

PUBLICATION MANUSCRIPT

**EVALUATION INFORMATION SECURITY ON
UNIVERSITAS MUHAMMADIYAH KALIMANTAN TIMUR USING INDEKS
KAMI**

Wiliam Aryanda, Faldi, Asslia Johar Latipah



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**INFORMATION ENGINEERING S1 STUDY PROGRAM
FACULTY OF SCIENCE AND TECHNOLOGY
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APPROVAL SHEET PUBLICATION MANUSCRIPT

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It has been approved for publication on,

At the date of 2022, 26 October

Adviser



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Examiner



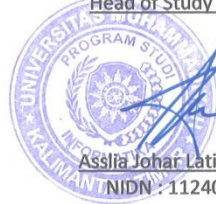
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EVALUATION INFORMATION SECURITY ON UNIVERSITAS MUHAMMADIYAH KALIMANTAN TIMUR USING INDEKS KAMI

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Abstrak

Adanya rencana untuk meningkatkan keamanan informasi sesuai dengan Standar Nasional Indonesia (SNI), Universitas Muhammadiyah Kalimantan Timur (UMKT) sebagai salah satu kampus terbesar di Kalimantan Timur harus mempunyai kesadaran mengenai pentingnya keamanan informasi. Tujuan dari penelitian ini adalah untuk mengukur tingkat kelengkapan dan tingkat kematangan keamanan informasi di UMKT serta memberikan rekomendasi perbaikan untuk meningkatkan tingkat kelengkapan dan tingkat kematangan keamanan informasi. Dari hasil studi dokumen, wawancara dan kuisioner berdasarkan Indeks Keamanan Informasi SNI ISO/IEC 27001:2013 dihasilkan tingkat kelengkapan keamanan informasi sebesar 279 dan tingkat kematangan berada pada level II dimana sudah adanya penerapan kerangka kerja dasar pengelolaan keamanan informasi akan tetapi penerapan langkah pengamanan masih belum teratur. Untuk mencapai tingkat kematangan III+ sebagai standar melaksanakan sertikasi ISO dan sesuai dengan Standar Nasional Indonesia (SNI) UMKT dapat melakukan strategi perbaikan secara bertahap sesuai rekomendasi yang diberikan.

Kata kunci : Evaluasi, Indeks Keamanan Informasi (KAMI), Keamanan Informasi, ISO 27001, Manage Security

Abstract

There are plans to improve information security in accordance with the Indonesian National Standard (SNI), the Muhammadiyah University of East Kalimantan (UMKT) as one of the largest campuses in East Kalimantan must have awareness about the importance of information security. The purpose of this research is to measure the level of completeness and maturity level of information security in UMKT and provide recommendations for improvement to increase the level of completeness and maturity level of information security. From the results of the study of documents, interviews and questionnaires based on the Information Security Index SNI ISO/IEC 27001:2013, the level of completeness of information security is 279 and the level of maturity is at level II where there has been an application of the basic framework for managing information security but the implementation of security measures is still not regular. To achieve maturity level III+ as a standard for implementing ISO certification and in accordance with the Indonesian National Standard (SNI), UMKT can carry out a gradual improvement strategy according to the recommendations given.

Keyword: Evaluation, Information Security Index (KAMI), Information Security, ISO 27001, Manage Security

1. INTRODUCTION

The Internet's technology is improving at a rapid pace. The number of users continues to grow and develop until it reaches every corner of the globe. The internet network's ability to accelerate creativity and creation is one way to do just that. As long as an internet connection is available, data may be sent across long distances and at any time of day or night since there are no restrictions on when or where it can be sent. Internet access will be a need for everyone, including those who aren't online all the time. Technology for Management In order to achieve excellent governance, it is necessary to have effective means of communication and dissemination of information^[3]. Good governance ensures that the company's own information system is accountable and sustainable, and that it can benefit the public as far as possible via good governance^[1].

There are both beneficial and bad effects to the growth of information technology, one of which is the ability to get information quickly, and one of which is the emergence of cybercrime, which puts individuals and organizations at risk. One of the hottest topics in cybercrime prevention right now is the dissemination of security knowledge. Built-in system management security information might improve attack prevention. Hardware, software, networks, computers, data and resources all power human beings; thus, an assessment of repair facility security is required. Gap-filling updates and repairs, as well as quality maintenance to recall investments that have been made, will be the primary goals of the examination of security information. In order to make UMKT's current security system more secure and robust, an examination is needed.

Learn more about how the Universitas Muhammadiyah Kalimantan Timur data center network is evaluated for security. The Indeks Keamanan Informasi (KAMI) can be used to evaluate this. SNI ISO/IEC 27001:2013 certification and governance area map security system information in a government agency or a government agency can be evaluated using the Indeks KAMI application^[2]. As a result of the research, the latter will serve as a resource for UMKT's repair and security information.

2. RESEARCH METHODS

UMKT is a university that has implemented an IT-based paperless system, in which the IT sector plays a significant part in the daily activities of the campus. In order to safeguard campus IT assets from hacker assaults, a robust data and information network security solution is required. UMKT, one of the greatest universities in Kalimantan, is no doubt a target for hackers because of its status as one of the region's most prestigious institutions. As a consequence, it was necessary to have something that could be utilized as a reference for strengthening the campus's security system in order to prevent hacking from taking place.

2.1 Subject Study

In order to evaluate the security information from the data server, UMKT's more than 6,000 students are studying security data center information^[6].

2.2 Object Study

In do a research that first noticed is object research that will researched. Where is the object study the contained problem that will made ingredient study for searching for the solution. As for the object the author's research will careful is security information on the data center network at UMKT located study this done writer at the Universitas Muhammadiyah Kalimantan Timur, having his address at Jl. Ir. H. Juanda No.15, Sidodadi, Kec. Samarinda Ulu, Samarinda City, East Kalimantan.

2.3 Method Data Collection

2. 3.1 Studies Literature

At the outset of a research project, it's important to gather relevant literature or information from other sources. The Indeks KAMI technique, security networking, and related research are all referenced in the article or publication cited.

2.3.2 Information Mining

At this stage, observations and data collection were carried out directly based on theory on the object of the case study which was the UMKT. Later the data will be in the form of interviews and other supporting documents related to the 6 Indeks KAMI Areas.

Data collection aims to determine the situation in UMKT. The results of data collection will be taken into consideration in calculations using the Indeks KAMI framework. Several data collection techniques will be carried out including the following:

2.3.2.1 Interview

Interview is a technique of collecting data or information by asking questions directly to the parties or sources that have been determined. In this case study, resource persons such as the IT Unit, Campus Leaders

(Rector), Finance Section and other related parties at UMKT. The interviews were conducted with the aim of digging up related information about the level of readiness and effectiveness of information security in accordance with the assessment criteria in the Indeks KAMI framework.

2.3.2.2 Observation

Observation technique is one of the efforts made in identifying and observing directly the actual situation (situation, condition) in UMKT. The type of object to be observed in the observation can be a space in its physical aspect, a set of activities (activities), objects (objects), actions, a series of activities (events), goals to be achieved (organizational structure, strategic plans, etc.). The observation itself will be carried out in a structured manner and in accordance with the needs of the evidence (validity) of the interviews that have been conducted.

2.3.2.3 Document Review

Document review will be carried out on the required supporting documents related to the interview elements. Later, a review or re-analysis of the document will be carried out to see whether the required documents meet the requirements or are correct as they should be. The documents in question can be in the form of Policy documents, Guidelines, Procedures, Standards, Work Instructions, etc.

2.4 Rating Indeks KAMI

This is followed by a step called appraisal, in which an evaluation is performed only utilizing data from interviews conducted by the author with parties linked to the study. Data is submitted into Indeks KAMI as questionnaires throughout the evaluation process so that when all data is entered the result will be rejected in phases following.

2.4.1 Analysis and Discussion Related Evaluation

This will be done in phases, with comments and changes made after an assessment using Indeks KAMI has already been completed. We'll take a look at what UMKT can do better, and then give suggestions and recommendations on how to do it better. The preceding value input data outcome data interview provided the Writer with a solid foundation from which to make recommendations and adjustments.

3. RESULT AND DISCUSSION

This chapter describes the discussion of the research topic and the findings. In this study, a discussion will be held based on the evaluation conducted at Universitas Muhammadiyah Kalimantan Timur in order to get the Indeks Keamanan Informasi .

3.1 Score Assessment Results Per Section

3.1.1 Kategori Sistem Elektrik

This is the first level, which must be completed before the assessment of the next 5 (five) sections can begin. This step tries to categorize the agency's role and Electrical System Category into certain classes, namely Low, High, and Strategic.

Based on the assessment, it can be seen that the Electrical System Category Score shows a value of 26, the Electrical System Category Score at the Universitas Muhammadiyah Kalimantan Timur is included in the High category so that if there is interference with information technology services, especially information security, it will there is a loss impact that will hamper the processes that occur in the internal and external scope of the Universitas Muhammadiyah Kalimantan Timur itself, which means that the need for an Electrical System for academic and administrative services at the Universitas Muhammadiyah Kalimantan Timur is quite vital and taken into account.

Table 3.1 Mapping Score Electrical System Category

Bagian I: Kategori Sistem Elektrik		
Terendah	Tertinggi	Status
10	15	Rendah
16	34	Tinggi
35	50	Strategis

Some points of concern are points 1.1 and 1.2 in Attachment A which received status C, which is very short of funding in the Electrical System Category at Universitas Muhammadiyah Kalimantan Timur, which can be seen from the amount of funds issued by the campus to the IT Unit.

This indicates that there is still a lack of awareness of the Electrical System Category matters, in the sense that the funding can significantly provide support for various operational and managerial applications for various functions and business processes at Universitas Muhammadiyah Kalimantan Timur which are generally related to the process of creating and flowing information.

3.1.2 Tata Kelola Keamanan Informasi

The following are the results of Tata Kelola Keamanan Informasi at the Universitas Muhammadiyah Kalimantan Timur:

Table 3.2 Mapping Validity Tata Kelola Keamanan Informasi

Validitas Tata Kelola Keamanan Informasi									
Tingkat Kemantangan I		Tingkat Kemantangan II		Tingkat Kemantangan III		Tingkat Kemantangan IV		Tingkat Kemantangan V	
Validitas	Yes	Validitas	No	Validitas	No	Validitas	No	Validitas	No
Status	I+	Status	No	Status	No	Status	No	Status	No
Status Akhir	I+								

Information:

1. Based on the assessment, it can be seen that the Information Security Governance Score at the Universitas Muhammadiyah Kalimantan Timur shows a value of 47 (out of a maximum score of 126) which means it is in the Low category. For the assessment of Information Security Governance aspects.

2. From all the question points, the status that becomes the attention is "Dalam Perencanaan" it shows that the IT Unit is quite aware of the importance of Information Security Governance but for its implementation it is still not available, especially for Information Security Policy Documents.
3. Information Security Policy (Security Policies) document is required as a reference to protect important information assets. The document contains various ways that need to be done to control management, mechanisms, procedures, and procedures for securing information.
4. It is necessary to carry out a program to increase competence and expertise for officials and officers implementing information security management on a regular basis.

3.1.3 Pengelolaan Risiko Keamanan Informasi

The following are the results of the assessment Risiko Keamanan Informasi at the Universitas Muhammadiyah Kalimantan Timur:

Table 3.3 Mapping Validity Pengelolaan Risiko

Validitas Pengelolaan Risiko									
Tingkat Kemantangan I		Tingkat Kemantangan II		Tingkat Kemantangan III		Tingkat Kemantangan IV		Tingkat Kemantangan V	
Validitas	Yes	Validitas	No	Validitas	No	Validitas	No	Validitas	No
Status	I+	Status	No	Status	No	Status	No	Status	No
Status Akhir	I+								

Information:

1. Based on the assessment, it can be seen that the Information Security Risk Management Score at the Universitas Muhammadiyah Kalimantan Timur shows a value of 26 (out of a maximum score of 72) and also has not passed the I+ maturity level which means that it enters the minimum threshold with many status questions indicating the status "Dalam Perencanaan".
2. There is no standard or work program regarding risk management that is defined in general or specifically regarding information security at Universitas Muhammadiyah Kalimantan Timur.
3. In the assessment in this category, there are still many aspects that are still under planning, in other words the Universitas Muhammadiyah Kalimantan Timur is still not aware of the potential threats or risks that will occur and can cause losses to their information assets.
4. It is necessary to define documents and strategies for the implementation of Information Security Risk Management which aims to minimize the possibility and influence of the occurrence of adverse events on information security with a documented risk management plan, as well as routinely reviewing further risks and the necessary risk management plans.

3.1.4 Kerangka Kerja Pengelolaan Keamanan Informasi

The following are the results of the assessment Kerangka Kerja Keamanan Informasi at the Universitas Muhammadiyah Kalimantan Timur:

Table 3.4 Mapping Validity Kerangka Kerja Pengelolaan Informasi

Validitas Kerangka Kerja									
Tingkat Kemantangan I		Tingkat Kemantangan II		Tingkat Kemantangan III		Tingkat Kemantangan IV		Tingkat Kemantangan V	
Validitas	Yes	Validitas	No	Validitas	No	Validitas	No	Validitas	No
Status	I	Status	No	Status	No	Status	No	Status	No
Status Akhir	I								

Information:

1. Based on this assessment, score of the Information Security Management Framework at the Universitas Muhammadiyah Kalimantan Timur shows the value of 40 (out of a maximum score of 159) which means it falls into the low category.
2. Universitas Muhammadiyah Kalimantan Timur has conducted periodic financial analysis regarding changes to infrastructure and management.
3. Based on assessment a number of policies and operational work procedures, including implementation strategies, measurement of the effectiveness of the majority control are still in planning and some are not implemented (status “Tidak Dilakukan” and “Dalam Perencanaan”).
4. It is necessary to formulate an information security policy that covers aspects of infrastructure and detailed information security regulations, for example, which includes non-technical issues such as the use of inappropriate passwords that indicate non-compliance in operating the information security system.

3.1.5 Pengelolaan Aset Informasi

The following are the results of the assessment Pengelolaan Aset Informasi at the Universitas Muhammadiyah Kalimantan Timur:

Table 3.5 Mapping Validity Pengelolaan Aset Informasi

Validitas Pengelolaan Aset Informasi									
Tingkat Kemantangan I		Tingkat Kemantangan II		Tingkat Kemantangan III		Tingkat Kemantangan IV		Tingkat Kemantangan V	
Validitas	Yes	Validitas	No	Validitas	No	Validitas	No	Validitas	No
Status	I+	Status	No	Status	No	Status	No	Status	No
Status Akhir	I+								

Information:

1. Based on this assessment, the Information Asset Management Score at the Universitas Muhammadiyah Kalimantan Timur shows a value of 74 (out of a maximum score of 168) and reaches Maturity Level I+.
2. For the aspect of managing information assets, in general, it is quite good, such as there are many related regulations that have been implemented and there are many other aspects that have been partially implemented and some have been implemented comprehensively, such as data back-up procedures and unnecessary data destruction procedures.
3. It is necessary to develop a policy for managing information asset security which includes infrastructure aspects and detailed information security regulations, for example, which includes non-technical issues such as the use of inappropriate passwords that indicate non-compliance in operating the information security system.

3.1.6 Teknologi dan Keamanan Informasi

The following are the results of the assessment Teknologi dan Keamanan Informasi at the Universitas Muhammadiyah Kalimantan Timur:

Table 3.6 Mapping Validity Teknologi dan Keamanan Informasi

Validitas Teknologi dan Keamanan Informasi									
Tingkat Kemantangan I		Tingkat Kemantangan II		Tingkat Kemantangan III		Tingkat Kemantangan IV		Tingkat Kemantangan V	
Validitas	No	Validitas	Yes	Validitas	No	Validitas	No	Validitas	No
Status	No	Status	II+	Status	No	Status	No	Status	No
Status Akhir	II+								

Information:

1. Based on this assessment, the Information Technology and Security Score at the Universitas Muhammadiyah Kalimantan Timur showed a score of 92 (out of a maximum score of 120) and reached Maturity Level II+.
2. In the assessment carried out at this stage, the Universitas Muhammadiyah Kalimantan Timur needs to carry out routine scanning of networks and information security gaps, as well as collaborate with independent parties to assess the reliability of information security that is applied and the need for regular scanners to prevent security holes in aspects and supports the availability of automatic password change application to be able to change passwords if there are urgent matters.

3.1.7 Suplemen

The following are the results of the assessment Suplemen at the Universitas Muhammadiyah Kalimantan Timur:

Table 3.7 Mapping Validity Suplemen

Validitas Suplemen					
Pengamanan Keterlibatan Pihak Ketiga		Pengamanan Layanan Infrastruktur Awan		Perlindungan Data Pribadi	
Persentase	16%	Persentase	0%	Persentase	0%
Skor	0.48	Skor	0.00	Skor	0.00

Information:

1. Based on this assessment, The score of Third Party Security Service Providers at Muhammadiyah University of East Kalimantan shows a value of 0.48 which means it falls into the low category, then Cloud Service Security gets a score of 0.00 and personal data protection also gets a score of 0.00
2. The results of the assessment obtained in this category are that there is still no or not yet intense involvement of third parties in the provision of the Universitas Muhammadiyah Kalimantan Timur services. So it is necessary to increase or involve third parties in security as a service provider.
3. Lack of security for cloud infrastructure services (Cloud Service), even though the era of Cloud Service is growing, it is very much needed as a data storage place even though not all data is entered into the Cloud Service.
4. Based assessment number of policies and procedures for the protection of personal data have not been implemented (status "Tidak Dilakukan"). This aspect must be implemented as soon as possible given the importance of data in the current era. So there needs to be data protection that can prevent data theft.

Table 3.9 Mapping Total Score 5 Aspects Indeks KAMI

Indeks KAMI	Skor	Tingkat Kematangan
Bagian II: Tata Kelola Keamanan Informasi	47	I+
Bagian III: Pengelolaan Risiko Keamanan Informasi	26	I+
Bagian IV: Kerangka Kerja Pengelolaan Keamanan Informasi	40	I
Bagian V: Pengelolaan Aset Informasi	74	I+
Bagian VI: Teknologi dan Keamanan Informasi	92	II+
Total Skor (II+III+IV+V+VI)	279	I s/d II+

Table 3.9 shows the results of measuring the maturity level of information security for Parts II, III, IV and V and VI at the Universitas Muhammadiyah Kalimantan Timur. For an explanation of the ranking order in the table above, the lowest order is I, while the highest is V, as shown in Figure 3.1.

Table 3.10 Mapping All Aspects With Readiness Status

Sistem Elektrik			Skor Bagian II+III+IV+V+VI		Status Kesiapan
Skor Bagian I					
10	15	Rendah	0	174	Tidak Layak
			175	312	Pemenuhan Kerangka Kerja Dasar
			313	535	Cukup Baik
			536	645	Baik
16	34	Tinggi	0	272	Tidak Layak
			273	455	Pemenuhan Kerangka Kerja Dasar
			456	583	Cukup Baik
			584	645	Baik
35	50	Strategis	0	333	Tidak Layak
			334	535	Pemenuhan Kerangka Kerja Dasar
			536	609	Cukup Baik
			610	645	Baik

Table 3.10 shows the mapping between all sections of the Indeks KAMI where the higher the dependence on the Kategori Sistem Elektrik or the more important the role of the Kategori Sistem Elektrik in the agency's duties, the more forms of security required. In the Kategori Sistem Elektrik, Universitas Muhammadiyah Kalimantan Timur gets a score of 26 so it is included in "Tinggi" section then the scores in sections II, III, IV, V and VI if accumulated or added get a score of 279 and enter the readiness status "Pemenuhan Karenagka Kerja Dasar".

The following is a display of the radar diagram Indeks KAMI:



Figure 3.3 Radar Diagram After Assessment

Then in Figure 3.3 are the results of the Radar Diagram after the assessment with details of Tata Kelola, Pengelolaan Risiko, Kerangka Kerja and Pengelolaan Aset showing the diagram at the Kerangka Kerja Dasar point while the Aspek Teknologi gets results at the Penerapan Operasional end point. In the diagram, you can see a comparison between the readiness conditions as a result of the evaluation process with the existing reference level of completeness. In the radar diagram, the background area shows the threshold level of completeness (category) I to III (light green to dark green) Indeks KAMI.

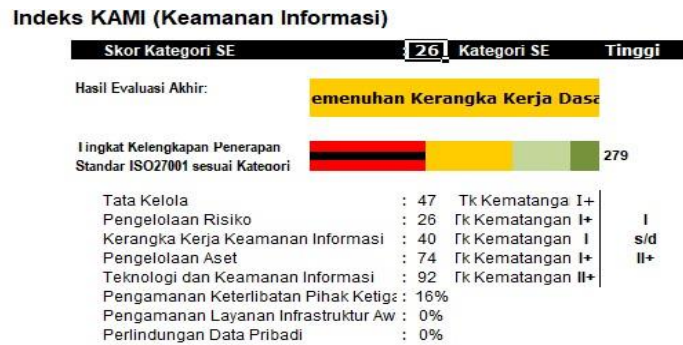


Figure 3.4 Information Security In Universitas Muhammadiyah Kalimantan Timur

The scores for each area are summarized in Figure 3.4 showing how much of the completeness level of each area has been achieved at the Universitas Muhammadiyah Kalimantan Timur.

The Completeness Status displayed by the Bar Chart instrument in Figure 3.4 shows that the achievement is still in the red area and is still in the readiness status “Pemenuhan Kerangka Kerja Dasar” with a total value of 279 with details in the Area Tata Kelola getting 47 points, Area Pengelolaan Risiko 26 points, Area Kerangka Kerja Keamanan Informasi 40 points, Area Pengelolaan Aset 74 points and Area Teknologi dan Keamanan Informasi 92 points, so that it is still not in accordance with the completeness of control required by the ISO/IEC 27001:2013 standard. The red area is still in the readiness status “Tidak Layak”, then the achievement in the yellow area is still “Pemenuhan Kerangka Kerja Dasar”, the light green achievement indicates that the readiness status is “Cukup Baik”, while the dark green achievement gets the prefix “Baik”.

4. CONCLUSION

Based on the results and discussions carried out in the previous chapter, the following conclusions are obtained:

1. For the maturity level per area, it is known that the Tata Kelola area is at level I+, the Pengelolaan Risiko area is at level I+, the Kerangka Kerja area is at level I, the Pengelolaan Aset area is at level I+, and the Teknologi area is at level II+. Where the maturity level is still in the range of level I to II+, and the minimum limit that must be achieved in order to be able to carry out ISO certification is III+.
2. The value of completeness of information security obtained from the five areas in the Indeks KAMI obtained an assessment result of 279 (out of a total score of 645) and is at level II.
3. These results indicate that most of the existing information security processes at the Universitas Muhammadiyah Kalimantan Timur have not been carried out routinely and have not been in accordance with existing standard procedures. Based on the standard from ISO/IEC 27001:2013, the management of information security at Universitas Muhammadiyah Kalimantan Timur still has to be improved, especially in the Pengelolaan Risiko area which has the lowest score compared to other evaluation areas, followed by the Kerangka Kerja area and the Tata Kelola area.

5. RECOMMENDATION

Based on the research that has been done, the following are brief suggestions given to improve the five security areas of Indeks Keamanan Informasi (KAMI):

1. For further research, researchers should use the latest version of Indeks Keamanan Informasi (KAMI) assessment standard from the Badan Siber dan Sandi Negara in order to adapt to the development of needs, relevance and the latest technology.
2. Detailed technical instructions are needed regarding the assessment process on the Indeks KAMI in order to understand the score obtained as well as for improvement and development of the assessment process for the future.

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Naspub: Evaluation Information Security On Universitas Muhammadiyah Kalimantan Timur Using Indeks KAMI

by Wiliam Aryanda

Submission date: 26-Oct-2022 11:04AM (UTC+0800)

Submission ID: 1935581783

File name: Jurnal_WILIAM_ARYANDA_1.docx (1.49M)

Word count: 3774

Character count: 21192

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