

APPLICATION OF FINANCIAL DECISION SUPPORT SYSTEMS IN NORTH MACEDONIAN COMPANIES

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Abstract: *A company's financial strategy represents the company's direction on accomplishing and sustaining its competitiveness on the market. The financial strategy is constituted by the aims, ways and alternatives in improving and optimizing the financial management with the aim to achieve corporate results.*

A financial decision support system provides information for specific financial problems by using analytical models and techniques including data base access for creating effective decisions by the manager. Financial managers use these systems for financial planning, financial modelling, analyzing alternative action plans, as well as conducting financial decisions.

This paper addresses the usage of financial decision support systems in North Macedonian companies and the usage level of these systems, the need for companies to implement a financial decision support system, to determine the need for this type of decision support system in the companies, to identify the implementation purpose, to define the usage of spreadsheets is financial analysis, as well as the usage of visualizing tools.

Keywords: *financial strategies, financial decision support system, financial management, financial analysis*

INTRODUCTION

The support of a specially designed computer system is needed to facilitate the data management process, as well as to implement and analyze financial models. A financial DSS can be defined as a computer information system that provides information in the domain of a specific financial problem, which uses analytical models and decision-making techniques as well as access to databases to support the user in making effective decisions when the problem is complex or poorly structured (Weber, 2008: 421). According to Palma-dos-Reis and Zahedi (1999), the software for financial DSS needs to directly support the modelling of problems that will be subject to decision making and the identification of the best alternatives. The financial DSS consists of the same components as the other DSSs, namely the data component, the model component and the user interface, so that the financial DSS receives the data from the databases, and the analysis is performed according to the user's selection and the corresponding models and is presented in a format that is understandable to the user. The role of the financial DSS could have a role as well as the normative system that leads to a clear solution, i.e. the recommendations are based on the set theoretical principles or it could be analytical that supports the decision-making process but still remain subjective elements and it is not necessary to has a clear solution or unique best alternative (Weber, 2008: 421).

DSS is used by financial managers in financial planning, financial modelling, analyzing alternative course of action and making financial decisions. The financial manager uses the computer system to improve his ability to solve semi-structured problems, where through interaction with the system he receives the necessary decision support. Table 1 presents some goals of financial management, examples of problems that may arise in achieving the goals and DSS tools and models that would help solve problems or support the decision maker to make an appropriate decision.

The financial DSS consists of a model database and a database through which they provide their support. The model database is a software component consisting of models used for calculations and analyzes that mathematically represent the relationship between variables such as sales, costs, and net profit. A typical example of a DSS model is the spreadsheet, while other DSS models include financial planning models, capital budgeting

models, linear programming models and analytical models which can be in the form of spreadsheet models or statistical and mathematical programs¹.

Objectives of financial management	Problems that need to be decided	Examples of DSS models and tools
<i>Financial forecasting</i>	Projections for planning and budgeting purposes	Alignment, Autoregressive average models
<i>Calculation of costs or capital</i>	Objective measurement of the performance and set a minimum rate of return	Reduced Cash Flow (DCF) and Internal Rate of Return (IRR)
<i>Capital budgeting</i>	Allocation of limited funding through the placement of internal investment projects	Net present value (NPV), valuation of real options, payback period
<i>Financial risk analysis</i>	Lack of cash flow, liquid risk	Simulation, sensitive analysis
<i>Financing for business growth</i>	Choosing between alternative sources of funding for companies at an early stage	Evaluation of alternatives, Flexibility, debt ratio
<i>Credit analysis / borrowing qualifications</i>	Credit quality and willingness to borrow	Ratio Analysis, Interest Coverage

Table 1. Financial management goals, problems that arise in achieving the goals and DSS tools and models for solving or supporting the decision maker

Spreadsheet models are spreadsheets that can be used for a variety of tasks and applications. Today the most widely used spreadsheet package on the market is Excel. Spreadsheets are the most widely used tools because they include many powerful financial, statistical, mathematical and other functions. The applicability of the spreadsheet package by the financial manager is relevant in financial planning, capital budgeting and linear programming. DSSs based on financial planning models are an important method in creating projections for financial statements for a period longer than one year. Financial planning models provide support to financial managers when there are several assumptions that

¹ Strategic financial management (<http://icanig.org/documents/SFM.pdf> accessed 09.01.2018)

need to be made so it is necessary to jointly determine the impact of those assumptions in conditions when it is necessary to show the effects of different assumptions from the level of sales, different selling prices, entry costs and other projected variables in the financial statements, in case it is necessary to evaluate different financial plans and their effects on significant variables such as earnings per share, debt-to-equity ratio, and when it is necessary to modify the initial plan based on the outcome of previous projections. Capital budgeting models are used to support the manager in financial analysis and evaluation of various capital investment alternatives. The data that are relevant to the decision-making process are by nature semi-structured, while the models that help to analyze them are reduced to "what if" analysis, sensitive analysis and the like. Formulating and offering solutions to linearly programmed problems belongs to utilizing a computer-based DSS Problems of this type can have multiple constraints and interactive variables that make it difficult to find solutions to those problems and are probably impossible to approach manually.

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In order to discover the usage of financial decision support systems in North Macedonian companies we addressed the company’s financial managers.

The company uses financial decision support system

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	24	46.2	46.2	46.2
	Yes	28	53.8	53.8	100.0
	Total	52	100.0	100.0	

Table 2. Usage of financial decision support systems

In Table 2 we have the results the show us the managers that use financial decision support systems where we can see that out of the 52 of the financial managers, 28 financial managers (53.8%) use FDSS and 24 financial managers (46.2%) that do not use these systems.

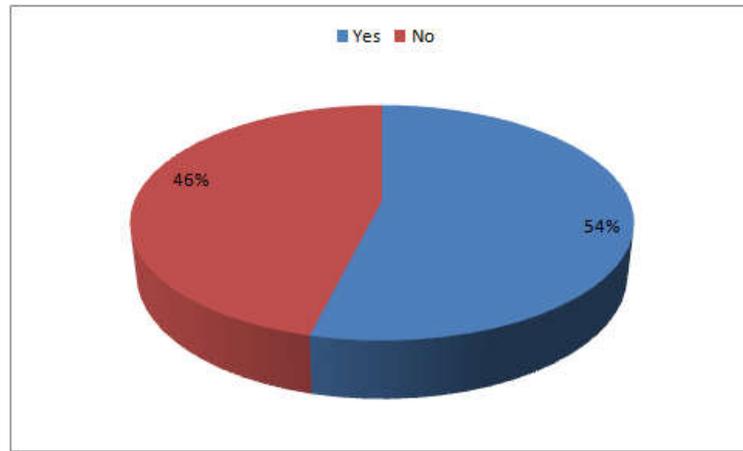


Figure 1. Relative view of financial managers that use financial decision support systems

Addressing the applicative usage of the financial support decision system, 35.8% answered that the use their system for financial planning, 32.8% use their system for financial planning, 23.9% to analyze alternative action plans and just 7.5% of the managers use their system for financial modelling.

Usage type of the financial DSS ^a	Responses		Percent of Cases
	N	Percent	
Financial planning	24	35.8%	85.7%
Financial modelling	5	7.5%	17.9%
Alternatives analysis	16	23.9%	57.1%
Financial decision making	22	32.8%	78.6%
Total	67	100.0%	239.3%

a. Dichotomy group tabulated at value 1.

Table 3. Usage type of the financial decision support system

Models that include spreadsheets, because of their digital nature allow for powerful financial, strategic, mathematical and other functions are one of the most used tools for financial analysis. That is why we addressed the question: how many of the financial managers use spreadsheets while doing the financial analysis. We discovered that 30 managers (57.7%) use spreadsheets for their financial analysis compared to 22 managers (42.3%) that do not.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	22	42.3	42.3	42.3
	Yes	30	57.7	57.7	100.0
Total		52	100.0	100.0	

Table 4. Usage of spreadsheets while doing the financial analysis

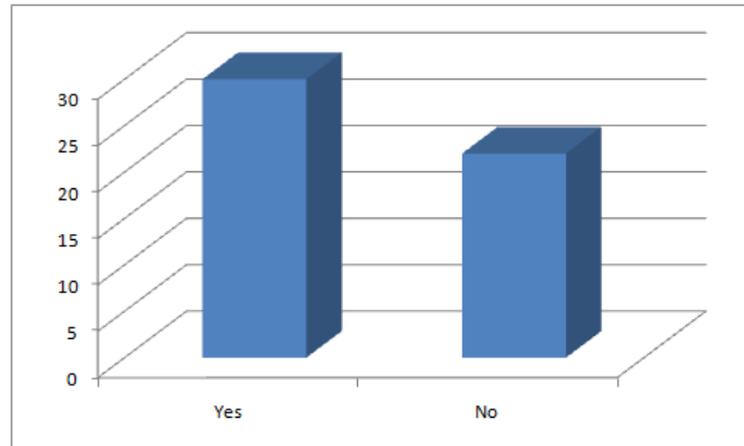


Figure 2. Usage of spreadsheets while doing the financial analysis

The financial managers that answered that they use spreadsheets had the option to declare the financial analysis types that the spreadsheets are used. The answers on this question included:

- planning and sales projection;
- planning production expenses/cost;
- product profitability analysis, business units, branches, processes, tax needs, risks and financial reports;
- financial analysis of a product, process or organization level;
- client profitability;
- analyzing the market and the competition;
- operational profit analysis;
- budget planning;

- payment plans;
- planning financial distribution;
- preparing future budgets, evaluation and estimation of future income and expenses, comparison of expenses between different time frames or between employees as well as all the financial analysis needed for the company's workflow;
- cost-benefit, cash flow, costumer analysis, product analysis, market share analysis;
- horizontal analysis, vertical analysis, analysis of financial indicators, analysis of working capital, leverage analysis, Dupont system analysis;
- implementing new products and investments – long term analysis, comparison analysis by time intervals on spent, sold material and product discontinuation, for improving processes, planning the expense reduction, short term analysis and per-employee expense analysis;
- cash flow planning, expense analysis, determination of trends in the financing area and planning, financial reports;
- analysis of the companies buyers and suppliers, product profitability, indicators from the financial reports;
- analysis of the aberration of the planned current results in comparison to the income statement (sales, material expenses and operational expenses).

Companies that do not use decision support systems were further investigated as to whether they have the financial and technical ability to apply DSS, whether company data is stored in appropriate databases, which sector in the company needs the system the most, whether the company is planning or is already in the phase of introducing a system of this type, in what way and in what format the reports are submitted to the CEOs and whether data visualization tools are used in the company, in order to more easily display the necessary data to the executives directors.

Regarding whether the company has the opportunity to apply a decision support system, according to the answers shown in Table 5, 48 managers or 92.3% answered

positively, and 4 managers or 7.7% believe that the company does not have the financial ability and technical support for system application.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	4	7.7	7.7	7.7
	Yes	48	92.3	92.3	100.0
	Total	52	100.0	100.0	

Table 5. Opportunity to apply DSS

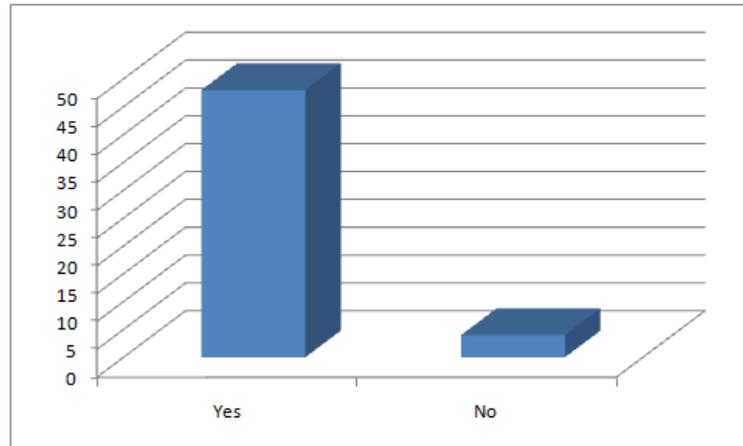


Figure 3. Opportunity to apply DSS

In addition to whether companies have the ability to apply a decision support system, the implementation of the system requires the company to store its data in appropriate databases, as one of the prerequisites for applying a decision support system. Regarding this question, 96.2% or 50 managers answered that in their company the data is stored in databases, and only 3.8% or 2 managers answered that the company data is not stored in appropriate databases. Table 6 presents the answers to this question, and Figure 4 also visually shows the frequency of answers.

Company data is stored in appropriate databases

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	2	3.8	3.8	3.8
	Yes	50	96.2	96.2	100.0
	Total	52	100.0		100.0

Table 6. Storage of company data in appropriate databases

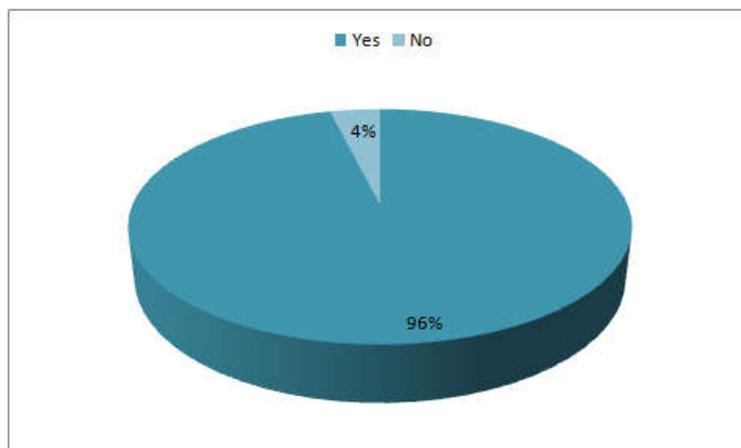


Figure 4. Storage of company data in appropriate databases

Of the answers received on whether the company has the ability to apply the system and whether the company data is stored in appropriate databases, i.e. 92.3% of the answers are that the company has the ability to apply DSS and 96.2% answered that the company data are stored in appropriate databases, it can be concluded that the prerequisites for the implementation of the system are met, but as a reason why many do not apply DSS may be due to insufficient information about the purpose of the system and the benefits arising from its use or that companies are not flexible in accepting new technologies.

Because each sector has a different need for a decision support system, this research also covers that segment, i.e. which sector in the company has the greatest need for the system. The answers offered in relation to this question referred to the production sector, the finance sector, the marketing sector, the human resources sector and the sales sector.

		Responses		Percent of Cases
		N	Percent	
Sector most in need of DSS ^a	Production	25	21.9%	50.0%
	Finance	35	30.7%	70.0%
	Marketing	7	6.1%	14.0%
	Human resources	16	14.0%	32.0%
	Sales	31	27.2%	62.0%
Total		114	100.0%	228.0%

a. Dichotomy group tabulated at value 1.

Table 7. Company sector most in need of DSS

From the received answers presented in Table 7. It can be concluded that the managers in the companies in North Macedonia stated that the financial sector has the greatest need of DSS 30.7% of the answers refer to the fact that the financial sector has the greatest need for DSS, then 27.2% refer to of the sales sector, 21.9% refer to the production sector, 14% to the human resources sector, and only 6.1% think that the marketing sector needs DSS. Given that the largest percentage refers to the need for financial DSS, the topicality of the subject of this research is highlighted in which the application of the financial system for decision support by financial managers, planning and development of FDSS and the development of financially executed information system.

The research ends with an overview that shows us how much data visualization tools are used in companies. The answers received regarding this question are presented in Table 8 and in Figure 5.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	19	36.5	36.5	36.5
	Yes	33	63.5	63.5	100.0
	Total	52	100.0	100.0	

Table 8. Application of data visualization tools in the company

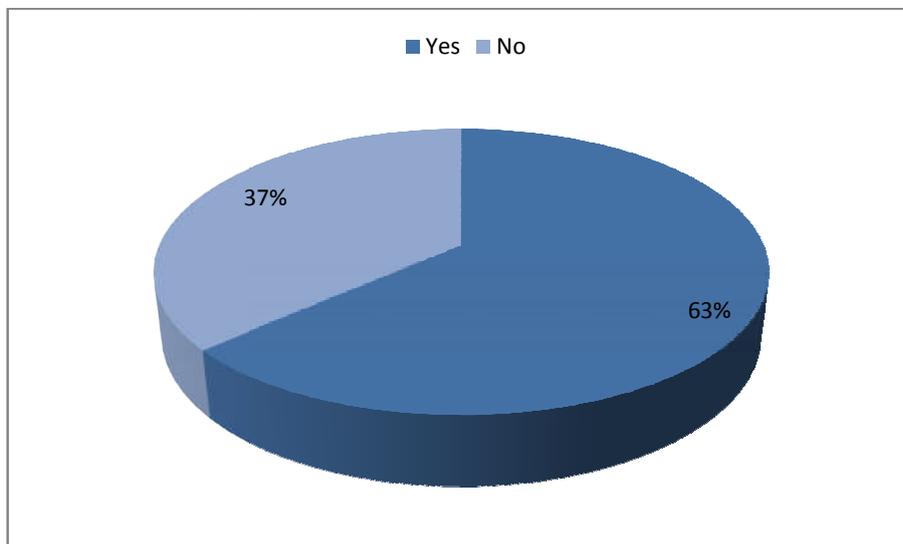


Figure 5. Application of data visualization tools in the company

The analysis of the answers received by the managers for the application of visualization tools in the company, it can be concluded that a larger percentage or 63.5% of

the answers refer to the fact that the company uses data visualization tools, and the remaining 36.5% of the answers refer to the fact that the company does not use tools for visualization of data in the company. From the higher percentage of positive answers regarding this question, it can be concluded that managers still strive to visualize the data, which gives a better picture of the situation in which the company is and eliminates unnecessary data from the summary reports.

CONCLUSION

From the research conducted in the companies in North Macedonia, it can be concluded that the companies use financial decision support system and that the financial system for decision support has the greatest application in the financial planning. When performing financial analysis by financial managers, spreadsheets are applied by managers in companies in Macedonia using tools for data visualization. As a final conclusion, it can be concluded that the managers in the companies in North Macedonia believe that the financial sector has the greatest need for a decision support system.

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