An Integrated Proposal for a Knowledge Management Implementation & Maturity Assessment Model

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Abstract: The goal of the paper is to suggest a comprehensive and integrated knowledge management implementation and maturity assessment model based on the most common critical success factors and corporate enablers discovered during a systematic overview of the knowledge management maturity models and the related literature review. Summarizing the review leads to the discovery of KMMs CSFs and key themes, while simultaneously examining the idea of standardization through accepted KM standards and their core principles. To provide a model that can be used by both practitioners and researchers in the future to improve organizational performance and to be used as a tool for knowledge management performance measurement, the implementation stages of the proposed framework, the maturity levels, the proposed assessment measuring tools and methods are presented in an approach that encompasses the core guidelines of ISO 30401.

1. INTRODUCTION

Despite being intangible, knowledge is a resource that, like other resources, needs to be managed (ISO, 2015). The degree to which knowledge assets are successfully managed inside businesses is known as knowledge management (KM) maturity (Sajeva & Jucevicius, 2010). KM maturity (KMM) describes the stages of evolution of KM initiatives inside an organization (Pee & Kankanhalli, 2009). Organizational maturity models (MM) categorize processes and pinpoint phases, which guide managers' plans (Churchill & Lewis, 1983; Gaál et al., 2008).

A review of the literature on KM and KM assessment frameworks is provided in the section that follows. It was based on the most well-known reviews of the literature that examined hundreds of frameworks and thousands of papers that had been published over the previous thirty years in the field of knowledge management assessment frameworks to identify key ideas and crucial success factors in KM. The research has established the study's research goal, which is the suggestion of a brand-new, comprehensive, and integrated framework for KM Implementation & Maturity Assessment. Following that, a summary of KM-related standards is presented. The integrated KM implementation and maturity evaluation model developed by the authors is presented in the next section along with the methodology, factors, and important areas that were taken into account. Future study directions and the research's findings are presented in the paper's conclusion.

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2. LITERATURE REVIEW SUMMARIZATION

Usually, knowledge is either implicitly tacit or explicitly formalized (Massingham, 2014). The knowledge a person has in their head is known as tacit knowledge (Polanyi, 1967). Codified knowledge is the knowledge that can be transmitted using a formal, systematic language (Nonaka & Takeuchi, 1995).

The SECI (Socialization, Externalization, Combination, Internalization) Spiral of Conversion model, as depicted in Figure 1, is a four-step process of knowledge creation including socialization, externalization, combination and internalization (Nonaka & Takeuchi, 1995).

![Figure 1. The SECI spiral Model](image)


Most of the KMM models we studied, identified key performance areas and crucial success elements relating to people, processes, and technology. Even if they do not specifically name them, the remaining KMMMs make references to these elements as well. It is anticipated that these KPAs and CSFs combined can offer a thorough KM assessment.

The model should include multiple factors, as one component cannot accurately depict the overall state of knowledge management maturity within an organization because this is based on multiple key success factors (CSFs); Some variables are interconnected and context-sensitive (e.g. high quality of IT tools does not yet mean there is an adequately developed organization climate to support the use of it). Thus, the following are the eight variables that should be included in the KM maturity model: Organizational (people & organizational atmosphere and processes); Knowledge-related (acquisition, utilization, sharing and ownership); and IT-related (capturing knowledge and usage of IT tools) (Armstrong & Taylor, 2014).

Institutionalizing a training program is viewed as a top goal. Everyone inside the organization must first be made aware of the goals of knowledge management and knowledge engineering, as well as how the KM-KE program will affect them. Organizational practices such as relevant training, knowledge-sharing-enabled HR rules, and curiosity-fostering KM procedures will increase participation. Knowledge requirements and knowledge availability could be matched with the creation of user profiles that accurately reflect users’ interests. A collection of HRM collaborative methods can promote knowledge.
Management must refrain from utilizing a KMMM as a tool for punishing and reprimanding underperforming units to accurately reflect reality. Instead, it needs to draw attention to any areas that require additional guidance and help. Paulzen et al. (2002) specifically recommend that staff members take part in the evaluation of KM maturity. One corporation took a particularly intriguing approach to measure when they disseminated "business basics" all around and at all levels as performance indicators on important activities. Business fundamentals, such as delivery, cost, customer, or people measures, are shared by all professional staff members of the organization; however, these measurements are self-driven rather than management-driven. Individuals use a straightforward grading scale to gauge their success concerning these company basics and essential processes. The organization-wide formal evaluation is then conducted every quarter concerning the business fundamentals. To provide an integrated approach to measurement across the business and a compelling example of integrating process measures with other organizational metrics, the same approach is used to track individual performance, performance against goals, and process performance (Armistead & Machin, 1997).

HR may play a significant role in knowledge management simply because people exchange information; it is not merely a matter of using IT to capture explicit knowledge. HR's responsibility is to ensure that the organization has the necessary intellectual capital. According to CapPELLI and CROcker-HEFTER (1996), the resource-based view of the company emphasizes the idea that "distinctive human resource practices help to build unique competences that differentiate products and services and, in turn, promote competitiveness." HR may help by offering guidance on cultural management, organization design and development, and by setting up processes and programs for learning and communication. There are ten methods (Armstrong & Taylor, 2014) to do this:

1. Assist in creating a culture that is open and emphasizes the significance of knowledge exchange.
2. Encourage a spirit of loyalty and confidence.
3. Guide the creation and growth of organizations that support knowledge exchange through networks, collaboration, and communities of practice.
4. Offer guidance on hiring practices and resourcing services to guarantee that highly valued workers who can contribute to knowledge development and sharing are attracted to and kept on board.
5. Offer suggestions for how to encourage knowledge sharing and recognize those who do so.
6. Assist in the creation of knowledge-development and knowledge-sharing-focused performance management procedures.
7. Create organizational and individual learning mechanisms that will produce knowledge and aid in its dissemination.
8. Create and plan workshops, conferences, seminars, communities of practice, and symposia that allow for the interpersonal sharing of information.
9. Create methods for capturing and, to the extent practicable, codifying explicit and tacit knowledge in cooperation with IT.
10. In general, advance knowledge management among top managers to persuade them to take the initiative and support knowledge management programs.

Since leadership is a complex concept, many theories have been developed to try to explain it. These theories, which are outlined below in brief, have evolved and examine a variety of aspects of leadership and leadership behavior. They are complementary to one another in many ways, and collectively they contribute to a thorough grasp of what the leadership process entails. The
fundamental and, for many, most well-known theory of leadership is trait theory, which analyzes leadership in terms of the traits that effective leaders possess. But it has its limitations, and rather than concentrating on the personalities of leaders, pragmatic research was done to determine what behaviors constituted leadership. Employee as differentiated from job-centered behavior and the processes of deliberation and starting structure were identified as the two dimensions of leadership behavior, respectively, by the key leadership behavior studies done by the Universities of Michigan and Ohio State (Armstrong & Taylor, 2014).

Adair (1973) created the most compelling analysis of what leaders do. He clarified that a leader's three primary responsibilities are to: 1. Clearly state what the group is expected to perform in order to define the task in need. 2. Complete the assignment; this is the group's purpose. Leaders see to it that the group's goal is achieved. Frustration, discord, criticism, and perhaps even the group's eventual dissolution will occur if it is not. 3. Keep up strong interpersonal connections, both between themselves and other group members and within the group. If these connections help complete the task, they are effective. They can be divided into those who are interested in the team, its morale, and its sense of unity, and those who are interested in individuals and their motivations. According to Adair, the three areas of need that leaders must meet are the greatest way to articulate the demands on them. These are: 1) task needs—getting the job done; 2) individual needs—aligning one's needs with those of the task and the group; and 3) group maintenance needs—fostering and maintaining a sense of unity within the group. These requirements were modeled by Adair as three overlapping circles, as shown in Figure 2. According to this concept, the demands of the task, the individual, and the group are interrelated. Fulfilling task requirements will also fulfill group and individual requirements. However, meeting task needs requires consideration of both individual and group needs. Meeting individual needs will also help to meet group needs, and vice versa. Leaders run the risk of becoming so task-focused that they neglect the requirements of both the individual and the team or group. Being overly concerned with the demands of the individual or group at the expense of the work is just as risky. The most effective leaders are those that satisfy and balance these three needs as required by the circumstances (Armstrong & Taylor, 2014).

![Figure 2. John Adair's Model of Leadership](image)


Hansen et al. (1999) recognized the codification strategy and the personalization strategy as the two knowledge management strategies. The approach to codification Knowledge is meticulously defined and kept in databases so that everyone in the company can quickly access and use it. Knowledge is formalized explicitly utilizing the "people-to-document" method. Consequently,
the strategy is document-driven. Knowledge is taken from the creator, created independent of the creator, and then utilized for different purposes. It lets users search for and obtain codified knowledge without having to get in touch with the person who created it because it is preserved in an electronic repository for public use. In order to manage databases, this method heavily relies on information technology and the intranet. Personalization tactics Knowledge is transferred mostly through direct person-to-person interactions and is tightly linked to the person who generated it. This "person-to-person" method entails facilitating the transmission of tacit knowledge. By fostering networks and encouraging face-to-face interaction between individuals, the exchange is accomplished through unofficial conferences, seminars, communities of practice, brainstorming sessions, and one-on-one meetings. The choice of strategy, according to Hansen et al. (1999), should depend on the organization, including what it does and how it does it. Therefore, firms like Ernst & Young that use knowledge to solve recurring issues may rely on codification to make recorded solutions to related issues accessible. However, strategy consulting firms like McKinsey or Bain rely on a personalization strategy to enable them to deal with the complex strategic issues that they are presented with and that necessitate the supply of original, meticulously researched recommendations. They must locate and nurture individuals who can employ a person-to-person knowledge-sharing technique in order to channel individual expertise. It is possible to locate experts who can be contacted via phone, email, or in person. According to the study by Hansen et al. (1999), businesses that effectively utilize knowledge employ one of the two strategies—personalization or codification—as their primary approach and complement it with the other. They noted that those who attempt to be outstanding at both techniques run the danger of failing at both (Armstrong & Taylor, 2014).

When it comes to infrastructure and Knowledge Management Systems, the following steps should be followed (Armstrong & Taylor, 2014) at the starting implementation phase:
1. Creating an intranet,
2. Creating ‘data warehouses’,
3. Using decision support systems,
4. Using ‘groupware’, i.e. information communication technologies such as e-mail or discussion bases,
5. Creating networks or communities of practice or interest of knowledge workers.

### 3. STANDARDIZATION IN KNOWLEDGE MANAGEMENT

Organizational knowledge management was introduced on September 15 of 2018 to the followers of ISO 9001 as KNOWLEDGE MANAGEMENT RESEARCH & PRACTICE 3: 7.1.6, organizational Knowledge – The organization shall determine the knowledge necessary for the operation of its processes and to achieve conformity of products and services. This knowledge shall be maintained and be made available to the extent necessary. When addressing changing needs and trends, the organization shall consider its current knowledge and determine how to acquire or access any necessary additional knowledge and required updates (ISO, 2018).

Long before that, the European Committee for Standardization published The European Guide to Good Practices in Knowledge Management (CEN-CWA 14924-1, 2004). The five main knowledge-related actions outlined in the Guide are: a) Identify knowledge; b) Create (new) knowledge; c) Store knowledge; d) Share knowledge; and e) Use knowledge, according to Weber (2002). Two essential requirements must be addressed in order to improve the outcomes of these basic knowledge activities. Aligning or integrating the core activities into ordinary tasks
and organizational procedures is the first stage. The fundamental operations must be adequately balanced to account for the distinctive qualities of each business process and organization, which is the second stage.

The knowledge management system standard ISO 30401 adopts a process-centric approach to knowledge. This is why it's crucial to have it developed, consolidated, retained, shared, adapted, and applied so that employees may make informed judgments and take coordinated action, addressing difficulties based on previous experience and novel future insights (ISO, 2018). The management of knowledge, according to ISO 30401, necessitates valuing many knowledge-related factors, such as the knowledge's nature (which is intangible, complex, and human-created), value, focus (on organizational goals, strategies, and needs), adaptability, shared understanding, environment, culture, and interactivity (Zeferino et al., 2020).

4. MODEL PROPOSAL AND METHODOLOGY

Through the literature survey which included case studies publications, the following key points were identified:

− Human resources, processes and technology enablers have been identified as primary factors and enablers in the prominent literature. The People – Process – Technology three-fold perspective is the most commonly encountered and referenced in KM theory and KM frameworks.
− Leadership may be a factor not so much encountered in literature and case studies results, however, it is the core principle defined by ISO 30401, around which all KM concepts and steps evolve.

The GQC spider-web version KM model that the authors designed (Bougoulia & Glykas, 2022) shown in Figure 3, takes into account the following literature and methodology milestones and presented a draft for a model basis:
1. The Tacit – Explicit Knowledge distinction combined with
2. The SECI (Socialization, Externalization, Combination, Internalization) spiral model for continuous improvement
3. The People – Process – Technology three-fold perspective
5. The Leadership – cored cycle of the ISO 30401.

In this approach, the Outward phase represents the implementation stages and the Inward phase represents the maturity assessment process. Thus, it allows for the same stages to be used in a complementary fashion. The two phases can stretch over one year, for example, implementing practices can be the focus for nine months, followed by three months of assessing the results and the maturity. This also allows for repetitiveness to achieve optimal levels, year after year.

Another key point of the proposed “Outward – Inward” approach model, which is depicted in Figure 4, is that it allows for an organization to be at a different implementation stage or assessment level for each of the eight factors that represent the eight axes that form the framework’s guidelines. However, leadership, which is the core of the model proposal, must be involved at all times in every implementation stage and assessed respectively during the 3-month assessment period.
Businesses prefer the widely used maturity model known as the Capability Maturity Model (CMM) (Kuriakose et al., 2010). The Capability Maturity Model Integration (CMMI), which uses both a staged maturity assessment representation and a continuous maturity assessment portrayal for process improvement, was developed by the Software Engineering Institute of Carnegie Mellon University. The staged portrayal of the model has five stages. Random and chaotic processes characterize "initial" maturity level 1. The term "Managed" refers to the second maturity level, which is characterized by processes that are planned and carried out in line with organizational policy. The application of standard operating procedures to provide uniformity across the entire organization characterizes the third maturity level, "Defined." The management of process performance by quantifiable goals distinguishes the fourth degree of maturity, "Quantitatively Managed." The "Optimizing" maturity stage, which is the fifth, is defined by continuing, innovative processes and technological improvements that increase process performance continuously.
Given that knowledge management is highly related to and dependent on Information Technology, the CMM’s implementation stages are an optimal fit to encompass the respective stages in this research’s proposed model, as this model is previously described. The five implementation stages: 1. Initial 2. Managed 3. Defined 4. Quantitatively Managed 5. Optimizing can also be used in a reverse inward approach, as the maturity assessment levels for each of the eight key areas of the proposed framework: 1. People 2. Technology 3. Process 4. Change management – Continuous improvement 5. Strategy 6. Communication 7. Customer focus 8. Performance Measurement is always weighted by the Leadership implementation/assessment factor, as shown in Figure 5.

![Figure 5. The maturity levels of the proposed model](image)

To find the major knowledge gaps and the essential information needed to offer high-quality products and services, an organizational knowledge audit, benchmarking, and strategy are also necessary. There must be a system in place for keeping information and making it available at the necessary level, including roles, procedures, and enabling technology (ISO, 9001). The one-year repeated cycle that is proposed in this research’s model, allows for the annual maturity assessment results to be used as a benchmarking basis while at the same time, being taken into account while redesigning strategy and goals for the next year’s implementation stages. The basic knowledge management tool-kits of the ISO 9001, are considered a fundamental aspect of the model.

According to the APQC, the American Productivity and Quality Center, founded in 1977 and one of the world’s foremost authorities in benchmarking, best practices, process and performance improvement, and knowledge management, measurement has always been contentious in knowledge management. Some knowledge managers claim that anecdotal evidence is more persuasive than data and that it would be wiser to invest the time required to calculate KM's business impact in enhancing the organization's KM services. But APQC strongly advises in favor of it despite the difficulties involved in quantifying something as intangible as KM. Some of the explanations are as follows:

- By being truthful about the objectives an organization seeks to achieve, measurement reminds managers of what's most crucial and stops them from deviating from the broad vision outlined in the KM business case,
- Before measurable results being apparent, measures show progress throughout the early phases of a KM deployment,
- Data helps managers recognize problems and course-correct when a KM tool or approach is not working as planned,
- Less involved groups are revealed through analysis, allowing managers to create focused tactics to raise awareness and spur involvement,
- The KM program will be better protected amid upcoming organizational changes or cost-cutting initiatives if a KM manager can provide evidence of KM's impact on the business.

The knowledge management metric that APQC uses shows a variety of evaluation methods, as shown in Figure 6. Most businesses use leaders' and users' feedback, success stories, and other anecdotal evidence to show how KM benefits the organization. To establish whether their target audiences are being reached and their goals are being achieved, the majority of people evaluate KM's performance using activity and satisfaction measures. Business impact and ROI indicators are less popular.

![Figure 6. Methods used to evaluate KM program Performance](Source: APQC.org)

While business value and impact metrics are less common than other types of evaluation, KM programs that employ these techniques frequently receive higher evaluations from decision-makers and more substantial financial support. Decision-makers tend to give KM initiatives that employ these techniques higher ratings and stronger financial backing.

It should come as no surprise that KM teams who directly link knowledge sharing and reuse to the bottom line find it simplest to secure the funding required to maintain and grow their programs. Programs that assess cost savings via KM are more likely to anticipate having their next budget approved easily or very easily among KM initiatives that track business value indicators. Similar to this, KM initiatives that link KM efforts to rising sales are more likely to anticipate an easy budget approval. But non-financial metrics of business effect, such as cycle time reductions, time savings, and quality enhancements, seem to be equally important in boosting executives' faith in KM and persuading them that it is serving the intended purpose.

Based on the previous observations, the basis of the proposed model assessment methodology is that the overall maturity level of an organization will be an overall total of weighted averages,
in the sense of metrics. Within this measurement system, Leadership will be the one and only Constant, and its relationship with all other measured factors will always be integrated into the measurement process. People, Process and Technology are the factors that carry the highest weight in metrics. And most importantly, the metrics will not measure absolute factors, but the relationship between them, as shown in Figure 7. The relationships formed will be the proposed KPIs for the KM maturity assessment model.

![Figure 7. The proposed model's assessment methodology approach](image)

In that sense, the most weighted 3 relationships, are the:
- People – Process relationship (“PP”),
- People – Technology relationship (“PT”),
- Technology – Process relationship (“TP”).

The relationships of the Constant “Leadership” that need to be established and measured are:
- People – Leadership (“L1”),
- Process – Leadership (“L2”),
- Technology – Leadership (“L3”).

The proposed KPIs to measure the performance of the 3 crucial assessment relationships are formed as follows, attributing a weighing factor of “2” to the Grades regarding People, Process and Technology:

1. KPI (1) = “People – Process” = \{2 \times (PP)\} \times CL1, where
   \[CL1 = “People – Leadership” + “Process – Leadership” = L1 + L2\]

2. KPI (2) = “Technology – Process” = \{2 \times (TP)\} \times CL2, where
   \[CL2 = “Technology – Leadership” + “Process – Leadership” = L3 + L2\]

3. KPI (3) = “People – Technology” = \{2 \times (PT)\} \times CL3, where
   \[CL3 = “People – Leadership” + “Technology – Leadership” = L1 + L3.\]
An Index Table (1) for these relationships is provided below:

<table>
<thead>
<tr>
<th>People</th>
<th>Process</th>
<th>Technology</th>
<th>Leadership</th>
</tr>
</thead>
<tbody>
<tr>
<td>People</td>
<td>x</td>
<td>PP</td>
<td>PT</td>
</tr>
<tr>
<td>Process</td>
<td>PP</td>
<td>x</td>
<td>TP</td>
</tr>
<tr>
<td>Technology</td>
<td>PT</td>
<td>TP</td>
<td>x</td>
</tr>
<tr>
<td>Leadership</td>
<td>L1</td>
<td>L2</td>
<td>L3</td>
</tr>
</tbody>
</table>

These aforementioned weighed relationships of CS factors (People – Process, People – Technology, Technology – Process), the Constant Relationships (People – Leadership, Process – Leadership, Technology – Leadership) thus forming the three most important Key Performance Indicators for the proposed Knowledge Management Maturity Assessment matrix.

The matrix provides the remaining relationships that should be assessed during the Inward phase of the KM maturity assessment. Those relationships examine the integration of the remaining defined CSFs: Strategy, Communication, Customer focus, Change Management, Continuous Improvement and Performance Measurement:

- Strategy – People (“SP”)
- Strategy – Technology (“ST”)
- Communication – People (“CP”)
- Communication – Technology (“CT”)
- Customer Focus – Technology (“CFT”)
- Customer Focus – Process (“CFPr”)
- Change Management – Process (“CMPr”)
- Change Management – People (“CMPe”)
- Continuous Improvement – Process (“CIPr”)
- Continuous Improvement – People (“CIPe”)
- Performance Measurement – Process (“PMPr”)
- Performance Measurement – People (“PMpe”)

The relationships of the Constant “Leadership” remain the same, as before:

- People – Leadership (“L1”),
- Process – Leadership (“L2”),
- Technology – Leadership (“L3”).

The proposed KPIs to measure the performance of these 12 secondary assessment relationships are formed as follows, attributing a weighing factor of “1” to the Grades regarding Strategy, Communication, Customer focus, Change Management, Continuous Improvement and Performance Measurement:

1. KPI (4) = “Strategy - People” = (SP) x (L1)
2. KPI (5) = “Strategy - Technology” = (ST) x (L3)
3. KPI (6) = “Communication - People” = (CP) x (L1)
4. KPI (7) = “Communication - Technology” = (CT) x (L3)
5. KPI (8) = “Customer Focus - Technology” = (CFT) x (L3)
6. KPI (9) = “Customer Focus - Process” = (CFP) x (L2)
7. KPI (10) = “Change Management - Process” = (CMPr) x (L2)
8. KPI (11) = “Change Management - People” = (CMPe) x (L1)
9. KPI (12) = “Continuous Improvement - Process” = (CIPr) x (L2)
10. KPI (13) = “Continuous Improvement - People” = (CIPe) x (L1)
11. KPI (14) = “Performance Measurement - Process” = (PMPr) x (L2)
12. KPI (15) = “Performance Measurement - People” = (PMPe) x (L1).

An Index Table (2) for these KPIs and their relationship to the crucial KPIs and Constants is provided below:

| Table 2. Index Table for the secondary KPIs of the proposed KMMM |
|---------------------|------------------|------------------|----------|------|
|                     | People - Process "pp" | People - Technology "PT" | Technology - Process "TP" | Leadership | KPI               |
| Strategy            | SP, ST            |                  |                  | L1, L3   | KPI (4), KPI (5) |
| Communication       | CP, CT            |                  |                  | L1, L3   | KPI (6), KPI (7) |
| Customer Focus      |                  | CFT, CFP         |                  | L2, L3   | KPI (8), KPI (9) |
| Change Management   | CMPr, CMPe        |                  |                  | L1, L2   | KPI (10), KPI (11) |
| Continuous Improvement| CIPr, CIPe      |                  |                  | L1, L2   | KPI (12), KPI (13) |
| Performance Measurement | PMPr, PMPe     |                  |                  | L1, L2   | KPI (14), KPI (15) |

The metrics spreadsheet for the early implementation stages of the proposed KM implementation and maturity assessment framework is presented in Table 3.

5. FUTURE RESEARCH DIRECTIONS

The study found a gap in two distinct areas. First off, there aren’t any actual case studies or implementation projects because the Knowledge Management ISO Standard 30401 is still rather new. Given the widespread demand for KM methods in contemporary firms, this will undoubtedly alter shortly. Results from the use of the Standard are anticipated to offer a better and more comprehensive insight regarding the performance measurement related to KM.

Second, the research revealed a need for a comprehensive strategy for KMMMs, one that could be used in all shapes and sizes of businesses, and this paper set out to fill that need.

6. CONCLUSION

This study sought to develop a comprehensive and integrated methodology for knowledge management maturity assessment. A system made up of steps, literary milestones and questions was created to achieve this main goal.
This paper presented the findings of the method research and the results of the literature survey. This research led to the identification and recording of KMMMs CSFs and KM important points. The idea of standardization and its connection to knowledge management was summarized, along with recognized KM Standards and their fundamental ideas. Although there are many publications on knowledge management, there is a lack in the literature when it comes to case studies that relate to KM Standards. This discrepancy can be mostly explained by the ISO 30401’s recent publication and completion of its three-year pilot implementation cycle, which is normal for newly created Standards.

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Area</th>
<th>Metrics Indicator</th>
<th>Toolkit</th>
</tr>
</thead>
<tbody>
<tr>
<td>People - Process &quot;PP&quot;</td>
<td>Awareness</td>
<td>1. Number of customized user profiles created</td>
<td>Internal audit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. To what degree the management’s goals have been made public</td>
<td>Internal audit</td>
</tr>
<tr>
<td></td>
<td>Participation</td>
<td>1. Hours spent on KM meetings and events</td>
<td>Log-in data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Number of employees that participate within a year in KM approaches and activities</td>
<td>Internal audit</td>
</tr>
<tr>
<td></td>
<td>Sharing</td>
<td>1. Number of processes shared</td>
<td>Log-in data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. To what degree employees feel comfortable in sharing their knowledge to help others</td>
<td>Internal audit</td>
</tr>
<tr>
<td></td>
<td>Contribution</td>
<td>1. Number of new processes created and documented</td>
<td>Survey</td>
</tr>
<tr>
<td></td>
<td>Performance</td>
<td>1. To what degree employees feel that they saved time in everyday routines</td>
<td>Survey</td>
</tr>
<tr>
<td></td>
<td>Satisfaction</td>
<td>1. To what degree are the employees satisfied with new processes</td>
<td>Survey</td>
</tr>
<tr>
<td>CL1 Leadership</td>
<td>1. Hours of KM meetings and events</td>
<td>Internal audit</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Number of new performance goals</td>
<td>Internal audit</td>
</tr>
<tr>
<td>People - Technology &quot;PT&quot;</td>
<td>Involvement</td>
<td>1. Hours spent using knowledge in KMS systems</td>
<td>Log-in data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. To what degree employees feel that participation generates experience and contribution</td>
<td>Survey</td>
</tr>
<tr>
<td></td>
<td>Usability</td>
<td>1. Percentage change in time savings attributed to KM</td>
<td>Management data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. To what degree the users consider knowledge in databases useful</td>
<td>Survey</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. To what degree the users re-use knowledge</td>
<td>Survey</td>
</tr>
<tr>
<td></td>
<td>Sharing</td>
<td>1. Number of returning users in databases</td>
<td>Log-in data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Errors reported by employees or detected during audit</td>
<td>Internal audit</td>
</tr>
<tr>
<td></td>
<td>Efficiency</td>
<td>1. Percentage change in cycle time reduction from projects/processes attributed to KM</td>
<td>Management data</td>
</tr>
<tr>
<td></td>
<td>Training</td>
<td>1. Number of organized KMS workshops</td>
<td>Internal audit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Hours spent on KMS testing</td>
<td>Log-in data</td>
</tr>
<tr>
<td></td>
<td>Satisfaction</td>
<td>1. To what degree are the employees satisfied with new technologies</td>
<td>Survey</td>
</tr>
<tr>
<td>CL3 Leadership</td>
<td>1. Funds for KM meetings, trainings, events, and workshops</td>
<td>Management data</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Number of new strategic goals</td>
<td>Internal audit</td>
</tr>
<tr>
<td>Technology - Process &quot;TP&quot;</td>
<td>Knowledge</td>
<td>1. Number of accesses in defined areas and processes</td>
<td>Log-in data</td>
</tr>
<tr>
<td></td>
<td>Structure</td>
<td>2. Number of returning users in databases</td>
<td>Log-in data</td>
</tr>
<tr>
<td></td>
<td>Usability</td>
<td>1. To what degree employees experience saved time in finding information in databases</td>
<td>Survey</td>
</tr>
<tr>
<td></td>
<td>Contribution</td>
<td>1. Number of new processes created and documented in KMS</td>
<td>KMS data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Number of solutions created</td>
<td>KMS data</td>
</tr>
<tr>
<td></td>
<td>Quality</td>
<td>1. Number of success stories</td>
<td>Log-in data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Number of lessons learned</td>
<td>Internal audit</td>
</tr>
<tr>
<td></td>
<td>Efficiency</td>
<td>1. Average time of resolution</td>
<td>KMS data</td>
</tr>
<tr>
<td></td>
<td>Improvement</td>
<td>1. Number of processes that were declared obsolete or updated</td>
<td>KMS data</td>
</tr>
<tr>
<td>CL2 Leadership</td>
<td>1. Funding of KM applications, platforms and technologies</td>
<td>Management data</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>2. Number of new customer focus goals</td>
<td>Internal audit</td>
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The research objective of the study was expanded to include the recommendation of a comprehensive and integrated framework for knowledge management maturity assessment that incorporates the fundamental principles of ISO 30401 and can be used by both academics and industry professionals.

A proposal for such a model was then presented, using the newly introduced authors' definition of an “Outward – Inward” combination approach to use the same model as an Implementation Framework and a Maturity Assessment Model. The web-like relationships between factors, enablers and KM aspects can be used as a Knowledge Management Maturity Assessment model's parameters, constants and KPIs.

References

Sajeva, S., & Jucevicius, R. (2010). The model of knowledge management system maturity and its approbation in business companies. OcialiniaiMokslai, 3(69), 57-68