

SOFTWARE APPLICATION WITHIN COMPANIES IN PURPOSE OF BUSINESS DEVELOPMENT AND ENVIRONMENT PROTECTION AND SUSTAINABLE DEVELOPMENT

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Abstract—This work presents the effects of software tools` application, such as OLAP, Data Warehouse, Data Mining, applied within intelligent systems` development program in forest company “Lipovica”. The main purpose and the accent of this research is to present the effects of intelligent system concept application on specific supporting field, in decision making and business development, as well as to show these concepts` contribution to protection of the environment and sustainable development, and the wealth of its impact upon the process of management and decision making and upon business development.

Key words—Data Warehouse, Data Mining, Environment protection, OLAP.

I. INTRODUCTION

SOFTWARE application within companies with purpose of business growth with the aim of environment protection and sustainable development, has been the subject of the research conducted in forest company “Lipovica”, whose main field of interest is production and exploitation of wood, [5] Within the company, there are three organized branches with each one having its own defined system of administration. Each of the administration branches has its own data base, both in written and electronic form. Part of the data from each of these bases within each organized part exists in one or more copies. In case the management requires certain information from these branches, the data has to be procured from each of them. Each of the administrative systems will independently collect the data using its own data base, and use it to create the case ready for delivery to the customer. After the customer has received the information, he gets three files, and upon the analyses it can be ascertained that the specific amount of data is identical to and only one part of it specifically concerned with the subject of the demand. After this is done, all three reports must be incorporated into one, containing the insight into what has been demanded. It is only after this action has been taken that the process of decision making begins, the process that originally initiated the need for data collection. This example

makes it evident that as many as three workers must be included into the process, and this requires a certain amount of time to be executed, after which, with their or their manager`s effort (another worker), all the input has to be united into one whole, [7]. This is the example of uneconomical use of time and the employees` overwork in a practically simple task of specific data collection gathered from different parts of the company. The situation described stands to pinpoint a number of manifesting problems: [8].

- 1) *poor information exchange or a total lack of it*
- 2) *multiplication of work*
- 3) *non-consistent information*
- 4) *lack of unified standards*

Unique data base formation users shown in the following Fig. 1.

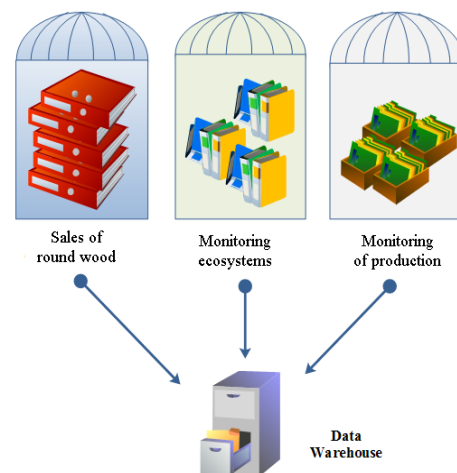


Fig. 1. Unique data base formation, [6].

In order to overcome this problem, by means of IT system introduction, a unique data base is being formed, and this is where all the data is gathered into one place through systematization and optimization, [14] (Data Warehouse), keeping the possibility for each of organized parts to use it independently, if feasible. All the data thus integrated become unique, consistent, with common standards and forms, all of which makes

their protection easier to achieve, [9]. No lost, misplaced, deleted or otherwise unavailable information. Access to integrated data by all the users shown in the following Fig. 2.

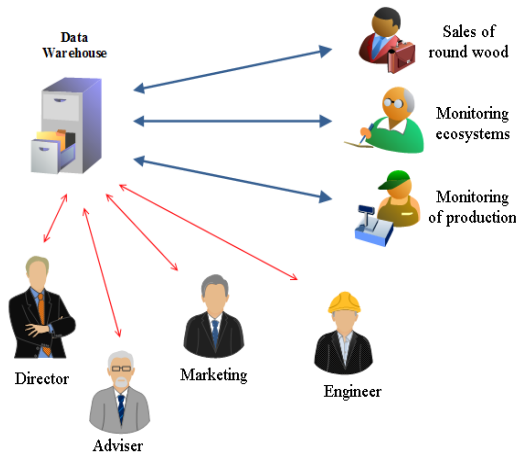


Fig. 2 Access to integrated data by all the users,[5].

The above structure and the means of access lead to yet another concept, which is the access to the data not contained within the file, folder or a group. The data is usually hidden and unavailable until process of filtration is done, which utilizes many horizontally and vertically produced values to pinpoint the one required. The term implies "data mining" from "data warehouse", [4]. It has already been explained through previous demonstration of data collection from different sources and their comparison, organization and filtration according to specific criteria. This has employed and spent certain human and time resources to reach the solution, whereas the utilization of ITC solution, both working hours and days spent in search and data filtration could have been brought down to as much as a couple of seconds, even with the enormous data base in question. In case of even smaller data bases, as with our example, the results would be instantaneous. The same data might as well have been procured by any other employee with privilege of access to the system. Technologically speaking, from individual data bases made inside different organized parts (selling, eco system tracking, growth and the state of forests), we have formed a single interconnected data base (data warehouse) containing all unified data from all the independent bases open for future clients` demands, in case they wish to acquire specific information, [1].

II. EFFECTS OF OLAF REPORT APPLICATION IN „LIPOVICA“ COMPANY

OLAP reporting is actually a way of forming simple and approachable reports through use of large data bases that provide data in very short space of time by means of multiple filtrations, [12]. This approach to reporting makes it possible to utilize and apply

experience of other companies that practiced the use of similar concepts of business intelligence. Those companies are capable of decreasing the overall working costs, to significantly increase productivity and utilize in the best way possible their strategic values, [10].

Eco forest system tracking within a company such as "Lipovica" plays crucial role in planning of income increase from that specific forest, [6]. It is based upon the process of forest-economic and production plan tracking. It assumes the need of balanced market demand for cutting and the possibility of maintaining of forest eco system. Predictive planning of environment protection applies to systems that make it possible for mid-term and long-term planning of forest capacity recovery, when it comes to both quality and quantity, types of sowing material, etc.

In order to achieve the above aim of system improvement through use of the already mentioned IT solutions, certain preconditions must be created, concerning the acquisition of field data. And as this requires a lot of work and it applies to every single line of sowing seed, the degree of realization becomes exponentially increased. Under the term of acquisition, the forming of GIS mapping is applied, containing the information of the state inside every spot of the field, keeping in mind the corresponding premises. Graphic outline of inter dependence between age and quality shown in the following Fig. 3.

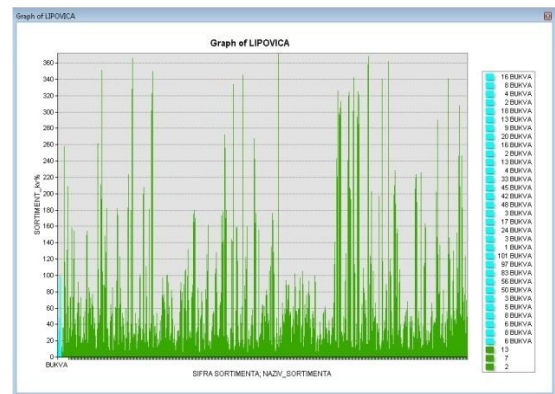


Fig. 3. Graphic outline of inter dependence between age and quality, [2].

The example of this kind of selection and analyses of space data through Arc Map tool goes as follows : "Select each trunk of beech tree inside the part X, more than 7 years old, with length of space between the nearest trunk no less than 5m and no longer than 12m".

Selected trunks could be exported into a special table belonging to SQL base, with the possibility of addition of another column containing required text, and isolated into personal base, and such, [13].

After field acquisition has been executed, a coverage map of each spot of land with all the types of trees and their age is designed. This data can be translated into table outline, but graphic as well, which enhances visual perception in the process of decision-

making. This process also enables cross-demands (for example, a client wishes to see the amount of pine forest ample for cutting with 40 to 120 cm in radius for the following 6 months` period, etc.) so, through this process, the acquisition of required information is only a matter of a split second, which could, in the first example, relate to the state of pine forest divided into spots of land, and in the next, to the possibility of beech trees` sales along with the exact Fig.s concerning the parameters of the whole amount. This means that multidimensional structure of data and enquiries obtained through use of OLAP (Online Analytical Processing) technology is, so to say, unlimited, under only one condition, which is the existence of basic data that could enable the execution. The following pages will display some of the possible applications shared by all the companies.

A. Application within financial branch

Most companies execute almost all their analyses within the finance sector, as thesis where all the data is being consolidated. Financial analyses concern the expenses, incomes and comparative analyses of achieved performances and designed expectations, as well as the feedback connection with the management, with the aim of taking possible measures of corrections within the business plans and activities. However, this traditional approach to analyses as being executed within the finance sector is not the best possible solution for a number of reasons:

- 1) Managers entrusted with business activities are held responsible for different fields of work, and their field of work passes the limits of the finance sector. On the other hand, they are best acquainted with the data that come as a result of their sector`s authority, though their disconnection from the process of analyses poses a problem.*
- 2) The key factor of financial reports dealing with expenses (such as the products or the clients) does not as a rule appear inside financial analyses, as they usually deal with values within different accounts, cards, etc. Financial analyses could thus establish the financial factors, though not the real state that effects the profitability.*
- 3) The analysts spend most of their time studying the final reports, disregarding their source and all the processes by which they appeared upon their desk.*

OLAP reports make it faster, easier and more meaningful to work inside the financial sector. Besides, this significantly enhances information distribution.

Example: Profit and losses : This type of report is created for detailed analyses of expenses upon the lowest levels covered by operative planning. It enables managers to comprehend the differences between real expenses and those designed by the plan for each category of expenses established inside operative plan. This type of analyses is crucial for maintenance of

plan`s discipline, envisioning of unplanned situations and for purpose of data reliability verification.

The moment the sector of finance distributes the data required by operative managers, through OLAP reports, they will be instantly visible. This enables managers and other employees with allowed access to this information, to have insight into their state whenever there arises the need for it- not solely at the end of quarter or whole year time, which actively employs the whole of management in search of key factors and their tracking through business activities, as used to be the case with the production of previously employed static data. For example, in case of sudden 5% rise of expenses, a detailed analyses leads to direct causes and the place where the increase of expenses originated. This enables the tracking of trends and tendencies of income and expenses increase, which enables instant response should there come to inaccuracy within designed values.

B. Application within the commercial branch

Teams of commercialists must be primarily concerned with the question of income and not the profit. The main aim of OLAP application in commercial branch is the adjustment of sales` activities with corporate goal of profit increase. The main problem, when it comes to sales connected reports, is the time needed for data collection, analyses, writing and distribution of reports. The time invested might count in hours, sometimes even days. OLAP reports make it possible for the teams of commercialists to quickly manipulate the information in matters of sales.

Example: Sales analysis is a perfect subject for OLAP reports, [13]. The source of data for this type of multidimensional analyses is kept within sales documentation that every company must possess. Through sales analyses, managers are able to spot the prevailing values with detailed analyses and the list of products that significantly affect the amount of sales. It is also possible to isolate the big vendors and establish the products that affect the income brought by those customers, all in detailed analyses. Basically, it is possible to combine the factors such as buyers, products and parts of market, in order to comprehend the parameters of growth and establish the trends. In this way the managers are able to discover the interdependences they have not been able to spot before. For example, it is possible to keep track of who among the buyers expresses the need for a certain type of wood and the exact amount of the demand, in different seasons of the year. It helps to determine whether we have managed to answer the demand by exploiting a single spot of land (which lowers transport expenses, engagement of executives and the increase of losses as a result of the moving of the goods) or whether the demand had had to be answered from more than one spot of land, where the two spots are separated by a long distance. Interactive reports for sales analyses shown in the following Fig. 4.

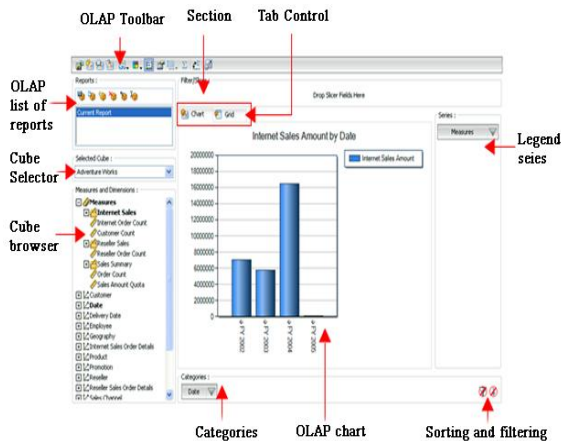


Fig. 4 Interactive reports for sales analyses [3].

C. Application within marketing branch

The key question is how to attract the vendors, those that will increase the companies' profits. The leading banks nowadays regard their clients the same way they once looked upon investment plans : they analyze their profitability and focus on those that perform best. OLAP reporting, within the sphere of marketing, make it possible for the companies to regard their vendors in the same fashion, [11].

Example : The vendor profitability report. This type of OLAP reporting classifies the vendors, ranging from the most profitable ones to those less so, keeps track of their values in time, as well as their number upon each level of the profit, which enables an uninterrupted insight into trends. It is possible for managers that use the report to keep track of each vendor within each group, to compare their parameters, such as their geographic location, the branch of industry they belong to, the size, number and the type of product they are buying and so on. Also, by the process of product attributes analyses – type of wood, the radius of specific part of wood, the frequency of yearly demand, the price – and so discover the key factors of profitability upon each and every part of the market.

III. CONCLUSION

The application of OLAP, Data Mining and Data Warehouse, leads to considerable betterment of modern information system within the company. These software tools, among other things, thanks to their possibilities and functions, make it easier and faster to decide in process of decision-making, thus increasing the competitiveness, having a positive impact upon business efficacy, thus allowing considerable savings for the company. Business enhancement in wood company "Lipovica" is self-evident, and sometimes even measurable. For example, the process of book keeping used to demand a lot of time, whereas now, with the use of OLAP, it is being accomplished in the real time. Also, the time between the moment parts of wood are ready for transport and the time of buyer's acquisition used to last a couple of days. Today, it only

takes a single day. Through use of the advantages of OLAP technology, OLAP boxes are created in the very beginning of the process, and they apply to different business branches : sales, supply, finance, book-keeping, eco system and forestry. This has proved to be an excellent solution and today it has seen its application within all the company's branches for the need of report-making and business analyses. Microsoft Excel is used for the viewing of the data, so that today there is hardly a user that hasn't applied the offered possibility to adapt reports and analytical overviews to his own needs and responsibilities. Through the introduction of the unique solution into all the organizational units of forest company "Lipovica", there came to a number of benefits, faster communication between buyers and sellers, as well as better communication inside the very company. Thanks to success of OLAP implementation within this company, the management has reached a conclusion that it is possible to enlarge the company's capacities for 23% within 5 years' time, as well as the possibility of re-division of seeds and cutting tools that would increase the profit to as much as 47% compared to the current period.

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