



IS/IT Master Plan using Ward & Peppard and IS Demand at Department of Agriculture, Food Security and Fisheries, Tasikmalaya Regency

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Abstract— The Tasikmalaya District Agriculture, Food Security and Fisheries Service is an office that has the task of assisting the regent in carrying out regional household affairs in the fields of agriculture, food security and fisheries. The Agriculture, Food Security and Fisheries Service of Tasikmalaya District is an agency that has just merged in the last 3 years as stated in the Tasikmalaya District Regent Regulation Number 59 of 2021. Based on Presidential Regulation Number 3 of 2003 and Presidential Regulation Number 95 of 2018 concerning Electronic-Based Government Systems (SPBE). So it is necessary to design a master plan for Information Systems and Information Technology using the Ward and Peppard method which consists of input and output stages and adds IS Demand as a tool to identify information system requirements made from an internal business analysis perspective. The results of this research are in the form of an output stage, namely compiling an IS business strategy with the results of 12 proposed information system priorities, an IT strategy with a proposed network infrastructure, and an IS / IT management strategy with a proposal for additional IT fields that support the business processes of the Tasikmalaya District Agriculture, Food Security and Fisheries Service

Keywords— IS Demand, Master Plan IS/IT, Ward and Peppard

Manuscript received 6 Mei 2024; revised 8 Mei 2024; accepted 11 Mei 2024. Date of publication 13 Mei 2024.

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I. INTRODUCTION

The Tasikmalaya Regency Agriculture, Food Security and Fisheries Office (DPKPP) has the task of assisting the Regent to carry out government affairs which are the regional authority and assistance tasks in the fields of food security, agriculture, and fisheries in Tasikmalaya Regency [1]. Then based on LKIP DPKPP Tasikmalaya Regency in 2021 that the economic conditions of the people of Tasikmalaya Regency earn 43.22% in agriculture and animal husbandry so that DPKPP Tasikmalaya Regency will be very necessary to manage and provide direction to the community in the field of Agriculture. DPKPP Tasikmalaya Regency is also currently an agency that has not shown the formation of good e-government, because DPKPP Tasikmalaya Regency is an agency that has only carried out mergerization for 2 years so that the need for SI / IT planning for SI / IT alignment in each field can be in accordance with the vision, mission, and objectives of the Tasikmalaya Regency DPKPP agency so that later it has a clear SI / IT planning roadmap for the long term [1] [2].

Based on the Presidential Instruction of the Republic of Indonesia Number 3 of 2003 concerning National Policy and Strategy for the Development of e-government and

Presidential Regulation Number 95 of 2018 requires the formation of a government that is clean, transparent, and able to respond effectively to the demands of change and be able to provide electronic-based government services [3] [4]. As a follow-up to the Presidential Instruction of the Republic of Indonesia Number 3 of 2003 and Presidential Regulation Number 95 of 2018, a strategic planning of information systems and information technology of DPKPP Tasikmalaya Regency is needed to meet the needs of electronic-based e-government development.

Strategic planning is a series of steps that are arranged systematically by conducting a comprehensive analysis to develop an action plan so that organizational goals are achieved [5]. Strategic Planning is also the ability to identify and evaluate the impact of using Information Technology as a formulation of overall business strategy [6]. The method that can be used in strategic planning is the Ward and Peppard method because this method is a comprehensive method, meaning that this method starts from analyzing the internal environment and external environment so that later it can formulate strategies that are in accordance with the organization's business objectives [7] [8]. As well as by adding IS Demand tools to harmonize the analysis of information needs and Business SI strategies.

Based on the problems faced by DPKPP Tasikmalaya Regency related to the utilization of SI and IT in supporting operational performance, this study aims to develop an SI/IT Master Plan for DPKPP Tasikmalaya Regency using the Ward and Peppard method and IS Demand which is expected to be able to harmonize the needs of information systems and information technology in accordance with the goals and vision, mission of DPKPP Tasikmalaya Regency in accordance with employee demand orientation

II. MATERIALS AND METHOD

Research related to the method of Ward and Peppard is found in research [9] [10] which aims to analyse the application of SI / IT in government agencies by producing a proposed application portfolio only. Then in research [11] [12] [13] [14] [6] aims to analyse the use of SI / IT that can be used in their respective companies due to the need to realign the use of SI / IT. In research [15] [16] conducted the use of SI / IT in the school or education sector to develop SI / IT strategic planning because at this time there is no alignment between the vision and mission and the use of SI / IT. So this research aims to utilise the Ward and Peppard method in making an IS/IT Master Plan at the Agriculture, Fisheries and Food Security Service by combining the Ward and Peppard and IS Demand methods. The stages of research carried out in this study will be explained in Figure 1

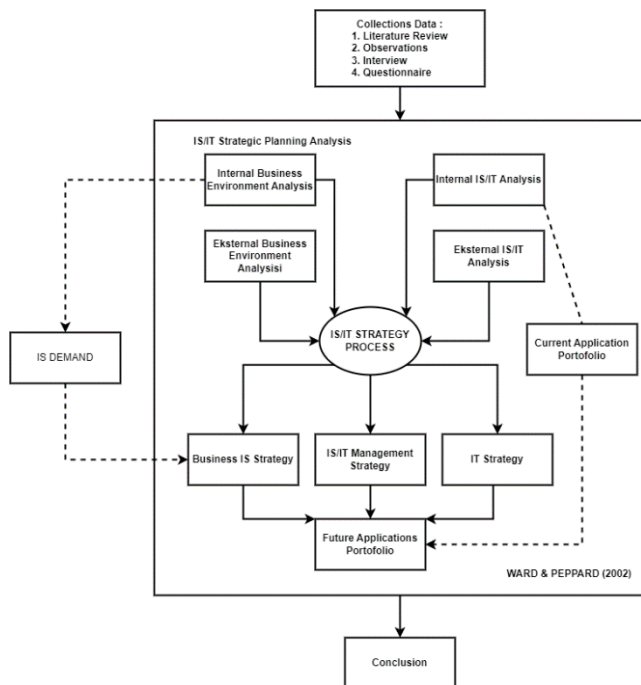


Figure 1 Research Stages

1. Collections Data

The data collection stage is carried out in 4 ways, namely literature review, observation, interviews, and questionnaires. In the literature study, data was collected about Ward and Peppard from various sources such as books, journals and theses [17]. At the observation stage, direct observations were made regarding the use or application of SI / IT at the Agriculture, Food Security and Fisheries Service [18]. At the interview stage, interviews were conducted with Nandang Nurdin Latip, S.P., M.P as the Planning, Evaluation

and Report section and with Adang Taryana, S.IP, as the general and Personnel section. The questionnaire stage was carried out to obtain the results of the SWOT analysis conducted to 10 respondents [19].

2. IS/ IT Strategic Planning Analysis

At this stage of the research refers to the Ward and Peppard framework which consists of 2 stages, namely the input stage and the output stage [20]. The input stage consists of 4 analyses, namely internal business environment analysis, external business environment analysis, internal IS/IT environment analysis, and external IS/IT environment analysis. While the output stage has 3 strategies, namely business SI strategy, IT strategy, and IS/IT management strategy [21] [22].

3. Conclusion

Draw conclusions from the results that have been obtained from research on the IS/IT Master Plan at DKPP Tasikmalaya Regency

III. RESULT AND DISCUSSION

1. Internal Business Environment Analysis

a. Value Chain Analysis

The main activities of DPKPP Tasikmalaya Regency are as follows in Figure 2.

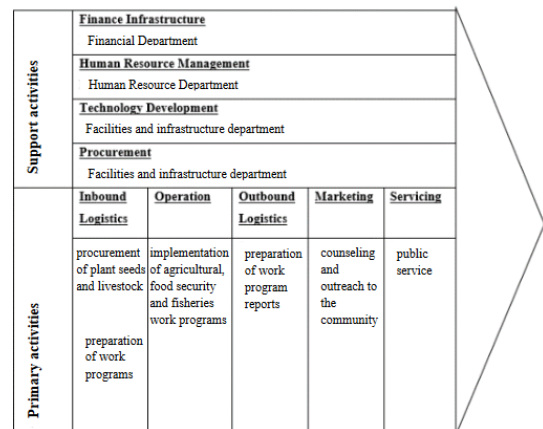


Figure 2 Value Chain Analysis

1). *Inbound Logistics* : Procurement of Plant and Livestock Seeds and Preparation of Work Programmes is carried out in the main activity of procuring plant and livestock seeds for actors in agriculture and animal husbandry/fisheries provided by DPKPP so that they can continue in Tasikmalaya Regency in an effort to maintain food security.

2). *Operations* : The implementation of the Agriculture, Food Security and Fisheries Work Programme is as an operations activity, by carrying out the implementation of the work programme that has been prepared and utilising plant and livestock seeds to be managed by the community in Tasikmalaya Regency in order to grow crops and raise livestock to maintain the stability of food security in Tasikmalaya Regency.

3). *Outbound Logistics* : The preparation of the Work Programme Report is the main activity of Outbound Logistics carried out by DPKPP Tasikmalaya Regency as a form of output from the input process and several work

programmes that have been carried out for operations activities where the results are in the form of Work Programme Reports that have been carried out by DPKPP Tasikmalaya Regency.

- 4). *Marketing and Sales* : Outreach and Socialisation to the community is the main activity to market the form of programs that will be implemented by DPKPP Tasikmalaya Regency so that the community can participate in the program.
- 5). *Services* : Facilities and Infrastructure Services to the community are the main activities in the form of services or Services by carrying out several service activities such as the construction of Fish Auction Sites, the construction of agricultural irrigation facilities and consulting services on agriculture, food security and fisheries in Tasikmalaya Regency.

Then for the supporting activities of DPKPP Tasikmalaya Regency are as follows :

- 1). *Finance Infrastructure* : Finance Section. This stage is carried out by the Finance Section to organise all forms of operational activities and employee benefits by the Finance Section as a supporting activity in DPKPP Tasikmalaya Regency.
- 2). *Human Resource Management* : Personnel Section. Human Resource Management is carried out by the Personnel and General Affairs section to manage human resources in DPKPP Tasikmalaya Regency.
- 3). *Technology Development* : Technology Development is currently carried out by the Facilities and Infrastructure section to manage IT because there is no section that manages IS/IT at DPKPP Tasikmalaya Regency.
- 4). *Procurement* : Procurement activities are carried out by the Facilities and Infrastructure Section as a form of supporting activity in an effort to fulfil facilities and infrastructure in DPKPP Tasikmalaya Regency.

b. SWOT Analysis

SWOT analysis was conducted to determine the strengths, weaknesses, opportunities and threats by looking at the internal and external business analysis environment at DPKPP Tasikmalaya Regency [23]. The SWOT analysis was carried out by giving a questionnaire to employees at DPKPP Tasikmalaya Regency. The following SWOT analysis of DPKPP Tasikmalaya Regency is in table 1.

TABLE 1. SWOT Analysis Results

	<i>STRENGTH</i>	<i>WEAKNESSES</i>
<i>OPPORTUNITIES</i>	1. Developing intense exploration in utilising the potential of biological natural resources owned by Tasikmalaya Regency 2. Improved development of facilities	1. Create an IS/IT strategic plan 2. Create an IT department to manage all IS/IT 3. Conduct all activities in a computerised and digital manner

and infrastructure in agriculture, food security and fisheries
 3. Improve co-operative relationships with stakeholders and other governments

THEREATS

- | | |
|--|--|
| 1. Improve co-operation with farmers, ranchers and fishermen | 1. Increase potential in agriculture, food security, and fisheries |
| 2. Able to adjust to technological advances in terms of work | 2. Designing and building IS/IT facilities to support internal communication and interaction for the agency. |
| 3. Improve working relationships with central and local government | 3. Make SOPs related to the utilisation of natural resources |

c. **Critical Success Factor (CSF) and Key Performance Indicator (KPI) Analysis**

CSF and KPI analysis is made by conducting interviews with employees and analysing existing business process documents at DPKPP Tasikmalaya Regency [24], then linked to existing business processes to determine the following strategic goals the results of CSF and KPI analysis at DPKPP Tasikmalaya Regency are in table 2

TABLE 2. CSF KPI Analysis Results

Strategic Objectives	CSF	KPI
Improving the quality of human resources in the fields of Agriculture, Food Security and Fisheries	- Conduct training for employees - Create an SOP for office management - Create SOPs for mail, document, and archive management	-(%) Performance appraisal -(%) Archive accuracy -(%) Mail register accuracy -(%) Preparation of employee needs data
Optimising financial management	Create SOP for activity budget expenditure	-(time) Activity reporting accuracy -(%) Budget expenditure

Improve facilities and infrastructure for Agriculture, Food Security and Fisheries.	- Create a plan to improve office facilities and infrastructure -Create SOPs for managing the distribution of crop and livestock seeds	-(%) level of accuracy of goods data -(%) fulfilment of crop and livestock seedlings -(%) cost efficiency
Improving Public Services	-Create an SOP for handling IS/IT problems -Collaborating with the wider community and other government agencies -Managing information media for DPKPP Tasikmalaya Kab.	-(%) success of programme activities -(%) community satisfaction -(time) publication of information on programme activities

2. External Business Environment Analysis

a. PESTEL Analysis

PESTEL analysis was conducted to see the influence of the external environment on DPKPP business processes. Tasikmalaya Regency, the external environment is Political, Economic, Social, Technological, Environmental, and Legal [25]. The following are the external factors of DPKPP Tasikmalaya Regency. The following are the external factors of DPKPP Tasikmalaya Regency :

- **Political Factor** : Based on Tasikmalaya Regency Regent Regulation Number 59 of 2021 concerning the Tasikmalaya Regency Agriculture, Food Security and Fisheries Service Duties and Functions, the Tasikmalaya Regency Agriculture, Food Security and Fisheries Service is to prepare and implement specific regional policies. The Tasikmalaya Regency Agriculture, Food Security and Fisheries Service performs its duties and local government affairs in the fields of Food Crops, Horticulture and Plantations, Animal Husbandry, Food Security and Fisheries. Tasikmalaya Regency was established in 1932 which has an area of 270,882 hectares with a population of 1,865,203 people.
- **Economic Factor** : The economic condition of the people of Tasikmalaya Regency is mostly in the agricultural sector with 43.22%, then trade 24.75%, and services 11.08%. With superior products in the agricultural sector, namely Organic Rice, Mangosteen, Mendong, and Golok Galonggong, it is necessary for the Tasikmalaya Regency Agriculture, Food Security and Fisheries Service to further foster people who work in the agricultural sector so that they can innovate more to get a greater amount of regional income, especially from agriculture.
- **Social Factor** : The Social Condition of the Tasikmalaya Regency Community towards the fields of Agriculture, Food Security, and Fisheries of Tasikmalaya Regency is directly proportional to the

economic conditions of the Tasikmalaya Regency community so that the need for guidance to the community to provide understanding to continue to innovate to make the most of agricultural land and fisheries in order to ensure stable food security in Tasikmalaya Regency.

- **Technology Factor** : At this time the people of Tasikmalaya Regency almost all have smartphones so that it can be an opportunity to utilise technology to accelerate the pace of information to the community. The development of integrated website-based technology will make it easier for people to access data and information easily. DPKPP Tasikmalaya Regency as a government agency, it is necessary to design the utilisation of IS/IT to be used optimally in supporting public services and agency performance.
- **Environmental Factor** : The Tasikmalaya Regency DPKPP environmental sector for office location is in the Tasikmalaya Regency Regional Government complex so as to facilitate communication to other local governments. Then for the work area of DPKPP Tasikmalaya Regency covers all areas of Tasikmalaya Regency, both water and land areas..
- **Legal Factor** : In an effort to run a good government agency and clear goals. So the Tasikmalaya Regency Agriculture, Food Security and Fisheries Office needs to maintain occupational safety and health for people who work in agriculture and fisheries. Due to the field of agriculture and fisheries will be very close to the use of chemicals, as well as the use of agricultural or fisheries tools and machinery, the need for occupational health and safety laws for the community.

3. Internal IS/IT Analysis

The following conditions of the application portfolio mapping results using the McFarlan Strategic Grid at DPKPP Tasikmalaya Regency are in table 3.

TABLE 3. Current SI Condition

STRATEGIC		HIGH POTENTIAL	
1.	SIRUP	1.	SIPD
2.	SIKHNAS	2.	SIMLUHTAN
		3.	IDENTIK PKH
KEY OPERATIONAL		SUPPORT	
1.	SIMPEG	1.	SRIKANDI
2.	SIMDA KEUANGAN	2.	Ms.Office
		3.	Webmail

As well as a list of hardware inventory currently owned at DPKPP Tasikmalaya Regency is in table 4.

TABLE 4. Hardware Inventory List

No	Item	Total
1	Desktop PC	28
2	Laptop	22
3	Printer	28
4	Access Point	3
5	Proyektor	3

Meanwhile, the network infrastructure in the current condition at DPKPP Tasikmalaya Regency is shown in Figure 2.

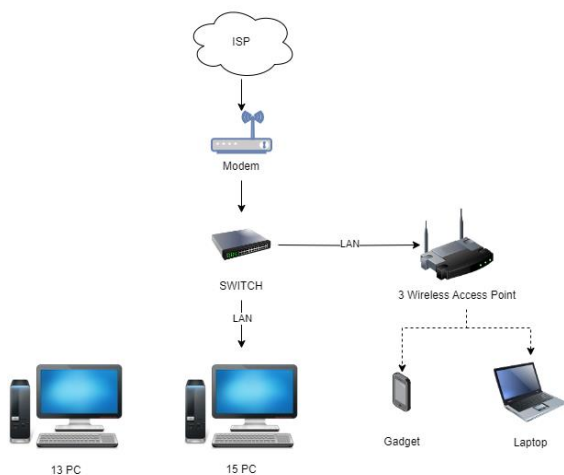


Figure 3 Current Network Infrastructure

4. Eksternal IS/IT Analysis

Analysis of the agency's external IS/IT environment serves to see the development of the current IS/IT conditions that will have an impact on the implementation of IS/IT at DPKPP Tasikmalaya Regency [14]. The following External IS/IT analysis [26] is in the table 5

TABLE 5. External IS/IT Analysis Results

External IS/IT trends	Benefits of IS/TI Implementation
The use of information systems for business processes in local government agencies	Facilitate the activities and business processes of government agencies due to the integration of all business units in an information system.
The proliferation of open source software	Reduce operational and maintenance costs of information systems
The development of Service Oriented Architecture (SOA) based technology for web applications	Facilitate the distribution of data and information from each business unit that is related and interconnected with the information system.
Mobile broadband internet technology that is increasingly used in computer networks	Facilitate the communication of data and information over long distances and improve the efficiency of time and place.
Data security systems that are starting to be widely implemented in various information systems	Provides security assurance of data integrity and hardware used
The development of social networking media along with the increasing use of smartphones	Facilitate promotion and services for the community

5. IS/TI Strategic Planning

The following are the results of the analysis that can be applied through the stages of the process that will provide proposals related to the IS/IT Master Plan for DPKPP Tasikmalaya Regency.

a. IS Business Strategy

In this research, the formulation of IS strategy in creating future information systems for DPKPP Tasikmalaya Regency was made with IS Demand analysis [27]. This is done so that the formulation of SI strategies in mapping information systems is in accordance with demand oriented and business oriented towards the business strategy of DPKPP Tasikmalaya Regency which has been identified in the analysis of the internal business environment. The following IS Business Strategy Mapping is found in table 6.

TABLE 6 IS Business Strategy Mapping

Strategic Objectives	CSF	Information Needs	IS Demand
Improving the quality of human resources in the fields of Agriculture, Food Security and Fisheries	-Conduct training for employees -Create office management SOPs -Create SOPs for mail, document, and archive management	-Employee data -Archive data, letters, documents -Employee performance information	Staffing Information System
Optimising financial management	Create SOP for activity budget expenditure	-Work programme data -Financial data -Employee data -Work programme budget information	Work Programme Information System
Improve facilities and infrastructure for Agriculture, Food Security and Fisheries.	-Create a plan to improve office and infrastructure -Create SOPs for managing the distribution of plant and animal seeds	-Asset data of goods -Data on the need for goods for work programmes -Goods distribution information	Tasikmalaya Regency DPKPP Asset and Goods Information System
Improving Public Services	-Create SOP for handling IS/IT problems -Collaborate with the	- Collaboratio n data (stakeholder s)	Tasikmalaya Regency DPKPP Website

wider community serta instansi pemerintah lainnya	-Work programme planning data -Work programme result information
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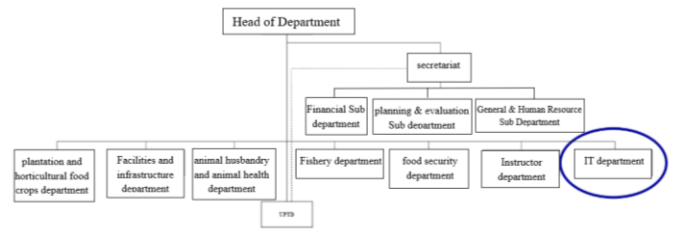


Figure 5 Proposed Agency Structure of DPKPP Kab. Tasikmalaya

b. IT Strategic

The information technology strategy is prepared based on observations of the internal IS/IT environment analysis [28]. The proposed IT strategy for DPKPP Tasikmalaya Regency is in the form of hardware management and proposed network infrastructure needed to be able to help existing business processes by adjusting the minimum specifications by looking at the conditions of work activities there by collecting various data on a large scale. The following hardware proposals are in table 7.

TABLE 7. Proposed Hardware

No	Item	Function	Total
1	Desktop PC	Operational	35
2	Laptop	Operational	30
3	Printer	Operational	35
4	Modem	Network	1
5	Access Point	Network	4
6	Router	Network	1
7	Swichth	Network	4

As for the proposed new network infrastructure, it is shown in Figure 4.

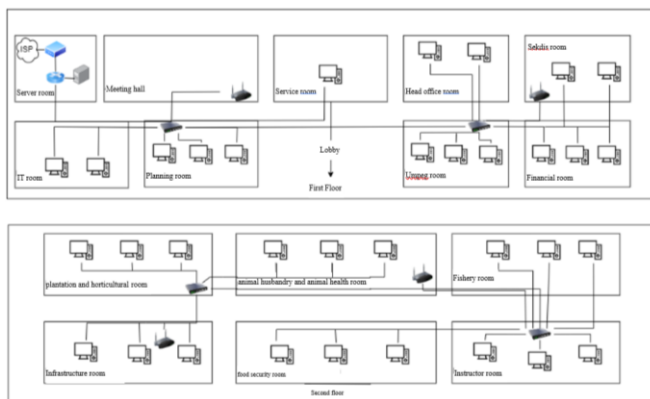


Figure 4 Proposed Network Infrastructure

c. IS/TI Management Strategy

The IS/IT management strategy is in the form of adding an IT field that has the duties and responsibilities to manage all information technology of DPKPP Tasikmalaya Regency [29]. The following picture of the proposed organisational structure of DPKPP Tasikmalaya Regency is in Figure 5.

6. Gap Analysis

Gap Analysis to find out the Information System gap for IS strategy at DPKPP Tasikmalaya Regency. The following results of Gap Analysis at DPKPP Tasikmalaya Regency are in table 8.

TABLE 8. Gap Analysis DPKPP Kab. Tasikmalaya

Application Name	Gap Analysis			
	Optimized	Developed	Retained	Replaced
ISIKHNAS			✓	
IDENTIK PKH				✓
Website DPKPP Kabupaten Tasikmalaya		✓		
SIPD			✓	
SIMLUHTAN			✓	
SIRUP			✓	
SI Perencanaan Program Kerja		✓		
SI Aset dan Barang		✓		
SIMPEG			✓	
SIMDA Keuangan			✓	
SRIKANDI	✓			
Ms. Office			✓	
Webmail			✓	

The following is a description of the results of the Gap Analysis according to Ward and Peppard [5] in table 8, namely:

- Retained category, namely ISIKHNAS, SIPD, SIMLUHAN, SIRUP, SIMPEG, SIMDA Keuangan, Ms.Office and Webmail applications are applications that already exist in DPKPP Tasikmalaya Regency and need to be maintained for operational activities in DPKPP Tasikmalaya Regency.
- The Optimised category is the SRIKANDI application because of the need to improve the application to optimise the use of the application at DPKPP Tasikmalaya Regency, namely adding features for incoming letters and other archive storage, not only as an outgoing letter application.
- The Replaced category is the PKH IDENTICAL Application because this information system is an old information system that is no longer used and has been updated by the ISIKHNAS application..

- d. The Developed category is in the Tasikmalaya Regency DPKPP website application, IS Work Programme Planning, and IS Assets and Goods, namely making applications because the application does not yet exist in Tasikmalaya Regency DPKPP to provide benefits to Tasikmalaya Regency DPKPP.

7. Future Application Portofolio

The following proposed future applications using the McFarlan Strategic Grid to map applications according to their category and contribution to the future state of expectations are in table 9 [30].

TABLE 9 Future Application Portofolio

STRATEGIC		HIGH POTENTIAL	
1. SIRUP		1. SIPD	
2. ISIKHNAS		2. SIMLUHTAN	
3. Website DPKPP Kabupaten Tasikmalaya		3. SI Perencanaan Program Kerja	
KEY OPERATIONAL		SUPPORT	
1. SIMPEG		1. Ms.Office	
2. SIMDA KEUANGAN		2. Webmail	
3. SRIKANDI			
4. SI Aset dan Barang			

IV. CONCLUSION

Based on the results of IS/IT strategic planning using Ward and Peppard and IS Demand, namely getting a proposed McFarlan Strategic Grid application portfolio with proposed information systems including ISIKHNAS, DPKPP Website, SIPD, SIMLUHTAN, SIRUP, IS Program Planning, IS Assets and Goods, SIMPEG, SIMDA Finance, SRIKANDI, Ms. Office and Webmail. Then the IT Strategy by proposing a network infrastructure that is adjusted to the circumstances and conditions and the IS/IT Management Strategy with the proposed addition of the IT Division to manage the Information Technology System in the Tasikmalaya Regency Agriculture, Food Security and Fisheries Service. The results of the Gap Analysis based on employee demand orientation on the information system proposal that the PKH IDENTICAL application can be deleted or not used because it already has the ISIKHNAS application and the SRIKANDI application needs further development to meet the needs of the organisation's business processes.

Suggestions for further research are to conduct a more in-depth analysis in the preparation of IT strategies by identifying the hardware used in supporting its performance processes. In addition, the IS/IT application portfolio can be applied by the Tasikmalaya Regency Agriculture, Food Security and Fisheries Service so that it can benefit business processes to increase competitive advantage for local government agencies.

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