

ASSESSING KNOWLEDGE MANAGEMENT MATURITY LEVEL BASED ON APO APPROACH (A CASE STUDY IN IRAN)

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Abstract: Knowledge management is no longer strange words in today's industrial landscape. Most of the large or successful companies are having knowledge management inside their organization; in fact some of them are heavily focusing on their knowledge management unit. A very important thing is how the company manages to implement knowledge management in their organization. This study helps to explain the use of KM assessment and the important factors to be improved. This study utilizes APO's approach in assessing the organization KM maturity level through qualitative survey. Analysis of this research shows the different maturity level for each type of gender, age, and position in the organization and taken further to see the relation with the organization performance from its financial reports.

Keywords: APO Model, Knowledge Management, Organizational Performance, Maturity Model.

1. INTRODUCTION

Knowledge Management (KM) is rapidly growing disciplines in some countries, especially in the developing countries. Knowledge is an asset to an organization. A number of techniques and tools help in discovering and leveraging existing valuable knowledge assets within the organization. These techniques and tools ensure the success of knowledge management applications, because they promote the objectives of knowledge management in the organization: knowledge growth, knowledge communication and knowledge preservation (Steels, 1993). Therefore, organizations need to establish techniques and tools in their organizational memory to capture, store and apply knowledge assets (Wiig et al, 1997).

In today's volatile competitive environment, Knowledge Management (KM) has become one of the most sought-after capabilities by many forward-looking organizations. As investments in various KM initiatives inflate, the call for coherent and comprehensible principles and practices to guide KM implementation efforts has increased. To address these needs, researchers and practitioners have proposed maturity modeling as a way of formally describing the KM development process by assessing the extent to which KM is explicitly defined, managed, controlled, and effective (Klimko, 2001; Kulkarni and Freeze, 2004; Kulkarni and St. Louis, 2003; Paulzen and Perc, 2002). While several KM maturity models have been proposed, a consistent view on how an organization's KM maturity can be assessed and determined remains elusive. Recognizing this gap, we attempt to address the following research question: How can an organization's level of KM maturity be assessed?

Also, the proliferation of many different KM Maturity Models (KMMM) adopting different definitions and assumptions has made their selection and application difficult (Kulkarni and St. Louis, 2003).

This article attempts to Measure knowledge management maturity levels in organizations and provides a method for the measurement of knowledge Management maturity levels, and focus on identifying the stage of knowledge management maturity in organization departments. It will allow justification of knowledge management initiatives by identifying the maturity level and success factors.

Regarding the above-mentioned points, in the present study, concepts of knowledge management, various models related to knowledge management, research findings and findings of different researchers in the field of knowledge management were assessed then the best model for the current situation of organization in each factor scrutinized.

2. LITERATURE REVIEW

Maturity models describe the development of an entity over time. The entity can be anything of interest. It can be a human being, an organization, a technology, a product, a process etc. Maturity model gives a path to improvement. Maturity Model can also be used as a basis for comparison (Klimko, 2001). Maturity models are driven by the necessity to have a clear cut road map for any organization that is embarking on knowledge management implementation. It provides the clear vision with a description of the path ahead. Knowledge Management Maturity Model (KMMM) can be considered as an application of structured approach to knowledge management implementation.

The development of a single entity is simplified and described with a limited number of maturity levels (usually four to six):

- Levels are characterized by certain requirements which the entity has to achieve on that level.
- Levels are sequentially ordered, from an initial level to a final level of perfection.
- During development, the entity progresses forward from one level to the next. No levels can be skipped.

Maturity models are basically application of life cycle approach. The entity develops through the levels, until the highest level, which is the level of perfection. For example, the Analysis Capability Maturity Model (ACMM), which has been developed for the US American National Reconnaissance Office (NRO) (Smith and Von Winterfeldt, 2004). It has been designed to evaluate processes of organizations that conduct state commissioned studies (Covey and Hixon, 2005), or model of Capability Maturity Model Integration (CMMI), which integrates several models that evolved from the context of the initially very popular Capability Maturity Model (CMMI Product Team, 2006). On the basis of CMM, Cook and Visconti started in 1992 to develop the Document Process. The characteristics of some KMM models reviewed, along with their strengths and inadequacies are summarized in the Table 1. The models are named with the name of the first author, wherever available. Column 2 lists the key areas identified in the model. The models which did not identify any key areas are represented as 'Generic'. Column 3 lists the number of levels of the models followed by the names of the levels.

Table 1. Theoretical background of study

Model Name and Author	Key Areas	No of Levels and Names	Strengths
KMMM(Hubert Hubert and Lemons (2010)	Generic	(5) Initiate, Develop, Standardize, Optimize, Innovate.	KM strategy that is linked to business strategy and driven by return on investment. Individual, departmental and organizational performance assessment aligned with the KM strategy.
KMCA (Kulkarni) Kulkarni and Freez (2004)	Knowledge	(6) Difficult, Possible, Encouraged, Enabled, Managed, Continuously Improved.	Detailed assessment methodology. Validation of the model
KMMM (Klimko) Klimko (2001)	Generic	(5) Initial, Knowledge	Advanced and Innovative knowledge. Documented and measurable KM

		Discoverer, Knowledge Creator, Knowledge Manager, Knowledge Renewal	processes. Extended. Organizational maturity.
Knowledge Journey KPMG (2000)	People, Process, Content, Technology.	(5) Knowledge Chaotic, Knowledge Aware, Knowledge Focused, Knowledge Managed, Knowledge Centric	Identification of characteristics in terms Key areas like people, process, technology and content.
KMMM (Natarajan) Natarajan (2005)	Business process Readiness, Technology, Infrastructure, Human Behavior Leadership.	(4) K-stages	Validation of the model
KMMM (Boyles) Boyles et al (2009)	Human Resource, Training, Documentation, Technology, Tacit Knowledge, KM Culture.	(5)	Detailed assessment criteria were listed.
APO (2009)	leadership; people; process; technology, knowledge management achievements, innovation, knowledge process	(7)	To emphasize the key elements of the success in knowledge management, culture, human resources, information technology and leadership

2.1 KM: APO Framework:

In APO KM Framework, each stage is delivered fairly easy to learn and do (Praba, 2009). Fairly comprehensive discussion with a description of the systematic structure are given, at least it is easy to understand clearly, even for those who are new to KM. Convenience provide including the provision of facilities for delivery of material, material slides, each slide presented topics, keywords, and examples of cases for comparison.

As presented by Shigeo Takenaka (2009) in the implementation of practical guidelines APO Framework, submitted that: 1) Considered knowledge as a key to growth and innovation, particularly in the Asian Productivity Organization member states (APO). Knowledge is widely agreed to be dependent for growth and productivity, it is a reason why knowledge should be managed well; 2) The success of KM in institutions and practitioners in the countries of Europe and America in 2007, triggering the commissioners (experts) in Asian countries to draw up a complete APO KM Framework to the definition and implementation methodology that is easy to implement, especially in Asian countries. These experts included representatives from the countries of India, Japan, Malaysia, Philippines, China, Singapore, Thailand, Vietnam and APO Secretariat. But KM was originally intended for organizations of small and medium scale.

The purpose of the APO KM Framework is to provide a general understanding among member countries and emphasized the value of KM for the success of the organization (Ajmal, 2009). The framework is simple and comprehensive, leading all elements of KM solutions that are relevant, and serves all reference types of organization that aims to improve performance through the KM.

This framework is specifically written for SME's organization as a KM initiative for the organization with an emphasis on an integrated approach, multi-disciplinary, with the aim of improving the productivity, profitability and growth. The term "growth" aimed at socio-economic development for non-profit organization.

The framework is simple and comprehensive, leading all elements of KM solutions that are relevant, and serves all reference types of organization that aims to improve performance through the KM. Framework and methodology make sure that nothing will be missed, by reducing the variety and complexity of KM to manageable tasks. In addition, these guidelines are summarized the cases of KM implementation in the organizations both small and medium enterprise facilitator in better understanding to the context of SME's as an opposition to large organizations. It helps to design KM program deeply, roadmap and action plan for the organization. KM did not work if it does not achieve the business goals, and KM must be aligned with the organizational goals. Next is a layer: Accelerators, Knowledge Process and Outcomes.

Accelerator Layer also consists of a collection of triggers and enabling KM: Leadership (the driver that propels the KM initiative in the organization), Processes, People, and Technology.

Recognizing the importance of KM to the economies of its member countries, and in particular its importance to SMEs, the Asian Productivity Organization (APO) commissioned a fact-finding mission to leading KM institutions and practitioners in Europe and the USA in May 2007 to study the latest trends and developments in KM and to share their best practices with the rest of Asia. Following that mission, an Expert Group was convened to formulate an APO KM framework that would be practical and easy to implement specifically in the Asian SME context (Nair and Kamlesh, 2009).

APO KM framework is divided into five (5) main maturity levels, Level 1: Understanding KM, In this session, It is introduced the purpose of the application of KM in the organization, understanding the difference between information and knowledge, type of knowledge, knowledge assets, Knowledge Process, KM Tools and Technology. Level 2: The need to have KM in organization, Level 3: Doing KM Implementation Approach in some areas, Level 4: Doing KM Implementation perfectly with continues evaluation and improvement, Level 5: The centrality of KM in organization.

2.2 Organizational Performance:

Measuring the organizational performance is very difficult (Mohamadi et al, 2009). However, there is no unique way to measure organizational performance related to knowledge management. The measures of organizational performance are classified into two categories: tangible and Intangible (Drew, 1997 – Davenport, 1999).

Table 2. Previous research work about performance and KM relation

SCHOLAR	TITLE	CONCLUSION
Treacy and Wiersema (1995), Harrison and Leitch (2000), Zacket al (2009), Heisig (2009), Ibrahim and Reid (2009)	KM and Organizational Performance	Km and factors were directly related to organizational performance
Jadoonand Hasnu (2009)	Collaboration dichotomies in KM success	Relation between knowledge management success and collaboration
Muller and Raich (2005)	Relationship between Leadership and Intellectual capital	Focus on measurement and relationships of IC factors

3. RESEARCH MODEL AND HYPOTHESES

In this study, we tried to select measures of both categories that are influenced more by organization knowledge level. Self-reported items are also used because they do represent broad measures of performance which are commonly tracked, and they are used to compare business units and industries (Alavi, 2005). Harrison and Leitch (2000) recommended that organizations need to constantly update their knowledge resources to remain competitive.

There has been some research conducted over the past decade evaluating the knowledge process and factors affecting on it (Wiig et al, 1997; Muller and Raich, 2005; Choy and Suk, 2005; Azadeh et al, 2006; Jadoon and Hasnu, 2009; Zack et al, 2009; Heisig, 2009; Sensuse and Lukman, 2012). Furthermore, Turner and Minnone have identified important key variables namely, process, intellectual capital (human), culture and strategy in knowledge management process (Turner and Minonne, 2010). The research model is represented in Figure 1 and hypotheses of the research are as in the following.

Hypotheses:

H1: There is a positive relationship between profits and knowledge maturity level

H2: There is a positive relationship between revenues and knowledge maturity level

H3: There is a positive relationship between Collaboration and knowledge maturity level

H4: There is a positive relationship between Learning & development and maturity level

H5: There is a positive relationship between Trust and knowledge maturity level

H6: There is a positive relationship between T-shaped skill and knowledge creation process

H7: There is a positive relationship between Support of IT and knowledge maturity level

H8: There is a positive relationship between organizational creativity and knowledge maturity level

H9: There is a positive relationship between customer and knowledge maturity level

H10: There is a positive relationship between financial performance and knowledge maturity level

H11: There is a positive relationship between Organizational creativity and nonfinancial performance

H12: There is a positive relationship between Organizational creativity and financial performance

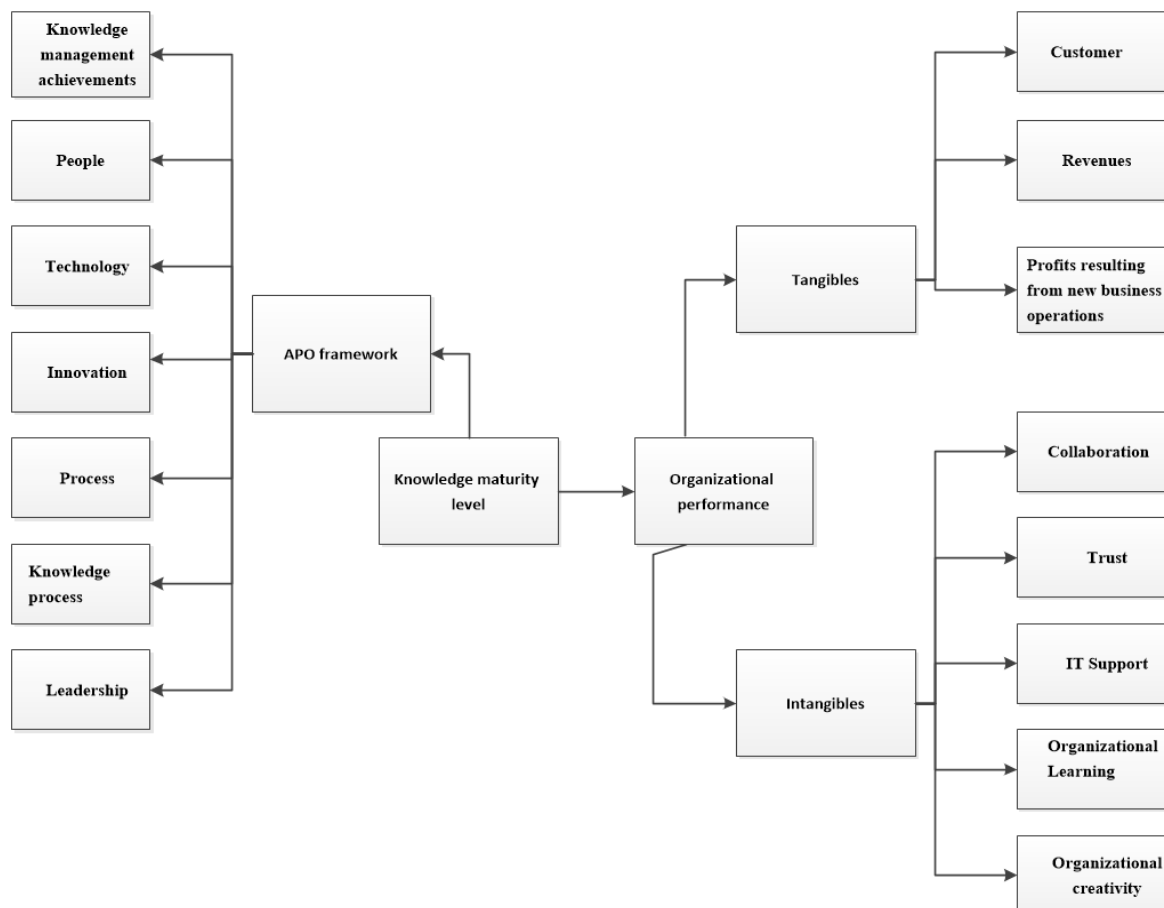


Figure 1: Research model

Collaboration:

Many researchers have considered collaboration as an important variable in knowledge creation or sharing processes. Scott and Bruce (Scott and Bruce, 1994) insisted that collaboration reduce fear and increase openness and therefore encourage new ideas and risk taking. Persisted that collaboration be indeed strongly conducive to knowledge Creation and transfer. Therefore, collaboration is the important factor in knowledge management.

Trust:

Trust facilitates learning between partners. We define trust as reciprocal faith in others' intention and behaviors according to (Kreitner and Kinicki, 1992). Decisions by exchanging knowledge under certain conditions are based on trust. Trust is an important variable in knowledge creation process.

Learning:

Learning and development is important. An emphasis on individual learning and development infuses an organization with new ideas. Intense training, mentoring, and peer pressure literally force professional to the top of their knowledge works. The great intellectual organizations seem to develop deeply ingrained learning and development culture (Lee and choi, 2003).

Skill:

Concerned with skill, many researchers refer to T-shaped skill .T-shaped skills means that they are both very deep (the stem of the T) yet broad enough (the cross of the T) to enable their possessors to explore the interfaces between their particular knowledge domain and various applications of that knowledge in particular product (Tatham et al, 2010 - Barile et al, 2015).

IT Support:

Technology context is referred to the existing information technology infrastructure and capabilities supporting the knowledge management architecture (Bharadwaj, 1999).

One aspect of technology infrastructure is knowledge-oriented tools such as Lotus Notes and World Wide Web-based intranet (Baharadvaj, 2000). Another aspect of technology infrastructure is a common, pervasive set of technologies for desktop computing and communication. This means a capable, computer on every desk, with standardized suitable tools that people can exchange documents (Gottschalk et al, 2011).

Organizational creativity:

A number of researchers have considered organizational creativity as an important factor for organizational improvement. Woodman et al (Woodman, 1993) suggested that creativity for organizations represent a dramatic organizational change. Organizational change may include organizational effectiveness, survival, and organizational performance. Davenport (Davenport, 1998) suggested improvements of ideas might lead to better organizational performance.

4. RESEARCH METHOD

Research constructs are knowledge management based on related literature reviews and various theories. For the questionnaire, the multiple-item method was used and each item was based on five point Likert scale from 'very low' to 'very high'. A multiple regression method is used to test the data. Total number of questions of APO framework was as much as 42, with a total score of 210. Each category has a maximum value of five, with the number of questions per category is 6 items. The unit of analysis in this study is Man plastic company in Tehran province. We collected 36 questionnaires. We performed reliability test for internal consistency. Items with Cronbach's alpha values less than 0.6 were removed.

The end result in the form of a matrix is added up into a total of matrix categories, each group, the total score, and the average score, then the value of the matrix is illustrated in the radar graph in Figure 2.

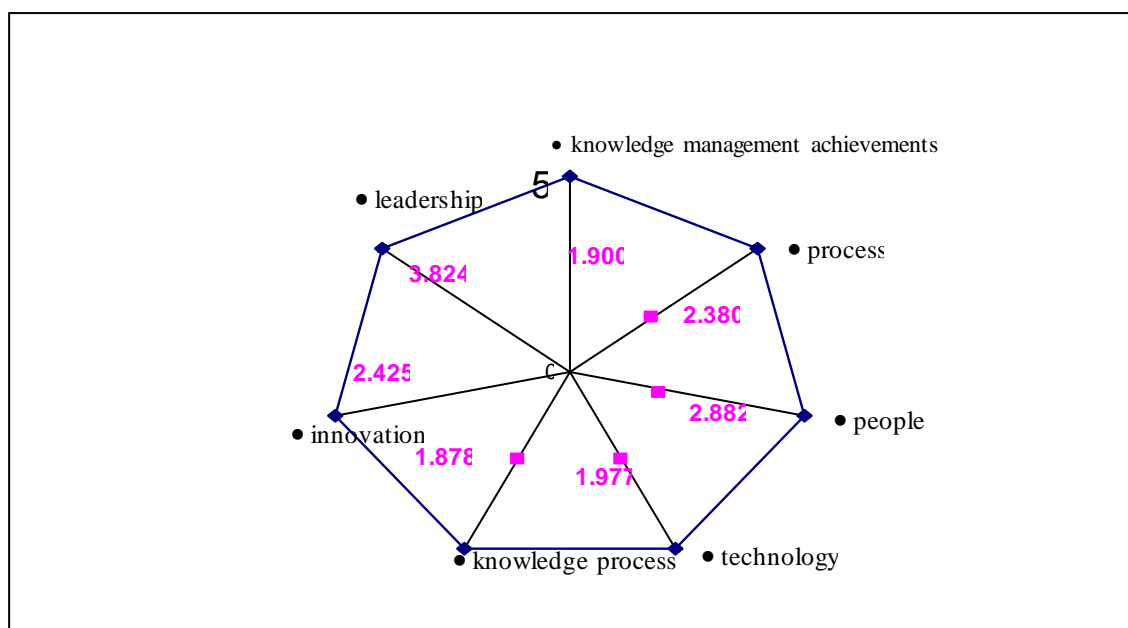


Figure2: Final results based on 7 audit criteria matrix workshops

As shown in Figure, it can be obtained the highest value reached by category Leadership (3.824), while the lowest value by KM process (1.878), others are respectively knowledge management achievements (1.9), People (2.882), Technology (1.977), Learning & Innovation (2.425), and Process (2.38). Of the total mean score (96.63) which is obtained by KM Readiness in the range of 84-125 equals to KM Initiation. It means just beginning to recognize the KM. The other range is 42-83--KM Reaction, 126-146--KM Introduction (Expansion), range 147-188--KM Refinement, and 189-210--KM Maturity (Figure3).

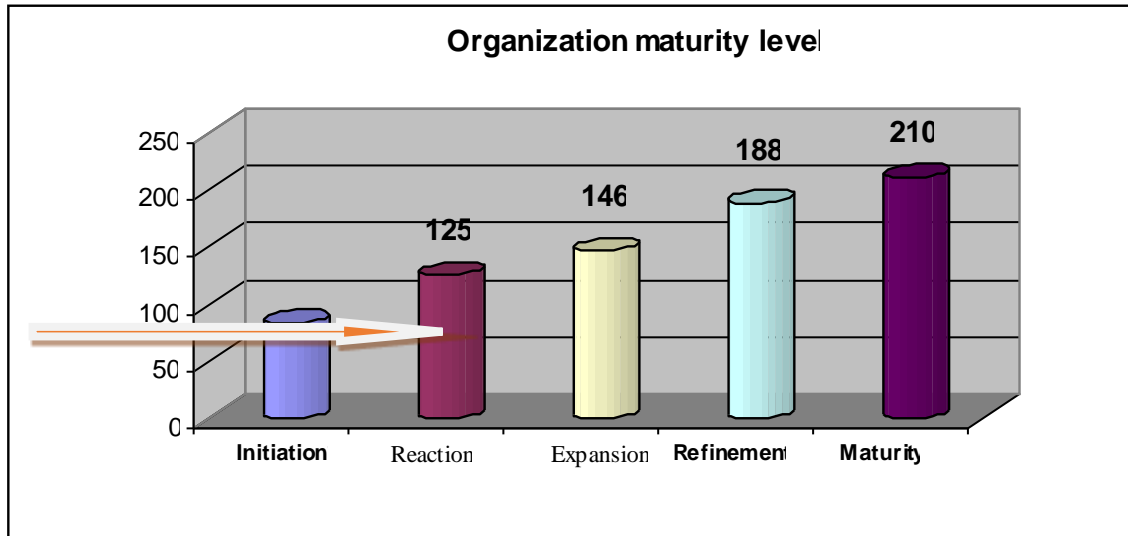


Figure 3: Interval Point KM Readiness (source: APO)

4.1 Organizational performance:

For further analysis, we divided organizational performance into tangibles and intangible factors, Analyses were performed on the 41 items that measured the components of organizational performance and return on investment (ROI) for financial performance. We used factor analyses to explore and identify appropriate indicators and the relationships between them and then with multiple regression analysis the relationship between them was evaluated (Table 4).

Table 4: KM maturity and organizational performance relation

Hypotheses	t-value	p-value
H1: profits and knowledge maturity level	-2.58	0.01
H2: revenues and knowledge maturity level	-0.34	0.37
H3: Collaboration and knowledge maturity level	3.92	0.00
H4: Learning & development and maturity level	4.23	0.02
H5: Trust and knowledge maturity level	1.86	0.01
H6: T-shaped skill and knowledge maturity level	0.25	0.86
H7: Support of IT and knowledge maturity level	1.27	0.33
H8: organizational creativity and knowledge maturity level	12.09	0.02
H9: customer and knowledge maturity level	5.69	0.48
H10: financial performance and knowledge maturity level	1.50	0.02
H11: Organizational creativity and nonfinancial performance	5.69	0.01
H12: Organizational creativity and financial performance	1.50	0.16

We found that knowledge maturity level was a significant predictor of knowledge profits ($\beta = 0.17$, $p < 0.05$), which supported H1. However, revenue was not significantly related to the KM maturity level (H2 was not supported). For the intangible factors, collaboration, learning and development, and trust, knowledge maturity level had significant positive influences on them, which support H3, H4, and H5. For T-shaped skill and support of information technology, there was

no significant effect of knowledge maturity level. We found that knowledge creation was a significant predictor of organizational creativity ($\beta = 0.65$, $p < 0.00$), which support H8. As proposed in hypothesis 11, organizational creativity showed a strong positive relationship with nonfinancial performance ($\beta = 0.473$, $p < 0.00$). The strength of this association indicated a very significant relationship between organizational creativity and organizational performance. However, organizational creativity was not significantly related to financial performance ($\beta = 0.106$, $p < 0.16$). Thus H12 was not supported. In sum, Table 5 shows the results for the hypotheses. This means, an organization can achieve strategic benefits of KM from effective creation processes.

Table 5: Result for Hypotheses

Hypotheses	Standardized beta coefficient	t-value	Results
H1:profitsandknowledgematurity level	0.17	-2.58	NotReject
H2:revenuesandknowledge maturity level	0.02	-0.34	Reject
H3:Collaborationandknowledgematurity level	0.28	3.92	NotReject
H4:Learning&developmentandmaturity level	0.65	4.23	NotReject
H5:Trustandknowledgematurity level	0.11	1.86	NotReject
H6:T-shapeskillandknowledgematurity level	0.71	0.25	Reject
H7:SupportofITandknowledgematurity level	0.09	1.27	Reject
H8:organizationalcreativity and knowledge maturity level	0.65	12.09	NotReject
H9: customer and knowledge maturity level	0.37	5.69	Reject
H10:financialperformance and knowledge maturity level	0.10	1.50	NotReject
H11:Organizationalcreativityandnonfinancialperformance	0.47	5.69	NotReject
H12:Organizationalcreativityandfinancialperformance	0.10	1.50	Reject

The non significant findings in the pilot study bear discussion. We expected that technological contexts would have a positive relationship with KM maturity level. However, the study indicated that the second texts were not significantly related to knowledge maturity level. Since KM maturity is in the introduction stage, organization may have not considered technology context yet. The relationship between organizational creativity and financial measure may reflect the unique economy environment of market; this implies that financial measure may not be stable in the period 5.

5. CONCLUSION

An effective Knowledge Management implementation depends upon the organizations ability to design and develop the systems and processes and to develop an environment that fosters learning, knowledge creation, knowledge sharing and the use and re-use of organizational and personal knowledge (McInerney and Koenig, 2011).

The difficulty for many organizations is that there is a lack of a current situation knowledge level view that could guide the implementation of Knowledge Management efforts, we present an integrated report results of company knowledge maturity stage and relationships among KM maturity and organizational performance. From the results, it can be concluded that exposure to APOKM Framework method can be applied to the organization increase understanding of the importance of implementing KM in company (Garrido and Padilla, 2011).

Based on the assessment matrix acquired sufficient innovation, but the drawback is in knowledge processes the total range of scores at the level of KM initiatives, with the conclusion KM was already identified and ready to be applied. This is due to the unequal distribution of technology infrastructure available in each unit, as well as a lack of understanding of KM in depth to be a part of improving the performance, Productivity, and growth.

Some activities that reflect the KM process has been going on such as collaboration with some scattered units to share knowledge and experiences. It is supported by an This study attempts to find the relationships between knowledge maturity level and each factor influence on organization performance such as learning, staff skills, and technology.

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