



**UNIVERSITAT
JAUME·I**

LEAN MANAGEMENT METHODOLOGY: THE CASE OF AUTOMECANICA LEVANTE

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DEGREE IN BUSINESS ADMINISTRATION

AE1049 –FINAL DEGREE WORK

ACADEMIC YEAR: 2016-2017

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INTRODUCTION

We are currently in a very globalised environment, in which day to day competitiveness is more and more demanded to companies, being necessary the improvement in terms of efficiency and productivity in every process. Facing the complexity of this scenery, it is necessary to modernise policies, focusing them to the development of new concepts with which improve the concept of competitiveness (Esty and Wiston, 2009). Consequently, companies are going to need to face the challenge of searching and introducing new techniques, both organizational and productive, in order to be able to compete in this global market.

As a response to this situation, the Lean Management (LM) appears, methodology followed by companies who want to improve their competitiveness, obtaining better results while using less resources. Its main objective is to eliminate all the activities which do not add value to the productive process (Tejeda, 2011).

The Lean Manufacturing has its origins in the Just in Time (JIT) production system, developed in the 50's by the motorcar company Toyota, from Japan. With the extension of the system to other sectors and countries, a new model has been created, which has been transformed into the paradigm of the associated productivity systems to the industrial excellence improvement.

According to Hernández and Vizán (2013, p.6) "the Lean system consists on the systematic and habitual application of a group of production techniques which search the improvement of the productive processes through the reduction of all kind of waste". The key is to generate a new culture tending to find of applying these improvements to the fabrication plant, both as in a job role level and in the fabrication line, and always in direct contact with the existing problems for which collaboration and communication among the managers and operators is considered fundamental.

Despite being a pioneer from the motorcar industry, it has been adapting to any type of organisation, including the services sector, as well as every business department (Cuevas, 2012).

Further from the techniques applied in this system, it is a corporate philosophy in which every staff member is in contact and the workers are free to "analyse, think and act", giving prominence to people (Grau, 2012). When introducing Lean to any business it is with the purpose of easily detecting the areas to improve, as well as of easing and improving the exploration of good job practices; as well as aligning objectives between worker and company, which will mean that they are working in the same direction.

Nevertheless, it is true that in Spain this system is not well known yet, specially among the SME's (Hernández and Vizán, 2013). That is why the two main objectives of this work are going to be, on one hand, make the Lean methodology and its techniques known, and on the other hand, to implement and analyse the project of application of the methodology in some of the processes of Automecánica Levante, SME located in Almazora (Castellón), and focused on the motorcar sector.

The structure of this work is a case study divided in three chapters. The first one, a theoretical guide in which the fundamental basis of the Lean methodology will be explained. On chapter two, in order to start the project, the situation of the company will be studied through a mixed methodology. Firstly, an empiric study will be made, with anonymous polls, and after that, there will be a qualitative study through personal interviews with the members of the analysed department. With the information gathered, possible upgrades and Lean tools will be proposed. Being the proposals in motion, new polls will be made in order to analyse if its implementation are being effective, and a brief resume of the results will be made, as well as some recommendations to future investigations. Also, the limitations which have appeared during the process will be exposed.

CHAPTER 1. THEORICAL CONTENTS

1.1 Lean Management

1.1.1 Historical introduction

The Lean philosophy has its origins at the start of the twentieth century with the modifications developed by F. W. Taylor and Henry Ford on the serial production which started being used by the end of the previous century. Afterwards, Ford introduced the first serial production chains in the car industry, intensively applying product standardization, elementary task machines, task simplification, work specialization, specialized training, etc (Hernández and Vizán, 2013).

However, this new methodology does not start to be known as “Lean” until it doesn't break with previous techniques. For this reason, it can be said that Lean Manufacturing is born in Japan, and it is based on the Toyota Production System (TPS).

Nevertheless, this has recently been evolving regarding some precepts and principles related to two main ideas: Giving a great importance to the role of the human factor in production processes, and an evident continuous improvement spirit.

Regarding the book, *The machine that changed the world* (Womack et al., 1990), one of the most recognised books which explains the history of the Lean methodology, the Toyota philosophy precepts were established in 1935 on the 5th anniversary of the death of the Toyota group's founder, Sakichi Toyoda, as a result of his teachings and which reflect the company's spirit.

During the 50s, the reconstruction years after WWII, Japanese industry in general and Toyota in particular, had to face the challenge of putting the manufacture industry on its feet; with a limited demand, not being able to resort to economies of scale, and in addition, in a scenario in which it was difficult to obtain funding.

The poor market movement and the limited available resources were a breeding ground for more efficient production proposals, able to be the answer to that extreme unfavourable situation. Regarding production processes, production is redefined based on a series of fundamental ideas in order to give a solution to the exposed problems (Moreno, 2010):

- To only manufacture what it is needed: Those things for which there is already a client. Inventory is fixed money occupying space, it has to be avoided. Expandable basis to all the process phases: Each phase has to produce just what the next one needs.
- To eliminate all that doesn't add value to the product: “Value” in client's terms.
- To stop production if something is not working properly: In order to immediately identify the source of the problem and to solve it in order to avoid its propagation. To change from inspection method to zero-imperfection production.

Thus, the pillars of this system are “Just in Time” production (produce what is needed, when it is needed) and “Jidoka” (Inherent quality to the production system), both on a

constant improvement environment and a declared respect to the people involved in the system.

The success obtained by the application of these ideas revitalise Toyota and are spread through Japan in the 50's. Its efficiency starts being known in the western world during the 70's and the petroleum crisis. The system permits the adaptation of the production in order to give a response to a new type of demand, which is faster, and in a less traumatic way than its competitors, ending with the power that Ford and General Motors had had until that moment in the motor industry.

In the 80's, Toyota and other Japanese companies export this production system to their European and American factories, so it is spreading outside of Japan and its philosophy begins to adapt beyond manufacturing.

Nowadays, Lean Manufacturing is a worldwide known methodology, being each day more introduced in the productive system, as well as in every department.

As a summary to the study carried out by Rachna Shah and Peter T. Ward on the Journal of Operations Management (2007), next there is a table with a timeline which shows the most important phases in the evolution of the lean production:

Table 1. Evolution of lean production

YEAR	EVOLUTION OF LEAN PRODUCTION
1927	-H. Ford production's philosophy and the basic principles of the Ford Production System (FPS) on "Today and Tomorrow".
1937-1973	-Toyoda (later, Toyota) Motor Company, established in Koromo, Japón. -Creation of the main concept and tools of the Toyota Production System (TPS). -Appearance of the Just in Time (JIT) concept. Key component of the TPS.
1978-1988	-1973: The petroleum crisis in North America developed a great interest in the Japanese manufacturing system. -1977: It is published the first academic article regarding Kanban and Just in Time tools (Sugimori et al.)
1988-2000	-1988: Krafcik coins the "Lean" term to describe the manufacturing system used by Toyota. -1990: "The machine that changed the world" was published (Womack, Jones and Roos). The machine was established as "Lean production" to identify the Toyota production. -1992: The Toyota Guiding Principles were published, as a reflection of the company that Toyota wanted to be: Its management philosophy, values and methods that it has adopted since its foundation. -1994: The book "Lean thinking" by Womack and Jones was published, developing the Lean philosophy and taking the concept into business level.
2000-present	-2001: The "Toyota way" manual was created, and internal document of the company in which its philosophy and aspirations, and in which the two main pillars of this philosophy are identified: "Respect to people" and "Continuous improvement". -2004: Liker summarises the Toyota Style into 14 principles that are the roadmap for the application of the company values by all the staff in its day to day work and on their relationships. -2006: Toyota Motor Company becomes the N°1 car manufacturer in North America.

Source: Own elaboration

1.1.2 Definition and Lean Management

When talking about Lean, we are referring to whatever that is related to creating value and eliminating waste, with the purpose of reducing costs and improving productivity, efficiency and quality. The concept of Lean, and all its versions: Lean Thinking, Lean Manufacturing, Lean Management, ErgoLean, etc, goes beyond a simple methodology or a combination of tools applied independently. It is more about a philosophy or a way of thinking to achieve a continuous improvement (Berenguer, 2016).

The basis of the Lean thought is very simple: to be continuously measuring and obtaining data in order to eliminate or correct those tasks or processes that don't provide value to the product nor to the client, and to strengthen those that do provide value.

As it is exposed on the National Institute of Standardization and Technology¹:

This is a systematic initiative, whose purpose is the identification and elimination of the overspend, through continuous improvement, flowing the product when the client needs it (Pull), under the conviction that everything, always, is improvable. Applicable both to manufacturing and services.

Another similar definition, according to the Lean Enterprise Institute², "The main idea of this model is to create the highest value as possible, from the client's point of view, with the less consumption of resources as possible (that is, lean), using the knowledge and abilities of the people that are carrying out the work".

Despite de different definitions, (2016, p.1), assures that:

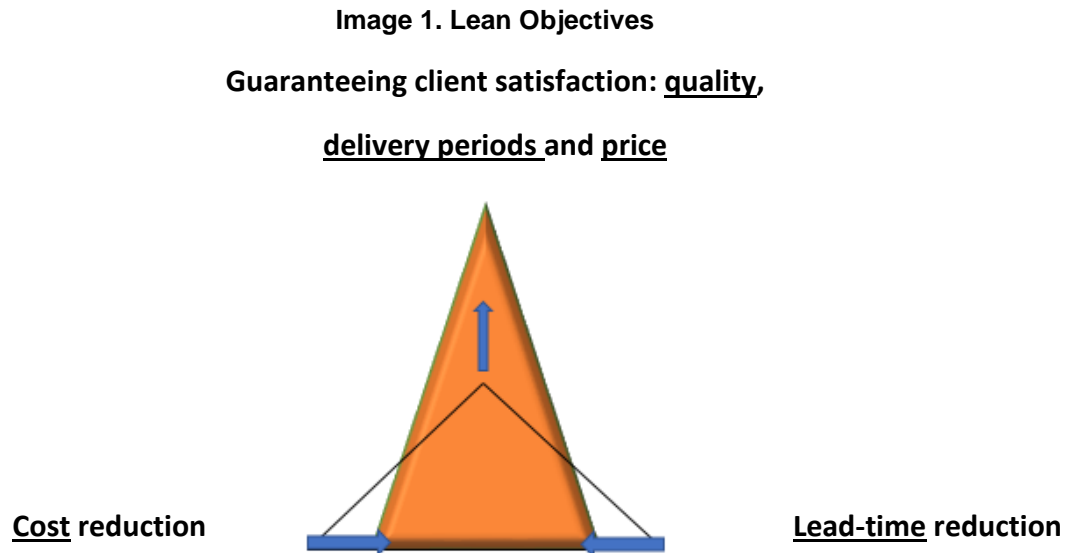
"Lean" philosophy is not a traditional cost reduction through services or personal reduction methodology. The main principles of this philosophy are respect to people and client satisfaction, as well as the elimination of the activities that do not offer value.

¹ Source: National Institute of Standardization and Technology: <https://www.nist.gov/>

² Source: Lean Enterprise Institute: <https://www.lean.org/WhatsLean/>

1.1.3 Lean Objectives

Lean methodology is mainly based on three objectives, consisting in satisfying the client, reducing costs as much as possible, and delivery periods³:



As indicated on previous image (image1), this is a discipline which guarantees maximum satisfaction to clients through quality, reduced delivery periods, and inexpensive prices. In that sense, it is indispensable to reduce the lead time as well as internal costs.

Nevertheless, it is important not to forget the most important part of the Lean methodology, it is, the constant of the respect to people, as that as Fujio Cho (President of Toyota) explained, "First we build people, and then we build cars". That is, a business doesn't have to be focused on objectives if it doesn't first look for training, motivation, and respect to the people that form it.

In addition, it tries to avoid traditional practices as the organisation of disconnected departments, in which department members do not know the other tasks, as well as the centralisation when management and decision making are vested in managers, and in which any other employee has no further importance (Hermeregildo, 2016).

³ Source: Renault Consulting: <http://www.renault-consulting.es/>

1.1.4 Lean phases

The Lean methodology is divided in 5 phases, regarding book *Lean Thinking* (Womack et al., 1996): To define value, to identify the value flow, the continuous and balanced value, Pull system, and continuous improvement.

First of them is to define the value of everything that clients are willing to pay. That is, the most expensive things don't have to be more valuable, but what clients really want to have⁴. In this phase, there are some examples, as the McDonalds case, in which what the client seeks is rapidity on the service, and not the hamburgers' envelopes to be more or less cared. Nevertheless, there also are other kind of business as, for example, exclusive jewellery, in which the client seeks to feel special, so having a nice envelope in the product would make him feel more satisfaction with the service⁵. Ultimately, it tries to study what the client really wants and, with the information gathered "to do it properly at first", and to exactly offer what the clients are willing to pay. "Value generation must be the objective of every management department. If until now the objective has been to maximise benefits, nowadays it has been replaced by value creation" (Bonmatí, 2011).

Regarding the second phase, when identifying the value flow, we must perfectly know which are our processes in order to obtain the final objective. To recognise which of them add value and which other don't. When recognising which processes do not add value we will be eliminating waste and we will know the exact necessary time to carry out the process, as well as with the exact costs (Tornos and Juanes, 2005). Some of the concepts in this phase would be ordering, controlling, guarding, revising, etc.

There are three main enemies for a Lean Production System, which are: Instability, Waste, and Inflexibility. These three lead to what is called as moult. Also, moults lead to situations of:

- **Overproduction:** It appears when producing faster or in a higher volume than the client's demands, and when wrongly planning the product mix. This provokes more work and energy waste, as well as stock excess that hides the problems.
- **Inventory-Stock:** It appears when planning is deficient and when the productive apparatus is not easily predictable (excess of defects). It provokes additional costs in order to maintain the operations, it can hide defects, camouflages operative efficiency and can hide problems of capacity.
- **Not to utilise the talent:** Insufficient utilisation of persons: It appears when people's skills are not properly utilised, when there is no communication, when the "old school" ideas prevail, or if there is not investment in training. It provokes lack of motivation, low progress in people's skills and "absenteeism".
- **Excess of transport:** It appears when plant flow is not organised in a logic way, if layout definition is deficient, or if stock management is oriented to size or type instead of to flow. It provokes excessive manipulations and intermediate storage of the product.

⁴ Source: Prodintec: <http://www.prodintec.es/es/>

⁵ Source: Renault Consulting: <http://www.renault-consulting.es/>

- **Operation without Quality-Defects:** It appears if there is a low level of standardization, or if the capacity of the process doesn't assure the certain level of quality that the client requires. It implies the need of re-doing the tasks and to recuperate over the products.
- **Movements:** They appear when the location of the tools is not close to the workers, when the sequences of the operations is distant, or when design and layout are poor. It provokes movements of staff or machinery which don't add value to the product, as well as unexpected line stops.
- **Awaits:** When the task assignment is not equal in the different phases of the process; also, when demand surpasses the production capacity or when the standardised work doesn't exist or doesn't work. It provokes a source under-use.
- **Overprocessing-Unnecessary processes:** It appears when processing a product beyond the client's specifications, when we mechanise a product that the client is also going to mechanised, or when supplying a product over featured for the client's needs. It provokes an irreversible growth of costs.

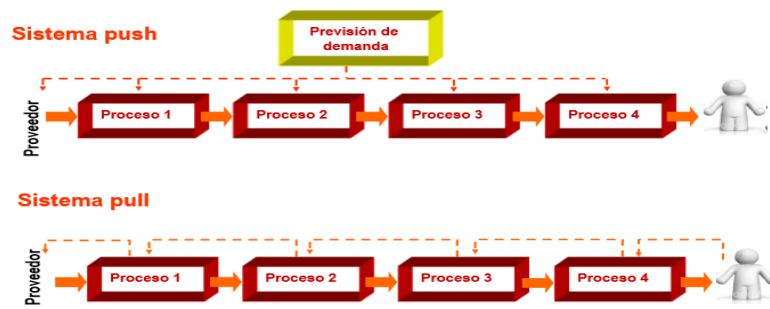
With all the consequences of the moults the SINTOMAS (Sobreproducción, Inventarios, No utilizar el talento, Transportes innecesarios, Operaciones sin calidad, Movimientos superfluos, Aguardar esperas, Sobreprocesos) "Nemotectnic Rule" is created.

The third phase is directly related to the second, as, once identified the value flow, it tries to keep it continuous and equilibrated, both in the factory and the client.

Fourthly, the Pull system, which consists in the next premise: The client's demand "pulls" of the production, that is, production is going to be bigger or smaller depending on the clients' needs, in order to avoid unnecessary stocks and to reduce the costs or the materials which are not going to be sold (Casanovas, 2012). As seen on the image (image 2), totally opposite to the Push system, in which production goes according to a prediction, but without having into mind the clients' needs, as stated by Muñoz (2009, p.26):

The risk that the Push perspective faces relies on the notion of radical changes in the demand's patterns, which make obsolete the products in the inventory, so this perspective is only useful in the case of not very differentiated goods (marketable) or when supply contracts that assure the product sales have been signed.

Image 2. Push System vs Pull System

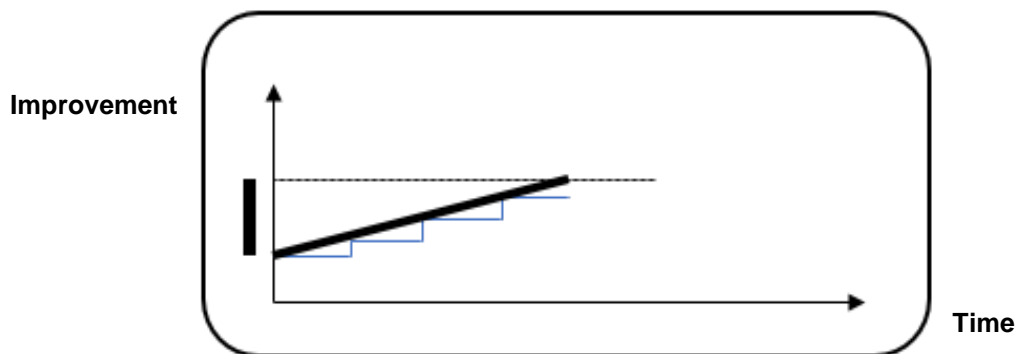


Source: Renault Consultig, (feb 2014)

Lastly, and having in mind the basis of the Lean methodology, any kind of implementation in the factory is not the goal but the path to follow, that is how we achieve the continuous improvement. This phase is mainly focused on progressing step by step, based on conventional knowledge. The operational are the main actors, taking advantage of their know-how and facilitating their implication and responsibility. This is the Lean phase which requires a better continuity, as its goal is not to achieve a short-term goal, but as when progressing, to maintain and set new objectives (Hernández and Vizán, 2013). “Not one machine or process will reach a point from which it won’t be able to keep progressing” (Toyoda, 1980).

As seen on image 3, this is based on achieving the results of satisfaction and efficiency through little improvements during time; acting in a stairs form with small steps.

Image 3. Satisfaction and efficiency results



Source: Renault Consultig, (feb 2014)

1.1.5 Lean tools

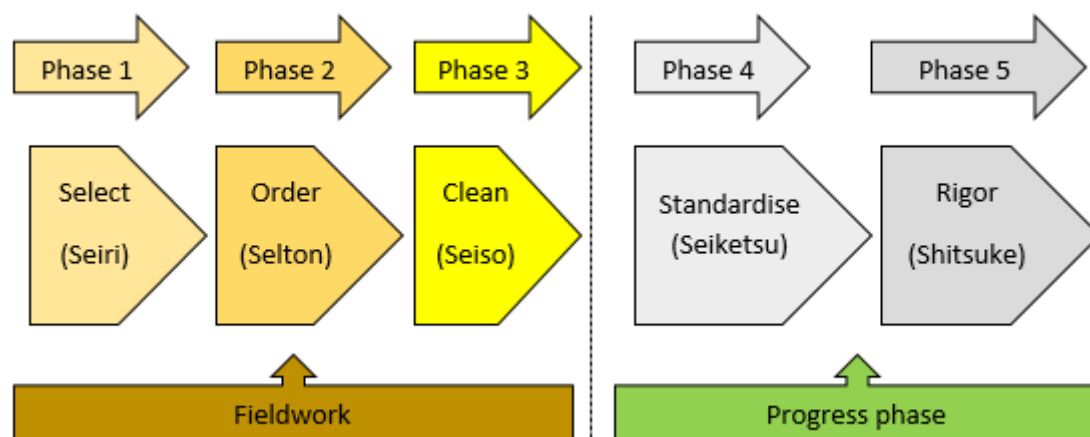
Lean tools consist in a series of processes which facilitate the implementation of the system in every business field. There is a great amount of tools, which are very different among them, however, experts do not agree when identifying, classifying and proposing their application field. Next, according the book *Lean thinking* (Jones and Womack, 2012), some of the main tools for every process of Lean methodology application are explained.

Dynamic 5S

One of the main problems that we have to face on quotidian job is the lack of order and cleanliness, independently of the sector: Excessive material stack or in inappropriate construction places, stock and uncontrolled waste materials in industry or papers and even uncontrolled office archives, are common examples of a lack of order in a company and which cause severe costs (Cordobés, 2017). This first tool as as its main objective to allow anyone, in any sector (production or tertiary), to optimize its efficiency through the application of 5 main principles (Image 4). Select, Order, Clean, Standardise, Rigor. To apply the 5S allows to reduce waste⁶.

The 5S dynamic transforms the workplace into a place where anyone can understand the methodology of working “at a glance”. In terms of quality, it means to make defects immediately visible; in terms of quantity, it means to make immediately visible the advance or delay regarding what planned. When achieving this, problems can be immediately treated and anyone can start working on improvements (Espín, 2012).

Image 4. Dynamic 5S



Source: Renault Consulting, (feb 2014)

⁶ Source: Renault Consulting: <http://www.renault-consulting.es/>

This dynamic has its basis on the thought that “nothing good can come from a disorganised workplace”⁷. Well organised and ordered workplaces allow to:

- Reduce trips, support, and useless costs.
- Improve security.
- Improve team motivation, as they are going to feel better in a nice work environment.
- Improve the performance of the facilities.
- Develop the rigor spirit.

Standardisation of the role

Secondly, we are talking about the role standardization. It is the best method in order to carry operations out, as it allows to achieve the objectives of quality, cost and periods, granting the security of the operator (Hernández and Vizán, 2013).

It is an operational method, common to all the shifts, free of inefficiency, irregularity and irrationality, which anyone can dominate, once formed and trained, that even rookies and veterans must apply⁸.

We have to keep in mind that, despite being the best method at the moment, it has to be continuously improved, with the purpose of advancing and maintaining it.

The standard of the roles has as its purpose the definition of the best way of doing things (until now), in the performance of an operation or a process.

It has to simultaneously guarantee the staff's security; the best quality level without resorting to controls and re-work; an easy operational method, ergonomic and economic; the period (that is, being able to deliver it to the next process in time), and the capitalisation of the progresses (Nakamura, 1997).

There are 4 elements which determine the standard operation:

- **Procedure of the operation:** In which it must be set the operational method, as well as the 4 principles of the movement economy (to reduce the number of movements, to execute them at the same time, to reduce the distances, and to make those movements easier).
- **Key points of its execution:** These are the key points in order to execute a phase. If an operator doesn't obey, quality, security and the ease or its execution.
- **The objective time of the operation.**
- **The common stock:** It is the minimum stock volume which is needed for the continuity of the process.

⁷ Source: Kaizen Bolg: <http://kaizenytpm.blogspot.com.es/2013/>

⁸ Source: Renault Consulting: <http://www.renault-consulting.es/>

TPM (Total Productive Maintenance)⁹

The purpose of this tool is to obtain the performance of the means, allowing to respond to the client's demand. Therefore, a performant means produces: The demanded piece, at the demanded moment, with the demanded quality, and at the minimum cost.

It is to create corporate culture, based on dynamics of improving the staff capacities in order to identify and eliminate all the waste in the facilities.

A fundamental part of this process is the preventive maintenances; which is focused on the knowledge of the machinery, the consideration of the precursor signals, and the economic realism. The preventive maintenances are focused on reducing the costs of the failures and of maintenance.

After confirming that the majority of the costly repairs and immobilizations could have been reduced and/or avoided by a constant and preventive maintenance.

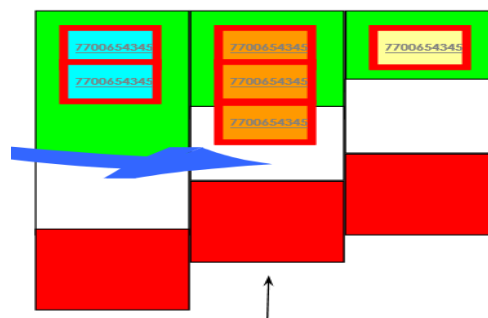
In order to accomplish this tool, it is worked under a Preventive Maintenance Plan (PMP), which can be professional (PMPro) carried out by the maintenance professionals; or Autonomous (PMA), which is carried out by the production staff.

Just in Time

The Just in Time system consists in producing the products required by the client in the required moment and in the amount required. That is, it is the client who demands what he requires. Its purpose is to reduce the timings in order to transform as fast as possible the Added Value into revenues. It is fundamental to identify and eliminate waste between processes as well as in every process (Hirano, 1990 y 2002).

Directly related with the Just in Time system there is another concept which acts as basis of this tool. It is the Kanban. The Kanban principles consist on sticking a card in an envelope which is going to be sent so that the client receives it, empties the envelope and re-sends the card to the supplier as a bonus order. The provider collects this cards in a board to monitor the orders in quantity and priority (Hernández and Vizán, 2013).

Image 5. Just in Time system



Source: Renault Consulting, (feb 2014)

⁹ Source: Renault Consulting: <http://www.renault-consulting.es/>

As seen on the previous image (Image 5), the stickers are placed in descendant order; those in the green area do not have to be sent until it is full, as it is the optimum size of the set; those in the white area mean that production has to be sent as soon as possible; and lastly, those in the red area have to be sent to production urgently, as there is risk of breakdown of delivery.

Quality matrix (Poka-yoke)

This tool is a very similar to the MPM. Its main difference is that the Poka-Yoke system (or error free system), are all the error prevention methods which are finally transformed into defects of the final product. This is a technique developed by the Japanese engineer Shigeo Shingo, which means “error-safe”.

Its principal purpose is to create a process in which it is impossible to make mistakes, that is, to eliminate the defects of the product, preventing and correcting mistakes which are appearing, as soon as possible. Generally, Poka-Yoke could be any mechanism which helps to prevent mistakes before they occur, or make them very obvious in order that the employee can easily detect and correct them in time, as for example, a quality matrix.

Nevertheless, we have to keep in mind that it is almost impossible to carry out control in which defects are detected, so it is almost impossible that a mistake reaches the final customer.

The necessary conditions for a Poka-Yoke are: Firstly, the appearance of an error/not common obscurity; the possibility of immediate reaction of the operator; a cause of the human error; and lastly, to be a simple system (Burlikowski and Szewieczek, 2009).

Study of the working methods¹⁰

It is very related to standardisation, as in both cases it is understood that every process can be improved. This study searches for the ideal method. Its philosophy is that every process is improvable as it is not being carried out in the ideal way (Renault Consulting, 2014).

In order to carry out a study and to improve the working methods, this procedure has to be carried out:

- **To select the tasks that have to be improved:** Being able to select the most important processes.
- **Record of the tasks:** That is, How the tasks are being carried out and how we want them to be done.
- **Critics to the tasks:** From the basis that the job is not being properly done, criticising it consists on questioning it and analysing what is being done wrongly.

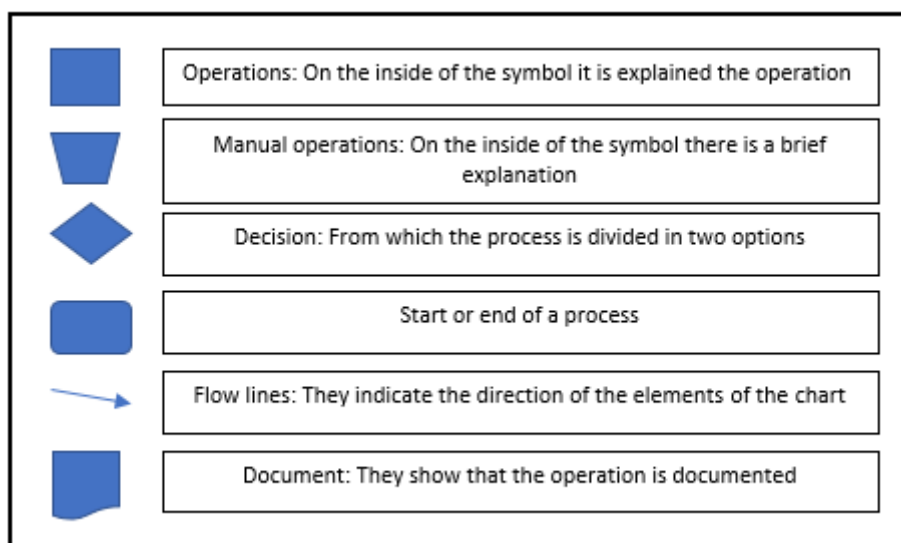
¹⁰ Source: Renault Consulting: <http://www.renault-consulting.es/>

- **To conceive a better method:** To put into practise the ideas and alternatives that are thought to be the best and which have been obtained in the previous phase.
- **To define the new method:** To make a report with details of the new method, trying to be as clear as possible and thinking on who it is addressed to.
- **Implementation of the new method:** On one side, the new method has to be accepted by the staff, and after that, this staff has to be trained for it.

Definition Flow of Materials¹¹

This tool consists on the graphic representation of the phases, operations, movements, decisions, and other events which occur in a process. It is represented by different symbols and figures which are commonly used (Renault Consulting, 2014). The most common symbols and its meanings are explained in the next image (Image 6).

Image 6. Flow chart figures



Source: Renault Consulting, (feb 2014)

¹¹ Source: Renault Consulting: <http://www.renault-consulting.es/>

1.2 Analysed company: AD Levante¹²

The company which is going to be analysed is Automecánica Levante. It was founded in 1986 in Castellón de la Plana, in a 100-metre squared by its current administrator, Francisco Tena Jordá.

At first, the company's commercial activity was focused on the motorcar mechanics, and over the years it has diversified its operations into electrics, bodywork, tyres, and garage equipment.

It has six points of sales, including its headquarters; more than 80 employees and an approximate billing on nine million euros. AD Levante has its headquarters in Almazora, a town close to Castellón, in a 7000-metre squared industrial unit, with 300 metre squared storehouse, offices, shop, tools and machinery showroom, garage and training room. In addition, there are 5 subsidiaries in the province: Villarreal, Vinaroz, Vall d'Uixó, Benicarló and Onda.

They have the best brands, and the newest high-quality products, with a range that covers the 100% of the garages needs. Among others, they can find filters, brake pads, dampers, batteries, and clutches.

The activity offered by the company is mainly aimed to garages from Castellón and its province, its main clients; despite they also offer their services to particulars. In total, it works with approximately 500 garages (although they have almost the double of accounts); among those 500 clients, 400 are regular (they demand products around 5 times a day) and 100 are occasional (they demand products once a week).

Regarding the human group, it is exactly formed by 83 workers, which are organised in the different points of sale and departments. These are:

- **Almazora centre (54 workers):** 8 in the replacements department, 17 in the deliveries department, 8 in the storehouse, 4 personas in the administration department, 4 in the buying department, 3 technical service, 2 in computing, 6 the commercial department, 2 in management.
- **Villareal centre (7 workers):** 2 in the replacements department, 5 in deliveries.
- **Vinaroz centre (6 workers):** 2 in replacements, 4 in deliveries.
- **Vall d'Uixò centre (6 workers):** 2 in replacements, 4 in deliveries.
- **Benicarló centre (5 workers):** 2 in replacements, 3 in deliveries.
- **Onda centre (5 workers):** 2 in replacements, 3 in deliveries.

¹² Fuente: Automecánica Levante: <http://www.adlevante.es/>

From the end of 2016, Automecánica Levante starts thinking of applying the Lean Methodology in its organisation. There are many companies in the same sector which have already implemented it, as Paher, partner of AD Parts in Valladolid. It is this company who advises Automecánica Levante to study the opportunity, showing it some of the results. This, added to the search of the continuous improvement philosophy, motivated the company to carry out its implementation.

It is in December 2016 when the company starts offering its first presentation regarding the Lean Methodology to a reduced number of 10 workers. In that purpose, they count on Renault consulting, which in an 8-hour conference briefly introduces the methodology to this group of workers.

Since 2017, and with the purpose of continuing prospering with the implementation, a new project is launched in which the staff is organised in “groupworks”. Considering a “groupwork” as a group of workers which can be from the same or a different department, and from the same or a different subsidiary, which has as a purpose to coordinate their operations in the company.

Each “groupwork” has a responsible which is responsible of the coordination of all the members of the group.

Currently, the company is on the starting phase of implementation of the Lean Methodology, as is has been working for a short period of time (5 months), making it difficult to appreciate big results. Nevertheless, it has been possible to influence in short-term aspects, as, for example, the holidays management process, among others; in which the company has already applied different Lean tools, being able to achieve several improvements.

CHAPTER 2. STUDY CASE ANALYSIS

On next chapter, we are going to analyse how Automecánica Levante commences to implant the Lean methodology on its organisation. Next study is aiming to be a starting point with a small introduction of how some work processes could be changed in order to apply the Lean philosophy.

This study case has been divided in three sections. Firstly, the situation of the company before applying the Lean methodology will be analysed. This study is focused on three concrete processes: Management of the holidays' periods, absenteeism communication, and development reports; through which intern communication is going to be analysed. In order to collect the information referring these three processes, some anonymous polls have been made (empiric study), as well as personal interviews with members of the departments (qualitative study).

After collecting the information, some improvement proposals have been considered in order to improve the analysed processes, as well as in order to increase the staff's satisfaction and the necessary Lean tools to achieve those objectives.

On the last section of the chapter, after 5 months of the implementation of these techniques, new polls are made, trying to analyse the changes which have occurred after the application of the Lean methodology.

2.1 Situation of the company before applying the Lean methodology

As we have observed on the section 1.1.4, in which we talked about the Lean phases, the first step to take when implanting the methodology in any company has to be the value generation. Automecánica Levante not only tries to satisfy its clients through the supplying of its products, but also tries to offer anything which adds value to its customers, through a series of added values which are the technique knowledge, as well as giving the maximum information as possible and a high standard client service.

Once the aspects that create value in the company have been identified, and referring to the second phase of the methodology, we have to identify all the process flows in order to test which of them are being correctly carried out and which of them have to be improved. Despite there are a high amount of aspects which are interesting to be analysed, there is one of them which we are going to investigate, and which is fundamental for the Lean methodology: The internal communication; as according to García (2011), internal communication is an essential strategic need for the proper operation of a company.

As Muñiz (2014, p.56) exposes on his book *Marketing in the XXI Century*, "internal communication is the communication addressed to the internal client, that is, to the worker. It is created as a response to the new needs that companies have of motivating their staff and being able to retain their best workers in their business environment in which changes happen increasingly faster".

The majority of companies are still ruled under old-fashioned dynamics which are based on buying time and effort from people in exchange of money (Dans, 2016). Nevertheless, internal communication tries to avoid practices in which workers are paid only for carrying out processes; but it tries to consider it as a challenge in which workers, apart from working, participate in training structures, social systems to share information, coordination equipment and efficient teamwork, or monitors of competitive or technological alerts in which hundreds or thousands of eyes see better than a few.

All these aspects motivate the knowledge of current internal communication in Automecánica Levante.

In order to know its situation, at the beginning of 2017, before the application of the Lean methodology; a workgroup was created in order to gather information. An anonymous poll has been done to the eight workers from the replacement department, which is focused on the sales, both on the phone and face to face, and selling to clients and particulars. These eight workers are in the same role, which is to deal with clients' orders, preparing them if the materials are on stock, or requesting to suppliers if necessary. Once the materials are collected, the packages are prepared so that the delivery department can send it to clients. From these eight workers, one of them is the person in charge.

This poll can be found on annex 1, entitled "Poll 1. Internal communication analysis". It was offered by the online human resources company "Equipo Humano"¹³, which started their activity in 2001, and are mainly focused in offering human resources innovative solutions to companies. The poll was made up of 10 questions with four possible correct answers each of them (a-d), all of them referring to internal communications. Its purpose is to detect how internal communication is in the company, in which direction it flows, which mechanisms does it utilise, and until which point does it achieve its objectives. This poll was a test for the company in order to check the current internal communications conditions, and to serve as a precedent for future investigations; as it was a questionnaire easy to find and to analyse. Once completed by all the department members, depending on the answers this company offers different results and recommendations.

After the poll is completed, the results expressed on the next table (table 2):

Table 2. Results from Poll 1 "Internal Communication Analysis" before applying Lean

QUESTION	WORKER 1	WORKER 2	WORKER 3	WORKER 4	WORKER 5	WORKER 6	WORKER 7	WORKER 8	
q.1	a	a	a	a	a	a	a	a	
q.2	a	a	a	a	a	a	a	a	
q.3	a	a	a	a	a	a	a	a	
q.4	a	a	b	a	b	b	b	b	
q.5	d	d	d	d	d	d	d	d	
q.6	a	b	a	b	c	c	b	b	
q.7	c	c	b	c	c	b	b	b	
q.8	a	b	a	a	b	a	a	a	
q.9	b	b	a	d	d	a	d	d	
q.10	a	a	a	a	a	a	a	a	
Main letter/worker	a	a	a	a	a	a	a	a	
Total main letter									a

Source: Own elaboration

¹³ Source: Equipo Humano: <http://www.equipohumano.com/>

On the table, it is proved that the most answered response is a). The company “Equipo Humano” offers a template with the information gathered, as in next table (table 3); getting: a) informal level, b) emergent level, c) advanced level and d) transactional level:

Table 3. Interpretation of the results from Poll 1

RESULTS INTERPRETATION			
Most of...	Communication Level		
a)	Informal	Current Situation	The only source of communication in the company are the informal channels (eg rumor), since communications are not managed or there are no defined mechanisms). The organization is not taking full advantage of the benefits of communication
		It is recommended	Start managing communication, not forgetting that changes take time and it is better to go step by step, starting with controlling the rumors that appear in the company and exploit the communication tools that exist
b)	Emergent	Current Situation	The company has begun to introduce communication elements, especially vertical descending (direction employed). You can still exploit many unused tools so far
		It is recommended	Take advantage of the management's willingness to communicate the company's policies and objectives to introduce new forms of communication (vertical and inter-departmental vertical communication).
c)	Advanced	Current Situation	The company has integrated different communication mechanisms and information management is adequate, although some aspects can still be improved and new tools can be integrated
		It is recommended	Integrate new mechanisms of communication and control to prove their effectiveness. In addition, it is important to give credibility to the information transmitted, managing well the emerging rumors
d)	Transactional	Current Situation	The communication management is satisfactory and achieves the proposed objectives. At this point it is important to maintain existing channels and further refine the use of communication tools and mechanisms. This is important if we do not want to become obsolete, as the technology advances very fast and new instruments appear that facilitate and speed communication
		It is recommended	We have excellent management of communication but this is not enough, we must remain active and integrate creativity in communications, we must ensure that the message we convey is attractive to employees and motivate action. The search for continuous efficiency in communication through new channels is recommended

Source: Equipo Humano

As “a” is the predominant answer, we can assure that Automecánica Levante has an informal level of communication, in which the only way of communication until now are through informal channels and “mouth to mouth”, as communications are not managed and there aren’t defined mechanisms of communication. The organisation is not leveraging from the advantages that communication offers. Facing this communication, it is recommended to start managing communications, taking into account that changes need time to be adopted.

Once the great lack the company has in the field of internal communication is detected through this investigation; the qualitative phase starts, which consists on interviewing each employee which has passed the poll. The purpose of the interview is to know how the different processes are being carried out regarding internal communication before the Lean application, and, from there, detect which are the mistakes committed and how they can be solved through the Lean tools.

The interview can be found on Annex 2, entitled “Interview to the staff of the analysed department”. This interview consists on eight open questions. The used template has been designed expressly to this investigation. On it, it is expected to get information regarding three fundamental aspects of internal communication: Management of the holidays periods, communication on absenteeism, and development reports. This is why all the questions are designed based on these aspects. Questions like: “Which steps do you take in order to...?”, “Do you receive any kind of information regarding...?”, so that from that, staff can explain which current processes they are carrying out.

According to different authors, and in order to be able to compare results before and after Lean application regarding internal communications, these three aspects are selected:

Management of holidays periods: It refers to how holidays are divided. It is a basic process of internal communication in every organisation, which has to be simple and comprehensible to every worker, the higher agreement there is between employers and employees, the better. Moreover, the sooner the planning can be made, and the longer-term it is made, the better prepared the company will be (Sandi, 2015).

Communication on absenteeism: Apart from medical leaves, workers must inform the company regarding any absence in advance and in a justified way, which is a fundamental process in internal communication (Ureña, 2013).

Development reports: Despite the importance of the development reports, companies not always have taken them into account, as, as Lavanda (2005) says, evaluation has historically been limited to the unilateral judgement of bosses with respect to the employee’s performance. But, as human resources management has evolved, some models of evaluation have been created. According to Sastre y Aguilar (2003, p.321), “Development evaluation is the systematic and structured process with which the employees’ performance is monitored, in order to evaluate their development and the results obtained in the achievement of their role”. According to Sánchez and Bustamante (2008), organisations need to know how their employees are performing in their roles in order to identify which of them effectively add value and which don’t. With this purpose, the development evaluation is carried out, as it is possible to mark the employees, so

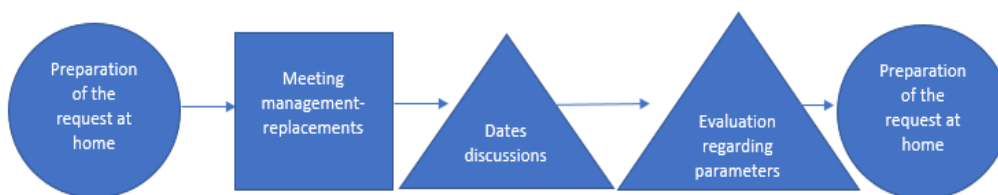
there can be a distinction between effective and ineffective employees, and in thus improve internal communication.

Once the interviews are finished, the information gathered is useful for knowing the steps that the company is giving before the application of the Lean philosophy in the three analysed aspects. This information is captured on a flow chart (Lean tool), which helps to visualise more easily the steps taken in all the processes.

Holidays solicitude:

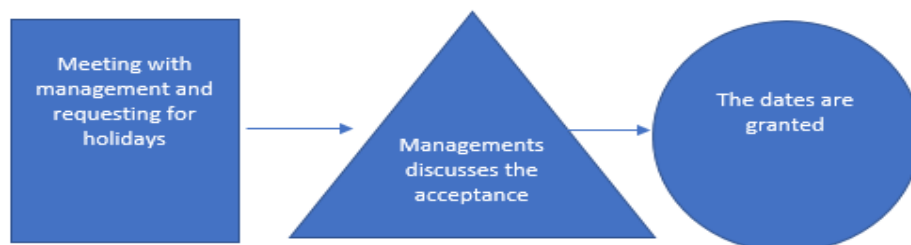
The flow of processes to request holidays is:

Image 7. First phase on holidays request



Source: Own elaboration

Image 8. Second phase on holidays request



Source: Own elaboration

In order to explain this process, it has to be taken into account that, firstly, each worker has 31 natural days of holidays, according to article 14 of the collective bargaining agreement of the metal trade of Castellón¹⁴, 2016, on which the company bases itself.

Knowing this, as the process takes place at the moment, it consists on 2 parts. First of them is a meeting, which takes place every December, between the company management and the department in question, in which every worker has to bring a proposal of a 15-day holidays for the next year. Having heard all the employees, management notes down the proposals. This is a very fast and easy process, provided that there are no coincidences. Nevertheless, it is difficult that there are no coincidences. If there are coincidences in the dates chosen, those who had less fair conditions on the

¹⁴ Source: Convenio Colectivo del Comercio del Metal en Castellón: <https://www7.dipc.as/files/1466-134-archivo/290604-1272.pdf>

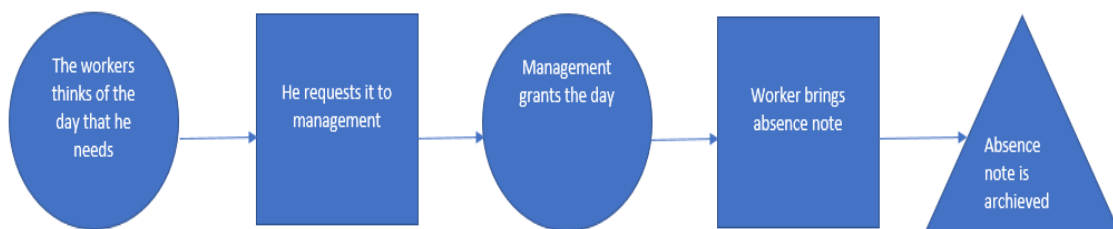
previous year have preference, and if there is no agreement, it is decided by raffle; until it is finally instituted half of the holidays period of each of the workers.

The remaining 16 days are not assigned, being possible to enjoy them during the year, as it is understood that free days can be needed and there is less anticipation needed. Here starts the second phase of the process, when a worker needs to ask for a free day, he requests it to management, who decides if the chosen day is available or not.

Communication on absenteeism:

The second situation to be analysed is the communication that a worker must have with management regarding the no assistance to its job by any justified reason. The proceedings currently being carried out consists on: Firstly, the employee has to ask for a meeting with management; once in the meeting, he has to inform about the reason, the day and the schedule of his absence. In that same moment, management grants the absence permit or not. After the day of the absence, the worker has to justify his absence with an absence note, which will be archived by the management department. The process flow is approximately this:

Image 9. Communication on absenteeism



Source: Own elaboration

Development reports:

It is the last process to study referring internal communication. In this case, unlike the two previous ones, it is almost impossible to carry out a process flow, as nowadays, as seen on the polls, workers do not really know which expectatives the company has on them. There is no process in which the company tells the staff what is expected from them, what they are doing well, and what do they need to improve.

The members of the analyse department work in selling spare parts both through the phone and on the physical shop. The only control which is being held at the moment is the review that management does on the calls received on the switchboard, so a control on the calls that every worker does is monthly done. Workers are informed if there is a decrease on the number of calls that they have attended in comparison with previous months.

2.2 Improvement proposals

If there is a common characteristic that these three processes share is the lack of internal communication when applying them. These are processes that don't have a work standard, whose decisions only depend on the management, what makes them difficult to be carried out if management is not available.

Once detected the scarcity on the three processes, a series of proposals for improvements are set, and which the company is going to apply through Lean tools, so that after some time from its application, the changes suffered on the processes are going to be analysed.

Regarding the **holidays requests**, it can still be divided into two phases, although it is possible to improve them. About the first of them, it is a very long meeting as if there are different workers whose proposals coincide, they are going to discuss about them until finding a solution. Thus, the purpose is going to be:

To modify how the first 15 days of holidays are conceded with the intention of reducing time and conflicts between workmates, being now done through a raffle. That is, in the meeting to be held next December, each department member will be assigned a number and a raffle will be made regarding the fortnight that each member is going to have as holidays (regarding the most demanded months, June, July, August). For next years, according to the numbers that the have been given, there will be a rotation in the fortnights, and they will be able to exchange their holidays without the need of notifying to management. Thus, the intention is to give everyone the same opportunities and that, with this long term knowledge, to be able to organise and not to depend on coinciding with other workers.

Regarding the remaining holidays, the assignation system is also going to change. The objective is to give the decision power to the department manager, Javier Abadía, instead of to management. It will be carried out through the most common Lean tools, a process with which the department manager will know if he can or can not concede holidays to its workers. The rulings on which to build the decision are:

- Only one worker will be able to take free days if on the same week there is another worker from the same department on holidays.
- Single days can be conceded if there are no other workers on medical leaves, as there has to be available staff to help in the different offices if necessary.
- Free single days can be conceded at any time excepting the most busy months, June, July, and the first fortnight of August.
- The department Manager (Javier) has to be informed at least two days in advance, so he can organise the department.
- Once the days are conceded, Javier will have to access the intranet of the company to register the free days on the worker's profile, so that everyone in the company is notified.
- In case that it is the department manager the person to take free days, his duties will be held by Fernando Rosas.

In order to finish with the process, a post-holidays objective is proposed, which tries to also improve internal communication. In that sense, every worker who has been on holidays must be informed on what has happened in the company during his absence. Thanks to the interview, it has been stated that after their holidays the workers haven't been informed about possible changes the company has had or about what has happened on their department. The solution achieved is an email sent from the department manager to the worker, the day before his return, including a brief resume of what has been done during his absence.

Secondly, regarding **communication on absenteeism**. It is a very simple process which consists in "talking with the managers", and handing a doctor's note. Nevertheless, there are two clear mistakes. On one hand, when a worker requests for some free hours, only the company management is being informed about the situation, and his workmates, that are who will do his tasks during the day, are not aware of that absence, neither is the department manager, who is the person who has to coordinate the department if one employer is not assisting to work.

That's why one of the purposes is to also inform the department about the absence of one of its employees, aspect that will help on communication. It is going to be carried out applying two Lean tools, the quality matrix. As previously explained, it is a very simple and visual method, which seeks the prevention of mistakes; in this case, the lack of employees in key moments of the day. It consists on a small blackboard with will have the department workers' names written on it. Each worker will have to write down the dates and hours of his absence, so that his teammates will know at any time how many of them are going to attend.

In this same process, there is another problem, which is the accumulation of doctor's notes which sometimes are not necessary, which supposes a waste of time and space. This is why the second purpose on this process is to reduce the amount of paper and time wasted to the half, according to the second phase of the Lean methodology, which consists on eliminating those processes which do not add value to our work. It is going to be improved thanks to a computer improvement of the company's intranet. The computer department will add a similar option to the one added regarding holidays. When a worker needs to take a few hours, and once those hours have been granted by management, he will have to register it on the intranet, as well as registering the justifying note.

Thirdly, the **development report**. This is one of the worst evaluated processes inside the company, as it is fundamental for the Lean methodology that every employee knows what it is expected from them, so that he can concentrate on improving his performance to the maximum, as well as feeling motivated as he has an important role inside the organisation. In that sense, the main objective is going to be to improve the descendant communication. It consists on the communication from bosses to employees. One of the most common purposes is to give sufficient and specific orders (Martínez y Nosnik, 2009). There are several methods which help to improve descendant communication, nevertheless, we are going to focus on meetings and assemblies. In order to achieve this objective of improving descendant communication, it is proposed:

- 1 fortnight meeting with the department boss (Javier Abadía in this case), in which there will be done a global department evaluation. Javier will have to face the issues that considers to be more important during that period of time.
- 1 monthly meeting with each department employee, with a duration of 15 minutes approximately, in which he is going to be informed about: His positioning on calls (not only in the case of a decrease, but also if he is performing well in order to recognise his good job), sales positioning, possible client objections, etc. It is a general job review of every employee, so that internal communication can be improved, as well as a way of motivating them.

Finally, to close this section, this table shows a resume with the studied processes, its scarcities, objectives, and Lean tools to achieve them:

Table 4. Resume of the analysed processes

PROCESS	SCARCITY	OBJECTIVE	APPLIED TOOL
Holidays request	Phase 1: Coincidences in dates, very long process	To reduce time and conflicts	Rotation by raffle
Holidays request	Phase 2: Very dependant on management	To increase the decision power of middle managers	Standard
Holidays request	Post-holidays: Lack of information during absence	To improve internal communication	Explaining e-mail
Communication on absenteeism	Lack of notification regarding absences	To prevent the absence of an employee in advance	Quality matrix
Communication on absenteeism	Waste of paper	To reduce written information	Computer tool
Development report	Lack of results information to employees	To improve descendant communication	Periodical meetings

Source: Own elaboration

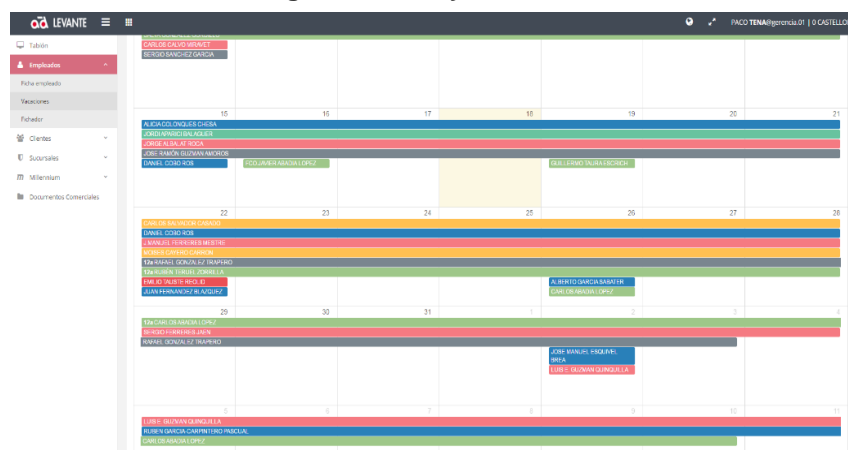
2.3 Results obtained after applying the Lean methodology

On May 2017, after 5 months of the application of the Lean methodology in Automecánica Levante, we can see that some of the improvement tools offered on the section 2.2 have been applied.

Regarding the **holidays request** process, only two out of the three tools have been applied. The standard on the holidays distribution for the second fortnight and the –email information for post-holidays returns have been successfully applied. What it was impossible to apply was the first fortnight distribution system through the rotation raffle, as they are normally distributed every December, so it is a long-term objective.

Next (image11), there is an example of the computer application created from this study, and through which Javi, as a department manager, or Fernando otherwise, can easily distribute their employees holidays as they request through the established standard. Each workgroup is identified by a colour, so it is very easy to identify if there is a week already taken by other department colleague.

Image 10. Holidays distribution



Source: intranet AD Levante

Regarding the second process, the **communication on absenteeism**, the proposal consisting on preventing in advance an employee’s absence has been implemented. As we can observe, the result of the quality matrix in order to improve the process is

Image 11. Quality matrix-Absenteeism

NOBRE	DÍA AUSENCIA	HORA
CARLOS	Jueves 25/06/17	11:00-11:45

Source: AD Levante

Nevertheless, it has been impossible to achieve the second proposed objective (to reduce the amount of paper through an informatics application) during this 5-month period.

Lastly, we refer to the **development report**. From the beginning of the year some meetings between department staff and the department manager, in which they are informed about the results that they are achieving. Receiving this information is one of the measures that is going to help the company the most in a long term, as making the employees be happy and feel part of the organisation will grow their motivation and as well as the results they obtain.

Having into account the proposals applied, and after 5 months from its application, the Poll 1 (annexe 1) has been made again, and these are the results:

Table 5. Results from Poll 1 “Internal Communication analysis” after applying Lean

QUESTION	WORKER 1	WORKER 2	WORKER 3	WORKER 4	WORKER 5	WORKER 6	WORKER 7	WORKER 8	
q.1	b	b	b	b	b	b	b	b	
q.2	a	b	b	c	a	b	b	b	
q.3	b	b	b	b	b	b	b	b	
q.4	b	a	a	a	b	a	a	b	
q.5	c	c	c	d	d	d	c	c	
q.6	a	a	b	a	a	a	a	a	
q.7	b	b	d	b	d	b	b	b	
q.8	a	b	a	a	b	a	a	a	
q.9	d	c	a	a	b	b	b	b	
q.10	c	b	a	b	b	b	b	b	
Main letter/worker	b	b	a/b	a/b	b	b	b	b	
Total main letter									b

Source: Own elaboration

We can see that after this second poll results have changed. Now the most common answer is B instead of A.

According to the interpretation offered by the “Equipo Humano” (Table 3. Interpretation of the results from Poll 1, where a) means informal level, b) emergent level, c) advanced level and d) transactional level) Automecánica Levante does not have an informal communication anymore, but changed its situation into emerging communication.

The company has started to introduce communication elements, especially in descendant communication (direction to employee). Nevertheless, there are still several tool which haven’t been used.

With this small results comparative on the same poll, offered to 8 members from the replacement department of Automecánica Levante, in a 5-month period and having applied changed on the holidays management, communication on absenteeism, and performance reports, we can verify that the application of these Lean tools has effectively had positive effects, being able to change from “informal communication” to “emergent communication”.

CHAPTER 3. CONCLUSIONS

This final grade project shows the most significant aspects of the Lean methodology, and which are interesting to any company that doesn't know the said philosophy. Through the conceptual explanation of the principles of this philosophy it was intended to transmit that Lean is a philosophy or culture focused on properly acting which was born from the direct observation of the problems which appear in a production plant, and which is also based on people. This philosophy is spread through systematic and habitual application of an large group of techniques or tools which have proved its effectivity at the time of casting aside those activities without added value and whose elimination is key for the competitiveness of the companies.

This philosophy has 3 basic concepts: To increase the clients' satisfaction, to reduce the delivery periods, and to reduce internal costs. It is able to produce great changes in the company through the implementation of different techniques as standardisation, the 5S dynamic, and a large list which eliminate all the unnecessary things in every process and allow to work on what really gives value to our work.

It is important to stress out that the secret is not on the name of the philosophy but on the attitude, persistent in time, of applying and implementing actions of continuous improvement, with the full support of the management and the staff, adapted to the specific circumstances of each company. Any company, and Automecánica Levante in particular, must prepare its employees to any change that it may occur in the organisation. It is difficult to carry out changes in the work processes through the Lean philosophy if that philosophy has not been taught to the people that must apply it.

Although we are dealing with very consolidated techniques in the motorcar sector, nutrition-beverage or pharmacy, its implementation can be done by any company, regardless of the sector or its size. In the case of SME companies there is not a bigger implementation as its owners, or managers, do not have the correspondent education or clear instructions regarding the philosophy and the practices related to Lean Manufacturing; in occasion, they not even think that a good management of human resources is an essential part of the success. In that sense, through the explanation, it has been stressed the important role that people perform in the application of Lean.

On the second part of this project, we analysed the changes that a company would undergo when applying Lean to some of their internal communication processes. In that purpose, the company we chose was Automecánica Levante, and more concretely, its replacement department.

Through the use of the mix methodology, it was possible to compare the internal communication before and after the application of Lean. After a series of anonymous polls (empiric study) to the members of the analysed department, previous to the application of Lean, we could observe that Automecánica Levante had several scarcities in that field. Once analysed the empiric part, we have selected three basic processes of internal communication, according to the opinion of different authors: Holidays management, communication on absenteeism, and development reports. Having these three processes, we designed and carried out interviews with the members of the department (qualitative study), in order to know how these processes were being applied

without Lean. With the information gathered we designed a flow chart to illustrate the processes. After that, we set six improvement proposals over the three analysed processes. After five months from when we started applying them it is possible to confirm (section 2.3) that four out of the six objectives have been successfully implemented. With this changes, we passed again the polls and the interviews to the same workers from the department. Showing that the application of Lean has produced positive changes in the company. In only 5 months, Automecánica Levante's internal communication changes from informal to emergent.

This study, applied to the real life of the analysed company has at every moment been treated as a pilot trial, with the mere objective of showing that Lean can suppose a competitive advantage to any type of organization and department, as well as to be a precedent to future investigations.

It has been shown that apart from introducing changes in the work processes, what it is searched is to take care of people. To make workers feel more identified with their job, working in processes that add value and eliminate waste, so that they are not working on useless processes. Thus, when maintaining people happy and motivated in their jobs, clients indirectly feels more satisfied with workers that offer the best of themselves.

3.1 Limitations, recommendations and future investigations

Regarding general terms, the balance of the investigation has been positive as, with the study case carried out, it has been possible to notice small changes that Automecánica Levante has undergone in its internal communication.

Nevertheless, it is true that there have been some limitations which have complicated the study to me more complete.

Firstly, we are going to talk about the sample we chose to apply the methodology in the investigation. That is, working with the information obtained from 8 workers from the same department can make that information not 100% precise. In order to be able to work with more representative information, all the workgroups should be interviewed, and not only one single department; nevertheless, due to the limited time and the extension of the project, it was opted to analyse only one department, so that we can get an approximate idea of what would be a future complete investigation.

As with the sample, the three processes that we chose can also be insufficient in order to study internal communication. It is evident that internal communication embraces more processes and types (ascendant, between departments, etc), nevertheless, according to different authors and in order to take a study in which it was possible to easily compare results before and after Lean application, we decided to only go through these three processes.

Another aspect that can also be considered as a limitation to the investigation is the methodology applied in the empiric part of the study. It would have been interesting to complete the polls and specify them in the sector that the company is competing it, using another type of scales (more rigorous). Nevertheless, despite the lack of this tool, the investigation could be carried out as we are facing a very simple project which is a pilot trial. It would be necessary to improve this part in a future and more complete study.

Lastly, it is important to stress that we are in the first phase of the application. It is complicated to compare the Lean results with only 5 months of time. In order to get more concrete results, we should let more time pass and wait until the company adapts the Lean philosophy 100% and, from then, compare the results and see which changes have occurred.

However, we can confirm that, in 5 months only there has been an improvement in the internal communication in Automecánica Levante, more work should be done in order to improve the study and to achieve the complete implementation of the philosophy.

In that sense, we are proposing some recommendations and future possible investigations:

Firstly, there should be trainings in the Lean methodology to all the staff, that is, the possibility of attending presentations which show the philosophy to the company, so that all the employees work in the same direction.

Next, the study could be expanded from the replacement department to the remaining departments, selecting the study processes on internal communication or on other aspect, so that it is possible to see which steps in the processes do not add value and can be eliminated, strengthening those that are correctly done. It would be interesting, for example, to work on the increase of authority of the middle ranges, to strengthen comradeship between employees not only from the same workgroup, but from all the company, so that they understand the job carried out by their workmates, etc.

Taking into account that changes need time, adaptation, and in some cases, economical costs, objectives must be realist, small goals which suppose to be constantly fighting for continuous improvement.

To conclude, as the company sets new objectives and completes them, more control methods should be applied in order to verify that the glows keep improving and they turn into continuous flows (fourth phase of the Lean methodology) and the achieved goals are not lost through time.

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ANNEXES

Annex 1: Poll 1. Internal communication analysis

Poll 1. Internal communication analysis

** Select with a circle the letter (a, b, c, or d) of your chosen answer to each of the questions.*

1. My company is characterised by...

- a) Sharing information through informal communication.
- b) The willing of the management to transmit the company's policies and objectives.
- c) Continuous communication from management and the development of mechanisms that provide feedback from employees.
- d) Fluid and constant communication, information is shared in ascendant, descendant and horizontally, at all levels, teamworks, improvement groups, etc.

2. Which is the role of communication in your company?

- a) It allows informal interaction of the employees.
- b) It transmits the company's objectives.
- c) It is a mechanism of coordination between the employees and the bosses which facilitates a better coherence in the acting plans.
- d) It the conductor through which the corporative values and culture are transmitted, allows to project its identity and to gather employees in a same direction.

3. Which communication flows represent your company?

- a) Mainly, communication in the company is held between the employees in the corridors or coffee reunions.
- b) Reports are advertised from management in order to explain the situation of the organisation.
- c) Employees and bosses periodically meet in order to discuss about the achievement of the objectives.
- d) There is a concrete Communication Plan which explains the communication channels which exist in the organisation and the situations when to use them. There are mechanisms which allow to evaluate the effectiveness of the communication and the grade of acceptance of the transmitted information.

4. In which communicative level is your company at the moment?

- a) Communication between workmates, informal.
- b) Communication between employees and their direct bosses (intradepartmental).
- c) Communication between employees from different departments which collaborate in projects, tasks, or activities, as well as with the bosses (intra and interdepartmental).

- d) Among all the levels of the organisation (intra and interdepartmental to all levels).

5. Which of these communication tools are the most used ones in your company?

- a) Noticeboard and leaflets.
- b) Suggestion box and informative notices.
- c) Meetings with employees and emails.
- d) Company intranet, emails, polls and periodical meetings with employees.

6. When transmitting a message...

- a) It is mainly transmitted “mouth to mouth”.
- b) Messages are transmitted through the management, in collaboration with the Human Resources Department.
- c) Messages are transmitted by the management or the intermediate managers depending on its content, using the communication medium which is more appropriate to the occasion.
- d) It is carefully chosen the transmitting, the context, the communication channel, and it is adapted depending on the interlocutors so that it is simple, understandable and pertinent.

7. How is communication noticed inside the company?

- a) Not reliable, and sometimes untrue.
- b) It is needed to analyse its sources, which is occasionally true, and occasionally ambiguous.
- c) Generally, communication is reliable, although occasionally, rumours can distort its content.
- d) Information is rigorous and reliable.

8. How are rumours treated on the organisation?

- a) They are common, flow easily, and are not managed.
- b) When rumours appear they try to be corrected, with no success.
- c) With the promotion of fluid communication between employees from the same and different department it is tended to avoid the appearance of rumours.
- d) As sometimes it is impossible to avoid the appearance of rumours, it is counteracted with formal and official communications which treat the same issues than the rumour with information from management.

9. The main problem of communication in my company is mainly due to...

- a) The absence of formal channels of communication.
- b) The lack of communication between employees and bosses.
- c) The secrecy of the departments, which do not communicate between them.
- d) Despite communication is fluid, other communication mechanisms and tools could be applied (p.e. Intranet).

10. Communication in my organisation...

- a) It is not really important, management does not pay attention to it.
- b) It is a media that management applies to transmit necessary information to employees.
- c) It is a tool that permits to inform employees and to coordinate them.
- d) It is a fundamental tool in my organisation, it is proactively used both to coordinate employees and keep them informed, and to motivate them, involve them, and generate a belonging feeling in them.

Annex 2: Interviews to members of the analysed department

INTERVIEW TO MEMBERS OF THE ANALYSED DEPARTMENT

As members of the department which I am going to analyse in my study, I am going to make you some questions regarding some of the processes applied in your job:

1. Which procedure do you follow when requesting holidays?
2. What would you change from the holidays requesting process?
3. Do you feel totally informed about everything that has happened in the department when you return from holidays?
4. Which steps do you follow to request an absence?
5. Do you think it would be useful to know when a workmate is going to be absent?
6. Do you receive any type of information regarding the results that the company gets?
7. How is your performance notified to you?
8. Would you feel better if you got more information regarding your personal results?

