



# **Design and Development Legislative Budget Oversight Knowledge Discovery Systems for the Regency/Municipal House of Representatives in Indonesia**

**JokoTriono, Daniel Wahyu Suprayoga Prabowo**

*Engineering Informatics Management Studies Program. University Of Merdeka Madiun, Indonesia*

**Assistriadi Widjiseno**

*Informatics Engineering Program, Kahuripan University Kediri, Indonesia*

**Abstract:** In operating the Budget function which is manifested in the form of discussions for mutual approval of the draft regional regulation on Local Government Annual Budget (LGAB) submitted by the regional head, the Regency/Municipal House of Representatives (RHoR) institution is often faced with various forms and various problems of regional LGAB like the availability of a relatively short discussion time, the large number of the data and information that must be processed, the complexity of the LGAB data structure and the format of the presentation of the limited LGAB data reporting. Another thing that is quite crucial in the institution of the Regency/Municipal of House of Representatives is that every 5 years a legislative election is held which causes the replacement of most RHoR members, so that knowledge and experience will also be lost, therefore RHoR institutions need to manage the knowledge of their members and implement management knowledge which is a structured and systematic effort in developing and using the knowledge possessed to assist the decision-making process for improving organizational performance. Therefore, it becomes an urgency to design and develop a knowledge management system and a knowledge discovery system (a system that creates knowledge) from the LGAB data contained in the LGAB document. While the methodology used in the design and development of this system is the Software Development Life Cycle (SDLC), which at the stage of system specification analysis and identification of business process modeling use case diagrams is followed by the design stage of system specifications making entity relationship diagrams and sequence diagrams as well as application coding. And the results of the design of this system have been able to facilitate the process of documenting LGAB data which is then processed into information or knowledge and produces output in the form of visualization of clustering analysis or comparative analysis of the proportion of LGAB allocations based on the LGAB year, city/district, organization code, revenue account code, shopping account code, financing account code, program account code, activity account code, account code and LGAB nominal where this clustering visualization will be valuable information and knowledge for strengthening literacy capacity, transparency and analysis in the process of discussing and determining regional regulations Transparent and accountable LGAB.

**Keywords—** *Knowledge Management System, Knowledge Discovery Systems, the Regency/Municipal House Of Representatives, Local Government Annual Budget*



## I. INTRODUCTION

### 1.1 Definition of Regency/Municipal House of Representatives (RHoR)

The Regency/Municipal House of Representatives 1, hereinafter abbreviated as RHoR, is a regional people's representative institution that is domiciled as a part of regional government management [1], whose members are elected through general elections [2], and ratified based on the decision of the Regency/Municipal General Election Commissions to ratify the results. the election of members of the RHoR [3], as well as the membership of the RHoR inaugurated by the governor's decision as the representative of the central government for members of the Regency/Municipal House of Representatives[4]. While the members of it are at least 20 (twenty) people and a maximum of 50 (fifty) people [1]

The length of service for members of the Regency/Municipal House of Representatives is 5 (five) years and ends when the new Regency/Municipal House of Representatives members take an oath [1]. The composition of the Regency/Municipal People's Representative Council consists of members of the political parties participating in the general election who are elected through general elections [1], and the Regency/Municipal House of Representatives is a Regency/City Regional People's Representative institution that is domiciled as an element of the Regency/City regional government administration, as well as members of the Regency/City Regional People's Representative Council. Regency/City is a Regency/City regional official [1].

### 1.2 Regency/Municipal House of Representatives Function

Based on Law No. 23 of 2014 concerning Regional Government, article 149 and article 150, the Regency/Municipal House of Representatives has functions including the formation of Regional Regulations, budgeting and supervision. With this function, the Representative captures the aspirations of the people. Further explanation regarding the function of forming a Regency/City regional regulation is applied by discussing with the regent/mayor and approving or disapproving the draft Regency/City Regional Regulations, submitting a proposal for a draft Regency/City Regional Regulations and compiling a program for the formation of a Regency/City Regional Regulations with the regent/mayor. In the case of drafting a Regency/City Regional Regulation, the draft Regency/City Regional Regulation may originate from the Regional House of Representative or the regent/mayor, as well as the draft Regency/City Regional Regulation accompanied by an explanation or statement and/or Academic Paper. Manuscript of research results or authorized studies and other research results on a certain problem that can be scientifically justified regarding the regulation of the problem in a Law Draft, Provincial Regulations Draft, Draft District Regional Regulations, as a solution to the problems and legal needs of the community [5]. While the budgeting function is realized in the form of discussions for mutual approval of the draft Regional Regulation on LGAB submitted by the Regional Head, this budeting function is carried out by discussing the general LGAB policy and priorities and temporary LGAB ceilings prepared by the Regional Head based on the Regional Government work arrangement, discussing the draft Regional Regulation on LGAB, discusses draft regional regulations on changes to LGAB and discusses draft regional regulations on accountability for LGAB implementation [4] and the supervisory function is manifested in the form of supervision on the implementation of Regency/Municipal Regional Regulations and regent/mayor regulations, implementation of the provisions of other laws and regulations related to the implementation of Regency/City Regional Government and implementation of follow-up on the results of the audit of financial statements by the State Audit Board. On the implementation of follow-up on the results of the audit of the financial statements by the Audit Board of the Regency/Municipal RHoR shall be entitled to a report on the results of the financial audit conducted by the State Audit Board. The RHoR shall discuss the report on the results of the audit of the financial statements, and the RHoR may request clarification on the findings of the report on the results of the audit of the financial statements to the Audit Agency [1].



## 1.3 Formulation Of Local Government Annual Budget (LGAB)

The Regulation of the Minister of Home Affairs Number 13 of 2006 regarding Guidelines for Regional Financial Management acknowledged that the Local Government Annual Budget, hereinafter abbreviated as LGAB, is the annual financial arrangement of the regional government which is discussed and approved mutually by the regional government and RHoR, and predetermined by regional regulations. And in the process of its framing, there are guidelines for the preparation of the Regional Revenue and Expenditure LGAB which are synchronized in the Regulation of the Minister of Home Affairs of the Republic of Indonesia each fiscal year which is the main policy as a guide and direction for regional governments in the preparation, discussion and determination of the LGAB. While the documents in the preparation of the LGAB consist of:

- a) General policy on LGAB (KUA) and provisional LGAB priorities and ceilings (PPAS);
- b) Work plan LGAB for regional work units (RKPD);
- c) Draft regional regulations on LGAB;
- d) Draft regional head regulations concerning the elaboration of LGAB;

In the preparation of the KUA draft, it contains, 1) regional macroeconomic conditions, 2) assumptions for the preparation of the RREB, 3) Regional Revenue policies, 4) Regional Expenditure policies, 5) Regional Financing policies, 6) achievement strategies. Furthermore, the PPAS design is prepared in stages 1) determining the priority scale of regional development, 2) determining program priorities, activities, and sub-activities, 3) determining program priorities, activities, and sub-activities, 4) compiling performance achievements, targets, and temporary LGAB ceilings for each program, activity, and sub-activity [7].

## II. LITERATURE REVIEW

### 2.1 Knowledge Management As An Organizational Strategic Asset

Knowledge management is a process within the organization, and information technology to acquire, create, reveal, and provide knowledge for the organization to achieve strategic goals [40]. Therefore, knowledge is the most important part to build a competitive resource. [8], [32],[9]. Among the benefits of knowledge management is the improvement of the competence of the government, improving the quality of government services [10], [11], in addition to the success of e-government realization [12]. So the government should utilize the wealth of knowledge he had [41], with attention to key themes of the main organization such as the system of knowledge, the involvement of strategic, social and cultural context [42], [14], as well as the significant factors including the dimensions of process, leadership, culture and technology [15], [16]. So that an organization can learn from the experience of the good and the bad [17], then the knowledge management should be started from strategy planning, orientation and evaluation of [18].

The crucial thing in the organization is when knowledge is not captured, understood, and transferred would not be useless [19]. Learning from this experience of 2014, PT. Dirgantara Indonesia should make a plan of management knowledge to keep the knowledge of its human resources as the presence of senior employees who retired who have the knowledge and valuable experience [20]. While the institution of the Regional House of Representatives which has the function of legislation, oversight and LGAB [1] where legislative elections held once in every 5 years that lead to the turn of the majority of members of Regency/City People's Representative Council, so that knowledge and experience will also be lost [43] therefore, Regional House of Representatives need to manage the knowledge of its members [21].



## 2.2 The Behavior of the Information Needs of Members of Parliament

The role of information in order to support performance of members of parliament is very important. However, it still needs a better perceptive and information requests of more massive as well as search pattern correct information as the basic job of the decision maker or the members of the parliament [22]. There is an argument that in political life there is a need for information flow into a main power source. And the manners of members of the British parliament is the trigger of information search, with a flood of information everywhere, and then the volume of this information actually makes the difficulty in making the decision public to the demands of the diverse.

On the other side of public accountability demanded of the individual, groups, and associations. On the other hand the members of the parliament are also expected to have knowledge of various problems may appear, while the information needs often cannot be met reactively [23]. There are still a variety of problems and barriers to accessing information in legislative institution of China, the products of law is not codified and compiled with a different system, the minutes of the meeting are not collected and published, which cause difficulties for the legal researcher to trace the history of legislative debate and public hearings [24]. The behavior and skills of searching for information on the center documentation of the parliament is often not critical and pragmatic in using the information that's most easily obtainable, sacrificing quality for the sake of ease of access [25]. Only a few members of house representative are alert about the value of the library services / information. They depend on the source of information on non-documentary. They are not fully contented with the system of collecting information at this time, where they must dedicate time and attention more [26]. That the behavior of the members of parliament in the search for information is to make the request of hearings, to make a speech, and to make decisions [27]. This study discovered that the information needed by parliament members associated with the task of legislative and policy-making. Policy makers have little access to relevant information and can be relied upon when making decisions about policies, programs, and policy implementation [28]. That members of parliament are primarily looking for information to make a request / inquiry parliament, to speak and make decisions. Sources of information the most important are the treatise of the meeting, the mass media, personal letters, and information networks [29]. Those members of parliament enhance their knowledge and their participation in parliamentary activities based on real facts from the database information [30].

## 2.3 Knowledge Management System

Knowledge management system refers to the information system to manage organizational knowledge. This system is the application of information technology to support and improve the process of organizational knowledge in the aspect of creation, storage, acquisition and delivery [31]. Knowledge management systems are equipment proposed to support knowledge management with the characteristics that support the communication among users, coordinate user activity, collaboration among users in the creation, modification and dissemination of a product. These systems rely on information technology which can facilitate the exchange of information in the organization with emphasis on the identification of sources of knowledge, the analysis of knowledge and manage the flow of knowledge in an organization and intellectual assets [32].

Knowledge management system involves the mechanism and technology to collect, store, retrieve, transform and distribute knowledge. And in public sector organizations, knowledge management system used to develop and maintain the ability to identify the relevant information required to accomplish the mission of the organization, as well as strengthen the collaboration within the organization and storing, managing valuable knowledge that can be used in the near future or the future [10]. Knowledge management system is the system or the platform of information and communication technology which combines and integrates the functions to contextualize both aspects of knowledge tacit and explicit in the organization. And knowledge management system integrates with instruments of knowledge management such as knowledge workers, business processes in the overall cycle of recycling knowledge, while the final goal of knowledge management systems is to support the



situation of learning organization and to make the activities in organization more effective [33].

Knowledge Management system is a system which is generally based on information technology used to perform the management of knowledge at each stage, both the time of acquisition, storage, retrieval, utilization and completion of [41]. Knowledge management system is the integration of technology and mechanisms that support the development of the 4 process of knowledge management which consists of the application of the system of knowledge that facilitates the utilization of knowledge to other individuals without going through the process of acquiring and learning, knowledge sharing system is the system that facilitate the organization and distribution of explicit knowledge and tacit among individuals, the systems capture the knowledge that maintains and formalizing knowledge and supports the process of taking the second aspect of knowledge tacit and explicit within the individual, artifacts, or organizational entity, and the system of knowledge discovery is the system to creates new knowledge either in the form of explicit knowledge and tacit from data and information or from the synthesis of prior knowledge [40]. Web 2.0 and big data is a tool that can be used to develop a knowledge management system based on facilitation, participation and collaboration of people to improve, finding, collecting, managing and applying their knowledge to make the process and implementation of a knowledge management system with more fast and more simple.

Taking overview from the analysis of the literature fissure, it was found that the variation of the knowledge management system expands in large companies and small and medium enterprises. And from the evidence analysis library, there are still shortcomings than the reviews on the variation of the system of knowledge management in large companies and small and medium enterprises [35]. The success of the progress of a knowledge management system done for NOMAD depending on the availability of data, information technology infrastructure, well-built support from management and the readiness of the people who have knowledge to share their experiences [36]. The design of a knowledge management system by adopting the method of Joint Application Design (JAD), allows to get the needs that are aligned with the expectations of the users and satisfaction level of users in the development of the prototype and the need to achieve 84% of a maximum score of [37]. The best way to manage the knowledge of the public sector is to follow the process of knowledge management using information technology. Without management knowledge as well, then the organization can't figure out how that knowledge will be inflicted, coded, stored, shared and used in a public sector organization [38]. Cultural factors and leadership is the determining factor of knowledge management system, it is emphasized on the standard of the main principle that knowledge comes from people [39].

### III. METHODOLOGY

In the designing and development of systems and knowledge discovery, the methodology used is the Systems Development Life Cycle (SDLC) Waterwall, which is the process of determining how an information system can sustain business needs, designing and development of the system and present the result to the user [44].

SDLC is a model that typically includes 5 steps as the followings planning system, system analysis, system design, system implementation and support, and the security of the system [45]. Figure 1 below shows the scheme of the SDLC.

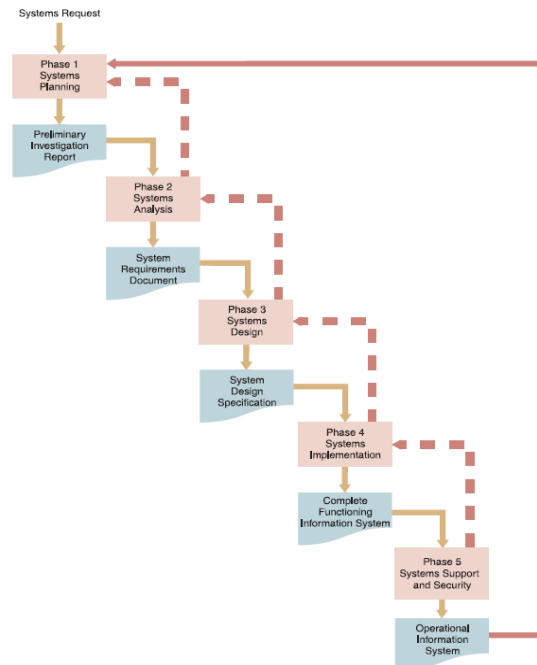


Figure 1. SDLC

Systems Development Life Cycle (SDLC) is the overall process that consists of all the activities required to build, launch and take care of an information system [46]. In addition, SDLC is a phase approach to analyze and design which keep the system in the best condition through the use of the cycle of the specifics activity analysis and its users [47]. In implementing SDLC above, the stages of the methodology of the research was made as shown in figure 2 below :

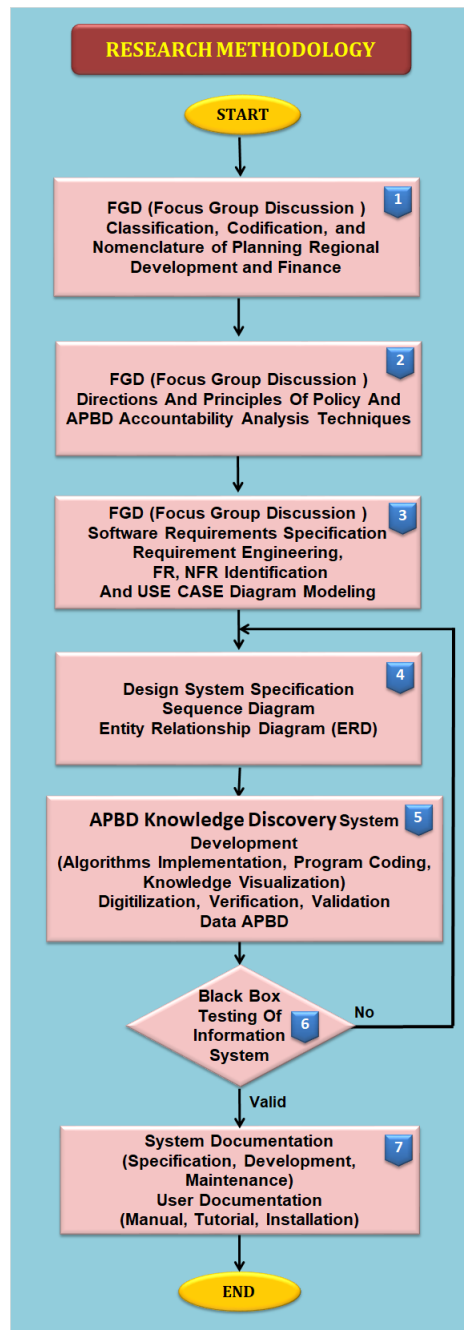


Figure 1. Research Methodology

### 3.1. FGD (Focus Group Discussion) Classification, Codification And Nomenclature of Development Planning And Local Finance

FGD aims to obtain input on the direction and foundation of the policy, and the purpose of the use and application of the Regulation of the Minister of Home Affairs of the Republic of Indonesia No. 90 Years 2019





on the Classification, Codification, classification and Nomenclature of Development Planning and Local Finance arranged systematically covers:

- a. Affairs, the Field of Affairs, Program, Activities and Sub-Activities;
- b. Function;
- c. Organization;
- d. Source of funding;
- e. Territorial Administration of the Government; and
- f. Account.

The results or output that is expected from the activities of this FGD is to compile and map the anatomy of the LGAB, as well as their relationships with the documents KUA which contains policies on income, expenditure, and Financing as well as the underlying assumption for the period of 1 (one) year and Priorities and the Provisional LGAB Ceiling, which is a program priorities and the maximum limit of the LGAB assigned to the area official for each program and activity as a reference in the preparation of the work plan and the LGAB of the regional work units [48].

### **3.2. FGD (Focus Group Discussion): Directions and Principal Policies and Techniques of LGAB Accountability Analysis**

This FGD activity aims to obtain input in the form of the principal policy as guidance and direction for local government in the preparation, discussion and determination of the LGAB, as well as the harmonization and synchronization of direction and the principal policy of the central government with the vision and mission of local government [49]. As well as the analysis techniques accountability LGAB based on Income Area that includes the local revenue (PAD), transfer income, other local revenue legitimate. Shopping Area that includes are operating expenditure, capital expenditures, unexpected, shopping transfer. Regional financing includes financing revenue and expenditure financing [50]. Realized with 5 Macro Indicators of Development (economic growth, human development index, gini ratio, unemployment rate, poverty level) where the technique of the analysis of accountability this LGAB would be needed by members of the people representative regional members of County / City in monitoring the LGAB to ensure that all public policy-related LGAB cycle implemented in agreement with relevant laws and policy and oriented on priorities of the public [51], [52], [53].

### **3.3. FGD (Focus Group Discussion) Software Requirements Specification Requirement Engineering, Functional Requirement, Non Functional Requirement Identification**

FGD activities were carried out with various sources as the followings sources from the Regional House of Representative, resource persons for LGAB analysis consultants, and resource persons from academics who have expertise in the field of policy research, to obtain input on the system requirements needed by them, so that a system design is obtained that is in accordance with the needs of users as well as functional and non-functional requirements. Furthermore, the results of this FGD will provide input for making Use Case Diagram Modeling. Use Case Diagram is to state the visualization of interactions that occur between the user and the system. Use Case Diagrams can also be used to describe and explain the context of a system so that the scheme boundaries are clearly visible [67].

### **3.4. Design System Specification, Sequence Diagram and Entity Relationship Diagram (ERD)**

Sequence diagrams describe interactions between objects inside and around the system, including users, system interface, data storage media and others. Sequence diagrams show a set of messages that are depicted in the order of time. Sequence diagram consists of the vertical dimension (time) and horizontal dimension (related objects). The main point of this illustration is to define events series that can produce the desired output [54].





Data storage Media exist in the sequence diagram will be described more clearly on the Entity Relationship Diagram (ERD). ERD will be described entities, attributes and relationships between attributes which will be put into the metadata for the system to be created. Modeling ER is urbanized for the database designed by Peter Chen available in a paper in 1976 [66].

### **3.5. Development of Information Systems The implementation of the system information on the system is done by doing the following stages:**

#### **1. Algoritm Implementation**

Implementation of the algorithm of Knowledge Management System[40][65] is using the Knowledge Discovery System method [68] [40][62]. This method involves the user in the development of the system. The user is also actively participate in the development of the system [61]. The user will assume that the system is built to have good quality [63].

#### **2. Coding Program**

In this system the implementation of an information system using web based programming with native PHP programming language.

#### **3. The Visualization Output**

The results of the application of this system produces the visualization output analysis in the form of tables and graphs.

#### **4. Digitalization**

The process of digitizing the data in the form of regulation is written in the printed media then performed data entry, classification and codification according to the rules of Regulation of the Minister of home Affairs No. 90 2019 on the Classification, Codification and Nomenclature Development Planning and Financial Areas[57].

#### **5. Verification**

Tahapverifikasidilakukansetelah proses digitalisasiinidilakukan. Hal ini agar tidakterjadinyakesalahanpadaentri data, klasifikasidankodefikasinya.The stage of verification is done after the process of digitizing is done. This is to avoid the occurrence of errors in data entry, classification and codification..

#### **6. LGAB Data validation**

This stage is to make sure the calculations on the report of the LGAB have been correctly presented in the application.

### **3.6. Information Systems Testing**

This process is a test implementation of the system and apps after going through the stage of developing. At this stage, the process is carried out entry test to produce output according to the report of the LGAB. Application testing of this information system using the blackboxtesting[64]. At this stage, if there is a mistake or a failure then it will do the correction to flow Sequence Diagrams and Entity Relation Diagrams. If this stage is declared invalid, then the design of this system began to be documented.

### **3.7. System Documentation System**

The stage of system documentation is done after the design of the system has passed the stage of the test using both experimental data or real data. At this stage, the documentation on the specifications of the application that is used in software, hardware, the flow system. This stage also document the development of this system later, as well as how to perform a system that has been on the road later.



## 3.8. User Documentation

At this stage, the documentation is made for the users of the information system. Documentation made at this stage is user manual in the form of an e-book, a video tutorial as well as the way in installation.

## IV. DISCUSSION

In realizing the performance of clean and free from deviation state based on Law No. 28 of the 1999 [59] as well as in realizing the financial governance that is transparent and accountability accordance with the legislation of the Minister of Finance No. 17 Year 2003[55] then drafted a Regulation of the Minister of home Affairs number 13 2006 on guidelines for the financial management area [56] where LGAB are set in based on the necessities of governance and the ability of local revenue. The arrangement of the LGAB is based on RKPD (Local Government Work Plan).

Then in 2019, the Indonesian government has made changes to the regulation of the minister of home affairs with the publishment of Minister of home Affairs Regulation No. 90 in 2019 about the Classification, Codification and Nomenclature Development Planning and Financial Areas [57] guidelines for local government in providing and presenting information in a tiered and self specialized classification / clustering, coding, and list of naming towards a single codebase to be used in the preparation of the planning, budgeting, implementation and accountability as well as the reporting of financial performance.

In the preparation of the Regulation of the Minister of Internal Affairs No. 90 of 2019 showed changes in the composition and structure of the code as follows :

### 1. Organization

Based on Government Regulation No. 18 of 2016 about the regional official [58] and legislation related to the other set of group in the organization then group on the organization made up to 3 groups. As for the organization was made to be 2 digits in each group column. As for the explanation as follows:

- (1) The first digit with the number 1, indicates the code of compulsory government affairs which is not associated to basic services.
- (2) The first digit with the number 2, indicates the code of mandatory government affairs that are not related to basic services.
- (3) The first digit with the number 3, indicates the code of government affairs of choice.
- (4) The second digit is ordered from number 1 to number 32 according to the order of regional government affairs.

### 2. Account

The preparation of the classification, codification, classification and nomenclature of the Account used in the stages of LGAB, implementation and accountability of regional financial resulting from the financial statements of the primer based on the source of the information/transactions of the compilers of financial statements

like Balance sheet, LRA and LO. In the system KMS-DPRD is on the object account, prepared digit code in 13 digits.

### 3. Programs and Activities

In running the affairs of government, sub the affairs of government, and authority between the composition of government to be run in accordance with the authority such affairs need to be translated into the form of concrete



in construction activity in the form of the nomenclature of the programs and activities of the area. According to Minister of Home Affairs Regulation No. 90 of 2019[57] on the Classification, Codification and Nomenclature of Development Planning and Local Finance then made the object of programs and activities (protran) in 10 digits.

## 4.1. Anatomy of LGAB

Anatomy is structured to describe the structure of the LGAB that will be created by a system. Image of the anatomical structure of the LGAB is shown in figure 3 below :

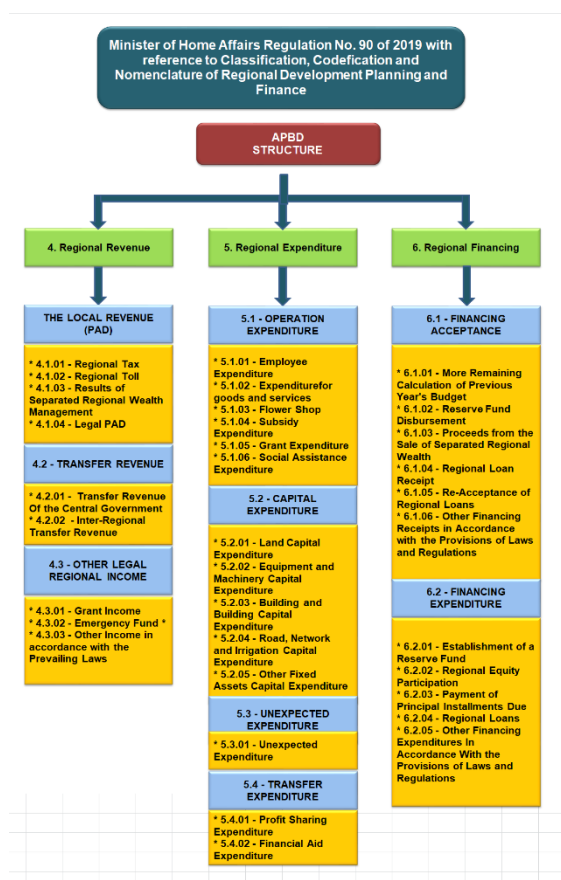


Figure 3. The Anatomical Structure of The LGAB

In the preparation of this anatomy, the object which is devoted is the Regional Revenue, Expenditure and Financing of the Region. It is needs to be supervised so the realization of financial governance is transparent and accountability based on the legislation of the Minister of Finance No. 17 Year 2003[55].

## 4.2. Use Case Diagram

From the results of the Focus Group Discussion (FGD) with a variety of speakers, i.e., members of Regional House of Representative, a Consultant to the local LGAB, activists, Non-Government Organization (NGO) advocacy of the LGAB of the region, it is produced and it is concluded that a system with the use case diagram [54] in the form of Information System flow Analysis, LGAB. In the use case diagram involves the role of the actor and the use case as follows:

1. Actor

The use case is abstraction at the center of interaction between the actors and the system. LGAB data input is a master data input, element, organization, rekening, program and activity, based on LGAB analysis, LGAB documentary data input, regional regulation and LGAB data verification LGAB data verification input. Image of LGAB regulation analysis information system diagram image is shown below:

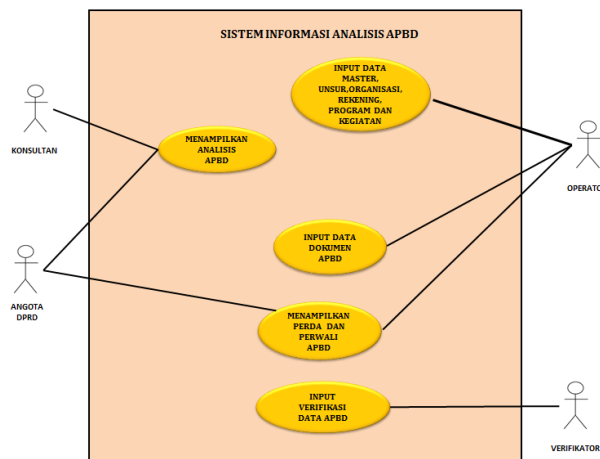


Figure 4. Use Case Diagram

Based on the ERD and the use case diagram, the system with a sequence diagram is made as follows :

Input the master data in this sequence is the beginning of the system KMS-DPRD. This process is performed by the actor operator with inputs data include data organization, protan, and account. The process of entry master data is as a supporting of data entry of LGAB later. Display sequence diagram Input Master Data shown in figure 5 below:

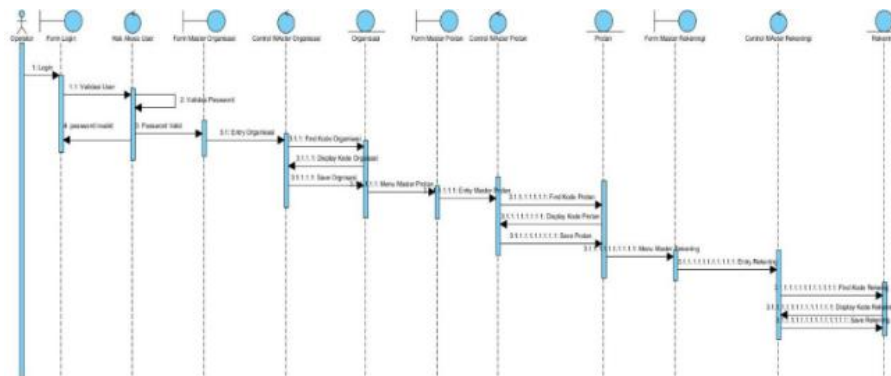


Figure 5. Master Data Input Sequence Diagram



#### b. LGAB Data Input

The process sequence diagrams [54] on the Input Data this LGAB using the actor operator where once the verification process is then carried out of the process input LGAB. Input process the LGAB is based on the object types like document, organization, protan, accounts and LGAB. Image sequence diagram Input Data LGAB is shown in figure 6 below:

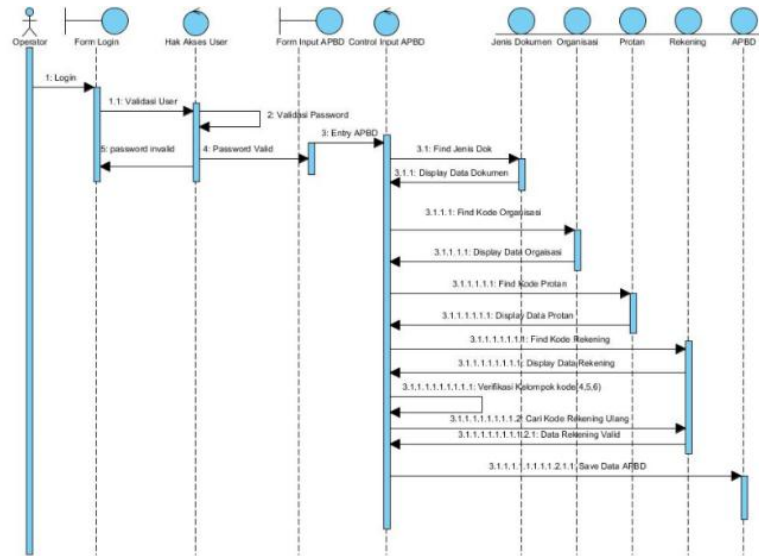


Figure 6. The LGAB data Input sequence

#### c. Verify LGAB input Data

The verification process of input LGAB data is done so that the data results of the entry of LGAB by the operator be correct and valid data. Actor verifier ensures the correctness of the data input the LGAB is based on the object type such as the document, organization, protan and accounts. In figure 7 is shown the display sequence diagrams Verify the Input Data LGAB

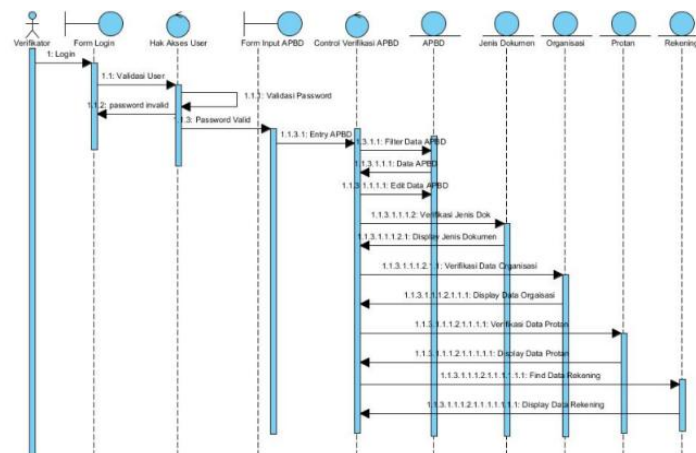


Figure 7. Sequence Diagram Verification of the LGAB input data



## d. The report of the Local Regulations and the Regulations of the Mayor

Sequence diagram on report of the regulation and help it involves the actors of the community and members of Regional House of Representative. The second actor is the user monitor data regulation and help on the system. This report is supported by the object of the organization, protan, accounts and LGAB. Image of sequence diagrams Report of the Local Regulations and the Regulations of the Mayor is shown in figure 8 below:

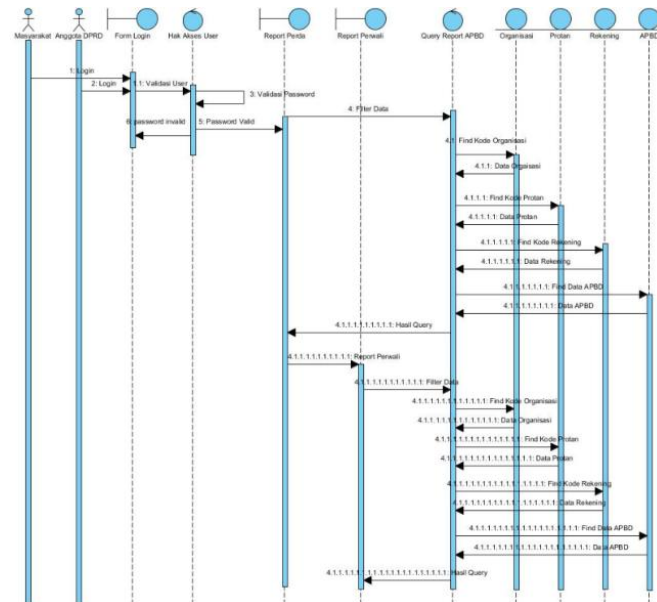


Figure 8. Sequence Diagram Reports the Local Regulations and the Regulations of the Mayor

## e. LGAB Analysis Report

Report on this analysis of the LGAB, actor used are a consultant and member of Regional House of Representative. The actors start to do the first login and then open the menu LGAB analysis report where the process is based on the object of the organization, protan, accounts and LGAB. A sequence diagram is described a process of the beginning of the user (a consultant and member of the Regional House of Representative) perform the process of data analysis the LGAB. This process includes the object the Login Form, User Access Privileges, Report Page, the LGAB Query Analysis, organization, protan, accounts and LGAB. Image sequence of LBAG diagrams Analysis Report is shown in figure 9 below:

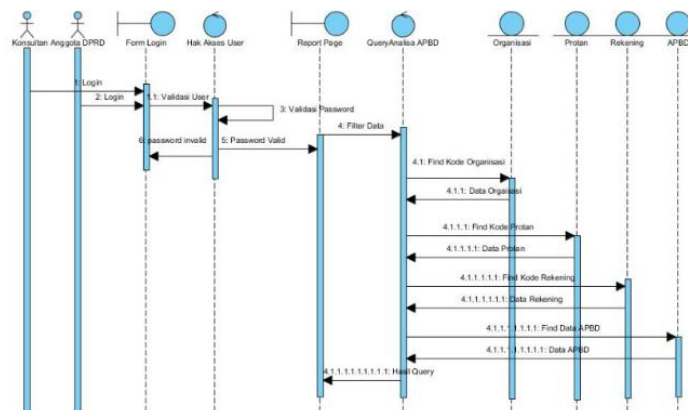


Figure 9. Sequence of LGAB Diagram Analysis Report





#### 4.4. Entity Relation Diagram

Based on the analysis above, the Entity Relation Diagram is created (ERD)[66] [60] as follows: In designing Knowledge Management System application of Regional House of Representative is required tables in the master as follows: kdl\_cover, kdl\_jenisdok, kdl\_protan, kdl\_fungsi, kdl\_rekening, kdl\_daerah, kdl\_unsur and kdl\_organisasi as well as a table of transactions that kdl\_apbd. Tables master these relate to each other to form the data in the table kdl\_apbd. The results from the relationships between the tables is shown in figure 10 below :

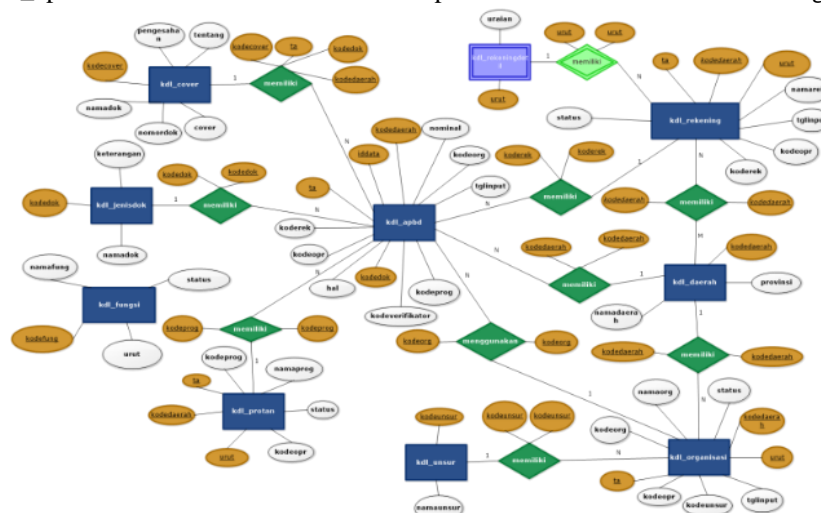


Figure 10. Entity Relation Diagram

The followings is a list of functions each table used :

##### 1. kdl\_cover

Table kdl\_cover used as data storage the title and theme of the document respectively the LBAG of each area. The presence of the table kdl\_cover allow a user to browse the LGAB data documents are in the database in accordance with the theme and endorsement.

##### 2. kdl\_jenisdok

kdl\_jenisdok table is used as a data storage type of document on a LGAB. Search data document the LGAB based on the type of the document will be related to the table kdl\_jenis this doc. Table kdl\_jenisdok contains the field kodedok, namadok and description, example namadok RKA-SKPD with a description of the Work Plan and LGAB-Work Unit.

##### 3. kdl\_fungsi

As predetermined in article 3 of Regulation No. 90 of 2019 on the Classification and Codification and Nomenclature Development Planning and Financial Area then the table kdl\_jenisdok used as a table of Classification, Codification, and Nomenclature then the table kdl\_fungsi prepared in order to align and integrate the affairs of local government and other elements with state spending is classified according to Function based on the necessities of the legislation. The contents of the table kdl\_fungsi is function code, function name, sort and status.

##### 4. kdl\_daerah

Table kdl\_daerah is used as the table data storage area LGAB documents in the database. Data table kdl\_daerah facilitate the search for the document of LGAB based on the area in question. The name of the area in the table kdl\_daerah includes the cities and districts in Indonesia.



## 5. kdl\_rekening

Table kdl\_rekening is used as the table data storage LGAB accounts. Fill in the table kdl\_rekening include the assets, liabilities, equity, income/revenue-LRA, shopping, financing, income-LO, and load. Table kdl\_rekening is structured based on the code of each region and each fiscal Year.

## 6. kdl\_organisasi

Table kdl\_rekening is used as a table of data storage organization, as predetermined in government regulation no. 18 of 2016 about the area and group in the organization of a maximum of 3 group [58]. Data tbl\_organisasi are grouped based on government affairs, supporting elements, supporting elements, elements of trustees, the elements of territoriality, elements of public administration and element specificity.

## 7. kdl\_unsur

Table kdl\_unsur is supporting table of the table kdl\_organisasi as the master data of a group of the organization of the supporting elements, elements of trustees, the elements of territoriality, elements of the organization of the supporting elements, elements of trustees, the elements of territoriality, elements of public administration and element specificity.

## 8. kdl\_protan

Table kdl\_protan a table of data storage programs and activities (protan) as set out in article 3 of Regulation No. 90 Years 2019 On the Classification and Codification and Nomenclature Development Planning and Financial Areas[57]. Table kdl\_protan is functioned to display the data on the activities of the programs and

activities of each region in each Year of the LGAB associated with the use of the LGAB in every area. the data table kdl\_protan this will facilitate local government in conducting the benchmark of performance measurement in the achievement of the goals and objectives of the public service.

## 9. kdl\_APBD

Table kdl\_APBD is the table key in the planning of the application of Knowledge Management System of Regency/City Regional House of Representatives. Table kdl\_APBD this connected with the table kdl\_cover, kdl\_jenisdok, kdl\_rekening, kdl\_daerah, kdl\_protan and kdl\_organisasi. Table kdl\_APBD this keeps the data of the regional LGAB every district in every year estimates. Table kdl\_APBD this also cover the data value of the nominal regional LGAB, every district, every program activities and organizations on every account. Analysis on the planning application is based on the data in table kdl\_APBD this. Table kdl\_APBD this contains field-Year Estimates (TA), iddata, kodedaerah, kodedok, koderek, kodeorg, kodeprog, nominal, thing, tglinput, kodeopr and kodeverifikator.

### 4.5. LGAB Knowledge Discovery System Development

In building a Knowledge Discovery System, the stage-the stage of completion is made as the following:

#### 4.5.1. Algorithm Implementation

At this stage, for the LGAB Knowledge Discovery System, a query system is made derived from the computational results of the coding and classification in the organizational table, program activities, accounts, LGAB nominal. The following is an example of a query system that is structured as shown in the formula below:

From the results of the implementation of the Knowledge Discovery System LGAB Algorithm, knowledge visualization is produced:



## 4.5.2. Knowledge Discovery System Development Interface

At this stage, a website-based application is created with the following menus:

### 1. Programs and Activities

In accordance with article 5 of the Minister of Home Affairs No. 90 of 2019 relating to the Codification Classification and Nomenclature of Development Planning and Regional Finance [57] that in the preparation of balance sheets, LGAB realization reports, and operational reports for the 2021 fiscal year, the Regional Government shall map out programs and activities according to the classification, codification, and Nomenclature in accordance with the Attachment which is an integral part of this Ministerial Regulation. The following is the Program and Activity interface in accordance with the mandate of Article 5 of Permendagri No 90 of 2019 [57] which is shown in Figure 11 below:

Figure 11. Program and Activity Menu

### 2. Function

In supporting the LGAB analysis report and in accordance with article 3 point 1b of the Minister of Home Affairs Regulation No. 90 of 2019 in connection with the Classification of the Codification and Nomenclature of Development Planning and Regional Finance [57], the following function interfaces are shown in Figure 12 below:

Figure 12. Function Menu



### 3. Organization

Organization is a regional apparatus which is an support element of regional heads and regional people's representatives in the administration of government affairs which are under regional authority. Based on the composition of regional apparatus accordance to the provisions of the legislation, Classification, Codification, and Organizational Nomenclature as referred to in paragraph (1) letter c of Minister of Home Affairs Regulation No. 90 of 2019 concerning Codification Classification and Nomenclature of Regional Development Planning and Finance [57]. The following is the organizational interface shown in Figure 13 below :

The screenshot shows a web application interface for creating an organization. The left sidebar contains a menu with options like Dashboard, Setting User Menu, Master Data, Program Kegiatan, Fungsi, Organisasi, Rekening, Cover, Jenis Dokumen, Daerah, and Unsur. The main content area is titled 'Buat Organisasi' and contains a form with the following fields: Tahun Anggaran (2019), Kode Organisasi (10100000001), Nama Daerah (KOTA MADIUN), Nama Organisasi (Dinas Pendidikan), Status (2), and Nama Unsur (Usulan Pemerintah Wajib Yang Berkaitan Dengan Pelayanan Dasar). There are buttons for 'Buat Manual', 'Import Excel', and 'Simpan'.

Figure 13. Organization Menu

### 4. Account

Classification, Codification, and Account Nomenclature in regional financial management are tools in the process of LGAB planning, implementation of administration and accounting as well as regional financial reporting consisting of accounts, groups, types, objects, details of objects, and sub-details of objects. Classification, Codification, and Account Nomenclature include assets, liabilities, equity, income-LRA (LGAB Realization Report), expenditure, financing, income-LO (Operational Report), and expenses. The preparation of Classification, Codification, and Account Nomenclature used in the stages of budgeting phase, implementation and regional financial accountability resulting from primary financial reports is reviewed based on sources of information/transactions preparing financial statements, namely the Balance Sheet, LRA and LO. The following Account interface is shown in Figure 14 below:

The screenshot shows a web application interface for creating an account. The left sidebar contains a menu with options like Dashboard, Setting User Menu, Master Data, Program Kegiatan, Fungsi, Organisasi, Rekening, Cover, Jenis Dokumen, Daerah, and Unsur. The main content area is titled 'Buat Rekening' and contains a form with the following fields: Tahun Anggaran (2019), Kode Rekening (10100101001), Nama Daerah (KOTA MADIUN), and Nama Rekening (Kas di Kas Daerah). There are buttons for 'Buat Manual', 'Import Excel', and 'Simpan'. Below the form is a table titled 'Data Seluruh Rekening' with columns for No, Tahun Anggaran, Nama Daerah, Kode Rekening, Nama Rekening, Status, and Urut.

Figure 14. Account Menu



## 5. Cover

In preparing LGAB documents, a cover interface is prepared to facilitate the process of searching for LGAB documents. Data connection with the LGAB table on the document number speeds up the process of searching for LGAB documents. The following interface cover is shown in Figure 15 below :

Figure 15. Menu Cover

## 6. Document Type

The function of Document Type is as a search catalog for LGAB documents. This makes it easier for users to get LGAB data in the database. The following is a document type interface display as shown in Figure 16 below :

Figure 16. Document Type Menu

## 7. Regional Menu

The regional menu is a master menu that is referred by other menus in order to distinguish the data in each region. The data entered is the code of the area, city/district and province. Figure 17 shows the Regional menu display



No	Kode Daerah	Nama Daerah	Provinsi	Action
----	-------------	-------------	----------	--------

Figure 17. Regional Menu

## 8. Elements

The Elements Menu is a data entry menu for business elements needed by the organization. The menu display of this element is shown in Figure 18 below :

No	Kode Unsur	Nama Unsur	Action
1	A1	Urusan Pemerintah Wajib Yang Berkaitan Dengan Pelayanan Dasar	edit delete
2	A2	Urusan Pemerintah Wajib Yang Tidak Berkaitan Dengan Pelayanan Dasar	edit delete

Figure 18. Elements Menu

## 9. LGAB

The LGAB document is the main document in the Regional House of Representative Knowledge Management System application. This LGAB document data includes relations with master document types, activity programs, covers, elements, organizations, regions and accounts. All of these master data masters are related to the LGAB interface as shown in Figure 19 below :





Figure 19. LGAB menu

#### 4.5.3. Knowledge Visualization

In this second stage, the Knowledge Discovery System displays the results of knowledge discovery which are shown in the graph below:

##### 1. Madiun City Regional Income Graph and Its Growth

The regional income of Madiun City in 2022 in the KUA PPAS is projected to be more pessimistic than the realization in 2020, when compared to the 2021 revenue target, which is relatively stagnant, where based on the draft KUA PPAS 2022, regional income is projected to be Rp. 1,004,999,753,910, - an increase of Rp. 1,177 M compared to the 2021 target, and decreased by Rp. 54.6 M compared to the realization in 2020. So, regional income in 2022 is projected to grow positively 0.1% compared to the year 2021, meaning that the regional government in 2022 projects that regional financial conditions have not returned to normal as before (as before the COVID-19 pandemic) where the realization of revenue in 2019 was Rp. 1,059 M more. The following is the trend of the regional income graph shown in Figure 20 below:

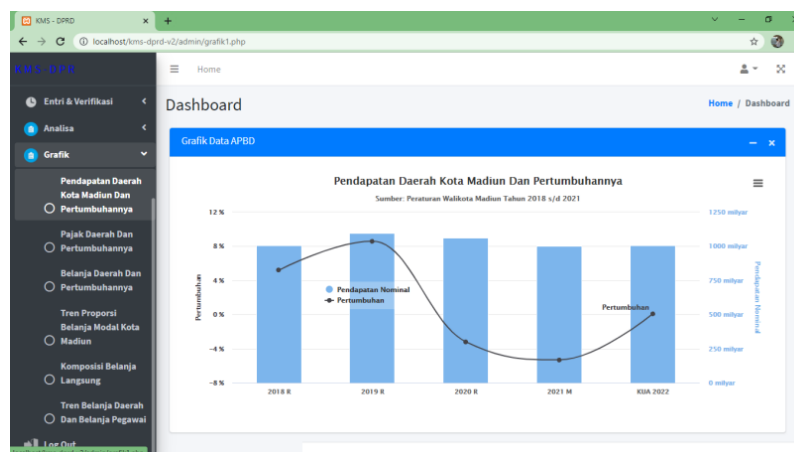


Figure 20. Graph of Madiun City Regional Income and Its Growth

##### 2. Graph of PAD and its Growth

For 2022 PAD, it is projected that growth will start to normal, in 2022 it will grow 8.6% from 2021, but nominally lower than its real potential (Projected PAD in 2022 will decrease by Rp. 2.3 billion compared to 2020 realization). The following figure 21 shows the trend of the graph:

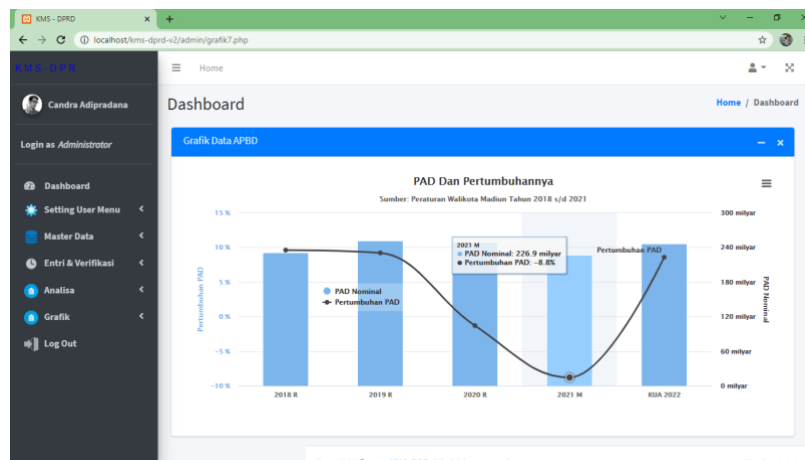


Figure 21. PAD Graph and Its Growth

### 3. Graph of Regional Expenditures and Its Growth

Regional expenditures for 2022 in the KUA PPAS draft are allocated Rp. 1,129,999,753,910,- consisting of Operational Expenditures, Capital Expenditures, unexpected expenditures and transfer expenditures. If the expenditure in 2022 is compared to the previous year's planning (in 2021) it decreases by Rp. 10.8M, grew minus 0.9% but when compared to the realization in 2020 it increased by Rp.115.3 B as shown in the following graph 22:

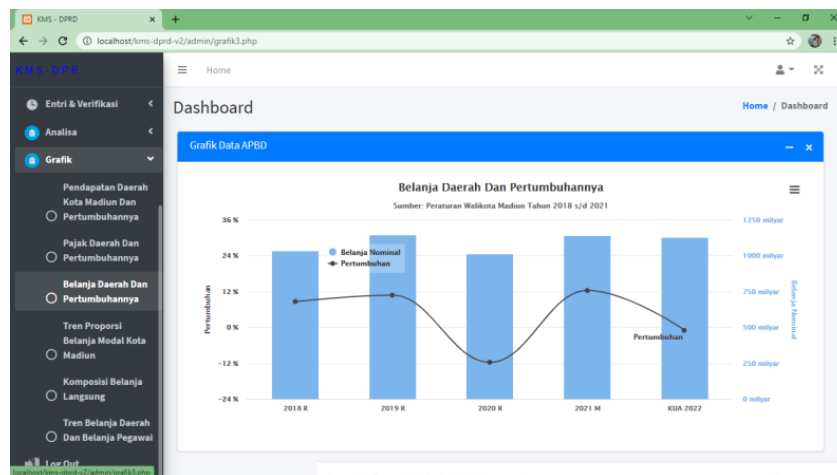


Figure 22. Graph of Regional Expenditures and Its Growth

### 4. Trends of Proportion of Capital Expenditure in Madiun

Capital Expenditures as a component of LGAB Productive expenditures and their proportion to regional expenditures in 2022 are allocated RP. 165.4 billion Worth 14.6% of regional spending. The following is the trend of the proportion of capital expenditure in Madiun from year to year as shown in Figure 23 below::

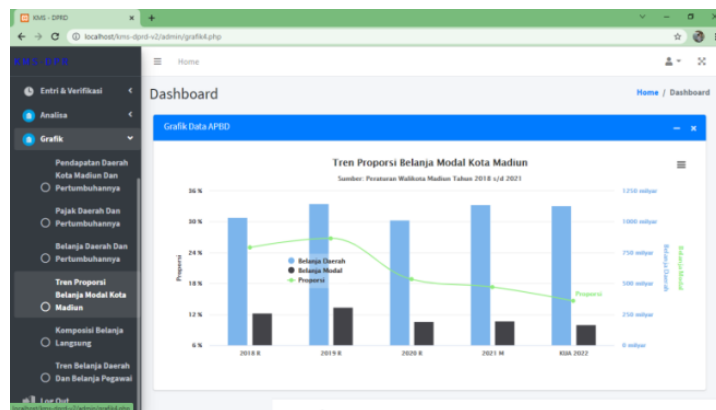


Figure 23. Trends of the Proportion of Capital Expenditure in Madiun

## 5. Graph of Regional Expenditure Trends and Employee Expenditure

In the data for the allocation of personnel expenditures in 2022, the value of personnel expenditure allocations has increased compared to 2021 and the realization of 2020. The following is a graphic image of the trend of regional expenditures and personnel expenditures as shown in Figure 24 below :

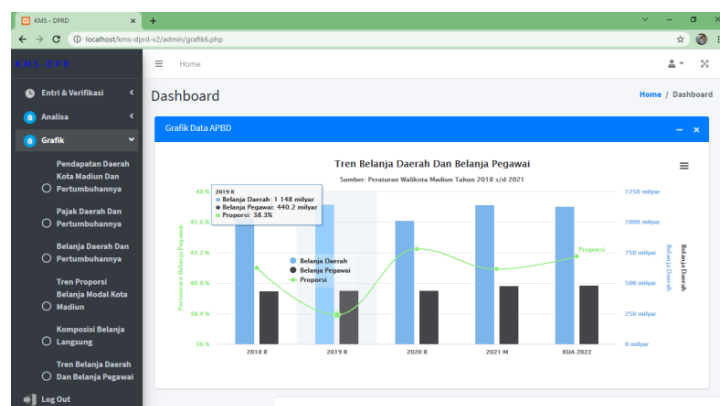


Figure 24. Graph of Regional Expenditure Trends and Employee Expenditure

## CONCLUSION

Based on problem formulation, analysis of system requirements, design and implementation of algorithms and system testing, this Knowledge Discovery System has been proven to be able to create/find and visualize knowledge consisting of Regional Income and its growth, PAD and its growth, Regional expenditure and its growth, Trends in the Proportion of Capital Expenditures, regional spending trends and personnel spending. So, the visualization of this knowledge will greatly assist in optimizing the budgeting oversight function of the Regency/Municipal House of Representatives

Furthermore, the follow-up plan for the development of the Legislative Knowledge Management System and future research is the Knowledge Capture System.



## ACKNOWLEDGMENT

The Directorate of Research and Community Service, Directorate General of Research and Technology Strengthening, Ministry of Research, Technology and the Higher Education Republic of Indonesia for Research grant scheme PTUPT 2020, Universitas Merdeka Madiun No. 012/AMD-SPKP2TJ/PTUPT/Unmer. Mdn/LPPM/VII/2021 supported this study so that it could be conducted well as what it was planned.

## REFERENCES

- [1] Law No. 23 of 2014 with reference to Regional Government
- [2] The 2<sup>nd</sup> Amendment of the 1945
- [3] Law No. 7 of 2017 with reference to General Elections
- [4] Government Regulations No. 12 of 2018 with reference to Guidelines for the Preparation of Orders for the Regional People's Representative Council of Provinces, Regencies, and Municipalities
- [5] Law No 12 of 2011 with reference to the Establishment of Legislation
- [6] Regulation of Minister of Home Affairs Number 13 of 2006 with reference to Guidelines for Regional Financial Management
- [7] Regulation of the Minister of Home Affairs of the Republic of Indonesia Number 77 of 2020 with reference to Technical Guidelines for Regional Financial Management
- [8] Petter Gottschalk, (2005), "Strategic Knowledge Management Technology", *Idea Group Inc*
- [9] Rony Dayan, Peter Heisig, Florinda Matos, (2017) "Knowledge Management As A Factor For The Formulation And Implementation Of Organization Strategy", *Journal of Knowledge Management*, Vol. 21 Issue: 2, pp 308-329
- [10] David E. McNabb, (2007), " Knowledge Management In The Public Sector - A Blueprint For Innovation In Government", *New York M.E. Sharpe, Inc.*
- [11] HarriLaihonen, Sari Mäntylä, (2018) "Strategic Knowledge Management And Evolving Local Government", *Journal of Knowledge Management*, Vol. 22 Issue: 1, pp. 219-234
- [12] Emad Abu-Shanab, IssaShehabat, (2018) "The Influence Of Knowledge Management Practices On E-Government Success: A Proposed Framework Tested", *Transforming Government: People, Process and Policy* Tested", *Transforming Government: People, Process and Policy*
- [13] Critical Knowledge Management Organizational Themes", *Journal of Knowledge Management*, Vol. 14 Issue: 4, pp.507-523
- [14] Wei Zheng, Baiyin Yang, Gary N. McLean (2010), "Linking Organizational Culture, Structure, Strategy, And Organizational Effectiveness: Mediating Role Of Knowledge Management", *Journal of Business Research*, 63, pp. 763–771
- [15] Ajay K. Jain, Hans Jeppe Jeppesen, (2013) "Knowledge Management Practices In A Public Sector Organisation: The Role Of Leaders' Cognitive Styles", *Journal of Knowledge Management*, Vol. 17 Issue: 3, pp.347-362
- [16] Ana Isabel Torres, Silvana Santos Ferraz, Helena Santos-Rodrigues, (2018) "The Impact Of Knowledge Management Factors In Organizational Sustainable Competitive Advantage", *Journal of Intellectual Capital*, Vol. 19 Issue: 2, pp.453-472
- [17] MariyaTerzieva, (2014), "Project Knowledge Management: How Organizations Learn From Experience", *ProcediaTechnology*, 16, pp. 1086–1095
- [18] Mona Jami Pour, Zahra Kouchak Zadeh, Nima Ahmad Zadeh, (2018), "Designing An Integrated Methodology For Knowledge Management Strategic Planning: The Roadmap Toward Strategic Alignment", *VINE Journal of Information and Knowledge Management Systems*, Vol. 48 Issue: 3, pp.373-387



- [19] Carla C.J.M. Millar, Martin Lockett, John F. Mahon, (2016), "Guest Editorial: Knowledge Intensive Organisations: On The Frontiers Of Knowledge Management", *Journal Of Knowledge Management*, Vol. 20 Issue: 5, Pp.845-857
- [20] Albert Yosuaa, Jann Hidajat Tjakraatmadja, (2015), "Assessment and Planning of Knowledge Management at PT Dirgantara Indonesia (Persero)", *Procedia - Social and Behavioral Sciences*, 169, pp. 109 – 124
- [21] Mintarti Indartini, Assistriadi Widjisen, (2019), "Strengthening Strategy Of Indonesian Local Legislative Councils On Budget Oversight", *European Journal Of Business And Management*, **Vol 11 No 24, pp. 68-74**
- [22] A.A. Alemna, K.E. Skouby, (2000), "An Investigation Into The Information Needs And Information-Seeking Behaviour Of Members Of Ghana's Legislature", *Library Management*, Vol. 21 Issue: 5, pp.235-240
- [23] Robert Orton, Rita Marcella, Graeme Baxter, (2000), "An Observational Study Of The Information Seeking Behaviour Of Members Of Parliament In The United Kingdom", *Aslib Proceedings*, Vol. 52 Issue: 6, pp.207-217
- [24] Susan Xue, (2005), "China's Legislative System And Information : An Overview", *Government Information Quarterly*, Vol 22, pp. 322–341
- [25] Rita Marcella, Graeme Baxter, Sylvie Davies, Dick Toornstra, (2007), "The Information Needs And Information-Seeking Behaviour Of The Users Of The European Parliamentary Documentation Centre : A Customer Knowledge Study", *Journal of Documentation*, Vol. 63 Issue: 6, pp.920-934
- [26] K. Shailendra, Hari Prakash, (2008), "A Study Of Information Needs Of Members Of The Legislative Assembly In The Capital City Of India", *Aslib Proceedings*, Vol. 60 Issue: 2, pp.158-179
- [27] Essam Mansour, Nasser Alkhurainej, (2011), "Information Seeking Behaviour Of MembersOf The Kuwaiti Parliament (MKPs)", *Library Review*, Vol. 60 Issue: 8, pp.671-684
- [28] David Kobla Fiankor, Harry Akussah, ( 2012), "Information Use And Policy Decision Making By District Assembly Members In Ghana", *Information Development*, 28, pp. 32–42
- [29] Md Uzzal Hossain, Md Arman Hossain, Md Shariful Islam, (2017), "An Assessment Of The Information Needs And Information-Seeking Behaviour Of Members Of Parliament (Mps) In Bangladesh", *Information And Learning Science*, Vol. 118 Issue: 1/2, pp.48-66
- [30] Isaiah Munyoro, (2019), "Assessing Parliament Of Zimbabwe's Informatics Database As A Tool For Providing Evidence-Based Information For Decision Making", *Journal of Librarianship and Information Science*, Vol. 51, pp. 218–227
- [31] Alavi, M. and Leidner, D.E. (2001), "Review: Knowledge Management And Knowledge Management Systems: Conceptual Foundations And Research Issues", *MIS Quarterly: Management Information Systems*, Vol. 25 No. 1, pp. 107-136
- [32] Kimiz Dalkir, (2005), "Knowledge Management In Theory And Practice", *Oxford, UK : Elsevier Butterworth-Heinemann*
- [33] Ronald Maier (2007), "Knowledge Management Systems - Information And Communication Technologies For Knowledge Management, Third Edition", © *Springer-Verlag Berlin Heidelberg 2002, 2004, 2007*
- [34] Sergio Orega-Rogla, Ricardo Chalmata, (2019), "Methodology For The Implementation Of Knowledge Management Systems 2.0 A Case Study In An Oil And Gas Company", *Bus Inf Syst Eng* 61(2):195–213
- [35] Roberto Cerchione, Piera Centobelli, Pierluigi Zerbino, Amitabh Anand, (2020), "Back To The Future Of Knowledge Management Systems Off The Beaten Paths", *Management Decision* Vol. 58 No. 9, pp. 1953-1984 © *Emerald Publishing Limited 0025-1747*
- [36] Laszlo Hetey, Eddy Neefs, Ian Thomas, Joe Zender, Ann-Carine Vandaele, Sophie Berkenbosch, Bojan Ristic, Sabrina Bonnewijn, Sofie Delanoye, Mark Leese, Jon Mason, Manish Patel, (2020), "Development Of A Knowledge Management System For The NOMAD Instrument Onboard The ExoMars TGO Spacecraft", *Aircraft Engineering And Aerospace Technology* 92/2 81–92, *Emerald Publishing Limited [ISSN 1748-8842]*
- [37] Dana Indra Sensuse, Hadiyan Nur Rochman, Shidiq Al Hakim, Winarni Winarni, (2020), "Knowledge Management System Design



Method With Joint Application Design (JAD) Adoption”, *VINE Journal Of Information And Knowledge Management Systems*, © Emerald Publishing Limited 2059-5891

- [38] Maoka Andries Dikotla, (2021), “Remodelling Public Sector Knowledge Management System Using Key Knowledge Management Processes”, *Collection And Curation*, © Emerald Publishing Limited [ISSN 2514-9326]
- [39] Peter Pawlowsky, Nina S. Pflugfelder, Maik H. Wagner, (2021), “The ISO 30401 Knowledge Management Systems Standard – A New Framework For Value Creation And Research?”, *Journal Of Intellectual Capital Vol. 22 No. 3*, pp. 506-527 © Emerald Publishing Limited 1469-1930
- [40] Fernandez I, B., Sabherwal R, (2014), “Knowledge Management System And Process”, *Prentice Hall M.E. Sharp, Inc.*
- [41] Regulation of the Minister of State for Administrative and Bureaucratic Reform, Number 14 of 2011 with reference to Guidelines for the Implementation of Knowledge Management Programs, Jakarta.
- [42] Peter Sun, (2010) "Five Critical Knowledge Management Organizational Themes", *Journal of Knowledge Management*, Vol. 14 Issue: 4, pp.507-523
- [43] Law Number 17 of 2014 with reference to the People's Consultative Assembly, the People's Representative Council, the Regional Representative Council, and the Regional People's Representative Council
- [44] Alan Dennis, Barbara Haley Wixom, Roberta M. Roth, (2012), “System Analysis And Design, Fifth Edition”, *Copyright © John Wiley & Sons, Inc*
- [45] Gary B. Shelly, Harry J. Rosenblatt, (2012), “Systems Analysis And Design, Ninth Edition”, © *Course Technology, Cengage Learning*
- [46] John W. Satzinger, Robert B. Jackson, Stephen D. Burd, (2012), “Systems Analysis and Design in a Changing World, Sixth Edition”, © *Course Technology, Cengage Learning*
- [47] Kenneth E. Kendall, Julie E. Kendall, (2011), “Systems Analysis And Design Eighth Edition”, *Copyright © Pearson Education, Inc., publishing as Prentice Hall*,
- [48] Regulation of the Republic of Indonesia Government Number 12 of 2019 concerning Regional Financial Management
- [49] Regulation of the Minister of Home Affairs of the Republic of Indonesia Number 64 of 2020 with reference to Guidelines for Preparation of Local Budgets for Fiscal Year 2021
- [50] Regulation of the Minister of Home Affairs of the Republic of Indonesia Number 90 of 2019 with reference to Classification, Codification, and Nomenclature of Regional Development Planning and Finance
- [51] Finance And Budgeting Team, (2007), “*Budget Supervision by DPRD*”, *USAID (United States Agency International Development) LGSP (Local Governance Support Program)*”
- [52] Legislative Strengthening Team, (2009), “*Analysis of APBD for DPRD Members*”, *USAID (United States Agency International Development) LGSP (Local Governance Support Program)*
- [53] LGSP Team, (2009), “Final Report”, *USAID (United States Agency International Development) LGSP (Local Governance Support Program)*
- [54] James Rumbaugh, Ivar Jacobson, Grady Booch, (2005), *The Unified Modeling Language Reference Manual second edition*, Pearson Education, Inc
- [55] Law No. 17 of 2003 with reference to State Finance
- [56] Minister of Home Affairs Regulation number 13 of 2006 with reference to regional financial management guidelines
- [57] Minister of Home Affairs Regulation No. 90 of 2019 with reference to Classification, Codification and Nomenclature of Regional Development Planning and Finance





- [58] Government Regulation Number 18 of 2016 with reference to Regional Apparatus
- [59] Law No. 28 of 1999 with reference to State Administrators that are Clean and Free from Corruption, Collusion and Nepotism
- [60] Widjisen, Triono, 2018, Design And Development Of APBD (Indonesian Local Government District Annual Budget) Information Systems Analysis Application, International Journal Of Advanced Research In Computer Science (IJARCS), Volume 9, No 4, July – August ISSN : 0976-5697, Page 1- 12
- [61] Avison, D. and Fitzgerald, G. (2006), “Information systems development: methodologies, techniques and tools”, Information Systems Series.
- [62] D. I. Sensuse, H. N. Rochman, S. A. Hakim and W. Winarni, "Knowledge management system design method with joint application design (JAD) adoption," VINE Journal of Information and Knowledge Management Systems, pp. 1 -20, 10 desember 2019.
- [63] Camel, E. George, J.F. and Nunamaker, J.F. (1992a), “Supporting joint application development (JAD) and electronic meeting systems: moving the CASE concept into new areas of software development”, Proceedings of the Twenty-Fifth Hawaii International Conference on System Sciences, IEEE.
- [64] Khanna E. 2017. On the applicability of Artificial Intelligence in Black Box Testing. International Journal On Computer Science And Engineering. 9 (5): 165–169
- [65] Tiwana, A. (1999). The knowledge Management Toolkit: practical technique for building a knowledge management system. London: Prentice-Hall, Inc.
- [66] Chen, Peter (March 1976). "The Entity-Relationship Model - Toward a Unified View of Data". ACM Transactions on Database Systems. 1 (1): 9–36. CiteSeerX 10.1.1.523.6679. doi:10.1145/320434.320440. S2CID 52801746.
- [67] Larman, C., 2005. Applying UML and Patterns. 3rd Edition. NJ: Prentice Hall.
- [68] Becerra-Fernandez, I., Gonzalez, A., Sabherwal, R. 2004. Knowledge Management Challenges, Solutions and Technologies. Pearson Prentice Hall: New Jersey