



ICPM'11

CONTEMPORARY AND FUTURE TRENDS IN PRODUCTION MANAGEMENT

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In the text there are minor syntax and stylistic errors.

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16-08-2011

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BUSINESS INTELLIGENCE AS A TOOL FOR KNOWLEDGE MANAGEMENT IN SMES¹

Justyna Patalas-Maliszewska

1. Introduction

The growing interest in knowledge management research has led to a recent proliferation of diverse definitions and perspectives, as well as a limited number of empirical studies. The competitive advantage of companies, especially SMEs, is increasingly being decided by knowledge. Knowledge is a broad concept, embracing both formalized knowledge (explicit) and non-formal knowledge (hidden). Looking at the relationship between data, information, information management and knowledge, should be regarded knowledge as a strategic resource for a company [Senn, 1990]. The application of information systems that support knowledge management in SMEs may offer guarantees of a constant competitive advantage in the market.

Many studies have focused on knowledge management strategies and methodologies from an organizational perspective [Barthelme et al., 1998], [Basu, 1998], [Carayannis, 1998], [Drew, 1999]. Many useful studies on the development of information sharing systems and collaborative tools to support intra-organizational processes and teamwork also exist [Chen and Liang, 1999]. However, both the methodology and functionality of software systems for knowledge management are highly dependent on the characteristics of the process and the knowledge involved.

Strengthening the competitive position of enterprises in the SME sector is certainly being carried out by successful chosen and using of knowledge management tool. It can be assumed that the ability to operate and use knowledge in order to implement objectives of an enterprise is one of the guarantees of business development.

So, the following research problem can be formulated:

There is a given enterprise of an SME sector with defined business processes. Are there the data mining tools dedicated to SMEs, which would be

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suitable to use for business evaluating convenience and opportunities of their usage? If so, how can we management of knowledge, using such tools?

In this article, the author reviews research on knowledge management and the importance of data mining tools for SMEs in an effort to assess the current state of the literature. In chapter three the example of data mining tool (business intelligence) for SME is presented. In chapter four the methodology of implement the BI tool in SME is given. The article concludes with an agenda for future theoretical and empirical research on implement the data mining tools in SMEs.

Big organizations have applied BI (business intelligence) tools perfectly well, however, small business frequently encounter a problem, since majority of data mining tools costs a lot comparing with received income of an enterprises, therefore small business, by necessity to analyse data, use simple spreadsheets. The article gives some suggestion how this problem might be solved.

2. Knowledge management in SME

The enterprises functioning in market economy have to implement changes in their systems of organization and the management that they use. In economic practice, making a decision in an enterprise is conditioned by competitors' action, changing environments factors, e.g. technical progress and results of research works. Added value for SME can be determine as knowledge, employees' skills and abilities, social relation, know-how, and particularly effective investment in intellectual capital. The enterprises which invest in human capital and system of work are achieving competitive advantage because of their workers' readiness to learn and qualify and also thanks to effective information and communication transfers [Edvinsson and Malone, 1997].

The management of knowledge is promoted as an important and necessary factor for organisational survival and maintenance of competitive strength. To remain at the forefront, organisations need a good capacity to retain, develop, organise, and utilise their employees' capabilities.

SMEs are a decisive role in job creation and, more generally, are a factor of social stability and economic development. However, often face the difficulty of raising capital or credit, the Limited Warranty that they are able to offer, as well as restrictions on access to information, notably regarding new technology and potential markets. Small and medium enterprises do not only affect the harmonious development of local and regional, but also respond most flexibly to changing market conditions. For these reasons, they are seen as the main force to promote the competitiveness of the economy and improving the ability to compete in third markets. Strengths SMEs (is clear and simple organizational structure, speed decision-making process, the ability to adapt to the existing → que

demand and creativity. The strictly defined business environment elements that determine the competitive advantage as knowledge management of SMEs can be based on the assumptions of the "knowledge-based economy" (see Fig. 1).

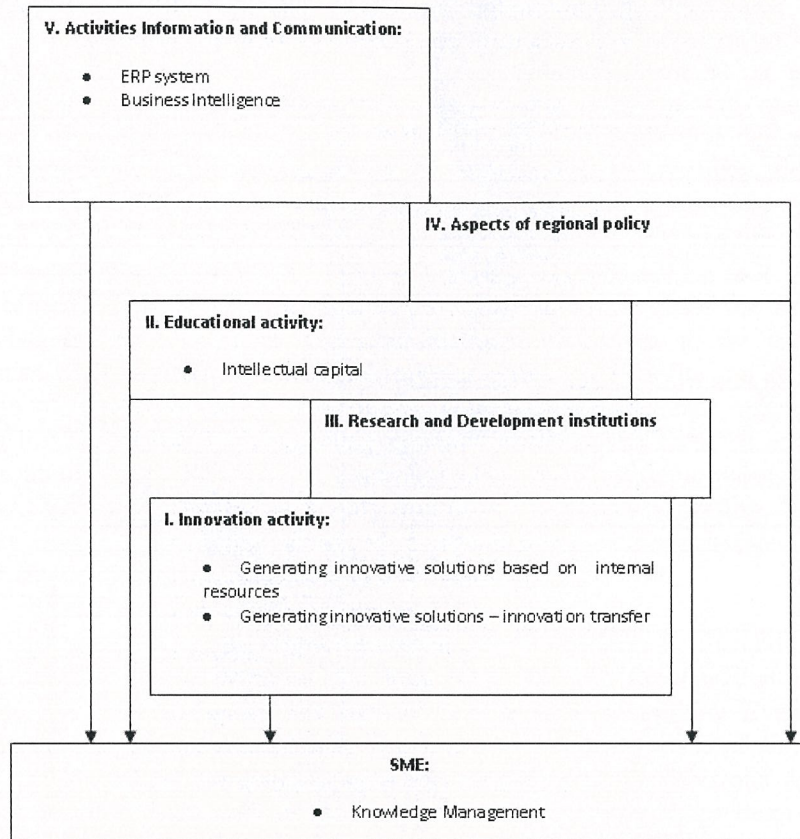


Fig. 1. Determinants of the competitiveness of the SME sector

The specificity of the SME sector makes their competitiveness largely dependent on external factors and the ability to adapt to them. To a large extent, their competitiveness is dependent on their respective host-country's socio-economic policies, including such things as the ranges of possible promotional activities which may enable SMEs to achieve the necessary short-and long-term competitiveness.

Knowledge management in the organization relates to the formulation of strategy in this sense:

- deepening the knowledge of the orientation of the organization's mission,
- power-oriented organizational culture on knowledge,

- selection of the objectives of knowledge and knowledge selection strategies to achieve those goals,
- identification of knowledge gaps and barriers,
- assessment of the knowledge created in the enterprise,
- implementing knowledge strategies: design tasks, roles, processes, information infrastructure. computer technology (see Fig. 2).

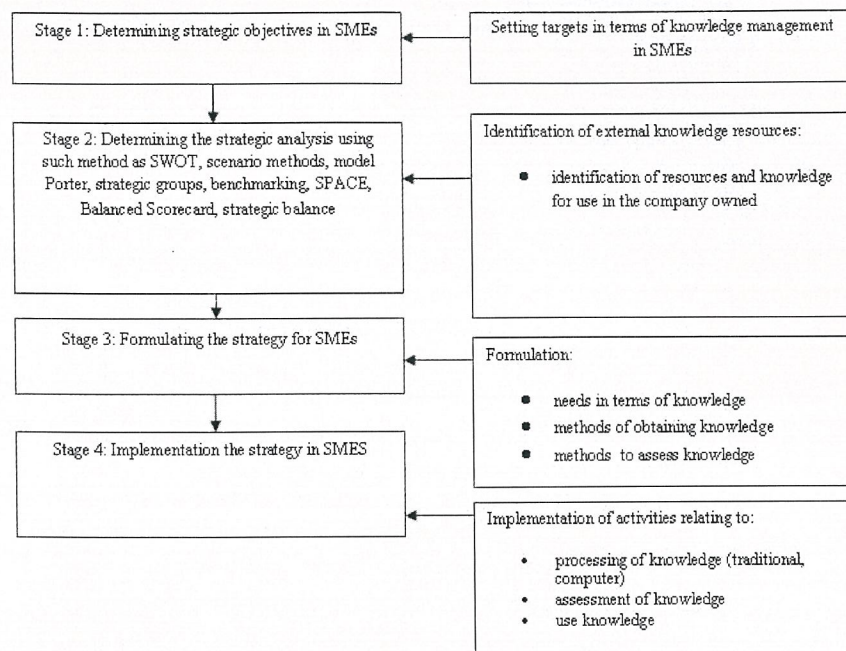


Fig. 2. Model of knowledge management in SME

Implementation of the model of knowledge management (see Fig. 2) in the SME sector requires consistency and understanding the use of two management areas: strategic and knowledge.

The basic prerequisite for improving the competitiveness of SMEs is to conduct a wide range of investment activities. Well-planned, evaluated and executed investments may significantly improve the situation of the company, bad investment decisions and reduce liquidity. Appropriate investment activities in SMEs are carried out on three basic levels: the investment budget, assessing the effectiveness of investment, financial reporting system.

are?

Meaning of the sentence?

The implementation of data mining tool in SME is important, strategic decision for (SME) that determines the further developing of the enterprise.

Data mining in small business is little studied and the majority of the offered products are oriented to big companies. Solomon made a research about the willingness of small business to use high technology. He distinguished a decade of IT fields in which small business planned to invest their money [Solomon, 2005].

crisis → However, how important data mining is for small business is greatly revealed in Rotholz article. The main idea is that data mining can help enterprises to react beforehand to the market changes and to survive easier even during financial crises. It is stated that if SME used data mining tools by themselves they could notice the market changes, their tendencies and various anomalies themselves [Ritholz, 2009].

To effectively implement the Business Intelligence tools (BI), the selected system has to meet the most important business objectives of the investor. Application of BI must bring the organization a number of benefits and assist the operation of almost all areas of business. Transforming data into information replaces the guesswork and conjecture conclusions based on facts. In addition, business intelligence can improve communication between departments of the company. BI should enable not only running a standard reporting. Should primarily allow to perform advanced analysis using statistical forecasting, research trends, the relationship between the search data.

The decision about BI implementation has to be taken correctly. The selected supplier of BI becomes the long term business partner that has to guarantee the developing of the system and on-going support. Eventually changing of the BI (after the faulty implementation) costs a lot of time and money. To formulate the requirements the most important decisions for the enterprise (critical decisions) in the each business area have to be determined (see chapter four).

3. Example of Business Intelligence (BI) for SME

Information is input to knowledge management tools. Knowledge management plays a significant role in the implementation of a corporate strategy, increasing the speed of the decision-making process. The SME sector should also see the need to reduce the risk of wrong decision making and gain cost savings. More and more SMEs are beginning to take action in order to implement and develop knowledge management tools. The success of the enterprise will depend on the level of the development of the techniques and methods used for communicating information and transforming it into knowledge. One solution that allows you to capture, analyze and process data and information is business intelligence.

Business Intelligence:

- information that is analyzed to the point where it is sufficient for the decision,
- a tool for informing the board,
- a means to analyze and assess the market situation,
- a continuous process, covering the entire enterprise,
- a way of thinking,
- a philosophy.

A business intelligence system will operate effectively if it is based on modern information technology. Thanks to it, the management of the information flow, the generation of summary reports, the making of presentations and data visualization can all be performed automatically. Information technology can be regarded as a strategic company resource (if companies set up their business opportunities around ERP, CRM, SCM - that information technology becomes a tactical tool), if there are links of information generated by transactional systems and analytical information with the development of the company. Business intelligence combines the resulting data, and decisions about any strategic and business strategies. An example of a business intelligence solutions for the SME sector is the Comarch CDN XL Business Intelligence tool (BI), a complete system used to manage all the processes within a company. This system also supports the reporting of more than just a corporate database, it can enable the consolidation of the various actors and does not require additional work, or the use of costly and time-consuming external studies. Furthermore, this system allows you to easily create a summary analysis of aggregate data from the sales of many sellers, as well create an analysis for each body separately. Business Intelligence gives you the ability to view reports from anywhere at any time, including such things as:

- the ability to distribute reports to a recipient's email box – subscription,
- access to reports in a web browser - e-bi,
- the ability to view reports on your mobile device - comarch mobile manager.

Sample reports are shown in figures 3-5.

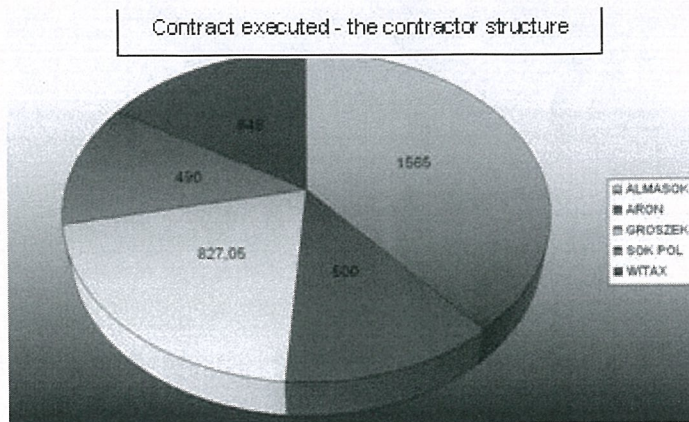
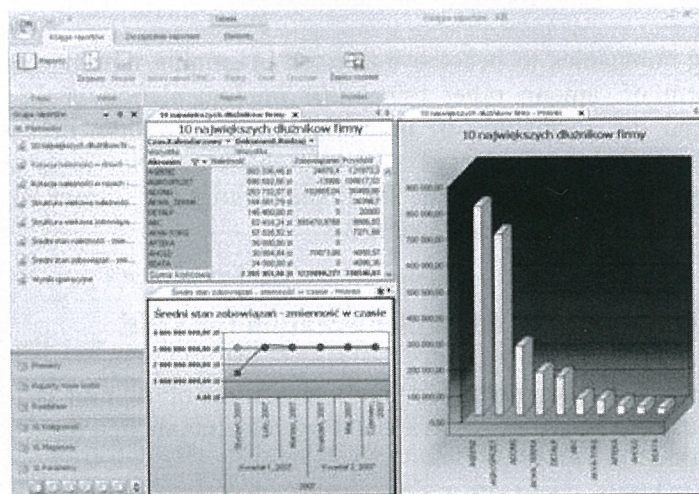


Fig. 3. Example reports using BI

Source: <http://www.comarch.pl/erp/oferta/produkty/comarch-cdn-xl/funkcjonalnosc/raportowanie#bi>



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Fig. 4. Example reports using BI

Source: <http://www.comarch.pl/erp/oferta/produkty/comarch-cdn-xl/funkcjonalnosc/raportowanie#bi>

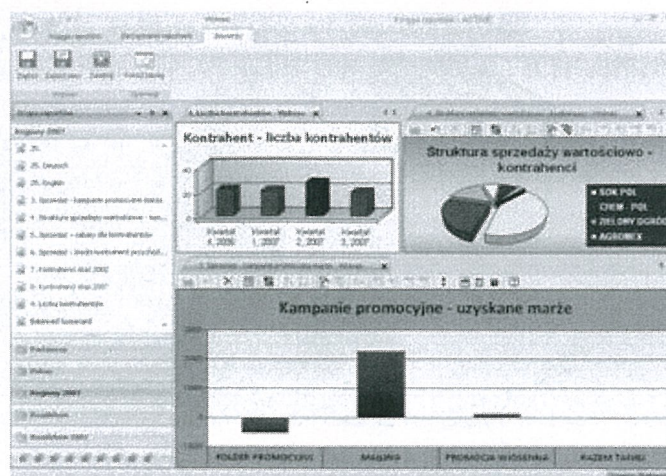


Fig. 5. Example reports using BI

Source: <http://www.comarch.pl/erp/oferta/produkty/comarch-cdn-xl/funkcjonalnosc/raportowanie#bi>

Getting companies to become interested in gaining new business solutions (in the form of, among other things, an implementation of BI, technology transfers and the acquisition of industrial property rights), necessary for the development of their business, is a big challenge. So, it is so important proceeding according to a scheme for implementing the system BI. The author proposes a methodology to implement BI.

4. Methodology of BI implementation for SME

The proposed methodology of implementation of BI tool is based on the optimize business activities by efficient usage of accumulated data (see Fig. 6).

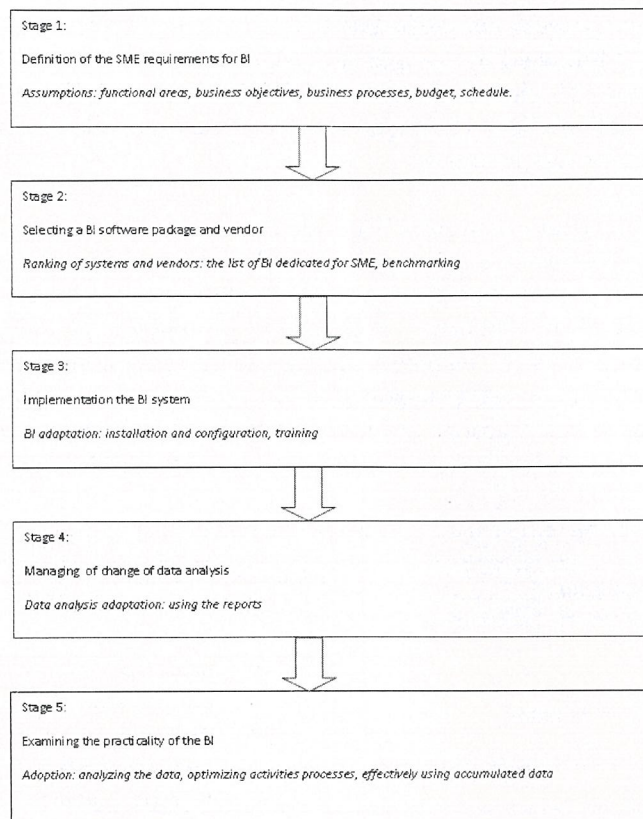


Fig. 6. Methodology of implementation of BI tool

For the small and medium size enterprises (SME) to meet different demands and stand up to the international and local market competition it is necessary to proceed with the oncoming tasks in an efficient and reasonable way, which can be achieved by the systematic analysis of the undertaken tasks in relation to the company organizational and economical ability of their completion. It is somehow imposed by the free market mechanisms, international trade exchange, advancing privatization, introducing of the integration IT management systems and the application of the quality management systems.

The dynamic development of data mining tools for SME witnessed in the recent decade together with their growing sale increase provide the best evidence for the fact that the systems are in demand as a supporting tool in management. Bearing in mind the needs of the market, IT developers customize BI to SME demands.

SMEs that are to make a decision concerning the introduction of BI tool tend to make a pre-evaluation of the efficiency of the very implementation (for example, taking into consideration the level of the user's objectives realization) .

However, the process of efficiency evaluation is very expensive, time consuming and followed by complicated analyzes. Bearing this in mind, there is a demand for developing the criteria of BI efficiency that would diminish the risk of inadequate implementation and, at the same time, allow solving problems which could otherwise be missed.

Successful implementation of BI is determined by achieving a user-defined requirements. The financial perspective is reduced to improve the profitability of the company, to provide liquidity, growth of sales revenue, lower manufacturing costs. Analysis of the indicators is the starting point for planning actions that affect the future of your business. Based on the data contained in the basic financial statements of the company, such as balance sheet, income statement, cash flow, was selected groups of indicators (see Table 1). Improving the size of these indicators is the basis for the decision to implement BI.

Table 1. The indicators assess the functioning of the company

Group of indicators	Indicators describing the economic effects achieved thanks to implementation of the BI
Coefficients of liquidity	<ul style="list-style-type: none"> • current ratio • quick ratio • acid-test ratio • cash ratio • average collection period • total asset turnover
Coefficients of profitability	<ul style="list-style-type: none"> • gross margin • profit margin • operating margin • return on assets • return on equity • return on investment • return on invested capital • return on sales • net profit margin • return on capital employed • return on net assets • internal rate of return
Debt Management Ratios	<ul style="list-style-type: none"> • debt ratio • times interest earned • debt to equity ratio • debt to total funding ratio

Source: Brigham, 1999

Implementation of BI is a costly process and long lasting. Users choosing the data mining tool most often evaluate the system not only from the standpoint of current needs, but also in terms of economic efficiency of investment. This means that

companies can decide to accidental products often inadequate for your needs. Therefore, I propose the new concept of methodology of BI implementation for SME (see Fig.7):

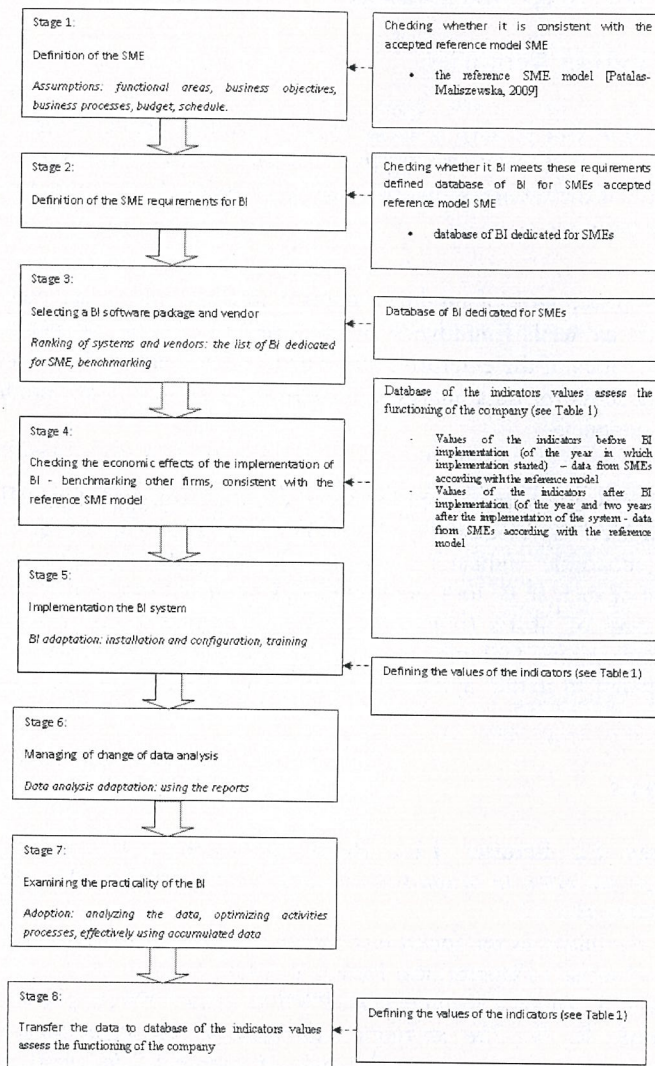


Fig. 7. The new concept of the methodology of implementation of BI tool

Picture could
be greater.
It is hardly
readable.

The research is focused on creating:

- the database of the indicators values assess the functioning of the company: values of the indicators before and after BI implementation (of the year in which implementation started and of the year and two years after the implementation of the system) – data from SMEs according with the reference model,
- database of BI dedicated for SMEs.

When enterprises decide to increase their competitiveness, there is a need to improve knowledge management tool first. The advantage of knowledge management allows the enterprise to achieve competitive advantage.

5. Concluding Remarks

Development of data mining tools, dedicated to SMEs, creates the need to formulate a methodology, that will make an objective assessment of the effectiveness of this tool. Depending on the different needs and priorities of individual users of software efficiency has different meaning.

Using appropriate tools it might be applied to SME which are considering about future prospects as well. Employees of the enterprises can independently evaluate outcomes of activities of the enterprise and make decision easier. It is very important to use data mining tools for data analysis, because organization could predict the market changes, their tendencies.

In this article is given an example of a dedicated BI solutions for SMEs as a tool to manage knowledge. The methodology to implement the tool in the SME is developed and selected economic indicators, which will evaluate the effectiveness of the implementation of such an BI tool, are provided. Conducted research focuses on building a knowledge base of SMEs (objects) because of similar functional areas that have implemented data mining tool and verifying the effectiveness of those decisions. Efforts are also an attempt to define a class of BI in terms of similarity of ongoing business processes.

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Key words: data mining tools for SME, Knowledge Management in SME, Business Intelligence

Abstract: The enterprises functioning in market economy have to implement changes in their systems of organization and the management that they use. Data mining in small business is little studied and the majority of the offered products are oriented to big companies. This work presents approach to the methodology of implementation of Business Intelligence tool, based on the optimize business activities by efficient usage of accumulated data the data mining technologies for SME. Implementation of BI is a costly process and long lasting. This means that companies can decide to accidental products often inadequate for your needs. Therefore, in this article is proposed the new concept of methodology of BI implementation for SME.