

# Meranti Island E-Government Master Plan: A Root Cause and SWOT Analysis

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**Abstract.** E-government is an established Information and Communication Technology development program. The implementation of e-government in government governance and public services certainly requires the use of information and communication technology (ICT) along with reliable human resources to manage it. There is still a reasonably high gap between the EBGs maturity level of the central agency and the index, and the local government is a challenge for the Meranti Islands Regency. To realize its vision and mission, the Meranti Islands Regency has made various efforts for transparency, accountability, good governance, and efficiency of government administration supported through ICT. The purpose of this research is the mapping of ICT utilization data in Meranti Islands Regency and the identification of the obstacles that occur using GAP Analysis. SWOT analysis is a method that requires little, or no cost and root cause analysis is a problem-solving method used to identify the root cause of an error or problem. The GAP analysis results show that based on the SWOT analysis, 18 strengths, 19 weaknesses, 12 opportunities, and 12 thread ats in the application of ICT are obtained, which are divided into 6 components. Based on the Root Cause Analysis, it was found that the main problem was the low capacity of human resources in the application of ICT, as well as insufficient hardware/software requirements. For the study results study, it can be concluded that a SWOT analysis equipped with *Root Cause Analysis* can be used for strategic planning for implementing EBGs in the next five years.

**Keywords:** e-government; GAP analysis; Root Cause Analysis; SWOT Analysis; Meranti Islands Regency.

## 1. Introduction

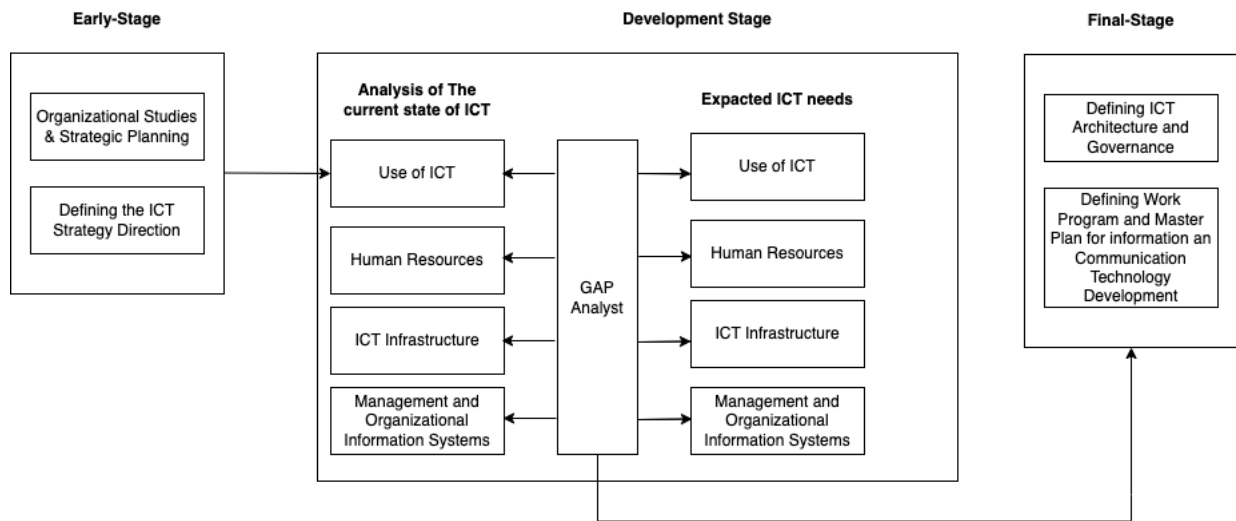
E-government is an established Information and Communication Technology development program. E-government is one indicator of the success of reform, with the aim of creating transparency, accountability, and standardizing government processes. The implementation of e-government is the mandate of Presidential Instruction No. 3 of 2003 concerning the implementation of electronic governance in Indonesia.

The implementation of *e-government* in government governance and public services certainly requires the use of information and communication technology (ICT) along with reliable human resources to manage it. One of the efforts to create a world-class bureaucracy is the implementation of the Electronic-Based Government System (EBGS), both at the central government and regional governments, as has been issued in Presidential Regulation no. 95/2018 regarding EBGS [1].

The application of EBGS to the central and regional governments is also applied to sub-district government, research by [2] shows that the evaluation of the maturity level of EBGS uses two domains (EBGS Governance and EBGS Services) and four assessment indicators. The two domains include EBGS governance, with indicators of Use of General Applications Sharing Domains of EBGS Governance and EBGS services, while the four indicators of EBGS maturity evaluation have been remapped in public services so that not all domains and indicators are used. Based on the results of the EBGS mapping, two domains and four indicators will be used as a maturity assessment. The three main focuses in the concept of developing the EBGS master plan refer to the smart city literature, namely technology, human resources, and governance [3]. The technology concept refers to the centralization of information and communication technology (ICT) to improve infrastructure efficiency and improve the quality of local policies [4]. While the concept of human resources focuses on an educated population and knowledge capital to encourage urban growth and innovation. The governance rests on the relevance of partnerships and networks between local stakeholders to increase the number of innovations [5].

The EBGS master plan development method consists of several stages, including the initial stage, the development stage, and the final stage. The initial stage consists of organizational studies and strategic planning, as well as defining the strategic direction of ICT. The development stage is carried out by surveying the ongoing condition of ICT, and defining the expected ICT needs, then a gap analysis is carried out. The final stage is carried out by defining the ICT architecture and governance, defining the work program and the EBGS master plan. Gap analysis is a comparison between the current state of ICT and the expected ICT needs. In other words, gap analysis is a study made to identify whether the current system has met the needs or ideal conditions or not [6][7]. *Gap analysis* groups 6 (six) main infrastructure components using the *Strengths, Weaknesses, Opportunities, and Threats* approaches or commonly abbreviated as SWOT. SWOT analysis is generally used for strategic planning, but the method is considered very subjective and only focuses on solving weaknesses separately [8]–[10]. This is because the traditional approach to SWOT analysis is based on qualitative analysis where SWOT factors tend to have a subjective view of the assessment of managers and planners, so that they are considered inefficient and can lead to wrong business decisions [8]. To reduce these two shortcomings, this study adds the *Root Cause Analysis* (RCA) method as a complement to the SWOT analysis. The RCA method focuses on root cause analysis covering all levels and various aspects depending on the problem area [11]. The RCA method is an analytical framework used in problem solving to determine systemic causes and prevent the recurrence of errors [12][13]. In this study, the SWOT analysis was prioritized according to the needs of the community's perception of the dimensions of EBGS services. By SWOT and RCA analysis, it is hoped that the organization can formulate strategic plans efficiently because the SWOT factors that must be maintained or improved can be identified clearly and comprehensively.

## 2. Method



**Figure 1.** Proposed process

In analyzing the readiness to implement e-government in the Meranti Islands Regency, this research was carried out in 3 major stages, namely the early-stage, development stage, and final stage.

### 2.1. Early stage

At this stage, organizational studies and strategic planning will be carried out to define the direction of the ICT strategy by conducting interviews with related parties. This interview is also used as material for the identification and analysis of gaps later.

### 2.2. Development stage

This stage describes the results of the analysis of the current state of ICT and the expected ICT needs. In analyzing the two topics, GAP analysis was used. In the GAP analysis, this study uses the SWOT method and *Root Cause Analysis* for analysis and identification of problems that occur.

#### 2.2.1. SWOT Analysis

Gap analysis is a comparison between the current ICT conditions and the expected ICT needs. In other words, gap analysis is a study made to identify whether the current system has met the needs or ideal conditions or not. Gap analysis groups 6 (six) main infrastructure components using strengths, weaknesses, opportunities, and threats or commonly abbreviated as the SWOT approach. The analysis is described based on the results of a survey that has been conducted on a number of agencies and available supporting documents. In addition to analyzing the gap analysis of e-government implementation, SWOT has been widely applied in many fields, one of which is evaluating the digital business ecosystem [14].

#### 2.2.2. Root Cause Analysis

Identification of obstacles in the application of ICT in the Meranti Islands Regency was carried out using the root cause analysis method and illustrated using the Ishikawa diagram. In addition to identifying problems in the government sector, Root Cause Analysis (RCA) is also often used to identify safety incidents of contaminated food products [15]. The steps of *Root Cause Analysis* can be described as follows.

a. Data collection

Data were collected by survey method on several respondents, namely 43 Regional Employee Organizations (REO) in the Meranti Islands Regency, both from staff and leadership elements. After the data is collected, then an analysis is carried out with the team through the brainstorming method.

b. Draw a chart of the factors causing the failure of ICT implementation

Factors causing the failure of ICT implementation are divided into components of hardware, software, *brain ware* (HR), infrastructure, information data and institutions.

c. Identifying the root of the problem

At this stage, the root cause of the problem will be identified which is described in a fishbone diagram or Ishikawa.

d. Generation and implementation recommendations

At this stage, it will provide recommendations and implementations that must be carried out by the local government to support the readiness to implement e-government.

2.3. Final stage

This stage will describe the recommendations for ICT architecture and governance as well as work programs and ICT RIP. This recommendation will later be used to assess whether the Meranti Islands district government is ready or not in implementing e-government.

### 3. Results and Discussion

The results are the implementation of methods regarding data collection, SWOT analysis, and Root Cause Analysis.

3.1. Method of collecting data

The research method used is a survey approach, either by means of questionnaires or interviews. The object of this research is the regional government of the Meranti Islands Regency, Riau Islands Province. The selection of the object is because the local government is a district that was just opened in 2008 as an expansion of the Bengkalis Regency. So that local governments do not yet have an ICT master plan. In accordance with the district 's vision and mission to implement good governance, it is necessary to make a guide in the application of ICT. The analysis of the ICT condition was carried out by means of a survey to get an overview of the application and utilization of ICT in the Meranti Islands Regency on the current system. The identification of the ICT environment is also used to determine the readiness of local governments in implementing ICT. By looking at the initial identification, it is possible to analyze the gap between the current system and the expected system, and then find problems that occur in the ongoing system as the basis for compiling a master plan/RIP for the application of Information Technology and Information Systems. Questionnaire data was collected from November 15, 2021, to November 24, 2021. Data collection was carried out using the questionnaire method to 43 respondents from leadership and staff elements. Details of the Regional Apparatus Organization (OPD) can be seen in Table 1.

**Table 1.** Regional Apparatus Organization

Regional Apparatus Organization Agencies	Amount	Regional Apparatus Organization Agencies	Amount
UPT PUSKESMAS	10	INSPECTORATE	1

Regional Apparatus Organization Agencies	Amount	Regional Apparatus Organization Agencies	Amount
SEKDA	1	PP SATPOL	1
SEKDPRD	1	HOSPITAL	1
SERVICE	14	DEVELOPMENT ADMINISTRATION	1
DISTRICTS	7	<b>Total number</b>	43
BODY	6		

### 3.2. IT SWOT Analysis

Gap analysis is a comparison between the current ICT conditions and the expected ICT needs. In other words, gap analysis is a study made to identify whether the current system has met the needs or ideal conditions or not. Gap analysis groups 6 (six) main infrastructure components using the Strengths, Weaknesses, Opportunities and Threats approach or commonly abbreviated as SWOT. The analysis is described based on the results of a survey that has been conducted on several agencies and available supporting documents.

#### 1. Hardware

Hardware components include computers, telecommunications equipment, and peripherals, as well as other tools needed for the smooth operation of e-government. Hardware needs to be provided according to its function in each part such as servers, workstations, network components, required peripherals.

#### 2. Software

Software is a major component in computer systems and network systems (internet, intranet, and local area network). The selection of system software and applications is adjusted to the use, needs and the system being built. The selection of applications is tailored to the needs and functions of each agency. There are several ways to get it, namely by making your own, program packages or outsourcing.

#### 3. Network and Internet

The internet network is needed to facilitate internal and external communication in the implementation of e-government. Internal communication both vertically and horizontally is recommended using an intranet or LAN network system.

#### 4. Data and Information

Data is the main ingredient to be used as information, therefore accuracy, relevance and updating of data is prioritized. For this purpose, the data must be managed as well as possible. Sources of data can be internal or external, namely data collected by all agencies within the local government environment as well as the results of transactions in services to the community (new residents, new buildings, etc.). In addition to internal data, there is also external data collected either from the community or even from the warehouse.

#### 5. Organization

An organization that utilizes IT will adapt to IT capabilities. With the emergence of e-government in the management of government, organizations must be adapted to the needs.

#### 6. Humas Resources

Human resources which are the backbone of e-government implementers/managers must work professionally in carrying out their duties. HR consists of systems analysts, network administrators, database administrators, CIO (Chief of Information Officer), and operators. HR must be placed in

positions, according to their respective professions and needs so that they are more efficient and effective.

The following is Table 2 regarding the SWOT analysis of e-governments development.

**Table 2.** SWOT analysis of e-government development

a. Hardware component

<b>OT</b>	<b>SW</b>	<b>Strengths</b>	<b>Weakness</b>
		<ol style="list-style-type: none"> <li>1. Almost all agencies have computer inventory.</li> <li>2. Computer use 5 days/week, an average of more than 3 hours.</li> <li>3. The use of special officers in computer maintenance.</li> <li>4. Hardware works fine hardware maintenance budget.</li> </ol>	<ol style="list-style-type: none"> <li>1. Hardware does not support performance yet.</li> <li>2. The frequency of computer maintenance is one semester or a certain period.</li> <li>3. There are no rules for using computers.</li> <li>4. Use of a computer at home to do office work.</li> <li>5. Don't have a server yet.</li> </ol>
<b>Opportunity</b>		<b>Strategy SO</b>	<b>Strategy WO</b>
<ol style="list-style-type: none"> <li>1. Computer prices and availability in the market are getting cheaper and more competitive.</li> <li>2. The use of computers in community services with high daily frequency.</li> </ol>		improve human resource skills in the use of computers	Improve hardware performance and computer maintenance
<b>Threats</b>		<b>Strategy ST</b>	<b>Strategy WT</b>
<ol style="list-style-type: none"> <li>1. The sophistication of hardware technology that is very fast makes hardware specifications expire quickly.</li> <li>2. rapid sophistication of software demands sophisticated hardware performance.</li> </ol>		Perform hardware selection that is balanced with software	<ol style="list-style-type: none"> <li>1. Make some rules for using the computers</li> <li>2. Adding servers</li> </ol>

b. Software component

<b>OT</b>	<b>SW</b>	<b>Strengths</b>	<b>Weakness</b>
		<ol style="list-style-type: none"> <li>1. Software handling is done by sharing human resources.</li> <li>2. Consideration of developing software on their own initiative.</li> </ol>	<ol style="list-style-type: none"> <li>1. Software does not support performance yet.</li> <li>2. The origin of the new SIM is limited to receiving from the center.</li> <li>3. The availability of the website is only half of the agency.</li> <li>4. SIM not integrated.</li> <li>5. Availability of SIM maintenance is still part of the agency.</li> </ol>

<b>Opportunity</b>	<b>Strategy SO</b>	<b>Strategy WO</b>
<ol style="list-style-type: none"> <li>SIM in agencies uses a website platform and a combination with desktop and mobile.</li> <li>The programming language used is C, PHP, and others.</li> </ol>	<ol style="list-style-type: none"> <li>Improve programming language skills</li> <li>Improving human resources in handling software</li> </ol>	<ol style="list-style-type: none"> <li>Improve software that supports performance</li> <li>Improve HR skills by adding programming languages</li> </ol>
<b>Threats</b>	<b>Strategy ST</b>	<b>Strategy WT</b>
<ol style="list-style-type: none"> <li>Computer viruses and cyber-attacks are increasingly varied.</li> <li>development of software demands sophisticated and proficient hardware and brain ware</li> <li>User convenience is increasingly affecting the effectiveness of the application.</li> <li>Lack of concern about software piracy.</li> </ol>	<ol style="list-style-type: none"> <li>Increase HR training on computer viruses and cyber attacks</li> <li>Increase user comfort with the effectiveness of the application</li> </ol>	<ol style="list-style-type: none"> <li>Perform SIM integration and maintenance</li> <li>Avoid pirating software</li> </ol>

c. Network and Internet component

OT	SW	<b>Strengths</b>	<b>Weakness</b>
		Confidence of leadership and staff that internet and website can support performance	The computer is not yet LAN integrated.
		<b>Opportunity</b>	<b>Strategy WO</b>
		<ol style="list-style-type: none"> <li>Implementing a network using cable, fiber optic and wireless is not easy considering the conditions of the area which are islands.</li> <li>Network implementation requires a lot of money.</li> </ol>	<ol style="list-style-type: none"> <li>The computer must be integrated into the LAN</li> <li>Locations that must support the implementation of wired fiber cable and wireless networks</li> </ol>
		<b>Threats</b>	<b>Strategy WT</b>
		<ol style="list-style-type: none"> <li>Network technology is increasingly dynamic and rapidly developing.</li> <li>Network hardware and software are changing very rapidly so they are quickly left behind.</li> </ol>	Improve network technology

d. Data and Information component

OT	SW	<b>Strengths</b>	<b>Weakness</b>
		<ol style="list-style-type: none"> <li>Agencies have started to collect, organize, and publish data.</li> <li>Availability of standard rules/procedures for data services.</li> <li>The smoothness of data communication has been felt by some agencies.</li> </ol>	<ol style="list-style-type: none"> <li>Complaints of incomplete data.</li> <li>The data is not yet available online.</li> </ol>

<b>Opportunity</b>	<b>Strategy SO</b>	<b>Strategy WO</b>
<ol style="list-style-type: none"> <li>1. Database coordination between agencies.</li> <li>2. The availability of trained personnel in data handling does not yet exist.</li> </ol>	<ol style="list-style-type: none"> <li>1. Improvement of inter-agency database</li> <li>2. Recruitment of trained personnel for data handling</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair incomplete data</li> <li>2. All data is represented in online form</li> </ol>
<b>Threats</b>	<b>Strategy ST</b>	<b>Strategy WT</b>
<ol style="list-style-type: none"> <li>1. Openness of data and information that can be accessed between agencies.</li> <li>2. Cyber-attacks for data security between agencies</li> </ol>	<ol style="list-style-type: none"> <li>1. Improve data security</li> <li>2. Available data can be accessed between agencies</li> </ol>	Repair incomplete data

e. Organization component

		<b>Strengths</b>	<b>Weakness</b>
OT	SW	<ol style="list-style-type: none"> <li>1. Leaders and staff believe that ICT supports the vision and mission &amp; good governance.</li> <li>2. Leaders and staff believe that the mastery and application of ICT is the capital to be able to compete in global competition.</li> <li>3. Leaders are involved in the planning of ICT facilities and infrastructure.</li> <li>4. Between agencies have taken the initiative to coordinate and communicate with each other in completing the work.</li> </ol>	<ol style="list-style-type: none"> <li>1. Community complaints against services sometimes occur.</li> <li>2. There is no internal policy regarding ICT implementation yet.</li> <li>3. The unavailability of the Ministry of Communication and Informatics that specifically handles the implementation of ICT (is part of the SETDA).</li> </ol>
<b>Opportunity</b>		<b>Strategy SO</b>	<b>Strategy WO</b>
There is an awareness of the importance of service integration.		<ol style="list-style-type: none"> <li>1. Carry out integrated services to support the vision and mission and good governance</li> <li>2. Conduct training to support the application of ICT as a competitive capital in global competition</li> </ol>	<ol style="list-style-type: none"> <li>1. Make policies regarding ICT implementation</li> <li>2. Provide communication and information services that support the implementation of ICT</li> </ol>
<b>Threats</b>		Strategy ST	Strategy WT
Organizations that have been formed without leadership support and sufficient budget make the work program unable to run optimally.		<ol style="list-style-type: none"> <li>1. Consolidate between agencies in completing work</li> <li>2. Encouraging the formation of support from leaders and adequate budget for work programs</li> </ol>	Identify the same community complaints and make internal policies on ICT



f. Human Resources component

OT	SW	<b>Strengths</b>	<b>Weakness</b>
		<ol style="list-style-type: none"> <li>1. There are employees who care about the development of <i>e-gov</i>.</li> <li>2. Conformity of work with the wishes / expectations of employees.</li> <li>3. The ability of employees has been utilized to the fullest.</li> </ol>	<ol style="list-style-type: none"> <li>1. Many employees are not well versed in ICT.</li> <li>2. The number of employees who master ICT is small.</li> <li>3. The placement of ICT proficient staff is not appropriate.</li> </ol>
		<b>Opportunity</b>	<b>Strategy SO</b>
		<ol style="list-style-type: none"> <li>1. Appreciation for employees/institutions who have ICT-based performance.</li> <li>2. Computer science-based civil servant recruitment.</li> <li>3. Utilizing existing human resources, by adding training.</li> </ol>	<p>Appreciate employees/institutions that have the best performance in the ICT field</p>
		<b>Threats</b>	<b>Strategy WO</b>
		<p>Technical knowledge lost due to HR that is out or mutation</p>	<ol style="list-style-type: none"> <li>1. Selection of skilled human resources.</li> <li>2. Participate in HR training as needed.</li> </ol>
			<b>Strategy ST</b>
			<ol style="list-style-type: none"> <li>1. Perform regeneration of technical knowledge before employees carry out mutations</li> <li>2. Increased employee awareness of e-gov development.</li> </ol>
			<b>Strategy WT</b>
			<ol style="list-style-type: none"> <li>1. Improving the skills of employees who lack ICT skills</li> <li>2. Recruiting employees who understand ICT</li> <li>3. Re-mapping the placement of ICT proficient staff</li> </ol>

3.3 Root Cause Analysis

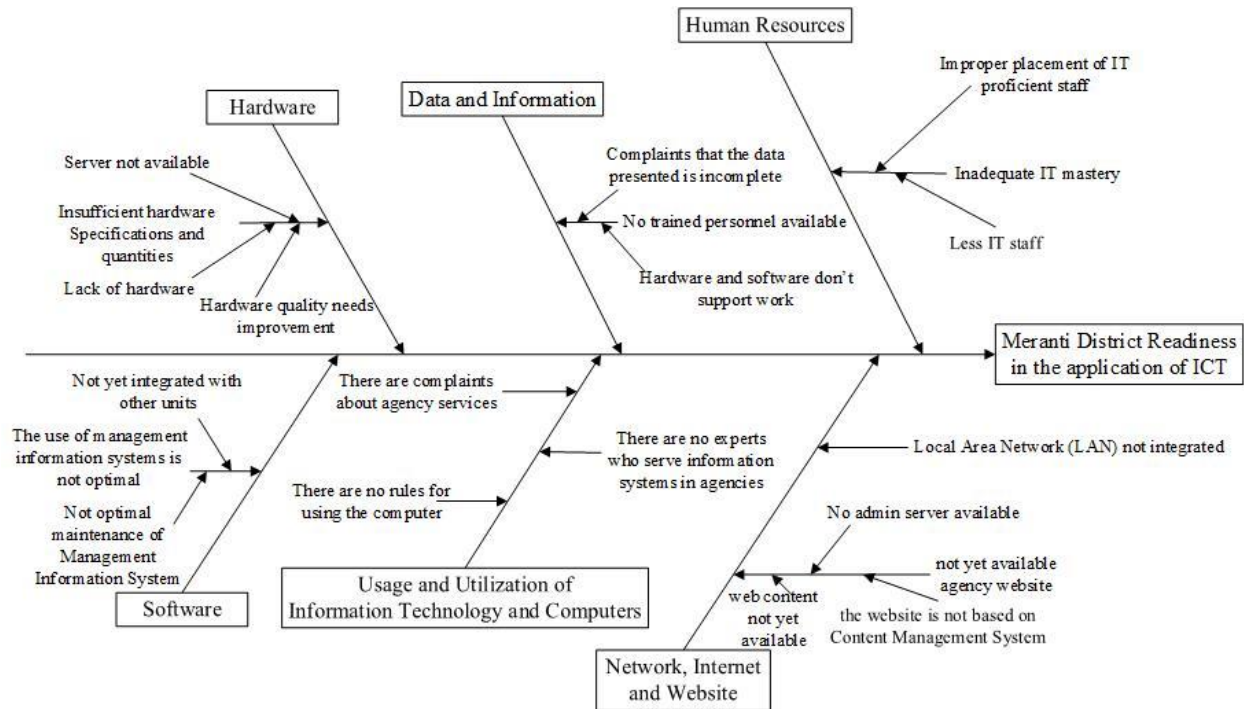
Furthermore, the SWOT analysis that has been mapped in Table 2 then looks for the root causes of the weaknesses in the application of ICT in Meranti Islands Regency. Identification of obstacles in the application of ICT in the Meranti Islands Regency was carried out using the root cause analysis method and illustrated using the Ishikawa diagram. The steps of Root Cause Analysis (RCA) can be described as follows.

Step 1 Data collection. The data were collected by survey and interview methods to several respondents, namely Regional Employee Organizations (OPD) in the Meranti Islands Regency, both from the staff and leadership elements. After the data was collected, then an analysis is carried out with the team through the brainstorming method.

Step 2 Draw a causal factor chart. As a result of the brainstorming, the team found several factors for the failure of ICT implementation in the Meranti Islands Regency which were divided into hardware, software, brain ware (HR), infrastructure, information data and institutional components.

Symptom (symptoms) in the human resource component include inappropriate placement of IT proficient staff, inadequate IT mastery, this is because the number of IT human resources is lacking so that employees who handle ICT problems have limited knowledge, or because the placement of IT staff is not appropriate, for example. employees with IT backgrounds are not placed according to their fields. The next symptom in the components of the use and utilization of ICT is that there is no expert knowledge in understanding information systems, there are no proper rules for using computers. The software component has symptoms of inadequate software quality; this is probably caused because it is still using illegal software. Another symptom is that the software does not adequately support the work, this is because it has not been integrated with other work units. Hardware components have symptoms of hardware specifications, and the amount of hardware is insufficient so that the quality of the hardware needs to be

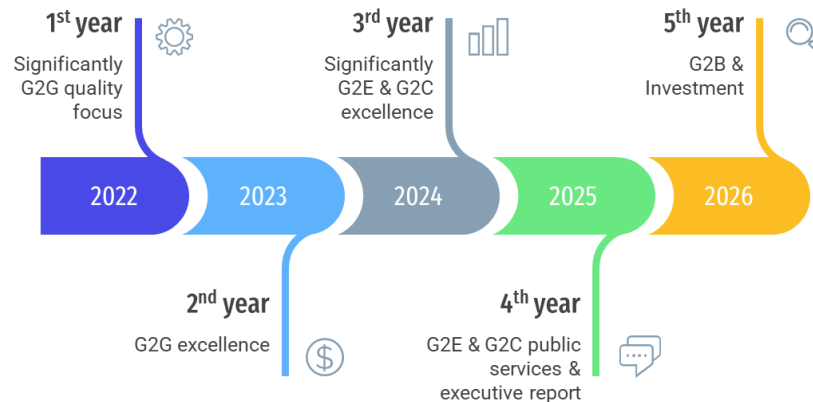
improved. Another aspect is that there is no server computer, this is due to the lack of computers, there are no adequate funds to provide a server.



**Figure 2.** Ishikawa Diagram

Step 3 Identify the root of the problem. The first crucial problem is the skills required for training to improve the quality of IT for the government environment, and the right human resources are needed for the appropriate units, especially the IT department. The second problem is the need, the quality of specifications and the amount of hardware is not sufficient, not only hardware in the software section is also experiencing the same thing. Symptoms of some OPD receiving SIMs from the Provincial Government or Central Government are not yet optimal in maintenance, this is because human resources do not have expert skills. The root of the problem with the implementation of EBGs is that in 2021 the local government does not yet have a communication and information office (still under the Regional Secretariat OPD) so that from the organizational structure it does not have the power to plan and use the budget. Therefore, the Ministry of Communications and Informatics has not been able to independently procure hardware, software and human resources according to competence. Existing human resources utilize available employees, even though they are not in accordance with their skills and competencies. Hardware and software also only use available resources, so service performance is not optimal.

Step 4 Recommendation generation and implementation. Recommendations that can be given to Meranti Islands Regency in the next 5 years are to set 5 stages in the strategic plan for EBGs implementation which include significant Government-to-Government (G2G) quality focus, G2G excellence, Government-to-Employees (G2E) & Government-to-Citizen (G2C) excellence significantly, G2E & G2C public services & executive report excellence, Government-to-Business (G2B) & Investments.



**Figure 3.** The proposed EBGs development plan for Meranti Islands Regency

The first and second years focus on the quality of G2G governance significantly, namely strengthening the organizational structure of ICT management by creating a special agency dealing with communications and information (DINKOMINFO). In addition, it is recommended to strengthen the quality of communication and exchange of information between government departments or agencies with one another to support good governance. Applications aimed at streamlining collaboration between work units and employees are a top priority, such as the development and integration of e-budgeting and e-planning. In the third and fourth years, the government has achieved quality governance, with the principles of transparency, participation, accountability, and coordination. In that year, EBGs development focused on providing quality services to employees and the public, supported by a dashboard application to produce executive reports. Examples of applications developed are e-performance applications and surveillance applications. This is intended so that internal processes can be optimized so that the service process to the public and reporting to the executive can be more efficient. After that, applications that are supportive of public services (G2C) and that touch the executive/leadership ranks so that the community and leaders as the main government stakeholders can provide full support for the overall application development. Finally, applications that are for business and investors (G2B) are built when internally the institution is ready, and support from the community and local government leaders has given full support to the development of e-government.

#### 4. Conclusion

The output of this research is a document mapping data on the use of ICT in the Meranti Islands Regency and the results of the identification of the obstacles that occur. Based on the SWOT analysis obtained 18 strengths, 19 weaknesses, 12 opportunities, 12 threats in the application of ICT, which is divided into 6 components. Based on the RCA analysis, it was found that the main problem was the low capacity of human resources in the application of ICT, as well as insufficient hardware/software requirements. From the results of the study, A government system that utilizes information technology which we call an electronic-based government system or SPBE must be carried out in order to realize clean, effective, transparent, accountable governance as well as quality and reliable public services. EBGs services can also cut costs and time, eradicate service-corruption, and create efficient and effective work processes. The use of Information Technology is not new, including in our government bureaucracy. The implementation of an integrated, unified, and sustainable EBGs is a shared hope whose completion requires synergy from all regional apparatuses and the community.

## 5. Acknowledgment

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