INTELLIGENCE IN STRATEGIC MANAGEMENT

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Summary: *This article describes the software product STRATEG, the product of a complex structure, great possibilities, rich functionalities and complete BSC automation The word STRATEG is not an acronym, but it symbolizes the substance, complex structure and value of the system for decision support system (DSS) in the processes of strategic management. The product is designed and built as a fruit of the long-range project "Decision Support System in Strategic Management".*

Key words: *Business Intelligence, Strategic Management, Decision Support Systems, Performance, STRATEG, ABSC, Achievements, BSC, Organization.*

1. Introduction

Strategic management means, in a broader sense, the process of making complex decisions and undertaking a series of actions in order to formulate and carry out some strategies that will provide competitiveness and the ability of successful communications between the organization and its environment. The process of strategic management can be simply described as a continual change and pervasiveness of the two basic phases: (1) phase of formulating the organization strategy, and (2) phase of carrying out the chosen strategies. Strategy formulating is a process concentrated on decision making about: (1) defining philosophy and mission of the organization, (2) setting goals of the organization, and (3) choice of strategies for effective and efficient goals setting. Carrying out strategies includes decision-making about: (1) bringing face to face the strategy and organization structure and providing management appropriate to the

strategy, (2) development of budget, functional strategies and motivation systems, and (3) control of strategy efficiency in attaining defined goals of the organization. Effective and efficient management has to be necessarily supported by many software products of computer technology, before all, by business intelligence systems (BIS).

2. The theoretical and methodological aspects of strategic achievements

Performance management is the key of organizational efficiency, ingredient of changes; and the organization that are capable of managing their metrics are generally very successful.

However, to measure is not enough. In order to be efficient, managers and organizations have to pay attention from measuring only to the management of actions.

The Balance Scorecard (BSC) is probably the best methodology for implementing the chosen strategies in the organization and measuring strategic achievements (2, 3, 4). BSC means the holistic model of strategy that will enable to every organizational segment, working team and employed person to recognize his/her contribution to the success of the organization. The mutual BSC vision sets the mutual performance model using the holistic approach in connecting, harmonizing and uniting individual efforts in attaining strategic goals of the organization. The necessary condition of successful business performance management is to determine the key relations. The realization of the vision means the sequence of strategic periods when aspiring to

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the formation of the causality-consequence graph oriented from the lower to the higher levels, trying to embody the vision. Achieving the distant strategic goals at the highest hierarchical level means attaining the goals at previous lower hierarchical levels of the goal tree. Therefore, every strategy 'becomes unwrapped', it spreads down through every layers and functions of the organization, but the main guiding principle is the strategy of the organization. Every functional unit in the organization, in accordance with its position in the organizational hierarchy, every team and every individual have the roles and tasks directly or indirectly oriented to attaining distant strategic goals. These indicators characterized and appropriate for some functions, and which of them are common for some teams, groups, organizational units, business units, and the organization on the whole. Therefore, it is necessary to provide the application of the balanced multi-metric approach of BSC methodology in every part of the organization in order to manage suitably, effectively and efficiently in functioning the whole organization. The traditional BSC method operates with four perspectives, or fields, mutually connected in causality and consequence and harmonized: innovation of products and services and human resource development, effectiveness and efficiency of internal processes, experience and relations with consumers and financial performances.

BSC methodology facilitates strategy implementation and long-range goals, enabling the transfer of vision, strategies and goals of the organization into specific, measurable goals and the system of performance measures, contributing in this way to connect the long-range strategic goals with the short-range actions in concentrating the whole organization to carry out strategies and attain the set goals. Connecting vision, strategy and strategic goals with the short-range actions can be reached by: (a) clearing up and transferring vision into specific strategic goals, focusing on the relation of causality and consequence and the driving force of performances; (b) by communicating strategy and its connection with the goals of organization units, teams and individuals; (c) clear determination of strategic goals and targets that should be reached and the identification of critical processes for attaining strategic success, as well connecting strategies with resource allocation; (d) strategic return information; collecting and examining performance data on strategies and de-

fining new strategic initiatives or adapting existing strategies.

The vision is connected with operative activities by the structured group of operating strategies. The strategy is conceived as a hypothesis based on the causality-consequence roles gravitate toward the goals at the lower level that are necessary and sufficient condition in attaining goals at the higher hierarchical level. So formed the tree of set and connected main goals and subgoals, created in the whole organization, is directed "vertically"- to attaining the set of distal strategic goals and it functionally harmonizes and unites the actions leading to embodying the vision.

Strategic goals are photographed into the set of key performance indicators - KPI (Key Performance Factor), that are used for measuring performances to strategies and goals, which are then followed, in those elements understood as critical for successful carrying out strategies and achieving these goals. BSC means that performance management and measuring are carrying out within the context of the set goals. ABSC is a very important standpoint and prerequisite of this methodology and necessity to understand what important in the organization is, and then to measure and control it.

3. Business intelligence solution for strategic management: *strateg*

3.1 Concept of the System

STRATEG is a support decision system in strategic management of the organization. It is the model-based and designed set of procedures for processing and interpreting information for giving support managers in the process of making strategic decisions. The concept of STRATEG is shown in Figures 1. and 2. The system supports suitably and with a lot of functionalities the following: (1) formulating, evaluating and strategy choice, and (2) strategy implementation.

Figure 1. points to the model of strategic management and the main menu of the software product. Figure 2. points to the set of functions and processes of strategic management supported by this software. The analytical powers of the system are huge, thanks to the built corporative Data Warehouse and the methods and techniques of explorative data analysis: OLAP and Data Mining. Data Warehouse, OLAP and Data Mining enable a lot of different analyses: *analysis of consumer behavior* (in order to anticipate the

Figure 1.
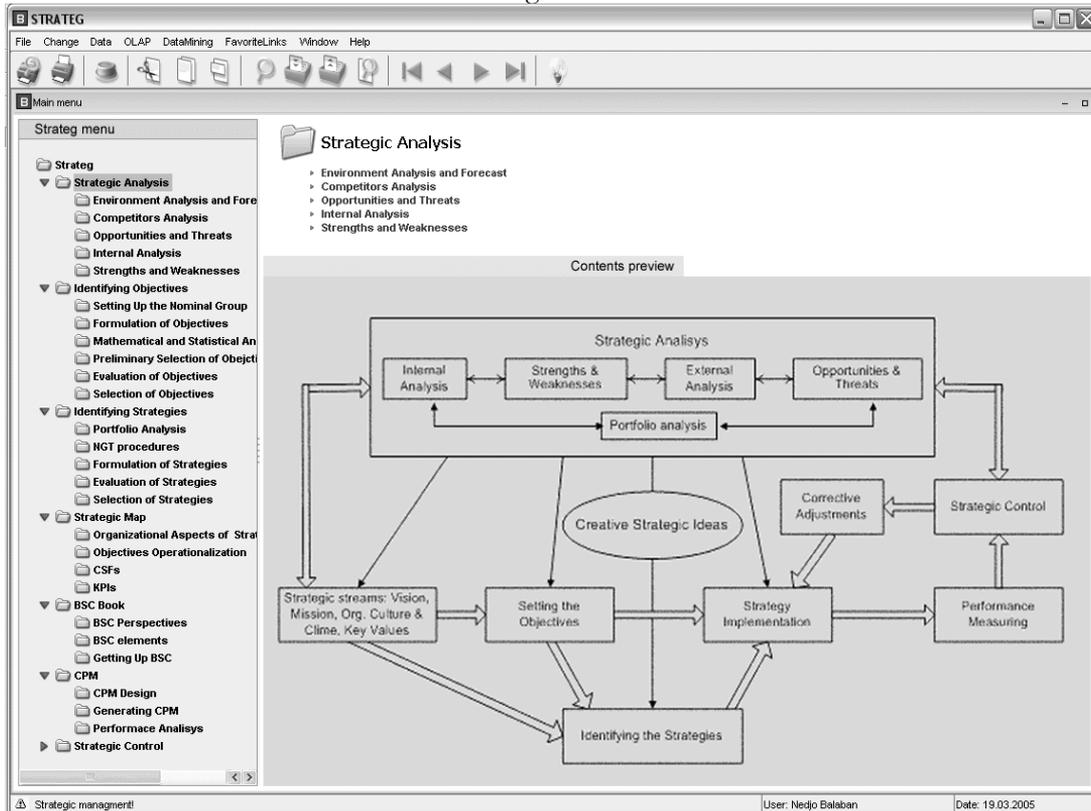
layers of future orders, to advance product/service planning, to acquire new and keep former consumers, and so on), *analysis and sale anticipating, marketing analysis* (segmentation, analysis of special offers, generating the list of the best prospects for target marketing campaigns, and so on), *financial analysis* (profitability analysis): profitability of consumer segments, profitability of individual consumers, the most profitable production lines and products, the most profitable time periods, developing models for price optimization, and so on*), competitiveness analysis, stock analysis, capacity analysis, cost analysis, quality analysis, calculating many hundreds of key performance indicators.* These analyses mean obtaining valuable information from data, which are also connected to the exploration, and together they mean discovering, revealing (new facts, hidden cases, trends, clusters, exceptions) and using information for strategic decision-making. Data exploration means searching big sets of evaluation data, and it is undertaken with a view of explorative and empirical researches.

## 3.2 Functionalities of the System

The functionalities of the system can be seen in about thirty main groups of tasks supported by STRATEG (Figure 3.). The functionality within this context means these dimensions: what, how and with what the applicative soft-

ware solutions support the processes of formulations, evaluations and choice of strategies, and how they enable the implementation of strategies and strategic control.

The functionalities of the system are grouped into the following: (1) strategic analysis: analysis and forecasting of environmental change of the organization, analysis of competitiveness, analysis of evaluation of environmental circumstances, analysis of organization, identification and evaluation weaknesses and powers of the organization; (2) formulating and choice of goals: forming nominal groups, formulation of new goals, mathematical-statistical analysis of proposed goals, preliminary choice of goals, , evaluation of goals, choice of goals; (3) formulating and choice of strategies: portfolio analysis, procedures of nominal group techniques, evaluation of strategies, choice of strategies; (4) strategic map: organizational aspects of strategic map, operationalization of goals, CSF defining, KIP defining; BSC book: defining of BSC perspectives, defining of BSC elements, BSC making; (6) CPM (Corporate Performance Monitor): CPM design, CPM generating, analysis of KIP achievements,; (7) strategic control: problem identification, design of alternative solutions, undertaking of actions, follow-up of the results of undertaken actions.

The source of data and information for strategic analysis are: DW, OLAP, and DM. DW

Figure 2.
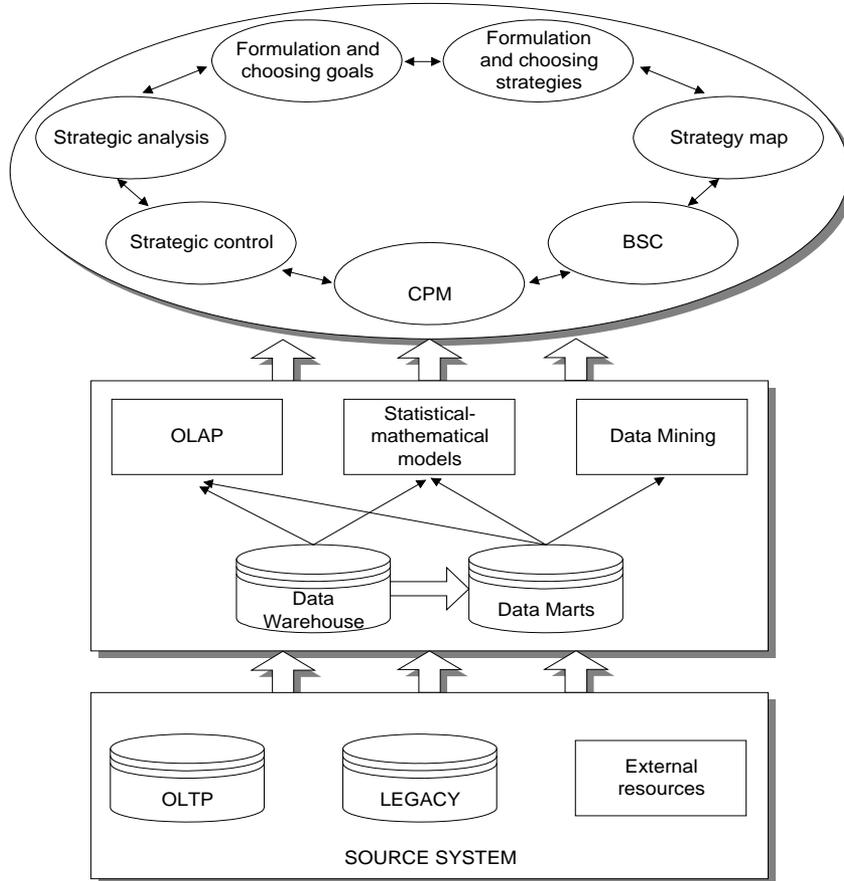
is a complex holistic structure of the union of over twenty data marts. To illustrate this, with a view of having insight into part of the power of analytical solutions of this software, we'll show the application of clustering method in the analysis of selling. We took the set of selling data in the period of a year. On the basis of the variables: geographic region, total amount of bought goods per months, total amount of bought goods per sorts and discount, the segmentation of consumers is done by the clustering analysis according to the neuron net (IBM, DB2 Intelligent Miner for Data). The received clusters and schedules of variables " Profitability" in these segments are illustrated in Figure 4. We can easily catch sight of the shown variable distribution "Profitability" that the biggest profitability is in cluster 0, the least in cluster 2. By the clustering analysis, we identify the group of the most profitable and the least profitable consumers; this represents the valuable information in managing consumer relations.

In interpreting the functionalities of ABSC, we'll point to CPM. The achievements of key performance indicators in relation to the former period and the plan are controlled. That goes

without saying that the inspections of this monitor are carrying out as a combination already defined dimensions. The values of KIP are withdrawn from the base, values for the past period and plan values are already found in the base, and the current values, those for KIP that are quantitative, are updated from DW, while for those that are not quantitative we determine the scales for quantifying them. The KIP monitor has the key role in ABSC, i.e. CPM. It controls the achievements of key performance indicators in relation to the previous period and the plan. The KIP values derive from the analytical base (DW) and they are always calculated with every loading. For example, the Figure 5 illustrates the pattern of CPM. Practical achievements and benefits are obvious: we can notice trends, patterns, layers, deviations, and stimuli for undertaking preventive and corrective actions.

3.3 Architecture and Technology

The development of the software is based on *SOA* architecture (service-oriented architecture), woven from the components and their mutual connections, increases their inter-permeability in this way, improving location transpar-

Figure 3

CORPORATE PORTAL (SELF -SERVICE)					
Strategy implementation (BSC)	STRATEGIC CONTROL	Problem identification	Design of alternative problems solution	Undertaking of actions	Follow-up of results of undertaken actions
	CPM	CPM design	CPM generating		Analysis of achievement
	BSC BOOK	Defining of BSC perspectives	Defining of BSC elements		BCS making
	STRATEGIC MAP	Organizational aspects of strategic map	Operationalization of goals	CSF defining	KIP defining
Strategy formulation	FORMULATING AND CHOICE OF STRATEGIES	Portfolio analyses	Procedures of nominal group techniques	Formulating of strategies	Evaluation of strategies	Choice of strategies
	FORMULATING AND CHOICE OF GOALS	Forming of nominal group (TNG)	Formulation of new goals	Mathematical - statistical analysis of goals	Preliminary choice of goals	Evaluation of goals	Choice of goals
	STRATEGIC ANALYSIS	Analysis and forecasting of environmental change of organization	Analysis of competitiveness	Analysis and evaluation of environmental circumstances	Analysis of organization	Identification and evaluation of weaknesses and powers of organization

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Figure 4

CLUSTER_NEUR

[PROFITABILIY]
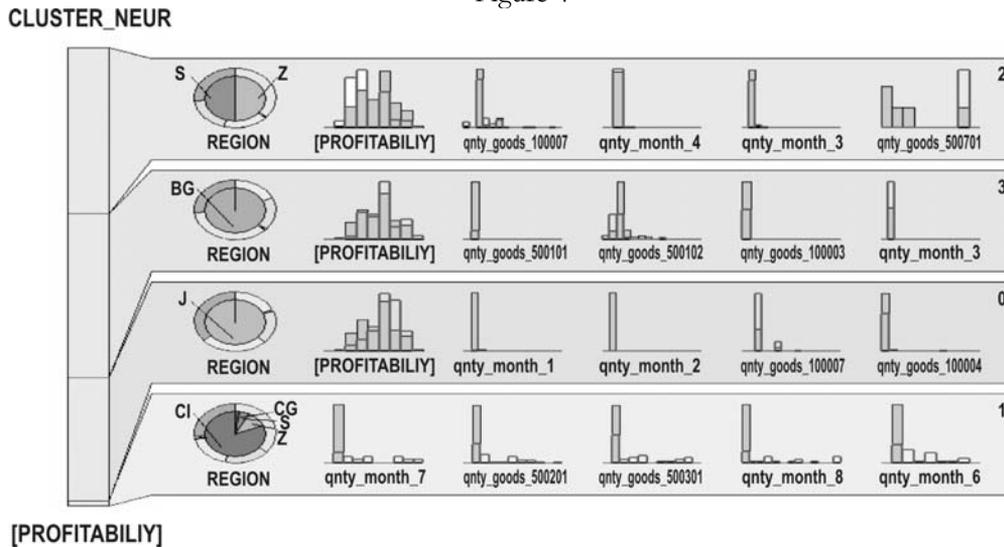
ency. *STRATEG* architecture is multilayer one and, roughly, there are three layers: (a) relational database,(b) business object model, and (c) graphic user interface. The vertical cooperation between these three layers is done by the application of some of technological solutions intended for the cooperation of different software subsystems (JDBC, JRMI-over-IIOP, XML, and similar); for the horizontal cooperation of some similar systems, SOA architecture is employed. From the aspects of application of SOA architecture, the most interesting is the middle layer responsible for implementing several subsystems: object persistence subsystem, business logic subsystem, user interface subsystem, sub-system for interface with other subsystems, security subsystem, and transaction processing subsystem. STRATEG is developed in J2EE technology. The data base server can be: DB2, Oracle, SQL Server, Informix...

The applicative server (WebSphere, or any other) provides interfaces to different types of users. ROLAP MicroStrategy uses DW and OLAP data analyses; IBM DB2 Intelligent Miner for Data is used for Data Mining and statistical data analyses. All the applications are the Internet applications.

Figure 5.

BALANCED SCORECARD										
Shareholder Perspective						**Customer Perspective**				
Key Performance Indicator	Actual	Target	Trend	Difference		Key Performance Indicator	Actual	Target	Trend	Difference
Revenue	$7,000,000	$8,500,000	▼	($1,500,000)		Market Share ($)	76.5%	85.0%	►	-8.5%
Days Sales Outstanding	26	15	►	11		Market Share (Unit Volume)	78.1%	85.0%	▲	-6.9%
Return On Capital Employed	31.0%	30.0%	▲	1.0%		Profit Per Customer	$16,800	$20,000	▼	($3,200)
Operating Cash Flow	$874,680	$1,000,000	►	($125,320)		% Revenue From New Customers	13.7%	15.0%	►	-1.3%
Debt-To-Equity Ratio	1.88	0.87	►	1.01		Average Discount Rate	7.8%	10.0%	▼	-2.2%
Price-To-Cash Flow Ratio	15.45	15.70	►	-0.25		Delivery On Documented Requirements	89.1%	100.0%	▼	-10.9%
Internal Business Processes						**Learning & Growth Perspective**				
Key Performance Indicator	Actual	Target	Trend	Difference		Key Performance Indicator	Actual	Target	Trend	Difference
Revenue Per Employee	$933	$1,000	►	($67)		Return On Compensation	12.0	10.0	▲	2.0
Average Machine Downtime	4.9%	1.0%	►	3.9%		Employee Turnover Rate	15.0%	5.0%	►	10.00%
On-Time Delivery Rate	64.7%	100.0%	▼	-35.3%		Absentee Rate	4.6%	2.0%	►	2.60%
% Internal Help Desk Calls Resolved	97.2%	100.0%	►	-2.8%		Average Tenure (Years)	3.7	3.5	►	0.2
Lead-To-Order Conversion Rate	83.6%	85.0%	▲	-1.4%		Average Performance Score	21.0	25.0	▼	-4.0
Inventory Turnover	7.3	8.0	▼	-0.7		# Training Hours Per Employee	3.7	3.5	►	0.2

4. Conclusion

The measuring of performances is one of the most important links on the chain of strategic management: from strategic analysis to strategic control. Information got by CPM, as part of ABSC, enables improving in carrying out the chosen strategies; evaluation of correct estimation of strategic alternatives and strategy choice; evaluation of the chosen strategy; set goals reforming; better understanding of faveourable and negative circumstances of relevant and macro organizational environment; better understanding powers and weaknesses of the organization and some of its parts, and reforming the mission and philosophy of the organization. ABSC enables managers a reliable anticipation and problem identification that can hinder in attaining goals, design of alternative problem solution, specification and description of preventive and corrective actions, follow-up and evaluation of results of the undertaken actions.

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POSLOVNA INTELIGENCIJA U STRATEGIJSKOM MENADŽMENTU

Rezime: *Ovaj članak opisuje softverski proizvod STRATEG, koji ima složenu strukturu, velike mogućnosti, bogate funkcionalnosti i kompletnu BSC automatizaciju. Riječ STRATEG nije akronim, nego simbolizuje suštinu, složenu strukturu i vrijednost sistema za podršku odlukama (DSS) u procesima strategijskog menadžmenta. Proizvod je projektovan i izgrađen kao rezultat dugoročnog projekta "Sistem za podršku odlučivanju u strateškom menadžmentu".*