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Implementation of Making Monitoring Control System (MOS) Applications to Know Cylinder Repair Codes in Paper Production Areas

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ABSTRACT

The rapid development of information technology has had an impact on various fields of life and professions. An organization usually has various kinds of business processes that it wants to achieve. Business models can assist in evaluating current and common business models out of business process automation (BPA). PT. XXX is a manufacturing company that produces paper with the largest output in Indonesia. The company is committed to implementing sustainable business principles in all of its operational activities. So far, Control Monitoring activities at the company are still carried out manually, starting from taking samples, checking the standard of a spare part, to preparing reports. This causes the ineffectiveness of the work cycle, so to overcome these problems a computerized system is created in the form of a Monitoring Control System (MOS) application for the Finance & Accounting department. With this application program, it is hoped that it will be able to reduce the use of paper in the process of monitoring, recording, and speed up the preparation of reports so that they are more quickly received by other departments at PT XXX.

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1. INTRODUCTION

The rapid development of information technology has affected various fields of life and professions. the existence and role of information technology in all sectors of life unknowingly has brought the world into a new era globalization is faster than imagined. The development of this information technology characterized by the rapid advancement of increasingly sophisticated computer technology facilitate the application of information systems within the organization. this matter causes system changes to agencies or companies that must also change. their way of working and began to switch from conventional to automatic (automation).

An organization generally has a wide range of business processes to achieve its goal. A business process is a series of activities that are interrelated with one another where if the business process goes well then the activities in an organization will run effectively and efficiently. The efficiency of business processes is an important thing that can improve the efficiency of the company

as a whole [1]. Business process modeling can help to analyze existing business processes and is usually followed by business process automation (BPA). BPA focuses on process and workflow automation through technology, integrated use of software and applications [2] [3].

PT. XXX is one of the largest vertically integrated manufacturing companies producing paper and paper products in Indonesia. The company is committed to implementing sustainable business principles in all of its operational activities. The company continues to increase production capacity and expand marketing areas to meet increasing domestic and international market demand, especially in the Asian market. The company's vision is to create a legacy by becoming the best paper producer in the world. While its mission is to utilize limited resources to carry out green, safe and efficient production processes, to provide the highest quality products for every customer need, and maximize shareholder value [4]. In supporting the company's business development, PT XXX has several interrelated departments. One of them is the Finance Accounting Department which consists of several sections, namely General Accounting & Tax, Budgeting, Cost Act & System Control, and Cost Control & Management Report. The business process of the Cost Control & Management Report section is to carry out cost monitoring activities on each type of part produced and to make reports to other departments. Control Monitoring is the activity of supervising the production process in the field (plant) by weighing each product sample and machine performance data so that it is following predetermined standards, analyzing products that do not comply with the standards with samples, and controlling the production costs of a product so that it is following the selling costs in the form of a report so that it does not cause any loss to PT XXX.

So far, Control Monitoring activities are still carried out manually, starting from sampling, and checking the standard of a spare part, to preparing reports. The problems that often arise are the use of paper in spare part sampling activities results in paper purchasing costs, printing costs, photocopying costs, and large filing space. The process of making a long report is due to the activity of transferring data from paper sampling into the Microsoft Excel application and making reports that takes a very long time and is not effective. From the business process analysis, PT XXX conducted it. in the form of making a computerized system in the form of an application, namely the Monitoring Control System (MOS) for the Finance & Accounting department which can reduce the use of paper in the monitoring and recording process, and speed up the preparation of reports so that they are more quickly received by other departments at PT XXX. Therefore, the purpose of this research is to create an application to assist the Finance & Accounting section in terms of Eliminate the use of paper by 100% in the monitoring process, making all monitoring reports automatic so that the time to create and submit reports is faster. Increasing the flexibility of using the system via mobile phones using an Android-based system. As is known, Android is the market leader in the mobile phone operating system. In this digital era, Android dominates the market by 85.9%. Meanwhile, the use of mobile phones has replaced laptops in terms of mobile capabilities [5].

2. RESEARCH METHOD

The type of research used is qualitative research, where qualitative research is also called qualitative naturalistic which shows that the implementation of this research occurs naturally or as it is and does not manipulate circumstances, as well as emphasizing natural descriptions. Researchers also used an action research type approach as a follow-up to the research conducted. Researchers make an ongoing effort to solve problems that occur in an institution [6][7]. Based on the research objectives to be achieved in this study, then data collection techniques used are interviews, observation, and documentation. Then the data obtained were then analyzed using a qualitative descriptive approach. The method used by researchers in system design to find out the Repairing and Sperpart Hydraulic & Pneumatic codes is the Waterfall method. The Waterfall method is a type of model used in the software development process and the program is tested utilizing black-box and white-box testing to ensure that the program functions properly as expected. namely where this study uses the waterfall model with the stages as shown below. The stages of the Waterfall model are illustrated in Figure 1 for building the system in this study, an explanation of each stage in the following sub-chapters:

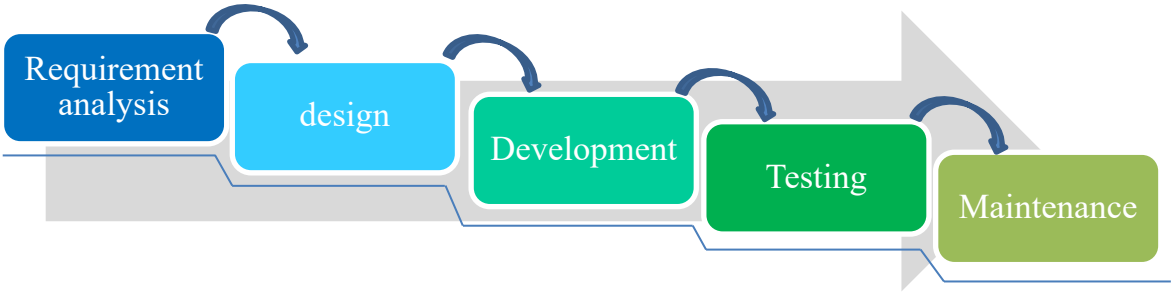

Figure 1. Waterfall Model [8][9]

The phases in the Waterfall Model [10] are

1. Analysis; collect comparative data needs and complete web service and web application technology developments and then analyze their feasibility to be used as a method in developing library information systems along with database requirements that must be met by the program to be created. This phase is done to produce a complete system design [11]
2. After obtaining the data in the needs analysis process, the data is converted into a "blueprint" prior to implementation (making the system). In this stage, the process is carried out to design output, input, program procedures, hardware and software to build an information system. In this study designed several features that have been described in Figure 2, including: data recording features, data calculations, and report generation.

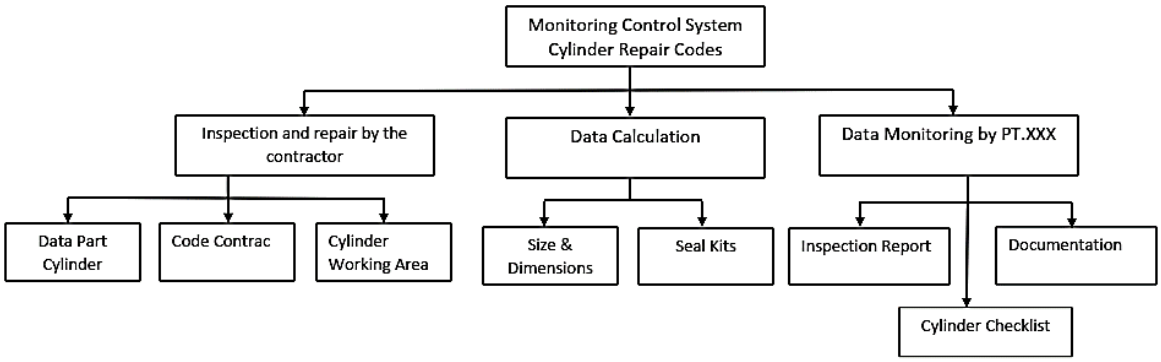

Figure 2. Monitoring Control System System Sitemap Cylinder Repair Codes.

Figure 2 illustrates the monitoring control system cylinder repair codes. the description of the picture is as follows:

a) Monitoring Control System Cylinder Repair Codes performs Inspection and repair by the contractor, Data Part Cylinder, Code Contract, Cylinder Working Area.
b) Monitoring Control System Cylinder Repair Codes perform Data Calculations to calculate Size & Dimensions, Seal Kits.
c) The Monitoring Control System Cylinder Repair Codes system makes reports for Inspection Reports, Documentation, Cylinder Checklist reports.

Use case diagrams to describe the expected functionality of a system. A Use-case diagram is a diagram that describes the interaction between the system and external parts of the system as well as with use. A use case represents an interaction between actors and the system to find out information system activities at PT. XXX between the user and the system is presented with a use case diagram and can be seen in Figure 3 below.

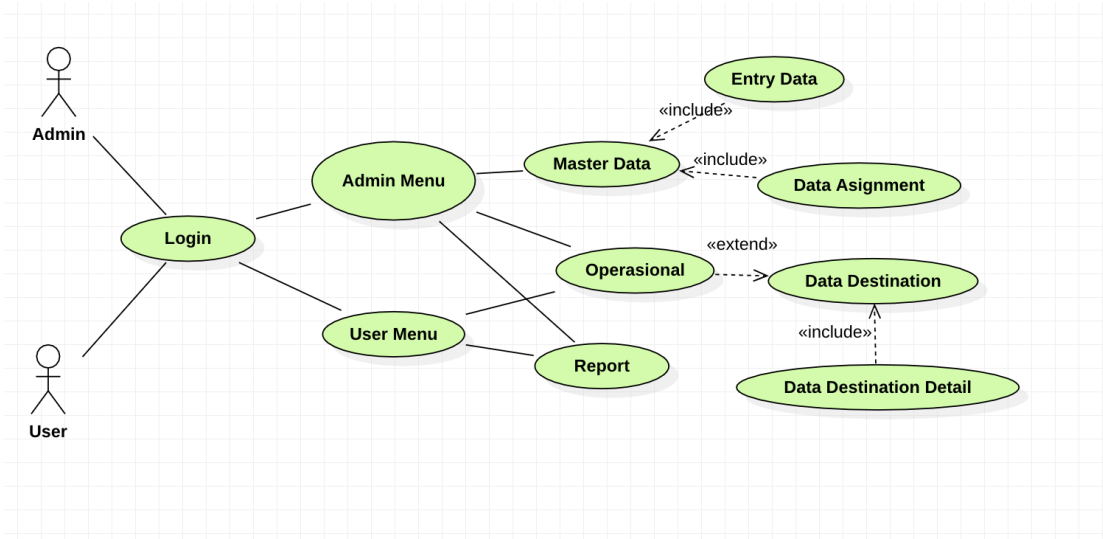

Figure 3. Usecase Diagrams

Figure 3 illustrates monitoring control system cylinder repair codes. explanation of the picture is as follows: admin enters data collection of cylinder part data, code contract, cylinder working area, then master data performs calculations, then sends inspection report, documentation, cylinder checklist to master data, then master data will send a report to the admin.

3. Code; The Coding stage is the stage where the results of the software design are translated into a language that can be understood by computers. This study uses the C# programming language because this programming language supports Interctive UI/UX technology applications. The resulting database is stored in the code data application.
4. Test; System testing uses Black box testing, which considers the application as a black box where the user ignores the business system adopted. Blackbox testing focuses on the suitability of a component against specifications.

The existing facts are then analyzed and presented to answer research problems to achieve research objectives. The steps in conducting data analysis are as follows

1. Planning; in this stage, it is formulated how the system supports the needs in creating business value as well as the Activity Plan for making the system
2. Analysis; At this stage, observations are made on the existing system, analyzing the current business processes. Then an analysis of system requirements is also carried out so that functional and non-functional requirements of the system are produced.
3. Implementation; At this stage, the program code is generated and the application is tested. This stage produces a prototype of the required application.
4. Prototype System; After the prototype that has been made is approved by the user, the prototype will be made into the actual system. If it has not been approved, it will be carried out again at the analysis stage
5. Drawing Conclusions or Verification Researchers try to describe the data collected which is poured into conclusions continuously throughout the research process. By increasing data through a continuous verification process, conclusions can be drawn.

3. RESULTS AND DISCUSSION

3.1. Analysis of Current Business Processes

Control Monitoring is a routine process of collecting data and measuring progress against program objectives. Monitor changes, which focus on processes and outputs. Monitoring involves calculating what we do. Monitoring activities are carried out by Control Monitoring staff but the activities at PT XXX are still manual, namely recording sampling consisting of a minimum of 5

samples for each part and then calculating production time and data producing parts using a check sheet. After that, the data from the sheet is transferred and processed into a report using the Microsoft Excel application. This system starts with the Control Monitoring staff doing direct monitoring in the field by bringing check sheets and checking tools used to measure each part. Furthermore, the actual data found in the field is entered into a check sheet. The data is then transferred to the staff's computer. After that, the staff made a report based on field data using Microsoft Excel and sent it via email to other parties.

3.2. Bisnis Proses Automation

After analyzing the current business processes, Business Processes are then applied Automation (BPA). In this case, the built business process does not change the business process existing ones, only automating the data input of each Repairing and Sperpart Hydraulic & Pneumatic in the field into the computer and efficiency of the report generation process. Business Process Automation is done by eliminating the data input process from the check sheet into Microsoft Excel and making it easier for department heads to view reports. The implementation of BPA is in the form of making an Online Monitoring System (MOS). Automation is carried out with the Online Monitoring System application found in [12][13].

Recording of monitoring activities carried out by Control Monitoring staff in the field which was originally done manually onto a check sheet on paper. The automation that is done is the staff input data for Repairing and Sperpart Hydraulic & Pneumatic in the field into an Android-based smartphone. The data will automatically be stored in the database and help reduce paper usage. Making reports by transferring data from the check sheet to the computer. Automation is carried out in the form of an automatic report generation function so that the time for making reports is faster. The latest reports can be seen by heads of departments or other related parties by downloading via the web-based MOS application.

3.3. Designing the MOS Online Monitoring System application.

The MOS Online Monitoring System application helps the Financial & Accounting department in determining Hydraulic & Pneumatic Repairing and Sperparts that are produced according to standards and provide benefits quickly and accurately. Making the MOS application is built using the PT XXX standard.

3.4. Data Planning

Data modeling in the MOS Online Monitoring System application is described in a class diagram. This class diagram is used as the basis for creating a database in the form of Blackbox Testing of System Features with tables. Table 3 explains the process trials of each stage in this research system feature.

Table 1. Blackbox Testing of System Features.

No	Test scenarios	Test Case	Expected results	Test result	
				In accordance	It is not in accordance with
1	Users can login to in the appropriate system with access rights each	Username = admin Password = admin	The system is expected to lead to the admin home page. The system is expected to lead to the user's home page that matches the username entered	In accordance	
2	Admin can display data for Hydraulic and Pneumatic Inspection Report Repair Code	The admin selects the Hydraulic and Pneumatic Inspection Report Repair Code data that will be displayed by the system	The selected Hydraulic and Pneumatic Inspection Report Repair Code data will appear in the Inspection Report data table	In accordance	

3	Admin can print Hydraulic and Pneumatic Inspection Report Repair Code data	Admin clicks on the Hydraulic and Pneumatic Inspection Report Repair Code data that will be selected	The selected DataInspection Report appears and is ready to be printed.	In accordance
4	Admin can Export Inspection Report data to Excel	Admin click data Export Inspection Report data to Excel	The selected Data Inspection Report is automatically saved or the file is downloaded in Excel format.	In accordance
5	Users can display Inspection Report data	The user selects the Inspection Report data that will be displayed by the system	The selected Inspection Report data will appear in the Hydraulic and Pneumatic Inspection Report Repair Code data table	In accordance
6	The user prints the Hydraulic and Pneumatic Inspection Report Repair Code data	The user clicks on the Hydraulic and Pneumatic Inspection Report Repair Code data that will be selected	The selected Hydraulic and Pneumatic Inspection Report Repair Code data appears and is ready to be printed.	In accordance

Testing is a description of specific interactions that must be tested by testers from the system designer or users to test the behavior of the software. Black box testing considers the input value in a study and ignores the internal mechanisms of a system [14]. At the testing stage, this research uses the Black Box testing method. Figure 4. Incoming Visual Inspection Report can be seen in the image below.

CUSTOMERS		FO NO	-
		DATE	-
CYL. NAME	-	PART NO	-
IO. NO	-	REFF	-
KODE UNIT	-	QTY PROCESS	-
INCOMING VISUAL INSPECTION REPORT			
HISTORY			
1. ROD	**CONDITION**		
	RECOMMENDATION		
2. TUBE	**CONDITION**		
	RECOMMENDATION		
3. HEAD END	**CONDITION**		
	RECOMMENDATION		
4. TIE ROD & NUT	**CONDITION**		
	RECOMENDATION		

Figure 4. Incoming Visual Inspection Report.

Incoming inspection, also known as receiving inspection, validates the quality of purchased raw materials, parts, or components based on established acceptance criteria. Standard time measurement for incoming QC operators. The existence of a time standard will be a reference for operators regarding how long activities must be completed and can determine the required workforce [15].

3.5. Implementation and Testing of the MOS Online Monitoring System Application

Monitoring Control System (MOS) Application Testing includes all forms contained in the application and accordance with business processes. Functions that are measured in outline include cataloging, cylinder working area conditions, cylinder seal data, and incoming visual inspection reports carried out by Control Monitoring staff and preparing reports [16]. The following are the results of application testing:

1. In the process of managing users, menus and roles on each form are given a validation to minimize application user errors in the data input process and are also given error messages if empty data is found or notifications have been running according to application needs.
2. After this application, the process of monitoring the repair code data for hydraulic and pneumatic inspection reports and management of reports becomes faster and easier to access. Previously, monitoring activities were still carried out manually with check sheets and entering data into Microsoft Excel to make reports.
3. In this application eliminates the use of paper because with this application it does not need paper for check sheets and photocopies.
4. The Monitoring Control System (MOS) application has accurate and actual data because it uses a real-time reporting system.

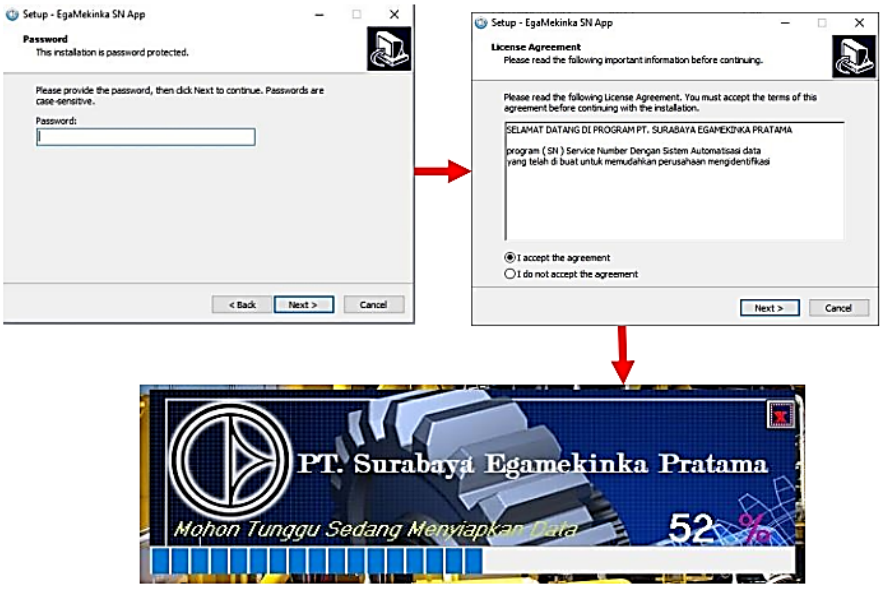

Figure 5. Visual Application When Installed.

Visual Application When Installed can be seen in Figure 5 above. The librarian login menu is a page provided specifically for admins or managers of hydraulic and pneumatic inspection report repair codes. In this menu, the hydraulic and pneumatic inspection report code manager can manage all activities that occur in the Inspection Process including cataloging, cylinder working area conditions, cylinder seal data, and incoming visual inspection reports. Display of the Hydraulic and Pneumatic Repair Inspection Report Code Application Report can be seen in Figure 6 below.

On the start page, users can immediately search for the desired hydraulic and pneumatic inspection report repair codes through the Monitoring Control System (MOS) Application. This page also displays several menus such as cataloging, cylinder working area conditions, cylinder seal data, incoming visual inspection report, and Librarian logins. Figure 5 above is a display of monitoring control system (MOS) application search results using the repairing data input keyword. By using the Application Monitoring Control System (MOS) system, search for catalog collections, cylinder working area conditions, cylinder seal data, and incoming visual inspection reports [6]. The many advantages gained by using the Application Monitoring Control System (MOS) system are very helpful for managers when compared to conventional systems used before. Previously, work on the system was still manual, it was not uncommon for errors to occur and required more time, now it can

be done more effectively and efficiently using the Monitoring Control System (MOS) Application system [17].

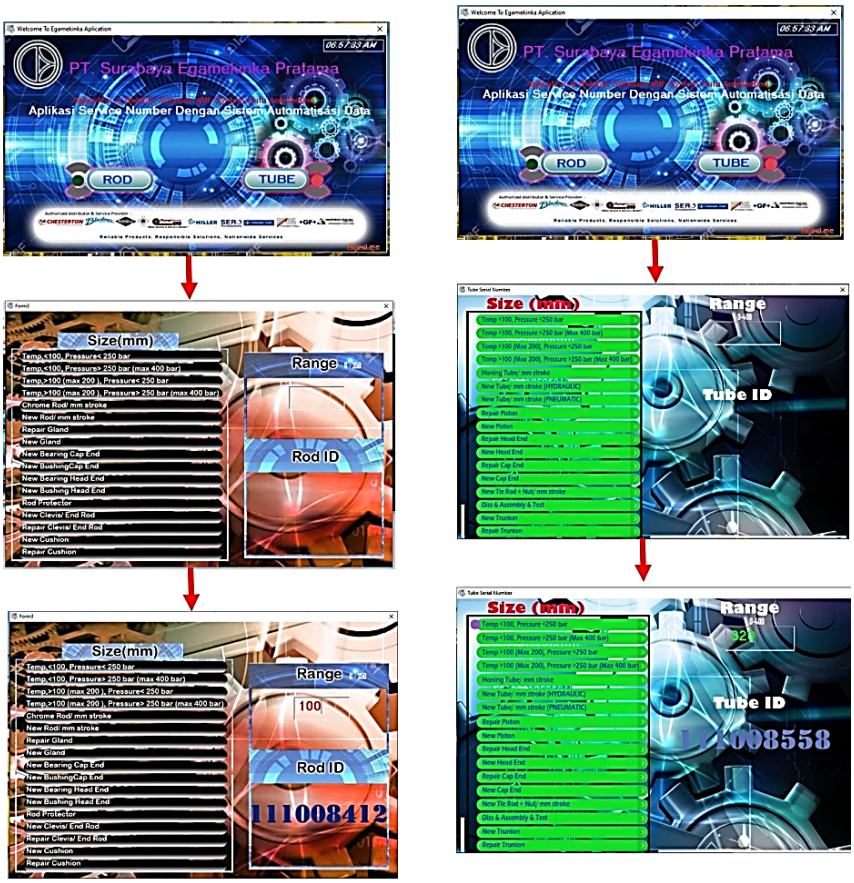

Figure 6. Appearance of the Hydraulic and Pneumatic Repair Code Inspection Report Application Report.

5. CONCLUSION

Daily recording activities in the context of sampling by Control Monitoring staff in the production area which were originally carried out using check sheets in the form of paper have been achieved using an Android smartphone or via the website. Thus, the use of paper in the monitoring process is 100% eliminated. The inputted data will be entered into PT XXX's database. Implementing a Monitoring Control System (MOS) Application Making System with Business Process Automation (BPA) is the right effort to overcome the problems that exist at PT.XXX To Know Hydraulic and Pneumatic Repair Codes and Materials Used in the Production Area. The Monitoring Control System system that exists in the paper industry, will make it easier for staff or users to work. This will make a series of data input activities for Repairing and Sperpart Hydraulic & Pneumatic more time-saving as well as more effective and efficient.

REFERENCES

[1] S. D. Larasati, S. A. Wicaksono, and N. H. Wardani, "Perbaikan Proses Bisnis Menggunakan Metode Business Process Improvement (BPI) (Studi Pada Bagian Riset Pemasaran dan Pusat)," *J. Pengemb. Teknol. Inf. dan Ilmu Komput. Univ. Brawijaya*, vol. 1, no. 11, pp. 1425–1432, 2017.

[2] M. Nikolaidou, D. Anagnostopoulos, and A. Tsalgatidou, "Business processes modelling and automation in the banking sector: A case study," *Int. J. Simul. Syst. Sci. Technol.*, vol. 2, no. 2, pp. 65–76, 2001.

[3] B.-Y. Chang, "Business Process Management of Telecommunication Companies : Fulfillment and Operations Support and Readiness Cases," Ajou University, 2011.

[4] N. Weni, "Analisis Profitabilitas Dan Likuiditas Untuk Menilai Kinerja Keuangan Pada Pt. Pabrik Kertas Tjiwi Kimia Tbk," Universitas Muhammadiyah Makassar, 2022.

[5] J. O. Malenje, "Challenges facing Business Process Automation in Public Universities in Kenya," *J.*

Emerg. Trends Comput. Inf. Sci., vol. 5, no. 4.

[6] A. Sani, "Library Automation Management System Based On Open Source Senayan Library Management System (SLIMS) (Case Study of the Library of H. Bata Ilyas STIE Amkop Makassar)," *J. Manag. Bus.*, vol. 1, no. 1, pp. 46–65, 2017, [Online]. Available: http://www.journal.stieamkop.ac.id/index.php/seiko/article/view/72%0Ahttp://www.journal.stieamkop.ac.id/index.php/seiko/article/download/72/72

[7] I. Arif, "Konsep dan Perencanaan dalam Automasi Perpustakaan," in *Seminar dan Workshop Sehari " Membangun Jaringan Perpustakaan Digital dan Otomasi Perpustakaan menuju Masyarakat Berbasis Pengetahuan "*, 2003, pp. 1–8. [Online]. Available: https://core.ac.uk/download/pdf/11883545.pdf%5Cnhttp://maunglib.do.am/Artikel/Konsep_dan_Perencanaan_dalam_Automasi_Perpustakaan.pdf

[8] A. A. Wahid, "Analisis Metode Waterfall Untuk Pengembangan Sistem Informasi," *J. Ilmu-ilmu Inform. dan Manaj. STMIK*, no. November, pp. 1–5, 2020.

[9] H. Kurniawan, W. Apriliah, I. Kurnia, and D. Firmansyah, "Penerapan Metode Waterfall Dalam Perancangan Sistem Informasi Penggajian Pada Smk Bina Karya Karawang," *J. Interkom J. Publ. Ilm. Bid. Teknol. Inf. dan Komun.*, vol. 14, no. 4, pp. 13–23, 2021, doi: 10.35969/interkom.v14i4.78.

[10] K. Nia, F. Wahyudi, and R. A. Hamdhana, "Audit Sistem Informasi E-Rapor Menggunakan Framework COBIT 4.1 Domain ME (Monitor and Evaluate) pada SMA Muhammadiyah 1 Kepanjen Malang," *J. Sist. Inf. dan Inform.*, vol. 1, no. 1, pp. 27–32, 2022, doi: 10.33379/jusifor.v1i1.1281.

[11] R. S. Naibaho, "Pengenalan Teknologi Informasi," *J. War. Ed. 52*, no. April, p. 45, 2017, doi: https://doi.org/10.46576/wdw.v0i52.253.

[12] B. Seta *et al.*, "Keuangan Sekolah Berbasis Website Menggunakan," vol. 5, no. 1, 2021.

[13] B. F. Siswanto and P. Rosyani, "Perancangan Sistem Informasi Penggajian Karyawan Pada Tb Blitar Berbasis User Centered Design," *J. Inf. Syst. Res.*, vol. 3, no. 1, pp. 7–17, 2021, doi: 10.47065/josh.v3i1.1096.

[14] B. H. Rambe, P. Rahmadani, I. Deci, N. Marnis, and R. M. Ibnu, "UML Modeling and Black Box Testing Methods in the School Payment Information System," *J. Mantik*, vol. 4, no. 3, pp. 1634–1640, 2020, doi: https://doi.org/10.35335/mantik.Vol4.2020.969.pp1634-1640.

[15] R. P. Bachtiar and P. D. Muhammad Kusumawan Herliansyah, S.T., M.T., "Aplikasi Metode Day In Life Of (DILO) untuk Studi Kerja di Departemen Quality Control PT. Kievit Indonesia," Universitas Gadjah Mada, 2016. [Online]. Available: http://etd.repository.ugm.ac.id/penelitian/detail/99945

[16] F. Wahyudi, "Rancang Bangun Aplikasi Pembayaran Iuran Komite Berbasis Web Di Smk Taman Ilmu Kromengan," *J. Teknol. Terap. G-Tech*, vol. 3, no. 2, pp. 214–220, 2020, doi: 10.33379/gtech.v3i2.376.

[17] R. Astika and S. Arahman, "Rancang Bangun Aplikasi Sistem Informasi Stok Persediaan Barang Berbasis Web pada Toko the Don's House," *J. Cendikia*, vol. 17, no. 1, 2019, [Online]. Available: https://jurnal.dcc.ac.id/index.php/JC/article/view/188