015-0788

Organizational culture by change management: DHL Global Forwarding case study

Authors:

Prof. Camila Papa Lopes – Unisantos – camilapapa@hotmail.com

Av. Monteiro Lobato 520 – São Vicente – 55-13-9119-1183

Dr. Getulio Kazue Akabane – Unisantos – akabane@webrazil.com.br

Rua Dr. Carvalho de Mendonça 144 – Santos – 55-11-99787520

Prof. Rafael Mateus Barreto – Unisantos – rafael.barreto@dhl.com

Rua Dr. Carvalho de Mendonça 144 – Santos – 55 – 13-97408776

Dr. Ulisses K. Shimizu – Mackenzie - ushimizu@uol.com.br

Av. Washington Luiz 1527 – São Paulo - 55-11-56861479

POMS 21st Annual Conference

Vancouver, Canada

May 7 to May 10, 2010

ABSTRACT

This paper presents a qualitative analysis of the organizational culture influence in managing change, about business logistics. It is understood that transformation only becomes possible through the commitment of all company professionals, which is provided by the organizational culture, as it introduces values that build on the programs changes, methodologies and activities. A case study about change perspective was carried out on DHL Global Forwarding, analyzed as an example of a company's overall program that resulted in market share as more and better logistics services company in the world. It was observed that aspects of this program were responsible for culture change in the company. The results show that cultural change was due to adoption of a methodology for implementation of services that promotes professionals' involvement in the quest for continuous improvement in service delivery and processes. This methodology is Lean Six Sigma, which helps to establish criteria and procedures consistent with the company culture.

Keywords: Lean Six Sigma, Services Costs, Customers.

INTRODUCTION

In the services field, organizational evolution and administration of processes targets modification of values and the professionals' learning that innovation have to acquire new competences in order to follow market demands and customers’ needs. However, there is necessary to introduce methodologies and philosophies addressed to change management when

considering employees' resistances even the business complexity face to the human acting that it influences in the productivity and quality in the services area.

To Lovelock and Wirtz (2006), the productivity (to work faster and in more efficient way for reduction of costs) and quality issues were always important aspects in production management and its improvements that process like selection, training and supervision that represents cost reduction requirements.

Organizational culture can be considered as the basis for administration, as each organization has its own set of rules, values and behaviors that must be perpetuated by employees. Cultures provide the type of organization that will enter the market, its role and image. Their study allows the identification of factors that influence the decisions and policies within and outside the organization, establishing links with its customers from the language developed by managers.

Concerning the quality programs point of view, Ferguson (2007) considers Lean Six Sigma as philosophy, addressed for continue betterments through wastes elimination. Then Six Sigma targets reduction of processes variation used more by engineers and statisticians than by managers. The integration of those two programs make the characteristics of each one hinder the initial understanding of those involvements, therefore, a program achievements of that level is well implemented and have acceptance for entire organization, then change management should be very well conducted.

According to Juran (1999), the quality control always happened during the productive process, examining the variables that affect final quality instead of inspection process after the product is ready. The statistical process control among the other used methods was fundamental despite such concepts were put in to practice. According to Kenneth and Marshal (1994), Japanese learned and they had never lost from view the purpose of Deming and Juran of

generating the quality level that the consumers requirements, in other words, they adopted quality with focus in the customer.

In this article, the quality factor was approached in the services fields by adoption of lean and six sigma methodologies that, combined, they can represent improvements in the processes of services. This section, according to George (2004, p.9), has prominence in the global context: "Operations of services now act more than 80% of GDP of the United States and they are growing quickly all over the world".

According to Denton (1990), the six sigma is an important tool to improve acting and leadership in the organizations for the effective use of statistical methods to reduce process variability and focused in the customer's needs that they consider a critical aspect.

In agreement with Abraham (2007), the companies increases integration between lean and six sigma and it comments on: "In a conceptual terms, idea is to treat lean focusing mainly wastes elimination and process speed increase then Six Sigma approaching the variability reduction and, consequently of the flows.

The importance of studying Lean Six Sigma in the organizations of services to Sousa (2006), lives in the fact that the literature focuses in an accentuated way on the industrial processes and it doesn't accompany the transition tendency for savings in that the section of services has been taking larger proportion, as the case of Brazil.

The main objective of the present research is analyses the culture influence in change management on DHL Global Forwarding, what is done by Lean Six Sigma.

In George's (2004) vision Lean Six Sigma for services represents a methodology of improvement in businesses that maximizes shareholder's value when reaching the tax of faster uplifting in customers' satisfaction, costs, quality, process speed and invested capital acts.

LEAN PHILOSOPHY

According to Queiroz (2007), Lean Manufacturing had its origins starting from the Toyota production systems (Just in Time) after to Second World War, being applied firstly in a shop floor and later adapted to the entire dimensions of businesses in organizations, resulting in the Lean Thinking, that is the operational philosophy or a system of businesses, as form of aligning in sequence actions that create values, to accomplish uninterrupted activities and in an effective way and to offer the customers what they want in the right time.

George (2004, p.3) defines: Lean is a group of beginnings that accelerates the speed of all the processes through the company. For Womack et al. (1996), one of the main consequences of the lean thinking is the reduction of losses through the elimination of activities that does not join value to the final product / service. In agreement with this author, the elimination of the waste has as focus on reaching a target cost based on the perception of the customer's value and all involved in the chain of values, that should be willing to negotiate a group of beginnings, in the context of the lean initiative, that orientates the behavior among companies and in parallel developing mechanisms for mutual verification, in way they do not divert these values.

The characteristic of the concept Lean (GEORGE 2004) are:

- It focuses in maximization of the process speed.
- Offering tools for analysis of process flow and times of arrears in each activity of the process.
- It centers in the separation of work that adds value from the non added value with tools to eliminate the root cause of activities that do not add value and it costs.
- It offers a way of quantifying and eliminating the cost of the intricacy.

In the Lean philosophy business partnership is focused in the optimization, where cooperation network grow is transferred from the internal to the external partnership in order to get a total opportunity of continuous betterment. In this level of relationship, the effective way of negotiation is the unified solution of problems, where company and customer explore the future together, with focus in the improvements that can assure the customer's satisfaction and to result in own sustainable competitive advantages and entire organization that renders the service, with mutual benefits in the long term (CARAVANTES 1997).

A limitation of Lean concept is that the difficulties to put a process under a statistical control (GEORGE 2004).

According to Corrêa and Gianesi (1993), implantation of the Lean philosophy requires a systemic approach in which several aspects of the process are modified and they compose the essence of its implantation among them as follows:

- Commitment from the high administration: change for the lean mentality;
- Measurement and evaluation of processes: performance indicators;
- Organizational structures: specialists should qualify the operators to assume responsibilities (former skills, quality, maintenance, etc);
- Organization of the work: the work favors flexibility, communication and work in team;
- Knowledge of processes and flows: compilation of material flows and information.

In the services section, there are two relevant premises in adopting the implantation of Lean, for its peculiarity on customer's participation on the operations and processes: the first to be considered service as more effective if customer is less involved in the accomplishment (CHASE

1978) and second foresees that productivity earnings occur when customer participates in the services operation when customer company attributes process is low (FITZSIMMONS 1985).

For Seddon (2005) it is necessary to know customer needs and requirements. This can be made by questioning problems that are presented and by evaluation on service process, therefore, it presupposes the customer's participation in an effective way in order to reduce wastes, to solve problems and to reduce costs.

SIX SIGMA METHODOLOGY

According to Pande et al. (2001), Six Sigma is a system to reach, to sustain and to maximize business success, impelled by understanding customers' needs, through disciplined use of facts, data and statistical analysis and diligent attention to management, improvement and reinvention of businesses processes. In agreement with Rodrigues (2006), this methodology remains on a problem to be solved and it evidences people's value and their knowledge, with base in three pillars: adoption as administration philosophy, business strategy and operationally with statistical tools.

Originated in Motorola in the 80th decade, Six Sigma substituted the *Total Quality Management* program (TQM). According to Mikel Harry (ALONSO 2007), one of program creators, TQM had not presented expected results, because it lacked an objective. The methodology was created in the production shop floor by competition needes within foreign products, promoting a series of operational benefits, reduction of defects, resulting in a faster and clear production. Later, it passed to be used in project management an administration system to aids in strategies execution and increases its market value of the product. Starting from 1992, the methodology was adopted by other companies and the Motorola University passed to offer subject training and consulting in 1999. General Electric it also adopted Six Sigma as a process

for the continuous improvement in the production and administration of projects. Due to the advantages that resulted, all the employees were trained to multiply the best practices, making possible the replication of the projects in the whole company and adoption of advanced statistical tools, control of the quality, process of change acceleration and management of the technology (RECHULSKI 2004).

According to Pestorius (2007), since the application in Motorola, Six Sigma obtained several definitions connected to the efficiency in the operations, improvement of the businesses to achieve process excellence. But its main objective lasts long solid because of the continuous incentive process improvement adopted methodology in standardized problems solution, documented and susceptible to repetition.

Differentiating to Six Sigma philosophy and other quality approaches, Larson (2003) uses a definition done by Bill Smith, considered one of program creators in Motorola: organized common sense.

Rodrigues (2006) considers that Six Sigma has as a main product creation and/or modification of a process with bases in the largest business profitability and effective service of needs and customer's expectations.

Anderson (2006) understands Six Sigma as a management philosophy that aims to reach challenging objectives of reduction of defects in processes, products and services, using the collection of data and rigorous analysis of results; and Sousa (2006) defines as an approach focused in processes for business improvement, and fundamental subject lives on the processes of analyzing individually them and in each stage.

In same way as Lean concept, George (2004) evidences some characteristics of Six Sigma as:

- Emphasizes the need on recognizing opportunities and eliminate defined customers defects.
- Recognizes that the variation harms our capacity to give services of high quality in a reliable way.
- Requests decisions based in data and it incorporates an including group of quality tools under a powerful structure to effective solution of problems.
- Offers a culture infrastructure highly prescribed is effective in the obtaining of maintainable of results.
- When correctly applied, it promises and gives USD 500.000 or more of improvement in the operational profit for Black belt a year (a value reached concretely for a lot of companies).

Some companies consider that Six Sigma should just be driven by engineers. That statement leaves mainly of who uses Lean method. In spite of the engineers to dominate the methodologies easily contained in the program Six Sigma, Pande et al. (2001) disagree with this statement, when recognizes that measurements and statistics are the base of the program, but that Six Sigma is not just summarized in that.

In synthesis, sigma means standard deviation, or a variation measure and number six indicates the level of defective products generated in any process, that represents statistically 3,4 possible defective products to each millions of produced products.

According to Campos (2006), the main element of Six Sigma is knowledge. It is obtained in an easier and fast way when the statistical thoughts is developed, that is simple, however it is little published and little used because of the aversion demonstrated by most of the people to the statistical methods. The methodology Six Sigma is, therefore, an applied group of tools in a

logical way and structured, with the purpose of reducing the variations and the defects in the processes, following the principles of the statistical thought:

- The whole work happens in a system of processes interconnected;
- The variation exists in all processes;
- Knowledge and reduction of the variation is the key of the success.

In the Six Sigma approach, strategic projects, with goals and defined periods, they are driven by specialist's teams in the methodology, calls the Green Belts or Black Belts, and for leaders, or champions that are the responsible for removing the barriers that appear for the development of these projects (RODRIGUES 2006).

In agreement with Rodrigues (2006) and George (2004), the Six Sigma Project is divided in five phases by the methodology DMAIC: D (Define); M (Measure); A (Analyse); I (Improve) and C (Control), defined for Guide Project Management Body of Knowledge) and explained in the table 1.

PHASES		DMAIC
Initiation	D	Define the critical processes and objectives before business, expectations and customers' needs
Planning	M	Measure the performance of the process and identify the problems and intensities of it.
Execution	A	Analyze the performance and problems
Conclusion	I	Improve the process eliminating the problems, reducing the costs and joining values to the customer
Control	C	Control the performance of the process.

Table 1. DMAIC Methodology

Source: Rodrigues (2006)

The method DMAIC leans on in other quality methodologies, using the Diagram of Cause and Effect, also known as diagram of fish spine and diagram of Ishikawa, that consists on a method that contributes to research roots of problems starting from questions like: what, where, how and why. These questions contribute to systematize the problem and sometimes, the answer is explicit in the diagram (SLACK, CHAMBERS AND JOHNSTON 2008). By adopting the quality methodologies, the Program Six Sigma constitutes a tool of process analysis adapted and effective for the section of services for verifying each stage of the process and the acting of the organization.

INTEGRATION OF LEAN WITH SIX SIGMA

On Ferguson's vision (2007), Lean and Six Sigma are two programs different with similar purposes, when explaining that six sigma is a program, and Lean is a philosophy (important to emphasize that the author works with distribution and manufactured goods, those professionals' profile is more gone back to Lean, for that the defense of calling it philosophy). For the author, some projects six sigma lose the value as soon as it reduces the visibility, already the philosophy Lean does not, because it is transmitted to all the parts of the company. This way, it defends as a tool of transformation while the six sigma just a change in management; the six sigma has begin, half and end with the methodology DMAIC, already Lean is part of the life of the company and of its professionals.

According to Queiroz (2007), the adoption of just Six Sigma or Lean Manufacturing carts many benefits for the organization. However, when used together, in a harmonic way, the two systems become more effective, since the strong points of one fills out the possible gaps or

deficiencies of the other. That union will potentiate the forces, exercising enormous influence in the general performance of the processes of a company.

The difference on the characteristics of the programs Lean and Six Sigma pointed out by the authors George et al. (2005) through their tools has the purpose of stimulating the companies adopting them. On the other hand, the non uniformity is observed in their aspects as pointed by Fergurson (2007) that defends the largest potentiality of the program Lean to the cultural change of the organization.

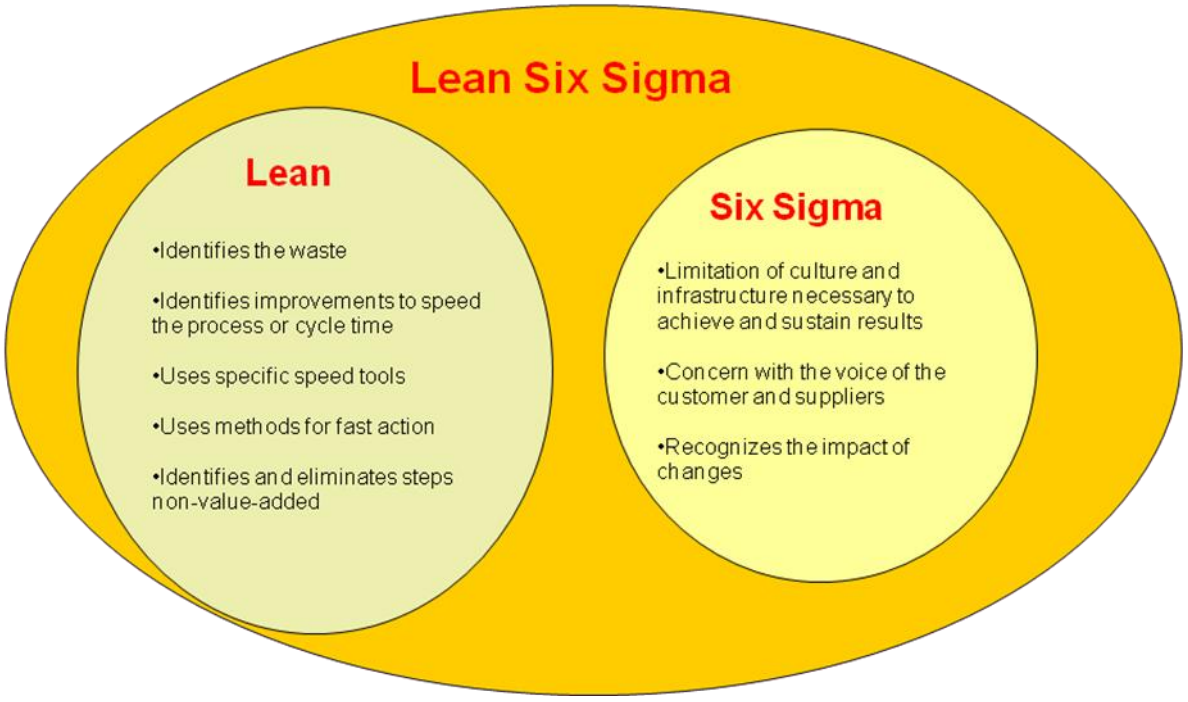

Figure 1. Lean Philosophy and Six Sigma Integration

Source: Adapted from George (2004)

According to Queiroz (2007) the integration between Lean and Six Sigma requires involvement of leadership and establishment of strategic objectives, elaboration of a program commanded by trained team and culture change so those involved can know the tools, their

potentialities and like this to apply them to obtain effective results. The author mentions the strong points of the two form methodologies to emphasize their importance in the processes analysis, which consequently, generates understanding about their effectiveness on operations of services:

Six Sigma strongest points

1. Use of methods structured to reach goals DMAIC AND DMADV;

2. Use of statistical tools, for data analysis, that aims the solution of complex problems;

3. Aims on reduction of the variability;

4. Emphasis in the reduction of costs and defined defects by the customers;

5. Selection of projects associated to the strategic goals of the company;

6. Focus in the improvement of products and not just in the processes improvement;

7. Direct measurement of the financial return generated by the program;

8. Sponsors' infrastructure and specialists (Sponsors, Champions and Belts);

9. Specialists' high dedication;

10. Involvement of all the people from the company, from different levels of making deeper the program (Black Belts, Green Belts, Yellow Belts, White Belts), as responsible for knowing and implement their concepts and the methodology;

11. Recruiting processes, training, promotion, recognition and reward contemplating and motivating the consolidation of the culture Six Sigma.

Lean strongest points

1. Tendency for immediate action in case of problems solution of restricted mark and of low complexity, through the Kaizen events;

2. Use of simple techniques for data analysis during the kaizen events;

3. Search of the lead team's reduction and work in process;

4. Emphasis in the maximization of the processes speed;

5. Strategic Projects Selection identified by mapping the Value Flow and also of projects of exclusive interest of some area on the company.

According to Harry (ALONSO 2003), director of Motorola at that time of the implantation of Six Sigma and considered godfather of the method, if a rug of 140 square meters went clean with quality 3 sigma, the surface that would continue dirties in the end of the work would be equivalent to the busy area for a lie back chair. If the cleaning was made with six sigma quality, surface dirties would be of head size of an imperceptible pin. Each sigma generates an exponential defects reduction; therefore, as sigma increases it also reliability increases.

METHODOLOGY

An exploratory case study was accomplished in a DHL Global Forwarding, a global extent logistic services company in Brazil operation. The process adopted on the research, a transport of loads, starting from customers needs perception on the clearance and delivery of documents to the carrier. Thus exploration is particularly useful when the researchers do not have a clear idea of problems to face during the study (JOGGING AND SCHINDLER, 2003, p.131).

The collection of data was accomplished with documental research, starting from process documentation supplied by the company analyzed during period of January from 2007 to August of 2007 and January from 2008 to August of 2008, time frame of Lean Six Sigma application in

way to compare processes results between 2007 and 2008. In agreement with Yin (1994), the research should identify some situations in that all of the research strategies are relevant. Subjects "how" and what" is formulated on a current group of events in which the investigator has little or any control. This study investigative tried to identify "how" it happens in the logistics chain in that factors “what” is affected. As the study research for these questions, this suggests adoption of an exploratory methodology (YIN, 1994, p. 21). He also reminds that exploratory studies are firstly useful in generation of hypotheses centered in the phenomena under investigation. Therefore, it was also anticipated that research would result in emergency of hypotheses and an additional theory to address for future similar researches.

In fact, the identification of behaviors of a phenomenon is essentially an exploratory activity in main objective is to refine research idea to facilitate a wider research (KERVIN 1992). Before this premise, the apprenticeship of information gather can be considered as a preliminary investigation according to Emory and Jogging (1991), being constituted in an essential method in transport research. Although it was common in exploratory research trusts the specialists' opinions and the focus in the initial apprenticeship groups, this was not considered in the present case.

CASE STUDY

DHL Global Forwarding is leader in the world market of sea freight and airfreight, with about respectively 11% and 9% market share. There are about 30.000 employees in more than 800 places in 150 countries and places.

A logistic services execution process was analyzed for a customer, in the year 2008 time frame. The Lean Six Sigma was applied to each customer then process analyzed or in the process execution with verification of all of the stages. In this case a group of processes was analyzed, once the customer uses in wide range of logistic services offered by the company.

The starting point is from customer's perception that logistic procedures were not effective and incompatible with their needs. The identified Lean Six Sigma implantation problem was excessive days in documents transfer process in sea freights from shipping arrival date in Santos Harbor in order to delivery selected goods to the carrier. This gap generated high storage costs and demurrage. Then Six Sigma by DMAIC methodology was applied complemented with Cause and Effect Diagram- Ishikawa diagram as first phase called Define. It was quite simple to identify the application objective of Lean Six Sigma, because the customer (that already knows the program) informed exactly what they needed to consider ship arrival dead line until documents deliver to the carrier. The initiative followed objective guide line for four days to the transaction.

The Measure phase was soon accomplished. Easily was obtained data, once all of the processes are registered in the customer's system that allows the extraction of reports.

As premise that customer is involved once great part of necessary documents for unload and demurrage is supplied by them. In this phase, the process over time was observed as in the figure 2, that relationship between ship arrival and documents delivery in the carrier had high variability degree, some arriving at 25 days of it goes through the procedure just as sample.

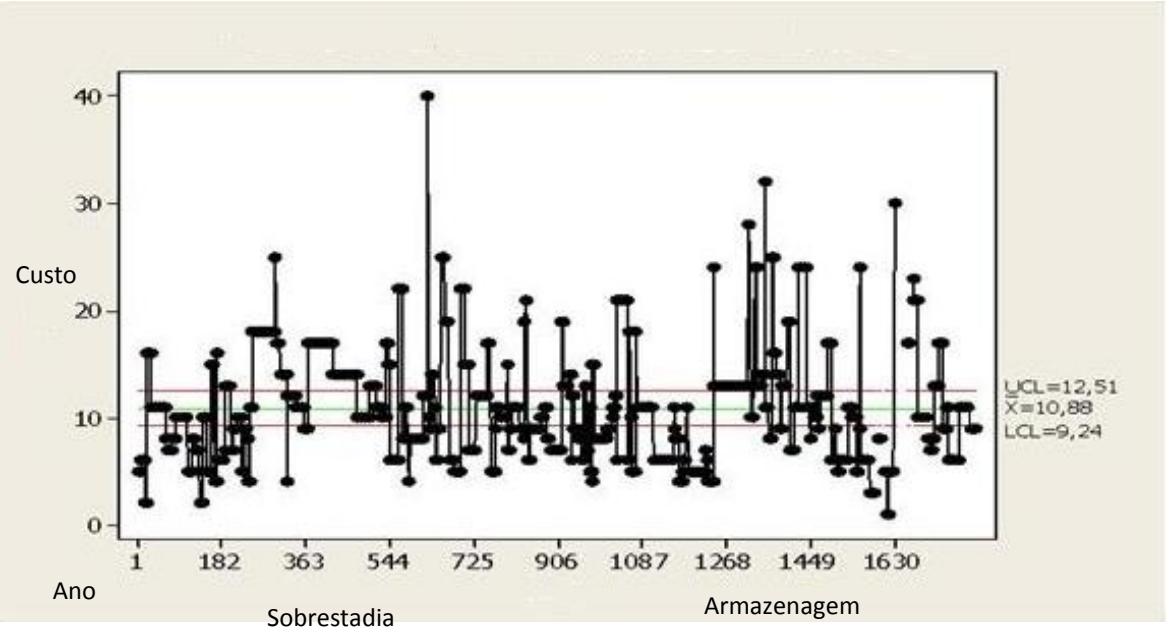

Figure 2. Graph of relation among date of ship arrival to documents delivery for carrier before lean six sigma project

Source: DHL Global Forwarding (2008)

Starting from customer needs, logistic costs reductions involving demurrage and storage, it was concluded after internal processes analysis for reaching the proposed objective that clearance time reduction. In this point, it happened into the process from ship arrival to documents delivery in the table 2.

Client's needs	*Drivers*	Objectives of the business and of the customer
logistic costs reduction (demurrage and storage)	Customs clearance time reduction from ship arrival date to documents delivery to the carriers	The customs clearance is made within four days from ship arrival date for green channels

Table 2. Mentioned customer needs

Source: DHL Global Forwarding (2008)

Starting from the objectives identification follows stages identification to reach process analysis happening in DMAIC third phase called Analyse. The reality stakes incompatible with customer's premise and organization for lack of customer's control on their internal processes and consequent delivery of documents in the transaction were observed.

If control was not made company have no knowledge the exact time of transaction then considered as hypothesis that the process was accomplished in about six days. It was identified that main indicator for the initiative was in 10,88 days instead of initial premise of six days. Using the diagram of Cause and Effect (Figure 3), the problem main cause was structured. The costs generated by customer were investigated it could help to break paradigms in the logistic processes to the application of Lean with Six Sigma.

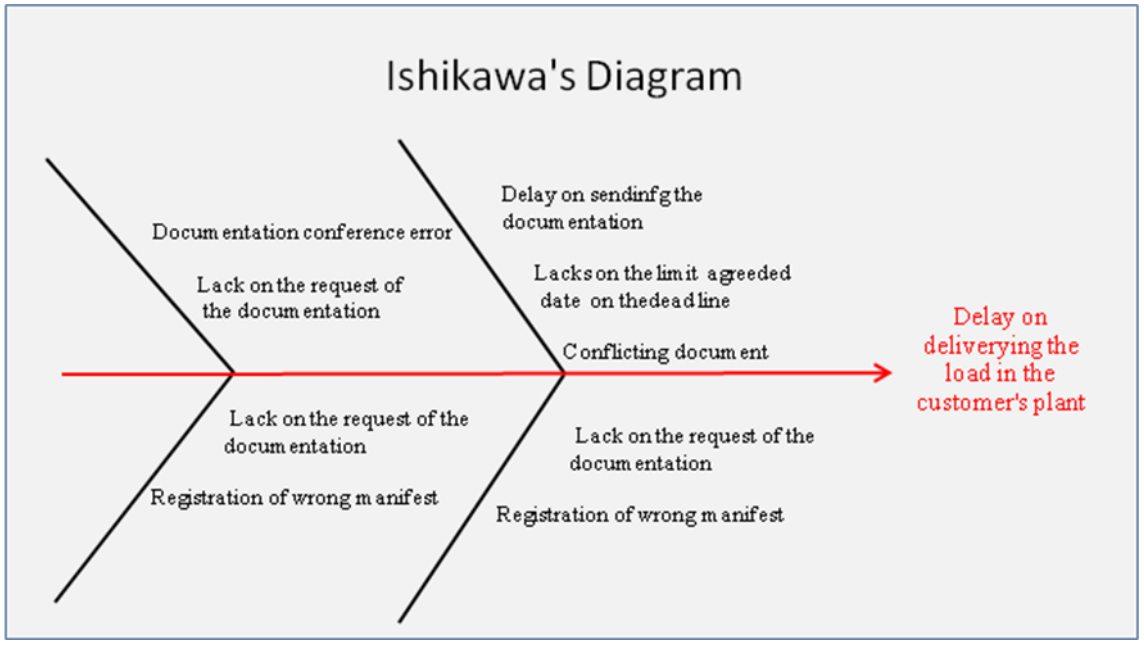

Figure 3. Ishikawa's Diagram

Source: DHL Global Forwarding (2008)

With the diagram evidences that main problem was documents delivery, because it shows uniformity lack and incurrence, generating wastes of time and cost along the process. Among the main causes they faced through clearance procedure adopted in Santos Harbor after ship arrival, such as excess of bureaucracy and unnecessary processes involved in the transaction.

After problems identification that causes over time, the implementation phase was accomplished - Improve, essential to verify if identified solutions were effective in a methodology execution. The proposed objective was to reduce process lead time that took about 10 and a half days in 60% from total.

As solution, the premise was process reduction means cost cutting by eliminating 3 days of impact in Key Procedure Indicator - KPI, a quality indicator used by the company.

A flowchart as a map of the process was presented (table 4) to the customer.

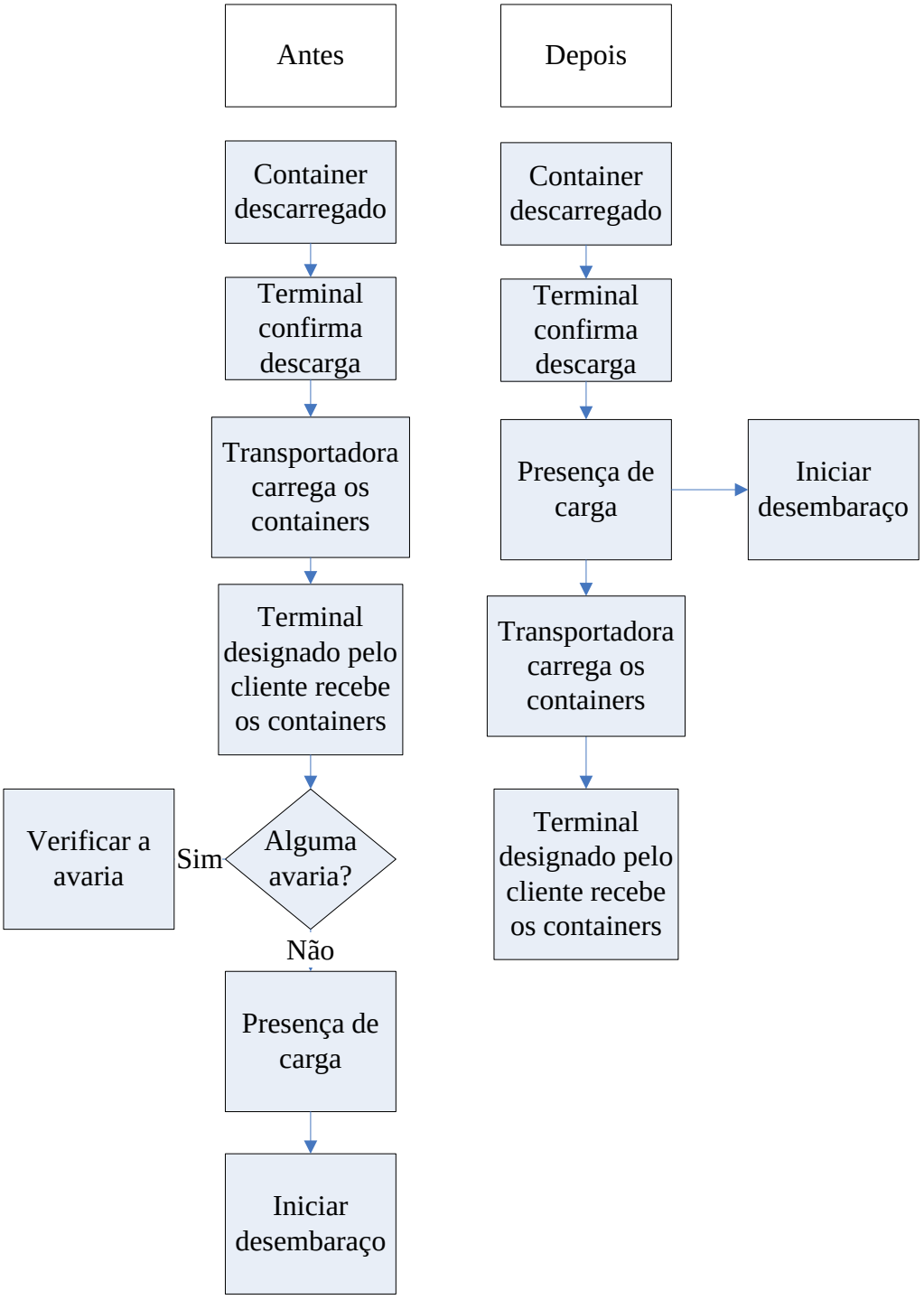

Table 4. Process Flowchart before and after Lean Six Sigma

Source: DHL Global Forwarding (2008)

The control graph was adopted (Figure 5), characterizing the Control phase, as tool to present to the customer the analysis results, to be aware initiative and results. Under this tool the customer really understood process change and knolled time improvement in cycle reduction.

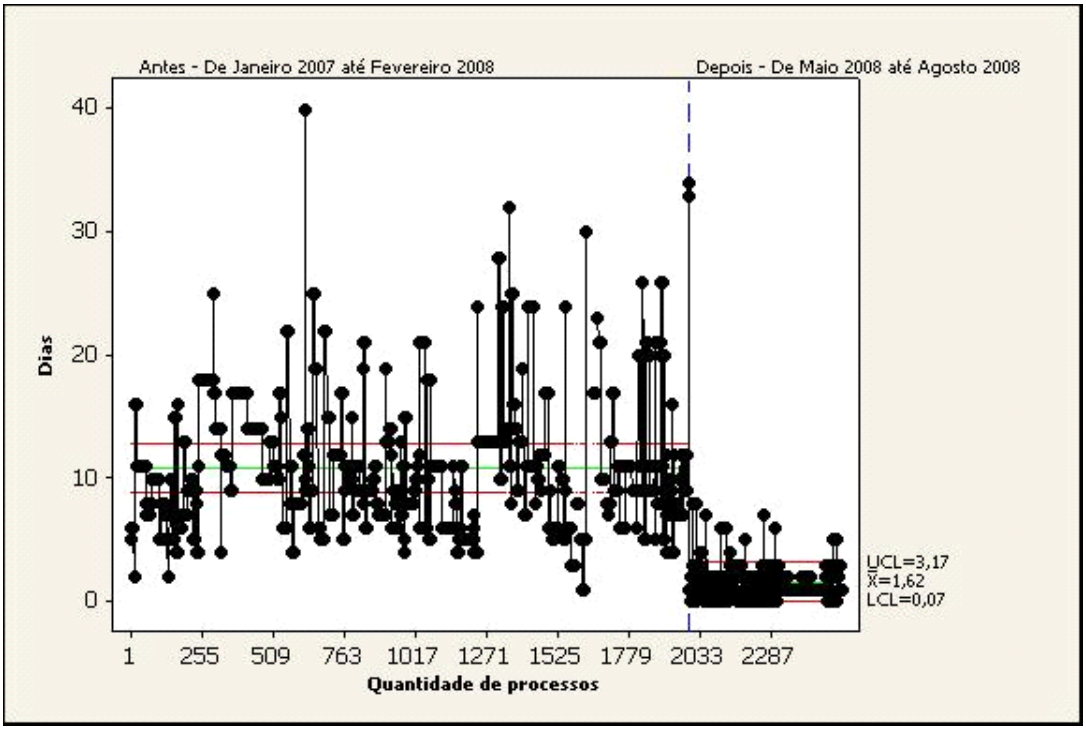

Figure 5. Relation among ship arrival date to documents delivery for carrier after lean six sigma project

Source: DHL Global Forwarding (2008)

After Lean Six Sigma process accomplishment, the variability fall is observed and processes execution started in less than two days, so that besides supplying customer's need, the deadline was overcome, reducing bureaucracies and amount processes in the transaction, representing customers satisfaction, overcoming expectations and also, generating customers costs reduction and starting from their results for the company side,:

- Reduction on period of ship arrival to documents delivery to carrier from 10,88 days for 1,62 days in average;
- Reduction of demurrage costs from U$25.045,25 to U$14.213,25, in average, comparing the period of January to August of 2007 and January to August of 2008;
- Reduction in storage cost from U$152.596,83 to U$82.632,52, in average, comparing the period of January to August of 2007 and January to August of 2008;
- Total customer save in the total of U$596.412,79, comparing the period of January to August of 2007 and January to August of 2008.

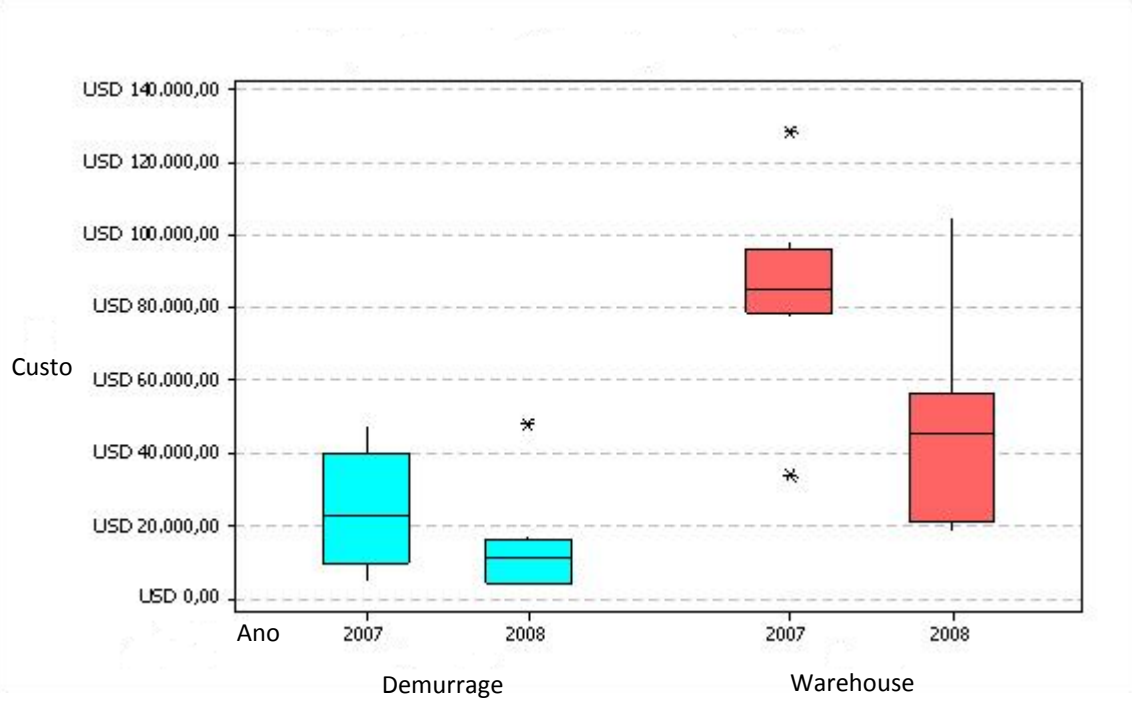

Figure 6. Logistic costs saving exhibition

Source: DHL Global Forwarding (2008)

Due to the partnership between company and customer, on premise adoption of customer's participation in the process, the application of Lean Six Sigma contributed to reduce process variability, it produced a lean mentality for eliminating unnecessary stages and it influenced in the cost, not only for customer, also for company side, because 50% of customer's economy were billed by company, in other words, it reduced their costs in the process of installment of logistic services in U$298.206,40, starting from October of 2008.

CONCLUSION

Lean Six Sigma is an appropriate and effective tool in a services area in the sense of process restructuring that can represent customer’s needs with reduced costs, reduced process time and consequent execution of service, variability decrease in the process.

The tools are complementing each other, but as limitation of present study, are observed that emphasis should relapse on organization culture change because two methods depend on people's compromising in a company performance and process implementation. This way, more specific studies on the cultural appeals and people's administration should be accomplished in order to show the effectiveness of the tools.

With the results, Lean Six sigma can contribute significantly for companies logistic services acting processes improvements inside organization or improving customer relationship.

Finally, continuous and effective logistic process integration is only reached with the adopted idea is integration, segmentation, transparency, composition and another that provides to supply chain level comparable to the collaborative administration in consonance to the competitive horizontal integration of logistics chain. The more specific issues is more perfect

initial chain evaluation in order to get more expected results of the model, what motivates new exploratory studies to find better applicability.

As for the limitations observed in this study is that the processes itself, as well as the analysis for Lean Six Sigma are complex, disabling to show all details the tool, besides suggesting that other studies are made applied to services, in way to identify methodology applicability and continuity, while philosophy of services.

REFERENCES

ABRAHAM, Márcio. Modelo de Gestão do Lean Seis Sigma. **Qualidade Excelência Six Sigma**. São Paulo, n.5, p.3-5, novembro-dezembro de 2007.

ALONSO, Viviana. Conselhos do padrinho. São Paulo, **HSM Management**, n.38, p.78-81, maio-junho, 2003.

ANDERSON R. *et al*. Similarities and differences between TQM, six sigma anda lean. **The TQM Magazine**, v.18, n.3, p.282-296, 2006.

CARAVANTES, et al. **Administração e Qualidade**. São Paulo: Makron Books, 1997.

CHASE, R. B. What does the customer fit in a service operation. **Harvard Business Review**, v.56, n.6, p.137-142, 1978.

COOPER, Donald R.; SCHINDLER, Pamela S. **Métodos de pesquisa em Administração**. Porto Alegre, Bookman, 2001.

CORRÊA, Henrique L.; GIANESI, Irineu G. N. **Just -in- time, MRP II e OPT** - Um enfoque estratégico. São Paulo: Atlas, 1993.

DENTON, D. Keith. **Qualidade em serviços:** o atendimento ao cliente como fator de vantagem competitiva. São Paulo: Makron: McGraw-Hill, 1990.

EMORY, C.; COOPER, D. Business Research Methods. In: IRWIN, Richard D; HOMEWOOD, I.L.; FIOL, C.M.; LYLES, M.A. Organizational learning. **Academy of Management Review**. 1991. v. 10, n. 4, p. 803-13, 1985.

FERGUSON, Douglas. Lean and six sigma: the same or different? **Management Services**, p.12-3, october 2007. Disponível em: http://findarticles.com/p/articles/mi_qa5428/is_200710/ai_n21295894. Acesso em: 20/02/2009.

FITZSIMMONS, J. A. Consumer participation and productivity in services operation. **Interfaces**, v.15, n.3, p. 60-7, 1985.

GEORGE, Michael L. **Lean Seis Sigma para serviços**. Rio de Janeiro: Qualitymark, 2004.

GEORGE, Michael L.; ROWLANDS, David.; PRICE, Mark; MAXEY, John. **Lean Six Sigma pocket toolbook**. New York, NY: McGraw-hill, 2005.

JURAN, J. M. **Controle da qualidade**. São Paulo: Fundação Getúlio Vargas, 1999.

KENNETH, J.K.; MARSHAL, S. **Gestão da qualidade total na prática**. Rio de Janeiro: Campus, 1994.

KERVIN, J.B. **Methods for Business Research**. New York, NY: Harper Collins, 1992.

LARSON, A. **Desmystifying six sigma**. New York, NY: AMACOM, 2003.

LOVELOCK, Christopher; WIRTZ, Jochen. **Marketing de serviços**. 5.ed. São Paulo: Pearson Prentice Hall, 2006.

MARTINS, Petrônio G.; LAUGENI, Fernando. **Administração da produção**. São Paulo: Saraiva, 2000.

PANDE, Peter S.; NEUMAN, Robert P.; CAVANAGH, Roland R. **Estratégia Seis Sigma**. Rio de Janeiro: Qualitymark, 2001.

PESTORIUS, Michael S. Aplicando o Seis Sigma às vendas e ao marketing. **Banas Qualidade**. São Paulo, ano XVI, n.178, p.40-50, março de 2007.

QUEIROZ, Maricy de Andre. Lean Seis Sigma. Como integrar o lean manufacturing com o seis sigma. **Banas Qualidade**. São Paulo, ano XVI, n.178, p.40-50, março de 2007.

RECHULSKI, D.K. Programas de qualidade seis sigma – Características distintas do modelo DMAIC e DFSS. **PIC-EPUSP**, n.2, p. 1219-1237, 2004.

RODRIGUES, Marcus Vinícius. **Entendendo, aprendendo, desenvolvendo qualidade padrão Seis Sigma**. Rio de Janeiro: Qualitymark, 2006.

ROTONDARO, Roberto G (coord.) **Seis Sigma:** estratégia gerencial para a melhoria de processos, produtos e serviços. São Paulo: Atlas, 2008.

SEDDON, John. **Freedom from command & control**. New York, NY: Productivity press, 2005.

SOUSA, Eduardo Lopes de. 2006. **Aspectos que facilitam ou dificultam a aplicação da abordagem seis sigma em uma empresa do setor de serviços**: o caso da Telemar. Dissertação (Mestrado em Administração). Pontifícia Universidade Católica, Campinas, 2006.

WOMACK, J. **Lean thinking**. New York, NY: Simon & Schuster, 1996.

YIN, K. **Case Study Research** - Design and Methods, Applied Social Research Methods Series 5, 2.ed. Newbury Park, CA: Sage, 1994.