**International Journal of Advances in Data and Information Systems**
Vol. 3, No. 1, April 2022, pp. 1~10
ISSN: 2721-3056, DOI: 10.25008/ijadis.v3i1.1227


# Payroll Information System Design Using Waterfall Method

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**Article Info**

***Article history:***

Received Feb 24, 2022
Revised Mar 19, 2022
Accepted Apr 30, 2022

***Keywords:***

Payroll
Information Systems
Waterfall method
Sorong Islands District
ICT

**ABSTRACT**

The Sorong Islands District Office has problems in terms of employee payroll, because it is still carried out by means of recording using an employee job record book and tax deductions, etc. So it takes a very long time to record the salaries of employees according to class and position. This problem can be solved by utilizing ICT, which is to create a payroll information system according to class or position and the deductions evenly. The method used to design this payroll information system is the waterfall method, with Unified Modeling Language (UML), Macromedia Dreamweaver CS 6 for interface design and XAMPP for database design. The purpose of this research is to be able to process all employee salary data at the Sorong Kepulauan District office in detail so that it is effective and efficient in order to produce an information system that is fast, precise, and accurate.



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## 1. INTRODUCTION

Information and Communication Technology (ICT) is currently progressing very rapidly, this has become an attraction for private companies and government agencies [1],[2],[3],[4]. ICT has penetrated to operational problems in getting work done [5],[6],[7]. Each employee can complete their work by utilizing one of the ICTs, namely the website. Websites provide facilities such as storing and executing computer programs, finding and retrieving information [8-11].

Information in a company or agency is very important [12-14]. Due to lack of information, the company or agency will experience an inability to control resources, in the end, they will experience defeat in competing [15-17]. The value of information is determined by two things, namely the benefits and costs of obtaining it [18]. Companies or agencies use ICT to process transactions, reduce costs, generate income to payroll.

Salary is a form of remuneration or award given regularly to employees for their services and work. Salary is an important element for every company or agency [19], [20]. Every employee who works for an agency is entitled to a salary based on the applicable payroll regulations and provisions. Salary provision is not only important because it is the main impetus for someone to become an employee, but also because the salary given has a big role in the morale of the

employees [21],[22]. Therefore, the existence of an ICT capable of calculating salaries on time and with accurate amounts [23-25] is needed in a company or agency, one of which is the Sorong Islands District office.

The problem faced by the Sorong Islands District office is that employee payroll is still carried out by recording using an employee job record book and tax deductions, etc. So, it takes a very long time to record the salaries of employees according to class and position. This problem can be solved by utilizing ICT, which is to create a payroll information system according to class or position and the deductions evenly.

The design of this payroll information system requires an analysis of system requirements, such as system input requirements, system process requirements, system output requirements, software requirements, hardware requirements and user requirements [26-29]. The system design uses the waterfall method because this method has stages of work that are carried out sequentially, which means if the first stage has not been completed, it cannot proceed to the next stage of work. Each stage is interrelated because the output of the first stage will be the input for the next stage so that each stage must be completed properly. The purpose of this research is to be able to process all employee salary data at the Sorong Kepulauan District office in detail so that it is effective and efficient in order to produce an information system that is fast, precise, and accurate.

## 2. RESEARCH METHOD

The method used in designing payroll information systems is the Waterfall method. This method is a systematic and sequential information system development model [30-33]. This method flow can be seen in Figure 1.

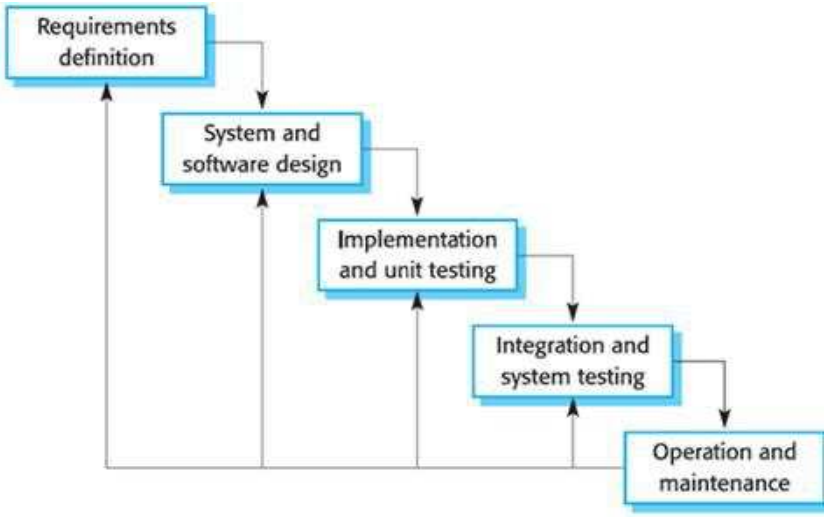


Figure 1. Waterfall method flow

1) Requirements Definition. This initial stage aims to find out the obstacles faced and to plan how the system will work. To achieve this goal, the process of collecting data from the Sorong Islands District office was carried out with direct interviews with 4 resource persons, namely one office leader, one treasurer and two Sorong Islands District employees.
2) System and Software Design. The second stage is system design using Unified Modeling Language (UML), Macromedia Dreamweaver CS 6 for interface design and XAMPP for database design.
3) Implementation and Unit Testing. The third stage is the system realization stage based on the results of the design that was made in the second stage, then verifying each program unit whether it has met the specifications and design.
4) Integration and System Testing. The fourth stage is the system testing stage, the system testing technique used is Black Box Testing. This test is carried out to see if

there is a problem with the system, as well as to ensure all units on the system are working properly. If no problems are found in the system, the system can be given to the Sorong Islands District office.

5) Operation and Maintenance. This stage is the stage that will be carried out if the system has been operated by the Sorong Islands District office.

## 3. RESULTS AND DISCUSSION

The description of the results and discussion in this research consists of system requirements, both hardware and software requirements, UML, payroll information system display to system testing.

### 3.1. System Requirements

This system requirement is divided into two, namely:

1) Hardware requirements, including one unit of Asus notebook with specifications Intel(R) Core (TM) i7-7500U processor, 2.70 GHz 2.90 GHz CPU, 8GB RAM, 1TB HDD.
2) Software requirements include Windows 11 Pro 64-bit, Macromedia Dreamweaver CS 6, XAMPP, Mozilla Firefox Web Browser Version 97.0.1 (64-bit), Rational rose.

### 3.2. Unified Modelling Language (UML)

UML in this research is used for the design of payroll information system. The sections consist of use case diagrams and activity diagrams.

1) Usecase diagram

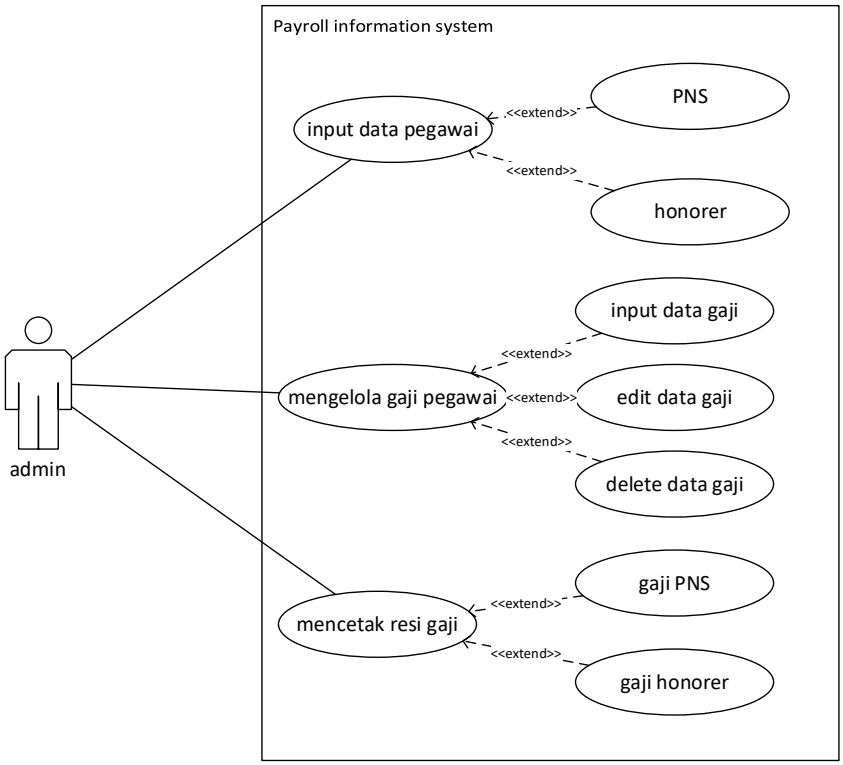


Figure 2. Usecase Diagram

Figure 2 shows a use case diagram in which there is one actor, namely admin. First, admin can input employee data, both Civil Servant (PNS) and honorary employees. Second, admin can manage employee salaries. In this case, admin can

input, edit and delete employee salary data. Third, admin can print employee salary receipts for both PNS and honorary employees.

2) Activity diagram

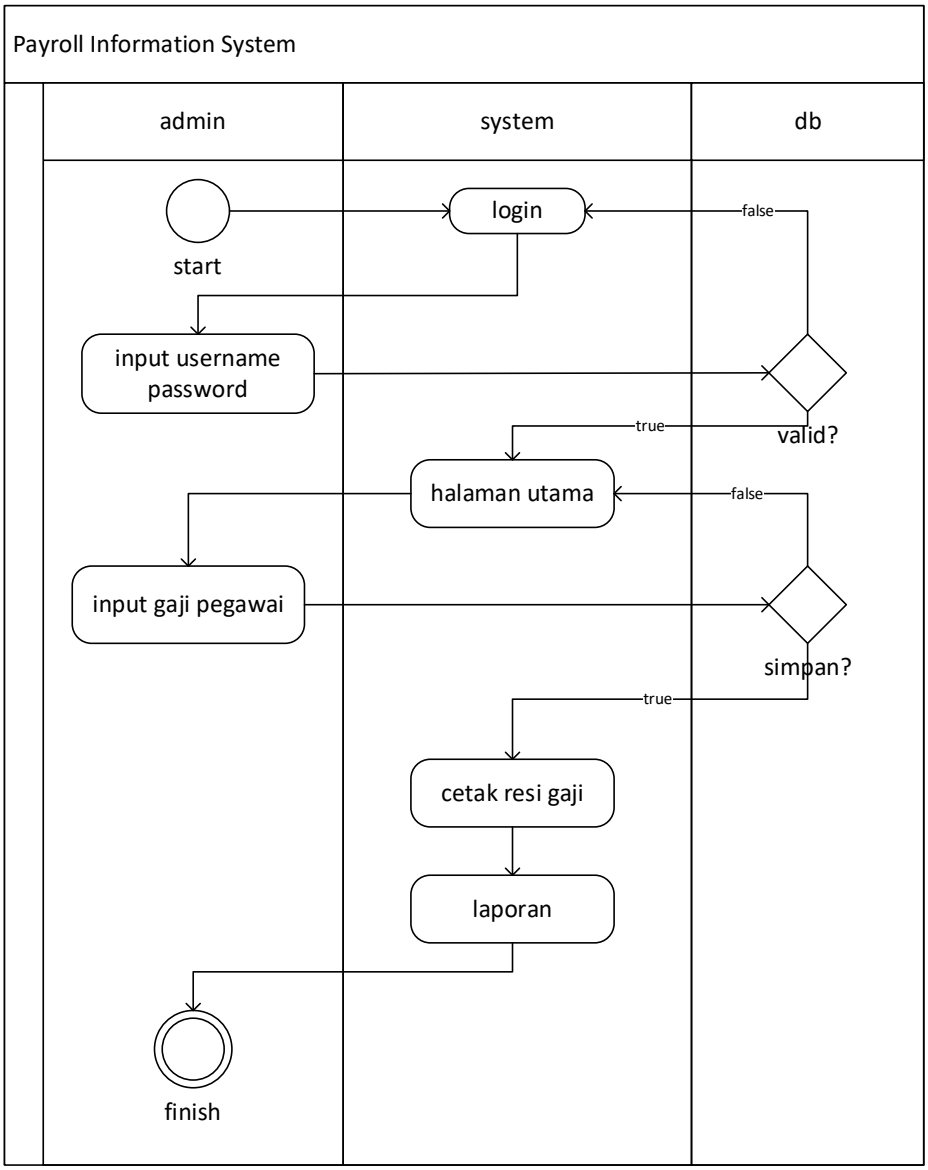


Figure 3. Activity Diagram

Figure 3 shows an activity diagram, which shows every activity carried out by the admin in the payroll information system. Admin can login through the system by filling in username and password, then can enter the main page of system to print the report.

### 3.3. Entiry Relationship Diagram (ERD)

ERD is a data model that uses several notations to describe data in the context of the entities and relationships described by the data. ERD in this research is used to explain the relationship between data in the database, where the admin can calculate the amount of civil servant salaries and honorariums which can be seen in Figure 4.

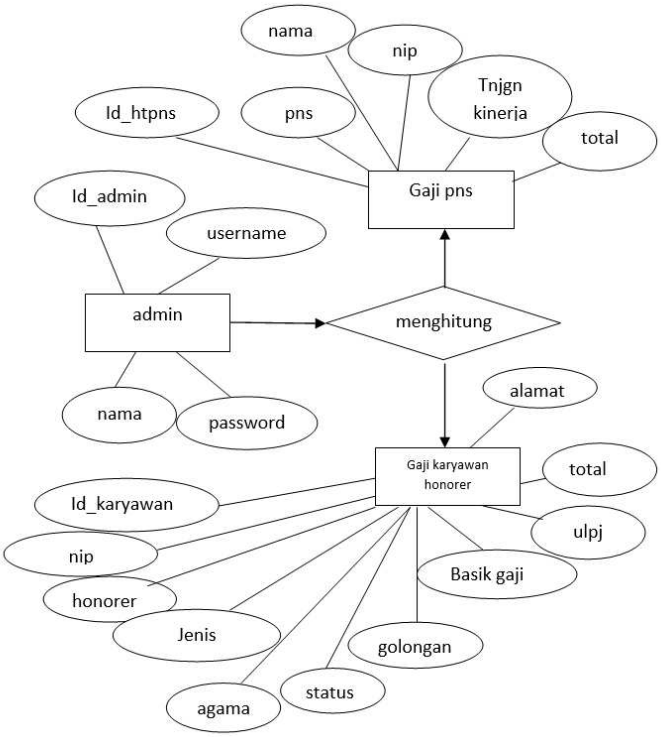


Figure 4. ERD system

### 3.4. Payroll Information System Interface

The entire interface of the payroll information system can be seen in the figure below:

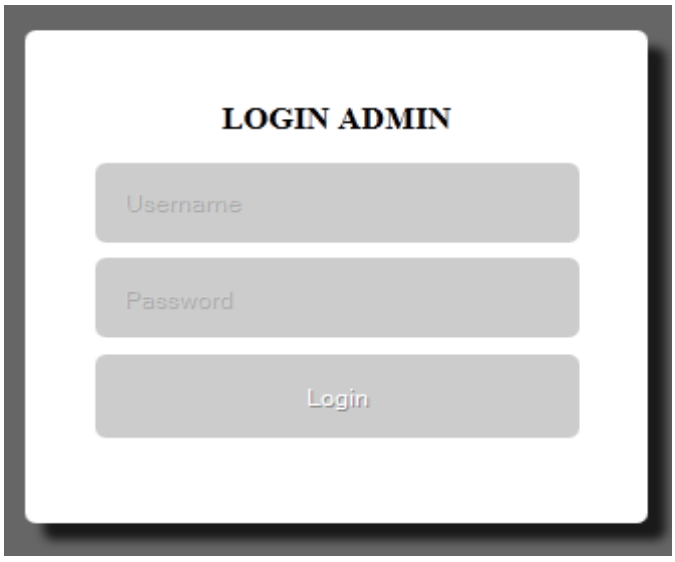


Figure 5. Admin Login Form

Figure 5 shows the admin login form, which is used by the admin to access the system by entering the correct username and password.


Figure 6. Main Page

Figure 6 shows the main page. On the main page there are several menus, namely Employee Data, Timesheet, Salary Slip, Payroll Period, Administrator, and Logout. All of these menus can be accessed by the admin if successfully logged in.

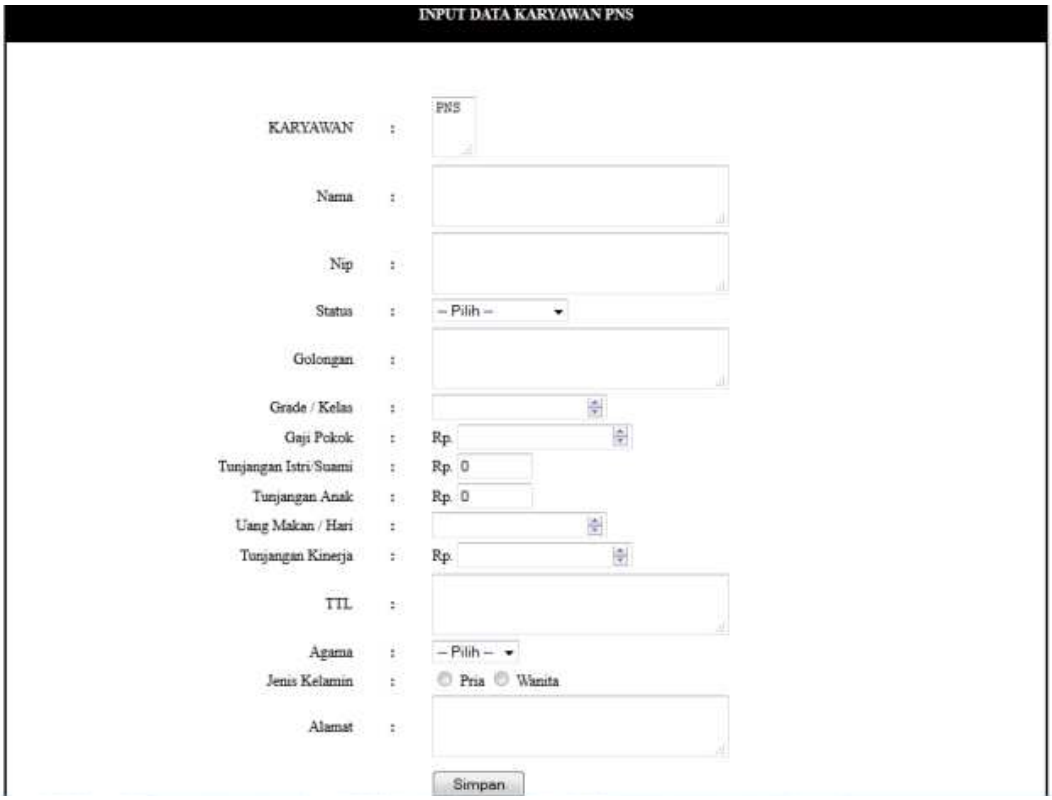


Figure 7. PNS data input page

Figure 7 shows the PNS data input page. On this page, admins can input permanent employee data, in this case civil servants. The data that must be filled in is name, ID, status, class, grade/class, basic salary, wife/husband allowance, child allowance, meal allowance/day, performance allowance, date of birth, religion, gender and address.

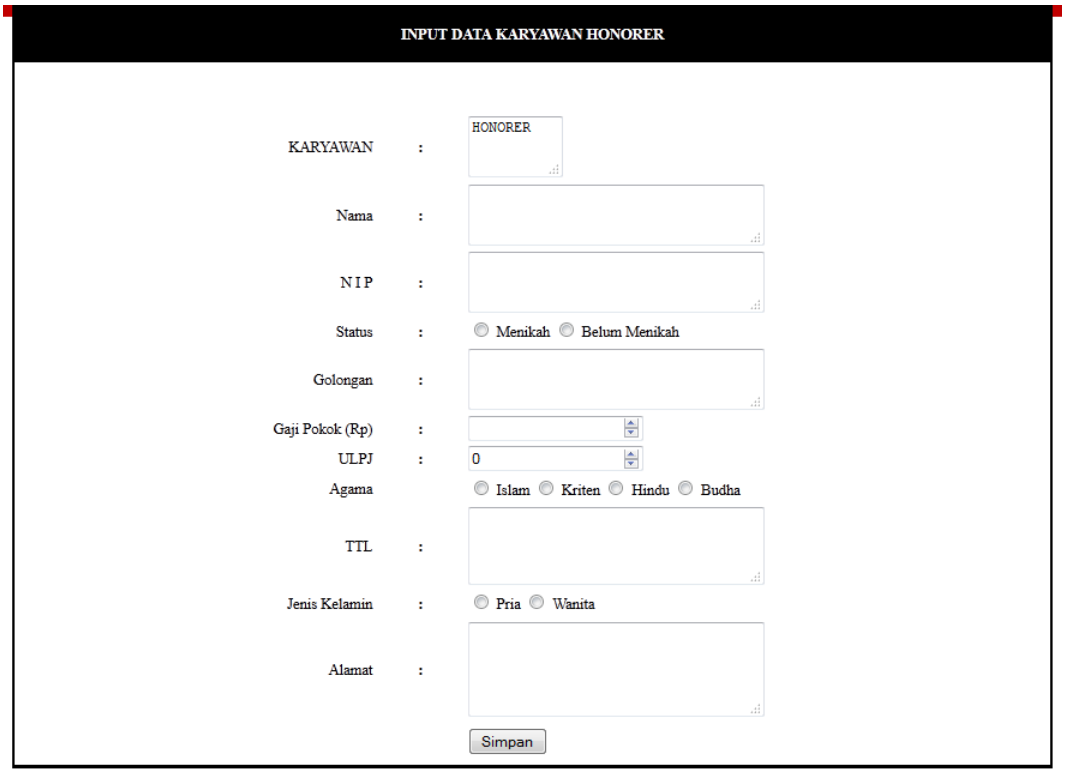


Figure 8. Honorary employee data input page

Figure 8 shows the honorary employee data input page. On this page, admins can input honorary employee data. The data that must be filled in is name, ID, marital status, class, basic salary, ULPJ, religion, date of birth, gender, and address..


Figure 9. PNS data page

Figure 9 shows the PNS data page, if the data has been entered successfully, the data will appear on this page.


Figure 10. Honorary employee data page

Figure 10 shows the honorary employee data page, if the data has been entered successfully, the data will appear on this page..

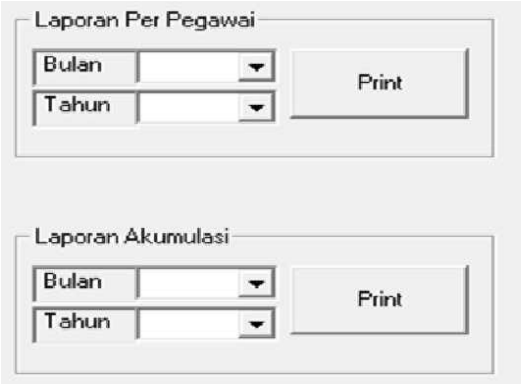


Figure 11. Report Page

Figure 11 shows the report page for each employee, the admin can make a salary report for each employee using this page.

### 3.4. System Test

This research uses Black Box Testing in testing the system. The tests carried out are observations of the results of system execution by using test data to check system functionality. Starting from the admin process login, managing data, printing reports, to logout, everything is valid. System test results are listed in Table 1.

Table 1. Black Box Testing

| Number | Function | Status |
|---|---|---|
| 1 | Admin login | Valid |
| 2 | Login using the wrong username and password, system refuses | Valid |
| 3 | Login using the correct username and password, system accepts | Valid |
| 4 | Input civil servant data (PNS) | Valid |
| 5 | Edit civil servant data (PNS) | Valid |
| 6 | Delete civil servant data (PNS) | Valid |
| 7 | Input honorary employee data | Valid |
| 8 | Edit honorary employee data | Valid |
| 9 | Delete honorary employee data | Valid |
| 10 | Print reports for each employee | Valid |
| 11 | Admin logout | Valid |

## 4. CONCLUSION

The conclusions from the description of the discussion in this study are:

1) The waterfall method is a suitable method used in this case research, because this method has stages of work that are carried out sequentially, which means if the first stage has not been completed, it cannot proceed to the next stage of work. Each stage is interrelated because the output of the first stage will be the input for the next stage so that each stage must be completed properly.
2) The information system created is also able to help process all employee salary data at the Sorong Islands District office in detail so that it is effective and efficient in order to produce an information system that is fast, precise, and accurate, because there is no need to make a recording using an employee's job record book and tax deductions, etc., and the time required is not long.

## ACKNOWLEDGEMENTS

The highest appreciation is conveyed to the Sorong Islands District office which is the place of research, as well as to the Information Systems Department and the Research and Community Service Institute of Victory Sorong University who have provided the opportunity to conduct research.

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