

Visual management method for decision-making support

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Abstract

The visual management, the lever of Lean, is much recommended for the improvement of the companies' performance. It is based on visual methods facilitating the definition of the objectives, the decision-making and the reactivity. These visual methods make the problems easier to solve because the image and the graphics give a clearer vision.

In this work, we propose a generic method for the evaluation of concept, the measure of satisfaction and/or maturity of a concept, as well as the support to the selection or to the decision. It looks like the analysis methods SWOT " Strengths, Weaknesses, Opportunities, Threats ".

So, we are going to create a program which allows transforming a matrix of Likert type data into matrix of positive colors (Green and its variants) and/or negative colors (Red and its variants) for the visual management. This matrix, which once sorted out thanks to permutations on lines and columns, allows to give the result of evaluation, satisfaction, maturity and also helping in the decision-making or in the establishment of an action plan. She allows us easily to know the classes or the elements on which we can act to increase the performance (elements having a lot of red and its variants).

This method has several uses within the global supply chain in particular the customers or workers satisfaction, the suppliers selection, the skills management, supply chain maturity...

Keywords: visual management, performance, decision-making support, supply chain.

1. INTRODUCTION

The vision is certainly our main sense allowing us to apprehend a situation, thus it is very difficult to handle and solve a problem if it is not visible. Companies have more and more recourse to the approaches of Lean and in particular the visual management.

The visual management is a continuous improvement approach which allows to make visible all which is meaningful and to share the knowledge of the situation with full transparency. So, it allows to represent and to compare the data, to identify the causes of the problems in order to be capable of reacting quickly to resolve them; and assists to make the decisions at the appropriate level [1].

The visual Management has to be made, under a clear, sober and homogeneous presentation, and especially has to contain representative and useful information and indicators [2].

The significant differences observed with regard to the fixed objectives have to give rise to an analysis and to a corrective action plan.

Our method looks like the methods of analysis SWOT which addresses generally the analysis of both environments intern (strengths and weaknesses) and extern (opportunities and threats) of the company to reach a systematic approach and an assistance for the decisions [3]-[4]. This analysis, combined with the methods of multiple criteria decision-making support, is important for the formulation and the development of the strategy of the company [5]-[6].

Decision-making is considered as an important part of the job in many professions where decisions are made by the expert specialists [7].

In the second part of this work, we are going to detail our generic method. The third part will contain an example of application. Then, in the part 4, we are going to quote the diverse uses of the method proposed within the supply chain.

2. THE PROPOSED METHOD

Our method is from the concept of visual management which aims at presenting the information in a clear and significant way.

The principle of this method comes from the Régnier abacus [8] used only for gathering all the opinions in a meeting. We tried, in this paper, to generalize it to all the activities of the company.

Then to facilitate the data processing, we propose a generic visual tool for the evaluation of concept, measure of satisfaction and/or maturity of a concept, as well as the assistance to the selection or to the decision.

We are going to create a program which transforms a matrix of Likert type data into matrix of positive and negative colors for the visual management.

This matrix, which once sorted out thanks to permutations on lines and columns, allows to give the result of evaluation, satisfaction, maturity and also helps in the decision-making or in the establishment of an action plan.

It allows us easily to know the classes or the elements about which we can act to increase the performance (elements having many negative colors).

For this program we chose:

- Type Likert's scale varying from -5 to 5 (see table 1).
- The positive colors will be the Green and its variants.
- The negative colors will be the Red and its variants.

Table 1 : Likert scale

Mark	Signification
5	Strongly agree / Very good
3 / 4	Agree / Good
1 / 2	Reserved / Average
0	No opinion
-1 / -2	Reserved / Average
-3 / -4	Disagree / Bad
-5	Strongly disagree / Very bad

3. EXAMPLE OF APPLICATION

For the company, to know the expectations of its clients is inescapable in front of a wild competition. As well as the Preservation of its distinction asks for a deep sense of observation and for a capacity of action. The positioned companies adapt themselves more quickly.

Customer expectations are the key factors of the clients' satisfaction and they are reflected in the average sales of the company. Thanks to a concise survey, we obtain crucial information to quickly adapt the strategy of the company.

The survey can be led in points of sale or on-line on the Web site or by means of the Facebook page of the company... according to several indicators, namely: The service quality, the price, the speed of answer, the availability, the competence, the respect for deadlines, invoicing, image of the company, quality of products, quality of the relations, the diversity of the proposed products, the commitment of the company ...

To solve the problems which face the company with the customers, it has to know at first the source of its problems (her weak points and the customers unsatisfied).

The lines of the data matrix will contain the customers and the columns selected indicators (see table 2).

3.1 Source data

We have data on the opinions of 7 customers about 9 services of the company used as indicators of customer satisfaction level.

Table 2 : Likert type data matrix

	price	service	Deadline respect	Products quality	Company Image	Relationship quality	Products diversity	Speed of answer	Competence
Client 1	2	3	3	-3	1	2	-5	-3	1
Client 2	5	3	4	1	3	3	-3	3	1
Client 3	4	2	5	2	2	3	-4	2	3
Client 4	3	0	5	0	1	0	-3	-1	2
Client 5	3	3	4	-1	3	2	-4	1	4
Client 6	4	-1	4	2	4	2	-2	2	4
Client 7	4	0	5	-2	3	1	-1	3	4

3.2 Program application

By means of the created program, we transform the data of Likert type into colored data (Figure 1).

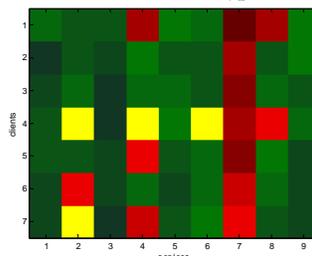


Figure 29 Data Matrix transformed into colors

Once the matrix was sorted out, we obtain the figure 2.

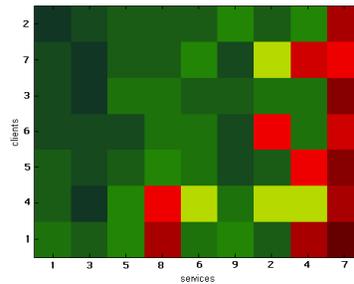


Figure 30 : Color matrix sorted out

3.3 Interpretation

On this figure, we can clearly see that the company has a problem concerning the diversity of its products and that it has to change her strategy towards this point. Also we can see that the customers 1 and 4 are the most dissatisfied customers, the company has to be for their listening.

4. USES WITHIN THE SUPPLY CHAIN

4.1 Customer satisfaction

During the last two decades, the organizations of all types more and more recognized the importance of the customer satisfaction and its loyalty [9]. More the satisfaction and the loyalty of the customer is high more the company is at a strong competitive position ending in a bigger market share and in an increase of the profits [10].

The customer satisfaction is generally assumed as being a significant determiner of repetitive sales and customer loyalty; moreover, more than 60 % of sales to new customers can be attributed to the references by word of mouth [11]. Also we considered it for a long time as one of the key antecedents to create the brand loyalty.

There is a very large number of factors influencing the satisfaction. The importance of these factors led to an increasing research to define the essential characteristics of service criteria. We quote among these factors: the quality of service, price, reliability, availability, [12], respect for deadline, products quality, The anticipation of customer expectations and the image of the company [13], logistic performance, innovations in the proposed services [14]-[15].

According to J.E. Lewin [16], when there are several changes concerning the contact employees, the company can have difficulty to satisfy the customer. Besides, the fast changes of the clients expectations, of the technologies and the competition require the companies to improve their agility [17] and their flexibility throughout the supply chain either at the level of the development of products [18], or at the level of the production [19] with the aim of arriving at the customer satisfaction.

The company must be all the time aware of the reaction of its customers by any method (questionnaire[20], complaints, returns...). And consequently, our matrix will be formed by all the customers of the company (lines) and the relevant criteria (columns).

4.2 Suppliers selection

The contemporary procurement management aims at maintaining a long-term partnership with the suppliers and to use a restricted but reliable number of suppliers. Thus, the choice of the adequate suppliers involves much more than the scanning of series of prices and will depend on a wide range of factors so quantitative as qualitative.

Suppliers' selection is a problem of multiple attribute decision-making. The criteria and the techniques of decision-making are two important elements in this problem.

Dickson [21] was one of the first ones in this domain of study. He identified 23 different criteria including the quality, the delivery, the performance, the policy of complaint and guarantee, the capacity and the installations of production, the net price and the technical capacities.

Weber, Current and Benton [22] categorized the literature on supplier's selection in passing in review 74 articles. They identified criteria such as the geographical location and the technological Capacity. The most popular criteria are: the quality, the delivery and the price [23].

Several approaches of decision-making were proposed for the selection of the suppliers, as the analytic hierarchy process (AHP), analytic network process (ANP) [24], case-based reasoning (CBR), data envelopment analysis (DEA), fuzzy group theory [25], genetic algorithm (GA), mathematical programming, simple multi-attribute rating technique (SMART) and their hybrids [23].

The definition of the appropriate criteria can be made by experts' team in the industry field of the company.

For the data matrix of our program in this case, lines will contain the candidate suppliers and columns are the chosen

criteria.

4.3 Skills management

The preservation and the development of competitive advantages to a market constantly changeable require the creation and the exploitation of a network of adequate skills. As a consequence, the skills management is a key-problem in the strategic management as well as the tactic [26].

Managing skills requires the capacity to estimate the value of competence of an organization which counts on several factors. It has the main objective to define and to constantly maintain skills, according to the objectives of the company.

This skills management can be organized according to four sorts of process (identification, evaluation, acquisition of the skills and the use of their knowledge) [27].

Thanks to our program, the company can evaluate the existing skills and even define the skills which it needs and consequently, decide if it has to acquire new skills or to form those existing and in which domains.

The managers can assign grades to the employees varying between -5 and 5 (signifying : competent, versatile, not at all competent...) concerning various tasks and missions.

4.4 Employees satisfaction

The satisfaction of the employees maintains narrow links with the phenomena of implication, commitment and motivation in the work, but also with the absenteeism [28], the staff turnover, the social climate, the production, the performance, the physical health, the mental health [29], the stress, or still with the global satisfaction of life [30]. Thus the company has to give importance to this point. The job satisfaction depends on several factors: appropriation of the space [31], components of the work atmosphere [32] ...

4.5 Supply chain maturity

The world competition is not any more between organizations, but rather between supply chains. What urges companies to develop their supply chain which thus became a way potentially of value for guaranteeing a competitive advantage and improving the organizational performance [33].

The maturity of the supply chain passes by several levels (the term Supply Chain has no meaning in the organization, intern collaborative Supply Chain, intern and extern collaboration, information sharing throughout Supply chain...). And concern all the features of the company since the corporate strategy until the measure of the performances by way of the various components of the logistics.

The works realized in this domain connect the maturity of the supply chain with its performance [34]-[35]-[36]. Paché and Spalanzani [37] proposed five levels of maturity.

In order to understand the stakes and the functioning of the supply chain, and consequently, define the level of maturity which it reached; it is necessary to evaluate the logistic strengths and weaknesses.

The company can define for every feature the criteria susceptible of indicating the level of maturity. For example, for the logistic reactivity, we find criteria as flexibility, agility, products customization, standardization, lead time, unproductive time, customer receivables. And so estimate the maturity of its supply chain.

4.6 Other uses

Our tool can be used in other parts of the supply chain namely:

- The detection of the most frequent machinery failures and even the machines which breaks down a lot to help the maintenance department making the most appropriate decision (Acquisition of new machines, planning of the preventive maintenance...).
- The human resources management (follow of the absenteeism rate, determination of the team bonuses...).
- The quality of the made parts either the most frequent defects for a family of parts.
- The meetings animation which can base itself on this tool to make visible the contribution of each one of the participants (Take the opinion of all the participants towards various points to be treated without wasting time: marks / colors).
- The choice of performance indicators because every indicator has characteristics which determines its quality and its utility.

We can use this program almost everywhere. Wherever we need to evaluate, to measure, to select or to decide.

5. CONCLUSION

Thanks to the visible representation of the company critical information, the staff understands better what we expect from him, what usually shows itself by efforts with the aim of higher working performances.

The visual management also gives exploitable information which allow the hierarchy to control better the work performances and to determine in real time the domains where improvements are required. The global result contributes to increase the productivity in all the company by increasing the efficiency and the quality while improving the

availability of machines and installations.

Our method is general to all the activities of the supply chain, and can be even applied in other domains.

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