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Development of a Church Information Management System Using Scrum at HKBP Sola Gratia Kayu Mas Jakarta

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Abstract

The rapid growth of the congregation at HKBP Sola gratia Kayu Mas Church in Jakarta has posed challenges in managing member data efficiently and effectively. The previous data management system, which relied on Microsoft Excel, showed significant limitations in data retrieval, family grouping, and presenting birthday or elderly member information. This study aims to develop a web-based church congregation management information system using the Scrum methodology as an iterative and flexible software development approach. The research methodology includes observation, interviews, literature review, and black box testing. The results indicate that the developed system successfully meets user needs, simplifies congregation data management, and enhances the effectiveness of church administrative services. The implementation of Scrum has proven to be effective in accelerating development processes, accommodating changing requirements, and increasing user involvement through continuous evaluation. This system is expected to be replicable in other churches with similar needs as an integrated digital solution for congregation management.

Keywords : *Congregation Data Management, Hkbp Sola Gratia Information System, Scrum On Congregation System Development.*

1. INTRODUCTION

The church today is seen as an individual as well as an allied community. Fellowship of the church to hear the Word of God [1]. This allied community is also often referred to as members of the congregation [2]. In general, the number of members of a church from year to year is always increasing, this is due to several factors such as church turnover and higher births than the number of deaths. The growth of members of this congregation certainly requires better management so that it can be better served.[3].

HKBP Sola gratia Kayu Mas Church is a church in the East Jakarta area and is a small part of the HKBP Church. HKBP Sola gratia Kayu Mas Church is a large church that is experiencing a high growth in congregation membership. The number of congregations of HKBP Sola gratia Kayu Mas is currently 1500 members of the congregation with a total of around 500 families. At this time, the management of congregation member data is still using Microsoft Excel software. The use of MS. Excel can document the information of congregation members well. However, the management of congregation members using Ms. Excel files is less flexible in grouping congregation members by family. It is also difficult to find information about members of the congregation such as congregations that have their birthdays in a week, families whose wedding anniversaries, and the number of members who are over seventy years old. Ms. Excel's limitations have resulted in less than optimal service of the Church management to the members of the congregation. Given these limitations, a more robust, centralized, and web-based system

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is needed to effectively manage congregation data [4]. To answer this problem, this study proposes the development of a website-based Church Congregation Management Information System, to be able to help the Church manage congregation data. [5]. The system developed aims to increase the effectiveness and efficiency of church administrators in managing and obtaining information related to the congregation [6],[7]. Some of the key features in this system include grouping congregation and family data, birthday tracking, and presenting reports for church ministry purposes. [8],[9].

Table 1 Previous Research

Researcher & Year	Research Focus	Development Methods	Key Features	Limitations	Difference & Contribution of This Research
Oktavianus dkk. (2025)	Sistem informasi jemaat Gereja Pantekosta Serikat di Indonesia	Linear/traditional approach	Congregational data collection, simple report	There is no fast iteration mechanism; Limited Personal Service Features	This study uses Scrum for rapid iteration and integrates personalized service features such as birthdays, weddings, and seniors
Kandai & Manullang (2020)	Sistem pendataan jemaat Gereja Kristen Injili Tanah Papua	Waterfall	Web-based congregation data collection	No birthday/special service tracking; slow system adaptation	Full-featured for social-pastoral ministry and adaptive to user feedback
Purba (2023)	Aplikasi SIAJ-GBKP	Details not explained	Collection of data on members of the congregation	No report export module for announcements; No family grouping	This study adds data export to Excel and grouping of congregations by family
Royani dkk. (2022)	Sistem informasi gereja berbasis mobile di Gereja Toraja	Scrum	Mobile access for congregation data collection	Limited features on data input and access; No special features for large congregation ministry	This study applies Scrum to a web-based system with contextual features for large churches (family, elderly, marriage)
Penelitian ini (2025)	Sistem informasi manajemen jemaat Gereja HKBP Sola Gratia Kayu Mas	Scrum (iteratif)	Family grouping, personal birthday/wedding, senior, export report	The built-in features still focus on basic needs such as family grouping, birthday tracking, elderly identification, and report export.	Combining iterative Scrum methods with contextual congregational ministry features for large churches; easily replicated in other churches

The information system at HKBP Sola gratia Kayu Mas was developed as a website-based application [10],[11]. This application will be developed using the Scrum method. Scrum as one of the agile software development frameworks [12],[13], Enable iterative development through Sprint, thus accelerating the process of building a system, receiving feedback periodically, and adapting easily to changing user needs[14],[15][16]. This study describes the process of development, system design, and real implementation results through a case study at the HKBP Sola gratia Kayu Mas Church. The final result of this research is a web-based congregation member management application that will be used by Church administrators to manage congregation data that can be accessed *online*.[17][18],[19] This application will be a solution to make it easier for Church Administrators to manage the data of Church members both individually and grouped based on family. Congregational birthday data will also be displayed based on the duration of the date such as birthdays in the week. The birthday data of the search results will also be able to *be exported* to Ms. Excel files for reporting by Church administrators. The

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development of the congregation member management application is done in collaboration with several developers, so that the selection of application development using the scrum method will be very appropriate [21]. The author chose this method to speed up application development and also make it easier to adapt in case of changes [21], [22].

The novelty of this research lies in the development of a web-based Church Church Management Information System which is specifically implemented at HKBP Sola Gratia Kayu Mas by fully applying the Scrum method at all stages of development, from planning, coding, testing, to evaluation. Unlike previous research that generally used the SDLC approach or only built web-based systems in general, this study combines the design of features tailored to the needs of church ministries such as congregation grouping by family, personal birthday and wedding tracking, and elderly identification with an iterative agile approach to ensure quick adjustment to non-technical user input. This approach not only produces a functional and adaptive system, but also proves the effectiveness of Scrum in the context of religious organizations, which is rarely discussed in the literature, so it has the potential to be replicated in churches or other communities with complex data management needs, attached to previous research in Table 1 and the Comparative Evaluation of Development Methods in Table 2.

Table 2 Comparative Evaluation of Development Methods

Comparative Aspects	Scrum This Research	Conventional Scrum	Waterfall	Prototyping
Duration of the Sprint	1–2 weeks, to expedite feedback from church administrators	2–4 weeks as per Scrum practice standards	There are no sprints; sequential stages without iteration	Rapid iteration, but without a formal sprint structure
User Engagement	Very intensive on each sprint (including the planning and evaluation stages)	Intensive on *Sprint Review* and project start-ups	Low; generally only at the beginning and end of the project	High on prototype creation and evaluation
Change Flexibility	Very high; Real-time customized backlog based on user feedback	High, but the backlog is usually tightly controlled by *the Product Owner*	Low; Difficult changes after the running stage	Tall; prototype can be changed according to input
Process Structure	Iterative with *Daily Scrum*, *Review*, and *Retrospective* to ensure quality	Iterative with standard Scrum procedures	Linear: analysis - design - implementation - testing	Not as strict as Scrum; More focus on fast model creation
Suitability for Dynamic Needs	Very suitable, able to adjust features according to the dynamics of church ministry	Appropriate, but iterations can be slower due to longer sprints	Less suitable; unresponsive to change	Suitable for early exploration, but less systematic for full development
Key Benefits	Adaptive, quick response, close collaboration with non-technical users	Structured processes and proven effective across many projects	Complete and clear documentation at the beginning	Quick process in creating an initial overview of the system
Key Disadvantages	Requires high commitment from users and teams every week	Sprints are longer, response to changes is a bit slow	Difficult to adjust if needs change	Less suitable for complex systems that require strict quality control

2. RESEARCH METHODS

This research uses a software engineering approach with an agile system development model, especially the Scrum method. This method was chosen because of its flexibility and efficiency in dividing the development stages into small parts (sprints) that can be completed iteratively [13],[14],[15]. This research process includes the stages of collecting data on system needs, system design, software development, and system functional testing as seen in Figure 1.

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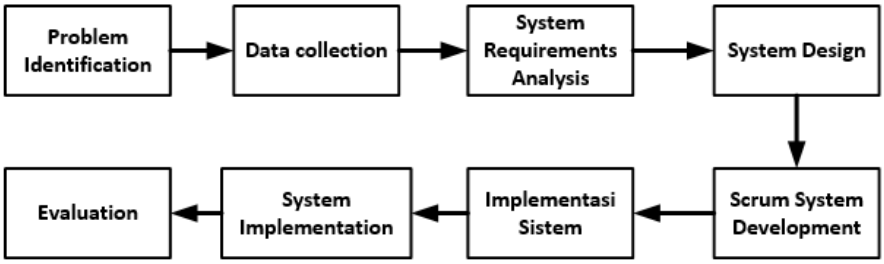

Figure 1 Research Methodology

2.1 Data Collection Methods

To obtain the needs of the relevant system and in accordance with the real conditions in the field, the researcher carried out several data collection techniques as follows:

a. The researcher conducted direct observation of congregation data management activities at the HKBP Sola gratia Kayu Mas Church. This activity includes recording new congregation data, updating data, searching for birthday information, and recording congregation families. From the results of this observation, an initial understanding of the workflow and obstacles faced by the church management was obtained.
b. Interviews were conducted with the church secretary and several other administrators to explore the functional needs of the system, such as the types of data that need to be stored, information that is frequently searched, and the flow of services that require information system support. Additional information such as the status of the congregation's activity, employment, and education was also obtained to enrich the congregation's profile data.
c. The researcher also conducted a review of various journals, articles, and other documents that discuss the development of church information systems and the application of the Scrum method in software development projects. This study helps to develop a framework and system structure that is in line with existing standards.

The data collected through observation, interviews, and literature studies is then systematically processed to produce a specification of system requirements. This process begins with qualitative data analysis from the interview results, where functional and non-functional needs information is identified, categorized, and prioritized. The results of this analysis are poured into a product backlog which contains a list of features to be developed. Next, this backlog is broken down into *sprint backlogs* for each development iteration. Each sprint begins with Sprint Planning which refers directly to the findings of field data, so that each feature that is worked on really answers the real needs of users. After implementation, the system is tested using *black box testing* with test scenarios that are also compiled based on the needs data collected in the initial stage. The test results are analyzed, and improvements are made in the next sprint until the system meets the criteria agreed upon with the user.

2.2 System Development Methods

The system development method used in this study is Scrum, one of the methods in agile-based software development. Scrum emphasizes teamwork, flexibility, and the development of systems in short iterations called sprints.[15],[16],[17],[18] The stages in the Scrum method applied in this study include:

a. Sprint Planning

The product development and owner teams discuss the product backlog and formulate a work plan for the first sprint. At this stage, needs analysis and initial system design such as use case diagrams, activity diagrams, and class diagrams are also carried out.

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b. Daily Scrum

Every day the team held a short stand-up meeting to report on the progress of the task, obstacles faced, and the next work plan. This aims to maintain coordination and continuity of work.

c. Sprint Review

After one sprint was completed, the team demonstrated the system to the church as a user. The feedback obtained is used for improvements and enhancements of features in the next sprint.

d. Sprint Retrospective

Internal evaluation is conducted by the development team to assess the work process, challenges that arise, as well as things that can be improved in the next iteration.

2.3 System Testing

System testing is carried out using the black box testing method to ensure that each function performs as expected. With Black Box Testing, developers only focus on the functionality of the developed system while the source structure of the code used does not need to be considered. [23], [24], [25]. This test includes all the main features, such as login, congregation data input, family grouping, birthday search, and presentation of data in the form of reports. Test results are recorded and analyzed to ensure no errors or failed functions.

To measure the system's effectiveness, a comparison of congregation data search times was conducted before and after the implementation of the system. The trial covered three search scenarios: (1) list of members having birthdays within the week, (2) list of families celebrating wedding anniversaries in the current month, and (3) list of members aged over 70 years.

Table 3 Comparison of Data Search Time

Search Scenario	Before System (Excel/manual)	After System (Web-based)	Time Saved (%)
Birthdays this week	8 min 30 sec	20 sec	96.1%
Wedding anniversaries this month	10 min 15 sec	25 sec	95.9%
Members aged >70 years	12 min 10 sec	30 sec	95.9%

Table 3 show the results show that the system can reduce data search time by over 95% compared to the manual Excel-based method. This improvement has a direct impact on accelerating church administrative and pastoral services, such as birthday announcements and visits to elderly members.

3. RESULTS AND DISCUSSION

3.1 Analysis of the Running System

Based on the results of observations and interviews at the HKBP Sola gratia Kayu Mas Church in Jakarta, it was found that the congregation data management system currently used is still manual with the help of Microsoft Excel software. Data management includes recording new members, family grouping, and searching for birthday data manually, so it takes considerable time and effort. In addition, limitations in accessing and classifying data result in services to the congregation being less optimal and not responsive to the latest information needs.

3.2 Information System Design

In designing a system, visual approaches such as use case diagrams, activity diagrams, and class diagrams are used to describe the flow and structure of the system. This information system was developed web-based so that it can be accessed flexibly by church administrators, both from the church office and from home. The main modules in the system include:

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- Congregation Profile Management: records personal data, occupation, active status, and date of birth.
- Family Data Management: grouping congregations into family units.
- Birthday Information: displays a list of congregations whose birthdays are based on a specific period.
- Congregation Data Aged 70 Years and Above: presents information on elderly congregations for special service purposes.
- Wedding Anniversary Information: displays family data celebrating wedding anniversaries.

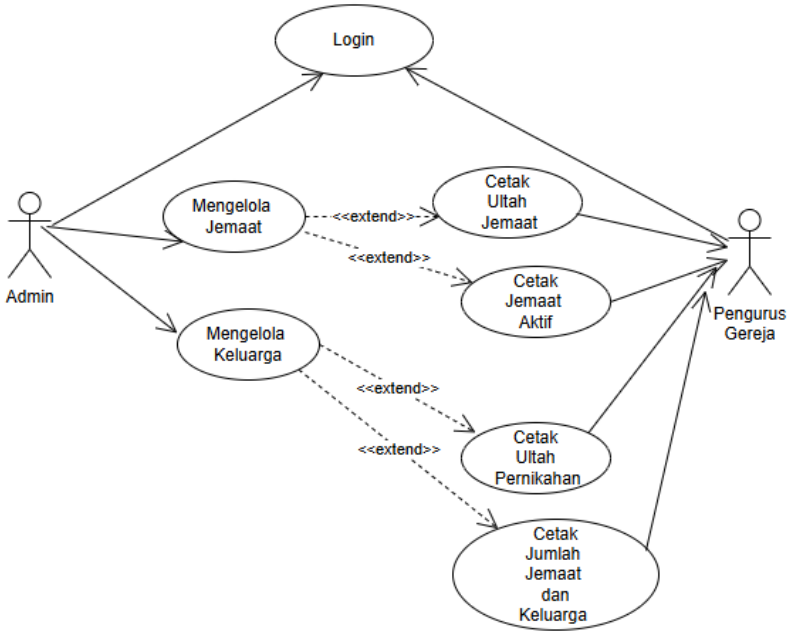

Figure 2 Use Case

The two main actors featured are the Admin and the Church Administrator. Admin is the Secretary of Huria who manages congregation data. Meanwhile, the next actor is the Church administrator, the Pastor who needs congregation data information. To manage and search congregation data, both actors must log in first.

3.3 Implementation with Scrum Method

The development process is carried out using the Scrum method which consists of several sprints. Each sprint includes feature planning, coding, initial testing, and evaluation of results. The following are the stages of implementation:

1. Sprint Planning: Define product backlogs such as login features, congregation data inputs, family groupings, and birthday reports.
2. Daily Scrum: Teams conduct daily meetings to ensure work progress and identify technical bottlenecks.
3. Sprint Review: Each sprint closes with a presentation of the system to the user (church administrator) to get live feedback.
4. Sprint Retrospective: Evaluations are conducted to refine the next sprint and improve teamwork efficiency.

The sprint results show that development with Scrum allows for gradual refinement of the system based on user input, while maintaining team productivity.

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3.4 System Test Results

The system is tested using a black box testing approach to ensure all functions are running according to specifications. The test was performed on the main features as seen in Table 4 below:

Table 4 System Testing

No	Features Tested	Description of Testing	Results
1	Login	Verify user access based on email and password	Succeed
2	Input Data Jemaat	Addition of new congregation profile data	Succeed
3	Add Family	Grouping of congregations in family units	Succeed
4	Show Birthday	Filter congregation data by date of birth	Succeed
5	Wedding Anniversary	Featuring a family couple celebrating an anniversary	Succeed
6	Congregations Aged 70 and Over	Filter congregation members by age	Succeed

The application of the Scrum method has been proven to support the development of the system iteratively and adaptively. Intensive communication in each sprint is able to bridge the needs of users and developers directly. The final results show that the system successfully automates the process of recording and searching congregation information, reducing reliance on manual processes, and accelerating the ministry of church administrators to the congregation. With the birthday tracking feature and information for the elderly, church services become more personal and on target. The system can also be easily further developed to support congregation statistical reports or integration with other church digital platforms.

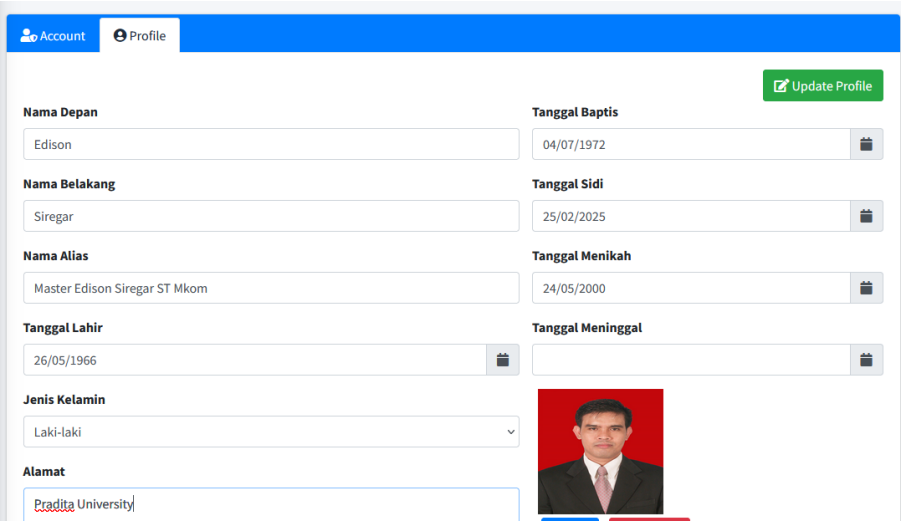

Figure 3 Web designing interface

Web Design Interface of Church *Church Management Information System* developed in a case study at HKBP Sola gratia Kayu Mas Jakarta. This description can be used in the results section or the attachment of your article. This information system is designed to be web-based so that church administrators and administrators can access it flexibly from various devices. The user interface (UI) is built with simple, intuitive, and informative principles, making it easier for users to input, search, and display congregation information. Here are some of the main interfaces developed:

a. Login Page

A starting page that serves to authenticate users. There is an email and password input field as well as a "Login" button. The system can only be accessed by registered users (admins or church administrators).

b. Dashboard Page

After successfully logging in, users will be redirected to a dashboard page that displays a summary of information such as:

1. Total number of congregations
2. Number of heads of household
3. Congregational birthday notifications this week
4. List of congregations over 70 years old

The dashboard makes it easy for users to get a quick overview of the condition of the congregation.

c. Church Data Page

This page is used to add, edit, and delete church data. The information recorded includes:

1. Full name
2. Place and date of birth
3. Work
4. Education
5. Activity status
6. Description (e.g., moved, died)

Search and filter features make it easy to quickly search congregation data.

d. Family Data Page

This page is used to create family units and group congregations based on family relationships (father, mother, child, etc.). This feature is important to support structurally grouping of data and family-based pastoral services.

e. Congregation Birthday Page

Displays a list of congregations whose birthdays are in a specific period (daily, weekly, monthly). Users can filter by date, and the results can be exported to an Excel file for church announcement purposes.

f. Wedding Anniversary Page

Presenting data on families who are or will celebrate their wedding anniversaries. This page is very useful in supporting spiritual ministries such as special prayers or pastoral visits.

g. Elderly Data Page (70 Years and Older)

This feature automatically displays congregations aged 70 and older based on their date of birth. This information is used by the church to provide special awards or services to the elderly congregation.

h. Responsiveness and Accessibility

The system interface is designed to be responsive, it can adapt to different screen sizes (desktop, tablet, and mobile). The color design and visual elements are customized to make them easy to read and use by users of all ages.

4. DISCUSSION

The results of the development of a web-based congregation management information system in the case study of the HKBP Sola gratia Kayu Mas Church show that the use of the Scrum method has a positive impact on the effectiveness and efficiency of the software development process. By dividing work into sprints, the development team can work more structured and flexible to changing user needs. The implementation of Scrum allows for rapid iteration and direct feedback from users (church administrators), so that the features developed are more targeted and in line with real needs in the field. Each sprint results in a live-testable version of the system, allowing for gradual evaluation of functionality and rapid correction of errors or inconsistencies. In terms of functionality, the system built successfully overcame the limitations of congregation data management which previously only relied on Excel. With the features of family grouping, birthday search, identification of elderly congregations,

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and the ability to export data to Excel, this system provides real added value in supporting church ministries administratively and social-pastoral. In addition, the success of this system also shows that the development of information systems in the church environment is not only technically possible, but also strategic in improving data-based services. The church can reach out to the congregation in a more personal way, such as giving a birthday greeting on time or organizing special activities for the elderly in a planned manner. In terms of challenges, some adjustments need to be made during the development process, such as re-explaining technical needs to non-technical users, as well as overcoming the limitations of developer time and resources. However, this can be overcome with a Scrum approach that emphasizes open communication and continuous evaluation.

Overall, the results of the development of this system can be a model that can be replicated by other churches with similar characteristics. The implementation of information technology in the religious ministry environment has been proven to not only increase administrative efficiency, but also strengthen the role of the church in the holistic ministry of the congregation.

5. CONCLUSION

This research has succeeded in developing a web-based church congregation management information system using the Scrum method, with a case study at HKBP Sola gratia Kayu Mas Church Jakarta. The system built has proven to be able to overcome limitations in managing congregation data which was previously done manually using Microsoft Excel. Features such as family grouping, birthday search, identification of elderly congregations, and wedding anniversary information, have made it easier for church administrators to carry out more effective, efficient, and structured services. The Scrum method has been proven to support the system development process iteratively and adaptively. Through a sprint approach, the development team can build the system gradually by receiving direct feedback from users at each stage. This allows the developed system to be more in line with the real needs in the field, and is easily adjusted if there are changes during the development process. Overall, the application of the Scrum method in the development of this system not only provides advantages from a technical point of view, but also has a positive impact on improving the administrative and social-pastoral services of the church. As a follow-up to the results of this study, there are several suggestions that can be considered. First, the system can be further developed with the addition of features such as congregation statistical reporting, worship attendance integration, or automatic reminder systems via email or SMS. Second, in terms of security, it is necessary to add an authorization system with different access levels according to the user's role so that the data is more protected. Third, training on the use of the system needs to be provided to church administrators to ensure that they can make optimal use of all the features of the system. Finally, this system has the potential to be replicated in other churches that have similar characteristics and needs, by making adjustments according to their respective contexts.

6. CONFLICT OF INTEREST STATEMENT

The author declares that there is no potential conflict of interest, whether financial or non-financial, that could influence the results of this research.

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of the Congregation: Empowering the Management of the HKBP Sola Gratia Kayu Mas Church" can be carried out.

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