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IDN Media Information Security Management System Maturity Measurement Analysis Using ISO 27001:2013 and KAMI Index Version 4.0

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Abstract— *The development of digital media greatly affects the public in accessing intellectual news, increases knowledge, and opens up insights. To maintain the consistency of factual and accurate news presentations, the company invests heavily in technology tools. The transformation of print media to digital media platforms has many demands to maximize and maintain the role of this technology. One of the focuses of this section is to focus on the security of the information held. The purpose of this research is to see how big the maturity level of the information system security management system at IDN Media, a Digital Media company that has many digital media application platforms. This maturity level assessment is measured using the tools created by the Ministry of Communication and Information KAMI Indeks version 4.0 to evaluate the maturity level, the level of completeness of the implementation of ISO/IEC 27001:2013, and an overview of information security governance in the company. The results of the study are the level of information security applied at IDN Media.*

Keywords—*Digital Media; Information Security; ISO/IEC 27001:2013; KAMI Index.*

I. INTRODUCTION

In today's modern era, the news is an important thing that makes people smarter, increases knowledge, and opens insight. Print media, especially newspapers have been predicted to die when electronic media such as radio and television developed. Due to the development of electronic media, print media has begun to open access in the network (online) as a form of defense against technology that is developing quite rapidly. In Indonesia, Republika newspaper initiated the online transformation in 1994, followed by Tempo, Kompas, Waspada, and other newspapers from year to year.

Due to the rapid development of technology to provide factual and accurate news, many companies are investing in technology tools. This development has made many print media transformed into digital media. Massive investment in technological devices and supported by the development of the internet and made the print media ecosystem in Indonesia undergo many changes.

This is also implemented and noticed by IDN Media, as a technology-based media company and content platform that focuses on Millennials and Gen-Z in Indonesia. IDN Media is a company founded on June 8, 2014, in Surabaya by Winston Utomo and William Utomo. In 2020 IDN Media has 11 active digital media products, namely IDN Times, Popbela.com, Popmama.com, Yummy, GGWP.ID, Duniaku.com, IDN Creative, IDN Event, IDN Creator Network, IDN Foundation, and IDN Programmatic OOH.

After the transformation of print media to digital platforms, there are many demands that every digital media must do to maximize and maintain the application of this technology. One of them is to focus on the security of the information owned as well as what happened to IDN Media. Maintaining information security also means the need for efforts to pay attention to the security factors of all supporting devices, networks, and other facilities that are directly or indirectly related to the information processing process.

Information security is the protection of information from various threats to ensure the continuity of business processes, reduce business risks, and increase return on investment (ROI) and business opportunities. In designing an information security system, there are security aspects that need to be considered, including confidentiality, integrity.

The importance of information security is also expected to have been applied to IDN Media to maintain the sustainability of this company, therefore, in this study, the authors analyzed the maturity level of the information security management system that has been implemented at IDN Media by using the Information Security Index (KAMI) tools which issued by the Ministry of Communication and Information based on ISO/IEC 27001:2013.

II. LITERATURE REVIEW

A. *Information*

In everyday expressions, many say that information is everything that we communicate, such as what is conveyed through spoken language, newspapers, videos, and others. This expression is often used – Fox (1983) quoted by Pandit (1992:64) categorizes it as the ordinary notion of information. In this expression, there is an understanding that there is no information if no one brings it. Therefore, there are three meanings of the word information. The first is information as a process, which refers to the activities of being informed. The second meaning is information as knowledge. Here information refers to all events in the world (entities) that are infinite, untouchable, or something abstract. The third meaning is that information is considered as an object or a real representation of knowledge.

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The information generated from data processing on a system has an important role in the management of an organization. Information is a very valuable asset so it needs to be guaranteed security by every organization (Agustina, 2009). Every part of the organization will depend on the information it has. The information is processed from various existing sources, both internal and external to the organization. Existing information will help in the organization's business processes. Each decision will refer to the resulting information. The information held must be of high quality and accurate. In addition to a good system, the quality of information must also be considered.

To be used properly, the quality of the information alone is not enough. Information security is required from parties who are not responsible for interfering with the processing and use of information.

B. *Information Security*

Information security is an effort to secure information assets against threats that may arise. So that information security can indirectly guarantee business continuity, reduce risks that occur, optimize return on investment. The more company information that is stored, managed, and shared, the greater the risk of damage, loss, or exposure of data to unwanted external parties.

In designing an information system security system, there are information security aspects that need to be considered, including:

- Confidentiality
  Aspects that ensure the confidentiality of information or data and ensure that information can be accessed by the authorized party.
- Integrity
  Aspects that ensure that data cannot be changed without permission from the authorities, maintain the completeness of the information, and guard against damage or other threats that can cause changes to the original information or data.
- Availability
  Aspects that ensure that data will be available when needed and ensure that users can access information without interruption.

C. *Information Security Threats*

The quality information that has been produced requires security measures from all threats and disturbances. Threats to information security can come from anywhere and will destabilize the organization's business processes. Several aspects need to be seen to secure data as stated by Whitman and Mattord (2011) as follows:

- Physical security: physical security of the system owned from dangers that can interfere with processing data into information. Such as natural disasters, unauthorized access to physical facilities, to theft.
- Personal security: protect people in the organization from problems that can arise that disrupt existing processes.
- Operation security: securing the organization's ability to process information.
- Communication security: protecting communication media and communication technology and utilizing technology for the benefit of the organization.
- Network security: secure the network to share information.

D. *Information Security Management System*

The Information Security Management System must refer to existing national or international standards so that the quality of the security provided is high and can overcome any problems. The international standard that has been recommended for the implementation of ISMS is ISO/IEC 27001:2013. This standard contains specifications or requirements that must be met in building an Information Security Management System (ISMS) and has been running on a risk-based basis to reduce threats and deal with problems quickly and precisely.

The implementation of this ISMS includes policies, processes, procedures, organizational structures, and functions of software and hardware. The implementation of the ISMS must also be directly influenced by the organization's objectives, security needs, and the processes used by the organization.

E. *Information Technology Risk Management*

The main purpose of implementing risk management is to provide views regarding the possibilities that can occur so that the organization can develop mitigation measures and evaluations related to risk. The stages in risk management based on (Spremic, 2008) include:

1. Identify and clarify risks.
2. Each risk is assessed.
3. Develop risk mitigation measures.
4. Documentation and implementation of measures to mitigate risks.
5. IT risk portfolio approach.
6. Periodic monitoring of IT and audit risk levels.

F. *ISO/IEC 27001 as an ISMS Standard*

The International Standards Organization (ISO) / International Electrical Committee (IEC) is a subsidiary of two organizations, namely the International Federation of the National Standardizing Associations (ISA) and the United Nations Standards Coordinating Committee (UNSCC) industry standards that can be adopted internationally. The importance of standardization of every aspect of life became one of the reasons for making ISO. One of the implementations is the creation of ISO 27001 whose implementation is in the field of information security management.

This standard also includes requirements for the assessment and treatment of information security risks that organizations must carry out to obtain compliance with this standard. The requirements of this standard are general in nature and are intended to be applied to all organizations regardless of type, size, and nature.

The ISO/IEC 27001:2013 consists of 14 control areas containing core topics that discuss the information security

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aspects contained in Annex A controls, 34 control objectives, and 114 controls implemented in the Information Security Management System (ISMS). ISMS is a systematic approach that aims to manage important information as well as sensitive organizational information to keep it safe.

ISO 27001 has been designed in such a way that it can be adapted in its application to small, medium to large organizations in any sector to protect the organization's important information assets.

G. *Information Security Index (KAMI) version 4.0*

The KAMI Index version 4.0 is a tool to evaluate the level of maturity, the level of completeness of the implementation of ISO/IEC 27001:2013, and an overview of information security governance in an organization. The KAMI index was created by the Ministry of Communication and Information.

This evaluation tool is not used to analyze the feasibility or effectiveness of existing forms of security, but as a tool to provide an overview of the state of readiness (completeness and maturity) of the information security framework to agency leaders.

The evaluation carried out using the KAMI Index covers the following areas:

- Category of electronic system
- Information security governance
- Information security risk management risk
- Information security management framework
- Information asset management
- Information technology and security
- Supplements

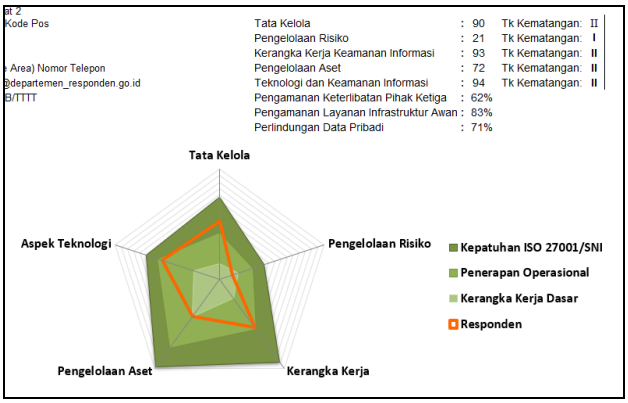

Fig. 1. KAMI Index Area Coverage version 4.0.

The KAMI index is an application that is used as a tool to analyze and evaluate the level of application of information security in an organization based on conformity with the criteria in SNI ISO/IEC 27001.

This evaluation tool can then be used periodically to get an overview of changes in information security conditions as a result of the work program being carried out, as well as a means to convey increased readiness to the relevant parties (stakeholders).

III. RESEARCH METHODOLOGY

A. *Electronic System Category Level Assessment*

This assessment is obtained from the answers to the Electronic System Category Level questions. The results of the SE Category assessment will be divided into three levels, starting from low to strategic as shown in Figure 2 below:

KATEGORI SISTEM ELEKTRONIK				
Rendah		**Skor Akhir**		**Status Kesiapan**
10	15	0	174	Tidak Layak
		175	312	Pemenuhan Kerangka Kerja Dasar
		313	535	Cukup Baik
		536	645	Baik
Tinggi		**Skor Akhir**		**Status Kesiapan**
16	34	0	272	Tidak Layak
		273	455	Pemenuhan Kerangka Kerja Dasar
		456	583	Cukup Baik
		584	645	Baik
Strategis		**Skor Akhir**		**Status Kesiapan**
35	50	0	333	Tidak Layak
		334	535	Pemenuhan Kerangka Kerja Dasar
		536	609	Cukup Baik
		610	645	Baik

Fig. 2. Electronic System Category Value.

A score with SE Category of 10-15 categorizes the importance of SE's role in the organization as low. A score of 16-34 categorizes the role of SE as high and a score of 35-50 categorizes the role of SE as very strategic in the organization.

These results show how important the role of SE in IDN Media is. Assessment in this category is done by looking at the status and scores based on the questions given. 10 questions are assessed with the status and score of the assessment can be seen in Table I below:

TABLE I. Criteria for Questions on the Role of Electronic Systems.

Status	Nilai
A	5
B	2
C	1

The highest score from the assessment of this category is 50 with the status of 10 questions "A" is called the strategic level and the lowest score is 10 with the status "C" is called low.

B. *KAMI Index Area Coverage Assessment version 4.0*

After the SE Category level assessment has been carried out, an assessment will be carried out on the coverage area of the KAMI Index version 4.0. The score is determined based on answers from sources whose choices have been determined by the KAMI Index tool version 4.0. Then the weighting will be carried out on the coverage area of the KAMI Index version 4.0 and all scores will be added up to produce a total score on the dashboard in the KAMI Index version 4.0. The total score will describe the condition of information security at IDN Media.

For the SE category, the available answers are answer choices that represent the state of SE needs in the IDN Media environment, while the answers for the coverage area consist of 4 choices, namely "Not Done" with a score of 0, "In Planning" with a score of 1, "In Implementation/Applied". Partial" with a score of 2, and "Completely Applied" with a score of 3. The total assessment of each area will be entered in the total table section of the KAMI Index dashboard version 4.0. in the supplement section it is calculated using the

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presentation of the implementation of Third Party Engagement Security, Cloud Infrastructure Services Security, and Personal Data Protection, as shown in Figure 3 below:

Tata Kelola	: 0	Tk Kematangan: I		
Pengelolaan Risiko	: 0	Tk Kematangan: I		I
Kerangka Kerja Keamanan Informasi	: 0	Tk Kematangan: I		s/d
Pengelolaan Aset	: 0	Tk Kematangan: I		I
Teknologi dan Keamanan Informasi	: 0	Tk Kematangan: I		
Pengamanan Keterlibatan Pihak Ketiga	: 0%			
Pengamanan Layanan Infrastruktur Awa	: 0%			
Perlindungan Data Pribadi	: 0%			

Fig. 3. Total US Index Area Coverage Assessment version 4.0.

The results of the area category assessment will appear on the ISO 27001 Standard Application Completeness Level Bar as shown in Figure 4 below:

Fig. 4. Completeness Level of ISO 27001 Standard Implementation.

The evaluation can be seen based on the value indicated by the level bar in Figure 4. For the red bar the value is “Not Eligible”, the yellow one is given the value “Needs Improvement”, the light green one is given the value “Enough”, and the dark green one is given the score. good point".

All data related to mathematical operations are processed using the KAMI Index 4.0 dashboard intermediary which was developed from Microsoft Office Excel software with the standard provisions of the KAMI Index 4.0 version. Area assessment based on 3 question labels, namely the form of the basic framework of information security (label 1), effectiveness and consistency of implementation (label 2), and the ability to continuously improve information security performance (label 3).

IV. Research Result and Discussions

A. *Electronic System Category Level Assessment Results*

Before the assessment of the area coverage of the KAMI Index version 4.0, a classification process is carried out first on the use of Electronic Systems in IDN Media. The purpose of this process is to see how big the role of SE in IDN Media is. This assessment measure consists of 3 categories, namely low, high and strategic.

From the results of the assessment of the importance of using Electronic Systems at IDN Media, a score of 39 has been obtained, so that it is included in the Strategic category according to the maturity level table of the KAMI Index 4.0 where the strategic category ranges from a score of 35-50.

The purpose of the strategic category in this assessment is that the use of SE in IDN Media is a much-needed and inseparable part of the entire work process that runs at IDN Media. The use of this SE gets a fairly high score because it has the obligation to comply with National Regulations or Standards, then its SE users exceed 5000 users, the connection of personal data with other personal data, the criticality of highly confidential data against attempts to attack or breach information security and the impact of failures that may result in the unavailability of national-scale public services.

Based on the importance of using SE in IDN Media, to get a "Readiness Status" with a "Good" score, the assessment results from the coverage area of the US Index version 4.0 must get a final score of more than 609.

B. *Results of the KAMI Index Area Coverage Assessment version 4.0*

This section will explain the results of the KAMI Index 4.0 assessment on IDN Media. Here is a display of the resulting KAMI 4.0 Index dashboard:

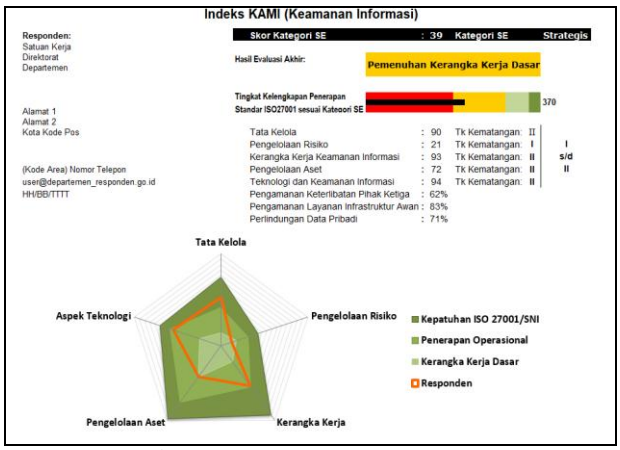

Fig. 5. Dashboard of US Index Assessment Results version 4.0 IDN Media.

From the dashboard, it can be seen that the Maturity level of Information Security at IDN Media is sufficient, namely, it has reached the Basic Framework Fulfillment standard, which is level II with a total score of 370. It can be seen on the radar chart dashboard of the respondents that not all areas are assessed in the KAMI Index version 4.0 is fulfilled and following ISO 27001 compliance. In the radar chart dashboard, it can be seen that there is 1 area that enters ISO 27001 compliance, 3 areas enter the operational application category, and 1 area that reaches the basic framework.

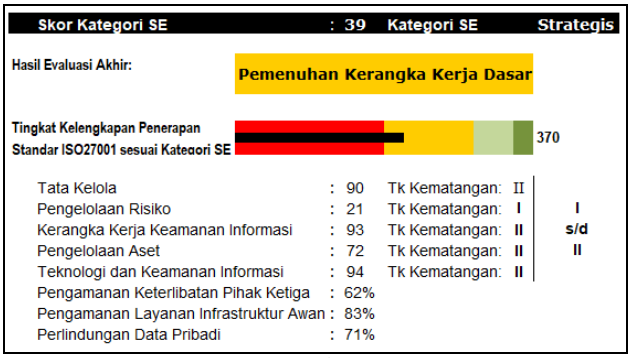

Fig. 6. Evaluation Results of IDN Media's WE Index.

From Figure 6 above, it can be seen that the KAMI Index value that has been achieved is level II. The value obtained only meets the basic framework because the value achieved does not meet the importance of using SE used by IDN Times, namely the strategic level with a score of 610. The score obtained by IDN Times is 370. For the maturity level of each

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area that has been assessed in the KAMI Index version 4.0 is also split enough. The following is a description of the maturity level of the assessed areas.

TABLE II. Maturity Levels of the Five Areas.

	Tata Kelola	Pengelolaan Risiko	Kerangka Kerja	Pengelolaan Aset	Aepek Teknologi
Tingkat Kematangan II					
Status	II	No	II	II	II
Tingkat Kematangan III					
Validitas	No	No	No	No	No
Status	No	No	No	No	No
Tingkat Kematangan IV					
Validitas	No	No	No	No	No
Status	No	No	No	No	No
Tingkat Kematangan V					
Validitas	No	No	No	No	No
Status	No	No	No	No	No
Status Akhir	II	I	II	II	II

The order of maturity level from lowest to highest is I-V. This maturity level shows the position of IDN Media as follows:

TABLE III. Condition Level of IDN Media.

Tingkatan	Kondisi
I	Kondisi Awal
II	Penerapan Kerangka Kerja Dasar
III	Terdefinisi dan Konsisten
IV	Terkelola dan Terukur
V	Optimal

The minimum limit that must be achieved to be able to carry out ISO 27001 certification is III+, while for now the maturity level of IDN Media is only limited to I-II.

V. Conclusions and Suggestions

1. *Conclusion*

From the introduction to the results and discussion, the topic of the problem and the results of the research have been determined. The results and analysis have been presented which have successfully answered the research questions and objectives by applying the theoretical framework and research methodology. The conclusion from this research is that the maturity level of IDN Media's information security management system has reached maturity level II (Application of the Basic Framework), and has not met the requirements for the minimum threshold for ISO/IEC 27001:2013 certification readiness, which is level III+.

Suggested improvement recommendations are set out for each fig and refer to the ISO/IEC 27002:2013 clause. To meet the minimum standard of readiness for ISO/IEC 27001:2013 certification, every area needs improvement on all sides. Based on the level of readiness to implement security following the completeness of control areas related to the basic form of information security framework, it must be in the status of being fully implemented. Then the effectiveness and consistency gain status in implementation. Partly also for the ability to improve information security performance.

2. *Suggestion*

For further research, it is recommended to pay attention to the relevance of the questions in the KAMI Index 4.0 area to help speed up obtaining the information and data needed.

The use of the KAMI Index 4.0 tools is very helpful in assessing the information security management system of an organization but still requires development in the Supplement area.

Acknowledgment

Thank you IDN Media, South Jakarta, Indonesia.

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