of computers, software, and data. A computer-based information system is a collection of computer hardware and software designed to convert data into useful information. Understanding information systems according to O'Brien [2006, p 4] [7], information systems can be a regular combination of people, hardware, software, communication networks, and data resources that collect, change, and, spread information in an organization. As according to Bodnar and Hopwood [1998]"The term information system suggests the use of computer technology in an organization to provide in formation to users. A "computer-based" information system is a collection of computer hardware and software designed to transform data into useful in formation. " According to Turban, Rainer, and Potter [2003], "An information system [IS]collects, processes, stores, facilitates, and disseminates information for a specific purpose. "An information system [SI] collects, processes, stores, analyzes, and disseminates information for specific needs.

Manuscript published on November 30, 2019.

* Correspondence Author

Fernao Dos Santos*, Information Systems Management Department, BINUS Graduate Program-Master of Information Systems Management, Bina Nusantara University, Jakarta Indonesia. 11480 Email: fernao.santos@binus.ac.id

Nilo Legowo, Information Systems Management Department, BINUS Graduate Program-Master of Information Systems Management, Bina Nusantara University, Jakarta Indonesia. 11480 Email: nlegowo@binus.edu

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Information system [SI] is a link between humans, procedures and the use of technology to collect, process, store, disseminate and present information used by one or several business processes in an organization [Laudon and Laudon, 2000].

While information technology [IT] is the convergence between computer technology and communication technology that causes information systems to be built and running as they should [Laudon and Laudon, 2000].

The use of information technology in an organization is expected to increase productivity, speed up the process and provide information support to management for decision making.

The application of IS / IT in an organization has three main objectives. First, improve work efficiency by automating various processes that manage information. Second, improve management effectiveness by satisfying information needs for decision making. Third, improve competitiveness or increase organizational competitive advantage by changing the style and way of doing business [Ward and Peppard, 2002].

2.2 Concept of Strategic

Organizational strategy can be defined as a "war plan" [War plan] undertaken by management to obtain a position that can win the competition, increase customer satisfaction and improve business performance. The organizational strategy consists of a series of competitive activities and business approaches applied by management in carrying out the operational activities of the organization [Hartono, 2006]. Organizations need an appropriate strategy for two reasons, namely:

a. The organization must actively form activities. An organizational strategy provides a method for the organization to proactively carry out its activities by providing a roadmap, for conducting operational activities, conducting business instructions, planning to build customer loyalty and building a competitive advantage on an ongoing basis to win the competition.

b. Bringing together ideas and initiatives from each business unit in the organization to form integrated and coordinated planning [Hartono, 2006].

According to Porter, there are three strategies that organizations can undertake to gain competitive advantage, namely:

a. Cost leadership: produce products and services at the lowest cost in the industry. Information technology can be used to help reduce administrative workload, scheduling, inventory costs and so on.

b. Differentiation: to be unique in the industry, for example by providing high quality products at competitive prices. SI / IT can help by adding features to products and services.

c. Focus: choose a specific reach segment to achieve the strategy of cost leadership and differentiation in this segment. Organizational strategies need to be formed within the organization, not just choosing strategies but carving out strategies. Carving out strategies aims to determine strategies so that they are appropriate and in line with the business needs of the organization.

2.3 IS and IT Strategic

Information system and Information Technology strategies are distinguished by their functions. Information system strategy is more emphasized to determine the application

supporting information systems needed by organizations. On the other hand, Information Technology strategy is more emphasized in determining the technology and infrastructure of IS / IT, and the resources in the organization. Information system Strategy emphasizes on determining the application of information systems needed by the organization. The essence of the Information system strategy is to answer the question "what?". Such as what kind of application information system needed by the organization that can support organization activities. Whereas Information Technology strategy emphasizes the choice of technology, infrastructure, and special expertise related to or answering the question "how?" [Earl, 1997]. Such as how to build infrastructure, and to get special expertise to support organization activities. To determine the Information system and Information Technology strategy that can support the achievement of the organization's vision and mission, it is necessary to understand the organization's business strategy. This understanding includes an explanation of the following: why a business is running, where the goals are, and the direction of the business, when the goals are achieved, how to achieve the goals and are there any changes that must be made. So, in developing an Information System and Information Technology strategy, the central issue is the alignment of the IS / IT strategy with the organization's business strategy. The IS / IT strategy should lead to integrated system performance to produce accurate information that can be used as input in making decisions [Ward and Peppard, 2002].

2.4 Strategic Planning of IS and IT

IS/ IT strategic planning is the process of identifying a computer-based Information system application portfolio that will support an organization in implementing business plans and realizing its business objectives. businesses, even looking for new opportunities through the application of innovative technology [Ward and Peppard, 2002].

III. METHOD

The scientific research method is a systematic, controlled and empirical investigation of a set of hypotheses built from theoretical structures [Hartono, 2008]. The research methodology will explain the research framework, types of data, research subjects, data collection and research instruments, and data analysis. Every research always uses theory. As stated by Neumen [2003]. "Researchers use theory differently in various types of research, but some types of theory are present in most social research." Kerlinger [1978] suggests that "Theory is a set of interrelated constructs [concepts], definitions, and propositions that present a systematic view of phenomena by specifying relations between variables, with the purpose of explaining and predicting the phenomena."

Theory is a set of constructs [concepts], definitions, and propositions that function to look at phenomena systematically, through the specification of relationships between variables, so that they can be useful to explain and predict phenomena.

Cooper and Schindler [2003], suggested that, "A theory is a set of systematically interrelated concepts, definitions, and propositions that are advanced to explain and predict phenomena [fact]."



This research is a type of descriptive research with a qualitative approach. Data analysis using Ward and Peppard methods. This research was carried out in the office of the Ministry of Health Ministry of ICT, Dili City. Data collection methods using interviews, observation and document study. Test the validity of the data with the SOWT, PEST, CSF, IT BSC and Mc Farlan analysis strategies of Grid analysis. Ward & Peppard version of the IS/IT Strategic Planning Framework.

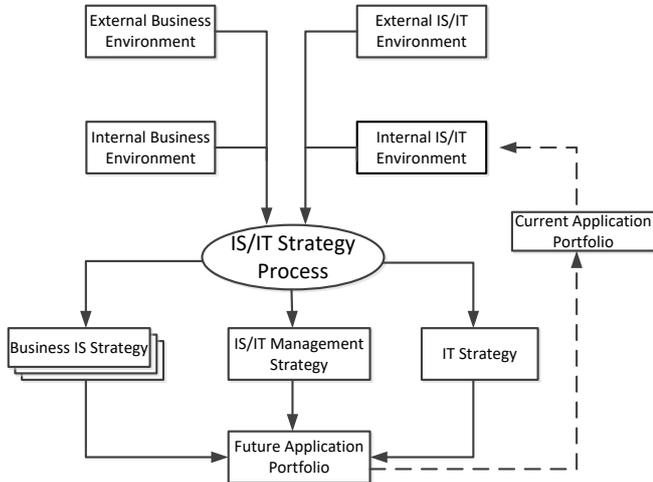
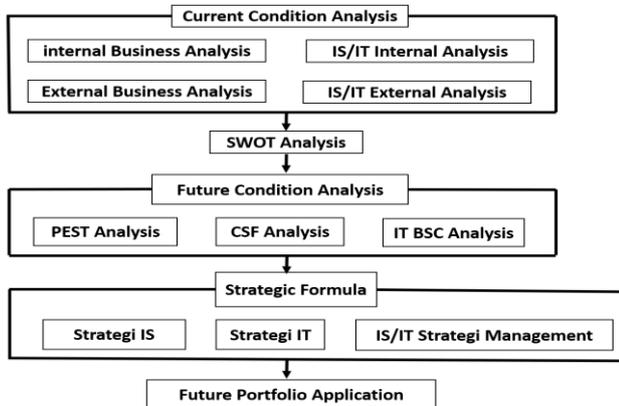


Fig. 1. IS / IT Strategic Planning Framework [Ward and Peppard, 2002:153]

3.1 Current Condition Analysis

Analysis of current conditions based on internal and external business conditions as well as internal and external conditions of IS / IT companies. The method used is:



3.2 SWOT Matrix Analysis and Results

Judging from the results of internal and external analysis, the total can be obtained as follows:

1. Total Strength Score = 3.85
2. Total Weakness Score = -3.52
3. Total Opportunity Score = 3.82
4. Total Threat Score = -3.6

Whereas the matrix area based on the total score above is:

Table 1. Matrix Extension

Quadrant	Point Position	Matrixs Ext.	Ranking	Priorities strategy
I	(3,85; 3,82)	14,70	1	Growth / Aggressive
II	(-3,52; 3,82)	-13,44	3	Stability / Defensive
III	(-3,52; -3,66)	-12,88	4	Decrease / turnaround
IV	(3,85; -3,66)	14,09	2	Combination / differentiate

Based on the table above, we obtain the following broad matrix quadrant ranking.

1. Rank 1: in quadrant I with a matrix area of 14.70
2. Rank 2: in quadrant IV with a matrix area of 14.09
3. Rank 3: in quadrant II with a matrix area of 13.44
4. Rank 4: in quadrant III with a matrix area of 12.88

Based on the results of the matrix's wide ranking, the determination of the position of the Department of ICT as a SWOT Matrix would be explained in Fig. 2. SWOT Matrix below.

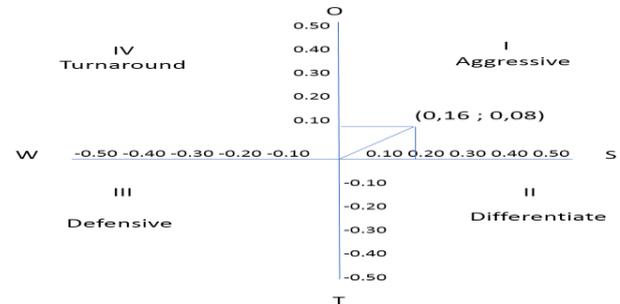


Fig. 2. SWOT Matrix

The determination of the coordinates of the figure is as follows:

Internal Analysis Coordinate = [Total Strength Score - Total Weakness Score]: 2

Internal Analysis Coordinate = $[3.85 - 3.52] / 2 = 0.16$

Coordinate of External Analysis = (Total Opportunity Score - Total Threat Score): 2

Coordinate of External Analysis = $[3.82 - 3.66] / 2 = 0.08$

The coordinate point is located at (0.16; 0.08)

3.3 Analysis of each quadrant for ICT Department Future Condition

1. In Quadrant I [SO Strategy] a general strategy that can be carried out by the ICT Department is to use the strength of the organization [government] to take every advantage on the opportunities that exist.

a. Improving the quality of human resources through training programs, providing scholarships to ICT employees to increase knowledge in the field of ICT both at central and district employees in supporting optimal coordination between units.

b. Improve existing ICT infrastructure that has been built

c. Using digital systems for all districts with a 3G Modem to access data / internet networks in all health centers.

d. Increase the number of employees who are professionals in the ICT field and buy new equipment (hardware & software) to support business operations.

2. In quadrant II [WO Strategy] the government would be able to make excellence on opportunities as a reference to focus on operational activities by avoiding weaknesses.



a. Cooperating with NGOs to get donor’s assistance in the form of hardware & software to improve ICT infrastructure that is not yet optimal.

b. Improve information processing more efficiently and better ways to communicate by presenting information to managers.

c. Improve SOPs in a clear organizational structure in accordance with organizational goals

3. In quadrant III [WT Strategy] Minimize all weaknesses to deal with each threat.

a. Increase the number of employees in the ICT field and buy new equipment [hardware & software] to support business operations.

b. Improving the skills and quality of existing human resources in the face of intense competition.

c. The government must provide and motivate employees with self-learning / online learning to continue their education to a higher level in the field of ICT to adapt to technological developments.

d. Develop an emergency plan and contingency plan or fall back system for all high risks such as loss of hardware, software and data.

4. In quadrant IV [ST Strategy] Make every strength to face every threat by creating diversification to create opportunities

a. Improve and make differentiation in the process of sustainable public services.

b. Improve SOP that is appropriate and in line with the needs in facing competition between units or departments

c. The government [MoH] must guarantee health information services for the public.

d. Conduct business continuity strategies and develop Business Continuity Plans [BCP] by reviewing IS / IT systems every three months [Trimester], six months [Semester] and one year [Annual]

Based on the picture above, in this case the ICT Department is in Quadrant I namely [SO Strategy]. A general strategy that can be carried out by the ICT Department is to use the strength of government to take every advantage at the opportunity.

Where the Department of ICT is the newest field in the Ministry of Health which was established in 2014. Increasingly the ICT department is improving to change the status of the manual system to an integrated digital system by utilizing the opportunities available, the ICT department is growing to become even better in all fields in every period. After knowing the position of the ICT department in Quadrant I, the strategies that can be carried out by the ICT department are as follows:

3.4 Results of IFAS, EFAS SWOT Analysis, and ICT Department Strategy

Table 2. SWOT Analysis Results and Strategy

IFAS	Strengths (S)	Weakness (W)
EFAS		
Opportunities (O)	Strategi SO (a) Improving the quality of human resources through training programs (training), providing scholarships to ICT employees to increase knowledge in the field of ICT both at central and district employees in supporting optimal coordination between units. (b) Improve existing ICT infrastructure that has been built (c) Using digital systems for all districts with a 3G Modem to access data / internet networks in all health centers. (d) Increase the number of employees in the ICT field and buy new equipment (hardware & software) to support business operations.	Strategi WO (a)Cooperating with NGOs to get donor assistance in the form of hardware & software to improve ICT infrastructure that is not yet optimal. (b) Improve and improve information processing more efficiently and better ways to communicate by presenting information to managers c. Improve SOPs in a clear organizational structure in accordance with organizational goals
Threats (T)	Strategi ST (a) Improve and improve quality in the process of sustainable public services. (b) Improve SOP that is appropriate and in line with the needs in facing competition between departmental units. (c)The government (MOH) must guarantee health information services for the public. (d) Conduct a business continuity strategy and develop a Business Continuity Plan (BCP) by reviewing it every six months or one year.	Strategi WT , (a) Increase the number of employees in the ICT field and buy new equipment (hardware & software) to support business operations. (b) Improving the skills and quality of existing human resources in the face of intense competition. (c) The government must provide and motivate employees with self-learning / online learning to continue their education to a higher level in the field of ICT to adapt to technological developments. (d) Develop an emergency plan or contingency plan, fall back, Plan B *) for any high risk.

IV. RESULT AND DISCUSSION

4.1 CSF Indicator Analysis Result

Table 3. CSF Indicator analysis results

No	CSF Indicator Analysis
1	Improving the quality of human resources
2	Repair and improving infrastructure
3	Improving SOP
4	Implementation of an integrated system
5	Optimizing quality operational systems
6	Improving and enhancing the system structure function to ensure a more optimal system
7	Improving the quality of skills and knowledge of managers and staff through training

Table 4. Results of CSF and KPI Analysis of Strategic Targets

No	Critical Success Factor (CSF)	Strategic Objectives	Performance Indicator
1	Quality of public services	Monitor regularly to ensure quality and timely services	Timely and quality service
2	High-quality and trained employees	Monitor and improve employee recruitment and selection processes to produce high-quality employees	Improve Education skills in accordance with the field and work expertise
3	Effective and efficient information systems	Creating an effective and efficient information system	The effectiveness of the method of presenting information in accordance with customer needs (customer)
4	Complete facilities and infrastructure that are up to date	Ensure that the ICT department has adequate supporting facilities	The compatibility of ICT department supporting facilities with the SOP established by the Ministry of Health
5	Quality manager and staff	Ensuring that managers and staff have carried out activities in accordance with the aim of creating quality managers and staff	Presence and dissemination of accurate and timely information
6	The realization of fluency in increasing the acceptance of information and public services to customers	Improve the quality of information distribution quickly and recorded in carrying out the work process	a. System application b. Database Server c. Network infrastructure
7	Improving the quality system and quality of public information services that are advanced in their fields	Improve the application of management systems to maintain and improve the quality and quality of information	a. System application b. Database Server c. Network infrastructure
8	Improve the recruitment system in the long run	Employee recruitment system that is easier for personnel to use	a. System application b. Database Server c. Internet and LAN network infrastructure
9	Improve employee recruitment systems that have been well structured	Develop existing employee recruitment systems to be more efficient	a. System application b. Database Server c. Internet and LAN network infrastructure



4.2 IT Balanced Scorecard Analysis and Performance Measurement of the ICT Department

The next stage is the field data collection activity based on the case studied. In collecting field data, there are two activities carried out, namely by conducting observations and interviews. Observation is a data collection technique by directly observing the object under study.

While the interview is a data collection technique by conducting questions and answers to informants related to research to obtain the information needed. And to process the interview data, the researchers used the benchmark from the 4 IT Balanced Scorecard perspectives that were directly outlined in the results and discussion.

The following design criteria assessment based on 4 perspectives which will be drawn in the analysis and conclusions, each perspective on the IT Balanced Scorecard can be explained as follows:

Table 5. IT Balanced Scorecard Criteria

No	Perspective	Rating / Criteria
1	Contributions of the Government / Dept of ICT	<ul style="list-style-type: none"> Utilization of Presence IT ISD projects at national and regional levels Value Added to IT applications Vision and Mission of the ICT Department
2	User Orientation	<ul style="list-style-type: none"> Making applications according to needs and requirement Training and learning related applications that are made User satisfaction with applications built from outside developers / ISPs. a) Benefits b) Complaints Application handling if an error
3	Operational Excellence	<ul style="list-style-type: none"> Number of Employees working on the project Internet / WiFi control and supervision Control and supervision of the constructed ISD project ISD and Manager Constraints in controlling internet / WiFi The requested project completion process a) The scope of the location b) Vulnerable time to work Internet / WiFi quality network according to employees The state of software and hardware in the office dep. ICT
4	Future Orientation	<ul style="list-style-type: none"> Standard for recruiting new employees dep. ICT a) Ability b) expertise c) Experience Training and learning for new employees. Distribution of Duties of New Employees Complaints from stakeholders and their handling a) Handling b) the settlement process Information and asset security Dep. ICT a) Data Back-up b) Hackers

Table 6 Strategic Target and Strategy Initiatives of the Department of ICT

Strategic target	KPI	Measurement	Annual achievement target		Strategic Initiative
			2018	2019	
IT Cost Management	Total Realization of IT Operational Cost Budget	USD (Thousand)	\$80,000.00	61,200.00	Lower IT Costs
Penerapan SLA (Service Level Agreement)	Prosentase Pencapaian SLA	Persentase (%)	80%	90%	Meningkatkan Pencapaian SLA
Peningkatan Keunggulan Layanan	% Realisasi kegiatan Kerja IT % Realisasi Proyek IT	Persentase (%) {Persentase (%)	70%	85%	Meningkatkan peran devisi IT sebagai partner bisnis
Ketersediaan Sistem IT	% Ketersediaan Aplikasi dan Sistem	Persentase (%)	70%	85%	Peningkatan Penerapan Solusi
Sistem ICT yang Mutakhir	Prosentase Peningkatan Tata Kelola IT	Persentase (%)	60%	70%	Kualitas Tata Kelola yang berstandar Internasional
Pengembangan SDM IT	Jumlah Sertifikasi Pekerja IT	Persentase (%)	60%	80%	Meningkatkan Kompetensi SDM

Based on the strategic targets and strategic initiatives, recommendations for improving the performance of the ICT department can be seen by improving some strategic targets whose achievement targets are below 70%, such as developing and improving the quality of IT human resources. Based on research conducted, it can be concluded:

1. Measuring the performance of the IT division, in this case the Department of ICT uses the IT Balanced Scorecard by referring to four perspectives, namely the perspective of the company's contribution, users, operational improvements and future orientation.

2. There are six strategic objectives used by the Department of ICT. Of the six strategic objectives there are one strategic objective for the perspective of the company's contribution, one strategic goal for the perspective of the user, two strategic goals for the perspective of operational excellence and two strategic objectives included in the perspective of future orientation.

3. KPI part of the ICT Department is obtained from the reduction in strategic objectives with the acquisition of six strategic goals that produce 7 KPIs.

4. The performance of the Department of ICT showed quite good results, this is seen from the six achievement targets the value of the achievement target is above 70%.

5. Recommendations for improving the performance of the Department of ICT can be seen by improving several strategic targets whose achievement targets are below 70%, such as the development and improvement of the quality of IT human resources.

4.3 The results of GAP Analysis of the current system

The potential technology results are then mapped into the McFarlan Portfolio as shown in Figure 3 Mapping is done based on the nature and position of the IS / IT towards the contribution of the ICT department in maintaining the operational system of the ICT department. Both on the current time scale and the scale ahead. Especially in the strategic and high potential.

Future Potfolio - Portfolio application to be proposed

STRATEGIC	HIGH POTENCIAL
** ITIL Application Management ** Interactive Website (Application Program PHP + Mysql) ** Decision-Support System (DSS), ESS and ES Applications ** ERP System	() Quality Management information system ** Employee development information system and career () Public service information system ** Monitoring and Control Information System
KEY OPERATIONAL	SUPPORT
** Training Information Systems and learning ** Management Information System work program ** Financial Management informational system () Management informational system Asset () Report Information System () DHIS2 Application () Aden Care & Aden Box Application (Liga Inan Application)	** Oracle HRMS Application or Oracle HCM Application () Human Resources Information System () Web Portal Information System
Key * Existing system is satisfactory () Existing System Needs Improvement ** Planned System ? Potencial System	Note: Application Carried out by SAP or Planned to be. its flexibility and highest data integrity

Fig. 3. Future Portfolio Application

Support: Applications such as Oracle HRMS Application or Oracle HCM Application, HR Management System, Web Portal Information System, Microsoft Office are support applications, meaning that the existence of this application does not affect the achievement of the ICT department's business operational objectives.



Key Operations: Applications such as the Internet, Training and learning Information Systems, Work Program Management Information Systems, Financial Management Information Systems, Asset Management Information Systems, Monitoring and Reporting Information Systems, DHIS2, Aden Care & Aden Box, Inan League are applications that indispensable in the daily operations of the ICT department.

Strategic: Applications such as ITIL Application Management, Interactive Website [PHP + Mysql Application Program], Decision-Support System [DSS], ESS and ES Applications, ERP System are applications that determine the operation of the ICT Department, without this application it is not possible the ICT department achieve its mission and objectives.

High Potential: Quality Management Information System, Staff and Career Development Information Systems, Public Service Information Systems, Monitoring and Control Information Systems are applications that will strengthen the ICT department as a single player in the department area ICT in the future

4.3 Implementation Project Planned

Ministry of ICT Ministry of Health will implement this project after obtaining approval of the 2020-2021 budget proposal.

After the ICT department's issues are identified as shown in table 4.6 below, the researcher can plan the project implementation of the IS / IT strategy and portfolio of future applications as shown in the following table:

Table 7 Identification of Issues

No	Issues	Possible Solution	SPIS
1	Resource Optimization	Resource Management	Yes
2	Lack of database coordination	Database Integration	Yes
3	SI capability is very lacking	Develop PSSI	Yes
4	HR IS / IT competence is lacking	HR system	Yes
5	There is no facilitation of analysis	Develop an analysis system	Yes
6	Information not up to date	Operational management	Yes
7	Infrastructure is not supportive	Develop Infrastructure	Yes
8	There is no knowledge management	Develop knowledge Management	Yes

4.4 Development of Implementation Plans

The implementation plan will be carried out on the IS / IT strategy and portfolio of future applications as shown in the following table:

Table 7. Plans for implementing the IS / IT strategy

Program	2020	2021	2022	2023
1. Improve the quality of internal and external public services by utilizing IS / IT that is easily accessible, transparent, safe, and can be accounted for				
a. Build information system applications in accordance with the IS / IT Strategic Plan	✓	✓	✓	✓
b. Use the organization's portal as a media for general information	✓			
2. Use IS / IT to improve the operational processes of public services and the provision of infrastructure				
a. Provides a reliable public service operational access system	✓	✓	✓	✓
b. Provides a general service operational support system	✓	✓	✓	✓
3. IS / IT Infrastructure Development that reliable				
a. Make SOP as a standard for using infrastructure	✓			
b. Developing infrastructure according to the application needs of the Department ICT	✓	✓		

Tabel 8. Rencana Implementasi Aplikasi

Program	2020	2021	2022	2023
ITIL Aplikasi	✓	✓	✓	✓
ERP Aplikasi	✓	✓		
Oracle HRMS	✓			
Website Interaktif (Web Helath Dep. ICT)	✓			
DSS, ESS, ES Aplikasi	✓	✓		

V. CONCLUSION AND SUGGESTION

CONCLUSIONS

1. The results of the SWOT analysis, Critical Success Factor can be used in identifying the IS / IT needs of the ICT department of the Ministry of Health of Timor-Leste, so a good IS / IT strategy planning is needed in managing the ICT department's management both in the fields of human resources, finance, infrastructure ICT and operations so that in the future the Ministry of Health's ICT department can run in accordance with its vision, mission and objectives.

2. From the results of the analysis of IS / IT needed by the Ministry of Health's ICT department management, the researcher can compile an IS / IT strategy plan of the Ministry of Health's Timor-Leste ICT department whose results will be implemented according to the strategic plan.

SUGGESTIONS

Considering that this research is only limited to the identification stage of IS / IT problems in the ICT department, it is recommended to proceed to the development and implementation of the ICT department's IS / IT strategy.

REFERENCES

- Ward, John. and Joe Peppard. *Strategic Planning for Information System* 3rd ed. England: John Wiley & Sons, 2002
- Nishadha, "SWOT Analysis VS PEST Analyses and When to Use Them," 2012. [Online]. Available: <http://creately.com/blog/diagrams/swot-analysis-vs-pestanalysis/>.



3. Gaol, L, Jimmy. 2008. *Sistem Informasi Manajemen Pemahaman dan Aplikasi*. Jakarta: Penerbit PT Grasindo.
4. Ward, J., P. Griffiths, P. Whitmore. 1990. *Strategic Planning for Information System*. John Wiley Series in Information System, Chichester, U.K.
5. Online version O'Brien, James A., 1936- *Management information systems*. 7th ed. Boston: McGraw-HillIrwin, c2006
6. Kaplan, R and Norton, D P *Translating Strategy into Action: The Balanced Scorecard*, Harvard Business School Press, Boston, MA. (1996b).
7. Kaplan, R and Norton, D P *the Strategy Focused Organisation – How Balanced Scorecard Companies Thrive in the New Business Environment*, Harvard Business School Press, Boston, MA. (2000).
8. 2006, English, Book, Illustrated edition: *Management information systems* / James A. O'Brien, George M. Marakas. O'Brien, James A., 1936
9. Alwi, 2007. *Analisis Tentang Jaringan Antar Organisasi Dalam Penentuan Strategi Pertumbuhan Ekonomi*
10. Peppard, Joe & Ward, John & Daniel, Elizabeth. (2007). *Managing the realization of business benefits from IT investments*. MIS Quarterly Executive. 6.
11. Laudon, K. C., & Laudon, J. P. (2000). *Management Information Systems: Organization and Technology in the Networked Enterprise* (6th ed.). Upper Saddle River, NJ: Prentice Hall.
12. Amado, C. A., Santos, S. P., & Marques, P. M. (2012). *Integrating the Data Envelopment Analysis and the Balanced Scorecard approaches for enhanced performance assessment*. Omega, 40(3), 390-403.
13. Luftman, Jerry N et al. *Managing the Information Technology Resource, Leadership in the Information Age* 1nd ed. New Jersey Pearson Education, 2004
14. Ward, John. and Joe Peppard. *Strategic Planning for Information System* 3nd ed. England: John Wiley & Sons, 2002
15. Bourne, M and Bourne, P *Understanding the Balanced Scorecard in a Week*, Hodder and Stoughton, London [2000].
16. Department of Health, *Information for Health: An Information Strategy for the Modern NHS 1998-2005* (September 1998). Available from: www.doh.gov.uk/ipu/strategy/index.htm
17. Rusydiawan, L., Krisnadi, I. (2011). *Meningkatkan Produktivitas Produksi dengan Optimalisasi Sistem Infrastruktur TI Menggunakan Metoda IT Balanced Scorecard*. In *ComTech, Jurnal Telekomunikasi dan Komputer*.
18. Robert S. Kaplan is the Marvin Bower Professor of Leadership Development at Harvard Business School. David P. Norton is President of Balanced Scorecard Collaborative, Inc.
19. Arofah N. Sholiq, Nisafani, A.M. (2012). *Penyusunan IT Balanced Scorecard Untuk Pengukuran Kinerja Divisi IT Di PT. Pertamina UPMS V Surabaya*. *Jurnal Teknik POMITS*.
20. Department of Health, *Delivering 21st century IT Support for the NHS* (July 2002). Available from: <http://www.dh.gov.uk/assetRoot/04/07/16/84/04071684.pd>
21. Kaplan, R and Norton, D P *the Strategy Focused Organisation – How Balanced Scorecard Companies Thrive in the New Business Environment*, Harvard Business School Press, Boston, MA. (2000).
22. Robert S. Kaplan is the Marvin Bower Professor of Leadership Development at Harvard Business School. David P. Norton is President of Balanced Scorecard Collaborative, Inc.
23. Cobbold, I., & Lawrie, G. (2002). *The development of [22] the balanced scorecard as a strategic management tool*. Performance measurement association.
24. Grambergen, W. *"The Balanced Scorecard and IT Governance"*. *Information System Control Journal, Volume 2, 2000*.
25. Hevner, A R, Berndt D J and Studnicki J, *Strategic [25] Information Systems Planning with Box structures*, IEEE Journal, 2000.
26. Anderson, Jamie. *"Creativity is not enough: ICT Enabled Strategic Innovation"*, European Journal of Innovation Management No 9, issue 2 pp 129-148., 2006
27. Ishak, Irni Suzila, *Designing a Strategic Information System Planning Methodologi For Malaysian Institutes Of Higher Learning (ISP-IPTA)*, IIS Volo VI, No 1-2, 2005.

postgraduate at Bina Nusantara University 2016 in the field of Information System Management, currently finalizing the thesis. Being a Telecommunications Officer since 2005 serving several peace keeping Mission with different mandate in different countries from ASIA to West Africa and East Africas in the fields of Communications Information and Technology Services (CITS), great transformed to Geospatial Information and Telecommunications Technology Services (GITTS), later transformed to Field Technology Section (FTS).



Nilo Legowo, Associate Professor in Graduate Program in Information System Management at Bina Nusantara University completed his undergraduate Education Management at Surabaya State University in 1989 and continued his master's degree in informatics engineering at the STTIBI graduated in 1997, and Doctoral Program in Management Research at Binus University graduated 2018. Being a lecturer since 1997 began teaching in various Private Universities in Jakarta in the fields of Computer Science and Information Systems. Since 2009, he has joined faculty member at the Computer Science Department of Bina Nusantara University as a Subject Content Coordinator (SCC) in the field of Software Engineering. Since 2011 he has been assigned as Deputy Head of Department to manage the Postgraduate Program in Information Systems Management.

AUTHORS PROFILE



Fernao Dos Santos, Telecommunications Officer in United Nations Mission in South Sudan, completed undergraduate Economic and Management Sciences at National University of Timor Leste in 2010 and continued

Retrieval Number: D4394118419/2019@BEIESP
DOI: 10.35940/ijrte.D4394.118419
Journal Website: www.ijrte.org

Published By:
Blue Eyes Intelligence Engineering
& Sciences Publication

