

# Development of Research and Community Service Information Systems (SIRIP) Based on Website

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## ABSTRACT

Information systems can be a tool for humans to store, process, and organize data. The sophistication of the information system will speed up the data processing process so that the time required by the user will be reduced compared to the manual method. The problem in this study is how to optimize research and community service information systems that can display research and service performance by integrating data from the LPPM sim and the need for data fulfillment from simlitabmas from the Ministry of Research, Technology and Technology. The data needs are in the form of research grants obtained from BRIN Ministry of Research and Technology funds and funds from non-Kemenristek / BRIN as well as research outputs in the form of publications, textbooks, intellectual property, etc. The purpose of this study is to develop a Research and Service Information System (SIRIP) by synchronizing data from SIMLPPM and the needs of SIMLITABMAS performance data. The urgency of this research is based on the fact that the management of coordination of research data input from each faculty and each institutional center and section at the university that has not been optimally coordinated, management of letters and management of making research decrees, and the need for research data and research outputs that must be inputted quickly to find out research performance of unstructured universities. Therefore, it is necessary to develop a Research and Service Information System (SIRIP) website by synchronizing data from SIMLPPM and the need for SIMLITABMAS performance data, which is an absolute necessity that must be done immediately so that research data management can be coordinated more optimally. The output targeted for this research is the website <http://SIRIP.unesa.ac.id> which serves as a portal for research data management. Additional outputs are scientific articles published in indexed international seminar proceedings.

**Keywords**— *Development, Website, Research, SimLPPM, Information System.*

## 1. INTRODUCTION

A university cannot be separated from the tri dharma activities that must be carried out by the academic community, especially lecturers. A lecturer is obliged to carry out tri dharma activities, namely education and teaching, research, and community service. Lecturers should carry out research and community service as a condition for promotion to the functional position of lecturers. All research and community service activities carried out by lecturers are coordinated and managed by institutions/units at a university. The Research Institute and Community Service Unit (LPPM) is one of the units at the State University of Surabaya which

is tasked with processing track record data of research activities and community service activities by lecturers [1].

Information systems can be a tool for humans to store, process, and organize data. The sophistication of the information system will speed up the data processing process so that the time required by the user will be reduced compared to the manual method. The advantages of using a database system include controlling data redundancy, limiting access rights, providing a storage structure for efficient query processing, providing multiple user interfaces, representing complex relationships or relationships between data, and improving data integrity. [2]. The utilization of computers as a medium of information has given a very important role in making a system that is safe and more efficient. This is evidence of technological developments so that access to

available data or information can take place quickly and accurately. Today many universities have implemented IT in their operations. Operations in question are educational, research, and community service activities (tri dharma of higher education). Each component of the university's tri dharma has a different complexity. LPPM is no exception, which handles research results and community service. From the observations, if community service activities do not apply IT assistance, various problems will arise in the implementation and evaluation of activities.

Community service activities are one of the activities that require the role of Information Technology (IT). The utilization of IT minimizes the possibility of the emergence of various problems in activities. Documents such as decision letters, assignment letters, proposals, and activity reports are often inconsistent. The evaluation of activities also has many limitations. If information is needed, such as who are the lecturers involved in the activity, what is the total cost for each activity or all of it is very difficult to know. The system built can help manage research activities and community service. When required administrative completeness such as Decree and Letter of Assignment, it can be generated automatically from the system. Proposal documents, reports and evidence of activity documentation can be uploaded into the system so that they can be archived digitally and structured. The system is expected to be a solution to the problems experienced. With the new system, human error can be minimized and the management of activities can be carried out more easily with the help of IT. By using a computer-based system the possibility of such errors can be minimized. Data for lecturers who take part in the activity is enough to enter once and then it can automatically be printed in the form of a decision letter or assignment letter. Evaluating the implementation of activities also has many limitations. If information is needed, such as who are the lecturers who are involved in the activity, who are the lecturers who do not participate in the activity in one period, what is the total cost for each activity or all activities, it is very difficult to know.

Based on the above problems, it is necessary to improve management to improve the performance of research activities and community service. LPPM (Institute for Research and Community Service) is an activity unit that functions to manage all research and community service activities carried out by lecturers in relation to improving the quality of lecturers [3]. In the field of research, LPPM, State University of Surabaya (Unesa) has been included in the independent cluster and Community Service (PKM) has entered the superior cluster. For activities to be managed properly and structured, a Management Information System (MIS) is needed. LPPM UNESA already has SIMLPPM to organize research data and community service. However, SIMLPPM has not displayed performance data that can be taken from various aspects, while the number of faculties and departments at the State University of Surabaya is very large.

Therefore, it is necessary to develop a Research and Service Information System (SIRIP) website by synchronizing data from SIMLPPM and the need for SIMLITABMAS performance data, which is an absolute necessity that must be done immediately so that research data management can be coordinated more optimally.

**2. METHOD**

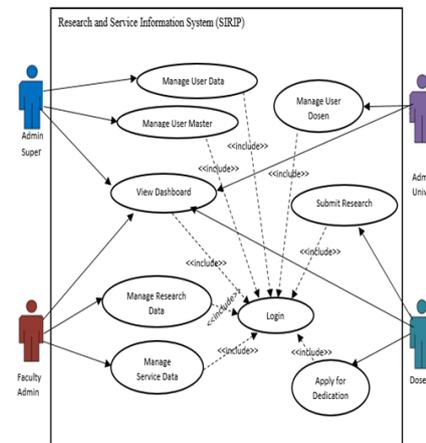
This study uses two data, namely primary and secondary data. Primary data was obtained directly from the source, namely the Research Institute and Community Service Division at the State University of Surabaya. Secondary data is data obtained from various sources other than LPPM Unesa, such as those related to the problem being researched.

**2.1. System Job Description**

The working description of SIRIP consists of Use Case, BPMN, DFD, CDM, and PDM which can be seen in more detail as follows.

**1. Use Case SIRIP**

SIRIP has 4 access rights namely, Super Admin, Faculty Admin, University Admin, Lecturers who have different tasks, as shown in Figure 1.



**Figure 1.** Use Case website SIRIP

The four access rights can access according to the access rights they have when they successfully pass the login process. Super Admin has access to user data manager, master data manager, and can view dashboards. Faculty admins have access to research data managers, service data managers, and can view dashboards. Univ admins have access to manage lecturer data and view dashboards. Access rights Lecturers have access to submit research and apply for service.

**2. BPMN**

BPMN (Business Process Model and Notation) or Business Process Model and Notation from SIRIP starts from granting access rights to lecturers, then the lecturer receives a username and password, followed by submitting research/service by the lecturer, which will later be managed and give a decision to accept research proposal or not by the faculty admin. In the final process, if not, the lecturer will get information on the rejection, if so, the lecturer, faculty admin, and university admin will get research/service data [3-5].

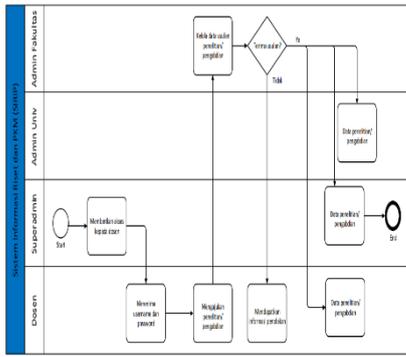


Figure 2. BPMN SIRIP

3. CDM SIRIP

The CDM of FINP has 18 continuous tables. The tables are User, Research Member, Service Member, Type of Research, Type of Service, Study Program, Department, Faculty, Service, Research, Research Scheme, Service Scheme, Source of Funds, Field of Excellence, Field of Science, Group, Research Outcomes, Outcomes Devotion, which in more detail can be seen in the following picture.

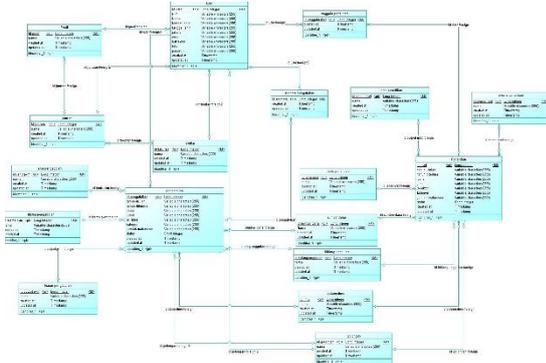


Figure 3. CDM SIRIP

4. PDM SIRIP

Contains tables from interconnected databases which have the same number as CDM, namely 18 tables and consists of tables User, Research Member, Member of Service, Type of Research, Type of Service, Study Program, Department, Faculty, Service, Research, Research Scheme, Service Scheme, Source of Funds, Field of Excellence, Field of Science, Group, Research Outcomes, Outcomes of Service, the details of which can be seen in the following picture.

5. DFD (Data Flow Diagram) SIRIP

Data Flow Diagrams (DFD) in research and research information systems contain workflows and system data [6]. In the diagram, this system has 4 users who have the following activities and data flows:

- a. superadmin
  - Has the most entities. The activities include logins, input lecturer data, faculty data input, funding source data input, research data input, service data input, and report export.
- b. Lecturer

Assigned to input research data or service, therefore the entity sends input in the form of research data and the output in the form of research reports and approval status.

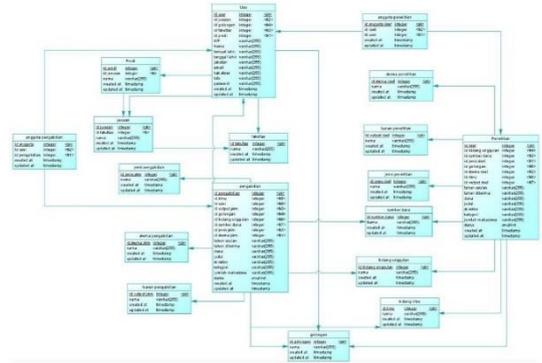


Figure 4. PDM SIRIP

- c. University Admin
  - Users admin of the university has 2 main entities, namely research reports and check graphs of research results.
- d. Faculty admin
  - Assigned to approve or reject proposals that have been submitted by the lecturer. Along with being able to see all the data on proposals in their faculties.

3. RESULT

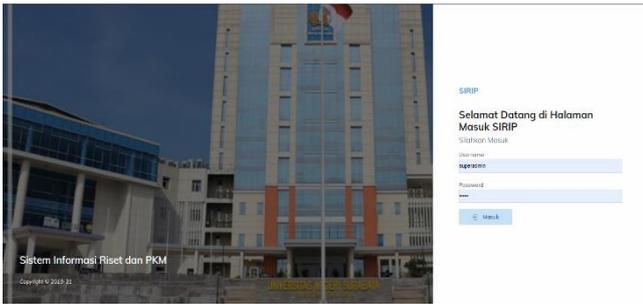
3.1. UI Display (User Interface)

SIRIP has several UI menu displays that can be seen on the initial screen after successfully logging in, namely on the dashboard page. On this page, it can be seen that FINP has 3 main menus as follows:

1. Data Analysis
  - This menu has a submenu containing the completeness of research data or service with the status of being rejected, accepted, or waiting.
2. Clustering Data
  - This menu contains data on books that have been made by lecturers.
3. User Data
  - This menu contains user data based on the admin access rights of each faculty and lecturer.
4. Master Data
  - This menu contains data that is the basis for input to this system, starting from a list of faculties, departments, study programs, types of sources of funds, types of fields of knowledge, types of superior fields, types of research or service outputs, types of research schemes or services, to data. group of lecturers.

3.2. Final Login Page

Figure 9 shows the Login page of SIRIP website. On this page, users can enter the username and password of each access right in the form on the right side of the website <https://sirip.lppm.unesa.ac.id/login> as in the following picture.



**Figure 5** SIRIPLogin Page

**3.3. Dashboard Page SIRIP**

The super admin dashboard page is the main view of users who have super admin access rights after successfully logging into the system. This page at the top of the dashboard display contains a research or service search column based on the year received and the field of knowledge, the search results are shown by graphs of UNESA research and service based on titles per faculty and graphs of UNESA research and service based on the relevant lecturers per faculty (FT is shown in color). red, FE blue, FBS with yellow, FIP in blue, FMIPA with purple, FIO with orange, and the last one is FISH with gray). On the left side of the dashboard page, there are options for analysis data (containing research data and service data) and user data (containing admin and lecturers).



**Figure. 6.**Dashboard SIRIP

**3.4. Research Data Page**

This page contains research data that has been registered in the SIRIP system, with the categories Name, Research Title, Rector's Decree, Year Received, Funds, Status, and Action (Member Data and Delete), This page also contains the status of the research proposal that has been submitted, the status can be in the form of waiting, rejected, and accepted. In addition to status, this page also has an “export” button which is used to retrieve research data based on the year it was received. On this page, the super admin can add research proposal data by using the "Add" button.

**3.5. Faculty Data Pages in Master Data**

This page contains a list of faculties in the form of a table as shown in Figure 5.10, where when the "department" button is clicked there are lists of majors, which includes a list of study programs when clicked on the "Prodi" button.

**3.6. Research Output Page and External Page of Devotion**

This page contains the types of outcomes resulting from a proposed study. These types of outputs are presented in tabular form. On this page, there is also a feature of adding the type of research output and this can be done using the “Add” button.

**3.7. Research and community service Type Data Page**

This page contains the types of research and community service data used in a proposed study. The types of this research are presented in tabular form which can be seen in Figure 14. On this page, there is also a feature to add research types and can be done using the “Add” button.

**3.8. Fund Source Type Data Page**

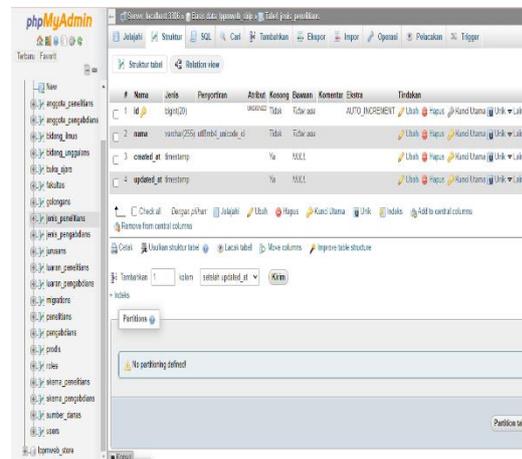
This page contains the types of funding sources used in a proposed research or community service. On this page, there is also a feature to add types of funding sources that are not listed in the table and this can be done using the "Add" button.

**3.9. Science Data Page**

This page informs the types of fields of science used in a proposed service or research. These types of fields of science are presented in tabular form. On this page, there is also a feature to add types of fields of knowledge that are not listed in the table and can be done using the "Add" button.

**3.10. Database Creation**

In making the application, a database is needed which is used as a data source and then stored on the server. One example of the results of creating a FINAL database can be seen in Figure 7.



**Figure 7.** Database Structure on the type of research

**4. CONCLUSION**

The creation of SIRIP can facilitate the needs of research data and community service. Several data of research and community service can be seen by faculty, type of research, research output so that comparisons and work evaluations can be carried out. The development of the FINAL website will always be carried out to meet data needs from various aspects so that it can facilitate access to research data needs and community service.

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