Developing Information System Strategic Planning in the Directorate General of Animal Husbandry and Health, Ministry of Agriculture

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Abstract

The goal of this article was to develop Information System Strategic Planning for Directorate General of Animal Husbandry and Health, Ministry of Agriculture. Data were obtained through interview and observation, and analysis used Ward & Peppard's IS Strategic Planning methodology framework and Bernard's Enterprise Architecture. The result indicated that Information System Strategic Plan consisting of three strategies, those were IS business strategy, IS/IT management strategy, and IT strategy. It can be concluded that the proposed solution to make the institution's performance better are Business Intelligence, Learning Management, and Mobile Application in which IS strategic plan supports to optimize IS/IT usage in order to meet the duties and function of Directorate General Animal Husbandry and Health (H).

1. Introduction

1.1 Background

In the era of globalization, information system (IS) and information technology (IT) increasingly play important role in the organization activities to enhance its performance effectiveness. The Directorate General of Animal Husbandry and Health, Ministry of Agriculture is in charge to optimize the utilization of local resources in creating and providing food safety and improving animal breeder welfare. The revitalization of the Directorate General of Animal Husbandry and Health faced the challenges of farm product demand, livestock seed supply and quality, livestock data presentation , population, production, global production and consumption management change, demand to food tenacity, and the emergence of utilization technology, etc. Referring to those challenges, the Directorate General of Animal Husbandry and Health create a business strategy related to the duties and functions to ensure continuity and consistency of livestock development program, and also keep the target to be achieved. This article focuses on developing information system strategic planning aligned with business strategy that help the Directorate General to meet the duties and functions.

1.2 Problems

Directorate General of Animal Husbandry and Health had not applied strategic information system, therefore the system was not run optimally in case each regional office sent report of population, slaughtering, production livestock via email or fax to the Directorate General office. This caused problem in data collection, data processing, and data dissemination. It required more time to access data, verification, and validation to produce livestock statistical data useful in prediction analysis of the future need of consumption, export, import, and decision making to develop animal husbandry and animal health. At present, the data analysis was still manually done, even though the data will be used to determine the development of data and planning for the future program. In addition, there was a less optimal labour in both technical implementation and system usage areas.

1.3 Goals

The goal of article was to develop IS Strategic Planning by analysing the situation (resource, infrastructure), process and system of the Directorate General of Animal Husbandry and Health, as well as identifying data and information need for policy formulation of livestock (statistical data). The creation of information system strategic planning indicated IS/IT management strategy, IT strategy, IS strategy business, as well as application portfolio aligned with the Directorate's duties and function.

1.4 Benefit

Article gave an overview of livestock condition, especially statistical process that could be used in evaluation and strategic formulation to improve condition and performance in the future. Other benefit was to give overview of the process and formulation of IS strategic plan that was not only support the activities but also useful in future.

2. Literature Review

2.1 Information System

Information system as a tool for people and organization by leveraging technology (hardware, software, communication network, and data resource) to collect, process, store, use, and disseminate information that automate the manual process in the integration of operational system (Bhatnagar, 2007; O'Brien, 2006, p5; Ward & Peppard, 2002, p3).

2.2 Information Technology

Information technology facilitates acquisition, processing, storing, delivering, and dissemination information and others that function as important source and critical success factor in competition, also those play important role to support achieving goals. (O'Brien, 2006, p9; Ward and Peppard, 2002, p3; Indra, et al., 2011; Teubner & Mocker, 2005).

2.3 Strategy

Based on Kuordi (2009, p.3-26) strategy is the approach to develop business success that should be clearly and effectively communicated in implementation that usually have the measurement business progress method, indicate which resource needed to be concerned. Strategy should be perceivable to assist in developing potential and produce new skill so that it can increase confidence and awareness that organization needs.

2.4 IS Strategic Planning

IS strategic planning is a set of long term goal that describes the purposed system and information technology architecture's focus to make the IS process become strategic in achieving goals. It is considered as the best mechanism supports organization to ensure IT activities based on organization need to ensure technology activities that is appropriately applied in line with the development of organization's need and strategy. It is an effective way to develop and maintenance IS/IT system that support the operation (Turban 2003, p.432; Chen et al., 2010, p.247; Al-aboud, 2011; Bhatnagar, 2007).

3. Methodology

3.1 Framework

Article performed the use of the framework of Ward and Peppard's IS Strategic Planning. The process began with environment analysis to identify the condition of organization. Analysis of the environment included both external and internal aspects, including business and IS/IT infrastructures, as well as analysis of current application portfolio. Based on the analysis, then the IS/IT strategy process was developed, consisting of three strategies, those are IS business strategy, IS/IT management strategy, as well as IT strategy that produces future application portfolio (2002, p.154).
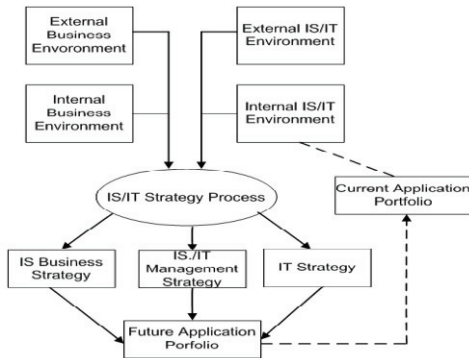
Fig 1. IS/IT Strategic Planning Model of Ward and Peppard (2002, p154)

3.2 Data Collection Method

Data collection method consisted of primary data source (input and output document) and secondary data source (analysis and reference related to theses). This data collection was based on literature study (book, journal, etc.), field study (direct study in order to collect actual data and information). Technique for data collection included interview and observation.

3.3 Analysis Method

Analysis method used Ward and Peppard methodology, that was analysis of business internal environment including analysis of business process and SWOT, analysis of business external environment including SWOT and PEST. Analysis of IS/IT internal environment included analysis of IT BSC, system infrastructure, and application portfolio. Analysis of IS/IT external environment related to technology trend.

4. Discussion

To create the IS Strategic Planning, an analysis of business and IS/IT environment, both internal and external business environment should be first done.

4.1.1 SWOT Analysis

SWOT analysis was done to analyze business environment, both external and internal, to identify the strengths, weaknesses, opportunities, and threats of the organizations. SWOT analysis was continued by calculating the weights to get the result which described the organization position.

Finally, SWOT analysis showed that the position of the Directorate General of Animal Husbandry and Health was in quadrant III, meaning that the institution used strategy to utilize opportunity for the weakness. SWOT analysis can be seen at Table 1.

Table 1. SWOT Matrix

	Strengths S1, S2, S3, S4, S5, S6	**Weakness W1, W2, W3, W4, W5,W6,W7,W8,W9,W10**
Oppor tunitie s O1, O2, O3, O4,O5 ,O6,O 7,O8	**S-O Strategy** • cooperate with related parties about IS and data and information system, and build appropriate network infrastructure and information system (S1,S2–O1,O3,O5,O8). • increase population and optimalization livestock production, and increase food tenacity and safety (S5– O4). • control and prevent animal diseases and maintain Indonesia area of diseases status (S4– O5,O6,O8).	**W-O Strategy** • increase availablity and improvement sedd quality (W5,W6,W9-O1,O2,O4,O5). • increase population and production livestock (W5,W6,W7,W8,W9–O2,O4,O5,O6,O8). • cooperate with related parties about IS and data and information system, and build appropriate network infrastructure and information system and increase the labor capability both in center and district (W1,W2,W3,W4 – O1,O3).
Threa	**S-T Strategy**	**W-T Strategy**

| **ts T1, T2, T3, T4,T5** | • increase the understanding of data and information needs and build the presentation methods that make data into information easily used related parties (S1 – T3).
• strict the trading by establishing policy to assit the farmer economic with tax tarif for import product, it is done to minimize dependecy of import product and keep the food safety from import product as well as expand the Indonesia area of diseases status (S1,S2,S3,S4,S6 – T1,T2,T4,T5.
• empower role and function of directorate as well as labor for policy and decision making (S1,S2 - T3) | • cooperate with related parties about IS and data and information system, and build appropriate network infrastructure and information system and increase the labor capability both in center and district (W1,W2,W3,W4-T3.
• make change of policy about tax tarif of import product so that domestic product can compete with import product (W10 – T1,T2,T5).
• prevent and secure product polution risk and illegal product with strict the free and illegal trading (W8,W9,W10 – T1,T2,T4,T5).
• perform counseling to increase the farmer interest and perform promotion to increase equity for livestock that give value for investor (W9 – T4).
• empower role and function of directorate as well as labor for policy and decision making (W1 – T3),W3,W4 – T3). |

4.1.2 Business Process Analysis

Livestock data collection (population, production, and slaughtering) began from District officer who collected required data from sub district officer. All data would be sent to Province officer. Province officer verified and validated the report then sent to the Directorate General of Animal Husbandry and Health via email, fax, or e-form. All the directorates compiled the processing data from Regional offices and then sent to the Secretariat. The secretariat would make a comparison between the current received data and the target. Finally the data were published in the book of yearly livestock statistics. Data analysis presented a comparison of the target and real achievement. Therefore, based on that data analysis the organization was able to make planning and program to achieve the goals. At present, data analysis was still manually done.

Area, function, and process of the Directorate General concerning data statistical flow presented at Table 2.

Table 2. Matrix of Area, Function and Process

4.1.3 IT Balanced Scorecard Analysis

Before analyzing IT division, the alignment of vision, mission, and strategy of the Directorate General of Animal Husbandry and Health with IT division must be done. The result was the mapping of IT perspectives and Balanced Scorecard as follows.

Tabel 3. Mapping of Perspectives with Strategy and Goal

IT Balanced Scorecard	**Strategy**	**Strategy Goal**
Instance contribution	• availability of appropriate network infrastructure and information system.	• increase IT function contribution

IT Balanced Scorecard	Strategy	Strategy Goal
User orientation	• maintenance and develop information system and infrastructure resource. • ensure supply of complete, fast, and accurate data and information.	• user cooperation • increase user satisfaction • increase user capability • increase user productivity
Operational improvement	• availability of appropriate network infrastructure and information system. • have high competence human resource. • maintenance and develop information system and infrastructure resource. • ensure supply of complete, fast, as wel as accurate data and information.	• problem management • operational efficiency • application development efficiency • IT staf performance
Future orientation	• have high competence human resource. • maintenance and develop information system and infrastructure resource.	• develop system and IT infrastructure • increase employee capability • increase system capability

The measurement done by identifing the perspectives and to bring the result of goal achievement. The weighting of measurement specified into very bad (0%-54%), bad (55%-64%), enough (65%-74%), good (75%-84%), very good (85%-100%).

Table 4. Evaluation of IT Division Performance

Perspective	Strategy Goal	Result	Note
Instance contribution	increase IT function contribution	76.67%	Good
	Average	**76.67%**	**Good**
User orientation	user cooperation	70%	Enough
	increase user satisfaction	72.5%	Enough
	increase user capability	73.33%	Enough
	increase user productivity	76.67%	Good
	Average	**73.13%**	**Enough**
Operational improvement	problem management	75%	Good
	operational efficiency	70%	Enough
	application development efficiency	71.25%	Enough
	IT staf performance	80%	Good
	Average	**74.06%**	**Enough**
Future orientation	develop system and IT infrastructure	100%	Very Good
	increase employee capability	75%	Good
	increase system capability	67.5%	Enough
	Average	**80.83%**	**Good**
Average		**76.17%**	**Good**

4.1. Internal and External IS/IT Environment

4.2.1 Infrastructure Analysis

The available infrastructures of Directorate General of Animal Husbandry and Health, consist of:

• 435 units of Computer/CPU;
• 145 units of Printers;
• 1 unit of server for data and statistic, 1 unit server for animal health;
• Operating System : Windows XP professional, Windows Seven;
• Application : Microsoft Office 2007, Server RQSQL, Visual Basic 6, Microsoft Visio 2007, and Website;
• Internet connection : Wi-Fi, cable internet.

4.2.2 Application Portfolio

The mapping of application portfolio presented in Table 5.

Table 5. Mapping Application Portfolio

Strategic	High Potential
	PSPK
	Animal Health System
Key Operational	**Support**
Office application	Ditjennak Website
SIMONEV	
Database application	
e-form (SIMNAK)	

This mapping was useful to identify category of application, so that a consideration which application gave contribution of IT and which application was critical to operational activities can be described. Table 5 indicates that:
- The key operational applications including office application, database application, e-form. and SIMONEV.
- The high potential applications including PSPK and animal health system.
- The support application including Directorate General of Animal Husbandry and Health's website.

4.2. Proposed Solution

4.3.1 Learning Management

Learning management was proposed to enhance labor performance with ease of money, time. and place. By learning management, the labor could learn just in time (directly) while working. The learning material concerned with technical livestock process, usage application, and procedures of calculating for statistical data.

Learning Management was a web based software application to plan, implement, assess learning process or service developed to delivery, track, report and establish learning content (Buendia, Agusti, Benlloch, Bisbal & Liuesma, 2004, p. 55). The advantages of learning management to users were they can do self learning that save time and cost, as well as flexible, meaning the system could be accessed everywhere and everytime as long as it was connected to internet.

4.3.2 Business Intelligence

Business intelligence is proposed to limit the time for analysis and make better decision, accurate, and timely. At present, the Directorate General of Animal Husbandry and Health still do the analysis manually and consequently the error in analysis may happened. For solution, business intelligence is able to give accurate and timely information related to livestock statistical so that it will support the decision in planning future development, cultivation, export, import, etc. By applying business intelligence, the development of data warehouse that facilitates an integration of application, showing a retrieval from operational data, external data, flat file , then are extracted, transformed, and loaded into data warehouse are achieved. Business intelligence can be viewed in the dashboard so that can it can be accessed faster, and supported accurate decision.

Turban dan Liang (2007, p.24) stated that, " *Business Intelligence* combine architecture, tool, database, analytical tool, application, methodology to enable interactive access of data, use data, do appropriate analysis." *Business Intelligence* is organization architecture of integrated operational collection as well as application to support decision and database that provide ease of data accessibility so that help in accurate decision making (Moss, 2003). Using business intelligence gives the value for organization, such as; consolidate data in one platform and disseminate into information that useful for organization, provide deep reporting, provide interface customization facilitation according to user expectation, minimize operational error from user, the cost not too high, flexible databank, and responsiveness (Turban dan Liang, 2007, p28). Those three concepts of business intelligence inspire the researcher in developing it.

4.3.3 Mobile Application

Although the regional offices had been given computer and system/application for reporting data but many of them did not send those required data. For solution, mobile application is proposed to ease the regional officer send report without turning on computer and connecting to internet. With mobile application, the regional officers can send report directly from the fields. The mobile application interface is based on web concept, consisting of header, menu, content, footer. The interface is aligned with the layer of mobile on the platform of blackberry, iphone, android, and windows.

Mobile application is an application that can be run even if user move with use tool (mobile), usually grouped based on platform (Ferdiansyah, 2008; VinnoMobile). Using Mobile application, the users will be easy to access information any time, communicate real time, manage community, can give directly information to user, not depend on internet, easy and friendly (VinnoMobile).

4.3. Technology Requirements

To implement the proposed system, it needs the hardware and software consisting of:

- 1 unit data warehouse server;
- 1 unit business intelligence server;
- 1 unit learning management server;
- 1 unit mobile application server;
- Ms. Windows Server Enterprise;
- Ms. Windows Web Server;
- Ms. SQL Server;
- PHP for learning management and dashboard development;
- Software for blackberry, android, iphone, windows platform to make mobile application.

4.4. Workforce Recommendation

To improve the performance of the Directorate General of Animal Husbandry and Health, the recommendations of workforce are as follows.

- Recruitment of five pranata komputer (middle level of computer competence person) to each Directorate, whose jobs are to assist in handling the problems, such as access information, data, and technology in order to directly interact with user.
- The requirements of the 5 pranata komputer are:
  - graduate from bachelor of computer science or computer course;
  - familiar with SQL, general database operational;
  - familiar with basic application usage, such as Ms. Word, Ms. Excel, Access, etc.;
  - familiar with VB and PHP application;
  - familiar with hardware, software, and network maintennace;
  - have experience working with SQL.

- Recruitment of one statistician whose job is to provide livestock data, analysis, and statistical data.
- The requirements of statistician are:

  - minimum graduated from D3 level;
  - familiar with simple, deep, and descriptive statistical analysis;
  - familiar with regression, correlation, and multiple regression analysis;
  - familiar with sampling and forecasting (based on time series) technique;
  - familiar with basic application usage, such as Ms. Word, Ms. Excel, Access,etc.;
  - familiar with general operational database;
  - familiar with report presentation with graphic.

Development of human resource is very urgent so that it should become first consideration. The recommendation to add some staff is to improve the institutions' performance, including :

  - develop training to improve capability of understanding information system and knowledge about IT and statistical;
  - develop capability of application team to produce a better, user friendly, and comprehensive application;
  - develop skill and knowledge with course, workshop, and seminar.

4.5. Gap Analysis

Table 6. Gap Analysis Related to Solution

Solution	Requirements	Current Situation	Expected Situation
Learning Management Business Intelligence	Requirement of staff with IT capability. Requirement of staff with statistics capability.	There is only one staff having IT capability (middle level of computer competence person), and there is still lack of staff with statistics capability.	Have some staff with computer regulation (IT) and statistics capabilities so they can assist statistical process.

Mobile Application	Easy of solution development	The lack of infrastructure, system, and database to support development.	Have system, infrastructure, and database to support statistic matters.
	Feature development with optimal resource	Time, human resource, and cost in development is quite high.	Number of human resource and other resources that optimally support the institution development
	Long term and short term support system.	Existing system is still lack of flexibility.	Easy of solution adjustment with existing data to meet statistics activities.

5. Conclusion and Suggestion

5.1 Conclusion

Based on previous analysis, it is realised that the Directorate General of Animal Husbandry and Health is positioned in quadran III (W-O) means the use opportunity to minimize weakness. IT division need to enhance better performance of animal husbandry process, especially statistical data. The proposed solution to develop better performance are learning management, business intelligence, and mobile application. With the IS strategic plan, the Directorate General of Animal Husbandry and Health can optimise IS/IT optimally to meet institution's duties and functions.

5.2 Suggestion

The enhancement of the communication between users and IT division, especially in application development is needed. The implementation of mobile application is expected immediately so that the officer can send data timely and faster. Support of the Directorate General of Animal Husbandry and Health is needed so that IS strategic plan can be well implemented. Directorate General is suppose to make policy to periodically evaluate performance, with the purpose to know employee performance and target achievements so that the Directorate General can make a proper and reliable future planning.

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