Key Performance Indicators Framework - A Method to Track Business Objectives, Link Business Strategy to Processes and Detail Importance of Key Performance Indicators in Enterprise Business Architecture

Eswar Ganesan  
Infosys Technologies, eswar_ganesan@infosys.com

Ramesh Paturi  
Infosys Technologies, rames_paturi01@infosys.com

Follow this and additional works at: http://aisel.aisnet.org/amcis2009

Recommended Citation  
http://aisel.aisnet.org/amcis2009/736

This material is brought to you by the Americas Conference on Information Systems (AMCIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in AMCIS 2009 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.
Key Performance Indicators Framework - A Method to Track Business Objectives, Link Business Strategy to Processes and Detail Importance of Key Performance Indicators in Enterprise Business Architecture

Eswar Ganesan
Infosys Technologies Ltd
eswar_ganesan@infosys.com

Ramesh Paturi
Infosys Technologies Ltd
ramesh_paturi01@infosys.com

ABSTRACT
Monitoring business objectives has become a challenge for enterprises. Business Strategies and the underlying Business Objectives has to be tracked and monitored for performance so that business stakeholders can make informed decisions. The challenge is to create a framework to identify, define, associate and track Key Performance Indicators (KPI) for effective monitoring of strategy to process linkage. Monitoring strategy execution is one of the critical phases in defining Enterprise Business Architecture and KPI framework is an approach to address the phase effectively. The paper attempts to define a fitment between Composite Enterprise Business Architecture Framework with Business Motivation Model of Business Rules Group and Balanced Scorecard approach, wherein business stakeholders are able to understand how Key Performance Indicators will help link business strategy to business processes, business role players and business products and services. The paper also attempts to define a framework for KPI Classification and relate it to business process hierarchy. The KPI Cycle detailed help enhancing Enterprise Business Architecture effort towards monitoring strategy to processes linkage.

Keywords

1. INTRODUCTION
Key Performance Indicators (KPI) are defined as a representation of a set of measures focusing on those aspects of organizational performance that are the most critical for the current and future success of the organization [1]. KPI are one tool used to convey the relative health of the business or one portion of that business and is a specific metric (a quantitative, periodic measurement of one or more processes), chosen from all of the collected or possible metrics within a business in such a manner as to convey the most amount of information in a single measurement – the “key” measurement [2]. KPI help the enterprise to define and measure business progress towards achieving business goals. Business goals detail what the business is striving to achieve and business objectives quantify the business goals by means of a performance measure and a metric. When the metric associated with the objectives are tracked for understanding the progress, it becomes a Performance Indicator and performance indicators which are important to report at regular intervals and indicate ‘key’ business information qualifies as Key Performance Indicators. So, KPI indicates us whether the business objectives are getting fulfilled and in turn the business goals are getting accomplished.

David Parmenter [1], classifies performance measures into three types: key result indicators (tells how one has done in a perspective), performance indicators (tells what to do) and key performance indicators (what to do to increase performance dramatically); the author also includes that KPI are deep enough in the organization that it can be tied down to an individual and will affect most of the core critical success factors (CSF) and more than one Balanced Scorecard perspective. We shall discuss about Balanced Scorecard approach in the subsequent sections of the paper in detail. KPI can be ‘leading’ indicators which directly impacts performance or ‘lagging’ indicators which are mostly financial indicators that are industry standards and are lagging as they represent the result of the action that is already taken. The general characteristics of KPI shall include:
reflect organization vision and strategy, easy to interpret and actionable, decided by management and tied to roles, processes, system capabilities, products/services and programs/initiatives of the enterprise.

Measurement mechanisms are essential for feedback and evaluation of organization’s vision and strategy success. Business Architecture is involved in studying the core business, the core value chain, the core value streams, and the core business processes [3]. A mechanism to measure as well indicate performance of business, value chain, value stream and business processes is part of defining business architecture and nothing but essential for enterprises. KPI mechanism helps doing the same for enterprise business architecture and is an important activity for strategy to process linkage or strategy execution. Enterprises have been struggling to implement strategy [4] and KPI definition and measurement as a mechanism shall help communicate strategy to everyone in the organization and bind them for complying with objectives. Strategy execution when measured and monitored using a KPI framework shall lead to process improvement as well organization effectiveness.

The paper is arranged as follows. Section 2 details the steps involved in developing enterprise business architecture for practical purposes on the basis of Composite Enterprise Business Architecture (CEBA) framework. Business Motivation Model (BMM) from Business Rules Group and Balanced Scorecard (BSC) approaches are described in brief and then section 2 provides the Composite KPI Framework through analyzing the fitment of CEBA with BMM and BSC. A classification schema for KPI is detailed in section 3. Section 4 prescribes KPI Cycle approach for effectively utilizing the Composite KPI framework and classification schema. The paper concludes with summing up the research findings along with scope for future work identified.

2. COMPOSITE KPI FRAMEWORK

In our previous paper [5], we have developed a framework and meta-model for Enterprise Business Architecture (EBA) known as Composite Enterprise Business Architecture (CEBA) framework (which we shall discuss in detail in section 2.3) comprising of 12 attributes pertaining to business which form the building blocks for EBA. In continuation of the framework, we propose here a working methodology for building an Enterprise Business Architecture (EBA) which shall comprise of three phases or activities: Business Strategy Formalization, Process Architecture Definition and Linkage between Strategy and Process (refer figure 1). Understanding the business situation, comprehending the operating model of the enterprise and modeling business strategy shall form part of the Business Strategy Formalization phase. Understanding the business behavior (or business processes), business function, business organization structure and linking business behavior to other business attributes shall form part of Process Architecture Definition phase. Understanding the linkage between business strategy and processes and monitoring them for effective strategy execution shall form part of Linkage between Strategy and Process phase.

![Figure 1: EBA Universal Set](image)

Executing Strategy or linking strategy to processes for translating strategies into results and effectively monitoring strategy execution have always been a challenge for enterprises. Kaplan and Norton [4], provide multiple examples of importance of strategy execution from various reports to conclude that strategy execution is more important than good vision. In purview of
Enterprise Architecture, Ross Jeanne et al. suggest that an effective foundation for execution depends on tight alignment between business objectives and IT capabilities and the process for the alignment usually go wrong because the enterprise strategy is not clear to act upon, IT solution is implemented to each individual strategic initiative and IT is always reactive to strategic initiatives rather than shaping future strategic opportunities [6]. The elements of strategy are to be deconstructed into operational aspects in order to attain the business goal and a business architect would like to monitor the performance of the strategy execution at regular intervals and at multiple management/organization levels for multiple business scenarios. Performance measures have to be defined and associated with business goals and the key performance indicators are to be tracked for making informed decisions by the business stakeholders. The challenge is to create a framework to identify, define, associate and track KPI for effective monitoring of strategy to process linkage.

In this paper, we shall only deal with the ‘Strategy to Process Linkage’ phase of EBA. We have adopted a two fold approach to understand the intersection between business strategy formalization and process architecture definition phases: 1) Understand how to derive KPI on basis of the Business Motivation Model and the Balanced Scorecard Approach and define the Composite KPI Framework through analyzing the fitment of CEBA framework with BMM and BSC in the lights of KPI. 2) Classify KPI and associate them at multiple process hierarchy levels so that one can monitor them for performance. The approach is detailed in the following sections.

2.1 BUSINESS MOTIVATION MODEL AND KPI

The Business Motivation Model (BMM) developed by the Business Rules Group provides a scheme or structure for developing, communicating, and managing business plans in an organized manner. Business Motivation Model has its linkages with Enterprise Architecture – as it addresses the business owner’s perspective and motivation column of Zachman Framework (ZF) for Enterprise Architecture [7]. The first two rows of ZF typically represent elements of Enterprise Business Architecture [8] and motivation column contains elements pertaining to the ‘why’ abstraction. BMM has two major areas, first the Ends and Means of business plans and second the Influences (shapes elements of business plan) and Assessments (impact of Influences on Ends and Means). Among the Ends are the things the enterprise wishes to achieve (Vision, Goals and Objectives) and among the Means are things the enterprise will employ to achieve those Ends (Mission, Strategy and Tactics) (refer Figure 2).

![Figure 2: Business Motivation Model: End-Means Concept](image)

According to BMM, each goal can have one or more measures of performance. Objectives quantify goals with an attainable, time-oriented, and measurable target that the enterprise seeks to meet in order to achieve its goals. The metrics for an objective are established by means of measures of performance of the goal and these metrics when tracked become performance indicators. So, if a metric is particularly important, it may attain a special status and be called a Key Performance Indicator or Critical Success Factor. Thus, BMM is one of the approaches to model one attribute of CEBA [5], ‘business motivation’, and also help derive KPI in a structured manner to track business objectives and strategy execution.
2.2 BALANCED SCORECARD AND KPI

Since it is always difficult to provide a clear performance target or focus attention on the critical business areas by a single performance measure, business managers have always wanted a balanced presentation of multiple measures including both financial and operational. This form the basis for Robert Kaplan and David Norton to devise the Balanced Scorecard (BSC) - an approach to translate strategy into action through measuring enterprise performance under four different perspectives: Financial Perspective (how do we look to shareholders), Customer Perspective (how do customers see us), Innovation and Learning Perspective (can we continue to improve and create value) and Internal Business Perspective (what must we excel at) [9] (refer figure 3). Balanced Scorecard soon became a run away hit among multiple firms as it directly ties business goals with performance measures, targets and metrics. The adoption of BSC could provide a balanced view of multiple measures for the senior management to monitor strategy execution. BSC as a tool puts vision and strategy in center of performance management system rather than control. Thus BSC has become an effective tool to utilize by business analysts, consultants, senior management as well as business architects for translating strategy into action and monitor business performance.

![Balanced Scorecard - Links Performance Measures](image)

**Figure 3: Balanced Scorecard Perspectives**

Over a period of time, organizations have identified Balanced Scorecard as a Strategic Management System which addresses a serious deficiency in traditional management system: their inability to link a company’s long-term strategy with its short-term actions; BSC can be used as a Strategic Management system with four major processes involved: Translating Vision, Communicating and Linking, Business Planning and Feedback and Learning [4]. It is clear that BSC should be applied at the process level also by deconstructing the corporate and business unit level scorecard, allowing BSC as an effective way to monitor strategy execution – long term as well short term actions. So, it is inferred that, performance measures along with their KPI are to be associated with the corporate scorecard, business unit scorecard and as well at process (process, role player and system capability) levels.

BSC as a Strategic Management System soon became a tool for building a strategy focused organization. Strategy execution is very important for organizations to succeed in the present competitive age and for the same they need to define performance measures for the business strategy as well as for business objectives and monitor them time and again. Kaplan and Norton provide a set of five principles that permit organizations to become strategy-focused, enabling them to execute their strategies rapidly and effectively: Mobilize change through executive leadership (formulate vision and strategy), Translate strategy into operating terms, Align organization with strategy, Make strategy everyone’s job and Make formulating strategy a continual process [10]. By defining a ‘Strategy Map’ (a combination of strategic objectives with cause-and-effect relationships) and associating Balanced Scorecard for the objectives one can translate strategy into operating terms. The scorecard has the associated measures and metrics (KPI) which help in monitoring the strategy execution. It is inferred that for taking strategy to everyone in the organization one has to convert it into operating terms – which means define performance measures and KPI for strategic objectives and deconstruct them to various downstream hierarchical business process levels and monitor them.

In yet another seminal article, ‘Mastering the Management System’ [11], Kaplan and Norton have put forth the five stage Closed Loop Management System for linking strategy to operations along with respective tools/approach for each stage to be
followed; the five stages include: Develop the Strategy, Translate the Strategy, Plan Operations, Monitor and Learn and Test and Adapt the Strategy. Strategy Map and BSC are the tools/approach for the second stage: - Translate the Strategy. The authors suggest that KPI dashboards to be provided regularly on operational review meetings while the BSC reports to be provided on strategic meetings of the enterprise for monitoring and learning business objectives. We get a clear picture on how to derive KPI on basis of BSC and the importance of tracking KPI regularly to monitor strategy execution.

2.3 FITMENT OF COMPOSITE EBA FRAMEWORK WITH BUSINESS MOTIVATION MODEL AND BALANCED SCORECARD APPROACH

Composite Enterprise Business Architecture (CEBA) Framework comprises of 12 elements referred as ‘attributes’ related to business and grouped in three broad categories namely ‘Business Building Blocks’ (consists of Business Location, Business Role Player, Business Commitment, Business Organization Unit, Business Events, Business Motivation and Business Situation), ‘Business Inputs and Transformers’ (consists of Business Information, Business Resource, Business Behavior, Business Functions) and ‘Business Value’ (consists of Business Offering). As part of CEBA Framework, we have suggested a network representation of the EBA attributes with relationships among these attributes established [5].

Figure 4: Composite KPI Framework – Fitment of CEBA, BMM and BSC
‘Business Motivation’ is one of the attributes of CEBA and shall be modeled with the help of BMM which deals with factors that motivate to establish business plans. Business Motivation takes advantage of the business situation both internal as well external situations that exist in the space where the enterprise competes to base its strategy upon. Goals as part of Business Motivation attribute amplifies business vision and are quantified by objectives and supported by business strategy [7]. The next logical question is how to model business goals. Rich literature on multiple goal modeling techniques are available [12, 13, 14, 15, and 16]. Multiple performance measurement techniques are also available in literature [17]. We find Balanced Scorecard as a powerful goal modeling as well as performance measurement technique with its balanced four perspective approach along with strategy and vision as the driving force. Goal Question Metric (GQM) approach, another goal modeling technique, which start with a goal (specifying purpose of measurement, object to be measured, issue to be measured and viewpoint from which the measure is taken), refine the goal with several questions which break the issue into major components and each question is refined into metrics for tracking and measurement, is also a powerful technique [16]. We suggest BSC as the primary goal modeling technique for the business motivation attribute of our framework which helps in deriving KPI. We also suggest GQM technique for deriving KPI especially for operational goals. Figure 4 provides the network representation of our proposed Composite KPI Framework metamodel wherein business motivation attribute is elaborated with the BMM and BSC linkage to derive KPI. On the basis of the ‘Composite KPI Framework’ and meta-model provided here, Objectives are measured by KPI and are owned by Business Role Players and are realized by Business Behavior or Business Processes. KPI acts as the glue that binds business objectives, business role players and business processes which produces business offerings (products/services) towards achieving business motivation, thus detailing an effective way to monitor organization performance.

3. KEY PERFORMANCE INDICATORS: A CLASSIFICATION FRAMEWORK TO TRACK BUSINESS OBJECTIVES

A classification schema for KPI are very essential in order to detail the importance of tracking it regularly, associating it with resources for responsibility in maintaining it and for reporting it at multiple management level. We list multiple KPI classification criteria on basis of available literature as clusters and metrics and relate them to process architecture at various process hierarchy levels in line with the approach we have adopted for the paper. All strategic objectives are linked to the enterprise value streams with supporting measures and metrics [18]. Analyzing Value Streams, which is part of process architecture, shall help in understanding impact on the strategic objectives and analyzing the related measures and metric (KPI) shall help plan improvements necessary to realize strategic expectations. Associating KPI at multiple process hierarchies thus assumes significance.

3.1 KPI Clusters and metrics

A. KPI can be classified generically into two broad categories: Strategic KPI and Operational KPI on basis of the associated management level (top/middle/line mangers) and time interval (long term/short term).

B. Ricardo Mendes et al. classify goals into two categories: first as quantitative and qualitative; second on basis of BSC, they classify goals as strategic and operational [13]. According to the authors, goals can be qualitative (qualitative strategic goal and qualitative operational goal) and quantitative (quantitative strategic goal and quantitative operational goal). Author Evangelia Kavakli in the paper titled ‘Modeling organizational goals: Analysis of current methods’ [15], details that goal identification is not an easy task and classifies goals as strategic (which are explicitly listed in corporate statements) and operational (which are implicit by nature). On the basis of the four goal types – strategic, operational, quantitative and qualitative, we can map and classify KPI accordingly.

C. Michael Smith et al. [19] classify metrics into three levels (Level 1, 2 & 3) wherein they differentiate regulated metrics and non-regulated metrics. Level 1 (Accounting or Regulated metrics) is the accounting metrics that are required by law or other external reporting purposes; they are lagging indicators of performance that provide limited insight as to why things happen. Level 2 (Performance or Non-regulated Industry Standard metrics) provides well-rationalized set of mid-to-high level metrics that provide a complete view of how well the business is performing across the functional areas; leading indicators and limited to fewer than 10 at any one management level. Level 3 (Analytical or Company-Specific metrics) explains performance metrics in detail and are used to perform root-cause analysis and can be very specific to a given business activity or task. On basis of these three metric hierarchies – regulated, non-regulated and analytical, we can map and classify KPI accordingly.
D. BSC provides an approach to translate strategy into action through measuring enterprise performance under four different perspectives: financial, customer, internal process and learning & growth [9]. Each of these perspectives in turn contains business goals, performance measures, metrics and targets to achieve them. On basis of these four perspectives – financial, customer, internal process and learning & growth, we can map and classify KPI accordingly.

E. Gartner’s Business Value Model (BVM) classifies business into three broad business aspects: demand management, supply management and support services and these business aspects are broken down into their aggregate measures which are further broken down into prime measures [20]. The Business Value Model also explains in detail the metrics associated with these prime measures. BVM supports the Balanced Scorecard, Six Sigma, Economic Value Added, agility and other methodologies. On basis of these three business aspects – demand, supply and support services, we can map and classify KPI accordingly.

The following table summarizes the KPI classification framework.

<table>
<thead>
<tr>
<th>Classification Cluster (C)</th>
<th>Metrics (M) for Key Performance Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic classification (C1)</td>
<td>Strategic (M1) Operational (M2)</td>
</tr>
<tr>
<td>Goal classification based (C2)</td>
<td>Strategic Quantitative (M1) Strategic Qualitative (M2)</td>
</tr>
<tr>
<td>Regulation based (C3)</td>
<td>Regulated or Accounting (M1) Non-regulated or Industry Specific (M2)</td>
</tr>
<tr>
<td>Balanced Scorecard based (C4)</td>
<td>Financial perspective (M1) Customer perspective (M2)</td>
</tr>
<tr>
<td>Business Value Model based (C5)</td>
<td>Demand Management aspect (M1) Supply Management aspect (M2)</td>
</tr>
<tr>
<td></td>
<td>Support Services aspect (M3)</td>
</tr>
</tbody>
</table>

Figure 5: KPI Classification Framework

3.2 BUSINESS PROCESS HIERARCHY TO KPI RELATION

As part of ‘align strategy to business processes’ phase of EBA, a business architect would like to understand and monitor business processes. One can define business processes as a sequence of activities which when performed together brings value to the customer and aims at fulfilling business goals. KPI enables to monitor business process performance at various hierarchy levels in terms of how well the business goal is getting accomplished. Business Processes are hierarchical in nature and here we provide a five level process hierarchy which includes the functional level processes, high level end to end value streams, high level business processes, business workflows and task flows (which are atomic in nature and translate to system requirements). Multiple functions are part of a business unit and multiple business units are part of the enterprise. The KPI classification framework is utilized to associate KPI at multiple levels of process hierarchy in order to monitor process outcome as well as monitor performance of business units and the enterprise itself. Figure 6 summarizes the Process to KPI association.
4. KPI CYCLE: IDENTIFY, DEFINE, ASSOCIATE AND TRACK

Having defined the classification schema for KPI, we provide a four phase approach KPI cycle: identify, define, associate and track for effective utilization of the Composite KPI framework suggested in the paper (refer figure 7).
The initial phase is to identify exactly what to measure – identify goals through goal modeling techniques including BSC and GQM; define related performance measures and objectives. The define phase utilizes the KPI Classification framework and define characteristics of the KPI including the metrics, target range for the metrics and benchmark levels, if any. In the associate phase, KPI are associated to processes, business participants (organization, department, role and system), business offerings (products/services) and programs/initiatives that affect objectives and goals. In the final phase, one track KPI through data collection, data interpretation, reporting as well performing a trend analysis (refer figure 8).

Figure 8: KPI Cycle - Steps

5. CONCLUSION

In this paper, we have presented the Composite Key Performance Indicators Framework through analyzing the fitment of Composite Enterprise Business Architecture framework along with Business Motivation Model and Balanced Scorecard approach. Also, a classification schema for KPI is detailed which allows one to define KPI on a more structured manner and associate KPI at multiple process hierarchy levels. Finally KPI Cycle – identify, define, associate and track, as an approach to effectively utilize the KPI framework is provided along with steps for each phase. Such a KPI framework shall enhance value for enterprise business architecture effort wherein one can monitor and track strategy to process linkage and make informed decisions. The KPI framework also act as a much required feedback and evaluation mechanism for enterprises as it advocates a structured approach for tracking and reporting KPI. There is scope for future work for developing an effective Process-KPI traceability which help shall bundle all the operational KPI from task level to form a strategic KPI at a value stream level. Such a traceability map shall definitely help business to monitor strategy execution in a much improved way.

REFERENCES