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This work is licensed under [CC BY 4.0](https://creativecommons.org/licenses/by/4.0/)**Abstract:**

The main purpose of Knowledge Management (KM) is to improve organizational efficiency by optimizing all available resources or assets. Therefore, organization should provide an environment that is conducive for the KM to be practiced at its best. Although KM has been introduced earlier but its practice in the Malaysian public sector is still in its infancy. This may be due to the lack of support and understanding in practicing KM activities, as a result implementing these activities often fails. Therefore, identifying the level of KM practice of employees is important, and proposing the evaluation factors becomes the main focus of this study. These identified factors can be used to assess the maturity level of KM practices in the organization. The maturity of KM practice refers to the level of acceptance and achievement of KM in the organization. If KM achievement level is not satisfied then improvements need to be made by each entity in the organization until it reaches the highest performance. This entity is referring to a wide spectrum of operations such as people, organizational processes, business initiatives or technology. In identifying the factors, the review from existing literature has been made. Based on people-process-technology framework, this study proposes four factors and sixteen sub-factors in determining the maturity of KM practices in the organization. All these factors have been confirmed by three KM experts and practitioners in the public sector organizations.

**Keywords:**

Knowledge Management, Maturity Level, People-Process-Technology Framework, Public Sector

## Introduction

The performance of an organization depends on the ability of its employees to practice the information and knowledge they have in providing the organization's needs in order to remain competitive (Abdurachman et al., 2021). However, due to lack of awareness and exposure in knowledge management (KM) practices, this concept failed to be adapted (Adeinat & Abdulfatah, 2019). Therefore, evaluating the efficiency of KM practices whether by the organization or employees is a necessity. However, one of the most difficult challenges in the organization is the ability to evaluate the success of a process or practice in the organization. In order to identify the yardstick that can be used to evaluate KM practices, identifying the factors that lead to the success of this practice should be done. It is said that the practice of KM in the Malaysian public sector is still at a moderate level (Balakrishnan & Chandramalar, 2019.), so identifying the factors that brought the organization to this level needs to be refined. Since there are differences in terms of culture, communication, coordination and cooperation in the public sector, encouraging a culture of KM practice becomes difficult. Furthermore, the lack of guidance and reference causes many public sectors faced difficulties in practicing KM activities effectively. Although there are various initiatives to encourage KM practices in the public sector, they are less effective and not able to attract interest among employees (Amber et al., 2018). To understand the aspects of KM that need to be evaluated, it is important to understand the concept of knowledge itself. Basically, knowledge is a framework that contains four components namely experience, value, data and expertise that produce new information and experience (Davenport & Prusak, 2000; Ahmad and Karim, 2019). To ensure this framework is comprehensive and accurate then these four components need to be well adapted. Knowledge usually shared with other colleagues, this sharing can be done in various documentation formats such as text, video, audio and so on (Ahmad & Karim, 2019). Based on this understanding, KM practice should be evaluated based on three aspects (Patil, 2013), namely:

- employee practices in daily tasks,
- the technology used, and
- the process that involved

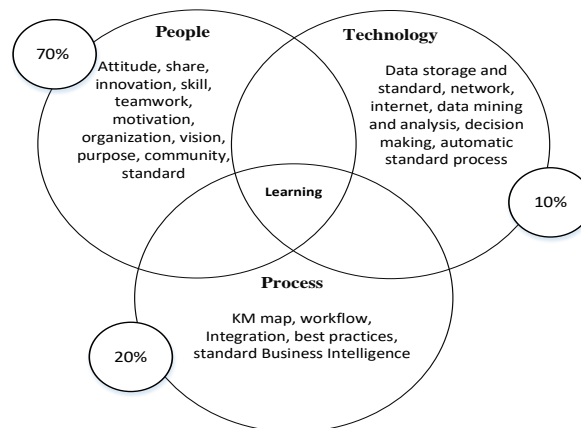
Therefore, in order to evaluate KM practices whether on employees or organizations, these three aspects need to be considered and improved to ensure the organization able to gain benefits and is able to achieve the goals (Rezaei et al., 2021). This has become the motivation of the study. Therefore the identification of factors and the sub-factors are based on these three aspects, and these limitations have become the scope of the study.

## Literature Review

The purpose of this study is to identify the factors that influence the practice of KM in the public sector and construct an evaluation method based on these factors. Various approaches and frameworks regarding KM practice have been referred. The purpose of KM assessment carried out in the organization is to identify existing weaknesses and improvement actions that need to be taken so that performance can be improved in a better direction (Abualwafa et al., 2023). To assess KM comprehensively, a framework that includes three important aspects in the organization namely process, processes and technology (PPT) shall be used (Sunmola & Javahernia, 2021). These three aspects are interconnected, holistic and are seen as appropriate in ensuring the evaluation is done collectively for the success of KM (Sunmola & Javahernia, 2021). These three aspects are seen as interrelated where employees (people) perform tasks, technology helps employees to improve performance and innovate. While

robust processes help employees increase efficiency in their work and technology helps streamline the processes. Combining these three aspects is able to create a synergy that helps to formulate a best practice that shall be adopted in the organization.

KM considers these three aspects as interrelated and needs to be taken into account collectively (Omar & Johar, 2022). Maximum benefits are only obtained when the implications of these three aspects are taken into account during the decision making process. However, the employee aspect is the most difficult thing to deal with and requires more effort and focus to manage it. Of which 70% of effort is required to manage employees, 20% of effort is required to manage processes while technology comprises 10% of organizational effort. This does not show that the technology aspect requires minimal effort in implementing it, the percentage given only describes the technology aspect that is the easiest and fastest to implement compared to the employee and process aspects. Figure 1 displays the PPT framework, the components involved in each aspect of the PPT and the relationship between them.



**Figure 1: People, Process and Technology Framework**

The PPT framework was first introduced by Cooper et al. (1964) to improve processes in organizations holistically. Due to its importance in improving the process, this framework is often used as a reference, and there are even writers who improve this framework and adapt it in various domains (Nur et al., 2017). Using this framework, employee tasks can be coordinated, processes are designed systematically and clearly while technology is used consistently. This framework shall be used as a guideline in evaluating and managing changes in the organization. The weaknesses in these three aspects can be identified during evaluation and the corrective action shall be implemented. It is appropriate to measure the organization's level of achievement against these three aspects. The higher the level of achievement of the organization in practicing KM, then it is said that the organization has reached its maturity. The systematic management of knowledge resources is defined as one of the important factors to increase the competitiveness of a sustainable organization (Badpa et al., 2018). This raises the question of whether the KM practices implemented in the organization successfully achieve the objectives and are able to manage knowledge systematically. However, until now there is no proper method to assess the maturity level of KM practices that can be used. Upon knowing this level, efforts to improve organizational performance to a higher level shall be made.

## Research Methodology

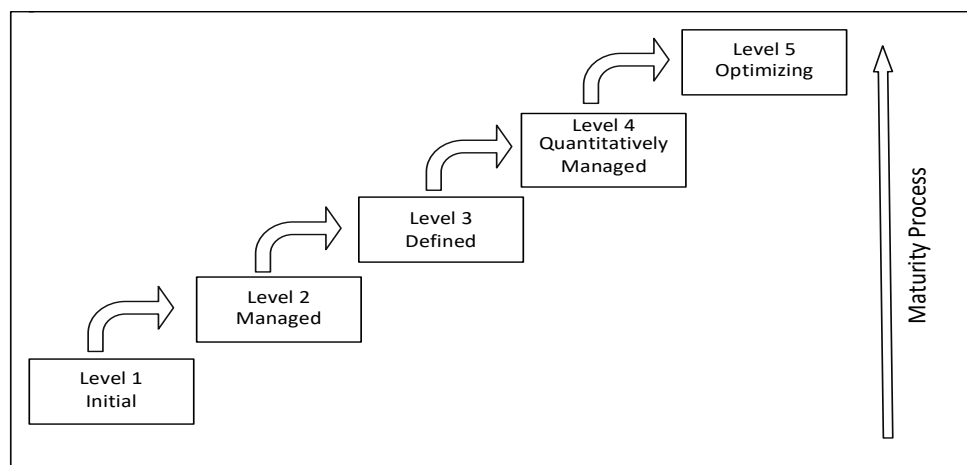
The intention of this study is to identify the factors that influence KM practices which are able to assess the status of KM acceptance and achievement. To achieve this goal, a quantitative approach is used and outlines four main activities in order to construct the design of a method for assessing the maturity level of KM practices in the Malaysian public sector. These activities are:

- analyzing related documents and article regarding KM practices and maturity model
- identifying factors and sub-factors that influence KM practices in the organization
- verifying the suitability of the identified factors and sub-factors in evaluating KM practices with the expert
- constructing the evaluation model in identifying maturity level of KM practices.

This study has referred to publications from 1999 - 2023 to identify the factors that influence KM practices. The selected factors are only based on the PPT aspects because these aspects are important for KM practices in the organization. Three experts from government sectors have been selected to verify the suitability of the identified factors and sub-factors in evaluating KM practices.

## Maturity Level as an Evaluation Tool

Evaluation process to determine the level of maturity is a method to test the level of performance of an organization and suggest improvements if necessary, which means that the organization often goes through an evaluation process to test its achievements, ability to grow and improve over time. Typically, there are five levels of maturity where level one is the lowest level and level five is the highest level that reflects the performance of the organization has reached the highest level of maturity (Thornley et al., 2016). According to Abu Naser et al. (2016) these five levels are Initial, Managed, Defined, Quantitatively Managed, and Optimizing as appeared in Figure 2.



**Figure 2: Evaluation Model with Five Levels of Maturity**

These five maturity levels are used to assess the level of achievement and also measure the organization's ability to manage business processes. Each level describes the organizational performance capability and opportunity for improvement. Each maturity level is described below.

- Maturity level 1: Initial
  - At this level, the process in organization is usually not documented, constantly changes and uncontrolled. This results in a chaotic and unstable process environment.
- Maturity level 2: Managed
  - There is a process that needs to be repeated to get more consistent results. The control over the process is loose but if the control is tightened, the steps in carrying out the process are still continued.
- Maturity level 3: Defined
  - A set of standard business processes is identified and documented where these processes are often improved. The process can be considered as being in the development stage with more extensive implementation. Based on the user's competence, this process can progress to the next level of maturity.
- Maturity level 4 : Quantitatively Managed
  - The process carried out is tested through various methods and the process is improved and adapted to the current situation. The maturity of the process allows it to be suitably implemented without neglecting the quality of the output. Organizations use process infrastructure and asset capabilities to achieve reliable results.
- Maturity level 5 : Optimizing
  - The organization has a consistent set of processes that are constantly improved and focus on innovation to optimize process execution.

The evaluation is done through the measurement of maturity based on the structure and the objective at each level (Abdul Rauf et al., 2020). The evaluation result is able to indicate the level of organizational performance and weaknesses that needs to be improved before moving to the next level of maturity. The higher the level, the higher the organization's ability to change existing weaknesses with opportunities to improve either in terms of improving quality or increasing the optimal use of resources. Organization should encourage the staff to learn and innovates to improve performance. Due to its ability in evaluation, this model has been used in various domains such as education, marketing, quality management and many more (Wang et al., 2011).

### **Factors Affecting Knowledge Management Practices**

The practice of KM in organizations is able to improve performance by ensuring knowledge and information is always available and easily accessible, so that accurate and comprehensive strategic decisions can be achieved. However, the practice of KM is still reported to be low among staff, especially in the public sector (Balakrishnan & Chandramalar, 2019). Therefore identifying factors that contribute to the low KM practice is needed. Although there are various aspects of KM maturity level that can be referred to (Abu Naser et al., 2016) but often the evaluation factor used refers to the PPT framework that is employees, processes and technology used in the organization. Therefore, this framework is analyzed in depth to identify the sub-factors that can be used to assess the maturity level of KM in more detail. This study proposes three factors stated in PPT framework to evaluate each level of maturity and also referring to the past studies one additional factor which is strategy is added. Strategy is considered as an important factor that influence KM practices since it supports in designing

the future planning of the organization. Based on the research conducted, a total of four factors and sixteen sub-factors have been identified, as shown in the Table 1 below.

**Table 1: The Factors and Sub-Factors of Each PPT Aspects**

PPT aspects	Factor	Sub-factor
People	• culture	<ul style="list-style-type: none"> <li>• group co-operation</li> <li>• confidence</li> <li>• behavior</li> <li>• commitment</li> </ul>
	• Structure	<ul style="list-style-type: none"> <li>• size</li> <li>• communication and flow of information</li> <li>• community practice</li> <li>• roles and responsibilities</li> </ul>
	• Human resource	<ul style="list-style-type: none"> <li>• training</li> <li>• appreciation</li> <li>• promotion</li> <li>• motivation</li> </ul>
	• Leadership support and	<ul style="list-style-type: none"> <li>• role and leadership</li> <li>• management support</li> <li>• management involvement</li> </ul>
Technology	• Information Technology	<ul style="list-style-type: none"> <li>• technology infrastructure</li> <li>• information technology tools</li> </ul>
Process and knowledge structure	• Process activity and	<ul style="list-style-type: none"> <li>• knowledge creation</li> <li>• knowledge storage</li> <li>• knowledge sharing</li> <li>• knowledge dissemination</li> </ul>
Strategy	• KM Strategy	<ul style="list-style-type: none"> <li>• KM goals</li> <li>• KM monitoring activities</li> <li>• skill retention</li> <li>• technological change</li> <li>• continuous learning support</li> <li>• current practice (individual)</li> <li>• current practice (process)</li> </ul>

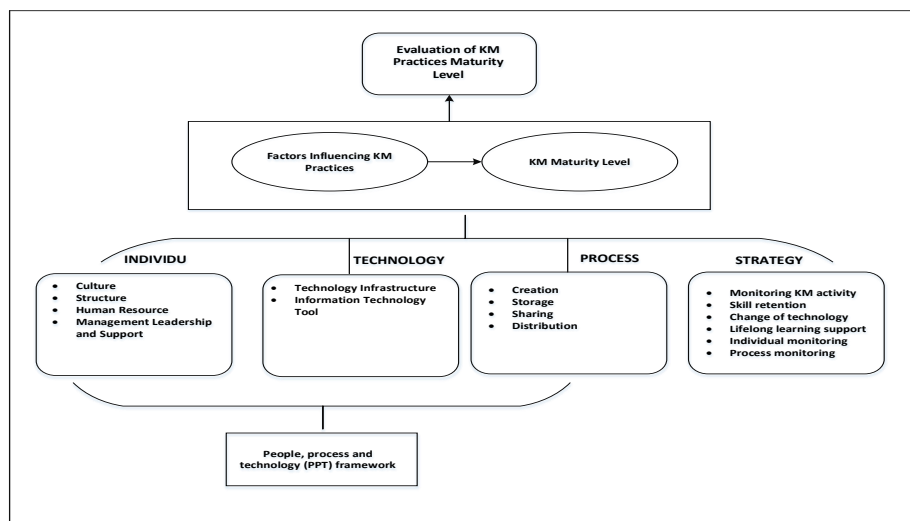
To verify the suitability of the proposed factors in evaluating KM practices, a total of four practitioners as well as experts in information technology (IT) from public sectors have been consulted. These experts are chosen based on their experiences in IT, their position and the working experiences with many employees under their supervision in the organization. The details of the experts are stated in Table 2.



**Table 2: List of Experts**

	Agency	Position	Years of experience
1	Ministry of Communication & Multimedia	Information technology officer	5
2	Ministry of Women, Family and Community Development	Information technology officer	15
3	Ministry of Housing & Local Government	Principal Secretary	5

For verification, an individual interview with the experts is conducted. A brief description of the research is explained and the list of the proposed factors is shown for evaluation. All the experts verified that the proposed factors and sub-factors are the influencing factors of KM practices, therefore suitable to be used for evaluation. Upon verification, this study has constructed the evaluation model that consists of factors that influence KM practices and KM maturity levels. Figure 3 shows the resulted constructed model that shall be used to evaluate the maturity level of KM practices.

**Figure 3: Evaluation Model in Identifying Maturity Level of KM Practice**

As shown in the diagram, a total of sixteen sub-factors have been identified based on people, process, technology and strategy aspects. These sixteen sub-factors are important to evaluate the level of KM practice in the organization. Based on these defined and verified factors, an evaluation matrix and the criteria to assess the maturity level of PP practice are constructed. The design of this matrix is illustrates in Table 3.

**Table 3: The Design of Evaluation Matrix**

List of Factors	List of Sub-factor	Maturity Level				
		Initial	Managed	Defined	Quantitatively Managed	Optimizing
<defined>	<defined>	<criteria>	<criteria>	<criteria>	<criteria>	<criteria>

There are three aspects in the evaluation matrix design, which are the list of factors and the sub-factors, and the maturity level. The factors and sub-factors listed are those that have been verified by the experts. The achievement on each of these factors needs to be evaluated to determine the level of maturity of KM practices. Maturity level measurement is based on the achievement of business processes that associated with KM practices. Maturity level is categorized into five levels which are: initial, managed, defined, quantitatively managed, optimizing. Therefore, the achievement criteria need to be identified, which indicate maturity level of KM practices based on the processes in the organization.

### Discussion

Although public sectors in Malaysia have practiced KM, there are various challenges in terms of its acceptance and implementation. Differences in culture, organizational structure and tools that support KM practice are said to be the challenges in KM implementation. It is expected that the implementation of KM in the public sector able to improve organizational. Therefore, this study focuses on evaluating the maturity level of KM practices in the Malaysian public sector. The PPT framework is referred in order to identify factors that influence KM practices and used these factors for evaluation to assess the maturity level. In addition, strategy factor is also taken into account based on its importance in planning the organization's strategy. This study has identified sixteen sub-factors that able to expand the description of these four factors. Based on the identified and verified factors, a maturity evaluation model has been formulated. Considering the proposed factors, sub-factors and its ability to evaluate the level of maturity of KM practices in the Malaysian public sector, the proposed model is significance when compared with the existing evaluation model. The difference is that the model proposed in this study is meant to evaluate the maturity of KM practices since the intention of most existing studies are to identify factors that influence KM implementation. Five levels of maturity can be used to evaluate the level of organizational performance and any improvement shall be planned. An evaluation matrix shall be developed based on specific domain factors or criteria to be achieved in order to identify the maturity level of KM practices.

### Conclusion

KM if practiced effectively can bring changes to the organization since KM is considered an asset that can be used to formulate effective and efficient strategies and able to help the organization face challenges in the future. It is important for the organization knows the level of KM practice by performing an evaluation that considers every aspect in the organization. Therefore, the strengths and weaknesses of the organization can be identified and the actions shall be planned for improvement. This study has identified four factors that refers to the PPT framework and suggests a strategy factor as additional factors based on the literature review and the recommendations from information technology practitioners in the Malaysian public sector. This study also suggests sixteen sub-factors that influence KM practices in organizations. All these factors and sub-factors can be used to evaluate the maturity level of



KM practice. As the next step, a questionnaire will be constructed to verify the significance of each of the proposed factors in influencing KM practice in the organization. An evaluation matrix to evaluate the maturity level of KM practice will be constructed. Upon knowing the level of maturity, it is hoped that the organization will be able to adapt KM more effectively and provide a more conducive working environment.

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