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Centralize Data by Utilizing CMIS to Assist Church Leaders in Making Strategic Plans (Case Study: XYZ Church)

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Abstract – *Congregations are social entities that require a sense of community to function effectively. One of the most prominent locations for community engagement is the church. The diverse needs of congregants drive their attendance at church, including worship, social interaction, and spiritual growth. To fulfill these needs, churches offer a wide range of programs. To effectively address these needs, churches must have a clear understanding of the requirements of their congregants. A church management information system (CMIS) provides insight into the congregation's needs, enabling church leaders to comprehend their congregants' requirements and develop a strategic plan. The XYZ Church CMIS and data governance were developed based on a comprehensive literature review and input from IT professionals engaged in group discussions. This research's objective was to develop a CMIS to collect and manage data on the congregation and church. The insights from the CMIS have enabled church leaders to adjust event schedules. Prior to the implementation of the CMIS, the average attendance at events was below 20%. A review of the CMIS data over a 12-month period, in conjunction with the insights gained from group discussions with church leaders, revealed that event attendance had risen to above 70%. The church management information system has proven to be an effective tool for church leaders to create strategic plans for event scheduling, resulting in increased event attendance. In future research, it would be beneficial to consider not only enhancing event attendance but also increasing the number of congregants.*

Keywords: *Church Management Information System; Centralized Church Data; Church Event Grouping*

I. INTRODUCTION

The operation of a church differs from that of a non-profit corporation (Raiyetunbi et al., 2022). The church's purpose has evolved from its original function as a place for prayer and worship to a broader community role (Salaki Reynaldo Joshua et al., 2023). In addition to serving God, the community engages in various activities including learning about life, business, social activity, and charity. The community is comprised of individuals from diverse age groups, cultures, professions, and reasons for joining. Each church has a distinct vision and mission, shaped by its programmatic offerings. They frequently highlight their contributions to the community. Like other organizations, churches must understand their communities. This entails identifying community needs, members, joining patterns, reasons for joining, and other relevant information. The congregation is social people who need a community, so important for church to know who their congregations and their needs (UDAYA & ONYENEKE, 2023).

In the contemporary era, data has assumed a pivotal role for non-profit organizations (Troisi et al., 2023). Data is used in many ways, including the operational functioning of an organization, the impact of the external environment on it, and the societal perception of the organization (Fast et al., 2023). While organizations are aware of the value of data, not all organizations effectively leverage it. In certain instances, organizations may not prioritize data collection, necessitating the gathering of data when it is required. This process is frequently challenging, encompassing not only the collection of data but also the storage and management of data. Churches also require data management capabilities, including data collection and storage. Church

administration (Sihombing, 2023) and finances are necessary for every church, whether conducted manually or digitally (Crumroy et al., 2023). A web-based information system is a technology that can be used to archiving data, such as that pertaining to church congregations (Ananta & Somya, 2023)(Leoni et al., 2023).

The Church of XYZ has historically employed digital data management techniques, though not in a centralized manner. The church has five departments: office, discipleship, generation, worship, and theology. Each department manages their data such as their members, financial, program, event, and attendance. The church leader was concerned that the program and event were not necessary for congregation. The implementation of various events has resulted in a lack of enthusiasm among the congregation. In addition to being ineffective, the cost of these events is a waste of resources. Many events have been implemented, yet their efficiency remains questionable. Consequently, the Church of XYZ has initiated an investigation into the potential benefits of adopting updated technology that implemented at church.

This paper will examine the trend of churches providing for their congregations' needs and how they collect and manage data. In this context, a church management system (Sherpa, 2022) has been employed. (Wiratama & Desanti, 2022) has implemented a web-based information system to collect data on the health condition of the BNKB Permata church's congregation with the aim of mitigating the transmission of COVID-19. (Kristoper Purba et al., 2019) (Rupilele, 2018) has also implemented a web-based information system to store data related to the church, including pastor data, congregation data, baptismal data, activities, and the schedule of the church.(Raiyetunbi et al., 2022) developed and implemented a web-based ubiquitous church management and information system to manage the information of church members and evaluate their activities and process management. (Ananta & Somya, 2023) developed and implemented a web-based information system for managing the congregation and Sunday services of a particular church.

The church possesses a vast quantity of data, which is intricate and comprehensive in scope. (Heilbert Armando Mapaly et al., 2023)developed an Android-based mobile software to provide information and congregational news in a digital format. Moreover, the church's financial operations also require digitization (Salaki Reynaldo Joshua et al., 2023). This necessitates the development of a web-based financial information system to manage information on church finances. A set of social events is scheduled according to user preferences and behavior, spatiotemporal conflicts, and competing events to maximize the overall number of attendees. To ascertain user preferences and behavior, it is necessary to implement an effective data management strategy that aligns with an information governance model. (Paramita et al., 2023) put forth an information governance model and research methodology for the construction of data warehouses and business intelligence models for non-profit organizations. The modeling is focused on the event scheduler (Jain & Abhishaik, 2022).

There is a discrepancy between the existing state and the prevailing trend. The hypothesis of this research is that the trend was adopted by the church, which has a solution for its issues and can achieve its goals. There is a discrepancy between the condition of XYZ Church and that of the modern church. A literature review reveals that many churches have been compelled to manage their data digitally. In this research, XYZ Church has conducted a comprehensive analysis of the literature review data previously presented. The implementation of a management information system (MIS) has been identified as a solution for the XYZ problems, as identified by the community. Attendance at XYZ Church events has been monitored, and the number of attendees is above 70% of the event's capacity. This paper outlines the methodology employed in the study. Section 2 presents the methodology employed to implement the gap condition, while Section 3 provides a detailed account of the results and discussion. Section 4 concludes the research, outlining the hypothesis that was adopted or implemented based on the literature review's findings. Additionally, it presents a solution to the problem currently being faced by the XYZ Church. Finally, Section 4 presents potential avenues for future research.

II. METHODS

The methodology employed in this research involved a comprehensive literature review and a forum group discussion (FGD) in twelve months. The initial phase of the study involved an in-depth examination of the existing process and the associated issues. This was followed by an investigation into the manner in which church leaders create program and event schedules. Additionally, the study explored the processes by which congregation data is collected and managed by the church. Table I explains how churches collect and manage data and schedule programs and events.

Table I. The Existing XYZ Church Condition

Process		Issue	Expected
Collect and manage data	Input should be in a printed form and managed by each department.	Sometimes the data is not available.	The data is complete, centralized, and accessible.
Schedule event	Department meeting	The event was poorly attended, with fewer than 60% of people coming.	Over 70% of people attend each event.

For example, the monthly schedule of events is created in Table II, which has an average attendance of 20%. The church is structured into five departments: Office, Generation, Discipleship, Theology, Praise and Worship, and Marketplace. The Office department was the sole unit that did not hold an event, as its responsibilities encompassed pastoral care, church volunteer management, church financial and asset administration, and congregation

management.

Table II. The example of Church Monthly Schedule

Department	Event Day	Attendance (%)
Generation	Sunday, Friday	20
Discipleship	Monday, Wednesday	15
Theology	Tuesday, Thursday	10
Praise and Worship	Thursday, Wednesday	25
Marketplace	Friday, Saturday	30

The schedule is not discussed before, each department has their schedule. The other department knows about it when the room is reserved for this event. In the process, sometime department must be changed if its schedule conflicts with other event have reserved room before. Figure 1 explained how the department reserved rooms for its event.

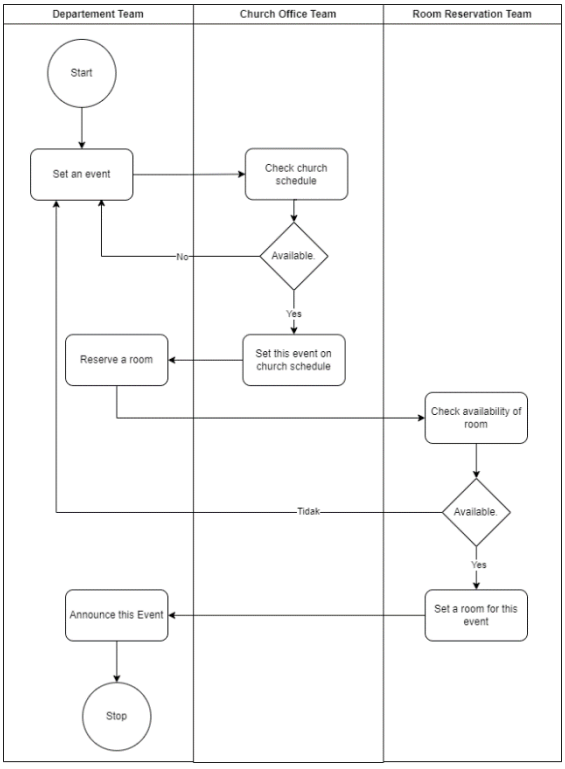

Figure 1. The Department Team has reserved a room for the event

A literature review was conducted to identify a solution for the issue and to establish an expected point, as presented in Table 1. Literature review has focused on how to collect and manage church data in church management information system. (Sherpa, 2022) (Wiratama & Desanti, 2022) (Kristoper Purba et al., 2019) (Raiyetunbi et al., 2022) (Heilbert Armando Mapaly et al., 2023) (Salaki Reynaldo Joshua et al., 2023) (Rupilele, 2018) (Hery et al., 2021)have implemented a web-based church management information system to manage church data and church operation management. (Jain & Abhishaik, 2022) proposed the implementation of an event scheduler as part of the church information system, which would enable users to be notified.

The church management information system has been designed and implemented in accordance with the specifications depicted in Figure 2. The system is designed to collect church data, view church data, create an event schedule, and view event schedules.

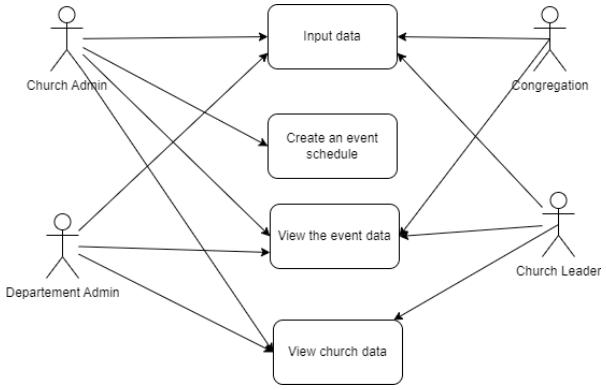

Figure 2. New Church Management Information System Use-Case Model

Data governance was also important. The existing condition, the XYZ Church data governance as Figure 3. The church data is depicted separately. Each database is managed independently by different departments.

Figure 3. Existing Data Governance Model

(Paramita et al., 2023) proposed a data governance model, depicted in Figure 4, which was adopted for CMIS. CMIS manages the data, with each data item related to other data items.

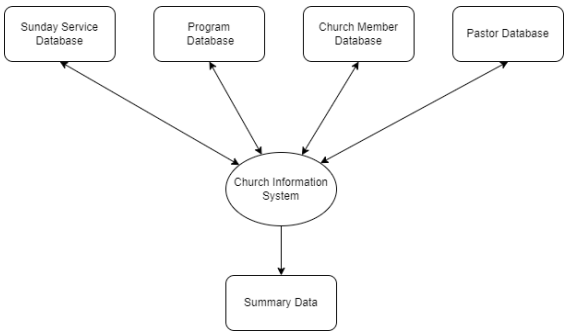

Figure 4. The proposed data governance model (Paramita et al., 2023)

Prior to the implementation of data governance (Paramita et al., 2023), an examination was conducted of the existing database. The database was evaluated with regard to its structure and correlation with other databases (Gillenson, 2023).

A new CMIS architecture and design were developed over the course of one year, based on a comprehensive literature review (Nugroho & Jayanti, 2017) (Pah, 2016) (Sakriwasista, 2009) (Halim & Somya, 2023) (Asih et al., 2022). Subsequently, the CMIS was employed to devise a strategic event scheduling methodology, as depicted in Figure 5. After data collection, the data was subjected to analysis, and a strategic approach was developed to create an event schedule and conduct FGDs with the data. A novel concept was created, and the event was classified according to age categories. The event was scheduled with

three scenarios, each implemented over three months and then reviewed. The results of each scenario were subjected to analysis. The scenario was deemed a success if the attendance rate exceeded 70%.

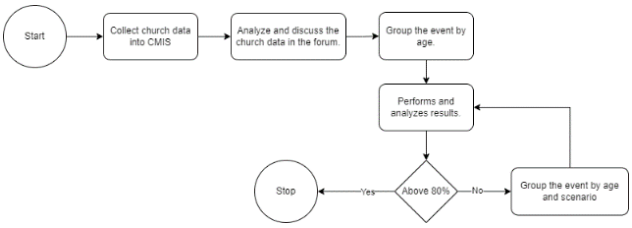

Figure 5. Create a Strategic Event Scheduling Approach

III. RESULTS AND DISCUSSION

The outcome of this research was the development of the XYZ Church Management Information System. The CMIS is employed to collect and manage data pertaining to the church for all departments. Each department lacked an application or form through which it could obtain data and manage itself. As illustrated in Table III, the data is managed by the CMIS.

Table III. The XYZ Church MIS Data

Data	Description
Congregation	The data set includes personal information such as name, date of birth, address, hobbies, and interests.
History of event attendance	A list of attendees at this event is provided.
Department data	A list of the programs and events scheduled for the coming period.
Church data	Organizational data encompasses a range of information, including management data, operational data, and financial data.

After one year, CIMS has amassed a wealth of data that enables the church to gain insights into its congregation and the activities it engages in. The church is able to ascertain the identity of its members, the attendance figures at each event, and the schedule of events. This data empowers the church leader with the ability to gain visibility into their church. The CMIS data is analyzed by church leaders to create a strategic plan. In this research, the church leader utilized the data to create a schedule of events. The data on the congregation allows the church to ascertain the number of congregations, the age of the congregations, and the area in which the congregations reside. This data is then related to the history of events, including the trend of participants and events, the number of attendees, and the number of events. The church leaders have visibility of every department and can relate the data from each department to the data from the church.

The objective of this research is to analyze congregation data and the history of event attendance. Prior to the development of the CMIS, the department team's sole focus was on their respective programs and the availability of rooms. There was no interdepartmental coordination. With the implementation of CMIS, all departments can collaborate with church leaders to develop an event schedule. A forum group discussion was held, resulting in the formulation of a strategic concept. The church and department leaders opted to alter the classification process for scheduling events, moving away from a department-based approach and instead adopting an age-based categorization.

The age-based categorization was developed through an analytical process and a discussion among church leaders and IT experts. The CMIS data revealed a relationship between age, interest, hobbies, and residence address. Based on this concept, the church leader modified the way in which event categories were organized, moving from a departmental to an age-based structure. The age of attendees is classified into five categories: children (below 13 years), youth (below 20 years), college (below 30 years), professional (below 40 years), and senior (above 40 years). Based on the age concept, all departments must collaborate to create an event.

The new concept was subjected to a three-month trial period. The newly proposed event schedule is presented in Table 4. The new concept has yielded positive results, with an average attendance rate exceeding that observed prior to its implementation, 41.7%.

Table IV. The outcome of the newly proposed event schedule concept

Event	Day	Frequency	Attendance (%)
Children	Sunday	biweekly	40
Youth	Saturday	weekly	30
College	Saturday	weekly	45
Professional	Friday	biweekly	40
Senior	Monday	weekly	50
General	Wednesday	weekly	45

The outcome of Table IV is not aligned with the desired outcome of 70%. Consequently, the church leader has deliberated and identified three potential scenarios for improvement: modifying the day of the week, the frequency of events, or both. The initial step involves a historical analysis of event attendance, which revealed that the day of the week for children and professional events has been changed to Saturday, while the days for youth and college events and senior events have been changed to Friday and Thursday, respectively, as shown in Table V.

Table V. The outcome of the initial scenario event schedule concept is as follows:

Event	Day	Frequency	Attendance (%)
Children	Saturday	biweekly	53
Youth	Friday	weekly	60
College	Friday	weekly	55
Professional	Saturday	biweekly	51
Senior	Thursday	weekly	57
General	Thursday	weekly	50

The schedule, as depicted in Table V, was implemented over a three-month period, resulting in a 54.3% success rate. Although the attendance figure has improved in comparison to the previous period, it remains below

70%. Consequently, scenario 2 has been implemented, with a modification to the frequency of events. Specifically, the frequency of events for children and professionals has been reduced to weekly, while the frequency for youth, college, senior, and all ages has been changed to biweekly, as shown in Table VI. This scenario was operational for a period of three months, and the results are 57.5%.

Table VI. The outcome of the second scenario event schedule concept is as follows:

Event	Day	Frequency	Attendance (%)
Children	Sunday	weekly	50
Youth	Saturday	biweekly	65
College	Saturday	biweekly	60
Professional	Friday	weekly	50
Senior	Monday	biweekly	65
General	Wednesday	biweekly	55

The event schedule of the Table VI analysis indicates that the change in the frequency of the event has had an impact, although it is not statistically significant. The resulting value remains below 70%. The final scenario in this research involved implementing the third scenario, which altered the day and frequency of the event (a combination of the prior and secondary scenarios). The third scenario, which pertains to children and professional events, has been modified to occur on Saturdays and on a weekly basis. In contrast, the days for youth and college events and senior events have been changed to Fridays and Thursdays, with the intention of making them occur biweekly, as shown in Table VII. The impact of the third scenario on the attendance numbers is indicated by an average attendance above 70%, 78.3%.

Table VII. The outcome of the third scenario event schedule concept is as follows:

Event	Day	Frequency	Attendance (%)
Children	Saturday	biweekly	75
Youth	Friday	weekly	90
College	Friday	weekly	80
Professional	Saturday	biweekly	70
Senior	Thursday	weekly	85
General	Thursday	weekly	70

Scenario 3 demonstrated a more pronounced impact on the number of attendees. Table V demonstrates that the alteration of the day has resulted in an increase in attendance percentage, reaching approximately 54.3%. Furthermore, Scenario 2 has also contributed to an increase in attendance percentage, reaching approximately 57.5%. Although the outcome is not optimal, the combination of both scenarios has been implemented, and the result is shown in Table VII, with an attendance percentage of 78.3%. The findings of this research indicate a correlation between congregation data and the history of event attendance, which can be utilized to inform the development of strategic concepts for the creation of event schedules.

IV. CONCLUSION

The Church of XYZ has implemented a church management information system (CMIS) to collect data on its congregation, including personal information, hobbies and interests, and attendance history at church events. The CMIS was developed by a church team, with the architecture and design based on a review of relevant literature and IT expertise. The CMIS was developed in response to the church's requirements for developing programs and event schedules. CMIS was operational for one year before being established. A year's worth of data from the CMIS has enabled the church leader to implement changes to the event schedule. These changes were made based on age categorization and attendance, with a 41.7% increase. However, these changes were not sufficient, so the church leader has created a first scenario. This scenario involves changing the day of the event and the result, with an attendance of 54.3%. After this, a second scenario was created, which involved changing the frequency of the event. This was done in response to an attendance rate of 57.5%. Finally, the church leader devised a strategy to combine scenarios one and two into a single scenario, the third scenario. This resulted in an attendance rate of 78.3%. CIMS proved to be an invaluable tool in assisting the church leader in creating an event schedule that increased attendance over a year. For further research, CMIS can assist the church leader in developing a strategic plan, such as increasing the number of congregants and the number of churches.

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