

A Capability Maturity Model for Corporate Performance Management – An Empirical Study in Large Finnish Manufacturing Companies

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Abstract

The paper presents a conceptual model for assessing the maturity of a Corporate Performance Management (CPM) in an organization. The CPM maturity development process was studied in five case companies where the author participated into CPM development projects in various consultation roles. Constructive and action-oriented research approaches were used with different methods for data collection and analysis. Through a literature study and the development process in each company, the author has made observations, and has identified 16 key components that can be used to assess the maturity of the CPM. The findings of this study further extend the CPM research by providing a deeper understanding about the process, components, and levels of CPM maturity. The paper also provides organizations with an understanding about CPM and its potential value.

Keywords

Corporate Performance Management, Business Performance Management, Business Intelligence, Capability Maturity Model, Organizational Effectiveness

Introduction

Increasing needs for Corporate Performance Management

Business Intelligence (BI), analytics and performance management (PM) have been the top priority for Chief Information Officers (CIOs) for the fourth year in a row (Gartner, 2009). Another survey by Gartner reveals that Corporate Performance Management (CPM) is the highest priority in BI in Europe (Stevens, 2008). However, the survey also states that in the next two years at least half of the companies implementing CPM system will not realize the full benefits of CPM. The companies fail to improve performance management processes, and for example simply try to automate existing finance-oriented processes. As a result, more understanding is needed about CPM and its potential value. Indeed, CPM is even important when times are tough: it can help organizations to find bottlenecks and inefficiencies or expose areas that are profitable.

Purpose, structure, and the focus of the study

The purpose of the study is to present a conceptual model for assessing the maturity of corporate performance management in an organization. The study is focused to case companies' operational activities in BI and CPM areas. In general, the study includes features

from many different aspects of CPM, but is mainly focused on BI and information systems point of view, and less on the aspect on how CPM is actually linked to corporate strategy.

The research question with the sub-questions is as follows:

How the maturity of the corporate performance management can be assessed?

- a. *What are the accelerators and drivers of CPM?*
- b. *What are the inhibitors, challenges and pitfalls of CPM?*
- c. *Can Capability Maturity Model (CMM) be used to denote the levels of CPM maturity?*

The paper begins with an introductory chapter where the research approach and methods are described. After that the underlying theories and concepts are presented. That is followed by an overview of CPM deployment cases with the common pitfalls and accelerators of CPM. Later the model including the components and levels are presented. Finally the main findings are presented in the conclusions.

Research approach and methods

The study is based on a multiple case study, constructive and action-oriented research approaches where different methods were used for data collection and analysis. The study concentrates on five empirical cases for a deeper understanding about the research object. The constructive research approach (CRA) is a research procedure for producing constructions, which, according to Kasanen et al. (1993), refer to “*entities which produce solutions to explicit problems*”. By developing a construction (e.g. a model, a diagram, a plan), something that differs from previously existed is being created. The authors also state that the functionality of the solution in practice and the novelty of the solution have to be demonstrated by implementing the solution. The CRA relies on a pragmatic notion of truth, i.e. “*what works is true*” (Lukka, 1999). Lukka also emphasizes that one characteristic of CRA is the intervening role of researcher(s). According to Kasanen et al. (1993), the constructive research approach can be either quantitative or qualitative or both, although usually case study methods are applied. Throughout the empirical case study and the data analysis, the research approach has been qualitative. Constructive research is by its nature closer to normative research than descriptive research. The research approach in this study can be categorized as normative since the intended results include the objectives of the researcher about how “things should be”.

Case studies were chosen to study the phenomena as the material was readily available. The number of case studies (5) was selected for practical reasons. The case studies represented BI, CPM and data warehousing (DW) projects where the author participated as a consultant during in a year 2009. The author believes it is enough to ensure comparability as all of the companies represent manufacturing industry, and business processes are similar in an each company. During the year 2009, the author wrote a research diary about the implementation cases, which was later analyzed in order to create the conceptual maturity model. From the research diary, the author identified components, methodologies and concepts that were common for each of the case company. A range of (recently) published research literature on management data systems, BI, and CPM was reviewed to explore the current state, issues, and

challenges learned from their practice. With the help of the literature study and empirical observations, the author identified critical success factors, drivers, accelerators, challenges and pitfalls for typical CPM initiatives. From these the dimensions and components for the maturity model were created, and later combined to CMM's typical levels.

Case study demographics

The five organizations participating in this study include five manufacturing companies. Each organization is headquartered in Finland. Three of the companies are listed in a Helsinki Stock Exchange (HEX). In addition, each of the company has multiple sites around the world. Of five companies, the number of employees ranged from approximately 300 employees to over 11000 employees. Total yearly revenue ranged from 75 to 2600 million Euros. In each case, the CPM deployments were done at a group level.

Theoretical background

Performance Measurement

It is over 15 years since Robert Kaplan and David Norton wrote their first Harvard Business Review article on the balanced scorecard (BSC). Kaplan and Norton recognized that BSC is just one part of the larger picture of organizational performance (Kaplan, 2009). The BSC retains traditional financial measures, but also includes measures and assessments in three other areas relating to nonfinancial perspectives and their outcomes: customer, internal processes, and workforce learning and development (Kaplan, 2009; "Business or Corporate Performance Management", 2003). Even though the BSC has been very successful and hugely influential, it does not perform that well at the operational level. The success of BSC has, however, resulted in the creation of systems and applications to deliver similar balanced measurement regimes linked to corporate strategy.

Kaplan (2009) defines performance measurement in its simplest terms as "*assessing business results to determine company's effectiveness and to address performance shortfalls and process problems*". Measuring performance is important at multiple levels of the organization. Executives use the data to know how well the corporate is in a line with its strategy, how well the strategy is being implemented, and whether major corrective actions need to be taken (Kaplan, 2009). Often, too, performance measurement is used in the human resources (HR), and it has a special meaning with reviewing and managing individual's performance (Stevens, 2008). Middle-managers can use the performance data to evaluate and motivate their employees in regards with performance and productivity. Employees, on the other hand, can learn whether they are contributing to company goals. If the data is disseminated outside, the external parties (e.g. shareholders, industry analysts, customers, media and government regulators) can use it to make choices whether to invest in the company, or to determine if the company is operating with efficiency and integrity (Kaplan, 2009). Today, however, performance measurement is related mostly to IT departments for measuring for example computer assets and resources, or the finance department with very specific rules to be followed explicitly, such as the generally accepted accounting principles (Stevens, 2008). In today's world, a transition is needed from measuring performance to proactively managing performance to achieve business goals (Stevens, 2008).

Performance Management

Cokins (2009) define PM simply as “*the transition of plans into results – execution*”. In this scenario, PM is the process of managing organization’s strategy (Cokins, 2009) which aims at the systematic generation and control of organization’s performance (Melchert et al., 2004). PM is about improvement to create value for and from customers with the result of economic value added creation to stakeholders and owners (Cokins, 2009).

Earlier in much of the academic literature traditional PM has been financially biased by focusing only on the inside of the organization on cost and budget variance data. The BSC literature widened the concept of PM by making executives look externally, at how customers and shareholders see the business, as well as internally at process performance and the source of innovation and learning. Nowadays companies are focusing in a wider range of stakeholders to ensure they pay attention to all the important facets of performance (Bournet et al., 2003). PM can be separated into an operational level and a strategic level. While on the strategic level business goals and strategic key performance indicators (KPIs) have to be defined and process redesign has to be initiated, the operational level concentrates on monitoring, controlling and optimizing processes.

Business Intelligence

The term business intelligence was first coined by the Gartner Group in the early 1990s. Not surprisingly, BI comes with many definitions. Traditional BI produces insights, suggestions, and recommendations for the management and decision-makers (Pirttimäki, 2006). The concept is dualistic, on one hand referring to the information and knowledge that describe the business environment and a company itself with its relations to markets, competitors, and economic issues. On the other hand BI refers to an analytical process that produces insights, suggestions, and recommendations for the management and decision-makers. This is done by transforming internal and external data into information about capabilities, market positions, activities, and goals that the company should pursue in order to stay competitive. (Pirttimäki, 2006; Weber et al. 1999; Grothe & Gentsch 2000). Some (e.g. Chamoni and Gluchowski, 2004) even see BI as a purely technological concept, meaning different IS concepts like Online Analytical Processing (OLAP), querying and reporting. Data mining is closely related to BI by providing different methods for a flexible goal-driven analysis of business data, which is provided through a central data warehouse.

Although BI offers the tools necessary to improve decision making within organizations, it provides no systematic means of planning, monitoring, controlling, and managing the implementation of strategic business objectives (Frolick et al., 2006). CPM provides a means of combining business strategy and technological structure to direct the entire organization towards accomplishing common organizational objectives.

Corporate Performance Management

The topic behind CPM is not a new at all. In fact, companies have been practicing it for some time already. However, its discussion is intensifying again, mainly influenced by the recent work of analysts and consultants who stress the close relationship between current business requirements and newly developing IT enablers (Melchert et al., 2004). To express the novelty of the approach, the label CPM was coined (Geishecker, 2002; Moncla and Arents-

Gregory, 2003), sometimes designated as Business Performance Management (BPM) (e.g. Baltaxe & van Decker, 2003; van Decker, 2004; Meta Group, 2002), Enterprise Performance Management (EPM), Business Performance Optimization, or Operational Performance Management. Much confusion remains as to what comprise CPM. The most used definition is from the Gartner Research Group (Geishecker et al., 2001) who sees CPM as an umbrella term used to describe the “*methodologies, metrics, processes and systems used to monitor and manage the business performance of an enterprise*”. CPM is targeted at the corporate level, mostly because the scope of performance management is very broad (Stevens, 2008; Cokins, 2009).

Although many use the terms BI and CPM synonymously, they are distinctly different (Frolick et al., 2006; Cokins, 2009). CPM enhances BI in two directions: First, CPM is more targeted to support process-oriented organizations than BI. Second, CPM aims at providing a closed-loop support that interlinks strategy formulation, process design and execution with BI (Melchert et al., 2004). CPM as a concept represents the strategic deployment of BI solutions, since BI provides the backbone (IT infrastructure, applications and the conversion of transactional data form operational systems into useful information) to implement CPM and CPM includes the business processes that leverage BI (Miranda, 2004). From purely IT perspective, the CPM can be seen as an advancement BI as CPM offers organizations an IT-enabled approach to formulate, modify, and execute strategy effectively (Frolick et al., 2006). The traditional BI technologies are complemented with analytical capabilities to deliver a balanced, cross-functional and strategic view of the enterprise (“Business or Corporate Performance Management”, 2003). Interestingly, Gartner predicts that by 2010, BI and CPM will have converged. The convergence will be between process driven analytics and strategy driven BI. This is mostly due to fact that BI has traditionally been the realm of reactive decision-making. In summary, CPM is closely related to BI; however, it brings new concepts and areas where traditional BI falls short.

Often enterprises manage their business by analyzing financially oriented metrics (Geishecker et al., 2001; Paladino, 2007). In fact, some still see CPM as a narrow concept that applies to planning, scheduling, and budgeting practices in business, and some discuss it in the context of legislation such as Sarbanes-Oxley Act (Frolick et al., 2006). In 2004, approximately 70 percent of performance management projects had their roots in finance (van Decker, 2004). Not surprisingly, the most used performance management process was budgeting, often focused at the operational level around a single-year budget. CPM brings in new methodologies and concepts such as Balanced Scorecard (BSC), Activity-Based Costing (ABC) and value-based management to broaden the view from a purely financial perspective.

A KPI is a measure reflecting how an organization is doing in a specific aspect of its performance (Kaplan, 2009). A KPI is one representation of a critical success factor (CSF), which, according to Kaplan (2009), is a key activity needed to achieve a given strategic objective. The KPIs encourage enterprises to look beyond traditional financial metrics for an understanding how the enterprise is performing. Using timely and actionable KPIs is essential to CPM. In addition, having an effective methodology to identify metrics that are linked to strategic business drivers is necessary for CPM success (Frolick, 2006).



Figure 1. BI and CPM alignment (van Roekel et al., 2009)

Figure 1 illustrates the CPM concept as a whole. The mission and vision statements lead to business goals and a strategy. Strategy states how the goals should be reached, and CSFs define the prerequisites to reach the goals. The business goals and imposed strategy lead to objectives and a policy (business plan). KPIs define how the objectives will be measured. The imposed policy will be stated with business rules. Within the BI environment, the KPIs are presented by scorecards, dashboards or other simple graphical readouts in a front-end web portal or similar interface, using metaphors such as traffic lights and gas gauges (Gruman, 2004). From the dashboard, managers can drill down to study performance data in more detail. CPM requires underlying data systems which can share cleansed, consistent and reliable data in a flexible ways. The data itself s aggregated to a data warehouse (DW) from operational information systems or other data sources.

Capability Maturity Model

Today many maturity models are based on the Capability Maturity Model (CMM) proposed by Carnegie Mellon University in the late 1980s. While maturity models are used to support organizational improvement, capability maturity models are focused on the improvement of organizational processes (SEI 2002). CMM describes an evolutionary improvement path from ad hoc, immature processes to disciplined, mature processes with improved quality and effectiveness. The levels with their characteristics are listed in a table 1. As such it provides the key practices for activities in selected areas that enhance the process capability in the topic area (Paulk et al., 1993). By focusing on the issues and implementing the common features, the organization matures. The main point of CMM is the objective evaluation of the “ability to perform” and as been applied to many areas beyond technology and engineering, notably risk management and business process optimization (Hamel, 2009).

Level	Description
1 – Ad hoc (chaotic)	Typically undocumented and in a state of dynamic change, tending to be driven in an ad hoc, uncontrolled and reactive manner by users or events.
2 – Repeatable	Some processes are repeatable, possibly with consistent results. Process discipline is unlikely to be rigorous, but where it exists it may help to ensure that existing processes are maintained during times of stress.
3 – Defined	Sets of defined and documented standard processes established and subject to some degree of improvement over time. These (as-is) standard processes are in place and used to establish consistency of process performance.
4 – Managed	Using process metrics, management can effectively control the actual process. In particular, management can identify ways to adjust and adapt the process to particular projects without measurable losses of quality or deviations from specifications.
5 – Optimizing	Focus is on continually improving process performance through both incremental and innovative technological changes/improvements

Table 1. The levels of CMM (SEI, 2002; Hamel, 2009)

Hamel (2009) indicates that CMM has been criticized as being *"overly bureaucratic and promoting process over substance"* and being a *"classical engineering approach that does not take under consideration numerous human cognitive, organizational, and cultural factors essential for the success of every project"*. Bach (1994) adds that CMM often lacks of a formal theoretical basis and that the models are based on the experience of *"very knowledgeable people"*. This indeed affects the validity of the model. Often CMM models are based more on consulting practices than have their roots in the academic literature. Bach also states that CMM provides little information about process dynamics: it is quite suggestive why each element is defined at the level they are. Again this relates to the subjectivity of the researcher(s). Despite the concerns, a maturity model brings value where there are no better or reasonable alternatives. It helps to assess the current and desired state and can serve as a communication and a change management tool.

Since CMM has been widely adopted by companies in diverse areas to assist in understanding the process capability maturity, it was chosen to represent the levels of CPM in this study. Therefore, the CMM forms the basis for the development of the Capability Maturity Model for CPM as a vehicle for assessing an organization's state of CPM and prescriptive steps they can pursue to improve it. The model uses the same five-stage or level schema as that of the CMM added with an additional stage 0 (unaware). SEI (2002) has level 0 (characterized as incomplete) in some of its versions, but from the latest version it has been dropped out.

Existing Maturity Models for BI, PM and CPM

Previous studies on CPM and CMM

In the research literature, Capability Maturity Models have been used to assess the maturity of IT Governance (Weill & Ross, 2004), Enterprise Architectures (e.g. Ross et al., 2006; NASCIO, 2003; IFEAD, 2006), IT and business alignment (Luftman & Kempaiah, 2007), and Service Oriented Architectures (Perko, 2008). A number of maturity models exist for assessing the maturity of Business Intelligence, Data Warehousing, analytic capabilities, and performance management. This study presents briefly four of them.

The Data Warehouse Institute's Business Intelligence Maturity Model

The Data Warehouse Institute (TDWI) presented its maturity model for BI in 2004. The focus is on the process most organizations undertake when implementing BI and DW (Eckerson, 2007a). The model consists of five stages (Figure 2) from infancy (traditional management

reporting and spreadsheets) to adulthood (enterprise data warehousing and analytical services). As organizations progress through the stages, they reap greater business value from their BI investments and achieve greater consistency in the way they define shared terms and metrics. As such, the model provides useful context to BI maturity assessments because it aligns closely with many of the BI success factors. According to a research conducted by TDWI in 2007 (Eckerson, 2007b), most companies are currently in the child and teenager stages.

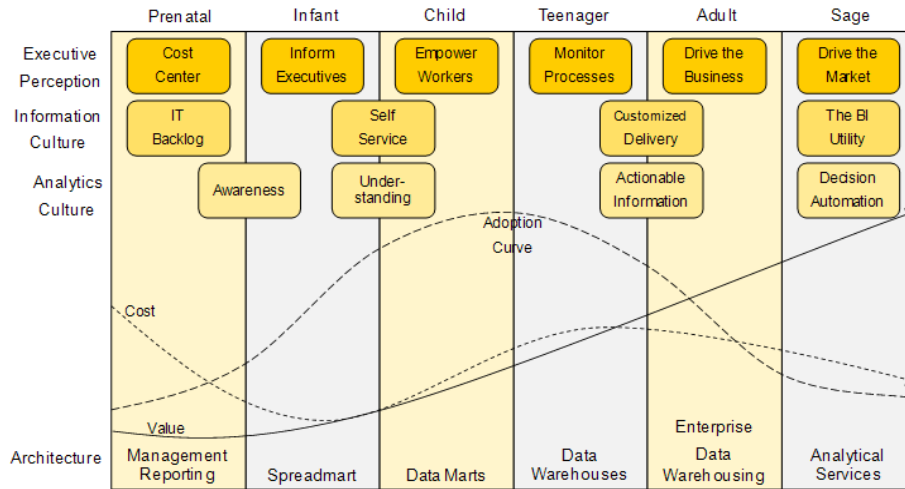


Figure 2. TDWI's BI Maturity Model (adapted from Eckerson, 2007a)

The model assesses the maturity across eight dimensions: *scope, sponsorship, funding, value, architecture, data, development, and delivery*. TDWI's model has characteristics and concepts from CMM. The model enables the measurement of current maturity of BI.

Logica's maturity model

Many big companies such as Hewlett-Packard, SAP, Microsoft and Logica have a BI/CPM maturity model and frameworks of their own. In Logica's maturity model the maturity and corresponding value is measured on stages in delivering information products. While TDWI's maturity model was more focused on the perception of the customer (e.g. CFO, business user, end user), Logica's maturity model is more focused on technology details as presented in a Figure 1. As with any other maturity model, one has to move a phase by a phase: it is not for example possible to jump from *data* to *predictive models* – or from *spreadmarts* to *enterprise data warehouses* (EDW). Predictive models go beyond traditional BI. Predictive analytics have been described as the new big differentiator for competitive analytics (Davenport, 2007), and the next management breakthrough (Cokins, 2009). Logica has, for example, successfully used predictive analytics in predicting bad debt customers, fraud detection on insurance, the likelihood of a churn, and future customer profitability.

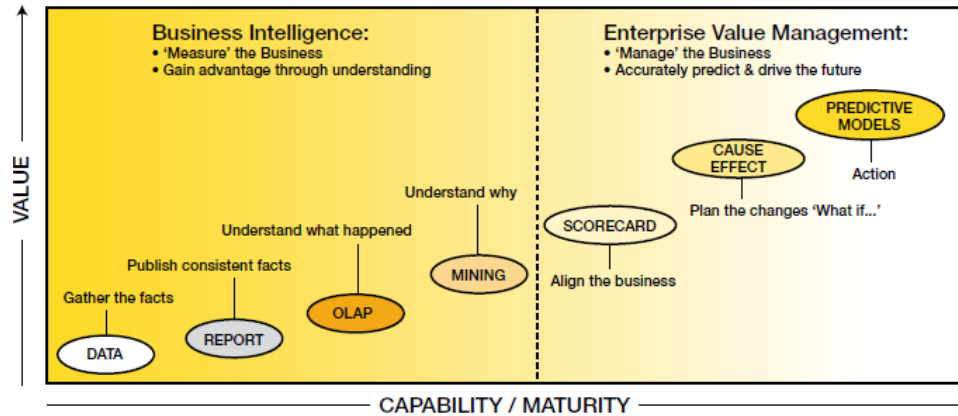


Figure 3. Logica's capability / maturity model (van Roekel et al., 2009)

Logica (van Roekel et al., 2009) makes a distinction between inside-out and outside-in measurement of the maturity. The outside-in is measuring the perception of BI by the organization. The focus is in how the various participants in BI experience their BI solution. Inside-out, on the other hand, is assessing current BI technology, processes and organization. The focus in this perspective is on the available BI solutions, how they are developed, deployed and used, and benchmarking them against the maturity of the marketplace as a whole. The TDWI's maturity model represents the first perspective, whereas Logica's model the latter.

Gartner's Business Intelligence and Performance Management Maturity Model

The Gartner Group offers a useful tool for understanding where an organization is with regard to BI and what it needs to do to move to the next level. Gartner bases its maturity curve on the real-world phenomenon that organizational change is usually incremental over time, as presented in a Figure 4. The levels of Gartner's maturity model are: *Unaware, Tactical, Focused, Strategic, and Pervasive*.

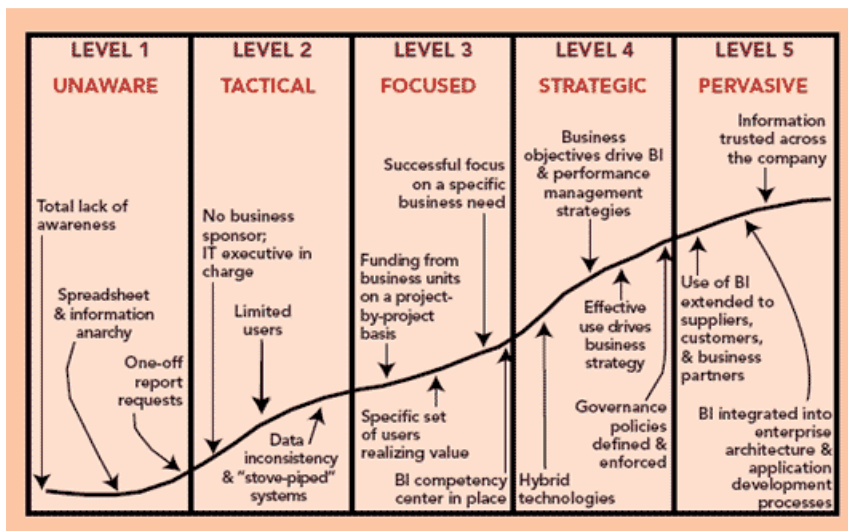


Figure 4. Gartner's Business Intelligence and Performance Management Maturity Model (adapted from Hostmann, 2007)

According to survey by the Business Performance Management magazine (Hollmann, 2007), 89 percent of organizations are at either the tactical or focused level of maturity. Only seven percent had reached level four and no organizations had reached level five. In the study, one characteristic was more than any other to indicate whether an organization is capable of operating at the higher levels of BI/PM maturity: its implementation of BICC (Business Intelligence Competency Centre), or its lack thereof. BICC is a group of business, IT, and information analysts who work together to define BI strategies and requirements for the entire organization. Of the five case companies in this study, only one organization had set up a BICC.

Davenport's Maturity of Analytical Capability by Stage

Davenport and Harris (2007) discusses analytical competition in organizations, and proposes a maturity model encompassing three vital areas of a successful analytical company: organization, human and technology capabilities (what others refer as people, process and technology) defined in five stages from *analytically impaired* to *analytical competitors*. The focus in the model is much on the good quality and consistent data. Emphasis is also put at how the analytical company is managed in regards with IT processes, governance principles, and analytical architecture. Davenport and Harris discuss about four pillars of analytical competition. These can be compared with the dimensions that other maturity models propose. Four pillars are: *support of strategic distinctive capability, enterprise-wide analytics, senior management commitment, and large-scale ambition*.

CPM deployment projects

Project lifecycle

According to analysts and executives, the deployment of CPM system should be done in stages (Gruman, 2004). Most organizations start with financial performance management as the data is readily available and metrics are easy to set up. The focus in the beginning is often at the tactical level in an organization, based on a specific business case or requirements (van Decker, 2005). Organizations develop ad-hoc solutions to BI and CPM, and implement different applications across the organization, with additional staff being required to consolidate the information. Over the years these solutions are connected to support information needs at a higher level, and become more and more dependent on each other. Maintaining and changing these organically linked solutions is a tedious and expensive process. Quite often, however, this is the way companies are developing a corporate performance strategy (van Decker, 2005) and in fact, that is the way CMM also proposes things should be done: a phase by phase. Of the five case studies, two started from scratch with financial performance management, such as analyzing the accounting and budgeting data. After financial performance management often comes operational performance issues since they are easily quantified, or might already be available because of the requirements by quality auditing processes (Gruman, 2004). This was also noted in the case companies, where often the next logical step was to analyze sales and purchasing data.

BI and CPM over the years has evolved from functional area applications to enterprise applications with a fast growing number of users and business requirements. Demand for

reports, dashboards, scorecards and decision support is growing. Organizations now face the challenge of effectively reducing BI costs without compromising the quality of service they deliver to users. Organizations therefore need to have an agreed and documented BI and PM strategy for delivering real business value from BI technology investments. A silo based technology or opportunistic approach leads to inconsistent results, inflexible applications and infrastructure. As a result the cost of ownership (TCO) will increase.

Inhibitors, challenges and pitfalls of CPM deployment

A research conducted by the Meta Group (2004) revealed that three organizational issues in particular form the biggest pitfalls (39%) to any CPM initiative. The first organizational barrier is the perception that CPM implementations are technology driven. This was also seen in some of the case organizations throughout the study. As explained before, a fundamental objective of CPM is linking strategy to organizational processes. Although technology supports CPM, strategically aligned business processes drive it. A study by Geishecker et al. (2001) also highlights the fact that people lack of realization that CPM as a concept has to be strategic.

The second challenge is discounting the impact of organizational resistance. CPM can change the existing power structures by introducing new or modified processes and systems, which makes information more transparent. The resulting resistance can hamper project implementation and adoption. The case companies also brought out the change in power structures and control when the CPM project was started. The tasks previously done at unit level may have changed to corporate level, and the people may lose their visibility in the data. It is also important to put attention into organizational issues: no single person owns CPM (Geishecker et al., 2001). The information system (IS) organization and business units must work together to define requirements and deliver a solution. Furthermore, erroneously assuming that the CPM project is completed once the technology is installed can lead to another set of challenges to CPM. Overlooking the importance of training end users and dealing with lack of user confidence in the system are post-implementation people issues that can plague CPM efforts. (Frolick et al., 2006)

Nowadays, many enterprises turned to BI vendors such as Cognos and Business Objects for a solution. The vendors provide infrastructure and reporting and analysis tools that open the business for all users. The author has noticed that during the year 2009 many BI vendors realized the opportunity to add value to their BI platforms and tools by adding CPM processes such as budgeting, forecasting and strategic planning. Unfortunately, business users transforming from a legacy (spreadsheet-based systems), often lack the knowledge of what these advanced applications can do, and how they should be deployed (Stevens, 2008). In addition, the popularity of “hot” areas (such as customer relationship management analysis) and budgeting encourages a tactical approach to application purchasing (Geishecker et al., 2001). It is also relevant that IT budgets may be restricted in economically uncertain times. In addition, within ERP systems, their closed architectures make it difficult to include data from outside the ERP system. Geishecker et al. (2001) pointed out issues such as a data inconsistency that are usually faced during a data extraction process from an operational source data system.

Accelerators and drivers of CPM deployment

Support for BI and PM is heavily driven by business objectives – often by corporate-level objectives and metrics. It is vital to have a C-level sponsor for the BICC who will be actively involved in providing guidance, direction, requirements, and management. This senior executive should also promote the competency center's efforts among other executives (Hostmann, 2007). Sponsorship by C-level executives will provide effective leadership for the project (Frolick et al., 2007). This was seen in the case studies as well: the projects where C-level sponsor was present usually went smoother, stayed in a schedule, and did not exceed their budgets. The importance of senior executives is also highlighted in other researches (Stevens, 2008; Griffin, 2004). Frolick et al. (2006) emphasizes that organizational factors are some of the most critical factors that facilitate an effective CPM implementation. On the other hand, management of resistance to CPM is another organizational factor that is critical to a project.

In a competitive business markets marketplace puts pressure on organizations to be better at forecasting and strategic planning. External pressure is also put through new accounting and regulatory standards, which drives the organization to require greater visibility into the organization to better monitor operations (Frolick et al., 2006). In the case companies internal needs were often found important: organizations put pressure on the consolidation of data sources to facilitate better coordination among cross-functional units, in order to provide “a single version of the truth”. Internal needs were also highlighted in linking strategy with KPIs and the actual data. CPM provides visibility into how well a company is maintaining its strategic focus (Bose, 2006). Case companies also pointed out reasons such as having a common business terms and language throughout the enterprise.

According to Gartner research (Stevens, 2008), the most important factor in CPM success is to ensure that any CPM implementation does not focus purely on the needs of finance, but encourages finance users to support the PM requirements of other functions and business units. The research also showed that CPM is most effectively deployed when there is a partnership between IT, finance and business users. In the case companies the projects often started from financial needs but were later developed to include other departments, too.

On the technical side, a key factor essential to a CPM implementation is the consolidation of the dispersed silos of data (Frolick et al., 2006). Enterprise Resource Planning (ERP) systems, their user interfaces and data models are too complex for strategic and operational users (Geishecker et al., 2001) so usually a centralized data warehouse is needed. This is by far the most difficult undertaking to deploying successful CPM. Often that is also the most time consuming part in a CPM project. The project team must establish an integrated repository of operational metrics aligned to corporate strategy, as well as one that cuts across functional boundaries. Incorporating all data sources to the system will help to ensure that the CPM solution is the only information source of the organization.

During the implementation process in the case companies, the author found out several benefits that companies are looking for when implementing CPM solutions and starting CPM initiatives. For example, a Global ICT Director in one of the case companies pointed out that *“compared with long SAP projects and rollouts, through CPM/BI projects a company can gain benefits in a relatively short period of time”*. As discussed before, a “one truth” in a data throughout the whole organization was the ideal state in many organizations – this would help

them in managing the corporate more effectively. The case organizations also wanted improved capabilities in order to compare actual performance to potential performance. CPM systems were also used to make quick wins: for example one case company pointed out that in this economic situation (recession) reporting global receivables is essential before selling the customers or retailers more goods. The case companies were also looking for a platform to have a common way to report, plan, and forecast things, in order to have a general understanding on the numbers. The easy access to, and a ability to analyze cross-functional data was found important. Throughout the CPM development process, the case companies were developing a common business vocabulary throughout the whole organization.

A Capability Maturity Model for CPM

The model consists of four components that are comprised of four subcomponents each with multiple levels pertaining to possible management choices and strategic decisions within an organization. Each of them has the potential to facilitate to the maturity of corporate performance management. An organization's score for each component is placed on a maturity model having six different levels to denote the maturity.

The four components of CPM maturity

Each of the levels of CPM maturity is described by four components that represent management activities or practices that are critical in enabling or inhibiting corporate performance management. The four components are:

1. *Management & Organization* – Encompasses the strategic decisions and objectives the company has set. Defines how CPM is organized and managed, and what contribution CPM brings to an organization.
2. *Technology* – The extent to which IT is able to provide a flexible infrastructure, enable or drive business processes, and share reliable and quality information across the organization.
3. *People & Culture* – Encompasses how people are trained, empowered with understanding on CPM, how they can make actions in regards with CPM, and how things are communicated and shared in an organization.
4. *Processes* – Encompasses the scope of the CPM initiative, how different methodologies are used, how CPM processes are defined, and how the performance is measured and reviewed.

Four components with their respective subcomponents are listed in a table 2. More detailed and up-to-date information for each of the components can be found online at <http://www.cpm-maturity.com/model.html>.

Component	Subcomponent	Description
Management and Organization	Strategy and objectives	Describes how decisions are made in the organization (based on instinct vs. based on analytics). Encompasses also the consistency in shared focus and metrics. Defines how CPM strategies are linked to risk management and productivity targets.
	Organization	Defines the extent of support from C-level executives. Discusses things such as how the CPM initiative is organized? Is BICC set up? Is there local control or enterprise-wide standards? How the partnership between IT, finance and business users is being established?
	Governance	Choices that organization make when allocating decision rights for CPM activities such as selecting and prioritizing projects, assuming ownership of technology, and controlling budgets and CPM investments. How governance policies are defined and enforced?
	Business value	Importance and contribution of CPM to the organization in terms of investments becoming efficient, ROI becoming positive, and CPM becoming indispensable.
Technology	Infrastructure	Encompasses the CPM architecture, its extent, analytical tools in place, and data warehousing.
	IT-business alignment	Encompasses how well IT capabilities are used to share information across the organization. Practices that address the extent to which IT is able to drive or enable transformation.
	Data governance	Defines how the data is being managed, are there common data definitions, what is the scope of common enterprise data.
	Data	Encompasses the quality of data, and data redundancy.
People and Culture	People	Encompasses how knowledge workers are empowered with timely information and insight. How much staff is needed to consolidate the information?
	Competencies	Encompasses the people's awareness of CPM, their understanding the value of information, and whether people can make actions based on CPM understanding.
	Communication	Encompasses the effectiveness of sharing information for mutual understanding, the methods used to promote information sharing and the partnership between IT and business.
	Culture	Encompasses the information sharing culture.
Processes	Scope	Encompasses the scope of CPM solution (silos vs. enterprise-wide solutions).
	Methodologies	Encompasses how well an organization is adapting methodologies such as Activity-Based Costing (ABC), Total Quality Management (TQM), and Balanced Scorecards (BSC).
	Process definitions	Defines how CPM processes are planned and managed. Are CPM processes documented, understood, and being used in a decision-making?
	Performance measurement / metrics	Defines if metrics and rules are aligned with the organization. How CPM objectives are measured and tracked? Are key metrics reviewed on a periodical basis.

Table 2. The components of a CPM maturity

The six levels of CPM maturity

The score that an organization achieves for the 16 components of CPM maturity are compared with a six-level maturity model to denote the organization's CPM maturity. These six maturity levels draw on the core concepts of the Software Engineering Institute's Capability Maturity Model, but the focus here is solely on CPM. The levels of CPM maturity are presented in a Figure 5.

Higher levels of maturity in the model are sustainable only if the lower maturity levels are strongly established. In the BI/CPM context, this translates to a robust architecture that makes the measurements possible. The predictability, effectiveness and control of an organization's processes are improves as the organization moves up these five levels. In the outcome, an imbalance often occurs between the different aspects of maturity. It is important to start balancing all the aspects to one level of maturity first and then start growing to the next level of maturity.

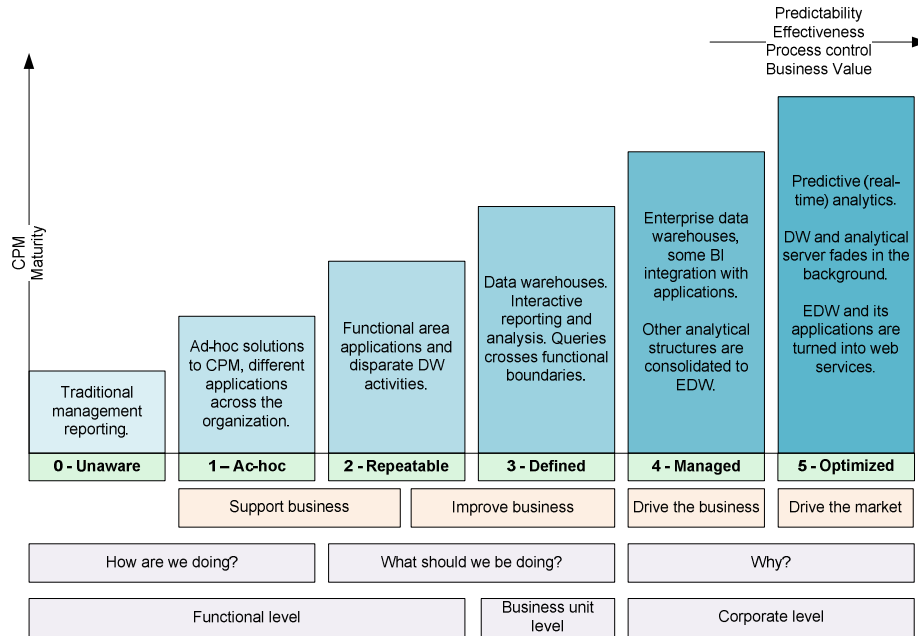


Figure 5. The levels of CPM maturity from an infrastructure point of view

Conclusions

Summary

CPM is a consolidation of concepts that companies have been practicing for some time, such as performance measurement, data warehousing, business intelligence, and total quality management. This single integrated concept is focused on enhancing corporate performance. CPM provides an opportunity to align operations to organizational strategy and evaluates its progress over time toward goal attainment (Frolick, 2006). However, companies are still unaware of the potential benefits of CPM and for example continue to use only spreadsheets to gather and disseminate vital performance information. For any organization, CPM offers the opportunity to examine the links between strategy and operation in a way that is supported by hard data to inform decision-making, improve collaborative working and enhance performance. When companies take the challenge of creating the resulting system, they will need to address managerial, organizational, technical, process and cultural issues - as described by 16 components in this study. The task is not easy, but it is essential for real, sustainable, improved corporate performance.

The key developments

The findings of this study further extend the CPM research providing a deeper understanding about the process, components, and levels of CPM maturity. The paper also provides organizations with an understanding about CPM and its potential value. The model provides a quick way for organizations to gauge where their CPM initiative is now and where it needs to go next. It also works as a communication and change management tool.

In regards with the original research questions, the maturity of corporate performance management can be assessed by measuring how well the company performs in regards with the 16 components presented in this paper. The most relevant accelerators and drivers – as well as inhibitors, challenges and pitfalls – of CPM were presented in this paper to gain more understanding about the components.

CMM was found to be a useful mechanism to denote the levels about CPM maturity. In fact, all the presented existing maturity models for BI/DW/CPM are all loosely based on CMM. TDWI's, Logica's and Gartner's models are heavily based on consulting practices, and do not offer that much academic contribution. As such, the study also fills the gap with present understanding about CMM and CPM from academic point of view. In addition, the model provides a quick way for organizations to gauge where their CPM initiative is now and where it needs to go next.

Suggestions for further research

The model needs further validation. Kekäle (2001) suggests that the validity testing in constructive research should be done by using the market mechanism that includes two stages: a weak and strong market test. The weak test is passed when a manager of a firm is ready to take the construct in use in the decision-making. The strong market test is passed when the construct is proved to improve the performance of the firm. Kasanen et al. (1993) argue that even the weak market test is very demanding and hard to pass.

It may be reasonable to make a quantitative study with a larger sample to validate the model in practice. This requires the creation of question pattern which relates to the identified components and levels of CPM maturity. Once the quantitative study is completed, it is also seen whether companies differ in their level in each CPM component. It would be also interesting to know, whether some of the components are predominant to others, or if some of the components are more mature than others. This could be accomplished for example by conducting a factor analysis on the identified components.

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