MANAGEMENT ACCOUNTING AND REAL-TIME BUSINESS DECISION MAKING

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Abstract. *The article presents research on the interrelations of management accounting and business intelligence. This paper brings up some methodological issues within the management accounting role in decision making. Management accounting prepares the information base which reflects all aspects of enterprise activities and therefore can be used for analytical purposes. Business intelligence serves as an enabling tool for efficient enterprise management.*

Key-words: *management accounting, business intelligence, business analytics, real-time decisions, performance analytics.*

JEL classification*:* M10, M15, M41

1. Introduction

Issues with analytical data storage and processing are becoming more and more relevant at this day. In addition to the opportunity of working with a single source of information, managers and analysts should be provided with convenient means of data visualization, aggregation, search, trends and forecasting. Despite the variety of analytical activities, data mining technologies can be identified, each of which corresponds to a specific set of tools. Analytical work within an organization is relatively diverse and depends on the nature of tasks, organizational characteristics of the company, the level and degree of readiness of analysts. At present, there can be distinguished four main types of analytical work: standard reporting, ad hoc queries, multidimensional analysis, and data mining.

The goal of this paper is to reveal the interaction between management accounting and business intelligence, and to show how top management can benefit from it. The materials in this paper are organized into two parts on management accounting methodology and interrelations of management accounting and business intelligence, respectively.

2. Management accounting and its role in decision making

Management accounting represents one of the activities in a management system. Its mission is to provide comprehensive information for decision making and to implement best business practices. In accordance with the mission, the goals of management accounting are to provide managers with operational and financial accounting information, necessary for the analysis of the financial performance of a company, optimal decision making, and monitoring the decision implementation.

In conformity with the main goal of the Association of Accountants and Financial professionals in Business (IMA)m [1] the work of management accountants and financial professionals is essential to financial management, organizational development, business decision making, and the achievement of strategic tasks. Their roles and responsibilities include: managing functions that are critical to business performance; supporting organizational management and strategic development; providing accurate and insightful information for more efficient decisions; ensuring that organizations operate with integrity and proper governance planning for the long-term and helping to ensure sustainability; safeguarding the interests of the organization and its key stakeholders.

Proponents of management accounting traditionally separate it from accountancy, the fiscal objectives from the management requirements, the external users from the internal and etc. However, in reality, accountancy historically has borne an administrative burden. In enterprises which have not lost the experience of a command economy, the accounting books have been accumulating the cost information according to the elements, items, places of origin, and have been forming the cost of production according to the calculation groups. Enterprises applying the normative method of accounting have almost up to 90%

of their costs and cost estimation calculated a day after the release of a batch of products or services. Such a management orientation of accounting is an exception rather than the rule. Fiscal targets impose their specification on the process of business transaction recording: there appear complex contractual schemes and minimization of taxes within the legislative framework . In addition, the principle of circumspection and the requirements of documentation of business transactions, in practice, lead to the fact that accounting records appear later in a few weeks, and even months after the reporting period. Thus, taking accounting as the main source of information for managers is not acceptable. Therefore, within the departments of enterprises and companies, either spontaneously or under a centralized leadership, operative accounting is organized to monitor the contracts and relationships with contractors, the movement of current assets, receipts and payments, etc. A special feature of operative accounting is the focus solely on management objectives, as well as the use of non-documented sources, forecasted assessments, etc. Any form of accounting and reporting is simply a mechanism to inform about various aspects of a company's activities. The difference between various kinds of accounting is only the variation of the information needs of the users of this information. Information flows, typical for companies with an effective system of an accounting process, show clearly that the main users of accounting information are the managers. They need both internal management information and financial information to make economically balanced business decisions. Tax declarations also require the analysis for a possible optimization of tax payments or decisions regarding the qualifications of tax experts preparing those statements.

The external users of financial statements - current and potential investors, creditors, shareholders and other stakeholders have access to financial statements prepared and audited by independent experts. On the basis of this analysis, an investor will make a decision on the desirability (or undesirability) of making an investment in the reporting enterprise; a bank will make a decision on the possibility of providing a loan; a shareholder will make a decision on possible dividends, etc. Finally, the state fiscal authorities only need the tax reporting information on those tax payments, which the state can reasonably get from the company.

Management accounting as a system of intra-firm management includes four types of accounting: accounting (conventional), operational (operative), financial, and statistical, each having its own specific features and has certain forms of reporting. At the same time, in connection with the consolidated property, management accounting is carried out for all the companies integrated by a unified title of ownership, and management decisions on global problems of the financial and economic activities are taken into consideration at the level of the parent company. The difficulty often lies in the fact that accounting and reporting standards are elaborated and established on the basis of the national legislation of the host country of the subsidiary, therefore the subsidiary must conduct double financial records - one for the local tax authorities, the other - for reporting to the parent company. Due to this fact, many companies have switched to accounting and reporting in accordance with the international accounting standards, elaborated by specialized international organizations or by the international accounting practice. Joint ventures face similar problems. The capital of joint ventures is owned by entrepreneurs coming from different countries, and they are managed and conduct financial and economic activities on a joint basis.

Management accounting is closely related to other control functions, and above all it is related to planning. Planning is the starting point of the management cycle. Under the determination of the goals and objectives of the financial and economic activities, planning is based on the analysis of economic information, which in turn is based on the economic analysis of the results of the financial and economic activities of the firm, carried out in past, present and future periods. The accounting system has to provide collection, storage, and aggregation of the information, which is necessary for economic analysis.

Modern management can no longer rely solely on the indicators of financial performance. As practice shows, the implementation of the management system, sorted by objectives, in particular the Balanced Scorecard Indicators (Key Performance Indicators) and other methods of business management, among ten key performance indicators of a company, only three are financial, and the other seven are non-financial indicators.

The development of management accounting can be analyzed also in the computer accounting system "1 C" . The 1C system already has the configuration 8.1. «The Manufacturing Enterprise Management». The experience of the implementation of 1C system shows that in most documents of the configuration transactions are at the same time reflected in different types of accounting: managerial, accounting or tax. Such division among the types of accounting is caused by the difference in goals and tasks undertaken by the regular (accounting and tax) and management (operational and financial) accounting.

The above conceptual research leads to the following conclusion: management accounting is the account of the enterprise activity, the main purpose of which is to provide managers with information for the decision making process and decision monitoring. This conclusion shows connections and interrelations between management accounting and business intelligence.

3. Interrelations of management accounting and business intelligence

To implement an effective enterprise performance management (EPM), leaders and managers must be fully aware of the enterprise's activities. Management accounting prepares the information base, which reflects all the aspects of the enterprise activities and therefore can be used for analytical purposes. Modern information and analytical technologies maximize such opportunities. Particularly, broad analytical capabilities provide the application of the business intelligence (BI) concept. EPM for managers is a methodology, BI is the enabling tool. Management needs to be committed to the data driven change process.

The notion "business intelligence" has been introduced by American researcher Hans Peter Luhn, who in 1958 published the article "A Business Intelligence System" in the "IBM System" journal. Luhn presented business as a set of different activities in science, technology, commerce, industry and business support systems as systems that sustain the mental activity or intelligent systems. The word "intelligence" Luhn used to mark the ability to determine the relationship between representations of facts and actions in the interests of problem solving and goal attainment. We believe that the modern grounds of the BI concept should be based on the ideas of N.B. Pakhlin and V.I. Oreshkov described in [10]. Making data analysis, the researcher produces a set of actions and forms the ideas about the nature of a phenomenon described by this data. Mathematical methods are usually used for data analysis. However, the analysis cannot be considered simply as information processing, since after information gathering, the analysis is primarily a tool to verify assumptions and to solve researcher's problems, respectively BI is closely related to modeling [10, p. 20 - 25].

In addition, we can talk about business intelligence in a broad, as well as in a narrow sense. Thus, we support the view of the analysts of the consulting firm Forrester Research [2, p.19]. The wide definition describes BI as the entire data-to-insight process, which includes data preparation (data integration, data quality, master data management, data warehousing). The narrow definition: BI represents last steps in the decision-making process, which is mostly data usage (reporting, ad hoc querying, dashboards, advanced (predictive) analytics, operational BI, process, context, text analytics, in-memory analytics). It should be noted that, according to Forrester Research, even these two options do not cover all the highlights of business intelligence.

The famous Gartner consulting firm [7, p. 1-2] defines the business intelligence and the analytics platform as a software platform that delivers capabilities across three categories: integration, information delivery and analysis. The first category, "integration", includes the following positions: BI infrastructure, metadata management, development tools, and collaboration. Information delivery in BI systems is based on reporting, dashboards, ad hoc queries, Microsoft Office integration, search-based BI, and mobile BI. The third category, "analysis", includes online analytical processing, interactive visualization, predictive modeling and data mining, scorecards, and prescriptive modeling.

Online analytical processing brings an opportunity to analyze data with fast query and calculation performance, using a style of analysis known as "slicing and dicing" and applying the "what if" model. Interactive visualization is aimed at a more efficient display of data by using interactive pictures and charts, instead of rows and columns.

The launch point for mining is a data warehouse which is populated from a enormous number of sources, including ERP databases, websites, call centers, etc. The Loudhouse research, conducted by SAP, has showed [6, p.11] that alongside the recent increase in the volume of data available to and collected by organizations, and the relatively recent ability to make sense of that data with a focus on the future, predictive analytics enters the mainstream of business intelligence processes. The Loudhouse research also found that with 90% of all of the world's data that has been generated in the last two years, organizations are feeling somewhat overwhelmed by the sheer scale of the data challenge that they face. As data has proliferated, technology vendors have responded by creating more advanced solutions to help organizations process this data and use it to drive their business decisions [4]. This factor also demonstrates that the elaboration of simple analytical tools is required by the end users. The appearance and development of self-service business analytics became a logical response to the needs of end-users. Self-service BA software is

a tool used by people who do not have high technical skills; it lets end users create personalized reports and analytical queries. As an approach to data analytics self-service business intelligence enables business users to access and work with corporate information without the IT department's involvement. SAP research [4] has emphasized that the sophisticated predictive analysis is moving fast from a small group of specialists to a broad spectrum of users and will become ever more valuable across business as a whole.

We also need to emphasize that the Loudhouse research conducted by SAP draws attention to the following important points: that with the rise in data volumes, predictive analytics is on the agenda for many organisations and is becoming an increased focus for investment. The majority (77 per cent) of respondents believe that they have gained a specific competitive advantage through the use of predictive analytics [3] . According to the report, small and medium enterprises (SMEs) need this competitive advantage in an environment that is increasingly crowded and competitive [3]. We find extremly important the Fisher's analytical answer to the following question: "If this innovation can help predict market trends, then what is holding SMEs back [3]?" The answer to this question reveals the current trend of development of business intelligence. According to Fisher getting access to and making sense of the data has, until recently, been seen as a complex and highly-skilled task, delivered by people with advanced degrees in statistics and prior analytical experience. Like any business, SMEs need to make a priority of embedding predictive analytics into all areas of an organisation. To make this possible, it is critical that companies empower their staff with both the skills and solutions to self-service their analytics needs. Skills gaps are common as new technologies emerge, but it is also important to remember that sophisticated predictive analysis is moving fast from a small group of specialists to a broad spectrum of users and will become ever more valuable across the business as a whole". These words actually mean that a new trend in the development of business intelligence is starting to emerge.

Thus, management accounting creates the main part of the information base for predictive analysis. The two basic types of data associated with the mining of enterprise data are static and event data. The ideal data sources for mining are customer behavior data. We also would like to mention two main parts of data for predictive analytics - structured and unstructured data. The Forrester Research's analysis [11] can confirm the following interesting figures: around 30% of all the structured data is used for analytics whereas only 8% of unstructured data is used for it.

The balanced scorecard (BSC) is a EPM tool that is used to align business activities to the strategy of the organization, improve internal and external communications, and monitor organization performance against strategic goals. The Balanced Scorecard concept suggests that presenting information about business performance should come from four different perspectives – Finance, Customer Relations, Education and Internal Processes. All the Balanced Scorecard groups include several key indicators that measure business performance. We consider that the following indicators have to be included in the Balanced Scorecard groups because they systemically reflect the current situation of an organization: Finance (increase of net assets; the ratio of the market price of share to earnings per share; the ratio of net profit to the number of personnel; the ratio of revenue to the total number of employees; increase of the economic value added; cash flow return on investment); Customers (increase in the number of customers; market share growth; the ratio of revenues to the total number of customers; average time spent per customer, or time of one order processing; customer satisfaction index, the number of customers who switched to competitors); Internal Business Processes (the number of returns of products sold because of defects found; labor productivity growth; reduction of administrative costs; acceleration of the turnover of the warehouse stocks; reduction of the stock immobilization by implementing "just in time" method; acceleration of the collection of accounts receivable); Personnel (the ratio of applicants to the number of hired workers; indicators of the employee competence; indicators of employee interchangeability; proposals on business process optimization, inventions and rationalization proposals received from personnel, indicators of the personnel turnover).

BI platforms display BSC indicators or metrics in a dashboard. In management information systems, a dashboard is an easy to read, single page, real-time user interface, showing a graphical presentation of the current status (snapshot) and historical trends of an organization's key performance indicators to enable instant and informed decisions to be made at a glance. Prescriptive analytics aimed at the selection of the best course of actions. Its goal is to simulate various outcomes in order to choose the best one. Prescriptive modeling, simulation and optimization select the correct value of a variable based on a set of constraints for deterministic processes, and modeling outcomes for stochastic processes.

The emerging area of business analytics can potentially extend the domain of management accounting to the comprehension of business dynamics and provide more solid inputs for managing its performance [5]. Silvia, Moeller, and Schlaefkec have introduced performance management analytics (PMA) as the next extension in management accounting research and practice. They have defined PMA as the understanding of relevant business dynamics through the use of data and analytical methods, and consider PMA as a relevant part of performance management systems and moreover as the missing link between the existence of highly sophisticated performance management systems and their effective implementation. Silvia, Moeller, and Schlaefkec argue that if relevance and effectiveness of performance management analytics will arise, education on management accounting would have to be redesigned and integrated with performance analytical topics and new skills and competences in IT and analytical methods might be required for management accountants. In order to create the basis for the effective application of performance management systems they should be designed and used within a specific or explicit business model and related with the information needs of key success business processes [5, p.15].

Silvia, Moeller, and Schlaefkec's study draws attention to the fact that "If relevance and effectiveness of performance management analytics are increasing, there will be consequences for teaching and training. ... Especially education in management accounting would have to be redesigned and integrated with performance analytical topics. Furthermore, new skills and competences in IT and analytical methods might be required for management accountants" [5, p.2, 15]. Labor market already confirms the above conclusion. Our analysis of the labor market announcements has found many requests coming from leading enterprises regarding the preconditions that employers stipulate when hiring new specialists for the management accounting departments, which include competency in management accounting and analytics. Such positions are sometimes called business-analysts. Responsibilities of the requested specialists include: elaboration of methodical materials on budgeting and technical-economic planning of the company , management accounting, motivation system of the personnel; measuring efficiency of new technology implementations; organizational and technical measures aimed at improving the enterprise competitiveness; elaboration of algorithms for measuring the companies' performance; monitoring the implementation of approved methodologies and algorithms of management accounting department activities and enterprise as a whole; elaboration of unified documentation and economic standards , the implementation of automated processing the planning and accounting information; methodological support and testing the work on the enterprise's automated business processes. Such deep professional requirements presented to specialists are also very serious and include knowledge of technology of the company's management, technology of the budget management, accounting and management accounting, economic and financial analysis skills, experience in elaborating methodical documentation (Regulations on budget management , on management accounting , etc.), excellent Microsoft Office skills, skills in obtaining financial information from 1C (version 7 and 8), and experience of working with large amount of data.

Forrester Consulting examined the total economic impact and potential return on investment that enterprises may achieve by deploying real-time decisions (RTD) [8]. The research carried out found that RTD significantly increases revenue by improving closure rates and transaction values. One existing RTD customer in the financial services industry experienced the three-year-risk-adjusted ROI equal to 986% [8, p.2]. The examined company identified the following benefits: increased closure rate revenue, incremental deal size revenue, greater customer retention and lifetime value, better business intelligence, improved customer services. The factors which affect the financial results of an organization the most are existing revenues/size of the organization; complexity of decisions/problems RTD is addressing; number of projects utilizing RTD.

5. Conclusions

Management accounting is expanding its mission, scope, and control objects. New management accounting tools, techniques, metrics, and approaches are continuously developing. As a consequence of the extreme competition, management accounting has broadened its domain from financial reporting and control to the decision making processes. The current stage of the management accounting development is closely connected to business intelligence technologies.

Companies in a highly connected and hypercompetitive economy require more rapid and sophisticated information and data analysis. Technological development - the appearance of computer networks and supercomputers - has created all the necessary conditions for a more effective support inreal-

time decision making processes, considering the possibility to accumulate large amounts of internal data and immediately obtaining all the necessary operational information, after which to use it in the process of management.

In order to be efficient, the implementation of business intelligence systems should take into account factors that affect the automation of analytical calculations. The experience of accounting automation shows that an organization needs accountants who can work with modern accounting programs. Similarly, organizations should have personnel that have the corresponding skills when applying modern methods of preparation, decision-making and using computer decision support systems.

When extending the domain of management accounting to business performance analytics, new competencies and skills about business intelligence, predictive and business performance analytics are required. If business intelligence is used at all the stages of a company and businesses are able to perform predictive analysis, they succeed and survive in a highly competitive marketplace, by introducing innovations, new technologies and continuing their organizational development.

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