

KM Maturity Assessment of Telecommunication Company in Indonesia using G-KMMM

Hanif Sudira
Faculty of Computer Science
Universitas Indonesia
Depok, Indonesia
hanif.sudira@ui.ac.id

Putra Tresna Linge
Faculty of Computer Science
Universitas Indonesia
Depok, Jakarta
putra.tresna@ui.ac.id

Tsaqif Alfatan Nugraha
Faculty of Computer Science
Universitas Indonesia
Depok, Jakarta
tsaqif.alfatan@ui.ac.id

Damayanti Elisabeth
Faculty of Computer Science
Universitas Indonesia
Depok, Indonesia
damayanti.elisabeth@ui.ac.id

Sofian Lusa
Faculty of Computer Science
Universitas Indonesia
Depok, Indonesia
sofian.lusa12@ui.ac.id

Dana Indra Sensuse
Faculty of Computer Science
Universitas Indonesia
Depok, Indonesia
dana@cs.ui.ac.id

Abstract— The knowledge that has a relationship with the organization directly or indirectly affects an organization's sustainability. For this reason, a company, at least to survive, must have a good knowledge management process. TLCO is one of the largest telecommunication companies engaged in information and communication technology (ICT) services and telecommunications networks in Indonesia. TLCO plans to transform into a digital telecommunication company to adapt to changes in the telecommunications industry, taking place very quickly. It is necessary to know the maturity level of Knowledge Management as one aspect that can be used as TLCO readiness to transform into a digital company. This study aims to assess the maturity level of knowledge management in TLCO using G-KMMM and provide recommendations related to knowledge management for improvement. Data collection used a questionnaire to several people within the directorate at TLCO. Based on the assessment conducted using the GKMMM model with questionnaire data, the maturity level of knowledge management in TLCO is at level 2 or awareness.

Keywords—knowledge management, knowledge management maturity model, a telecommunication company

I. INTRODUCTION

The knowledge that has a relationship with the organization either directly or indirectly affects an organization's sustainability. To make knowledge more valuable, organizations must be able to manage this knowledge well. Organized knowledge can improve company performance to compete with other organizations and face current developments [1]. The knowledge management (KM) process consists of classifying, collecting, and redistributing asset knowledge [2].

TLCO is one of the telecommunication companies in Indonesia which has quite a high variety of knowledge. TLCO has more than 11,000 employees consisting of several generations [3], namely baby boomers, generation X, generation Y and generation Z. Currently TLCO is dominated by the baby boomers generation (53%) [4]. This shows that there is a generation GAP that occurs in TLCO. The generation gap in TLCO causes a communication gap [4]. According to [5], research in 2017, communication between individuals in an organization is an essential part of Knowledge Management (KM). According to [4], generation Y who quit TLCO explained that the absence of good communication resulted from a generation gap that caused a mismatch of competence with the given job.

To overcome this, TLCO has implemented KM since 2007. On the other hand, TLCO has an issue in identifying the effectiveness of the KM implemented. This study aims to measure the KM system maturity in TLCO and analyze what developments can improve the existing KM.

Research conducted by Subroto [6], His study examines the implementation of KM in the Indonesian tax administration, Directorate General of Taxes (DGT) By measuring the level of maturity using the General KM Maturity Model (G-KMMM). The assessment results found that the overall maturity level was still at level 2 (aware). Qodarsih *et al.* [7] conducting research measuring the maturity level of KM in one of the ministries in Indonesia using the G-KMMM method, the maturity level of KM implementation in the ministry on five aspects, namely culture, policy, strategy, process and technology is at level 3. From these studies it is known that G-KMMM can be used as an assessment method to assess the maturity level of KM.

Based on this, this research was conducted to measure the maturity of KM in TLCO using G-KMMM. By knowing the maturity level of KM in TLCO, planning can be done to improve KM in the future.

II. HEORETICAL BACKGROUND

A. Knowledge Management and Knowledge Management System

Knowledge management (KM) can simply be described as doing what is necessary to make the most of knowledge resources. To gain a competitive advantage, KM is a process to generate, capture, organize, transfer and knowledge. In general, KM focuses on managing and making available essential knowledge, wherever and whenever needed [8]. According to Dalkir [9], KM is systematic coordination within an organization regulating human resources, technology, processes, and organizational structures to increase value through reuse and innovation. This coordination can be achieved by creating, sharing, and applying knowledge using experiences and actions that the company has taken to organizational continuity learning. So, KM is creating, sharing, using, and managing an organization's knowledge and information to achieve corporate objectives [10].

According to Becerra and Fernandez [8], Knowledge Management System (KMS) integrates technology and mechanisms to support KM processes. So, KMS is an information system that is applied to manage knowledge in

organizations. KMS is an IT-based system developed to improve knowledge creation processes, storage or retrieval, transfer, and application [11].

B. Maturity Model and Knowledge Management Maturity Model

The maturity model is formed by first understanding and reviewing the culture of the organization [12]. According to Doss and Kamery [13] Maturity model is a facility's path to reach process maturity. In terms of KM, the KM maturity model aims to help an organization assess its relative progress in implementing KM [14]. According to Pee and Kankanhalli [15], the KM maturity model is the extent to which knowledge management is defined, managed, controlled, and affected. It represents the stages of growth of an organization's KM initiative.

Several models for measuring the maturity level of knowledge management, such as the Siemen AG KM Maturity Model [7], were developed by the Knowledge Management Competence Center of Siemens AG. It helps to analyze all the critical areas of knowledge management relevant, such as the business environment, culture, strategy. In Siemens AG KMMM, the five maturity levels are initial, repeatable, defined, managed, and optimized. The next example is the 5iKM3 KM Maturity Model [16], developed by Tata Consultancy Services. It is based on the belief that KM's goal is to transform organizational knowledge into business benefits. In 5iKM3 KMMM, the five maturity levels are initial, intent, initiative, intelligent, and innovative. Another example is the Infosys KM Maturity Model [17], developed by Infosys Technologies to help them assess their KM system's maturity level. Again in Infosys KMMM, there are five maturity levels: default, reactive, aware, convinced, and sharing.

Pee & Kankanhalli [15] classifies the KM maturity model into two types, namely whether it is developed based on the Capability Maturity Model (CMM) or not. From their research, for CMM-based developments, they compared four maturity models, i.e., Siemen AG KMMM [14], Infosys KMMM [17], Knowledge Process Quality Model [18], Knowledge Management Capability Assessment (KMCA) [19]. For developments not based on CMM, they compared six maturity models, i.e., KPMG Consulting's Knowledge Journey [20], 5iKM3 KMMM [16], Klimko's KMMM [21], WisdomSource's K3M [22], VISION KMMM [23], Khandelwal's Stages of Growth for KM Technology [24].

C. General Knowledge Management Maturity Model (G-KMMM)

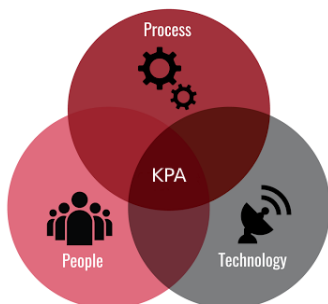


Fig. 1. G-KMMM Key Process Area

General Knowledge Management Maturity Model (G-KMMM) is a method of measuring the maturity of KM in an

organization. G-KMMM is based on the Capability Maturity Model (CMM) which follows a gradual structure and has two main components, namely the level of maturity and the *Key Process Area* (KPA). The maturity level is divided into three KPA as shown in Fig. 1 (people, process, and technology) [15]. Each KPA is also characterized by a set of factors. These characteristics help the organization reach a certain level of maturity, of course, when done collectively.

There are five maturity levels in G-KMMM consisting of initial, aware, defined, managed and optimizing as shown in Fig.2. It can be described definitively as follows [15]:

- *Initial*: have little or no intention of managing KM formally because it is not explicitly recognized as essential to an organisation's long-term success.
- *Aware*: the organization realizes the importance of KM and has the intention to formally manage it, but does not know how to do it.
- *Defined*: at this level the organization initiates various pilot projects to initiate KM.
- *Managed*: KM at this level has entered the organization and has been supported by KM technology in the company.
- *Optimizing*: the organization has a KM system that supports major business activities. There is a culture of sharing knowledge in the organization.

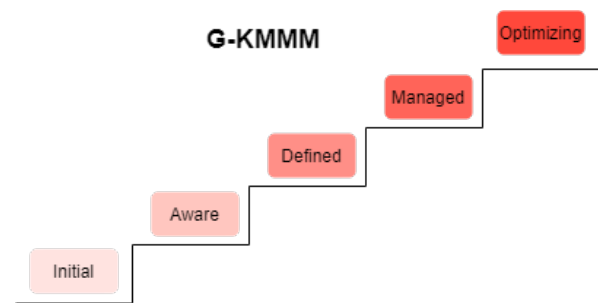


Fig. 2. G-KMMM Process Maturity

III. RESEARCH DESIGN

This study uses the General Knowledge Management Maturity Model (G-KMMM), which is applied to each directorate and collects the final results to assess KM's overall level in TLCO.

A. Case Background

TLCO is one of Indonesia's largest companies engaged in information and communication technology (ICT) services and telecommunications networks in Indonesia. TLCO currently divides its business activities into four segments: mobile services, enterprise & business services, wholesale & international services, and consumer services. TLCO aims to create a more prosperous and competitive nation and provides the best-added value for stakeholders with the vision of becoming a digital telco, the first choice for advancing society. To realize these goals and visions, TLCO has the following missions:

- Accelerate the development of smart digital infrastructure and platforms that are sustainable, economical, and accessible to all people.
- Developing leading digital talents that help boost the nation's digital capabilities and digital adoption rates.

- Orchestrate the digital ecosystem to provide the best customer digital experience.

From the explanation of the objectives, vision, and mission, TLCO has an agenda to transform into a digital telecommunication company to adapt to changes in the telecommunications industry. It is necessary to know the maturity level of Knowledge Management as one aspect that can be used as TLCO readiness to transform into a digital company. By understanding the maturity level of knowledge management, the organization can make the necessary adjustments. Therefore, this study aims to assess the maturity level of knowledge management in TLCO using G-KMMM and provide recommendations for improvements.

B. Methodology

In this research, the method used is descriptive quantitative with the following stages: (1) Literature study is related to the knowledge management maturity model, (2) Using the KM maturity model, which is selected based on literature studies, (3) Maturity level data collection which in this case study is based on a questionnaire, (4) Performs a maturity assessment, (5) Draw conclusions from the results of the maturity assessment and provide recommendations based on deficiencies. The methodology can be seen at Fig. 3.

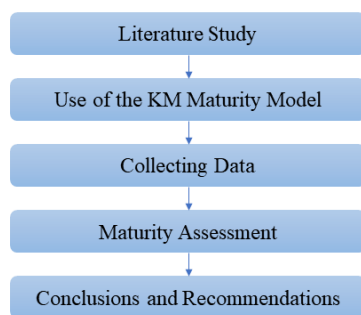


Fig. 3. Research Methodology

This study used the General Knowledge Management Maturity Model (G-KMMM) proposed by Pee and Kankanhalli [15] to determine its maturity level, where the case study was conducted. We use G-KMMM because this method is flexible to access knowledge maturity level in any various level organizations structure, including unit, department, or organization as a whole. Besides, this method also does not depend on the type of KM to be assessed. According to G-KMMM, the level of knowledge maturity in an organization is divided into five stages, namely initiation (initiate), awareness (aware), defining (define), and optimization (optimize).

At the initial level, an organization has little or maybe no attention to formally managing knowledge because it is not considered an essential factor in achieving its success and goals. Along with the increase in organizational awareness for managing knowledge, the organization's knowledge maturity level increases to the awareness level. Still, at this stage, an organization does not know how to implement it. At the defined level, organizations begin to build knowledge

management capabilities such as KM infrastructure that supports KM and build knowledge culture by using training and incentives. Next, KM has developed into the company's blueprint simultaneously with KM effectiveness evaluation based on model and standard used at the managed level. The highest knowledge maturity is the optimized level where an organization has optimized KM function to achieve key business activities and a culture of voluntary knowledge sharing in the organization.

For each maturity level in G-KMMM, an organization must achieve several criteria to pass each maturity level. These criteria are divided into three Key Process Area (KPA): people, process, and technology. Each KPA is described by a set of actions or primary practices that a company must take to pass a certain knowledge maturity level. Details about the KPA and maturity level criteria in the G-KMMM can be seen in Table 1.

In its application, any organization can implement primary practices at a higher level without completing the previous level first. However, in this case, this cannot be said the organization has already achieved a higher level because not all criteria in the previous level have been put into practice. To accomplish any maturity level, any organization must have implemented all requirements on those maturity level.

The assessment of knowledge maturity in G-KMMM is using several instrument questions related to KPA at each maturity level. Details about the assessment instrument can be seen in Table 2.

C. Data Collection

Data collection is done by giving questionnaires to several people in the directorates at TLCO. As for the details, four respondents from Enterprise & Business Service (EB), six respondents from Consumer Service (CO), three respondents from Wholesale & International Service (WI), five respondents from Finance (FI), five respondents from Human Capital Management (HC), three respondents from Strategic Portfolio (SP), seven respondents from Network & IT Solution (NI), three respondents from Digital Business (DB), and three respondents from Internal Audit (IA).

The total is 39 respondents, and all respondents have work experience of more than three years. The KM maturity assessment results for each directorate may differ due to differences in tasks, culture, and business processes. The G-KMMM assessment instrument was used as an questionnaires guide. The results obtained contribute to the general assessment of KM maturity at TLCO.

IV. RESULT AND ANALYSIS

KM maturity assessment for each directorate is done by evaluating whether a particular practice is implemented or not. For each procedure done, the answer is 'Y', otherwise it will become 'N'. A directorate must enforce all key practices at that level in order to qualify for the level of maturity within the KPA. Assessment results can be seen in Table 3. Based on the assessment carried out using the GKMMM model with questionnaire data, the maturity level of knowledge management at TLCO is at level 2, or awareness, the following will be explained for each process area

TABLE IV. G-KMMM MODEL [15]

Maturity Level	General Description	Key Process Area		
		People	Process	Technology
Initial	Little or no intention to formally manage organizational knowledge	organization and its people are not aware of the need to formally manage its knowledge resources	No formal processes to capture, share and reuse organizational knowledge	No specific KM technology or infrastructure in place
Aware	Organization is aware of and has the intention to manage its organizational knowledge, but it might not know how to do so	Management is aware of the need for formal KM	Knowledge indispensable for performing the routine task is documented	Pilot KM projects are initiated (not necessarily by management)
Defined	Organization has put in place a basic infrastructure to support KM	<ul style="list-style-type: none"> • Management is aware of its role in encouraging KM • Basic training on KM is provided (e.g., awareness courses) • Basic KM strategy is put in place • Individual KM roles are defined • Incentive systems are in place 	<ul style="list-style-type: none"> • Processes for content and information management is formalized • Metrics are used to measure the increase in productivity due to KM 	<ul style="list-style-type: none"> • Basic KM Infrastructure in place (e.g., a single point of access) • Some enterprise-level KM projects are put in place
Managed	KM initiatives are well established in the organization	<ul style="list-style-type: none"> • Common strategy and standardized approaches towards KM • KM is incorporated into the overall organizational strategy • More advanced KM training • Organizational standards 	Quantitative measurement of KM processes (i.e., use of metrics)	<ul style="list-style-type: none"> • Enterprise-wide KM systems are fully in place • Usage of KM system is at a reasonable level • Seamless integration of technology with content architecture
Optimizing	<ul style="list-style-type: none"> • KM is deeply integrated into the organization and is continually improved upon • It is an automatic component in any organizational processes 	The culture of sharing is institutionalized	<ul style="list-style-type: none"> • KM processes are constantly reviewed and improved upon • Existing KM processes can be easily adapted to meet new business requirements • KM procedures are an integral part of the organization 	Existing KM infrastructure is continually improved upon

TABLE V. ASSESSMENT INSTRUMENTS OF G-KMMM [15]

Level	Question
KPA: People	
2	PEO2a Is organizational knowledge recognized as essential for the long-term success of the organization?
	PEO2b Is KM recognized as a key organizational competence?
	PEO2c Employees are ready and willing to give advice or help on request from anyone else within the company
3	PEO3a Is there any incentive system in place to encourage knowledge sharing among employees?
	PEO3b Are the incentive systems attractive enough to promote the use of KM in the organization?
	PEO3c Are the KM projects coordinated by the management?
	PEO3d Are there individual KM roles that are defined and given the appropriate degree of authority?
	PEO3e Is there a formal KM strategy in place?
	PEO3f Is there a clear vision for KM?
	PEO3g Are there any KM training programs or awareness campaigns?
4	PEO4a Are there regular knowledge sharing sessions?
	PEO4b Is KM incorporated into the overall organizational strategy?
	PEO4c Is there a budget specially set aside for KM?
	PEO4d Is there any form of benchmarking, measure, or assessment of KM's state in the organization?
5	PEO5 Have the KM initiatives resulted in a knowledge sharing culture?
KPA: Process	
2	PRO2 Is the knowledge that is indispensable for performing routine tasks documented?
3	PRO3a Does the KMS improve the quality and efficiency of work?
	PRO3b Is the process for collecting and sharing information formalized?
4	PRO4a Are the existing KM systems actively and effectively utilized?
	PRO4b Are the knowledge processes measured quantitatively?
5	PRO5 Can the existing KM processes be easily adapted to meet new business requirements?
KPA: Technology	
2	TEC2a Are there pilot projects that support KM?
	TEC2b Is there any technology and infrastructure in place that supports KM?
3	TEC3 Does the system support only the business unit?
4	TEC4a Does the KMS support the entire organization?
	TEC4b Is the KMS tightly integrated with the business processes
5	TEC5 Are the existing systems continually improved upon (e.g., continual investments)?

TABLE VI. ASSESSMENT RESULT

Item	Directorate								
	EB	CO	WI	FI	HC	SP	NI	DB	IA
People Maturity	2	2	2	2	2	2	2	2	2
PEO2a	Y	Y	Y	Y	Y	Y	Y	Y	Y
PEO2b	Y	Y	Y	Y	Y	Y	Y	Y	Y
PEO2c	Y	Y	Y	Y	Y	Y	Y	Y	Y
PEO3a	Y	Y	Y	Y	Y	Y	Y	Y	Y
PEO3b	Y	Y	Y	Y	Y	Y	Y	Y	Y
PEO3c	Y	Y	Y	Y	Y	Y	Y	Y	Y
PEO3d	N	N	N	N	N	N	N	N	N
PEO3e	N	N	N	N	N	N	N	N	N
PEO3f	N	N	N	N	N	N	N	N	N
PEO3g	N	N	N	N	Y	N	N	N	N
PEO4a	Y	Y	Y	Y	Y	Y	Y	Y	Y
PEO4b	N	N	N	N	N	N	N	N	N
PEO4c	Y	Y	Y	Y	Y	Y	Y	Y	Y
PEO4d	N	N	N	N	Y	N	N	N	N
PEO5	Y	Y	Y	Y	Y	Y	Y	Y	Y
Process Maturity	3	3	3	2	3	2	2	3	3
PRO2	Y	Y	Y	Y	Y	Y	Y	Y	Y
PRO3a	Y	Y	Y	Y	Y	Y	Y	Y	Y
PRO3b	Y	Y	Y	N	Y	N	N	Y	Y
PRO4a	N	N	N	N	N	N	N	N	N
PRO4b	N	N	N	N	N	N	N	N	N
PRO5	N	N	N	N	N	N	N	N	N
Technology Maturity	3	3	3	3	3	3	3	3	3
TEC2a	Y	Y	Y	Y	Y	Y	Y	Y	Y
TEC2b	Y	Y	Y	Y	Y	Y	Y	Y	Y
TEC3	Y	Y	Y	Y	Y	Y	Y	Y	Y
TEC4a	Y	Y	Y	Y	Y	Y	Y	Y	Y
TEC4b	N	N	N	N	N	N	N	N	N
TEC5	N	N	N	N	Y	N	Y	Y	N
Overall Maturity	2	2	2	2	2	2	2	2	2
Company Maturity	2	2	2	2	2	2	2	2	2

A. People Area

The maturity level of KM for the people aspect at TLCO is still at level 2, and this is because TLCO realizes that organizational knowledge is considered necessary for organizational success in the long term. Knowledge management is regarded as the company's primary competency, and TLCO employees are ready and willing to provide or help. There are already partially implemented practices at level 3 and level 4. For practice at level 5 related to a culture of sharing knowledge, TLCO has started the initiative.

B. Process Area

KM maturity level for the process aspect, some are at level 2, and some are at level 3. the directorate of EB, CO, WI, HC, DB, and IA faces level 3 while FI, SP, and NI are at level 2. The directorate is still at level 2 of the KM maturity level because the best practice has not been documented. It can be seen that the aspect of implementing KM in TLCO has been well-defined. It's just that some directorates have not been defined.

C. Technology Area

KM's maturity level in the technological aspect at TLCO is at level 3. This is due to KM technology availability and supporting infrastructure such as knowledge management systems. In all directorates, procedures at level 4 have been partially implemented. At the HC, NI and DB directorates for practices at level 5 have been implemented. KMS at TLCO is

called 'kampiu', developed from a management initiative to create collaboration and communication, both formal and informal, to effectively encourage communication and knowledge to achieve its business targets.

V. CONCLUSION

Based on KM maturity assessment results, TLCO is at level two or 'aware' of the KM maturity obtained using the GKMMM assessment model, which considers people, process, and technology. It is implied that the company has realized the importance of knowledge. Still, companies need to learn again that maximizing the use of KM will provide more benefits.

To improve the use of KM in TLCO, the following are some recommendations we proposed for achieving the optimized level:

First, from the people aspects, the recommendations are as follows :

- Strengthening the Functions of the Knowledge Management & Case Study Center Unit in the Corporate University to manage KM daily
- Establish a clear vision mission related to KM implementation by giving Chief Knowledge Officer role to HCM Director.
- Consolidate KM into the overall organizational strategy.
- TLCO needs to strengthen the function of the community of practice in the organization by creating an active knowledge-sharing culture between employees.
- Periodic evaluation of KM practice.

Secondly, from the process aspects, the KM implementation recommendations are as follows:

- For the Directorate of FI, NITS and SP document every lesson learned and best practice.
- Existing KM systems are not actively and effectively utilized. This problem can be solved by increasing employee motivation to use the current KM system by giving incentives and rewards.
- Measure KM process quantitatively periodically through assessment.

Last, from the technology area, the KM implementation recommendations are as follows:

- Existing KMS is not tightened with the business process. There must be an integration link between the business process to KMS. For example, the company can create a technology implementation that makes a business report to KMS after a business project has finished.
- Adding budget for KM System development.

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