

<sup>1</sup>. Vasile ALEXA, <sup>2</sup>. Imre KISS, <sup>3</sup>. Sorin RAȚIU

## DIAGNOSTIC ANALYSIS - TOOL IN RESEARCH AND INNOVATION

<sup>1</sup>. "POLITEHNICA" UNIVERSITY OF TIMISOARA, FACULTY OF ENGINEERING HUNEDOARA, ROMANIA

**ABSTRACT:** To get an overview of the economic and financial situation of a company, it is required to summarize the diagnostic of its components in a comprehensive way, thus determining the strengths and weaknesses of its activity, i.e. the possible malfunctions and their causes. This paper aims to perform the global diagnostic analysis of a furniture company, under the current conditions characterized by the crisis period, by using CEMATT.

**KEYWORDS:** diagnostic analyzation, CEMATT, models, innovation, research

### INTRODUCTION - MODELS FOR PERFORMING THE GLOBAL DIAGNOSTIC ANALYSIS OF A COMPANY

The diagnostic analysis is an action that mainly aims the business performance measurement, identifying, on this basis, the causes of performance gaps, and the most effective solutions to increase the performance. The diagnostic analysis is a procedure that helps the company's management to understand the past and the present and, in the same time, to determine the future actions required.

For performing the global diagnostic, we need to set certain criteria intended to highlight the company in all its complexity, such as:

- Company's functions in connection with the management attributes, where each of the management attributes covers all of the company's functions;
- Presentation of the company in a structural concept, including the elements: resources, relationships, activities, outcomes and efficiency;
- The 5M's criterion, i.e. Men, Money, Merchandise, Materials, Market.

In literature, as well as in the normal practice, there are provided a number of models for the diagnostic analysis, and especially the global diagnostic analysis, such as:

- SWOT analysis - for quantifying the strengths, weaknesses, opportunities and threats; depending on the company's specific conditions, it operates with importance coefficients or with a scoring system;
- Rolland Berger model - specific for the consulting firms, it is characterized by a number of components (competition, products, manufacturing, distribution, financial and management), which are characterized on the basis of questions that enable making assessments through a 5-point scoring system (1 - it does not meet the criteria, 5 - it meets very well the criteria);
- Alexandru Gheorghiu model - is based on 8 components (research and development, market and competition, products, personnel, manufacturing, sales, management, financial), to which we assign importance coefficients. Then, these components are divided into criteria, highlighting their most important aspects;
- BCR model (where BCR means Romanian Commercial Bank) divides the company's activity on criteria and sub-criteria, adopts a scoring system, and sets a value scale based on the number of points:
  - less than 25 points - category E;
  - 25 - 37 points - category D;
  - 37 - 49 points - category C;
  - 49 - 61 points - category B;
  - more than 61 points - category A;

The bank makes the lending decision if the company falls at least in the category C. The detailed analysis of the BCR model reveals that the judgments and the process of awarding points are made from the position of the bank's interests.

- The scoring model is used by the company's investors (creditors) to determine their risks, and is based on observation, over a longer period of time, of two distinct groups of companies, of which one group has financial difficulties, and one group has a normal activity. A linear combination of rates is determined to distinguish the two groups;
- The histogram model, where for each component it is made a histogram;

The CEMATT model is based on 6 components, called Directions of Diagnostic Analysis - DDA, financial, marketing, technology, quality, general management and human resources, for which the weights are going to be determined.

**THE CEMATT MODEL [Centre for Management & Technology Transfer]**

The model is published in the book Diagnostic Analysis of Commercial Companies in Transition, Technical Publishing House, 1994, under the direction of Mr. C. Mereuță. The overall summary is presented in Table 1. The global performance indicator will assigns to the company the rating and the recommended restructuring strategy will be done.

Table 1

5 Star Rating	Rating
*	Masked bankruptcy
**	Critical situation
***	Difficult balance
****	Satisfactory adaptation
*****	Viability in a competitive environment

The component elements of the global diagnostic, called DDA (i.e. Directions of Diagnostic Analysis), have been set at 6, and the weights were defined as follows:

Table 1I

Directions of diagnostic analysis	Functions or subsystems	Weight
DDA1	Financial management	0.21
DDA2	Adaptation to market demands	0.17
DDA3	Technical and production management	0.15
DDA4	Quality management	0.17
DDA5	General management	0.15
DDA6	Human resources management	0.15

**CASE STUDY - RESEARCH AND INNOVATION TO THE FURNITURE FACTORY**

For diagnostic, we use the model CEMATT for grounding the options for restructuring solutions and the strategic plans to guide the company in the current competitive environment.

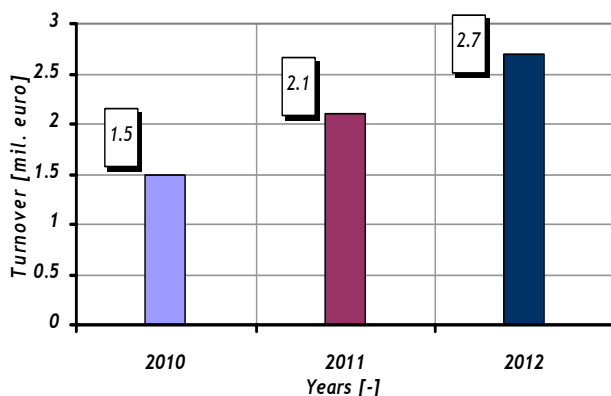


Fig. 1. Evolution of turnover  
DDA - 1. Financial management

Sr. no.	Indicator	N	K
1	Share of borrowed capital in the turnover	3	2
2	Evolution of the net working capital	3	5
3	Profitability of the activity	2	2
4	Financial profitability	2	5
5	Capital investment productivity	2	1
6	Evolution of the net indebtedness	4	5
7	Remuneration of human factor	3	2
8	Rate of financial autonomy	2	2
9	Asset liquidity	2	1
10	Inventory turnover rate	2	1

Table 1II

Indicator	31.12.2011	31.12.2012
Turnover	2100000	2750000
Quick assets	777642	1058310
Reserve assets	530146	613879
Loans and financial debts	168388	175679
Capital allowances	155291	223044
Own capital	424.016	613.020
Human resources expenses	98.195	149.164
Financial debts	461.858	529.435
Employees participation fund to the profit	5.489	7.887
Gross profit	29.332	34.002
Expenses & risks provisions	40.946	47.641
Net results of exercises	20.276	27.992
Uncashed invoice funds	123.053	139.587
Final products stocks	1.427	1.937
Fix stocks	581.060	768.113
Another debts (total)	496.941	614.381
Total short term debts	454.381	584.381
Total banking credits	336.019	380.919
Total debts	800.000	1.002.575
Total income	2542878	3473350

$$N_{DDAj} = \frac{\sum_{i=1}^{nj} (K_i \cdot N_i)}{\sum_{i=1}^{nj} K_i} \tag{1}$$

$$N_{DDA1} = \frac{1}{26} (2 \cdot 3 + 5 \cdot 3 + 2 \cdot 2 + 5 \cdot 2 + 1 \cdot 2 + 5 \cdot 4 + 2 \cdot 3 + 2 \cdot 2 + 1 \cdot 2 + 1 \cdot 2) = 2.73$$

$$N_{DDA2} = \frac{1}{11} (5 \cdot 3 + 2 \cdot 3 + 2 \cdot 4 + 1 \cdot 2 + 1 \cdot 2) = 3$$

**DDA - 2. Adaptation to market demands**

Sr. no.	Criterion	Evaluation step	C	k
1	The company's position in the market	The company's position is average, existing significant chances for improving the situation by using the internal resources of the company	3	5
2	The scientific and technical capacity to adapt to the market requirements	Satisfactory contribution of the design departments to the average position of the company in the market	3	2
3	The economic capacity to adapt to the market requirements	The performance / price ratios are competitive with those obtained by its main competitors	4	2
4	The marketing contribution to strengthen the company's market position	The marketing activity is weak and insufficient	2	1
5	The marketing strategy of the company	The marketing strategy is relatively satisfactory, but its application does not meet the requirements	2	1

**DDA - 3. Technical and production management**

Sr. no.	Criterion	Evaluation step	C	k
1	Research and design of new products	The index R&D expenditure / turnover ranges from 0.20 to 0.50%, the available R&D capabilities are below the requirements, but provide some recovery opportunities	2	5
2	Research and design of manufacturing methods	The technical design potential meets the current requirements	3	4
3	Providing technical equipment. Environmental protection	The technical equipment performance has a medium level	3	5
4	Equipment maintenance. Energy Consumption	Preventive maintenance system Capabilities for quick replacement of the parts	4	2
5	Organization of production. Productivity	The technological flows are streamlined, being mainly structured according to the product specialization principle	4	2
6	The logistic system	Fully mechanized internal transports, on marked and well maintained routes, partly programmed. Local automations.	4	1

$$N_{DDA3} = \frac{1}{19} (5 \cdot 2 + 4 \cdot 3 + 5 \cdot 3 + 2 \cdot 4 + 2 \cdot 4 + 1 \cdot 4) = 3$$

**DDA - 4. Quality management**

Sr. no.	Criterion	Evaluation step	C	k
1	Management system and quality assurance	The company adopted the system, adapted it to its own specific conditions, and implemented it more than 75%	4	5
2	Checking the manufacture quality	Structured checking system Plans and programs for improving the quality	5	2
3	Quality of projects	The projects include sufficient elements regarding the quality conditions and checking methods	3	1
4	Authority of the quality function	The quality function made use of its authority to stop the production over and over again, with positive effects	3	2
5	Quality of supply	Acceptance system based on supplier evaluation	4	1
6	Quality costs	Satisfactory records regarding the quality costs	3	1

$$N_{DDA4} = \frac{1}{12} (5 \cdot 4 + 2 \cdot 5 + 1 \cdot 3 + 2 \cdot 3 + 1 \cdot 4 + 1 \cdot 3) = 3.83$$

**DDA - 5. General management**

Sr. no.	Criterion	Evaluation step	C	k
1	Company strategy	The strategy sets realistic targets	3	5
2	Management process quality	Good quality management process, with real opportunities for improving through the own efforts of the management team	4	2
3	Management team quality	The management team members meet the requirements	4	2
4	Organizational structure of the company	Good structure, which allows progress towards the targets	4	2
5	Methods and management techniques applied	The applied management methods and techniques are adequate and suitable for the business strategy	4	1
6	Management information system	Partially inadequate system, which requires redesign and some developments	2	1

$$N_{DDA5} = \frac{1}{13} (5 \cdot 3 + 2 \cdot 4 + 2 \cdot 4 + 2 \cdot 4 + 1 \cdot 4 + 1 \cdot 2) = 3.46$$

## DDA - 6. Human resources management

Sr. no.	Criterion	Evaluation step	c	k
1	Company management	It is provided by a manager	1	5
2	Human resources management	Balanced leadership style	5	5
3	Level of remuneration and personal motivation	Salaries above the average salaries in economy	4	5
4	Analysis of personnel fluctuation	Satisfactory use of the workforce	2	5
5	Analysis of organisational structure	Medium level	3	2
6	Analysis of time use	Standardization system, payroll system	2	2
7	Hiring, promoting & testing system	Promotion based on professional competence	4	2
8	Unions and labour disputes	Union leaders	2	2

$$N_{DDA1} = \frac{1}{28} (5 \cdot 1 + 5 \cdot 5 + 5 \cdot 4 + 5 \cdot 2 + 2 \cdot 3 + 2 \cdot 2 + 2 \cdot 4 + 2 \cdot 2) = 2.93$$

On the basis of those 6 cumulative grades, obtained for the 6 analysis diagnostic directions we have studied, we are going to calculate the global performance using the relation:

$$S = \sum_{j=1}^6 N_{DADj} \cdot P_j ; \quad \sum_{j=1}^6 P_j = 1$$

Then we are:

$$S = 0.21 \cdot N_{DDA1} + 0.17 \cdot N_{DDA2} + 0.15 \cdot N_{DDA3} + 0.17 \cdot N_{DDA4} + 0.15 \cdot N_{DDA5} + 0.15 \cdot N_{DDA6} = 0.21 \cdot 2.73 + 0.17 \cdot 3 + 0.15 \cdot 3 + 0.17 \cdot 3.83 + 0.15 \cdot 3.46 + 0.15 \cdot 2.93 = 3.2$$

## CONCLUSIONS

This global performance indicator assigns to the company the rating "difficult balance". The recommended strategy is a defensive one, characterized by:

- major restructuring;
- active management;
- management improvement;
- severe regime of savings;
- influx of capital and know-how.

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FACULTY OF ENGINEERING HUNEDOARA,  
5, REVOLUTIEI, 331128, HUNEDOARA, ROMANIA  
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