

Performance Management Systems: Conceptual Modeling

Dmitry Isaev

Business Analytics Department
Higher School of Economics (HSE)
Moscow, Russian Federation
disaev@hse.ru

Abstract. The aim of the paper is to develop a methodological approach to conceptual modeling of performance management systems. For these purposes such systems are considered as means of information support of corporate governance and strategic management and include such components as analytical methods, management processes, information systems and personnel competences. As a result, a modeling approach based on functional blocks, modules and information flows is proposed, and a conceptual model of a generic performance management system is developed. The model consists of four aggregative functional blocks (strategic analysis and strategic choice, management by key performance indicators, corporate planning and budgeting, consolidated financial reporting) and may be considered as a reference model for different types of organizations.

Keywords: performance management system; strategic management; conceptual modeling; functional modules; information flows.

1. Introduction

In the modern economic environment performance management systems (PMSs), as means of information support of corporate governance and strategic management, become more and more important both for commercial companies and non-for-profit organizations. At present many organizations try to develop and use different types of analytical methods, business processes and applied information systems. However, up to now any holistic, strategy oriented methodology for design, implementation and utilization of PMSs is not available.

One of the first steps towards a comprehensive methodology of PMSs development is an approach to conceptual modeling of such systems. In turn, this approach may be applied for developing of a generic conceptual PMS model, representing general (i.e. common for different entities and industries) features of performance management systems. Such model may be considered as a reference model and may be useful for developing of specific PMSs of individual organizations.

2. Background

A concept of performance management system (PMS) is relatively new in management theory and practice. One of the possible definitions of this term was formulated by Ferreira and Otley: PMS is “the evolving formal and informal mechanisms, processes, systems, and networks used by organizations for conveying the key objectives and goals elicited by management, for assisting the strategic process and ongoing management through analysis, planning, measurement, control, rewarding, and broadly managing performance, and for supporting and facilitating organizational learning and change” [5]. Similar definition was developed by Business Performance Management (BPM) Standards Group: performance management is “a methodology to optimize the execution of business strategy that consists of a set of integrated closed-loop, analytic processes, supported by technology that address financial as well as operational data. BPM enable a business to define, measure and manage its performance against strategic goals. The core financial and operational processes of BPM include planning, consolidation and reporting, analysis and the deployment of linked key performance indicators (KPIs) throughout an organization” [4]. There are some other definitions

proposed by academic writers, business analysts and consultants, which consider PMS as a comprehensive management system that covers a wide range of aspects of strategic management and corporate governance.

One of the most important components of PMS is an informational aspect. Its importance brings to another treatment of performance management system – as a kind of management information system. Thereupon a definition of PMS as “a set of methods, processes, information systems and personnel skills, focused into the tasks of gathering, reconciliation, storage, analytical processing and presentation of information, which is critical for an organization’s information transparency and strategic decision making performed by external and internal stakeholders” was proposed [6].

At present there are a number of considerable developments related with PMSs. The examples are: codes of corporate governance [3, 7], the concept of Enterprise Architecture (EA) [8], developments in project management [2] and business analysis [1], as well as analytical software developed by leading IT companies. Each of these developments should be taken into consideration for design and implementation of performance management systems.

3. Modeling Approach

Conceptual design of PMS should be based on a functional modeling approach. The approach has some similarity with a well known IDEF methodology, but as opposite to IDEF it represents a ‘high-level’ framework, taking into consideration only general principles and characteristics of PMSs. The main elements of the conceptual model are:

- functional blocks – sets of functions that are related with generic stages of strategic management process;
- functional modules – more detailed objects within functional blocks, which provide one or several similar functions;
- information flows – connectors (arrows) representing data movements between different PMS functional modules (internal flows) and between PMS and external sources and recipients of information (external flows).

4. Conceptual Model

Conceptual model of typical performance management system consists of four functional blocks, which represent major stages of strategic management process.

The four blocks are associated with the following functional areas:

- strategic analysis and strategic choice;
- management by key performance indicators;
- corporate planning and budgeting;
- consolidated financial reporting.

4.1. Strategic Analysis and Strategic Choice

The functional block of strategic analysis and strategic choice is associated with collection and evaluation of all the information, which is necessary for strategic planning and decision making. In fact, the block is relevant to all the stages of strategic management process, including external and internal strategic analysis, corporate appraisal, strategic options generation, evaluation and choice, strategy implementation, feedback control. For these purposes the block receives relevant information from a wide range of data sources, both external (different sources of information situated outside an organization) and internal (all the other PMS functional blocks, accounting systems, other management systems within an organization). Outputs of the block are used by some other PMS functional blocks, in addition some of analytical information is to be presented to external stakeholders.

The functional block of strategic analysis and strategic choice contains the following functional modules:

- monitoring;
- forecasting;
- goals setting;

- corporate appraisal and positioning;
- strategic options generation;
- strategic options evaluation;
- strategic options choice;
- targets setting.

Monitoring module provides a regular process of gathering, structuring, generalization, analytical processing and presentation of information about events and trends, which are relevant to strategic development of an organization and to its environment. The role of monitoring is associated, first of all, with external and internal analysis. However, monitoring is also necessary for feedback analysis and control purposes, for example for analysis of targets achievement and fulfillment of corporate plans and budgets.

Inputs of the module are:

- environmental information (comes from multiple external data sources);
- accounting information (comes from accounting systems, ERPs and other sources of management information);
- qualitative information (comes from multiple sources of management information);
- results of targets achievement analysis (come from the functional block of management by key performance indicators);
- results of plans / budgets fulfillment analysis (come from the functional block of corporate planning and budgeting);
- consolidated financial reporting (comes from the functional block of consolidated financial reporting);
- consolidated management reporting (comes from the functional block of consolidated financial reporting);
- results of consolidated reporting analysis (comes from the functional block of consolidated financial reporting).

Outputs of the module are:

- non-financial corporate reporting (presented to external stakeholders);
- structured monitoring information (transferred to the modules of forecasting, goals setting, corporate appraisal and positioning).

Forecasting module if relevant to the task of estimation of future values of key business indicators; these estimations are necessary for making judgments about projected position of an organization. Forecasting relies on certain source information – historical data, assumptions, estimated probabilities. All the tasks of forecasting may be classified into two groups – forecasting of external environment and forecasting of an organization's performance. For definition of projected values of indicators different methods and mathematical models may be applied.

The only input of the module is structured monitoring information that comes from the monitoring module. The only output is forecasting information that is transferred to the module of corporate appraisal and positioning and to the functional block of corporate planning and budgeting.

Goals setting module is responsible for definition of global long-term goals of an organization and for detailed elaboration of the organization's mission and vision. To a considerable extent, goals setting is an informal process. Nevertheless, this process is also based on information about both environment and an organization, i.e. on monitoring data.

The module has two inputs:

- structured monitoring information (comes from the module of monitoring);
- results of corporate appraisal and positioning (comes from the corporate appraisal and positioning module).

The only output of the module is a set of corporate goals that is transferred to the module of corporate appraisal and positioning and to the module of strategic options evaluation.

Corporate appraisal and positioning module is relevant to determination of a gap between targeted and projected states of an organization in future. This task is associated with structuring and generalization of results of external (environmental) and internal (organizational) analysis, as well as with analysis of

forecasting information. Finally corporate appraisal allows developing strategic initiatives for corporate development.

Inputs of the module are:

- structured monitoring information (comes from the module of monitoring);
- forecasting information (comes from the module of forecasting);
- corporate goals (come from the goals setting module);

The only output of the module represents results of corporate appraisal and positioning that are transferred to the modules of goals setting, strategic options generation, strategic options evaluation and targets setting.

Strategic options generation module is responsible for definition of global strategic initiatives – large-scale projects, development programs and other undertakings that have a strong influence on an organization as a whole and may favor the achievement of its strategic goals. As usual, strategic options generation is a creative process. On the other hand, managers and consultants involved in his process rely on certain analytical information.

The only input of the module is a set of results of corporate appraisal and positioning (comes from the module of corporate appraisal and positioning), the only output represents feasible global strategic options (transferred to the module of strategic options evaluation).

Strategic options evaluation module allows estimating possible influence of each strategic option on general goals of an organization, as well as availability of appropriate resources. For this purpose different methodological approaches (strategic management accounting, corporate finance models, peer review) may be applied.

The module has three inputs:

- feasible global strategic options (come from the module of strategic options generation);
- corporate goals (come from the goals setting module);
- results of corporate appraisal and positioning (come from the module of corporate appraisal and positioning).

The only output of the module contains relevant information for the choice of strategic options that is transferred to the module of strategic options choice.

Strategic options choice module is responsible for definition of a set of strategic options (global initiatives) selected for practical implementation. The rest of options under considerations are to be either rejected, or postponed. The choice is based on the results of evaluation of the options. By turn the set of options chosen becomes a base for definition of corporate targets and for formulation of more detailed undertakings.

The module receives information for strategic options choice from the module of strategic options evaluation. The output of the module represents a set of strategic options for implementation that are transferred to the targets setting module and to the functional block of management by key performance indicators.

Targets setting module allows to define a set of specific targets that (opposed to global goals) are measurable, quantified and time-bounded. Targets are defined relying on the results of corporate appraisal and positioning, taking into consideration strategic options selected for implementation. The targets are used as a starting point for development of key performance indicators and scorecards.

The module has two inputs:

- results of corporate appraisal and positioning (come from the module of corporate appraisal and positioning);
- strategic options for implementation (comes from the module of strategic options choice).

The output of the module represents a set of top-level targets that are transferred to the functional block of management by key performance indicators.

4.2. Management by Key Performance Indicators

The main task of management by key performance indicators is formalization of corporate strategy and expression it in terms of specific metrics (key performance indicators, KPIs). In aggregate KPIs express

strategic objectives of an organization and may be treated as reference points for development of different units and divisions.

The appropriate functional block of the model is relevant to such stages of strategic management process as strategy implementation (developing of KPIs), control (recording the gaps between targets and actual results) and strategic analysis (investigation of causes of these gaps). The block has relations with two other blocks of the performance management system (the block of strategic analysis and strategic choice, the block of corporate planning and budgeting) and with accounting systems.

The block contains the following functional modules:

- key performance indicators setting;
- development scenarios generation;
- development scenarios evaluation;
- development scenarios choice;
- targets achievement analysis.

Key performance indicators setting module performs a hierarchical decomposition of top-level metrics to a set of particular interrelated indicators. Such approach allows to deploy corporate objectives to all the management levels and to focus the efforts of business units and departments to implementation of corporate strategy. For this task the Balanced Scorecard methodology or similar approaches may be applied.

The module has two inputs:

- top-level targets (come from the functional block of strategic analysis and strategic choice);
- strategic options for implementation (also come from the functional block of strategic analysis and strategic choice).

The only output of the module represents a set of target values of key performance indicators that is transferred to the modules of development scenarios generation, development scenarios evaluation and targets achievement analysis, and also to the functional block of corporate planning and budgeting.

Development scenarios generation module is responsible for description of specific activities aimed at different tasks of business development. As opposite to global strategic initiatives such activities do not have any large-scale impact on the organization, they likely represent a set of tools, by means of which global projects and programs are being implemented.

Like strategic options generation, the process of scenarios development has a creative nature and to a considerable extent relies on knowledge, managerial competences and best practice.

Inputs of the module are:

- strategic options for implementation (come from the functional block of strategic analysis and strategic choice);
- target values of key performance indicators (come from the key performance indicators setting module).

The only output of the module represents a set of possible development scenarios that are transferred to the functional module of development scenarios evaluation.

Development scenarios evaluation module takes part in the procedures of assessment of the scenarios generated, which is necessary for selection of scenarios for implementation. Such assessment is executed in terms of a set of the organization's key performance indicators. The evaluation is associated with discover of positive or negative influence of the scenarios on target values of KPIs. Thereby it is possible to estimate to what extent one or another scenario may be considered as compliant to the targets of the organization.

The module has two inputs:

- possible development scenarios (come from the module of development scenarios generation);
- target values of key performance indicators (come from the key performance indicators setting module).

The output of the module represents the results of development scenarios evaluation, this information is transferred to the module of development scenarios choice.

Development scenarios choice module allows to describe a set of scenarios (one basic and few additional) that should be implemented to corporate plans and budgets. The basic scenario is considered as the most probable, the additional scenarios rely on less probable assumptions.

The module receives information about results of development scenarios evaluation (from the functional module of development scenarios evaluation). The output of the module represents a set of development scenarios (one basic and several reserve scenarios) for implementation. This information is transferred to the functional block of corporate planning and budgeting.

Targets achievement analysis module is responsible for statement of deviations between target and actual values of key performance indicators, as well as for discovering causal factors clarifying such deviations.

The module has two inputs:

- target values of key performance indicators (come from the key performance indicators setting module);
- accounting information (comes from accounting systems, ERPs and other sources of management information).

The output of the module represents results of targets achievement analysis that are transferred to the functional block of strategic analysis and strategic choice.

4.3. Corporate Planning and Budgeting

Corporate planning and budgeting is one of the key elements of the management system, because it plays a role of a link between strategy and current activities of an organization. That's why corporate planning and budgeting should be integrated with a number of other management systems. It is important to distinguish corporate level planning and budgeting, which involves the whole organization, from current financial and operational plans that are short-term and local in nature. Both planning levels are necessary, but only corporate level planning may be considered as an element of performance management.

This functional block is relevant, first of all, to strategy implementation, because it provides development of corporate plans and budgets as a base for detailed operational planning. However this block also deals with the processes of control (determining the deviations between planned and actual values) and strategic analysis (investigation of causes of these deviations).

The block contains two functional modules:

- plans / budgets drawing up;
- plans / budgets fulfillment analysis.

Plans / budgets drawing up module may be considered as a principal element of the functional block. It is responsible for drawing up of long-term corporate plans (in operational terms) and budgets (in financial terms). Subsequently corporate plans and budgets become a base for detailed planning within ERPs and other management systems.

Inputs of the module are:

- forecasting information (comes from the functional block of strategic analysis and strategic choice);
- development scenarios (basic and reserve) for implementation (come from the functional block of management by key performance indicators);
- target values of key performance indicators (come from the functional block of management by key performance indicators);
- accounting information (comes from accounting systems, ERPs and other data sources).

The output of the module represents a set of corporate plans and budgets that is transferred to the module of plans / budgets fulfillment analysis, to the functional block of consolidated financial reporting and to management systems responsible for operational level planning (incl. ERP systems).

Plans / budgets fulfillment analysis module is associated with statement of deviations between planned and actual values of planning / budgeting items, as well as for explanation of causes of the deviations.

The module has two inputs:

- corporate plans and budgets (come from the plans / budgets drawing up module);
- accounting information (comes from accounting systems, ERPs and other sources of management information).

The output of the module represents results of plans / budgets fulfillment analysis that are transferred to the functional block of strategic analysis and strategic choice.

4.4. Consolidated Financial Reporting

At present consolidated financial reporting prepared in accordance with certain standards (such as IFRS or US GAAP) is considered as a main informational channel between a company and its stakeholders (first of all, investors). Moreover, for management purposes consolidated statements may be formed relying on management accounting or budgeting information. Such statements are not public, but they are also important for strategic decision making.

- The block contains two functional modules:
- consolidated statements preparation;
- consolidated statements analysis.

Consolidated statements preparation module deals with gathering of individual (i.e. related with certain companies within the group) financial data, reconciliation of this information, processing of the data according certain standard and drawing up of a package of consolidated financial statements. Preparation of consolidated management reporting has some specific features (derived from corporate standards) but in general it is based on similar principles and data processing rules. That's why processes of both financial and managerial consolidation may be combined within common functional module.

Inputs of the module are:

- accounting information (comes from accounting systems) – for consolidation of financial and management reporting;
- corporate plans and budgets (come from the functional block of corporate planning and budgeting) – for consolidation of planning / budgeting information.

Outputs of the module are:

- consolidated financial statements (transferred to the module of consolidated statements analysis, to the functional block of strategic analysis and strategic choice and also presented to external stakeholders);
- consolidated management reporting (transferred to the module of consolidated statements analysis and to the functional block of strategic analysis and strategic choice).

Consolidated statements analysis module provides a range of analytical procedures relevant for information of financial statements. The examples are: structural analysis, analysis of dynamics, ratio analysis.

The module has two inputs: consolidated financial statements and consolidated management reporting (both come from the module of consolidated statements preparation). The only output represents results consolidated statements analysis, this information is transferred to the functional block of strategic analysis and strategic choice.

5. Conclusion

The conceptual model of generic performance management system consists of four functional blocks: strategic analysis and strategic choice, management by key performance indicators, corporate planning and budgeting, consolidated financial reporting. This model represents general features of performance management systems and may be useful for development of individual models for specific organizations.

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