APPLICATION OF THE SIX SIGMA METHOD IN AN AVIATION COMPANY

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The objective of the contribution is to characterize the method of Six Sigma and to point out its main principles. The benefit is applying Six Sigma method in selected aviation company. The aim is to point out problem in the enterprise and then to propose measures for its elimination. The result is the draft method of implementation of Six Sigma in sales and sales network development.

K e y w o r d s – Six Sigma, define, measure, analyse, improve, control

1 INTRODUCTION

This contribution devotes of problems of quality that are in the air transport sector the most significant factor for success. Also small limitations in quality can lead to tragic events. Recently, the sector of air transport is braving to economic crisis, therefore is for companies in this branch a great problem to survive on the market and to show profit. That may enterprise to eliminate these negative influences, must put more emphasis on quality management. The part of management quality is too method Six Sigma which aim is still raising of quality processes in company and prevention of negative phenomena. This contribution addresses the problem of applying Six Sigma method to the particular company in air transport.

Six Sigma si revolutionary method of achieving success through satiation of wants customers, raising of profit and strengthening market position. More and more companies are interested in the essence of this method and rules for its application within their processes. Its simplicity and mostly positive responses is more and more attractive for the sector of air transport, in which is reenginnering of processes necessary mater.

2 THEORETICAL BASIC OF SIX SIGMA

As the next section of contribution is devoted to the application of method Six Sigma in an aviation company. In the first place we must clarify, what actually is Six Sigma.

Six Sigma is a systematic access to the quality which is looking for specific reserves in business processes and is based on knowledge and understanding of customer needs and disciplined use of data, statistical analysis and facts. Six Sigma laying emphasis on objecitve statistical Access to the quality. [1]

The basic role of Six Sigma method is understand and clarify all the factors that are influencing of quality so that they can identify and remove causes of defects and costs for their removal. Towards achievement of the expected results, it is necessary to implement this strategy of quality at all levels of management, including senior management and business owners. [2]

2.1 Objectives of Six Sigma

Six Sigma is a tool designed for raising of quality processes in the company as a whole. This tool is centred on searching of weak spoils and their removing. Six Sigma seeks to modify business processes in order to prevent the emergence of negative phenomena such as losses, defects or complaints. The objective of this method is [3]:

- reduce costs of business processes, defects, defects and prevent their occurrence,
- increase profit, productivity, market share,
- reduce operating time,
- effective use of resources,
- monitoring of processes to their successful management.

2.2 Principles of Six Sigma

Method od Six Sigma is based on the following central principles [4]:

- focus on customers – important is have knowledge of needs customers and abide by them,
- focus on processes – emphasis on the implementation of processes that lead to the fulfilling of customer requirements,
- focus on employees – an extremely important from part of managementm is motivation and support of employees or provide of space for their implementation and professional development,
- management and improvement based on datas, informations and konwledges – accumulating, statistical analyzing and subsequently oprimalization od datas,
- organization for support of Six Sigma,
- standard process of improvement process – using of standard procedure for elimination the shortcomings of errors. The standard process of improvement is for example a tool Six Sigma DMAIC (Define-Measure-Analyze-Improve-Control)
- proactive management - management by prediction of events is essential for success,
- excellence as a long-term goal - it is not only important to achieve a single improvement process, but important is also continuous improvement, which becomes part of the process.

3 APLICATION OF SIX SIGMA IN THE SELECTED AVIATION COMPANY

The contribution focuses on the application of Six Sigma method in an aviation transport company. We chose business Tomark Ltd., whose segment Tomark Aero, focusing on aircraft production, manufactures ultralight aircraft Viper SD-4.

After a thorough analysis of the company, weaknesses in the sales network were revealed, which is why. We will suggest the application of Six Sigma methods to the field of marketing and sales network in the next part of this contribution.

This implementation will be carried out following the DMAIC cycle, which consists of the following five steps:

- Define,
- Measure,
- Analyse,
- Improve,
- Control.

3.1 Define phase

In the first step of the DMAIC process it is necessary to define the problem and objectives of the project, and further describe the process that we want to improve. This post is dedicated to improving the sales process.

Defining the process

For a more detailed description of the process, SIPOC analysis was chosen. This analysis consists of identifying the five most important parts of the process. This includes the following components:

• suppliers,
• inputs ,
• process,
• outputs,
• customers.

First, it is important to identify key process, i.e. process that we will be improving and support processes that are necessary for securing the key process. The key process is therefore the sales process. His creation depends on ensuring sales network, business strategy, financing, evaluation and rewarding of employees, human resource development, marketing, data and information processing etc. The output of a key process, i. e. the sales, is a form of agreement between business and consumer, which implies that the trade will occur. The output is therefore an order.

It is important to identify customers, whether internal or external. Determination of the external customer is easy, because it is a buyer of a particular aircraft or dealer who consigns the product to the purchaser. The internal customer is another process that follows the end of the sales process. In our case, this may be the order processing, production and subsequent release of a product to the dealer.

After defining the process, outputs and customers; more difficult task of identifying the inputs and suppliers of these inputs occurs. Inputs are understood as the information, material and

other resources that are in the process transformed into outputs. Since the order is the output, the input may be a demand for the product of which supplier is either an external customer himself or dealer. The input can also be a product that company offers. Its supplier is, of course, the company itself.

The problem can be defined as a failure of the expected objectives. Tomark Aero Company nominates the plan sales volume for each year. This objective, however, in the last three years has not been fulfilled.

The target of implementation of Six Sigma in the sales process, is the increase of sales and assurance of the fulfilment of the expected sales volumes.

3.2 Measure phase

The second phase of the DMAIC cycle is devoted to measuring the current state of quality. First, it is necessary to identify the key criterion of quality. Our quality key criterion is a sale. The measurement, therefore, will consist of the following parameters:

- number of aircraft sold,
- the proportion of agents on total sales;
- revenues from sales
- fulfilment of the projected sales volume.

Based on these parameters, we will be able to compare the success of the project implementation of sales before and after the implementation of Six Sigma in the sale. Thus, the evaluation of the effectiveness of the project will be possible.

The number of aircraft sold

The first measured parameter is the number of aircraft sold. Company Tomark Ltd. has been engaged in the aircraft production only since 2006, so it is a relatively young producer of ultralight aircraft. It is essential to realize that the production of aircraft is a very demanding, complex and lengthy process, which includes a number of technical and safety testing for certification purposes. For this reason, it is impossible to expect huge numbers of aircraft sold annually. Since the beginning of its activity in the aircraft production, company Tomark Ltd. has sold 36 pieces of aircrafts. The development of the aircrafts sold in different years is shown in the figure below.

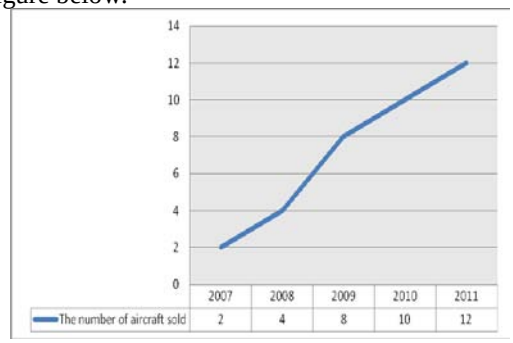

Figure. 1 - Development of aircrafts sold

The first two aircrafts were sold in 2007. At that time the company had not built a sales network, i. e. the first aircraft were sold to Slovak customers. The dealer networking began in 2009, when the dealer licenses with Germany and the USA were signed. An interesting fact is that just at that time the number of aircraft sold increased up to four aircraft per year, which was certainly a great success for a newcomer in aircraft production. It is understandable that with the gradual increase of the sales network, sales volume also increased.

The share of individual sales representatives in total sales

The dealer network currently consists of six vendors represented in the Czech Republic, Germany, Poland, Portugal, Ukraine and USA.

Seventh vendor is the Tomark Aero itself, which is based in Slovakia. As previously mentioned, the first vendors with whom the company has begun to work in 2009 were dealers in Germany and the USA. Later the sales network expanded to Poland, Portugal, Czech Republic and Ukraine.

The following figure shows what the proportion of individual vendors to total sales in 2011 was. Most aircraft, a total of 4 pieces, sold section Tomark Aero in Slovakia and thus participated in the sale of 34%. The second largest share, i. e. 17% belongs to vendors in Germany and the Ukraine, who sold 2 pieces of aircraft. Other dealers were provided with one piece of the aircraft in the last year, which represents 8% of the total sales.

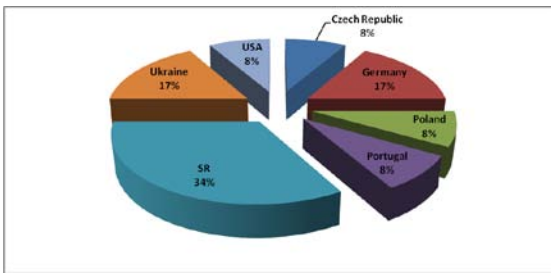

Figure. 2 - Share of individual vendors to total sales in 2011

Sales Revenues

The actual performance can be measured also by sales revenues. In the chart below we can observe the development of sales in recent years. Since the company Tomark Company Ltd. disagreed with the publication of real numbers, these values are only indicative. However, they have no influence on the development of additional assessment revenue in recent years because the curve of the development is unchanged.

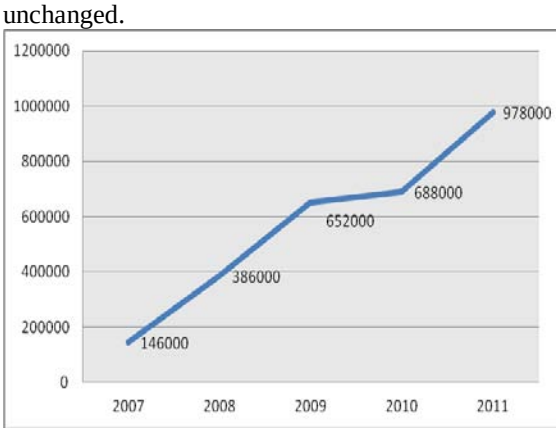

Figure. 3 - Development of the sales revenues of aircrafts in recent years

In the above chart we can see sales growth in recent years, resulting from the gradual increase in sales volume. Aircraft price ranges from 66,000 euros for the basic equipment, to 100 000 euros for full gear. As we can see, in 2009, sales grew only marginally, despite the fact that by two more aircrafts were sold as in 2008. This was due to the global economic crisis and the fact that customers inclined for the basic equipment for the purpose of saving the money.

Fulfilment of the projected sales volume

Finally, we are going to focus on the fulfilment of the projected sales volume. Plan sales during the last three years have not been fulfilled, as it sold for six aircraft less than the company planned to sell.

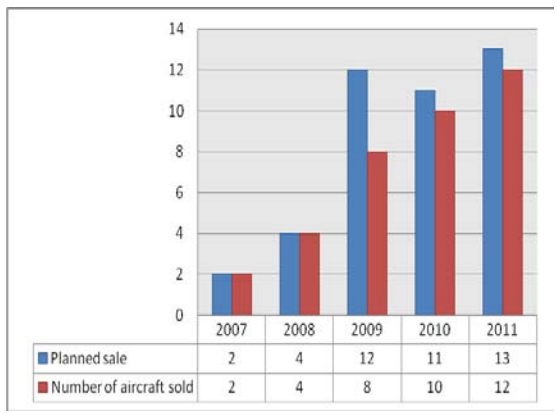

Figure. 4 - Fulfilment of the projected sales volume

Previous image contains the development performance of the planned sales volume. During the first two years, company has sold as many planes as planned. The company thus fulfilled sales plan for 100%. Since 2009, the company has planned to build sales network. Company planned tocooperate with the two dealers, expecting significant sales growth. Although this increase made, but not as much as they planned. The company has sold about 4 aircraft less than the expected volume of sales and marketing plan to meet onli for 67%. The following year, 2010, sold on a plane less than planned, which represents the fulfillment of the plan for 91%. In 2011, the plan was to fill for 92%.

3.3 Analyse phase

The third step DMAIC model is to analyze the possible causes of the problem. In this step is necessary to develop hypotheses about the causes of the problem and identify key factors for these causes.

Key factors failure of the expected objectives sales plan are people, management, methods, environment, equipment and material.

Management is involved in causing the problem for example insufficient motivation of the sales department employees and dealers. They are then less active, lazy and unwilling to actively participate in efforts to meet thesales plan. Another reason may be that the lack of corporate governance deals with the acquisition of information about the needs and requirements of their employees, which again can lead to reduced activity of employees. To meet the planned target is also necessary and sufficient qualification of dealers such as marketing, promotion, or work with computers. It is then an inability to work effectively with customers and its follow loss.

Failure to meet projected sales volume may be a result bad market segmentation and the lack of research that did not reveal important customer requirements. Company did not reach the right market segment and did not offer him a product of his imagination. The reason for lower sales can be change the supply from the supplier and the subsequent postponement of delivery of product to the customer.

In equipment, can be cause for example, a lack of or insufficient computing terms the seller (vendor has its own airport, etc.). If we will focus on the methods can detect many causes of our problem. Whether it will be a poor marketing, promotion, and less participation in exhibitions and fairs, the result is a low awareness of the company.

In the production of aircraft fulfills the important function also political and law influences on the behavior of businesses and consumers. Aircraft must meet the legislative standards and guidelines, which are constantly changing and are not unified in all countries. Therefore, it is these legislative processes complicate the sale. Sales volume may be insufficient as a result of the absence, respectively. small dealer network and low awareness in the global market. The impact of reduced sales is also poor quality and inadequate distribution of additional service facilities, such as service, flight school, sightseeing flights, and aircraft leasing.

Perhaps most important factor that most influences the volume of sales is the domestic and international economic situation. Very negative impact on the fulfillment of the planned sales volume was the global economic crisis. Saving had not only business but also customers. The company in order to save money had to forego participation in many exhibitions, which resulted in a reduction in awareness of the company and its products. Customers also save in time of crisis, which has led to reduced sales of aircraft, possibly due to reduced revenue savings to aircraft equipment. The previous statement only confirms that the sales volume significantly depends on the purchasing power.

In the analysis phase, we find also, how much money the company lost sales plan failure. Because of the lack of information from the company about its cost, this is only an indicative data, thanks to which we will have a better idea of the lost revenues. Aircraft price is from 66,000 euros to 100,000 euros, depending on aircraft equipment. We will work with the average price, t. j. 83 000 euros. The company has sold since 2007 for six aircraft less than planned. It is 498 000 euros, so the company sales were at last 5 years by nearly five hundred thousand euros less than the company anticipated.

3.4 Improve phase

The fourth phase of the DMAIC cycle is designed to build ideas that would help eradicate the root causes of the problem. The following are our ideas that could help improve the performance of the sales process.

The most important area that the company should focus its efforts on improving ia the area of marketing and promotion company and its products.

We propose the following measures:

- adapt to market demands - to conduct a thorough market research - know the behavior of customers, their needs and then choose the right market segment to offer and promote a product where it will be interested in;
- it is given to monitoring needs and requirements of customers and their satisfaction with the product;
- enhancement and improvement of Internet Marketing - contacting customers in more social networks through various competitions and events, facilitating the search options the company and its product by using keywords in search

engines, updated company website and its continuous improvement and the like;
- increasingly taking part in fairs, exhibitions and presentations - spread awareness about the company not only at home but especially abroad;
- organizing and attending air shows and similar events - offer sightseeing flights;
- increased use of advertising in local and foreign airlines and professional magazines and advertising;
- make every effort to continuously improve good relations with existing customers to spread positive feedback on the company and the product - eg. sending Christmas and birthday greeting cards, or gift packages with promotional items to the aircraft and the like.

In business management, we propose the following steps, which occur due to the elimination of negative impacts and by employees:

- increased interest in the needs and demands of workers - an employee who is at work feel good and fulfill all his needs, inevitably gives better performance than an employee who is unhappy at work;
- apply a motivational tool for the sales department employees - such as financial rewards, trips, etc.;
- motivate dealers to greater effort to sell aircraft companies - reward may be a discount on service;
- provide space for their employees and implement professional development - to organize or provide training in various areas of marketing, the use of computers and the like.

In the sphere of production the firm can perform the following steps:

- to focus on research and development - always looking for new ways to reduce weight or to extend the product range of other aircraft, which will broaden the range of potential customers;
- ever given to a certification process;
- save on equipment to reduce the cost of aircraft and aircraft would be more affordable for customers.

The increase in sales volume can also occur after the introduction of the following measures:

- improve the quality and volume additional services - provide a comprehensive air services (flight school, service, aircraft rental, scenic flights) only in Slovakia but also abroad;
- expand sales network - based on market research to determine which countries would be the aircraft Viper SD-4 interest, and then reach a dealer in the country, who would be willing to cooperate with the company;
- implementation of a comprehensive information system in business, which would facilitate and streamline the management of business and production processes in the company (by communicating with dealers, through monitoring of material flow, production failures, to sales of goods) and ensure the effective use of a dilution of time and resources;
- provide employees with the opportunity to improve their skills and abilities to use computer technology - to provide them with training regarding the information system, which is used in the company, respectively. about a new information system;
- implement other modules of the registration system called IFS - currently is in place only economic modules and warehouse management, so this should be completed, a recording system with modules for quality control of personnel management, management practices and identify the main parts of the aircraft from the purchase of material to dispatch aircraft;
- create a new, better, more detailed database of all customers;
- based on a thorough market research plan to establish an objective sales volume next year.

After these measures, we expect a positive change in fulfilling of determination sales plans.

The effectiveness and success of implementation of these proposed measures will be tested in 2013 when will be known amounts of sold aircrafts in 2012. The real situation is then compared with the planned production volume and evaluate the successful of the project.

3.5 Control phase

The final phase of the DMAIC cycle is dedicated to ensuring maintenance of the achieved level of improvements. In this phase is important for the company try to for continuous improvement. Organization for continuous improvement not only in sale is able to utilize:

- policy and quality objectives,
- internal audits,
- corrective and preventive measures,
- data analysis and performance indicators of processes,
- review the quality management system,
- improvement suggestions and proposals for change.

The main impulse for improving are results of analysis of monitored datas and processes and disagreements finding in the quality system as well as possible complaints.

The improvement process is important not only to determine the cause of the problem and eliminate them but also put emphasis on preventing their recurrence. The company must continually monitor of development achieve their objectives.

4 CONCLUSION

The analyses that were carried out clearly showed deficiencies in production and sales network to sell itself. As is going about young producer of aviation technology, this is mirrored in sale volume.

The contribution rests in implementation of method Six Sigma to the particular company in air transport. Application of this method for all company is extremely lengthy and difficult process, in that is of involvement the whole society and many a time requires assistance of a specialist in this area. Accordingly, the contribution of the proposal dealing with the application of method Six Sigma to a certain part of the company. We chose the area of marketing and sales network.

However, to demonstrate contributions of Six Sigma to a greater extent, i tis necessary to introduce it into other areas of society. The ideal would be to have the contractors in their business processes implemented this method. Six Sigma is placed on the philosophy of continuous improvement, therefore the company would never stop improving their processes because it will never be perfect functioning of the company and there opportunities for improvement.

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