# Effects of Knowledge Sharing Methods on Cyber Security Practice in Small Medium Enterprises'

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**ABSTRACT**
Small and medium enterprises (SMEs) are increasingly becoming targets of cyber-attacks due to their limited resources and inadequate cyber security practices. Knowledge sharing is crucial in enhancing cyber security practices among SMEs. This study investigates the effects of different knowledge-sharing methods on cyber security practices in SMEs. The study employs a mixed-methods approach, including surveys and interviews with SMEs in North Sulawesi. The results suggest that both formal and informal knowledge-sharing methods positively influence cybersecurity practices in SMEs. Formal methods, such as training sessions and workshops, are effective in improving cyber security awareness and knowledge, while informal methods, such as peer-to-peer sharing and mentoring, promote the adoption of cyber security best practices in SMEs. The study also identifies challenges and barriers to knowledge sharing and provides recommendations for enhancing knowledge sharing and cyber security practices in SMEs. Overall, this study highlights the importance of knowledge sharing in promoting cyber security practices in SMEs and provides insights for improving cyber security in this sector.

***Keywords:*** *Cyber Security, Knowledge Sharing, Small Medium Enterprises.*

## 1. INTRODUCTION

In this increasingly advanced digital era, cybersecurity has become an increasingly important issue for companies, especially for Small and Medium Enterprises (SMEs). SMEs are often the target of cyberattacks because they often lack sufficient resources and expertise to protect themselves from complex security threats. Therefore, improving cyber security practices in SMEs is very important. One of the factors that can affect cybersecurity practices in SMEs is the method of knowledge sharing used. Methods of sharing knowledge can include various approaches such as training, guidance, documentation, discussion, and collaboration between individuals or teams within organizations[1]. Through this method, knowledge and expertise in cyber security can be exchanged and applied in daily practice.

However, the impact of various knowledge-sharing methods on cybersecurity practices in SMEs still needs to be studied in depth. Previous studies have focused more on cybersecurity practices in large companies or government organizations, while research related to SMEs is still limited[2]. Therefore, this study aims to investigate the effect of knowledge-sharing methods on cybersecurity practices in SMEs. The main problem with Cyber Security Practice in Small and Medium Enterprises is limited resources, namely SMEs often face limited resources, including limited budgets, personnel, and technological infrastructure. This can affect their ability to implement effective cybersecurity practices [3]. The research issue will explore how knowledge-sharing methods can help SMEs overcome these resource limitations and improve their cybersecurity practices. Another problem is the lack of awareness about security threats as SMEs often lack adequate understanding of the security threats they face. They may not be aware of the potential for cyberattacks and the impact they can have on their business [4]. This research will explore how knowledge-sharing methods can increase SME awareness of security threats and the importance of strong cybersecurity practices. Apart from that, another problem is the lack of access to knowledge and expertise as SMEs often do not have access to the knowledge and expertise needed in the field of cybersecurity. They may not have trained personnel or cannot access quality external resources [5]. The research issue will address how knowledge-sharing methods can help SMEs access


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and utilize the necessary knowledge and expertise to improve their cybersecurity practices. The next problem is Uncertainty in choosing the right knowledge-sharing method, namely SMEs often face challenges in choosing the knowledge-sharing method that best suits their needs and resources. They may not know which method will give the best results in improving their cyber security practices [6][7]. This research will investigate the effectiveness of various knowledge-sharing methods, such as training, mentoring, documentation, and collaboration, in the context of SMEs, thereby providing insight into which methods are most effective in improving cybersecurity practices. The next problem is the influence of organizational factors such as cybersecurity practices that involve not only technical aspects but also organizational aspects [8]. Factors such as security culture, leadership, and organizational decision-making can influence cybersecurity practices in SMEs [9][10]. The research issue will address the influence of these organizational factors and how knowledge-sharing methods can help address the organizational challenges of implementing effective cybersecurity practices in SMEs. It is hoped that through this research, it is hoped that solutions and recommendations can be found that can improve cybersecurity practices in SMEs through effective knowledge-sharing methods.

However, the results of previous research show that the solutions that have been made still do not solve the problems that arise. There are still research gaps such as a lack of research that focuses on SMEs, namely the importance of cybersecurity practices in SMEs, and there is still a lack of research that specifically addresses the context of SMEs [11]. Many previous studies have focused more on large companies or government organizations[12][13]. Therefore, there is a knowledge gap in the understanding of how knowledge-sharing methods affect cybersecurity practices in SMEs. This research will fill this knowledge gap with a special focus on SMEs. In addition, there is a lack of understanding of the effectiveness of such knowledge-sharing methods. There are various knowledge-sharing methods that can be used in a cybersecurity context, such as training, mentoring, documentation, discussion, and team collaboration [14]. However, there is still a lack of understanding about the effectiveness of each of these methods in improving cybersecurity practices in SMEs [15]. This research gap points to the need for in-depth research to identify which knowledge-sharing methods are most effective in the SME context. Next is the lack of research that considers organizational implications such as cybersecurity practices that involve not only technical aspects but also organizational aspects [16]. Factors such as security culture, organizational structure, and decision-making can influence the success of cybersecurity practices in SMEs [17]. However, previous studies have not paid much attention to the organizational implications of knowledge-sharing methods for cybersecurity practices in SMEs. This research gap highlights the need for more holistic research that considers organizational factors in the SME context. In addition, there are also deficiencies in research that combine qualitative and quantitative approaches, such as many studies related to cybersecurity tend to only use quantitative approaches or structured surveys [18][19]. However, this approach may not provide a comprehensive understanding of individual experiences and perceptions regarding knowledge-sharing methods and cybersecurity practices in SMEs. Therefore, there is a research gap in the use of a mixed approach that includes qualitative methods such as interviews or case studies to gain a deeper understanding of how knowledge-sharing methods affect cybersecurity practices in SMEs. Through research that fills these research gaps, it is hoped that new insights and recommendations can be found that can increase understanding of the influence of knowledge-sharing methods on cybersecurity practices in SMEs. This will help develop strategies that are more effective in protecting SMEs from increasingly complex cybersecurity threats.

The novelty of this research can be formulated in an emphasis on the SME context such as a special focus on the SME context. Although cybersecurity practices are a major concern in various sectors, research specifically exploring SMEs is still limited. By focusing research on SMEs, this research makes new contributions to understanding how knowledge-sharing methods can impact cybersecurity practices at the small and medium business levels. In addition, an in-depth study of knowledge sharing methods such as an in-depth study of various knowledge-sharing methods can be used in the context of cybersecurity in SMEs, such as training, mentoring, documentation, discussion, and team collaboration. This provides novelty in gaining a more detailed understanding of the effectiveness of each knowledge-sharing method and how these methods can contribute to cybersecurity practices in SMEs. Next is the integration of organizational factors such as the integration of organizational factors in the context of cybersecurity in SMEs. Cybersecurity practices are not only related to technical aspects, but are also influenced by cultural factors, organizational structure, and decision-making. By considering the organizational implications of knowledge-sharing methods, this research provides a more comprehensive understanding of how these factors influence cybersecurity practices in SMEs. In addition, what can be achieved in this research is a combined qualitative and quantitative approach such as the use of a combined approach that combines qualitative and quantitative methods. As well as using surveys and statistical analysis to collect and analyze quantitative data, this research will also utilize interviews or case studies to gain an in-depth understanding of

individual perceptions and experiences related to knowledge-sharing methods and cybersecurity practices in SMEs. This approach provides a novelty in generating richer and more comprehensive insights about the impact of knowledge-sharing methods on cybersecurity practices in SMEs. By combining this novelty, this research is expected to make a new contribution to the cybersecurity domain by deepening an understanding of the influence of knowledge-sharing methods on cybersecurity practices in SMEs. This research will involve surveys and interviews with SME owners, information security managers, and related technical personnel in several different SMEs. The data obtained will be analysed qualitatively and quantitatively to identify the relationship between knowledge-sharing methods and cybersecurity practices in SMEs.

This study aims to investigate the effects of different knowledge-sharing methods on cyber security practices in SMEs. Through this research, it is hoped that it will be known which knowledge-sharing methods are most effective in improving cyber security practices in SMEs. The results of this research are expected to provide valuable insights for stakeholders in the field of cyber security, such as SME owners, information security practitioners, and other researchers. This research is expected to provide a better understanding of the relationship between knowledge-sharing methods and cybersecurity practices in SMEs. It is hoped that this research can contribute to improving cyber security in SMEs and help develop strategies that are more effective in protecting small and medium businesses from increasingly complex cyber threats.

## 2. METHOD

The research method used in this research is Literature Study, namely the initial stage of this research involves carrying out a comprehensive literature study on cybersecurity practices in SMEs, knowledge-sharing methods, and factors that affect cybersecurity in organizations. Literature studies will include academic journals, industry publications, books, and related online resources [20]. It aims to gain an in-depth understanding of the research topic and build a solid theoretical framework. In addition, this research design uses a mixed-methods approach that combines quantitative and qualitative data. The research design will include two main stages: surveys and interviews.

### *2.1. Survey*

The survey will be used to collect quantitative data on cybersecurity practices, knowledge sharing methods used, and respondents' perceptions of the effectiveness of knowledge-sharing methods. This survey can be distributed online to the relevant SMEs in the research sample. The survey questions will be designed to collect demographic data, level of cybersecurity awareness, use of knowledge sharing methods, and effectiveness of cybersecurity practices.

### *2.2. Interview*

In-depth interviews will be conducted with SME owners, information security managers, and relevant technical personnel. This interview will dig deeper into their perceptions, experiences, and views on cybersecurity practices, use of knowledge sharing methods, and organizational factors influencing cybersecurity in SMEs. Interviews can be recorded and analysed qualitatively.

The next stage is Data Analysis, namely the data obtained from the survey will be statistically analysed using data analysis software such as SPSS or Excel. This analysis will include descriptive statistics, analysis of differences, and correlation analysis to identify the relationship between knowledge-sharing methods and cybersecurity practices in SMEs. The qualitative data from the interviews will be analysed using a thematic approach, in which key themes will be identified and interpreted to gain in-depth insights into the influence of knowledge sharing methods on cybersecurity practices. The next stage is Interpretation and Conclusion, namely the findings from the data analysis will be interpreted and presented in a comprehensive narrative form. The results of this study will be used to describe the effect of knowledge-sharing methods on cybersecurity practices in SMEs. The research conclusions will include a summary of findings, practical implications, and recommendations for SME owners and information security practitioners in improving cybersecurity practices in SMEs.

## 3. RESULTS AND DISCUSSION

### *3.1. Emphasis on the SME context*

This research yielded interesting findings. In this research, we found that cybersecurity practices in SMEs still need to be significantly improved. Although a number of SMEs recognize the importance of cybersecurity, limited resources are a major challenge in implementing effective security practices. However, we also found that knowledge sharing methods, especially training, and mentoring, play a crucial role in increasing awareness and understanding of cybersecurity threats among SME employees. Team discussions and collaboration are also considered effective in addressing complex cybersecurity issues and building a strong security culture in SMEs. Context factors such as SME size, industry sector, and government regulations also influence the implementation of cybersecurity practices in SMEs. This research provides valuable insights for SME owners and information security practitioners in

developing a cybersecurity strategy that fits the unique context and challenges within the SME environment.

The survey results show that cybersecurity practices in SMEs still need to be improved. A number of SMEs have a low level of awareness and implementation of security practices. Commonly used knowledge sharing methods are training, mentoring, and documentation. Training is the most frequently used method and is considered effective. There is a positive correlation between the use of knowledge-sharing methods and the level of implementation of better cybersecurity practices in SMEs. Enabling factors such as adequate budget and the presence of trained information security personnel are associated with higher levels of cybersecurity in SMEs.

The findings of this study In the in-depth interviews that have been conducted, respondents stated that limited resources are the main challenge in implementing effective cybersecurity practices. Knowledge-sharing methods, especially training, are considered important to increase awareness and understanding of cybersecurity threats among SME employees. Team discussions and collaboration are considered effective in solving complex cybersecurity problems and strengthening the security culture in SMEs. Context factors such as SME size, industry sector, and government regulations also influence the implementation of cybersecurity practices in SMEs.

The findings of this research highlight the importance of knowledge-sharing methods, especially training, in improving cybersecurity practices in SMEs [21]. SME owners and information security practitioners can use these findings as a basis for designing training programs that suit the needs and availability of resources in SMEs [22]. Team discussions and collaboration can also be enhanced to build collective awareness and strong safety culture in SMEs.

This research makes a new contribution to the understanding of the influence of knowledge sharing methods on cybersecurity practices in the SME context. The results of this research illustrate the unique challenges faced by SMEs in implementing cybersecurity practices and emphasize the importance of context in developing an effective security strategy. Future research can involve more variables, such as the level of technology used and regulatory aspects, to gain a more comprehensive understanding of cybersecurity in SMEs. Longitudinal studies can be conducted to track changes in cybersecurity practices over time and identify the factors influencing those changes. Thus, the results of this research provide in-depth insight into the influence of knowledge sharing methods on cybersecurity practices in the SME context. The discussion of the research results outlines practical implications and recommendations that can assist SMEs in improving their cybersecurity by taking into account limited resources and unique contextual factors within the SME environment [23].

The results of this study found the results of quantitative analysis, namely in the survey conducted, it was found that the majority of SMEs use knowledge sharing methods in their cyber security practices. The findings also show that the most commonly used knowledge-sharing method is training (followed by documentation and discussion). As such, the effectiveness of knowledge-sharing methods varies, with training and team collaboration ranking highest for improving cybersecurity practices in SMEs. The results of this research also show that there is a positive correlation between the level of use of knowledge sharing methods and the level of cyber security awareness in SMEs. The Qualitative Findings of this study can also be seen from the in-depth interviews, SME owners recognize the importance of cybersecurity practices and knowledge sharing as key factors in improving cybersecurity. Training is considered effective in increasing employee understanding of cybersecurity threats and appropriate countermeasures. Team discussions and collaboration are considered essential for addressing complex cybersecurity issues and driving the adoption of end-to-end security practices throughout the organization. Organizational factors such as a culture of security, supportive leadership, and executive commitment are considered important in facilitating effective knowledge-sharing methods.

This research provides a new contribution to the literature with a particular focus on the influence of knowledge sharing methods on cybersecurity practices in SMEs. The results of this study broaden the understanding of the effectiveness of certain knowledge-sharing methods, such as training and team collaboration, in improving cybersecurity practices in SMEs [24].

The findings of this research can provide valuable insights for SME owners and information security practitioners in designing an effective cybersecurity strategy. Recommendations can be made for increasing the use of effective knowledge-sharing methods, such as intensifying training programs and actively encouraging team collaboration in cybersecurity contexts. This study was conducted within a specific geographical or industrial setting, so the findings and recommendations may not be fully applicable in general. This research is based on the perceptions and experiences of respondents so that individual subjectivity can influence the results.

Follow-up research could involve more variables and factors that affect cybersecurity in SMEs, such as the level of technology used and external factors. Longitudinal studies can be conducted to observe changes in cybersecurity practices over time and the long-term impact of knowledge sharing methods. As such, the results of this research provide insight into the effect of knowledge-sharing methods on cybersecurity practices in SMEs, and the discussion outlines practical

implications and recommendations that can assist SMEs in improving their cybersecurity.

## *3.2. In-depth study of knowledge sharing methods*

The results of this study indicate that an in-depth study of knowledge sharing methods yielded significant findings. In this research, we explore various knowledge-sharing methods used in the context of cybersecurity in SMEs. We found that the most commonly used knowledge-sharing methods were training, mentoring, documentation, discussion, and team collaboration. Our research results show that training is the most effective method of increasing employee understanding of cybersecurity threats and appropriate countermeasures. Additionally, team discussions and collaboration are considered critical to addressing complex cybersecurity issues and driving the adoption of end-to-end security practices throughout the organization. This research provides a deeper understanding of the effectiveness of each method of knowledge sharing in the context of SMEs and can be a basis for designing more effective knowledge sharing strategies in improving cybersecurity practices in SMEs [25].

*Training, Guidance, Documentation, Discussion, and Team Collaboration*

This research yielded valuable findings. In this research, we study the influence of knowledge-sharing methods such as training, mentoring, documentation, discussion, and team collaboration on cybersecurity practices in SMEs. Our research results show that training is a highly effective method of increasing employee understanding and awareness of cybersecurity threats and the appropriate actions to protect an organization. Mentoring has also proven effective in providing individualized guidance to employees dealing with cybersecurity challenges. Documentation is important in providing easily accessible guidance and reference resources for employees to implement good security practices. Team discussion and collaboration help in solving complex cybersecurity problems by leveraging different skills and experiences. By using these knowledge-sharing methods holistically, SMEs can strengthen their cybersecurity practices and increase resilience against cyberattacks. This research provides practical insights for SME owners and information security practitioners in designing effective knowledge sharing strategies to improve cybersecurity practices in SMEs [26]. We conducted in-depth research on the effect of knowledge-sharing methods, namely training, mentoring, documentation, discussion, and team collaboration, on cybersecurity practices in SMEs. The details of our findings are as follows:

### *3.2.1. Training*

Training has proven to be highly effective in increasing employee understanding and awareness of cybersecurity threats. Employees who receive cybersecurity training tend to have better knowledge of security practices and apply more effective countermeasures. Regular training tailored to the needs of SMEs can have a significant impact on improving cyber security [27].

### *3.2.2. Guidance*

Individual guidance by cybersecurity experts has proven effective in helping employees address specific cybersecurity challenges. The guidance provides hands-on assistance in understanding threats, implementing appropriate countermeasures, and dealing with security incidents efficiently. Employees who receive regular mentoring tend to have a better understanding of cybersecurity practices.

### *3.2.3. Documentation*

Complete and accessible documentation helps employees understand the security policies, procedures, and practices to follow. Good documentation provides clear guidance and reference sources that employees can use when dealing with cybersecurity situations. SMBs that have good documentation tend to have more structured and consistent cybersecurity practices.

### *3.2.4. Discussion*

Discussions among employees or cyber security discussion forums help in sharing knowledge, and experiences, and solving problems related to cyber security. Discussions allow employees to learn from one another, gain new insights, and increase their understanding of better security practices. Discussions also promote a strong security culture and build collaboration between the cybersecurity team and other departments.

### *3.2.5. Team Collaboration*

Team collaboration between the cybersecurity team and other departments in addressing cybersecurity issues is important. Collaboration enables the exchange of complementary knowledge and skills, enhances response capabilities to cybersecurity threats, and drives the adoption of security practices across the organization.

SMBs that encourage team collaboration in a cybersecurity context tend to have better security practices and higher awareness. The results of this study indicate that training, mentoring, documentation, discussion, and team collaboration are effective methods of sharing knowledge in improving cybersecurity

practices in SMEs. Implementation of this combination of methods can provide significant benefits and help SMEs strengthen their defences against cybersecurity threats [28].

### *3.3. Integration of organizational factors*

The results of this study indicate that the integration of organizational factors provides an in-depth understanding of the influence of knowledge sharing methods, such as training, mentoring, documentation, discussion, and team collaboration, as well as organizational factors on cybersecurity practices in SMEs. This can be explained as follows:

#### *3.3.1. The Effect of Knowledge-Sharing Methods*

The Knowledge Sharing method can be carried out through training, namely training which has proven to be a very effective method in increasing employee awareness, knowledge, and understanding of cyber security threats. In addition, the way of Guidance, namely individual guidance by cybersecurity experts, helps employees in facing cybersecurity challenges head-on and strengthens understanding of security practices, has been proven to contribute to the successful handling of cybersecurity in SMEs. In addition, other factors such as Documentation i.e. Documentation that is clear and easily accessible provide important guidance and references for consistent security practices and ensure common understanding across the organization. And the next factor is Discussions, namely discussions between employees and cyber security discussion forums facilitating the exchange of knowledge, and experiences, and solving problems related to cyber security. The next factor is Team Collaboration i.e. Collaboration between the cybersecurity team and other departments allows the pooling of different resources and expertise, strengthening the effectiveness and adoption of security practices [29].

#### *3.3.2. Influence of Organizational Factors*

The results of this study indicate that Organizational Factors can be determined by Security Culture factors, namely a strong security culture championed by the management and owners of SMEs provides an important foundation for the adoption of cybersecurity practices. In addition, Supportive Leadership factors such as Leadership actively supporting cybersecurity, through support, resources, and commitment, can influence the level of adoption and adherence to security practices. The next factor is Executive Commitment, namely Executive commitment to cybersecurity shows the importance of security as a strategic priority, influencing the allocation of resources and awareness throughout the organization. In addition, the Employee Engagement factor, namely employee engagement and participation in the cybersecurity process helps build a sustainable security culture and enhances the implementation of security practices.

The results of this study indicate that integrating organizational factors, such as security culture, supportive leadership, executive commitment, and employee engagement, along with knowledge sharing methods, is a comprehensive approach to improving cybersecurity practices in SMEs. Managing knowledge sharing methods with respect to these organizational factors allows SMEs to achieve better overall cybersecurity and build a strong security culture throughout the organization [30].

### *3.4. A combined qualitative and quantitative approach*

The research results provide a comprehensive understanding of the influence of knowledge sharing methods on cybersecurity practices in SMEs. In this study, we used a mixed qualitative and quantitative approach to explore deeper findings. Here are the results of our research based on this approach:

Results A quantitative survey was conducted to collect data from a number of SMEs that were randomly selected. The findings of this research indicate that knowledge sharing methods, such as training, mentoring, documentation, discussion, and team collaboration, contribute positively to cybersecurity practices in SMEs [31]. Training is the most effective method of increasing employee understanding and awareness of cybersecurity threats[32]. Individual guidance and team collaboration also make a significant contribution to improving cybersecurity practices in SMEs.

Results In-depth interviews were conducted with SME owners, information security managers, and relevant personnel to gain a deeper understanding of the context of SMEs and their experiences in cybersecurity practices. The qualitative findings support the quantitative findings and provide more detailed insight into how knowledge sharing methods can be applied successfully in cybersecurity practices in SMEs. Respondents underlined the importance of training in increasing employee cyber security knowledge and skills. Team discussions and collaboration are recognized as effective methods of solving complex cybersecurity problems and building a strong security culture in SMEs [33].

The integration of quantitative and qualitative findings provides a more complete and richer picture of the influence of knowledge sharing methods on cybersecurity practices in SMEs. Quantitative findings provide a broader understanding of the relationship between knowledge-sharing methods and cybersecurity practices, while qualitative findings provide deeper context and insight. Through a combined qualitative and

quantitative approach, this study provides a comprehensive understanding of the influence of knowledge sharing methods on cybersecurity practices in SMEs [34]. The integration of quantitative and qualitative findings allows us to present more in-depth and contextual findings about the effect of these knowledge-sharing methods [35]. The results of this research can provide valuable guidance for SME owners and information security practitioners in designing effective knowledge sharing strategies to improve cybersecurity practices in SMEs.

## 4. CONCLUSION

This study concludes that Knowledge Sharing Methods, namely knowledge sharing methods, such as training, guidance, documentation, discussion, and team collaboration, have a positive influence on cybersecurity practices in SMEs. Training has proven to be the most effective method of increasing employee understanding and awareness of cybersecurity threats. Individual guidance and team collaboration also make a significant contribution to improving cybersecurity practices in SMEs. In addition, Organizational Factors such as Organizational Factors, namely security culture, supportive leadership, executive commitment, and employee engagement, also play an important role in improving cybersecurity practices in SMEs. A strong security culture supported by SME management and owners creates a solid basis for the adoption of cybersecurity practices. Supportive leadership and executive commitment influence the rate of adoption and adherence to security practices. Employee involvement in the cybersecurity process also builds a sustainable security culture and enhances the adoption of security practices. Next is the Integration of Findings such as the Integration of quantitative and qualitative findings provides a more comprehensive understanding of the influence of knowledge sharing methods on cybersecurity practices in SMEs. The quantitative findings provide a broad picture of the relationship between knowledge-sharing methods and cybersecurity practices, while the qualitative findings provide deeper context and insight. The integration of these two types of findings provides a more complete and richer understanding of the effectiveness of knowledge sharing methods in improving cybersecurity practices in SMEs. The conclusion of this study emphasizes the importance of knowledge sharing methods and organizational factors in strengthening cybersecurity practices in SMEs. Training is the most effective method, but it is also important to consider aspects of security culture, leadership support, executive commitment, and employee involvement in efforts to improve cybersecurity. The results of this research can provide guidance for SME owners and information security practitioners in designing appropriate strategies to strengthen cybersecurity practices in SMEs.

## AUTHORS' CONTRIBUTIONS

***Johan Reimon Batmetan,*** acting as the lead researcher with the main task of coordinating and carrying out research activities in the process of data collection, data collection, data analysis, preparation of data interpretation, and preparation of research reports. In addition, he is tasked with coordinating and implementing activities research in the preparation of research instruments, research equipment, and supporting instruments. then tasked with coordinating and carrying out research activities in research development such as concept formulation, system research instrument validation, and conducting final evaluations. In addition, the chairman is tasked with coordinating and carrying out research activities in preparing the final research report, and publication of research results in national seminars/proceedings. Another task is Coordinating and being responsible for results research reporting ranging from daily reports, reports progress, final report, and use of research budget.

***Djubir R. E. Kembuan***, as a research member, is tasked with 1. Assisting the chairman in the process of data collection, data collection, data analysis, preparation of data interpretation, and preparation of research reports. 2. Assist the chairman in preparing research instruments, research equipment, and supporting instruments. 3. Assisting the Chair in system development: formulating concepts, functions, conducting system assembly, system validation, system testing both laboratory scale, partners and broad stakeholder scale, final system evaluation 4. Assisting the chairman in preparing the final research report, and publication of research results in national seminars/proceedings. 5. Also responsible for the results of research reporting starting from daily reports, progress reports, final reports, and the use of research budgets.

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