

# vPMM: A Value Based Process Maturity Model

Jihyun Lee, Danhyung Lee, and Sungwon Kang

**Abstract.** A business process maturity model provides standards and measures to organizations in assessing, defining and improving business processes, thereby guiding them to achieving business goals and values. In this paper, we present a business process maturity model called Value based Process Maturity Model (vPMM) that overcomes the limitations of the existing models. The vPMM is a model that can be used to determine the maturity of an organization's current business process practices by considering an organization's business value creation capability as well. It helps an organization set priorities for improving its product production and/or service provisioning using a proven strategy and for developing the capability required to accomplish its business values.

## 1 Introduction

Companies today strive to improve and innovate their business processes in real-time to cope with market dynamics. The Business Process Management System (BPMS) is considered to be a technical enabler that helps realize such needs of enterprises [6, 11, 15, 21]. Standard processes help an organization's workforce achieve business objectives by helping them work not harder, but more efficiently and with improved consistency. Effective processes also provide a vehicle for introducing and using new technology in a way that best meets the business objectives of an organization [3]. A business process should not focus on a project or process only; it should also focus on enterprise values because the ultimate purpose of a business process is to achieve business values so that a business process that doesn't contribute to business value achievement should be improved or adjusted to contribute business value creation. Therefore, a business process maturity model should be able to provide not only a roadmap for process improvement but also guidance for business value creation.

There are several existing researches on business process maturity models [4, 7, 10, 20]. However, business process maturity has not been sufficiently defined and standardized to be applied to an organization's business value achievement. The existing Process Maturity Model (PMM) and Process Management Maturity Model (PMMM) are not elaborated to the detailed level to apply in practice. For

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example, P. Harmon, D. M. Fisher, and M. Rosemann [7, 10, 20] only define business process maturity concepts or architectures. The Business Process Maturity Model (BPMM) [4, 5] was adapted as an OMG standard and is defined to the detailed level but leaves much room for improvement because it doesn't consider business value creation that should be achieved through a business process.

In order to overcome these limitations of the existing business process maturity models, we developed the vPMM that has the following characteristics:

- Guidance on how to control and improve an organization's business process competence
- Focusing on an enterprise for aligning with their business values through the business processes
- Conceptual processes that compare the maturity of an organization's current practices against an industry standard
- Reviewing the 'as-is' processes and performing vPMM-based gap analysis for developing 'to-be' processes.

The vPMM stands for value-based business Process Maturity Model. The vPMM is a model that can be used to determine the maturity of an organization's current business process practices by considering an organization's business value creation capability as well. It helps the organization set priorities for improving its operations for products/services (P/Ss) using a proven strategy and developing the capability required to accomplish its business values. Through the vPMM, an organization can efficiently and effectively manage their business processes while trying to achieve and realize its business objectives and values.

This paper is organized as follows: Section 2 presents the vPMM design principles and Section 3 introduces the vPMM by giving an overview, comparing it with its early version and discussing its distinctive characteristics. In Section 4, we describe related works and lastly, in Section 5, we discuss our contributions, conclusions, and future works.

## 2 The vPMM Design Principles

The vPMM has a five-level structure like CMM/CMMI and PMM. The maturity level of the vPMM reflects two aspects. The first aspect is maturity based on predictability control and effectiveness aspects as CMM/CMMI maturity model did provide [10]. Figure 1 illustrates the meanings of the process maturity in this aspect. Especially, the vPMM defines the maturity levels that include concepts such as the scope of influence of PAs, measurement & analysis, monitoring & control, and organizational process improvement activities.

The second aspect is the capability for embedding an organization's business values into its business processes and measuring the performance and results. Figure 2 shows the meanings of the maturity level from this aspect. In the Managed level, business processes are not coordinated enough to achieve business values and performance for business value accomplishment is measured from the black-box point of view. However, business processes are aligned and coordinated

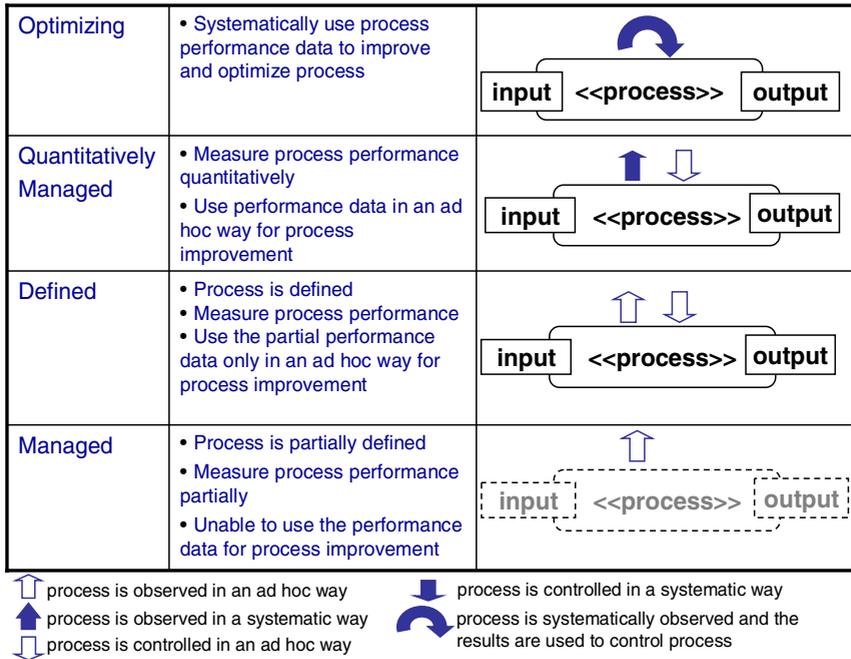


Fig. 1 Process maturities of the vPMM

in accordance with business values as processes are getting mature. Furthermore, a mature organization achieves capabilities to measure and control their business value achievement from the white-box perspective and also an organization can control its business values proactively.

The vPMM identifies generic business process areas with the viewpoint that any business process essentially belongs to one of the four generic kinds of activities – Input, Mechanism, Control, and Output (IMCO) [16]. All companies perform the functions of IMCO to produce P/S. Companies produce P/S using man power, money, and material via organizational processes and control for improving productivity and P/S quality. In order to produce a product or provide a service, a company consumes various resources. A company also requires a mechanism that turns the resources into products or services that will then be provisioned to the customer. For ensuring that these three kinds of activities are performed effectively and efficiently, a mechanism, inputs, and outputs should be monitored and controlled. From these four quadrants, essential KPAs of the vPMM are derived.

In addition, for deciding KPAs of each maturity level, core process and support process principles of value chain [17] is applied. Among core processes, processes with higher priority are deployed to the lower level and thereafter an organization has capability to perform the processes.

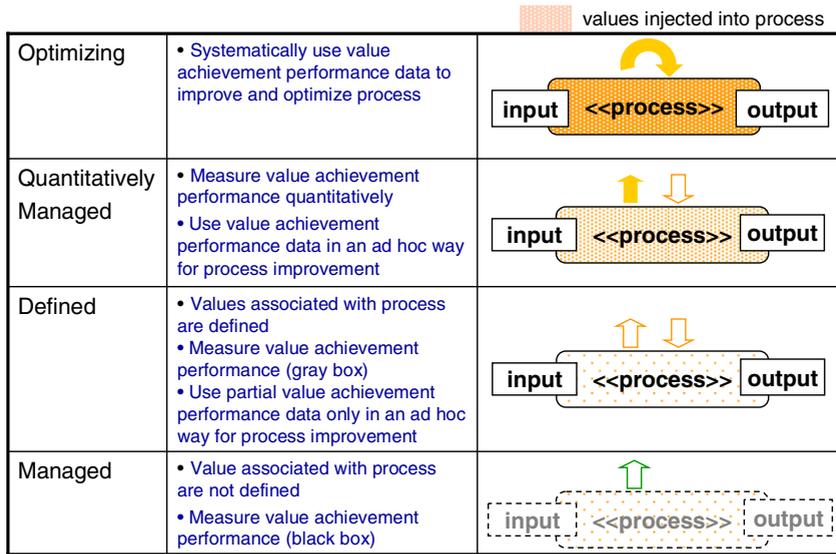


Fig. 2 Business values in process maturity

### 3 vPMM

The vPMM is a maturity model that considers an organization’s business values within an organization’s business processes and makes possible to guarantee that an organization’s maturity level means the capabilities for achieving organization’s business values.

#### 3.1 An Overview of the vPMM

Figure 3 illustrates major components of the vPMM. Maturity level consists of applicable guideline, KPAs, and the result of process area categorization. Each KPA has specific and generic goals, normative components of the vPMM, and purpose, introductory notes, and related process areas, informative components. The vPMM categorizes process areas into four categories; organizational management, P/S work management, process management, and organizational support.

Each specific and generic goal has practices (sub-practices), typical work products, examples, and guideline reference amplifications. Guideline reference amplification contains guidelines for embedding business values within business processes, business value measurement and analysis, and process map analysis. Moreover, the vPMM supports both staged and continuous representation.

The vPMM is a process maturity model that provides guide on what capabilities should be embodied in an organization for implementing business values. As an organization achieves goals in each maturity level of the vPMM, an organization is viewed as having the capability for accomplishing the corresponding business value.

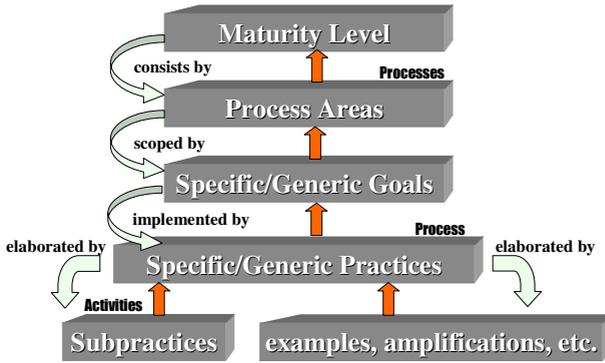


Fig. 3 Structural components of the vPMM

The vPMM guides an organization’s processes toward achieving its business values by structuring an organization to consider its business values and measure their achievement.

The vPMM consists of 5 maturity levels, 23 KPAs, 52 specific goals and 5 generic goals for institutionalization. Each specific goal has 3-5 specific practices, sub-practices, amplifications, and examples to guide goal achievements. Especially, the vPMM has processes embedding, measuring and analyzing business values, and includes those related amplification.

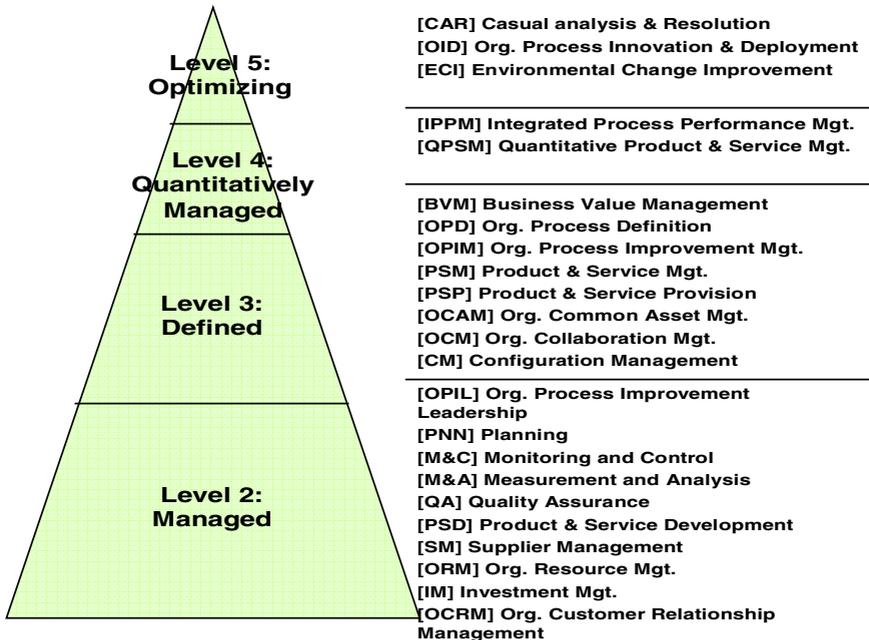


Fig. 4 The Structure of the vPMM

Figure 4 shows KPAs for each maturity level of the vPMM. The vPMM guides measuring, monitoring, and controlling business values achievement in KPAs, goals, and practices. In Fig. 4, the KPAs for measuring, monitoring, and controlling business value achievement are OPIL and BVM. In addition, the vPMM guides processes and practices to take care of related business values in accordance with their roles and responsibilities. For example, in Planning KPA of Level 2 of our vPMM, when a practitioner makes a plan for an assigned business work she is compelled to consider business value by making several plans first and then performing a tradeoff analysis based on the value achievement degree and necessary resources. As another example, with the Measurement & Analysis KPA of the vPMM, she has to find measures (KPIs) that would make significant impact on business value achievement. Especially, the vPMM considers explicitly the achievement of associated business values through accomplishing each goal of KPAs (i.e. Generic Goal 1, Generic Practice 1.2). Namely, accomplishing goals means achievement of associated business values.

### ***3.2 Differences from the Early Version of vPMM***

After we developed the early version of vPMM in [26], we conducted a survey to validate and revise the structure of the initial model. Survey questionnaires were completed by 12 representatives of the companies. The survey, which we called Voice Of Customer (VOC), was designed to obtain information such as the organization's business practices, the organization's priority of the KPAs for each maturity level of the initial vPMM, missing elements in the initial vPMM, the organization's needs for managing business process, and directions for improving business processes.

In addition, we conducted a survey on engineers and consultants who are responsible for developing business process management system and for consulting process improvement. The aims of the survey are to obtain information such as priority for each KPA in a provider's perspective, the missing elements on a provider's perspective, and gaps that exist in between markets and the providers.

The survey revealed important market needs, such as the necessity for improved leadership, customer relations, and separation of P/S from process management. There were some differences between VOC and VOE about KPAs. For example, engineers think that the configuration management is needed and should cover defined processes and common asset management to ensure strict compliance of rules in addition to the organizational process definition and the process management. These surveys also revealed the needs to develop capabilities, such as organizing Business Process Management Group (BPMG), P/S life cycle management, and adaptability management to cope with environmental changes.

In addition to incorporating the survey results, we also conducted formal reviews of our initial vPMM with practitioners and as a result of the reviews, some concepts and practices are adjusted. Requirements management processes are included in P/S Development KPA because managing requirements are not so complex in P/Ss works. And changes in requirements for P/S are not requested frequently. And we moved P/S Development and Customer Relationship Management KPAs from Level 3 to Level 2 because these are located in core

processes at value chain and because it is better to implement core processes in advance. In addition, Supplier Agreement Management KPA is renamed as Supplier Management because it also includes practices for integrated supplier management and supply chain management.

After constructing the vPMM structure through survey and formal review, we compared the model with CMM/CMMI, IS12207, and IS15288, which are all widely accepted and implemented in various industry sectors [3,13,14]. Additionally, we compared the existing researches of BPMM, PMM, and PMMM to check its compliance with the existing practices.

### ***3.3 The Distinctive Characteristics of the vPMM***

Process maturity in the traditional sense meant a degree of how specific processes are accurately and effectively defined, managed, measured, and controlled [27]. However, it does not indicate the degree of business value achievement. An ideal process maturity model should guide an organization so that it can measure and control its process capabilities how they are performing toward achieving an organization's business values. The vPMM is a maturity model in which maturity is an indicator of an organization's ability to control business values. The vPMM presented in this study has the following distinctive characteristics:

- The vPMM guides what capabilities that organization should have in order to implement its business values
- An organization obtains capabilities to implement business values by achieving the goals of each KPA of the vPMM.
- The vPMM guides an organization to measure and control its business processes and improve its business processes steadily in accordance with an organization's maturity level.
- The vPMM makes an organization to implement its processes toward achieving business values.
- The vPMM provides Value-Based Agile Assessment (VBAA) for assessing the vPMM conformance of an organization's business processes. The VBAA guides an assessor how to derive weaknesses, strengths, recommendations, and action plans from assessment.

## **4 Related Works**

Among the business process models that were proposed in the past, BPMM presented by Curtis [4, 5] is the only comprehensive model. It is also an OMG standard. Curtis borrowed well-defined and verified CMM/CMMI concepts and introduced them into the field of business process studies.

Fisher considered business process as having multi-dimensional and non-linear characteristics, unlike the software project/system life cycle [7]. Fisher defined actions on the ground that PMM is represented as five levers of change and five

states of process maturity. Due to its high level abstraction on actions, Fisher's model only provides ends, with no means to these ends.

PMM developed by Harmon regards all the core and support processes as a value chain, starting from the resource right up to the final product [10]. It also provides a checklist for accessing organization/process maturity. Although Harmon's approach shows the need for including values in PMM, his maturity model does not provide the means to achieve values.

When Smith introduced PMMM [20, 21], he insisted that "business process maturity should be taken into consideration because process management maturity has an orthogonal relationship with process maturity" [20]. Business process maturity should include business process management maturity for keeping up with the rapid changes of the business environment through continuous process improvement [25]. vPMM includes business process management maturity like BPMM and M. Hammar's PEMM (Process and Enterprise Maturity Model) [23].

Rosemann describes a BPM Maturity Model as a three dimensional structure that consists of Factor (IT/IS, Methodology, Performance, Accountability, Culture and Alignment), Perspective (Align, Design, Execute, Control and Improve), and Organization Scope (which includes time and area, the entity to which the model is applied, one dimension location, a division, a business unit or a subsidiary) [18, 19]. Rosemann's model has an advantage over other models in that it is supported by surveys and case studies. However, Rosemann's model is not well organized and has a complex three dimensional structure.

The 8 Omega Framework of BPMG encompasses the four dimensions of Strategy, People, Process, and Systems; the framework applies Discovery, Analysis, Design, Validate, Integrate, Implement, Control, and Improve (DADVIICI action) to all four dimensions [1]. It is simple and intuitive but it does not have principles or guidelines for its application. Further, the possibility of utilizing CMM model to business process maturity model development is currently being studied and tested by experts in industry and academia [12].

However, the existing maturity models and the associated methods did not directly consider business value achievement, which is the ultimate objective of implementing business processes.

## 5 Conclusions and Future Works

The ultimate goal of the vPMM is to be a business process maturity model that guides organizations in achieving their business values. In this paper, we reported our vPMM structures, and design principles. Business value achievement, which is not treated in other current business process maturity models including PMM, PMMM and BPMM, has been covered in the vPMM. In this paper, our main focus was to introduce the vPMM that makes an organization's business processes be aligned to a company's declared values. The vPMM was structured through the following procedures:

- Defining KPAs derived from IMCO functional model presented in IDEF0 and not from empirical intuition obtained through best practices
- Reflecting the opinions of experts such as practicing BPMS engineers and consultants
- Verifying whether KPAs are fully defined and value-adding process
- Verifying KPAs that are compliant with the exiting verified principles and models.

With the help of the vPMM, companies can analyze the strengths and the weaknesses of their 'as-is' business processes and develop 'to-be' models to achieve the organization's business values.

As Spanyi [22] said, a business process maturity model has to focus on competence. The maturity level should agree with the organization's competence for achieving their business values such as market share, revenue, and time to market improvement. The vPMM presented in this paper is the first business process maturity model that was constructed with that goal in mind and is carefully engineered such that design of levels, goals and sub-goals, practice areas and practices are all aligned towards the goal.

**Acknowledgments.** This work was partially supported by the Industrial Technology Development Program funded by the Ministry of Commerce, Industry and Energy (MOCIE, Korea).

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