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80/20 Principle: Application in Manufacturing Companies

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Abstract:

Responding to the request of a company in pushing the income statement in profit, the authors of this article propose to apply to the products contribution margin the 80/20 principle.

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We have gone from an ABC analysis of all the contribution margins of products valued at standard cost, and we proceeded to classify in families of group of finished products, the contribution margin from the lowest to the highest.

It was then applied to a cycle "loop" the rationalization of products starting from group 1 and so forth, until you reach the desired result on the income statement. After this analysis was developed the new total cost of the company according to the budget forecast of sales, removing the revenue and costs in excess and defining the resulting operational plan.

The result is an improved company where its income statement for the exclusive effect of the contribution of margin of product according to the 80/20 principle, and accordingly, downsize in its business activities.

Considering the result above mentioned the development of this methodology can become a standard for the corporate restructuring in a state of crisis.

Key words: 80/20 principle, Manufacturing company, Contribution margin

INTRODUCTION

The recent crisis, in 2008 has hit the world economy, and it leads the vulnerable and sensitive SMEs, to manage this critical situation carrying on projects of company restructuring with specific projects (Vrečko and Širec, 2013). This kind of project allows the companies to find a solution to the financial crisis that lead to decisions in the bankruptcy and informal (out-of-court) renegotiations (Pehrsson, Ng and Stockton, 2013).

Many people try to solve the problem through a careful analysis of the costs, finding out the best decision investment (Fleischman and Tyson, 1993) and, second, to contribute to solve the weaknesses in the important methodological and organizational principles system of cost accounting (Kachalay and Shevchenko, 2012) (Collett, Pandit and Saarikko, 2014) or

identifying cases of success or failure of the turnaround, that is the plan of reorganization and restructuring of a company in deep crisis (Ping and Yi, 2013). In order to support the SMEs's turnaround external organizations or consultancy firms become involved (Koch, 2008).

To provide support to the creation of a project of requalification the authors want to propose a methodology that not only reduces the industrial costs or other activities that lead, at least, to the break even in the income statement, but also an analysis 80/20 applied to the products contribution margin (Koch, 2013). This activity will reshape the turnovers, but at the same time will bring the income statement from loss to profit.

The development of this methodology, that considering the result obtained in a case study, will become a standard for the company restructuring in state of crisis.

METHODOLOGY PROPOSAL

During crisis period, companies are in the condition that the value of the production is lower than the total cost of the production, and the income statement highlight a loss.

Being in general, for the manufacturing companies, the industrial cost is about 80% of the total cost, a significant number of companies under investigation shown this, we focus on this topic. Considering that is not realistically possible anymore to reduce the company consumption and work force, we will work on the selection of the products that guarantee the appropriate contribution margin, right to obtain profit in the income statement. This will redraft the sales and market size, causes the loss of customers and orders, and the business will restart from value very close to the small size business. The classical phase of company restructuring focused on costs reducing or to increase sales will not anymore consider, due to

the fact that at the status quo is not reasonable cut the total cost, especially the industrial costs.

This is the method 80/20 applied only to the product and, consequently, to its contribution margin.

The application of this methodology requires the involvement of the executive management and it must understand this organizational process in order to make choices that ensure a positive result. Particularly it is important to simulate several times the consequences of this choice on the forecast (5 years) in the income statements, in order to certify the industrial plan.

The preliminary operational analysis that the management body should carry out after the application of 80/20 principle (Koch, 2008) (Koch, 2013) should foresee:

a) obtain from the enterprise information system the ABC of the contribution margins in the final balance of the previous year and in the current semester on the standard costs;

b) update the database cost with the increases for manufacturing purposes and work force;

c) to compare the contribution margins to sales volumes for each product;

d) remove from the final balance the products with an insufficient contribution margin and updating the database;

e) explode the new bills of materials (cycles and materials) from the new volume of production and calculate the new timing of direct labour cost, the cost of materials and external processing;

f) reduce the indirect and white collar labour cost with a focused analysis done by an expert on the new tasks and considering the annual number of working hours;

g) updating the database in order to calculate the new income statement and verify the situation of the profit. If the result is suitable, you should analyse the consequences of this plan on the market and on the customers and nevertheless on the sales agents whom would suffer economic loss.

It is therefore to perform this analysis and verify that this new solution is able to generate profit for the company that, in this condition, will be able to generate a project of corporate restructuring and reconditioning.

CASE STUDY

It has been analyzed a furniture company that made kitchen and baby rooms.

The income statement, during the year of the survey, is reported in percentage in the following chart (Table 1); a significant loss is shown by the data.

Table 1: Income statement for the year

Production value (A)	100,00
Industrial cost (B = C + D)	68,37
- Consumption (C)	51,30
- Labour cost (D = E + F + G)	17,08
Worker (E)	4,53
Indirect workers (F)	2,75
Direct workers (G)	9,70
Total industrial cost (H = B + I + J + K)	76,04
- Maintenance (I)	1,88
- Cost of energy (J)	1,35
- Amortization direct goods (K)	4,44
Total cost (L = M + N + O)	109,45
- Sales cost (M)	21,54
- Administrative costs (N)	7,60
- Amortization indirect goods (O)	4,37
Profit/loss (A – L)	- 9,45

The proposed methodology has been applied to analyse, each group of products and the generated turnover. The result of this first analysis are reported in Figure 1 where is it possible to see that the main groups of products don't generate any relevant turnover.

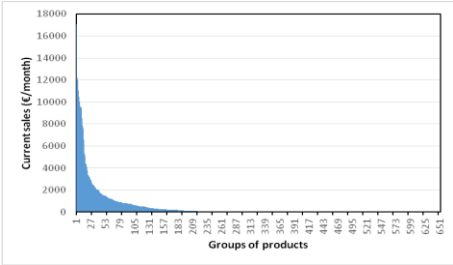

Figure 1: Current sales in function of the groups of products

The analysis shows that the 20.3% of turnover is generated by five group of product corresponding to 0,8% of the total number of groups of products. In the same way the contribution margins has been analysed for groups of products; the results are reported in Figure 2, which shows a characteristic K parameter which is define by the ratio between current sales price and the current cost, per each groups of products.

Considering the interest of the entrepreneur in having a profit not lower that a certain specific value, a specific calculation programme has been develop.

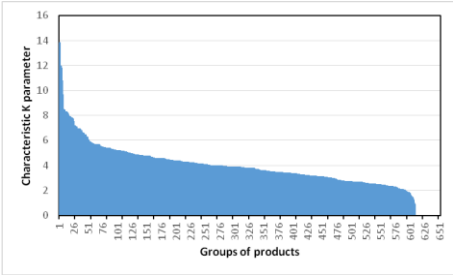

Figure 2: Characteristic k parameter in function of the groups of products

The program allows determining the profit/loss in the income statement generated by the removal of groups of products, and starting from the characteristic K parameter higher than zero, it is possible to achieve the minimum return on investment required by the entrepreneur.

In particular, starting from K higher than zero and eliminating in the different loop of simulation the groups of products which have for each iteration a value of K greater than 0.1 points and which have a specific turnover for single groups of product, it may be noted the profit achieved (Figure 3). The value obtained must be compared to that desired by the management.

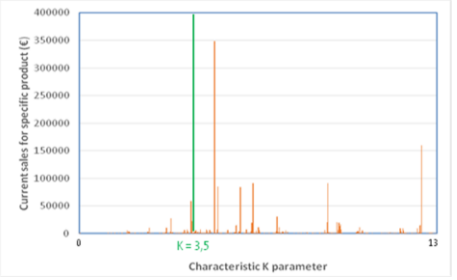

Figure 3: Current sales for specific product in function of the characteristic K parameter

The number of iterations has showed that it's possible to consider a limit value 3.5 for K, that is able to guarantee a return on investment as desired by the management (Figure 4). The result is a new company that will produce only products that have a characteristic K parameter higher than 3.5 and that allows to realize with the 32% of the groups of products the 55% of the previous turnover and generate profit.

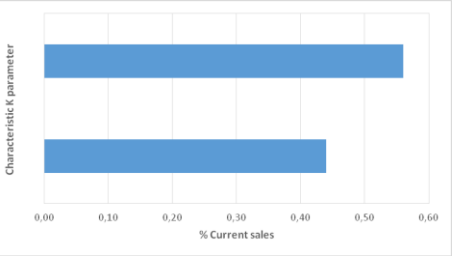

Figure 4: Characteristic k parameter in function of the % current sale

4. APPLICATION OF THE 80/20 TO DIRECT LABOR

As direct labor in the work of the company considered to affect at 9.7% of production value, it was decided to apply the 80/20 principle in this cost item.

It was therefore necessary to evaluate the industrial cost before and after the application of the methodology for the two subsequent years.

The methodology initially envisages to assess the industrial cost in the first year.

It was taken into consideration the following information:

- production value;
- consumption shown on the BOM;
- direct hours of production generated from the BOM.

It was obtained the following values:

- direct total hours € 125,236.54;
- indirect total hours € 60,959.18;
- consumption having a projected average increase of 3% and wastes of 7%.

It was then built the factory calendar for the first year, which frees up the working days and hours global company (Table 2).

Table 2

Month	Sunday	Saturday	Feast day	Work days	Available hours
January	5	5	2	19	152
February	4	4	0	20	160
March	4	4	0	23	184
April	4	4	1	21	168
May	5	4	1	21	168
June	4	4	1	21	168
July	4	5	0	22	176
August	5	4	0	22	176
September	4	4	0	22	176
October	5	5	0	21	168
November	4	4	1	21	168
December	3	3	3	22	176

From the factory calendar it has calculated the available hours of work of each employee. Therefore in Table 3 shows average of ordinary hours per employee, corresponding to the minimum work hours that the worker direct place to support the expected production.

Table 3

Description	Hours (h)	
Total hours available (255 days x 8 hours/day)		2040
Hours for illness + ex Feast day	96	
Time off	160	
Total net hours available		1784
Meeting	8	
Work net hours		1776
Illness and injuries (statistical value)	159,84	
Total hours of absence		423,84
Work ordinary		1616,16
Work secondary hours (statistical value)		101
Total		1717,16

It is therefore organized workers at the beginning of the first year regarded and it clusters for production departments as shown in Table 4. It is estimated the production capacity, expressed not only in the direct hours, but also producible in pieces, which in the analysis is called "semi manufactured theoretically be WIP. Then, it is proceed to a more detailed analysis of the direct hours of production in three different major departments and in turn divided into three main families. In particular, it is analysed the data sheet for the year preceding the one under consideration in order to have a certain database.

Table 4

Processing panels	Direct hours	Direct workers	Department managers	Production capacity (pieces / year)	Hourly production (pieces / hour)	Hours not production than the total (%)	Pieces / man handled	Workers made redundant
Tooling	8.939,17							
Down time	5.872,12							
Machine Hours	15.981,23							
Sub-Total	30.792,54	18	2	556419,79	324,06	48,1		
Painting								
Tooling	15.048,50							
Down time	858,50							
Machine Hours	23.584,00							
Sub-Total	39.491,00	22,5	2	373.569,24	217,57	40,28		
Assembly								
Tooling	17.037,00							
Down time	2.747,00							
Machine Hours	35.169,00							
sub-Total	54.953,00	33,0	2	276.315,62	160,93	36,00		
TOTAL	**125.236,54**	**73,5**	**6**	**1.206.304,65**	**702,56**			
Stock finished								
Production capacity	25.757,40	15,0		3.064.840,16	1.784,83		89,42	3

In the Table 5 allows you to identify the direct hours not productive, that is, those do not generate added value on the product and therefore are direct hours that the market is not willing to pay. In the same table in the second column shows the direct hours that are divided into three components: set-up (non-productive hours), downtime (unproductive hours) and machine hours (productive hours).

Table 5

Department	Direction	Technical employees	Employees Purchases	Direct workers	Indirect work	Workers to services
Directions	1					
Production		9	5			
Stock finish					15	
Machines				9	2	
Out of size				9		
Sanding finishing				10,5	1	

Painting				5	1	
Spray booth				7		
Assembly				33	2	
Prototypes					2,5	
Maintenance						2
Quality check						4
Drivers						3
Surveillance - cleaning						3
Total	1	9	5	73,5	23,5	12

Department	Employees services	Total	Shifts current	Total cost (€)	Months of work	Average annual cost (€)
Directions		1		91.200	12	91.200
Production		14		969.800	12	69.271
Stock finish		15		489.390	12	32.626
Machines		11		358.886	12	32.626
Out of size		9		293.634	12	32.626
Sanding finishing		11,5		375.199	12	32.626
Painting		6		195.756	12	32.626
Spray booth		7	2	228.382	12	32.626
Assembly		35		1.141.910	12	32.626
Prototypes		2,5		81.565	12	32.626
Maintenance		2		65.252	12	32.626
Quality check		4		130.504	12	32.626
Drivers		3		97.878	12	32.626
Surveillance - cleaning		3		97.878	12	32.626
Total		124		4.617.234	12	37.235

The three divisions of the company are organized in sequential order so:

1. processing of the panels, where the hours are not productive and affect 14,811.31 Total direct hours of department (30,792.54) for the 48.10%;
2. the paint shop, where the hours are non productive and affect 15,907 total hours of direct department (39,491) for the 40.28%;

3. assembly, where the hours are non-productive and affect 19,794 total hours of direct department (54,953) for the 36%.

The plant has a total of unproductive hours amounted to 50,512, affecting total direct hours (125,236.31) for 40,33%.

Due to the hourly cost of the plant is 56 € / h, the loss for non-productive hours of the establishment is of € 2,828,672, that the total direct labour of establishment, which amounted to € 3,556,224, accounting for 79%.

Applying, in all those products where the hours do not affect production for at least 80%, the 80/20 principle at non-productive, you get a reduction of non-productive hours of € 601 925, from which it follows a reduction of industrial cost from € 18,752,567 to € 18,150,642.

This decrease in the industrial cost generates an improved result for the company of 4.7%.

5. CONCLUSION

The authors proposed a methodology which has the purpose of applying the 80/20 principle to the contribution margin of the products.

Knowing the results of the last business year it's possible to implement a rationalization of the products that generate loss through an ABC analysis of contribution margins compared with those at standard costs, and envisage those products that produce profits greater than that desired by the management.

The methodology was applied to a case study that highlights the strong points of the methodology developed and the results achieved, and can be considered as a standard applicable in the corporate restructuring.

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