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Information Resource Management Maturity Model

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Abstract**—**Nowadays there are more than thirty maturity models in different knowledge areas. Maturity model is an area of interest that contributes organizations to find out where they are in a specific knowledge area and how to improve it. As Information Resource Management (IRM) is the concept that information is a major corporate resource and must be managed using the same basic principles used to manage other assets, assessment of the current IRM status and reveal the improvement points can play a critical role in developing an appropriate information structure in organizations. In this paper we proposed a framework for information resource management maturity model (IRM3) that includes ten best practices for the maturity assessment of the organizations' IRM.

Keywords**—**Information resource management (IRM), information resource management maturity model (IRM3), maturity model, best practice.

I. Introduction

INFORMATION Resource Management (IRM) is the management (planning, organization, operations and control) of the resources (human and physical) concerned with the systems support (development, enhancement and maintenance) and the servicing (processing, transformation, distribution, storage and retrieval) of information (data, text, voice, image) for an enterprise [1]. Burk and Horton [2] completed this definition by considering IRM as a managerial link that connects corporate information resources with the organization's goals and objectives. As IRM by treating information as a corporate asset can improve the competitive advantage of the organization [3] [4] [5] [6], it could be a strategic decision to have an improvement plan for the IRM itself. The concept of information resource management reflects a notion of information as a distinct corporate resource-in addition to capital, materials, organization and staff [7]. Information management becomes more important every day: we need to ensure that people within our organization get the information they need to do their jobs effectively, and, if we are to achieve real success, we need to ensure that people do not get information that is not relevant to their activity. The competitive advantage of organizations is very much governed by the effectiveness with which they manage their information resources [8]. On the other hand you can only improve an area that you have already measured it. In this paper a maturity model is designed to help organizations assess the maturity status of their information resource management and be informed about strength points and improvement areas.

The paper is organized as follows. First, in definitions and related concepts, a clarification of information resource management, maturity model, and best practice are presented. Then information resource management maturity model (IRM3) posed in three sections. At the first section best practices identified for information resource management are explained. Our proposed IRM3 steps are elaborated in the next section. As assessment is the most significant part of IRM3 it has presented in more details in last section. Finally in conclusion, the paper concludes with a brief summery of findings and some recommendations for future studies.

II. Definitions and Related Concepts

Another definition used by Lewis, *et al* [9] in their domain of the IRM construct indicates that IRM is a comprehensive approach to planning, organizing, budgeting, directing, monitoring and controlling the people, funding, technologies and activities associated with acquiring, storing, processing and distributing data to meet a business need for the benefit of the entire enterprise. They developed a measurement instrument for operationalizing the IRM. The instrument serves two functions: 1) to create a coherent, theoretical foundation for further research on IRM construct, and 2) to provide reference norms for practicing managers to use to assess the extent of IRM implementation in their organizations.

A "maturity model" is a conceptual framework, with constituent parts, that defines maturity in the area of interest [10]. If we substitute information resource management as our area of interest in maturity model definition provided by Project Management Institute (PMI), we can come to a definition for IRM Maturity Model (IRM3) as a conceptual framework that defines maturity in information resource management. According to Kerzner [11] maturity indicates that there are appropriate infrastructure of tools, techniques,

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processes, and even a good organizational culture. Maturity model let us know where we are in IRM and it could contribute to manage organizational information in a better way.

In many maturity models there should be some best practices as a core concept for assessment in order to let the organization measure and rate its current abilities in a specific area of knowledge. According to the Kerzner's opinion [12], best practices are those actions and activities undertaken by the company or individuals that lead to sustained competitive advantage. The key term in this definition is sustained competitive advantage. In the other words, best practices are what differentiate you from the competitors. Generally, there are two ways to identify best practices for organizations: 1) internal environment, and 2) external environment. Critical Success Factors (CSFs) of the organization can be considered as an internal source to find out best practices. External environment for identifying best practices includes benchmarking, seminars, publication, and participating in professional societies [12].

III. Information Resource Management Maturity Model (IRM3)

A. Best Practices

A research which has been conducted by Ward and Mitchell [13] shows that there are no statistically significant differences between Information Resource Management Critical Success Factors (CSFs) of private and public sector. In this article chief information officers (CIOs), or their equivalents of public (U.S. Federal Government) and private (Fortune 1000) sector were asked their perceptions about the biggest challenges that face their respective organizations. The study accomplished this task by examining the priority assigned to information resource management critical success factors by these high-ranking executives. In another research [14] conducted by General Accounting Office (GAO), IRM best practices have been identified. The GAO project team selected private and state government organizations representating IRM practices better than the norm, relying on expert opinion and a literature search. By reviewing, combining, and removing duplication of the result of these papers we provided a list of best practices required for our IRM maturity model as it follows:

Integrating IRM decision making in a strategic management process: Best-practice organizations specifically define their products and services by customer groups and their needs. They use the information to craft goals and corrective action based on the highest priority customer groups. Then, the successful organizations tailor IRM products and services to those goals and priority customer group needs. They define information systems not just as those delivered on time and within budget but also as those producing customer improvements in terms of quality, quantity, timeliness, and cost of service. Senior managers use the strategic management process to make critical decisions for major IRM projects through their life cycle.

Setting an IRM performance baseline by benchmarking against leading organization and set appropriate target: Best-practice organizations can set an IRM performance baseline by benchmarking against leading organizations to challenge accepted IRM habits and set appropriate targets for change. Furthermore these organizations recognize IRM3 as a part of organization improvement and essential to the future of the enterprise.

Linking mission goals and IRM outcomes through performance management: Best-practice organizations rely heavily on performance measures to define mission goals and objectives, quantify problems, evaluate alternatives, allocate resources, track progress, and learn from mistakes. These organizations develop specific performance measures for all IRM products and services, reflecting mission outcome requirements.

Aligning IT and organizational mission goals to improve service to customers/stakeholder: Aligning IT and organizational mission goals is important enough to be considered as a separate best practice which ranked high in both private and public sectors [13]. This alignment can be integrated within the area of IRM and convert IT as a somehow target in an organization to a powerful tool for competitive advantage.

Guiding IRM project strategy and follow-up through an investment philosophy: The best-practice organizations manage IRM funding as investments rather than expenses. In other words they view IRM funding as vital for the organization’s long-term health, not as “back office” or of little importance.

Formulating, funding, & implementing organization IT architecture/programs/projects: After aligning IT and organizational mission goals, IT architecture required to be considered as a project and should be funded and implemented. In this regard the organization can be sure of having an appropriate IT infrastructure.

Directing IRM changes by senior managers: IRM professionals may be initial facilitators or catalysts for changing IRM, but senior managers take on the actual leadership. They recognize that only they can initiate and sustain meaningful IRM change.

Building effective relationships with senior executives: Performing all activities related to the IRM requires an integrated cooperation with other department staff especially with their senior executives. Building effective relationships with senior executives ranked at third for the private sector and considered as critical success factor.

Using business process innovation to drive IRM strategies and maximize benefits of technology: The best-practice organizations first identify and prioritize their core processes before they even think about possible IRM solutions. These organizations rigorously examine their core processes and determine if they need to be redesigned or reengineered before funding information systems that support those processes. If IRM investments are made without reexamining processes,

the new or enhanced systems may simply improve the efficiency of ineffective processes.

Hiring and retaining skilled professionals: Finally hiring and retaining skilled professionals for IRM can ensure organizations regarding the IRM outputs. These leading organizations identify IRM skilled knowledge requirements for IRM personnel and provide resources and time for personnel to obtain them.

B. Steps

The IRM maturity model consists of three interlocking phases: knowledge, assessment and improvement. Best practices, methodology, and concept of IRM will be described in the knowledge phase. Information resource management is compared to the best practices in the assessment phase in order to find its maturity level on a continuum basis. By utilizing the assessment result, in improvement phase, organization makes decision on how to improve IRM maturity. Following steps could help organizations to implement IRM3:

Step 1: *prepare for assessment*. In this step we should have a clear status of our current IRM, information resource management best practices, and a plan that could be an approach of how the organization wants to initiate IRM3, by whom and when. Information gathering tool such as questionnaire survey, interview, or workshop in addition to sample population should be defined in this step. Obviously having a clear image of IRM3 in addition to understanding the concept of the model could lead the organization to a better measurement for their IRM maturity.

Step 2: *perform assessment*. The next step is to assess the organization's degree of maturity in information resource management. To do this step, an organization must be able to compare the characteristics of its current maturity status with those criteria (dimensions) described in the model. This step includes a complete review of the best practices in four dimensions: plan, deploy, check, and improve. At the end of this step, a general status of organization's IRM maturity will be revealed. As this is the key step of the model, it is explained in more details in next section. PDCI cycle related to the IRM3 has been shown in Fig. 1.

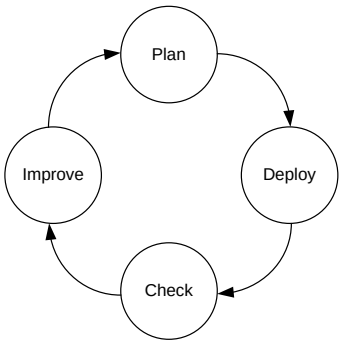

Fig. 1 PDCI cycle for IRM3 assessment

Step 3: *plan for improvements*. Most organizations will likely be unable to achieve all of the desired best practices at once. For those organizations choosing to pursue improvements in order to increase maturity, the results of the previous step will form a basis for the improvement plan. In making plan for improvements following items should be considered:

1) Best practices priorities for the organization;
2) Relationship among dimensions: it means that if one IRM best practice is not deployed at a desired level in the organization you should first plan for deploy not check or improve;
3) Current status of the best practices;
4) Best practice attainability: organizations may want to look for best practices that are easy to achieve. This consideration can help them demonstrate early success and gain valuable momentum to sustain the improvement initiatives; and
5) Cost: lower cost best practices might be considered as a priority.

Step 4: *implement improvements*. This step is where the organizational change will take place. Once the improvement plan has been established, the organization only needs to follow the plan. Knowing where you are in IRM is not enough; you require implementing the improvement plan to reach the higher maturity level in IRM.

Step 5: *repeat the process*. Having completed some improvement activities, the organization will be either return to the assessment step to reassess where it is currently on the continuum of IRM maturity or return to step three to begin addressing other best practices identified earlier assessment. These steps should be repeated periodically. The intervals for the organizations of higher level of maturity in IRM may be longer than those being in preliminary stages. In addition radical changes in the external environment of the organization by changing key process and key data accordingly, are able to act as a motive to an unplanned assessment.

C. Assessment

In assessment phase, we measure maturity level of each best practice by using a process similar to Deming PDCA cycle. With a little difference, we applied PDCI here which stands for plan, deploy, check, and improve. In plan, the best practice should be investigated to see if there is an approach. This approach should be integrated with other approaches and must be sound. In deploy, any document related to the said best practice should be deployed in accordance with the plan completely. Each process of the best practice should be checked as per the specific measures in check section. Based on the result of last part, there should be some corrective actions in improve section. Basic theme of the scoring method has been taken from European Foundation for Quality Management (EFQM). Criteria for the best practice assessment has been shown in Table I.

TABLE I
ASSESSMENT DIMENSIONS OF IRM3

Best Practice Description				%
Plan	Deploy	Check	Improve	
Clearly & widely proved	Clearly & widely witnessed	Repeatedly and regularly checked	Clearly & widely witnessed	100 95 90 85
Clearly proved	Clearly witnessed	Repeatedly checked	Clearly witnessed	80 75 70 65
Somehow proved	Occasionally witnessed	Frequently checked	Occasionally witnessed	60 55 50 45 40
Proved little	Seldom witnessed	Rarely checked	Seldom witnessed	35 30 25 20 15
No proof	No witness	Never checked	No witness	10 5 0

The result of the assessment can be inserted in a table which ten best practices come in rows and assessment dimensions (plan, deploy, check, and improve) come in columns. Also a weight factor can be allocated to the best practices. These weight factors may be obtained by asking the organization's experts. If we suppose following assumptions:

i = 1, 2, …, 10
j = P, D, C, I
P = Plan
D = Deploy
C = Check
I = Improve
WF_i = Weight Factor of i^{th} Best Practice
X_{ij} = Score of i^{th} best practice in j^{th} dimension
m_j = Maturity of j^{th} dimension
M = Maturity of the organization

simply we can calculate maturity status of each dimension as in (1).

$$m_j = \frac{\sum_{i=1}^{i=10} X_{ij} \times WF_i}{\sum_{i=1}^{i=10} WF_i} \quad (1)$$

It can be logically understood from the model that the score of plan should be higher than deploy, the score of deploy should be higher than check, and so on. Based on the achieved m_j the PDCI status of the organization's can be depicted in a star graph. An example of this star chart is shown in Fig. 2.

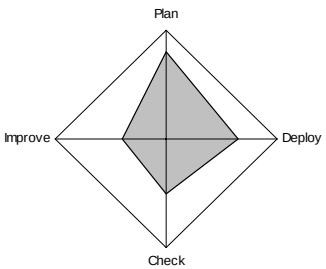

Fig. 2 PDCI continuum graph of the organization

In addition, maturity of the whole organization simply will be calculated as in (2).

$$M = \frac{\sum_j m_j}{4} \quad (2)$$

The result of this assessment is comparable among other organizations if the same weight factors used for the best practices.

IV. Conclusion

Information resources is the engine that is driving the information economy, and in turn is having and will continue to have profound impacts on business management, competitive advantage, and productivity [14]. This paper has presented the IRM maturity model (IRM3) as a self assessment framework for measuring the strengths and areas for improvement of an organization information resource management. A straightforward approach has been used for this model in order to provide a rough estimation of determining organization's IRM maturity.

Lewis *et al* [9] developed eight dimensions that constitute the IRM construct that can be based for another approach in developing a maturity model for organization's IRM. Future studies should be aimed at applying this model as a case study in different organizations.

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