Ecole Des Hautes Etudes Commerciales

EHEC

Thesis Submitted In Partial Fulfilment

Of The Requirements For Master's Degree In Commercial Sciences

Major: Management And Entrepreneurship

Lean Manufacturing And Its Impact On Company's Human Resources' Motivation

CASE STUDY: Schneider Electric Algeria

Submitted by:

Mrs. Lilia BOUCHARABINE

Supervised by:

Dr. Nesrine BOUCHA

Senior Lecturer

5th Class

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I dedicate this dissertation to

My mother than my mother than my mother

Than my father

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List of abbreviations

3M: Muda, Mura, Muri

5S: Seiri, Seiton, Seiso, Seiketsu, Shitsuke

AIC : Animation à intervalle court

BT : Basse tension

ERP : Enterprise Resource Planning

JAT : Juste à Temps

JCM: job characteristic model

JDS: job diagnostic survey

JIT: Just in time

MPS : motivating potential score

MT : Moyenne Tension

OEM : Original Equipement Manufacturer

OST : Organisation Scientifique du Travail

PDCA : Plan, Do, Check, Act

PME : Petite et Moyenne Entreprise

SE : Schneider Electric

SEA : Schneider Electric Algérie

SEI : Schneider Electric France

SET : Schneider Electric Turquie

SMED: Single Minute Exchange of Die

SPS : Schneider Production System / Système de production Schneider

TC : Temps de Cycle

TPM: Total Productive Maintenance

TPS : Toyota Production System /système de production de Toyota

TPS: Toyota Production System

VSM: Value Stream Mapping

WIP: waiting in process (temps d'attente)

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Abstract

Since the Toyota Production System was re-named and introduced as the Lean philosophy, many studies and articles have been published where the benefits of this philosophy are highlighted. The focus of most studies has been mostly on measurable benefits, the human aspect that exists in every organization and the effect that Lean can have over this aspect have been left out of the spotlight In this perspective,

The current research was undertaken to study lean manufacturing, mainly in the Algerian context –Schneider electric- and its impact on the company's human resources motivation. By adopting Hackman and Oldham's well-recognized Job Characteristics Model, using a mixed method approach .we have finally been able to confirm that lean manufacturing leads to staff's motivation and jobs under lean implementation have the potential to intrinsic motivate

Key words: lean manufacturing, human resources motivation, job characteristic model, human aspect for lean, motivating potential score

Résumé

Depuis que le système de production de Toyota a été renommé et présenté comme la philosophie Lean, de nombreuses études et articles ont été publiés où les avantages de cette philosophie sont mis en évidence. L'objectif de la plupart des études a été principalement sur les avantages mesurables, l'aspect humain qui existe dans chaque organisation et l'effet que Lean peut avoir sur cet aspect ont été laissés de côté Dans cette perspective,

La recherche actuelle a été entreprise pour étudier la fabrication sans gaspillage, principalement dans le contexte algérien - Schneider Electric - et son impact sur la motivation des ressources humaines de l'entreprise. En adoptant le modèle bien connu des caractéristiques de l'emploi de Hackman et Oldham, en utilisant une méthode mixte, nous avons finalement pu confirmer que la lean manufacturing mène à la motivation du personnel et que la mise en œuvre de l'emploi a le potentiel de motiver

Mots clés: lean manufacturing , motivation des ressources humaines, modèle de caractéristique du travail, aspect humain pour le score potentiel

Sammury

INTRODUCTION

General Introduction

The changing environment in which we live today forces companies to strive for excellence. Companies seek to satisfy their customers at the lowest possible cost. Over time, companies have implemented various improvement initiatives to achieve excellence, such as Total Quality Management (TQM), Six Sigma, Theory of Constraints, and Lean manufacturing.

Lean manufacturing is a methodology that helps companies reduce the time between order placement and product delivery while reducing waste. Several enterprises have tried to introduce the Lean approach in order to enhance competitiveness. However, the only successful ones were the companies, which understood that lean is not only about methods and Tools, but the people using them: employees. Although there is a reasonable amount of research on the experiences of employees dimension in Lean organizations and the impact of Lean practices on employee attitudes and well-being, especially employee motivation

The idea behind this thesis came from a personal interest in Lean manufacturing. Our major purpose of the whole study is to identify the lean manufacturing job design, and analyses how this job characteristics affect the human resources motivation inside their organization. This will help to contribute to professionals and companies that are interested in implementing the Lean philosophy and its tools inside their own organizations, with essential information and job-design model. This will help them go through an implementation effort and achieve a positive outcome, where not only operations are improved and waste is reduced, but also the well-being and the internal motivation of the people, which lead to achieve organizational goals.

The choice of the company SHNEIDER ELECTRIC was after a very long quest to find an adequate enterprise. This choice however turned out to be very suitable considering that Schneider electric is a multinational that implement the lean manufacturing practices in a purely Algerian workplace.

This research is here to answer the following primary question « **How can lean manufacturing job affect the company's human resources motivation? »**

In order to answer the previous question, it necessary to investigate the following

Q1- could lean manufacturing job be an enhancer to the company's human resources motivation?

Q2- what are the drawbacks of lean practices that affect negatively the workforce?

As a starting point, after initiating prior documentary research, and from the basis of some personal remarks and perceptions, three main hypothesis were conceived

H1-the internal motivation increases following lean implementation

H2- lean manufacturing result an increase in skill variety, task identity and task significance and feedback that develop a sense of meaningful, responsibility, and knowledge, which leads to motivate human resources

H3- lack of choice and limit the freedom are the main factors of the negative side of lean manufacturing

To go through this study, we will follow the Hackman and Oldham's well-recognized Job Characteristics Model, they propose a number of organizational and job-level characteristics that have the potential to create an internally motivating environment for employees. The adopted methodology was both descriptive, and analytical through a qualitative and quantitative study that included interviews and the distribution of a questionnaire for a better data collection. The final work was therefore divided into three chapters as follows:

The first Chapter will draws a general theoretical framework for the lean manufacturing tools and methods starting by the evolution of production systems over time, than the second section will be about a description of the lean philosophy. Finally, we will devote the completely third section to lean toolbox

The second chapter will be about human resources management, narrowing the circle to reach the human resources motivation with which this research is most concerned. The first section is to define the general concept of human resources management, highlight its main processes, and recite its most important models. The second section is to speak about the most well recognized motivation theories and specially the JCM, which we adopt. As for the third section will cover the core element of the research, which is the human aspect of lean practices and especially motivation

The last chapter harbored the projection of these theoretical earnings on our host company Schneider,, which introduces the company concerned with this research in the first section. The second section recite the survey process and the followed methodology. Then at last, the third section is to give us the results presentation and data analysis of the conducted practical

CHAPTER 01: LEAN MANUFACTURING

INTRODUCTION

To cope with tough competition and increase productivity gains, companies are tirelessly pursuing the quest for the universal organizational model: formerly with Taylorism and Fordism, and recently with Lean. This chapter is dedicated to the presentation of these production systems known throughout the history of industry and the evolution of Lean philosophy, which has been divided into three sections. The first section presents the evolution of production systems; the second section discusses the general concepts of Lean manufacturing. Finally, the third and final section attempts to focus on the toolbox of lean manufacturing;

Chapter01: Lean Manufacturing

Section 01: Manufacturing Systems

To cope with tough competition and increase productivity gains, companies are tirelessly pursuing the quest for the universal organizational model: formerly with Taylorism and Fordism, and recently with Lean

1.1. Definition Of Manufacturing System

The English notion "manufacturing" stems from the Latin Manu factum (made by hand). It is explained as the process of creating goods through a combination of materials, human resources and financial capital, which indicates the production of physical objects.

"*A manufacturing system has the ability to change the properties of material in order to produce physical products"*[1]

While production embraces physical products (goods), and non-physical product (services). a production system is defined as :" *a group of technical production facilities which are linked with each other for a certain type of production including the existing relation between them"*[2], this can be used to describe The process of creating goods and/or services through a combination of material, work, and capital. .

1.2. the evolution of production systems

The main objective of the company is to generate the highest profit possible via gaining more markets and especially reduce the waste

In the 20t century, Taylor came into play in the waste reduction, he emphasize the importance of work standardization and he suggested to replacing the existing procedures with another ones in which all the non-value added activates and time wastes could be eliminated.

[1]SOHLENIUS, (G), systematic nature of the industrial innovation process, doctoral thesis , university of technology, Finland, 2004, p20

[2] Ibid

This was evident in the Ford's production philosophy which was then built by using fundamentals of the Taylor's management theory. The latter was the basis for Toyota production system, which dominated in the last century.[1]

1.1.1. Taylorism

the existence of under-production, disagreement between employers and workers, often inefficient working methods and, secondly, the need to increase production and productivity push Taylor to look at individual workers and work methods, in order to find and eliminate wasted Time and motion in the operation. He called his ideas Scientific Management. Management could identify the one best way to do a job, determine the correct productivity level, and set a pay rate based on that level.

Taylor encouraged workers to suggest improvements and made management Responsible for careful analysis of these suggested methods. Whenever it was found to be superior to the old, he wanted it to be adopted as the Standard for the whole establishment. This shows clearly, that even Taylor recognized the importance of workers for effective changes

THORSTEN[2]. set in his book two main principles of Taylorism, they are as follows:

- **The scientific organization of work:** Taylor establishes that to be economical, the methods of carrying out the work must be studied and taught by different observers of the performers. This scientific analysis of work involves, in particular, a timing of each task to calculate the "right time" necessary to achieve it, the elimination of unnecessary gestures, the selection of workers and a performance wage
- **The division of labor:** the second principle is based on a division of labor vertical than horizontal, the vertical division is based on the social separation between engineers also called "white-collar workers" and blue-collar workers. The operators without qualification only perform production operations. All the other tasks such as, for example, quality control and maintenance are allocated to specialists. The worker must have as many specialized managers that can be distinguished from different functions involved by his work: a line

[1] "*Complexity in the World of Production*" ,Massachusetts Institute of Technology, November 14, 2000,
[2]THORSTEN (A), *successful implementation of organizational change in operation in operation instead of short term cost reduction,* lean survey, lean alliance, 2006, p14

manager for his pace of production, for his tools, for assignments, etc. The horizontal division consists to break down the work into successive elementary tasks.

1.1.2. The Fordism

1.1.2.1. rise of mass production system:

After the end of the 2nd World War, when the demands for products were very high, Henry Ford introduce the American system of production or known as Mass Production System at Highland Park near Detroit .Ford and his right-hand-man, Charles E. Sorensen, fashioned the first comprehensive Manufacturing Strategy. They took all the elements of a manufacturing system--people, machines, tooling, and products and arranged them in a **Mass production** system, also known as flow production or continuous production is the production of large amounts of standardized products, including and especially online s for manufacturing the Model T automobile. [1]

Taylor theory state that the productivity of the individual worker increased if he was assigned tasks suited to his capacities and strengths, that helps Ford to identify the unnecessary physical motions of workers so that productivity could be increased by eliminating; such waste like the time for the whole assembly process, These tactics helped Ford to develop his mass production system of his motor company, and make it more efficient

In his factory, Ford noticed the motor parts motion and their poor arrangement in the work place, he could release that the time and labor waste could be reduced by keeping heavy parts to be stationary while the light parts were moved, in this way Ford converted the manufacturing of cars to a place assembly line

Ford described the entire concept of waste in his “My Life and Work”. He had identified the waste motion, waste effort etc. of the average farmer, closely looking at his activities and attitudes. Mentioned in the same paper, Design for Manufacturing (DFM) was another Ford’s concept in mass production which was based on standardization of parts. Henry Ford's proven methods were for mass-production of any product or delivery of any service cheaply but went well beyond the synergistic and mutually supporting techniques. All these are case based and provide evidences for

[1] *International Journal of Economics,* Commerce and Management UK,Conceptual Evolution Of Lean Manufacturing, October 2015

steady state environment; therefore, Ford's philosophy cannot be applied to dynamic situations. Therefore Ford's concept requires further improvements to become more sustainable and relevant.[1]

1.1.3. The fall of mass production system:

When the world began to change, the mass production system cannot withstand the vagaries of the economic situation, it's began to break down and Henry Ford refused to change the system.[2] The main goal of mass production is the pursuit of productivity. Manufacturers designed products and pushed them to the consumers with only limited inputs from them. In fact, manufacturers had forgotten their customers. Quality of products had deteriorated. When products were not selling well, inventory cost increased.

The division of labor also caused problems between management and workers; the dehumanization of work, the loss skilled labor, high absenteeism, sabotage and high turnover, work-related accidents have had a negative impact on productivity. The complexity of assembly lines have also shown counterproductive effects in terms of operating time and flow balancing and late defects management in the production generating significant financial losses[3]

No one seemed to have noticed the problems Manufacturers faced until many Japanese products arrived in the US markets.

1.1.4. The rise of Toyota Production System

The origins of Toyota Production System date back to the beginnings of the twentieth century. The fathers of the system were Sakichi Toyoda, his sons: Kiichiro Toyoda and Eiji Toyoda as well as Taiichi Ohno, a manufacturing engineer. Saki chi Toyoda, who then worked in textile industry, invented a motor-driven loom with a specialized mechanism devised to stop in case of breaking off the thread. The mechanism became later a foundation for Jidoka (automatization with human manufacturing), one of the two main pillars on which Toyota Production System was built

[1] International Journal of Economicsm op.cit, p

[2]RABIA (A) : *Lean Manufacturing : Application aux entreprises algériennes,* thèse de Doctorat en SciencesEn Sciences Commerciales, Université d'Oran 2, 2016, p26

(Figure). Due to the application of a fault detection sensor, the defects stemming from human-related imperfections were reduced and the production capacity was elevated.[1].

In the 1950's, Toyota visited one of Ford's assembly plants in Detroit to observe how it is managed. This was part of a pre-planned offering to mend relationships between Japan and the US after World War II. After visiting the plant the Toyota representatives were impressed how the assembly lines were moving in an effortless and smooth pace, but they also noticed that everything was produced in larger batches, even if there was no need to create as much. Because of this, Toyota's representative decided not to apply Ford's technique into their assembly line, at least not in its purest form. They realized this would create unnecessary waste, and due to their economic and financial situation at the time, they could not afford to create automobiles that they would not be able to sell. Toyota modified the Ford assembly techniques and created procedures that enabled them to produce parts in smaller amounts, and in amounts that were actually needed. This was called Just-in-Time (JIT)[2]

Toyota started its production in a small volume, while minimizing the cost, and assuring that the assembly line was flexible and modifiable, it was the birth of Toyota Production System. Shortly after, another concept was advanced called "pull flow production"; an old practice of the American supermarket allowed to generate as many products as could be exploited in the successive process to facilitate the reduction of over production. Toyota became world known for its ability to produce products for much cheaper whilst maintaining the quality of the product

Toyota kept developing the Toyota Production System for the next thirty years and TPS was seen as the beginning of the Lean practices. Due to Lean practices being implemented onto other industries, the importance of customer in Lean practices rose. The importance of accommodating and preserving customer demands and the importance of employee's continuous learning, the most known Lean practices are the Henry Ford Model also known as "Fordism" and the Toyota Production System which derives from "Fordism", but there are significant differences between these practices. Henry Ford invented, the concept of the moving assembly line which

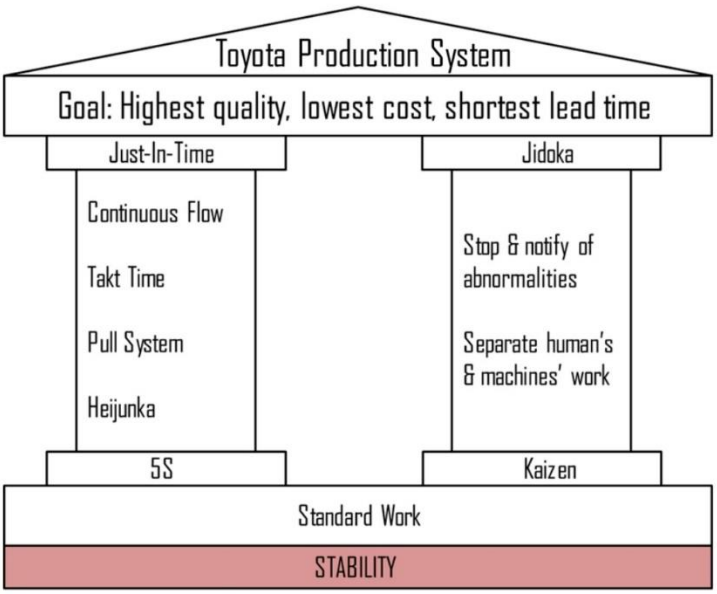
[1] ŁUKASZ (D) "*The Origins and Evolution of Lean Management System*", Journal of International Studies, Poznan University of Economics,2012,p47

[2] AMINA(M) :*EMPLOYEE PERSPECTIVE ON LEAN IMPLEMENTATION – A QUALITATIVE STUDY IN A FINNISH PENSION INSURANCE COMPANY,Master's thesis*,University Of Tampere,2016,p10

revolutionized the world of automotive manufacturing through the reduction of worker control and rationalizing production control, thus leading to an increase on efficiency.

Toyota Production System (TPS) is often seen as "**Fordism" with a Japanese flavor**[1], it was able to evolve and achieve efficiency that Fordism was unable to achieve. Due to TPS's growth in worker span of control, Toyota Motor Corporation was able to become more efficient and exceed the productivity and adeptness of General Motors

Figure 01: **TPS House**



Source: CHRISTIAN,(F): *lean management awareness, implementation status, and need for implementation support in VIRGINIA's wood industry,* master in science and forest products, VIRGINIA polytechnic, 2010

Comment: The TPS house serves as a representation of Lean. The base of the house is standardization and stability. Making continuous changes and fusing them into organizations own philosophy. The pillars are the Just-in-time and Jidoka tools, whose purpose is to eliminate waste. The center of the house is the importance of employee involvement, where as the customer satisfaction is seen as the goal of TPS, hence it being the roof.

The reasoning behind the success of the Toyota Production system was due to their ability to produce continuous productivity and efficiency, in a continuous manner, for several years.

[1] AMINA(M), op.cit, p11

TPS is the reason for Toyota's colossal rise from a small automotive manufacturer to a massive industry well known for its operational excellence

Toyota's operational excellence is based on the Lean tools and quality improvement methods, such as just-in-time, kaizen, one-piece flow, jidoka and heijunka. All these techniques were part of the reason that helped create the Lean manufacturing revolution. These techniques were not the only components in Toyota's success. Other automotive companies had the opportunity to take advantage of similar techniques and tools, without succeeding

Section 02: lean manufacturing

Lean Manufacturing was coined in 1991 by James P. Womack, Daniel T. Jone[1]s and Daniel Roos from the Massachusetts Institute of Technology in their book The Machine That Changed the World, in which they compared Japanese and American companies

2.1. "lean manufacturing" definitions:

Many other researchers and practitioners across the world have studied and commented on lean manufacturing definitions, the authors seem to have a different opinions on which characteristics should be associated with lean concept; table 2 presents that:

[1] AMINA(M), op.cit,p48

Table 01: lean manufacturing definitions

Author	Lean manufacturing definitions
Dankbaar (1997)	Lean production makes optimal use of the skills of the workforce, by giving workers more than one task, by integrating direct and indirect work, and by encouraging continuous improvement activities. As a result, lean production is able to manufacture a larger variety of products, at lower costs and higher quality, with less of every input, compared to traditional mass production: less human effort, less space, less investment, and less development time
Singh (1998)	Lean Manufacturing is a philosophy, based on the Toyota Production System, and other Japanese management practices that strive to shorten the time line between the customer order and the shipment of the final product, by Consistent elimination of waste.
Storch and Lim (1999)	Lean production is an efficient way to satisfy customer needs while giving producers a competitive edge
Shah and Ward (2003)	Lean manufacturing can be best defined as an approach to deliver the upmost value to the customer by eliminating waste through process and human design elements. Lean manufacturing has become an integrated system composed of highly inter-related elements and a wide variety of management practices, including Just-in-Time (JIT), quality systems, work teams, cellular manufacturing, etc
Seth and Gupta (2005)	Lean production refers to a manufacturing paradigm based on the fundamental goal of continuously minimizing waste to maximize flow.
Taj and Morosan (2011)	A multi-dimensional approach that consists of production with minimum amount of waste (JIT), continuous and uninterrupted flow (Cellular Layout), well- maintained equipment (TPM), well-established quality system (TQM), and well- trained and empowered work force (HRM) that has positive impact on operations/competitive performance (quality,cost,fast response,and flexibility).

Source: JAIPRAKASH (B):*Development and Validation of Lean Manufacturing Drivers, Barriers and Framework with a Focus on Ceramic Industry,PHD thesis*,birla institute of technology and science, pilani ,2013,pp9-11

Comment: From the above definitions, it is clear that lean manufacturing may be a way, a process, a set of principles, a concept, a philosophy, a program, or a manufacturing paradigm. But they are

all agree that lean's goal is to maximize the generation of customer by eliminating and driving out all forms of waste, ensuring 'right first time' quality, reducing timescales and minimizing cost and precise customer desires, compared with the previous system of mass production

2.2. lean manufacturing philosophy

The basic philosophical concepts of lean manufacturing are:

- ✓ **the waste**: is any activity that does not contribute to operations and therewith does not add value such as walk to get parts, or unpacking parts or waiting for lots to be finished

lean renowned for its focus on reduction three board types of wastes they are :

- **Muda:** is a Japanese word meaning "futility, uselessness, wastefulness", Taichi Ohno categorized waste into seven forms. These seven forms are: transport, waiting, overproduction, defects, inventory, motion and excess processing. Highlights wastes in seven forms are identified and described into Table 02 to let the reader understand the meaning in terms of manufacturing. Then it follows with some examples in different kind of organizations**.**

Table 02: The Seven Types of Wastes

Waste	Description	Examples
Over processing	It means organizations use big machines, which are not efficient with low quality that causes defects. So, organization should focus on long term and purchase smaller and simpler machines that fit to the capacity needed based on customers' demand	The variation between operators, which causes the machine to be used for several lines
Transportation	It is the movement of materials which is not needed, because their chance to getdamaged and deteriorated increases	The movement of materials on and off site without a need; and movement of intermediate product in the site
Motion	It happens when there are unnecessary movement of people and machines	Double handling of materials in the organizations

Inventory	It involves the over existence of raw materials, WIP and finished goods in organizations. This is considered waste because of the excess of cost spend on them	- The excess of inventory compared to the quantity that was specified - Large warehouse occupied with inventory in the site .When employees are unable to provide services according to customer's requirements due to lack of supplies
Waiting time	It is considered an enemy of flow, because materials and components do not move as a result of waste	Operators or employees waiting for something; materials waiting in a queue; and late delivery
Defect	It involves any waste which involves costs related to delay, warranty and repairs	- Rework, customers' complaints, or even lose of customers -Higher operating costs
Overproduction	It involves producing too much, or just in case it is needed without being focused on customers' demand. This leads to excessive lead times and deterioration of products	The area of space that is needed and used in the warehouse

Source: Rexhepi, (L) and Shrestha, (P), Lean Service Implementation in Hospital, Masters in strategic Project Management, Student Umea School of Business, 2011

Comment: However, nowadays there is a ninth waste in the form on environmental of energy waste, which implies the unnecessary or excessive usage of resources as well as substances released to air, water, or land that could harm human health or environment .

- **MURI**: overburden, can result from Mura, and from removing too much Muda

(waste) from the process. When operators or machines are utilized for more than 100% to finish their task, they are overburdened. This means breakdowns when it comes to machines and absenteeism when it comes to employees. To optimize the use of machines and make sure they function properly, preventative- and autonomous maintenance can be implemented. To prevent overworked employees, safety should be the focus of all process designs and all standard work initiatives. [1]

- **MURA**' unevenness, can be found in fluctuation in customer demand, process times per product or variation of cycle times for different operators. In production environments with low-volume, high product variation, flexibility is more important than in high-volume, low-product variation environments. When Mura is not reduced, one increases the possibility for Muri and therefore Muda. Mura can be reduced by creating openness in the supply chain, change product design and create standard work for all operators[2]

✓ The core idea of lean manufacturing is work on **JUST IN TIME**; the primary purpose of the concept of Just in Time is to ensure timely production and delivery, while minimizing inventories. Just in Time requires keeping stocks as low as possible, immediate detection and removal of damaged parts, materials and improper operation

✓ **Customer's focus** is central to lean philosophy. In this form, it emphasizes customer's expressed needs and develops Solutions to meet these needs. Other manufacturing techniques, start with the question "What provides the company with the most value at the least cost?" while *lean* begins with the question "What provides the *customer* with the most value at the least cost? which requires frequent and regular communication with customers and all aspects involving their experiences with the product.

In their book ‚Lean Thinking", Womack and Jones[3] discusses the role of customer focus as "lean thinking must start with a conscious attempt to precisely define value in terms of specific products with specific capabilities offered at specific prices through a dialogue with specific customers". Richards (1996) highlights one of the distinctive principles of lean production is that the consumer and the competition must never be overlooked.

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[1]http://www.panview.nl/en/lean-production-toyota-3m-model/toyota-3m-model-muda-mura-muri,viewed24/02/2018 at 21:21

[2] Ibid, viewed 24/02/2018 at 21:21

[3]JAIPRAKASH (B), op.cit., p144

The customer must be offered products that are more appealing than the competitive products in the market, otherwise, despite the company being efficient and competing, inventory will grow rapidly.

- ✓ Once lean has been implemented, it is necessary to develop the organization for continuous improvement to sustain the effort to improve the quality, productivity, flexibility and realize the benefits to a long term commitment and create a quality culture.

To make lean manufacturing successful vertically and horizontally along the time horizon, proper lean management structure be evolved clearly specifying the role of individuals in the structure.

2.3. lean manufacturing principles:

Lean principles originate from the Japanese manufacturing industry, which focused on getting the right thing to the right place at the right time in the right quality to achieve a perfect workflow.

2.3.1. Traditional principles:

Womack and Jones developed the five Lean principles in their book 'The Machine that Changed the World'. The book emphasized Lean Enterprise rather than Lean Manufacturing; Lean can be used in systems not just in manufacturing.

- The first principle is "*specify the customer defined-value*" it is the determination of the value from the point of view of the customer, the manufacture should give to their customer what is convenient for them, or conceived as economical for them, that's why it is important to know who the customer is.
- The second principle is "*identify and analyze the value stream*". This refers to the steps and processes from the raw material to the final product and its delivering to the final customer. Lean involves to analyze the value stream which identify three types of actions; actions that create value, action that do not create value but are unavoidable because of the restrictions of current technologies, methods or assets, and action that create no value and are avoidable

- The third principle is "*making the process Flow*". When the value stream has been identified and analyzed, all action in the process must be made to flow efficiently. Batch and queue processes should be avoided or continuously reduced so that there is a smooth and quick flow of information, products, and services. "Flow requires much preparation activity. But the most important thing is vision" When looking through the point of view of an entire supply chain, it makes sense for activities to be organized in a way that allows for

uninterrupted flow of work at the rate of demand pull from the customer. Disruptions to the supply chain flow affect the supply chain throughput, capacity, and cycle time and it ultimately "adds little value that the customers appreciate".[1]

- The forth principle is *pull*", it means short term response to the customer's rate of demand and not over producing, is to make it possible for customer to communicate their needs to each part of the manufacturing process. Lean manufacturing methods make one of the Kanban system to do this
- The fifth principle is *"perfection".* When the company have worked consecutively for the previous four principles, it becomes more efficient, previously hidden wastes in the process is exposed, his become an impetus for further review and refinement of the product flow, because it would now be able to see that perfection within the company processes is now possible. Its not only means a defect free company bur elso means delivering exactly what the customer wants, exactly when, at a fair price and with minimum waste.

2.3.2.Non-Traditional Principles:

There are also three more non-traditional principles that were discussed by Robert Trent[2] in his book End-To-End Lean Management:

- **To optimize is** to make something as perfect, effective, or functional as possible. The results of optimizing are often a reduction of waste. Some of the areas (within a supply chain) that benefit from optimization are:

- "The design of products and physical processes"
- "Number of transportation carriers"
- "Number of customers within the customer base"

- **Standardization:** Means to conform to something that is established as a model or ideal example Standardization is not restricted to just processes but also documents, measurements, contracts, and policies. Standardization also creates a foundation for flexibility as long as workers are trained properly and are given the responsibility for maintaining the standards. If workers do not have the freedom of interpretation (but have to get permission from authority) then standardization can become constricting.

[1] CUNNINGHAM, (J), DUANE (J), *easier, simplier, faster, systems strategy for lean IT*, productivity press, USA, 2007, p 11

[2] Ibid, p 13

Standardization allows for workers to develop new skills as well as enjoy variety in their work.

- **Simplification:** It means that the organization needs to be agile**,** nimble, and willing to experiment and learn to grow. These principles are not to be done once, but should be thought of as a continuous journey to improvement.

2.4. Lean manufacturing implementation

During the recent years, and since the lean manufacturing application is growing rapidly, some of the organizations have reported huge benefits, while many industries have not obtain the desired results

2.4.1. Lean Manufacturing Implementation strategies:

Lean manufacturing is a philosophy which cannot be implemented instantly so it requires tolerantly developing understanding within the organization about lean, starting with smaller projects of lean at tool level, taking guidelines of an expert, making and following the strategy with due course correction in strategy while implementing lean throughout the organization. Some of the steps are as follows:[1]

Step01: Senior Management Involvement: It is very much possible that problems will arise when lean implementation will progress and these issues must be understood and solved by top management without effecting lean implementation process.

Step02: Initiate with smaller projects: Initial project must be small so that more resources are utilized and more chances are for better results with lesser risk on people working on project and around will learn while doing project. The results will motivate other to follow the same and people will start having faith in lean techniques. So recommendation is to start with smaller project at tool level.

Step03: Start with limited execution: Lean implementation should be within limited area during start so that it can be monitored, corrected and directed for further implementation starting lean all-around the organization will reduce control and mentoring of people involved in lean implementation. Once movement is gained it should be spread in other areas.

[1] Rakesh (K), Vikas, (K) **,** *LEAN MANUFACTURING: ELEMENTS AND ITS BENEFITS FOR MANUFACTURING INDUSTRY* ,YMCA University of Science & Technology, Faridabad, Haryana, Oct 19-20, 2012, p 7

Step04: Employ a professional: Services of a professional mentor should be taken at least at the start. During conversion of a conventional organization to a lean organization lots of issue will arise and should be handled professionally they can be taken care with the use of expert.

2.4.2. Obstacles of lean manufacturing implementation

Most of the researchers[1] agree that the following may be the some of the obstacles of lean implementation:

- Lack of management support: When management starts and does not propel further this results only superficial lean and neither lean is implemented nor does it get benefits.

- Lack of training: About the understanding of lean philosophy, the organization where knowledge of lean lacks it cannot be implemented.

- Communication: is one of the prime obstacles in lean implementation because it helps to share informations, which lead to a better way to achieve organization goals.

-Resistance to change: that increases the fear of failure is when people doesn't want to change and hence it stops the process of lean**.**

- No direct financial advantage: Lean does not produce any direct financial benefits but it helps in identification and elimination of waste hence reduction of cost. Lean does not have any financial measure in terms of input and output so sometimes lean idea is superseded by other organizational priorities.

- Past failures: the poor launching of lean is an obstacle because of the lack of implementation strategy maybe lead to lack of faith in the whole philosophy.

2.4.3. performance indicators of Lean manufacturing

2.4.3.1. Takt Time:

In Germany, the word Takt means "tempo" given by the conductor to keep pace and synchronize the musicians. In Lean, Takt Time is the time it takes the customer to "consume" a product. It helps to avoid breaks, if we produce slower than the demand, and overproduction, otherwise. Takt Time is the first piece of data needed to organize just-in-time production, it calculated by the following formula:

$$takt\ time = Production\ Time\ Available / Customer\ Demand$$

[1] Rakesh (K), Vikas, (K), op.cit, p 700

The objective of the calculation of Takt time is to Produce at the speed of sale and synchronize at this rate the processes from the upstream to the downstream of the company to avoid the overproduction, overstock of finished products and outstanding between phases of production..[1]

2.4.3.2. Cycle time

Cycle time is a widely used indicator in performance measurement. These indicator measures, by observation, the time between the output of two products; and by highlighting this clue, manufacturers can quickly see where bottlenecks are manifesting in a process. The cycle time must be aligned with Takt time in order to obtain a regulated workflow (Each product that comes out corresponds to a customer's request). [2]

2.4.3.3.Time for added value:

Value-added time is the time during which the production system transforms the material or enriches the information. Value-added time is an indicator of efficiency. It is particularly followed in value chain mapping (VSM) to determine the performance of a process and its margins of progress[3]

2.4.3.4.Lead time

"Lead time" is the time it takes for one unit to make its way through your operation from taking the order to receiving payment. If the lead time is much higher than cycle time, it means you have a lot of units in your inventory. [4]

Section 03: Lean manufacturing toolbox

Since the beginning of new century many organizations are trying to be lean. This has led to the development and identification of many lean manufacturing tools, techniques and methodology for different purposes and waste elimination, and every day new one are being proposed

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[1] DEMETRESCOUX, (R) : la boite à outils du Lean, édition DUNOD, Paris,2015, p78

[2] CHINAR,(L) et FATHOUM ,(J) : "*Contribution à l'amélioration de la ligne de production Pril Isis par le déploiement d'outils innovants du Lean Manufacturing* ";Ecole Nationale Polytechnique, Alger,2014,p 30

[3] 2http://christian.hohmann.free.fr/index.php/lean-entreprise/les-basiques-du-lean/259-lead-time-cycletime-value-added-times een 22/07/2015 à 01.54h)

[4] https://toggl.com/takt-time-cycle-time-lead-time/, seen 01/05/2018 at 1 :23

However, the lean manufacturing tools and techniques have multiple names; some of them overlap with other tools or others are used in conjunction with each other to achieve the optimum results, and the most common tools are highlighted below

3.1. Cellular layout

Cellular manufacturing is one of the cornerstones when we want to be lean, is a concept that increase the mix of product with the minimum waste possible, a cell consists of equipment and workstations that arranged in an order that maintains a smooth flow of materials and components through the process, it also has assigned operators who are qualified and trained to work at that cell.

Arranging people and equipment into cells has great advantages in terms of achieving lean goals. One of the advantages of cells is the one-piece flow concept, which states that each product moves through the process one unit at a time without sudden interruption, at a pace determined by the customer's need. Expending the product mix in another advantage of cellular manufacturing when customer demand a high variety of product as well as faster delivery rates, its important to have flexibility in the process to accommodate their needs.[1]

This flexibility can be achieved through grouping similar products into families that can be processed on the same equipment in the same sequence

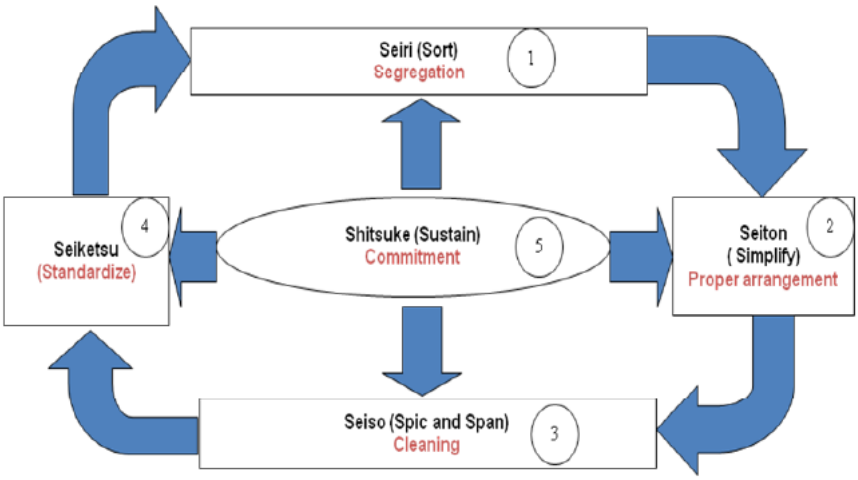
3.2. The five Ss

The **5S** method owes its name to five Japanese words: Seri, Seiton, Seiso, Seiketsu, and Shitsuke. Seiri refers to a systematic process of housekeeping to identifying all unnecessary tools, materials, machines, and equipment and classifying them according to the frequency of their use.The basic objective of 5S is to create an organized clean, safe and comfortable work environment so that quality products are manufactured; service is delivered in most cost effective manner

Without the implementation of 5S other techniques become less effective and the implementation may be tough. The 5S shown in figure 2 are as follows:

[1] FAWAZ(A) :lean manufacturing tools and techniques in the process industry with a focus on steel, doctorate thesis, university of pittsbuegh, 2003, p10

Figure 02: elements of 5S



Source: *JAIPRAKASH (B), op.cit, p46*

- Seiri (Sort): Move out the items that are not currently being used. Moving and tossing away needless items will make material flow smoothly and workers move and work easily.
- Seiton (Simplify): Items that do not belong to that area must not be in that area. The work-place tools must be marked and arranged as belonging to that area.
- Seiso (Sweep and Clean): This deals with cleaning and sweeping the work-place methodically. The work place should be maintained on a regular basis as it creates a healthy environment to work.
- Seiketsu (Standardize): It maintains a high standard of house-keeping and work-place arrangement. A regular audit should run and scores should be assigned for areas of responsibilities.
- ShitSuke (Sustain): Management should be accountable to train people to follow housekeeping rules and sustain the improvements made.

3.3. Kaizen

Kaisen, is a Japanese term that basically means “small improvement” as the result of continuous effort, it was introduced by MASAAKI IMAI

"Kaizen is an ongoing methodology and philosophy for challenging and empowering everyone in the organization to use their creative ideas to improve their daily work."[1]

Kaizen is done by the individuals mainly by operators for improvement in workings condition, safety, and quality, productivity, set up time reduction or any other small change for betterment, it emphasizes many aspects of human resources management: communication, training, teamwork, job involvement, and self-discipline. In Lean, Kaizen events are used to introduce other Lean tools to companies.

The standardized steps of Kaisen's quality route by GRABAN[2] are as follows:

A. Prepare and train the team:

During event preparation, identify problem cells and select the cell that will be given focus. This work should have been done in the early stages if it is within an overall corporate/operational IEE project execution roadmap. Assemble the team and, if necessary, conduct training on waste control, standardized work, and continuous flow.

B. Analyze present methods:

The team uses a videotape to analyze the cell in action to determine material flow, cycle time, cell layout, process waste, and other vital measurements. During this time they can generate a standardized work and work combination table. The team needs to record the current number of operations over time, and the defect rates. Photographs should be used to document the overall Kaizen event.

C. Brainstorm, test, and evaluate ideas:

Divide the team into smaller groups to discuss ways to improve the cell, using the compiled work cell analysis statistics. Groups then test potential improvement tactics on the work cell, assessing their impact. Results from the tested ideas are shared with other team members. This keeps other groups from making similar mistakes and inspires new ideas. This cycle may be performed many times before desired results are achieved.

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[1] GRABAN,(M), JOSEPH (E) SWARTZ, *Healthcare Kaizen: Engaging Front-Line Staff in Sustainable Continuous improvements*, CRC press, USA, 2012, p 04

[2]FORREST , (W. B):*Lean Tools That Improve Processes, BPTrends , March 2007, Pp3,4*

D. Implement and evaluate improvements:

After the team has developed its plan for achieving results, a maintenance request is generated, if necessary, where modifications are fully described so that management can authorize change(s) to the work cell and its processes. All of the working personnel are then trained in the new process by Kaizen team members. Improvements are monitored, and progress is video taped and standardized. Results are measured and items that require additional time are put on a future 30-day action list to be implemented by the team.

E. Results and follow-up:

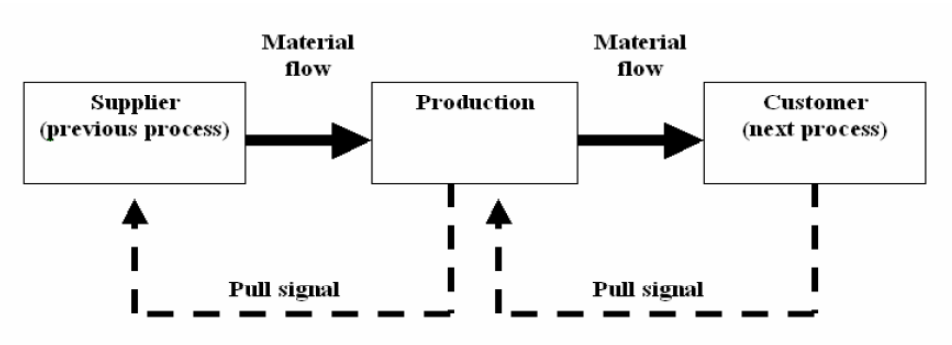
Team members document all improvement items and compile results to determine monetary savings, improved space utilization, and time reductions. Team members make a presentation to top management with a commitment to complete outstanding items. Management recognizes the team's performance and makes suggestions for the future

3.4. Kanban

It's a Japanese term means "signal card", it implies that a visual signal is produced to indicate that new work can be pulled because current work does not equal the agreed limit.so kanban is a shop floor tool which communicates customer requirement from downstream to upstream workers. The principle of kanban is that you start with whatever you are doing now and flow work through the system by pulling in when Kanban signals are generated

Kanban can be the relay signal between supplier and customer. Kanban signals can be generated by lights, colored balls down a tube, or a computer network

Figure 03: kanban pull syste



Source: VATALARO AND TAYLOR,***the Lean Replenishment Technique for Pull Production, 2003***

Kanban "label" data can include:

• Kanban number

• Supplier name

• Line site address: location of line where the component will be processed

• Shipping area address: shipping location for finished assemblies

• Part store address: factory location for temporary storage of components before assembly line use

• Part description

• Quantity in Kanban package

• Bar code Part number

3.5. Poka Yoke (mistake proofing):

Poka-Yoke is a method of preventing errors in the following mistakes employee or a random event. This method is a set of technical and assistive devices prevent defects and errors in manufacturing processes resulting from the tendency of physical and psychological man. The main principle in the system Pokka Yoke is that the errors do not blame the people, processes only. Analyzing the process of product defects should be noted that between the mistake and the ensuing defect, there is one potential option: notice mistakes and improve it. Hence the conclusion that the way to reduce the deficiency is to create conditions in which the error cannot happen or will be immediately visible[1]

3.6. Value Stream Mapping:

Jones and Womack[2] introduce a perfect definition of Value stream mapping; "*Value Stream Mapping is the simple process of directly observing the flows of information and materials as they now occur, summarizing them visually, and then envisioning a future state with much better performance."*

Value Stream maps offer a holistic view of how work flows through entire systems, and they differ from process maps in several significant ways;

Value stream mapping in a visual management tool which create maps to describe the current state, the future state, the ideal state, and the action plan of a company. The main objective of the value stream mapping is to identify the process within the company add or no add value to an end

[1]Kolinski, (A),*Logistics Management - modern development trends*, Poznan School of Logistics Press, Poznan 2016, Pp 46,47

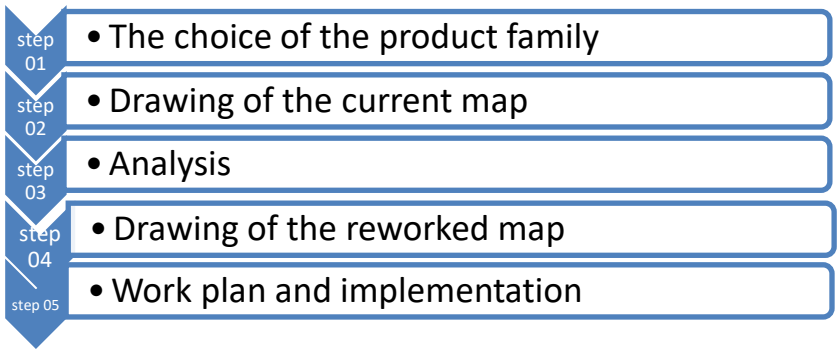
[2] Kolinski, (A), OP.CIT, p40

product by identify the material and information flow and linkages between them are documented. The future state map is then created using only the value-adding tasks. The non-value-adding tasks are then assessed for possible elimination

"Value stream mapping is conducted by assembling a team whose sole purpose for a given time is to conduct it. The team typically assembles in a conference rooms and using tools as common as 'Post It notes' they note down all the processes involved in producing a product and post them on a wall. Once all the processes have been identified, the team then notes and sticks on a separate part of the wall value-adding tasks embedded within the identified processes in a bid to identify the non-value-adding tasks. After this is done the notes are rearranged into the value-adding and nonvalue-adding tasks. The value-adding tasks are used to create a future state map while the non-value adding tasks are marked for elimination. The team is divided into the individual members whose tasks are to eliminate the non-value adding tasks" [1]

Finally, as value stream easy to implement it can easy serve as a cover for senior management members who are not fully invested in lean implementation. Value stream mapping only show the magnitude of lean opportunities, it should not seen or called lean itself

Figure 04: The stages of realization of the value stream mapping



Source: made by the researcher

3.7. Total Productive Maintenance (TPM)

[1]KERU MWACHARO (F),op.cit, Pp 15,16

Machine breakdown is one of the most important issue that concerns the people on the shop floor. The reliability of the equipment on the shop floor is very important since if one machine breaks down the entire production line could go down. An important tool that is necessary to account for sudden machine breakdowns is total productive maintenance.

In almost any lean environment, setting a total productive maintenance program is very important. There are three main components of a total productive maintenance program: preventive maintenance, corrective maintenance, and maintenance prevention:[1]

- **Preventive maintenance**: has to do with regular planned maintenance on all equipment rather than random checkups. Workers have to carry out regular equipment maintenance to detect any anomalies as they occur. By doing so sudden machines breakdown can be prevented which leads to improvement in the throughput of each machine

- **Corrective maintenance:** deals with decisions such as whether to fix or buy new equipment. If a machine is always down and its components are always breaking down then it is better to replace those parts with newer ones. As a result the machine will last longer and its uptime will be higher.

- **Maintenance prevention**: has to do with buying the nght machine If a machine is hard to maintain (e g.. hard to lubricate or bolts are hard to tighten) then workers will be reluctant to maintain the machine on a regular basis, which will result in a huge amount of lost money invested in that machine

3.8. Production smoothing or *Heijunka*

In LM system, it is important to move to a higher degree of process control in order to reduce waste. Another practice to accomplish this is production smoothing. Heijunka which is a Japanese word for production smoothing in which the manufacturers try to keep the production level as constant as possible from day to day.

Motwani[2] in a case study provided the details about the implementation sequence of Heijunka in the company. The sequence included determining the finished goods stores

[1] FAWAZ(A), op.cit, Pp 20,21

[2] JAIPRAKASH (B), op.cit, p44

requirement in terms of both sales and floor space, determining the withdrawal frequency based on takt time, conveyance manner and walk time, finished producer container size and designing/producing the appropriate *heinjunka* withdrawal tags, assuring that completed product racking on the cell is designed to trigger a production Kanban based on the *heinjunka* withdrawal and training the *heinjunka* material operator.

3.9. Improvement cycles: PDCA and IDEA:

Improvement cycles give the framework for the process of continuous improvement. Having a standardized approach towards continuous improvement is of the great value for any organization. There is a different variation of improvement cycles, but the concept is similar

- Plan Do Check Act (PDCA)

This is the most well-known and widely used improvement cycle in the world.

In this cycle, a company must begin by planning. The planning involves creating a hypothesis with the end customer and their requirements in mind

After planning comes doing. Doing simply involves implementing the improvement that was planned in the plan stage.

Then comes checking which involves checking if what was done was as predicted/planned, and if not why not, once the checking stage is complete, the company can then act on the results of checking. The necessary adjustments are made and standards are created. As the cycle begins once again the end result standards are continuously improved upon. If there is a large deviation from the standard then this should indicate that something went wrong.

- Investigate Design Execute Adjust (IDEA)

The cycle of IDEA is similar to that of PDCA. It is used by companies like Toyota for innovation and design. This cycle begins by investigating anything that gives the company cause to investigate; a problem, customers, data, and so on. After investigating, a new solution is designed. The new solution is then executed and is subsequently adjusted to prepare for the next cycle and to bring it closer to company requirements[1]

[1]KERU MWACHARO (F),op.cit, p 15

3.10. Single Minute Exchange to Die (SMED)

SMED is a method of shortening the set up time machine , which is enable for the replacement of tooling or set a production line in less time than 10 minutes, because it determinate the size of production batches. The basic premise of the method is a marked decrease the size of production batches in order to adjust production to the constantly changing demand .The method comprises the following stages of implementation: [1]

1. Separation of internal and external operations. Internal activities are all activities needed for retooling the machine, which the operator must perform machine is switched off. External other hand, is such that the employee can perform during the machine is running, eg. Transport the aid workshop preparatory activities. Separation of these activities can reduce setup times by up to 50%.
2. The transformation operations internal in external. At this stage, re-examine the activities and determines whether any external action has not been wrongly classified into internal operations. We are looking also for ways to transform operations internal in external.
3. Improvement of preparatory activities. Improvement of internal operations consists of parallel implementation of activities retooling, eliminating regulation and the use of mechanization. Improvement of external actions while concerns storage and transport of workshop aids with packages warehouse and transportation, and determination of their storage.

Conclusion:

This chapter allowed us to follow the evolution of the different production systems, ranging from Taylorism to Lean Manufacturing. It also allowed us to understand that the latter is an important ally for companies seeking to meet the urgent challenges to today, they face the challenge of reducing costs and changing operational efficiency, and therefore continually improving performance to achieve industrial excellence.

[1]Kolinski, (A),op.cit, p 46

CHAPTER 02:

MOTIVATION

AND

LEAN MANUFACTURIN

INTRODUCTION

As established by Liker and Meier, Lean can be seen as a philosophy that pursuits more than the reduction of waste in manufacturing activities because of its approach and consideration towards the human aspect of an organization by promoting the development of people. That is why there is a reasonable amount of research on the experiences of employees in Lean organizations and the impact of Lean practices on employee attitudes and well-being and especial motivation

This chapter will drew a theoretical framework of lean and its impact on human resources motivation. The first section is to define the general concept of human resources management, highlight its main processes, and recite its most important models. The second section is to speak about the most well recognized motivation theories. As for the third section will cover the core element of the research, which is the human aspect of lean practices and especially motivation .

Chapter 02: Motivation And Lean Manufacturing

Section 01: Motivation in Human Resources Management

Motivation is one of the most important concepts in HRD. In most organizations, it is common to hear the refrain that a particular employee is not motivated and hence his or her performance has taken a backseat. This is the reason companies spend humungous amounts of money in arranging for training sessions and recreational events to motivate the employees

1.1. Human resources management overview

1.1.1. Definitions

- At first, we choose a definition of HR class support given by Mr. Boukrouh Adel from the School of Higher Commercial Studies - HEC Algiers, in which he stated quoting P. Roussel*: "HRM is the set of activities aimed at developing collective efficiency of the people working for the company. The effectiveness is the extent to which the objectives are achieved, HRM will be responsible for driving the development of HR for the achievement of corporate objectives. HRM defines the strategies in disposition of the HR, organizational modes and logistical support to develop the skills necessary to achieve the corporate goals."*[1]

- The second will be by the words of Dunn and Stephens, "*The HRM is the process of attracting, holding and motivating all manager line and staff.*"[2]

1.1.2. The Activities of Human Resources Management

The first activity of HRM that comes into usage in a company is staffing, by which we mean the strategic human resource planning, recruiting and selection. The importance of these tasks is unquestionable, because success of an organization is built on its employees, their skills, knowledge and willingness to put in high effort into the workload.

The second substantial activity of HRM is training and development. Nowadays, most job positions require training, because the existing skills and habits of new employees have to be in accordance with the organization's demands.

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[1] Mr BOUKROUH, (A), Human Resources Fundamentals course support, Ecole des Hautes Etudes Commerciales HEC Algiers, 2015

[2] DUNN, J.D and STEPHENS: *EC Management of people*, Me Graw Hill Book Company, New York, 1972, P.10

Motivation is the third activity of HRM. There are several ways to enhance employees' motivation. As motivation is the main topic of this paper

The last task is called maintenance. Every organization tries to keep its valuable employees, thus it is not surprising that HRM makes great effort to improve safety and health, communication within the company and employee relations.

Every organization has to deal with all these tasks, but the size of the organization determines who will be responsible for them. In small businesses, the owner-manager is often responsible for recruitment, training, motivation and maintenance. We should point out that even if an organization has an HR department, the role of the company's managers remains important. It is no longer true that HRM practices are dealt with only by personnel specialists. In these days, the responsibility for leading and developing staff skills is also dedicated to line management.[1]

1.1.3. The importance of Motivation within HRM Activities

The manager can hire an employee with a skills, knowledge and experience, but this will not assure that he will be performant. This is very important for an organization, because they need employees who do their best and whose motivation is to reach goals that are in accordance with those of their organization. Motivation is the only element that determines employees' effectiveness, but it is the key.

Motivation is a necessary part for the human resources management. start with the manager who must have knowledge and influence factor on the motivation of his sub employees, to expect from them to perform well in the organization. goes through the employees to know expectations from their manager in work place end on the professional of human resources who has priority to motivate employee with well design learning and training system

There are two types of people. People who are self-motivated, which means they do not need any outside impulses to perform an activity. Then there is the second group of employees, which are much more common. These people perform tasks, because there are outside incentives that motivate them. When identifying job performance, there are three important factors; motivation, ability and work environment.. Therefore, we could calculate job performance as following:

Job performance = f(motivation x ability x work environment)

[1] KLEIBL, (J) and al. PERSONALNI (R)í: Oeconomica, vyd, Praha, 2002, p VI-VII

Ability tells us about the employees' physical and mental limits, technical knowledge and qualification, their working experience and training. When defining the working environment we have to include the technical level of the organization's equipment such as machines or instruments, the level of safety in the workplace, relationship with colleagues and supervisors and many others. Many surveys have shown a connection between hostile working environment and company profits.

1.2. Motivation generalities

The most important task for human resources management is motivating the employees to achieve the organization's goals, because it is clear that human is the key success of any company, is the "**life blood**" for the organization

1.2.1. Definitions

Definition 01:

Spender state that: *"Work motivation is a set of energetic forces that originate both within as well as beyond an individual's being, to initiate work-related behavior, and to determine its form, direction, intensity, and duration"*[1]

Definition 02:

Spector defines motivation as "*Motivation refers to the degree to which employees are committed to the achievement of outstanding performance both for themselves and for their company. Employee motivation pays off in bottom line performance. High motivation creates in employees the capability and willingness to work together to solve problems. Quality improves, customer responsiveness increases, and adaptation to shifts in the competitive environment occurs"*[2]

Etymologically, motivation generally is related to the Latin *movere* which mean *to move*; means to entice employees in a direction and manner which drive them to achieve the organization goals, so motives are seen as an incitement to human act

Psychologically, there is a difference between motive and motivation; a motive is an individual's psychological disposition which describe how are important certain goals for him, these motives

[1] PINDER,(C), Work motivation in organizational behavior (2nd edition), Psychology Press New York, 2008, p 10

[2] SPECTOR, (B): *Implementing Organizational Change:Theory Into Practice, edition PEARSON, new York, 2013, p 8*

are inborn but it could be developed during the individual socialization process. While motivation is to provide with a motive, it means the process in which an individual's motives became activated and subsequently cause a certain behavior.

Before we start our discussion of the various theories of motivation, it is important to establish the difference between intrinsic and extrinsic motivation

The intrinsic motivation is the behavior that people naturally engage in like eating or drinking because the motives are simulated by an inborn feeling, intrinsic motivation is self-generated. In the workplace, intrinsic motivation is the process of motivation by the work itself to satisfy the personal needs of the employee. The factors affecting intrinsic motivation include responsibility, freedom to act, courage to use and develop persons own skills, interesting tasks and opportunities for advancement.

External Motives are simulates by a situational context and do not arise from individual's inborn desire, it is the effort given by others to motivate the person, for example the rewards management provide such as pay rise, praise or promotion. Extrinsic motivators are efficient but the influence doesn't last long.

1.2.2. .Motivation Tools

1.2.2.1. Tools of extrinsic motivation

- **. Remuneration:**

It is compensation for the quality and quantity of staff activity. In order to use compensation as a motivational tool, as a general rule, it is strongly advised to develop a joint compensation policy or combine collective action and individual compensation, combining.

It must pursue two main objectives:[1]

1-equity: it aims at avoiding injustices, which will be according to the value system measured by seniority, function, and performance.

2-Motivation and recognition of services provided: remuneration policy should be motivating and allow to recognize the merits of individuals.

The remuneration consists usually of a fixed part (salary) and the other is a variable (Premium).

- **Working conditions and quality of life:**

[1] BOUCHA (N), *La gestion de la rémunération*, course of HRM, eHEC, 2010.

Work conditions management is interested not only in the external environment and to the material conditions such as: heating, lighting, ventilation, office layout, etc., but also to the content of the work, example: the management of working time, And especially of the environments of work safety. And to put employees at ease, the companies develop new services: gym, nursery, pool, laundry, etc. By acting on the psychological part of the employee, and make them feel comfortable, eliminating fatigue, physical and intellectual, to participate effectively and sustainably to the growth of the Business.Usability management also allows to generate internal relationships, which will arouse the employee's motivation and thus to ensure a good level of performance for the company. [1]

- **. The role of the manager:**

The ideal situation for a manager is to be leader too, he doesn't have to possess notions and concepts of management. So for the leader, the most important aspect is that he must have the ability to mobilize and train his team. He should focus on his own level of motivation and that of his team.

1.2.2.1. Tools of intrinsic motivation:

Intrinsic motivation is linked to personal motor of the person, it is the individual, its history, personality and its operation, it is shaped by the common situations and special that he encountered during his existence, and its sources vary:

- **. management techniques: Also known as psychological factors**

✓ **Delegate the power of decision**: "The delegation of power means that the manager shares with his team the power to make decisions related to a mission, rather than assign tasks to employees, he works with them in the planning and execution of the entire project"[2].

✓ **Sign of recognition:** " long before monetary, and even before recognition systems opportunities integration of one new post, what motivates most employees is precisely this consideration upstream which gives them the power to participate in the decisions and exercise their creativity"[3].

✓ **Develop autonomy:** Autonomy should be given to the employees so that they develop their self-confidence and creativity

[1] SAVALL (H), *Enrichir le travail humain, l'évaluation économique*, Ed. Economica, Paris, 1989, p.03

[2] ARTHUR (R.P), Encadrer et motiver une équipe, édition S&SM, Paris, 1998.

[3]La motivation par la reconnaissance, revue « *Qualité et mouvement* », Héron, date non précisée, N° 39.

- ✓ **Promote the spirit of competition**: when a collaborator aspires to such post because its competitor wants it, he gives him a very attractive color
- ✓ **Management by objectives**: Used both as a tool of management and motivation program. Employees will work as a team in a relatively autonomous way to the achievement of their objectives.
- ✓ **Enrichment of tasks:** Managers motivate employees by the reorganization of work which translates either by the removal of certain tasks to include in other expansion aimed at the expansion of tasks.

  - **collective motivation techniques:**

  ✓ **The corporate culture**[1]: Everyone arrives in the company with different motivations. The challenge for the company is to find how to motivate everyone keeping an overall consistency.

  ✓ **Internal communication:** It allows to develop the pride of belonging among staff, which attracts them and develops human capital. Internal communication is broken down into two types: first top-down communication: from managers to the staff, and the upward communication: from staff to the direction, in order to trace information "feedback" to superiors in order to give the floor to the staff

  - **HRM techniques:**

    ✓ **The recruitment**: organizations like to hire motivated and energetic employees rather than the person with high education but lack of energy[2]

    ✓ **The training**: "*is a way to develop the skills of the worker. The training is also a sign of confidence that the manager gives to workers. It is always an investment of time and money*"[3].

    ✓ **The coaching:** Coach a person, it helps him to find and apply his own solutions. It's art to accompany any individual who wishes to Solve business problems, Need assistance in decision making,

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[1] ALEXANDRE - BAILLY (F), BOURGEOIS (D), GRUERE (J.P), RAULET-CROSET (N) et ROLAND-LEVY (C), *Comportements humains et management*, 2e édition, Ed. Pearson Education, 2006, p168.
[2] BOUCHA (N), *Recrutement et sélection*, cours de GRH, eHEC, 2010.

[3] DIETRICH (A) et autre, *Management des compétences*, Edition DUNOD, Paris, 2010, P141.

- ✓ **Career management:** Career management is of very great importance: For the individual, it is a kind of development of skills; his needs to feel responsible, integrate and become more involved in the company. For the Organization, it helps to strengthen its culture, mobilizing its employees in order to achieve its objectives.

1.2.3. The indications of motivation:

1.2.3.1. social climate:

Therefore, the social climate will allow to objectively measure the feeling, the involvement and commitment of employees towards the company. A good social climate will cause the motivation among workers in the sense where they feel good, serene and confident with all people constituting the organization. They then want to invest more in their work. It is so important to have a social climate quality internally, if this isn't the case, the organization have to intervene quickly.

1.2.3.2. Absenteeism:

Low motivation means that the employee is not happy about his job and is not provided with adequate and effective motivation to do his job. As a result, he prefers to stay absent from work. The work environment needs to be made conducive for the employee so that he gets enough motivation to do work and restrains from being absent unnecessarily. Unless a management attendance program identifies and addresses the causes of employee absenteeism, it will be ineffective and unfair.[1]

1.2.3.3. Turnover:

The turnover is the rotation of personnel of a company, i.e. the number of outgoing on the number of overall strength of the company.Motivation is the main tool to eliminate the negative employee turnover rate inside organizations; this is the backbone of human resource management. The lack of adequate human behavior motivation will lead to a lack of clear goals and problems with fulfilment as well as a lack of organizational efficiency; further, it is not possible to expect employees to stay in the organization[2]

The personal motivation represents a major asset and a competitive advantage for the functioning and success of the company.

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[1] PEZZOTTAITE JOURNALS, N 2279-0942, Volume 4, Number 3,2015

[2] VNOUČKOVÁa(L), KLUPÁKOVÁb(H): *Impact of motivation principles on employee turnover*, Ekonomická revue – Central European Review of Economic Issues 16, 2013

Section 02: Theories of Motivation

There are many theories about what constitutes and creates motivation, but from their diversity we can gleam their inability to capture the complexity of human motivation in a simple, natural way. This section will highlight the most important and the most well-known ones and summarized them here, it will be about employees needs theories, intrinsic and extrinsic factors and management theories.

2.1. Needs-Based Theories

2.1.1. Hierarchy of needs theory

Maslow's Hierarchy of needs must be one of the best-known motivation theories in the world, he stared with the idea that people tend to want something, and what they want depend on what they already have. Maslow propose that we are motivated by five levels of needs that people try to satisfy, arranged in hierarchical order, Once we've satisfied a need, it no longer motivates us; the next higher need takes its place so we must satisfy lower-level needs before we seek to satisfy higher-level needs:

From the bottom to the top, there are: [1]

- **The Psychological needs:** They are all biological needs such as hunger, need for oxygen and water. As soon as those needs are fulfilled, organism of human body becomes satisfied and other dominant needs emerge.
- **the Safety needs:** When all psychological needs are being satisfied, the needs for security become active. In general, adults do not feel these needs unless they are in real urgent such as war or terror, children are more vulnerable to feelings of lost and endanger. These needs consist of security, stability, dependency, protection, freedom from fear and anxiety, need for structure, order, law and so on.
- **The Belongingness and Love needs:** If the both physiological and safety needs are gratified, love and belongingness will emerge. People seek to be loved and understood by others, they want to belong to the society, be part of teams and friendships.

[1] Mullins, (L) J: Management and Organizational behavior. Eighth edition. Prentice Hall, 2007, p 258

- **The Esteem needs:** All people in the society have a desire for self-respect, high appreciation and self-esteem, which make the person, feels useful and necessary to the world. They all look for confidence, stability, good reputation and prestige. But thwarting of these needs leads to inferiority, weakness and uncertainty.
- **The Need for self-actualization:** Even if all previous needs are being satisfied, there is still one missing step in Maslow´s. It is described as a tendency to become more and more what the person is, in other words, trying to reach his potential. The need for self-actualization can vary from person to person, one might find being a housewife as the desirable job whereas the other might seek for the acknowledgement in science.

Table03 : Maslow's Hierarchy of needs with examples

Maslow's Hierarchy of Needs	***Personal fulfillment***	***Professional fulfillment***
Highest: Self-Actualization	**Creative success and achievement**	**Challenging work, leadership, professional achievement**
Esteem	**Status and respect**	**Authority, titles, recognition**
Social	**Family and friendships**	**Team membership and social activities**
Safety	**Financial stability**	**Seniority/ Job security**
Lowest: Physiological	**Food and shelter**	**Salary**

Source: ibid, p233

2.1.2. Two factors theory

Herzberg started with the idea that what cause the job satisfaction are the opposite of what causes the job dissatisfaction, after a survey he made, he found out that what makes people happy is what they do and what makes them unhappy is the way they treated. So thinks that make people satisfied at work are different from those that cause their dissatisfaction. Based on these finding Herzberg created his theory of motivation and hygiene factors or also known as the two factors theory

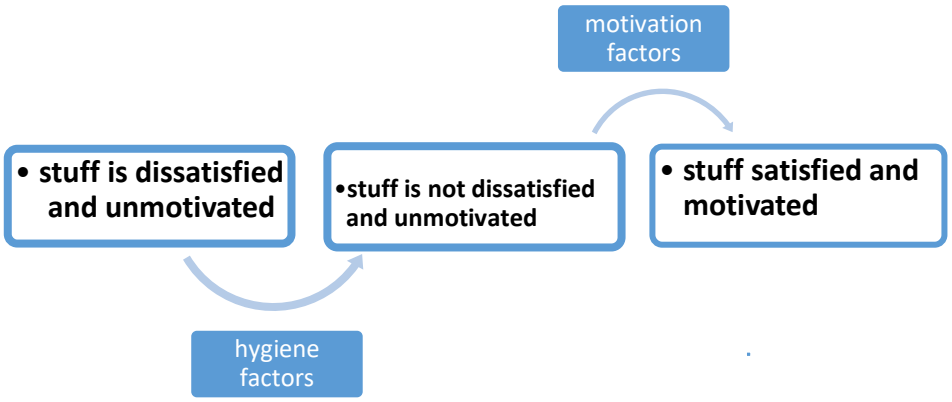
- **Motivators or motivation factors**: are those factors which causes the happiness and satisfaction towards the job, they challenge the person to develop their talent and fulfill their potential, so they came from intrinsic feelings

In addition to responsibility and learning opportunities also recognition, achievement, advancement and growth are motivation factors, these factors don't dissatisfy if they are not present but by giving value to these, satisfaction level of the employees is most probably going to grow.

- **Hygiene factors or dissatisfies:** are those which consisted of unhappy feelings and bad attitude toward job. They don't cause satisfaction but if they lack it causes job dissatisfaction such as Salary, Interpersonal relations, Supervision – technical, Company policy and administration, Working conditions, Personal life, Status and Job security.

"The main finding of Herzberg is that the opposite of satisfaction is not dissatisfaction but no satisfaction." [1]

Figure 05: the two factors theory (Herzberg)



Source: made by myself

2.2. Intrinsic factors theories

2.2.1. Expectancy theory

Vrooms theory explain why individuals choose one option rather than another, he propose that employees will work hard to earn rewards that they value and they consider attainable. It is based on how much probably for action and effort will lead to an outcomes. The concept of this theory is defined by vroom *"Where an individual chooses between alternatives which involve*

[1] Carol W. Ellis: *Management skills for new managers*, AMACOM, USA, 2005, p 83

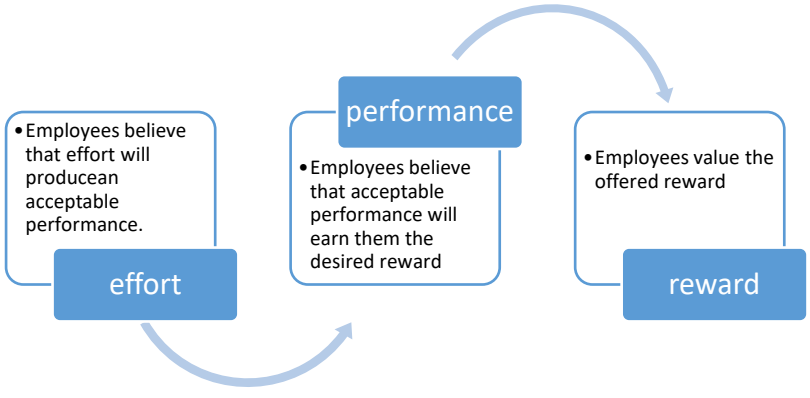
uncertain outcomes, it seems clear that his behavior is affected not only by his preferences among these outcomes but also by the degree to which he believes these outcomes to be possible. Expectancy is defined as momentary belief concerning the likelihood that a particular act will be followed by a particular outcome. Expectancies may be described in terms of their strength. Maximal strength is indicated by subjective certainty that the act will be followed by outcome, while minimal strength is indicated by the subjective certainty that the act will not be followed by the outcome."[1]

Employees are motivated to better achieve their job when offered something they want, they believe that will be satisfying, and they believe that it is possible to achieve it. So employees are not motivated to perform better when managers focus on offering and ignore the believing.

Employee's confidence that they will get what they want involves three beliefs:

- **Expectancy**: deals with the relationship between effort and performance, it means that higher or increased effort will yield better performance.
- **Instrumentality**: is the believe and the understanding of the relationship between performance and outcomes, is the thought that if an individual perform well he will achieve a value outcomes
- **Valence:** Valence means "value" and refers to beliefs about outcome desirability**,** valence in how the person expect the outcomes, and for sure there is differences of these outcome expectation from a employees to another, for example , a bonus may not increase motivation for an employee who is motivated by formal recognition or by increased status such as promotion.

Figur06: expectancy theory



[1] Vroom, V. H:"*Work and motivation"*, Wiley , New York, 1964, p 260

Source: Stephen, (J), op.cit, p 236

In conclusion, Green state that *" the Expectancy theory of motivation requires the fulfillment of the following conditions: employees are motivated to perform only when they believe that effort will lead to performance, performance will lead to outcomes, and the outcomes will lead to satisfaction.*[1]

2.2.2. Equity theory

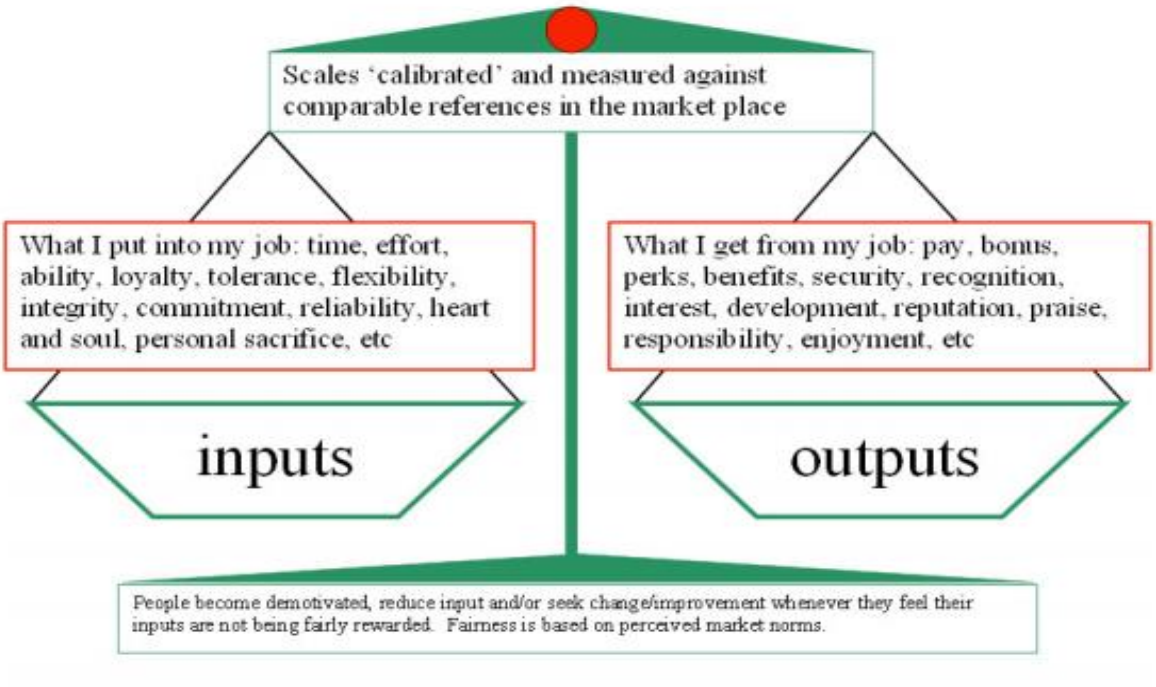
The theory of equity is developed by J.S.ADAM in 1960, it is a very important theory of the process theories.The theory focus on the perception on how fairly the employee is treated related to others, who can be in the same position, different position but in the same organization or maybe share the same age, level of experience or education. The employee create a contribution/reward ratio based on its job input (education, experience, performance…) and the outcomes received (salary, promotion…)

When the employee notice that his ratio is comparable to that of others, he perceive that they are treated fairly, when he perceive that the ratio is out of balance, it mean he treated unfairly, then he might try to bring the ratio into the balance by decreasing input; work less hours with no additional tasks or by increase outcomes by asking for raise or promotion. If not the employee will leave the organization

"Equity theory advises managers to focus on treating workers fairly, especially in determining compensation, which is, naturally, a common basis of comparison."

Figure07 : equity theory diagram

[1] Green,(T): *Performance and motivation strategies for today's workforce: a guide to expectancy theory applications,* Greenwood Publishing Group, USA, 1992,p 4



Source: *http://all-about-equity.blogspot.com, seen 23-03-2018 at 17:23*

2.3. Extrinsic theory

2.3.1. Reinforcement theory

The reinforcement theory or also called behaviorism is the process of changing the behavior, it seeks to answer the question" why do we behave the way we do"

Skinner invented the term in 1948o when he proposed that individuals are motivated when their behaviors are reinforced, it means roughly changing of behavior by the use of reinforcement which is given after the desired response. Behavior which is reinforced tends to be repeated (be strengthened); behavior which is not reinforced tends to die out

This theory is comprised of four types of reinforcement, the first two are about the desirable behaviors while the last two ones address undesirable behaviors:[1]

- **Positive reinforcement**: relates to taking action that reward positive behaviors

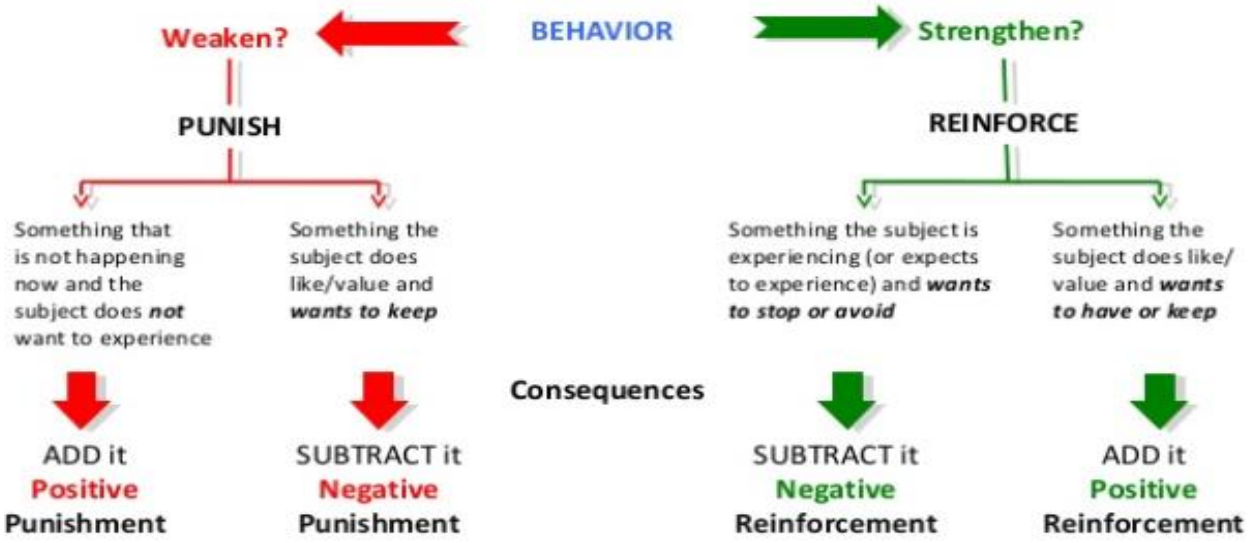
[1] NANCY,(H.S), "*management and motivation*", BUCHBINDE*: Introduction to Health Care Management,jones and barelert learning, 2017,p 27*

- **Avoidance learning:** occurs when actions are taken to reward behaviors that avoid undesirable or negative behaviors, this is sometimes referred to as negative reinforcement
- **Punishment:** includes actions designed to reduce undesirable behaviors creating a negative consequences for the individual
- **Extinction:** represent the removal of positive rewards for undesirable behaviors

The best way to strengthens a behavior is by providing a consequence an individual finds rewarding. The removal of an unpleasant reinforce can also strengthen behavior. This is known as negative reinforcement because it is the removal of an adverse stimulus. Negative reinforcement strengthens behavior because it stops or removes an unpleasant experience.

punishment and extinction can work either by directly applying an unpleasant stimulus like a shock after a response or by removing a potentially rewarding stimulus, for instance, deducting someone's pocket money to punish undesirable behavior

Figure08: Operant conditioning



Source: https://www.slideshare.net/dawndrake/operant-conditioning-chart, seen 23-03-2018 at 14:59

2.4. Management Theories

2.4.1. X Theory and Y theory

X and Y theory introduced by Douglas McGregor in 1960**.** It is the basic foundation used to develop and differebciate between management approaches and techniques. They are two distinct contrasting takes on understanding human motivation and management

The X theory based on the authoritarian management, in which manager believe that the employees are unmotivated and avoid responsibility, the need direction and must be controlled and forced to do their work

The Y theory base on an enlightened management which drive employees to be more creative and not narrow minded, allowance of development and growth in a friendly environment with no centralization . Managers are believe that employees are happy to work, they are self-motivated with w high accept of responsibility which lead to an excellent result

2.4.2. Taylor's scientific organization

Taylor innovated in a unidimensional concept of human and surrendered to the idea of motivation by constraint. In exchange with his physical force and his work, he should receive a wage that is proportional with the productivity. The wage in this era has become the engine that determines all.

The classical school therefore conceive the work divided into elementary units within workstations. It is the work to the chain; it means to find the right position for the right person. The functions of design, planning, execution and control are separated and distributed in a vertical hierarchy with a head who think and a body that executes.

The worker is then subject to his position of work and the pace imposed by the speed of the machine. Ford also thinks that the production must be standardized to increase the mass consumption. Besides to that, the standardization is pushed to the extreme allowing the production in large series.

While all of these theories are helpful in understanding management and motivation from a conceptual perspective, it is important to recognize that most managers draw a combination of all these theories to help motivate employees and meet their personal needs and goals and ultimately to achieve effectiveness

2.5. Job Characteristics Model Of Motivation

Employee motivation is one of the main responsibilities of manufacturing management. What motivates an individual to perform at his or her best? This question has intrigued management and inspired much research and interest One of the most widely recognized theoretical constructs in the study of worker motivation is the Job Characteristics Model (JCM)

2.5.1. History of the model

Work design got its start in the 1960s. Up until then, the principal attitude was that jobs should be simplified in order to maximize production, however it was found that the high routine and repetitive tasks increase employees dissatisfaction. It proposed that jobs should be enriched in ways that boosted motivation, it is from this viewpoint that Job Characteristics Theory emerged.

In developing the Model, Hackman and Oldham built upon the foundation of Herzberg's two-factor theory with some theoretical foundations based on the expectancy theory

In 1975, Greg R. Oldham and J. Richard Hackman[1] constructed the original version of the Job Characteristics Theory (JCT), which is based on earlier work by Turner and Lawrence. Turner and Lawrence provided a foundation of objective characteristics of jobs in work design. Further, Hackman and Lawler indicated the direct effect of job characteristics on employee's work related attitudes and behaviors and, more importantly, the individual differences in need for development, which is called Growth Need Strength in Job Characteristics Theory.

In 1980, Hackman and Oldham presented the final form of the Job Characteristics Theory in their book *Work Redesign*. The main changes included the addition of two more moderators, which are Knowledge and Skill and Context Satisfaction, removal of the work outcomes of absenteeism and turnover, and increased focus on Internal Work Motivation. Several of the outcome variables were removed or renamed as well. Concentration shifted to the affective outcomes following results from empirical studies that showed weak support for the relationship between the psychological states and behavioral outcomes. [2]

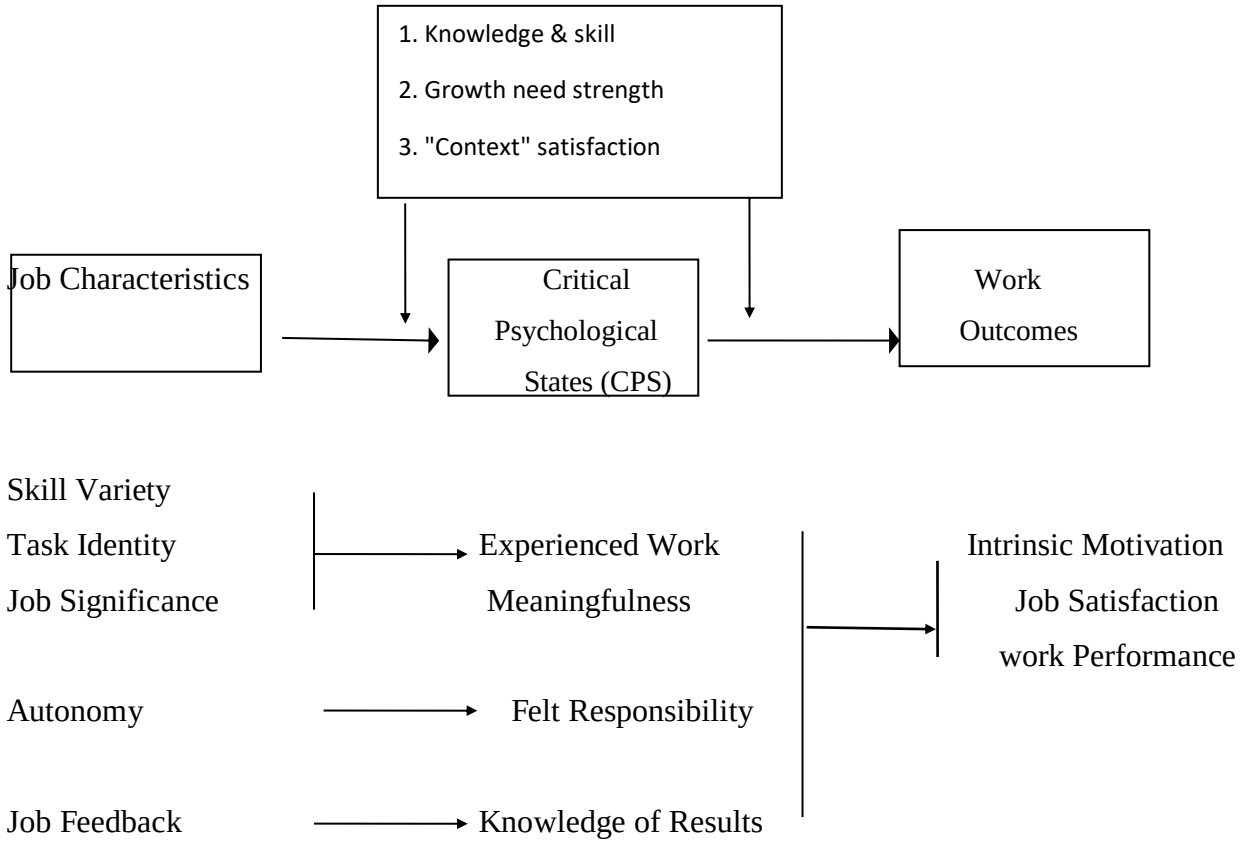
[1] HACKMAN, (J.) and OLDHAM, (G.): "How job characteristics theory happened". The Oxford handbook of management theory: The process of theory development, 2005, p151-170.
[2] Ibid, p160

2.5.2. The main theory variables

According to the final version of the theory, five core job characteristics should prompt three critical psychological states, which lead to many favorable personal and work outcomes. The moderators Growth Need Strength, Knowledge and Skill, and Context Satisfaction should moderate the links between the job characteristics and the psychological states, and the psychological states and the outcomes[1]

The following figure present a summary of the JCM theory

Figure09: Hackman and Oldham Job characteristic model



Source: Loher, Brian Noe, T., A. Raymond, Moeller, L. Nancy Fitzgerald and P. Michael, 1985, A Meta-Analysis of the Relation of Job Characteristics to Job Satisfaction, p 289.

[54]Hackman, J. R. & Oldham, G. R..: " *Development of job diagnostic survey"*. Journal of Applied Psychology, 1975, p159

2.5.3. The Five Core Dimensions

Hackman and Oldham started their study by specifying the five Core job characteristics which contribute to raise the work spirit and boost motivation in the workplace, which are defined as follows

- **Skill Variety**. "*The degree to which a job requires a variety of different activities in carrying out the work, which involve the use of a number of different skills and talents of the employee."* [1]

If a task requires a person to engage in activities that challenge or stretch his skills and abilities, that task almost invariably is experienced as meaningful by the individual. Many parlor games, puzzles, and recreational activities, for example, achieve much of their fascination because they tap and test the intellective or motor skills of the people who do them. When a job draws upon several skills of an employee, that individual may find the job to be of enormous personal meaning even if, in any absolute sense, it is not of great significance or importance.

- **Task Identity**: "*The degree to which the job requires completion of a "whole" and identifiable piece of working, doing a job from beginning to end with a visible outcome"*[2].

If, for example, an employee assembles a complete product (or provides a complete unit of service) he should find the work more meaningful than would be the case if he were responsible for only a small part of the whole job

- **Task Significance**: " *The degree to which the job has a substantial impact on the lives or work of other people whether in the immediate organization or in the external environment"*[3].

When an individual understands that the results of his work may have a significant effect on the well-being of other people, the meaningfulness of that work usually is enhanced. Employees who tighten nuts on aircraft brake assemblies, for example, are much more likely to perceive their work as meaningful than are workers who fill small boxes with paper clips, even if the skill levels are the same .

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[1] 1 Hackman, J. R. & Oldham, G. R..: " *Development of job diagnostic survey"*. Journal of Applied Psychology, 1975, p159

[2] Ibid,p 160

[3] Ibid,p 160

- **Autonomy**: "*The degree to which the job provides substantial freedom, independence, and discretion of the employee in scheduling the work and in determining the procedures to be used in carrying it out"*[1]

LANGFRED[2] demonstrated that contexts providing workers with low individual autonomy could actually engender high performance, thus, in the case of autonomy one size might not fit all

HACKMAN and WAGEMAN observed that worker responsibility and participation could engender ''autonomy'' even in the absence of freedom concerning procedures and timing. That is why they assessed individual autonomy using three measures: timing control, method control, and boundary control,

Finally, they conclude that autonomy is not a single construct; it can be viewed as comprising two distinct constructs:

- ✓ **Choice autonomy**: that is, freedom concerning procedures and timing, corresponding to the JCM definition of autonomy
- ✓ **Responsible autonomy**: an increase in accountability arising from decentralization of authority, power sharing, and participation in decision-making.

- **Feedback**: The degree to which carrying out the work activities required by the job results in the employee obtaining direct and clear information about the effectiveness of his or her performance.

2.5.4. Psychological states

Hackman and Oldham proposed that certain job dimensions would lead to particular psychological states, which will then lead to intrinsic motivation.

The theory hypothesizes that skill variety, task identity, and task significance combine in one unit to influence feelings of meaningfulness. Meaningfulness of the Work defines by Hackman: *"The degree to which the employee experiences the job as one which is generally meaningful, valuable, and worthwhile"*[3]. Autonomy support should enhance feelings of responsibility; Responsibility for Work Outcomes is "*The degree to which the employee feels personally accountable and*

[1] Ibid,p 160

[2] LANGFRED, C.W: "*Too much of a good thing? Negative effects of high trust and individual autonomy in self-managing teams",* Academy of Management Journal, N 47, 2004, p 385.

[3] HACKMAN, J. R. & OLDHAM, G. R..: " *Development of job diagnostic survey"*. Journal of Applied Psychology, 1975, p159

responsible for the results of the work he or she does"[1]. While feedback from the job should enhance knowledge of results which in "*The degree to which the employee knows and understands, on a continuous basis, how effectively he or she is performing the job"*[2].

2.5.5. The Moderator:

Hackman recognized that not all employees would respond positively to a job high in motivating potential, but there are characteristics in the people, which moderate the both job characteristics and psychological states relationship. The main three characteristics important in moderating job characteristics-psychological states relationship are:

- **Growth Need Strength (GNS):** "*GNS is the strength of a person's need for personal accomplishment, learning, and development". The theory posits that Growth Need Strength moderates both the relationship of core job characteristics and psychological states, and the relationship between psychological states and outcomes"*[3]
- **Knowledge and Skill**: For motivating jobs, adequate knowledge and skill lead to experiencing the critical psychological states and better outcomes, while insufficient knowledge and skill discourage the psychological states and result outcomes that are more negative[4]
- **Context Satisfaction**: when workers are satisfied with things like their managers, pay, co-workers, and job security they respond more positively to highly motivating jobs and less positively when they are not satisfied. The reason being that they must use attentional resources to handle the undesirable work context, which distracts from the richness otherwise inherent in the job.[5]

At the link between the job characteristics and the psychological states, when the job characteristics are good, it is more likely that psychological states will be experienced if moderator variables are high, especially growth need strength than if moderator variables are low. Referring

[1] HACKMAN, J. R. & OLDHAM, G. R..: " Development of job diagnostic survey", op.cit p159

[2] Ibid, p160

[3] KULIK,(C), OLDHAM,(G), & HACKMAN,(J) " *Work design as an approach to person-environment fit"*. Journal of vocational behavior, 1987,p 278

[4] ibid, p250.

[5] ,ibid, p 250

to the link between the psychological states and outcome variables, individuals with high moderator variables respond

2.5.6. The Motivation Potential Score

When a job has a high score on the five core characteristics, it is likely to generate three psychological states, which can lead to a high internal work motivation. This tendency for high levels of job characteristics to lead to positive outcomes can be formulated by the motivating potential score (MPS). Hackman and Oldham explained that the MPS is an index of the *"degree to which a job has an overall high standing on the person's degree of motivation...and, therefore, is likely to prompt favorable personal and work outcomes",* which is an overall estimate into a single number of the intrinsic motivating potential of a given job. MPS combine three factors: The average of the first three core dimensions (skill variety, task identity, and task significance) that lead to experienced meaningfulness, the autonomy, and the feedback. It can be calculated using the following formula:

$$\mathbf{MPS} = \frac{(\mathbf{skill\ variety} + \mathbf{task\ identity} + \mathbf{task\ significance})}{\mathbf{3}} * \mathbf{autonomy} * \mathbf{feedback}$$

Using this formula, a job can record the lowest score value 1 = (1*1*1), when the motivation potential of each dimension is the lowest. The motivation of each dimension is the highest if a job can record the highest score value 343 = (7*7*7), if items are rated on 7-point scale or 125= (5*5*5) if items are rated on 5-point scale. The score of each core characteristic is the average of the three items in each core characteristic

According to the equation above, a low standing on either autonomy or feedback will substantially compromise a job's MPS, because autonomy and feedback are the only job characteristics expected to foster experienced responsibility and knowledge of results, respectively. On the contrary, a low score on one of the three job characteristics that lead to experienced meaningfulness may not necessarily reduce a job's MPS, because a strong presence of one of those three attributes can offset the absence of the others.[1]

[1] HACKMAN,(J) & OLDHAM,(G):" *how job characteristics theory happened*". The Oxford handbook of management theory: The process of theory development, (2005), p151

Section 03: The Human Aspect Of Lean

Several enterprises have tried to introduce the Lean approach in order to enhance competitiveness. However, the only successful ones were the companies, which understood that lean is not only about methods and Tools, but the people using them: employees

3.1. Respect-For-Humanity principle

The traditional mass production system based on Taylorism division of labor in which operations are simplified into constituent parts, where employees were considered as interchangeable and in no need of skills of their own, they are supervised and expected to follow orders with no deviation on input into the process. In this traditional system employees were unable to further their own careers.

In Toyota's case, the important component of its success, and in the core of Lean thinking, is the philosophy of understanding people, and what motivates them. Workers are not seen as an extended part of the production line, but they are seen as an irreplaceable part of the company's management. The respect-for-humanity subsystem is the key element in the use of lean manufacturing whereby workers' suggestions are incorporated into operational decisions and, more importantly, management tangibly communicates its appreciation for the workers' input and shows respect for them. In summary, the notion of respect-for-humanity aims at "*leanness through inventory reduction, increased capacity utilization and variability reduction"*[1]. In summery the human side of lean management creates lasting value for the organization.

It is evidence that the core of lean philosophy is based on human resources. Wangwacharakul stat that "The challenge for every company that intends to implement Lean is to align resources and people in a common effort of continuous learning and improvement"[2], this explain how new plant manager understood that being lean is all about people being engaged. Under this premise, the employee need to be informed why and how implement the lean philosophy, understand the reasoning behind its implementation, trained to ensure their involvement, motivation and aspiration TPS is also based on team work which gives autonomous responsibility over the production and manufacturing line In order to further enhance the production performance. Multiskilled employees are a significant part of Lean. Employees being able to achieve high flexibility through being

[1] TREVILLE(S), ANTONAKIS, (J):. *Could lean production job design be intrinsically motivating? Contextual, configurational, and levels-of-analysis issues, Journal of Operations Management*, 2006, p103

[2] WANGWACHARAKUL,(P) and others: '*Cultural aspects when implementing Lean production and Lean product development – Experiences from a Swedish perspective', Linköping University*, 2014, p101

multiskilled. Main factor of Lean is using less of everything, including workers. When employees are multiskilled, it eliminates the need for further recruitment

This huge importance of human in lean implication is explain why most the critical success factors of its implementation turn around them

3.2. The Positive Effects Of Lean Manufacturing On Human Resources

Graham and milkman[1] indicate that Lean manufacturing respect for workers begin with a competitive wage, so workers in lean jobs earn more money than in other jobs

Toyota also has done a good job of providing job security with safe and attractive work environment.

On the face of it, an assembly line is anything but enriching. People do the same mindless task repeatedly and are responsible only for a tiny piece of an overall product. However, TPS adds a great deal to make the tasks more intrinsically motivating, it has specifically worked on designing assembly lines to improve job enrichment. Some of the features that make the job more enriching include job rotation, various kinds of feedback on how workers are doing at their jobs, the *andon* system which allows the worker to be proactive in solving problems, and a good deal of work group autonomy over the tasks and avoid monotony in the development of activities which has a negative effect on the health and learning capacity of people. Toyota is totally interesting in job enrichment and redesigned its assembly lines so that parts that make up a subsystem of the production install in one specific area on the assembly line.

Team membership has been observed in lean production implementations practice it is a king of grouping workers into teams according to their production line or cell. Individuals usually carry out production tasks under lean production, teams of workers collaborate to attack quality problems and carry out lateral tasks. Teams take responsibility for quality and discipline members who do not perform tasks correctly and teams reallocate tasks when a member is injured or absent.

Under the philosophy of Lean, workers are given more freedom to divide their activities and time as a group, and also the responsibility to not only maintain the quality of their work but to also

[1] Treville S., & Antonakis, J.. Could lean production job design be intrinsically motivating? Contextual, configurational, and levels-of-analysis issues, Journal of Operations Management, 2006, p104

to continuously improve it. This responsibility given is set to provide workers with a sense of commitment and motivation towards their work.[1]

In lean manufacturing, effort-spent *vis-a-vis* reward-received is increasingly becoming a major concern for practitioners because of work pace intensification, leading to the claim of *lean becomes mean*. Janssen showed that employees respond more innovatively to higher levels of job demands, when they perceive that their efforts are fairly rewarded by the organization. Understanding the issue of equity, in a setting that demands higher responsibility from the workers advances our understanding of respect-for-worker[2]

Toyota's system is also based on standardization, -standardized activities, provide workers with an ordered pace to perform their activities. Also, the opportunity of being involved in the solving of problems and continuous improvement of activities, allows workers to use their creativity and experience to generate positive results in terms of quality and costs, which at the same time, provides them with a sense of pride and job satisfaction. Womack[3] argue that toyota turned scientific management on its head and turned over control of standardization to work teams and continuous improvement (*Kaizen*) which involve an orientation towards the achievement of established goals through cross-functional work, therefore, promoting the exchange of knowledge and experience and bridging the flow of communication between a work team and Management.

Toyota s system based on continuous flow and the *andon* system is ideal for powerful behavior modification. Feedback is very rapid. The best kind of negative feedback is impersonal and people find out how they are doing without a supervisor even telling them by uncovering quality problems immediately. As for praise or reprimands from supervisors, the group leaders are right there on the floor in a perfect position to give immediate feedback to associates. In addition, they are trained to do it. [4]

3.3. The Dark Side Of Lean Manufacturing (anti lean authors)

[1] Losonci, D, Demeter, K & Jenei, I, 2011, 'Factors influencing employee perceptions in Lean transformations', *International Journal Production Economics*, 131 (2011), 30–43.
[2] Konovsky, M. A., & Organ, D. W. (1996). Dispositional and contextual determinants of organizational citizenship. *Journal of Organizational Behavior*, 17, 235-266
[3] Womack, J, Jones, D, Roos, D, 1990, 'The machine that changed the world', Macmillan Publishing Company, ISBN: 0-89256-350-8
[4] Liker,(K): *The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer*, McGraw-Hill, 2004, p203

The "anti-lean" authors are often doctors, ergonomists, social partners. According to CORINE VAINARDI[1] this is not a coincidence because, human-related issues have been forgotten by leaders and managers in charge of implementing the Lean philosophy in plants around the world. It must be admitted that some companies and organizations quickly forget that the "muri" is the waste that concerns the man and the equipment in the sense of safety in the work environment, work-related stress, motivation, creativity and innovation, workload and many other issues that are fundamental for the physical and mental health of workers

Parker is one of these anti lean authors, he criticize the effect that Lean practices have over man perception. Parker [2] points out how different studies have shown that specific features of Lean such as the installation of moving assembly lines have been associated to negative effects on people including job depression and low levels of motivation and commitment towards work activities. In this particular case, finding out that fast assembly lines could have negative effects on people is something critical considering that Lean depends on fast and continuous production lines where the flow of materials and products is not interrupted at any point.

Parker explain how the implementation of Lean affect negatively to the use and acquisition of new skills by employees. While some studies state that skill utilization and acquisition is increased under a Lean production system, others claim the opposite, and conclude that Lean relies only on people with highly specialized skills, meaning that people become less empowered and therefore less motivated towards their work.

Fatima & Leonard[3] add that the strict rules that standardization has put over such activities makes it hard for them to go through this effort, therefore, decreasing the level of autonomy of people inside an organization.. so workers have less power over their work and the level of involvement and participation that they are supposed to have inside a Lean environment is reduced to a consultative nature, decreasing this way the motivation and commitment of people towards continuous improvement and Lean in general.

In addition, Ohno (as cited in Conti et al) highlights the fact that the main objective of Lean is to eliminate any activity that does not provide value and can be considered waste. This objective results in processes that are continuous in flow and high in productivity, but also it means they

[1] CORINE,(V): "le lean atouts, impact, et limite" ,vuibert, paris, 2013, p105

[2] Parker, S, 2003, 'Longitudinal Effects of Lean Production on Employee Outcomes and the Mediating Role of Work Characteristics', *Journal of Applied Psychology*, p-p 620–634

[3] Ibid ; p630

become high in intensity, which of course increases the probability of stress at the workplace.[1] Which proved by HASLE, when he said " *the higher the degree of implementation of Lean in a company the higher the level of stress is among workers*".[2]

MEHRI [3]was the first who talked about the negative side of lean toward the health and job safety of employees when he described how the combination of fast paced lines and heavy machines usually found in manufacturing processes, could result in dangerous accidents and permanent injuries for workers.

Finally, it is the most dangerous effect could lean practices have, is the downsizing. It's known that main principle of lean philosophy is the elimination of waste, so It is not hard to see why a practice such as downsizing could be found in its implementations. For some managers, the best way to eliminate waste in the form of labor costs is through downsizing. The idea of achieving high levels of productivity with the least amount of human resources is the ideal scenario for any management team, but this strategy could easily end up with serious and damaging effects on the health and psychological well-being of people, because it provides challenging goals which can elicit 'search behavior' and is intended to expose workers to opportunities for utilizing, not only their motoric, but also their cognitive skills

As Trevill states *"when 'lean becomes mean', the negative consequences have been observed, such as stress, on the job injury, decreased motivation, or quitting".*[4]

Conclusion

Throughout this chapter, we have made an overview of the motivation of men at work and how the lean manufacturing system affect employees, The first section was about t he general concept of human resources management, highlight its main processes, evolution and activities.

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[1] Conti, R, and others, '*The effects of lean production on worker job stress'*, International Journal of Operations & Production Management, 2006, Vol. 26 No. 9, pp. 1013-1038,

[2] Hasle,(P), 'Lean Production—*An Evaluation of the Possibilities for an Employee Supportive Lean Practice*', Human Factors and Ergonomics in Manufacturing & Service Industries Journal, 2006, No. 1, 40–53 2011, p12

[3] Conti, R, and others.op.cit p 1014

[4] Treville S., & Antonakis, J.. Could lean production job design be intrinsically motivating? Contextual, configurational, and levels-of-analysis issues, *Journal of Operations Management*, 2006, p 99-123

The second section recite the most well recognized motivation theories and specially the JCM, which we adopt. As for the third section will cover the core element of the research, which is the human aspect of lean practices. In this last section we highlighted the both dark and bright sides of lean manufacturing and how much the human aspect is important in lean implementation, in this regard the next chapter will analysis the effects of lean on employees motivation following Hackman philosophy

CHAPTER 03:

THE PRACTECAL CASE

Introduction

In order to enrich our research work, we have carried out a study that allows both to know the degree of implementation of the different theoretical approaches of lean manufacturing within Schneider electric and to see how far this production system influence staff motivation .

This chapter is divided into three sections; the first is to present the company SCHNEIDER ELECTRIC. Moreover. In a second section, we will try to present the methodology of data collection. Moreover, in the last section, we will try to highlight the content of our study, both a quantitative study in the form of a questionnaire for the staff of the factory, and an interview as a qualitative study to support our research within the company and give more representativeness and credibility to our case, accompanied by data processing and analysis.

Therefore, the objective of our study is to analyze how the lean manufacturing job design could affect the motivation of company's human resources.

Finally, we will try to propose suggestions and recommendations that can contribute to the improvement of lean methods in the company and motivation thereafter

Chapter 03: practical case

Section 01: Overview of the host organization

This section will give an overall view of the host organization its products,maret, channel distribution, then go through a presentation of the factory and assembly lines. Finally we have a look on lean implementation in Schneider factory

1.1. Presentation of Schneider Electric :

1.1.1. Overview :

Schneider Electric (SE) is a French industrial group with an international dimension specialized in energy management. SE manufactures various products intended primarily for the distribution of energy as well as automatisms. Its head office is located in Rueil-Malmaison in the upper Seine.

The group is existing in 190 countries with 160,000 employees and is actually established in 106 countries. Schneider Electric sells its products and solutions in 5 markets: energy and infrastructure, building, residential, industry, data centers and networks.

After a series of acquisitions to complete and expand its offering such as American Power Conversion (APC), in 2006, Schneider Electric is moving towards a consolidation phase. Schneider Electric's commitment to the social and economic environment in sustainable development is concrete (strong commitment to learning, the planet ...). Thus, Schneider Electric is included in the ASPI Eurozone index (Advanced Sustainable Performance Indices) and in the Ethibel register (register of "sustainable" investment funds).

Schneider Electric is also a signatory of the Global Compact (Code of Conduct, which includes 10 principles around the environment, labor law, and human rights that companies must commit to respect and practice).[1]

1.1.2. The missions of SE:

Its main mission is to make its portfolio profitable to make energy:

- **Sure**: to ensure the protection of people and property.
- **Reliable**: for ultra-secure, ultra-pure and uninterrupted current flow and in particular sensitive applications.
- **Effective**: it is about adapting its products to the needs of each market.

[1] " *Manuel de Management Schneider Electric Algérie*", Schneider Electric, 2016, p07

- **Productive**: concerning automation, connectivity, and services throughout the life cycle of the facilities.

- **Green**: this dimension is concrete in terms of environmental commitment, as SE offers solutions that are more respectful of the environment

1.2.Presentation of Schneider Electric Algeria:

1.2.1. Overview:

SE has been existing in Algeria for more than 50 years, through the brands: Télémécanique, Merlin Gerin, TAC, APC, and PELCO.

- 1994: The creation of the liaison office.
- 2002: The opening of the first subsidiary of an international company in Algeria.
- 2002: Creation of a production unit and Medium Voltage (MV) equipment.

The company has integrated the Algerian market by:[1]

- The creation of the subsidiary under Algerian law in 2002;
- A team of 200 employees;
- Five regional agencies (Algiers, Oran, Annaba, Hassi Messaoud and Sétif);
- Two project and service departments dedicated to solutions;
- A network of 40 partners (distributors, system integrators);
- An industrial site for mounting medium voltage cells;
- A local distribution center;
- A warehouse of 6000 M^2
- A training institute approved by the state.
- 1 network of 40 partners (distributors, panel builders, system integrators) A team of 219 employees.
- Institut1 Institute of Training Approved by the State
- 1 SEA Excellence Center

1.2.2. Services of Schneider Electric Algeria:

Schneider Electric Algeria offers an integrated offer of products, services and solutions that make Energy Safe, Reliable, Efficient, Productive and Green.

As a specialist in energy management, Schneider Electric Algeria offers a wide range of products in the following segments:

[1] Ibid, p10

_ Automatisms and Control

_ Medium voltage - Automation and management of electricity networks

_ Electrical distribution

_ Installation and Control Systems

_ Automation and building safety

_ Secure energy and cooling

_ Renewable energies

1.2.3. The markets of Schneider Electric Algeria:

Schneider Electric sells its products in 5 main markets:

• The energy and infrastructure market: transport and distribution of electricity, gas, oil and water, airport, port, tunnels, metros, telecommunications and data processing infrastructure.

• The industry market: Agri-food, packaging, automobiles, pharmaceuticals, cement works, ...etc.

• The building market: hospitals, shopping centers or offices ... etc.

• The residential market: individual and collective residences ... etc.

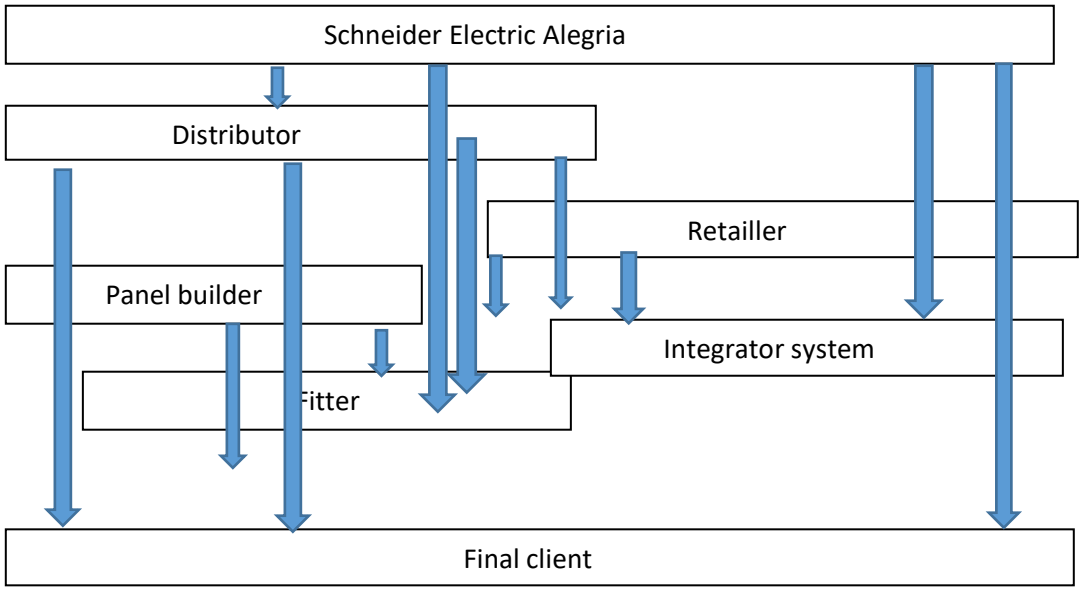
• The market for data centers and networks: from SMEs to multinational companies, administrations, hospitals, etc., any company for which the availability of data and the quality of energy are critical. which make it possible to manage the data center (installation, cooling ... etc.).

1.2.4. Distribution Channel

Schneider Electric Algeria uses multiple channels to approach its customers. It maintains close and lasting relationships with our customers and partners to meet their needs as accurately as possible.

SEA therefore promotes trade through these intermediaries, whenever the context allows. It regularly ensures their competitive advantages in the target markets and keeps, in addition, direct contact with major customers to know their changes, promote the prescription and develop services and the passage through these intermediaries allows SEA to to focus and progress in: electrical distribution and industrial automation

Figure10 : distribution Channel Schneider Electric Algeria

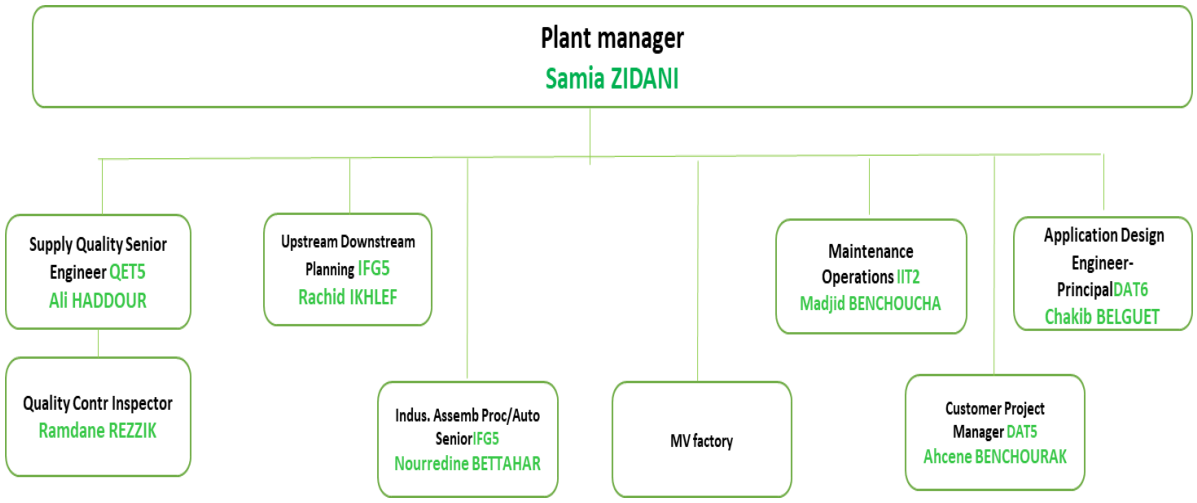


Source: internal document to the sales department

1.3. The Factory Presentation

1.3.1. The organization chart of the factory

figure11: SEA factory organizational chart



Source: internal document of the factory

1.3.2. Description of the factory

The total Surface Area of SEA is about 2090 m² it compose of 2 parts, factory and warehouse[1]

1. Total Surface MV factory of 1125 m²

✓ Numbers of production lines 2:

- interrupter Line level I Surface 169 m² Capacity 450 Cells/month
- breaker Line cells level C Surface 56m² Capacity 50 Cells/month

✓ Test area: Surface 20m²

✓ Area SF1: Surface 17m²

✓ Copper workshop: surface 27m²

2. The total area of the warehouse is compose of:

✓ In Coming Area **162m²**

✓ Shipping Area **153m²**

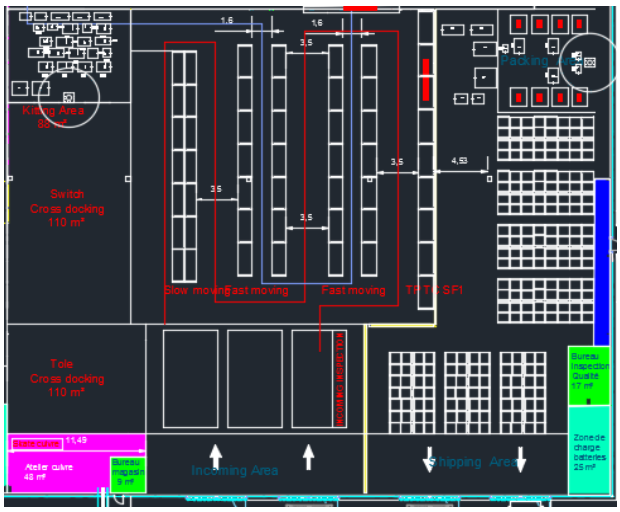
✓ Switch Storage Area **190m²**

✓ Kitting Area **70m²**

✓ Slow & Fast Moving Area **675m²**

✓ Finished Product Area **144m²**

✓ Packaging Area **90m²**



1.3.4. Presentation of products manufactured at the workshop level:

The company SEA manufactures substations in the field of medium voltage and sells electrical products in the field of low voltage.

• Switch cells and fuse protection: The cells consist of 3 compartments and 2 separate boxes separated by metal partitions or insulators (switch cells and fuse protection).

• Cut-off circuit breaker cells in SF6

1.3.5. The different lines of the assembly workshop:

This workshop includes two assembly lines. The SM6-36 line of standard electrical cells for public electrical substations and the SF1 line of circuit breaker cubicles for industrial electrical substations.

[1] "Procedure de fabrication", shneider electric,2018,p10

- **The process of assembling the SM6-36 cells (the switches):**

At this line is the assembly of cells for standard substations. There are 4 types of cells assembled at this zone: IM, PM, QM and CM cells, knowing that the standard substation is composed of two IM and one PM or QM. The manufacturing process of the different SM6 cells used in the composition of the MV / LV transformation substations goes through different stages in several workshops:[1]

• Subassembly preparation workshop,

• Copper workshop,

• Assembly line / SM6 assembly line,

• Test & Control,

• Packing and shipping,

The different assembly tasks will be carried out according to instructions and operating procedures for each workstation. These instructions and operating modes are updated as follows: The SM6_MVP industrial file or local adaptations of the SEA design office

- **Assembly process of the circuit breaker cell:**

This process has a maximum of 8 positions, each operator takes charge of a single circuit breaker under normal conditions, namely the availability of all the sub-assemblies and the articles and also the packaged cells, and in the case of emergency orders the circuit breakers must be supported by 2 operators.

Assembling a circuit breaker takes about 11 hours to 12 hours for cells M1 and 12 hours to 13 hours for DM2 cells. From the start of assembly until the end of assembly, and before entering the control zone. The operator under normal conditions that means at the beginning of the day the cell and the sub-assemblies must be available and in the stages ready to be used by the operator carries out this manufacturing time. The main tasks for the assembly (DM1, DM2) are:

-Use of the cell

-CT assembly [wiring, etc.]

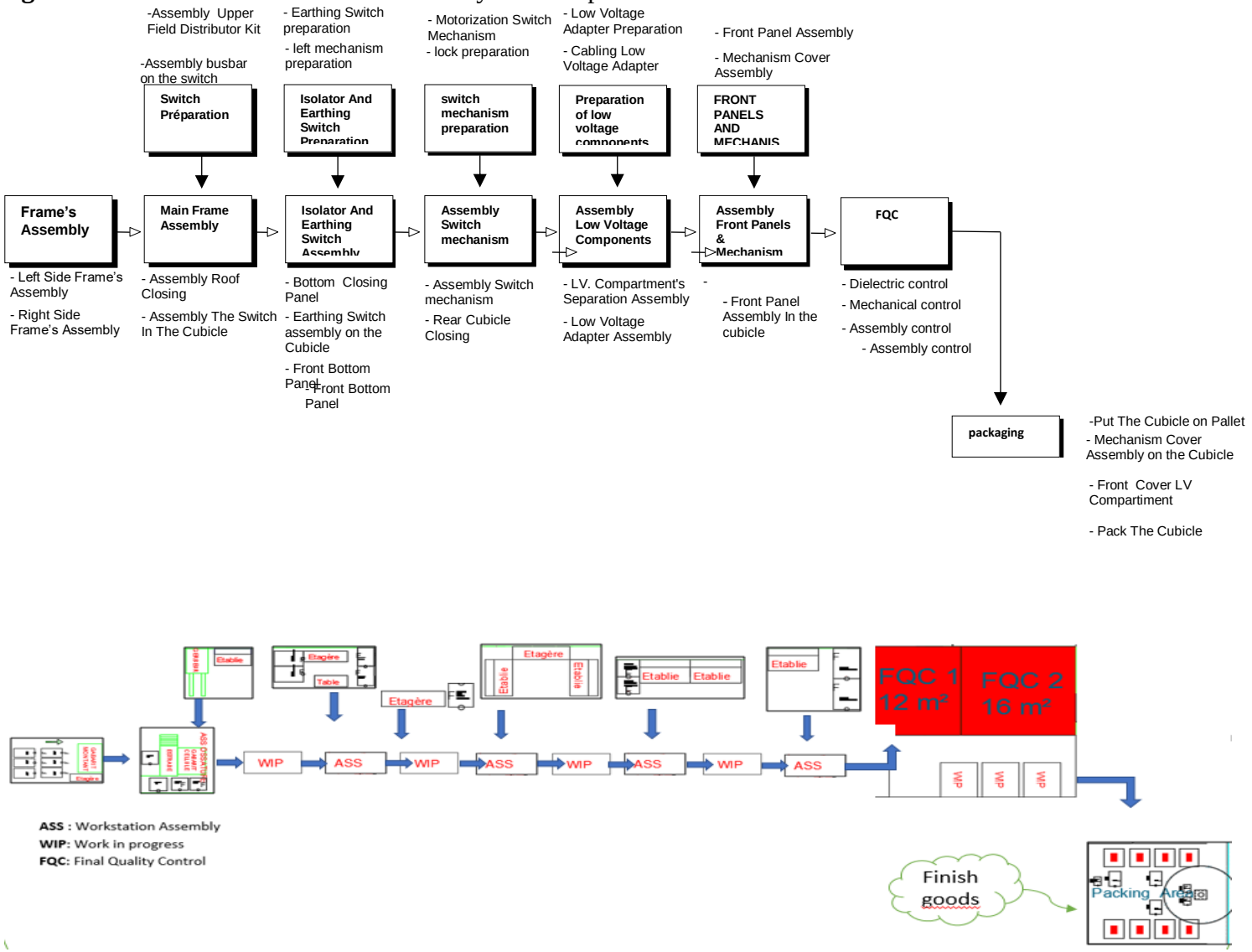
-Mounting breaker

-Mounting busbars

-Wiring circuit breaker -Preparation of the line -Cabling and Locking.

[1] Ibid, p12

figure12: The different lines of the assembly workshop



Source: internal document to scheduling departme

1.3.6. The launching of production:

The manufacturing process is triggered according to sales orders that are recorded at the sales department level using an ERP (SAP) system. Then, the production department prepares weekly scheduled orders using the scheduling function. The department responsible for planning prepares weekly production schedules in advance. According to this plans, the inventory manager checks the availability of the components according to the production plans. The stock department provides feedback to the scheduler who prepares the production orders. Subsequently, the inventory management department checks the availability of items ordered by SE France and SE Turkey each week. From this stage, production orders will be developed and sent to the assembly line, where production will be launched.

The deliveries of the sales orders are done 2 days / week by a confirmation of the sales man towards the function store in charge of the delivery of the finished products. (See Appendix 03)

1.4. Lean implication in Schneider Electric (SPS)

The Schneider Electric Algeria adopts the SPS (Schneider Production System), which is a set of rules, tools and methods required by the global Schneider group, which allows everyone to have a common approach in order to produce efficiently according to customers' expectation. Among the requirements of the SPS is the application of Lean manufacturing to all manufacturing processes. The Production System helps to structure and share an industrial culture, and to have a consistent approach to the processes. Indeed, it manufactures according to the principle of the fired flow. This principle is part of the just-in-time logic. It uses a system to regularize the inventory flow inspired by the kanban principle. In addition, the company is very committed to standardization through the adoption of international standards concerning the procedures for the assembly of the product. It also uses Visual management and continuous improvement, and so many other lean practices organize around 3 axes: [1]

- **Staff Contribution**: The 5S / Short Interval Animation (Aic) / the Suggestion System.
- **Product Design Process:** Kaizen / G8D and 6 Sigma / SMED / Poka Yoke./ kanban / TPM
- **Management of industrial and logistic processes**: MADC / WIP Management Customer Approach (PRR) ./ VSM

[1] Ibid, p17

There are some methods and techniques adopted by SEA

- **Méthode 5S**

The workshops are organized according to the principles of the 5S methodology, which is based on 5 principles:

-Remove: Eliminate any useless object. Dispose of waste and rubbish in the planned bins.

- Ranger: Each object (cart, tools) in a location clearly defined by colored tape and with a reference photo

- Clean: Clean is good ... do not dirty is better. As soon as a stain is noted, I clean without waiting for the end of the post.

- Standardize: Respect the 5S standard.

• Yellow and black transfer zones.

• Ilotated dedicated storage areas

-Respect: Enter the 5S audit of my workstation at the beginning of each faction (see appendix 04).

Every day: a 5S audit must be carried out at the post office.

Every month: a 5S audit is conducted by REF (Team Leader Manufacturing)

Figure13 : 5S standars

➢ **AIC (short interval animation)**

sorce: photo taked by the researcher

The performance of the workshops is measured hour by hour by each operator on a performance report books. The LEAN principles of this performance monitoring are as follows:

• common language: GREEN / RED

• Goals known to everyone and visualized in workshops and services

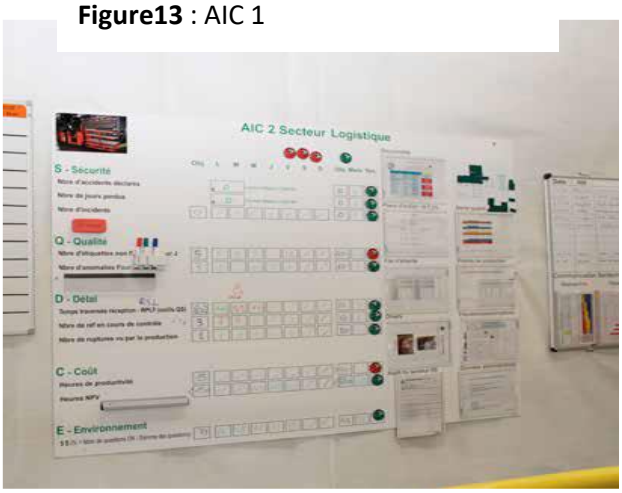
• Short frequency of performance measurement (time)

• Systematic search for causes of performance deviation (fact-based research and non-designs). The objective of this performance monitoring is to prioritize progress actions according to the stakes ("pareto").

There are three AICs:

-AIC1: is done every day at 9 am where meets all operators of the production line and their pilots to discuss about the assembly process and help workers to express themselves their problems at their levels

Figure13 : AIC 1



sorce: photo taked by the researcher

-AIC2: every day at 10 am between mastery and production responsible. They discuss about how the production is going and fix problems in the assembly lines (see appendix05)

-AIC3: every Sunday all the leaders and managers meet to discuss about high-level problems concerning all parts of the production process (see appendix06)

Figure15 : kan ban ccard

- **Kanban**

The assembly process of the SEA workshop follow the Kanban principle and the pull system using 3 types of cards: Kanban Sampling card icon, production Kanban card icon and also WIP or FIFO post icon.

The supply of a kanban post is done every 1 hour 30 minutes by a sampling of the store and the arrival of the production batch or assembly at Kanban station.

- **VSM**

In the SEA Manufacturing system , the first tool that required to be applied is VSM. The purpose of the VSM is to detect the different sources of waste (the 8 Muda). We collected the data in the workshop by going back the flow of a product while noting the problems and waste observed. Aal

that will summarizing in a map (see appendix). The analysis and ranking of these problems allows to build a planned progress plan in a future map (see appendix7)

Section 02: Methodology of study

In this section, we will explain the procedure adopted for the collection of primary data to achieve the aims and objectives of the study and to test the hypotheses. We present in this section the study objectives, the choice of the research method, the research strategies, and data analyses methods.

2.1. The objective of the study

Since lean manufacturing became the most attractive production system, we believe that there is a clear need to a better understanding of the kinds of motivational effects that lean production practices brings about.

The major purpose of this whole study is to identify the lean manufacturing job design, and analyses how this job's characteristics affect the human resources 'motivation inside their organization. This will help professionals and companies that are interested in implementing the Lean philosophy and its tools inside their own organizations, with essential information and job-design model. This will help them go through an implementation effort and achieve a positive outcome, where not only operations are improved and waste is reduced, but also the well-being and the internal motivation of the people, which lead to achieve organizational goals.

2.2. The theoretical approach

There are several theoretical models that can be suggested for the study of motivation. For this present study, the theory chosen to be the platform of the study is "THE JOB CARACTERISTIC THEORY". The reasons of choosing this theory is that the JCM is the most widely accepted work design theory of worker motivation because employees are motivated about what their job provides for them and about their psychological states, which leads them to achieving v organizational goals.

Second, as parker[1] discussed in his book that, to explain possible antecedents of intrinsic worker motivation in lean production settings, it is necessary to root job design models in the

[1] PARKER,(S), WALL, (T), CORDERY,(J): *" Future work design research and practice: towards an elaborated model of work design*". Journal of Occupational and Organizational Psychology, N 74, 2001, p 413.

context in which motivation occurs. However, the form proposed by Hackman and Oldham of the JCM is the most compatible with the lean production context

2.3. Research strategy

To achieve our objective and to strengthen our research, we considered it very important and useful to establish a mixed approach that is to say, we combined the qualitative and the quantitative approaches. The methodology of our investigation can be summarized as follows

2.3.1. Qualitative approach

In order to understand the influence of different lean methods on the motivation of Schneider electric's staff, we opted for the use of a **quantitative study**

VILATE define the questionnaire as: *"The questionnaire is one of the three main methods to study the facts. Based on the collection of information in order to understand and explain the facts. It applies to a set (sample) which must allow statistical inferences, it is the number of elements that ensures the validity of the questionnaire and allows the information obtained to be deemed reliable. The main reason why we choose this method is its objectivity"*.[1]

2.3.1.1. Purpose of the questionnaire:

The questionnaire aims at generating numerical data that can help to test our hypothesis following the JCM. So the objectives were first to evaluate the core five job characteristics under lean practices (task variety, autonomy, feedback, task identity, task significance) in Schneider electric , which will lead to an internal motivation , and then to do an approximate measurement of the motivation potential score (MPS) for the lean job in the organization

2.3.1.2. The Questionnaire Design

Throughout the process of designing our questionnaire, we were inspired by Hackman's JDS to create our own questionnaire adapted to our study and the context of the company. I gave a great importance and care to the choice of questions, as well as their clarity and relevance. The questionnaire were designed in English to make sure that all categories will understand it. It is composed of four parts:

- **The first part**: consists of 5 questions, it allows to highlight the sociodemographic information or the profile of the respondents (sex, age, level of study, experience and socio-professional statue)

[1] VILATTE.(J) : « Méthodologie de l'enquête par questionnaire », Laboratoire Culture & Communication, Université d'Avignon, Grisolles, 2007, p3.

- **The second part**: this part of our questionnaire counts fourteen question in total, divided into 5 groups related to the 5 core job characteristics (task variety, autonomy, feedback, task identity, task significance). This part aims at identifying employee satisfaction toward each job characteristic under the implementation of lean principles.

  The respondents of this questionnaire are also asked to indicate their agreement or disagreement with the questionnaire statements regarding their job on a 5-point Likert scale, from completely disagree completely agree, with scores ranging from 1 to 5
- **The third part**: it contains three questions aims to describe the psychological states of employees toward their implementation of lean manufacturing
- **The forth part**: it includes a single question with several possible choices, these choices represent the most important levers to improve for developing motivation within Schneider Electric

In our questionnaire, we used the three categories of questions:

- **Closed questions**: The respondent have a limited number of choices to answer these questions[1].this type of question was used for the first part of the questionnaire
- **Questions in the form of scale[2]**: these are questions designed to evolve the positions of individuals on psychological variables, they are usually scales of attitude. Which used in the second part with Likert scale of 5point for each item to measure the job characteristics as follows :

  1. Strongly disagree 2.Disagree 3.Uncertain 4.Agree 5. Strongly agree

- **Multiple-choice question**: In these types of questions, the respondent is offered solutions and must choose between several pre-established answers. The rate of this type of question is important to make it easier for respondents

2.3.1.3. Sampling and distribution

The target population for this study is the employees from Schneider electric, for the analysis of motivation policy under the lean implementation; we proposed to focus our study on the all-hierarchical levels including blue collar, white collar, and professional work. From a staff of 372

[1] VILATTE.(J), op.cit, p78
[2] ibid, p28

permanent employees, we took the whole population of the factory, which represent 10% of the Schneider population. We choose the factory population because our research aimed to study the behavior of employees in manufacturing process, and because the factory contain only 37 employee I decided to take the whole population

The distribution of the questionnaire is the hardest part of my study, it was administered to groups of employees (ranging from three to 10 at a time) for three days, where its distribution done face to face in my presence. I stayed in the same place as them in order to clarify any ambiguities in the questions and make sure that all questions was replied

Before taking the questionnaire, I explained to employees the nature, purposes of the research, and were given the option of not participating

2.3.1.3. Data analysis:

After collecting the copies, the data was despoiled using both EXEL and SPHINX; software which are convenient to use and fast to get the results .The collected samples will be further analyzed and then displayed into tables and charts. The analysis was only made in flat sorting; the absence of crossed sorting was because goals and the framework of this research did not need a variables correlation. Moreover, because our study was based on the JCM theory, it is clear that we used the MPS (motivating potential score) which is used as a predictable index for the internal motivation of employees

After calculating MPS for all jobs, John Wagner[1] divided the jobs into three categories, including low motivating jobs (jobs with <40% of the maximum MPS score), moderate motivating jobs (jobs with 40e70% of the maximum MPS score), and high motivating jobs (jobs with >70%of the maximum MPS score).

So because we use the 5 point Likert scale the job can record the lowest score value 1 = (1*1*1), when the motivation potential of each dimension is the lowest. The motivation of each dimension is the highest if the job can record the highest score value 125 = (5*5*5).

[11] BAHRAMIA ,(M) and others*: "Job Motivating Potential Score and Its Relationship with Employees' Organizational Commitment among Health Professionals*", Korea Centers for Disease Control and Prevention, eISSN 2233-6052, korea,2016, p4

2.3.2. Qualitative research:

2.3.2.1. Purpose of the run interviews:

To support our research within the company, give it more credibility and strengthen the results of the questionnaire, we are not only limited to the questionnaire. In addition to the latter administered to employees from different socio-professional categories, we also developed individual directive interviews with the managers of the head office occupying different functions, because we considered it important to address those who manage the employees and know the processes of lean implementation in the company.

This method strategy emphasizes more on analysis based on words rather than quantifying data numerically. Its focus is on descriptive and analytics methods. This is the reason why qualitative research is flexible in terms of structure and procedure for the data collection, which provides the flexibility to adapt based on the findings of the observation and interviews.

2.3.2.2. Running the interview

To carry out this study and to give an empirical dimension to our work, we conducted our interviews at Schneider electric factory through a sample of 2 managers. The first interview was with the plant manager Ms. SAMIA ZIDANI. It was on May 7th 2018, at 12h45. The second interview was with the engineer of Methods and industrialization, Mr. NOURDDINE BETTAHAR. This interview was held on the same day at 13h15. Both interviews contained almost the same set of questions following the interview guide attached to the annex section of this memoire.

2.3.2.3. Content analysis:

Our analyses was based on recording of the interviews, the recorded speech was transcribed word by word into a document of 10 pages in total. In addition to a word by word analysis, taking in consideration the speaker's voice pitch and tempo variations, in order to detect the unspoken language and put an adequate frame to each expressed idea in terms of certainty and credibility.

Section 03: Results Presentation and Data Analysis

This section intends to give a clear and well-argued answer to the research problem identified at the beginning of our work.Once the data are collected, the results will be displayed in tables and diagrams that will be interpreted, these tables and diagrams will allow us to understand and appreciate the results of the study.

3.1. Quantitative study: the questionnaire

➢ **First part : Demographic characteristics of the study participants**

In this part of the questionnaire, we will define the characteristics of our sample as follows:

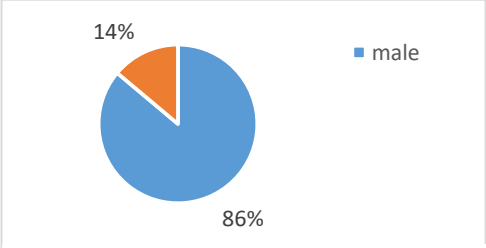
- **Gender:**

Table01: gender

	responses	Percentage
male	31	86,10%
female	5	13,90%
total	36	100%

Source: Made using Sphinx

Figure01: gender



Source: Made using Excel

Comment: We can see through the diagram above that 86% of the population in the factory are male while the female category represents only 14%, which means that this sector is occupied by men rather than women. This must be taken into consideration and measures must be taken to increase the number of women as much as possible, especially in positions of high responsibility.

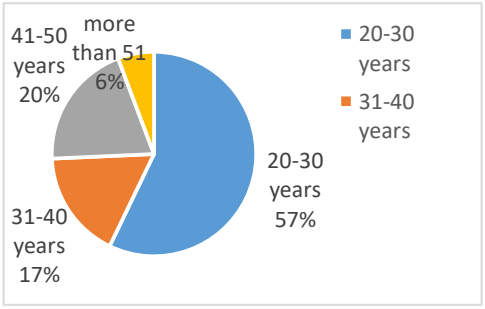
- **Age:**

Table 02: age

	Responses	percentage
20-30 years	20	57,10%
31-40 years	6	17,10%
41-50 years	7	20%
more than 51	2	5,70%
total	36	100%

Source: Made using Sphinx

Figure02: age



Comment: We can notice that 57% of the factory' population aged between 20 and 30 years, 17% are between 31 and 40, 20% are between 41 and 50 years old, and 6% are over 51 years old. We found that Schneider electric factory employs a young workforce, which reflects the energy and enthusiasm that runs in the company**.** This young workforce is one of the strengths of the company because they are characterized by their ambitions and have a desire to continue learning and developing their skills and knowledge, which absolutely will lead them and the organization to thriv

Source: Made using Excel

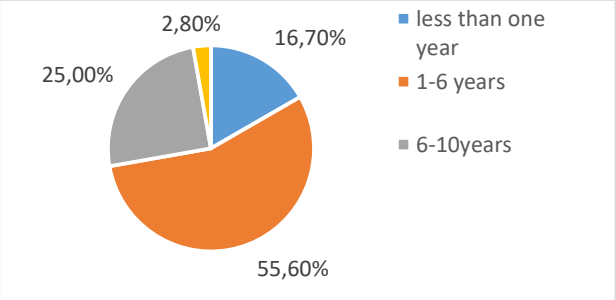
➢ Seniority:

Table03: seniority

	responses	Percentage
less than one year	6	16.7%
1-6 years	20	55,60%
6-10years	9	25%
more than 10years	1	2,80%
total	36	100%

Source: Made using Sphinx

Figure03: seniority



Source: Made using Excel

Comment: We find that 16, 7% of respondents have less than one year in the company , 55.60% have seniority between 1 and 6 years, and 25% of respondents have seniority of between 6 and 10 years in the company, while there is only one respondent who is in the company for more than 10 years

According to this figure, we notice that the highest rate of seniority is by staff who have more than one year within Schneider electric, which implies that the company is interested in employees who have experience in the field. This seniority is also explained by the stability offered by the company. Compared to other respondents who have a seniority less than a year with a percentage of 16% because of:

- The expansion of the company in Sidi Rached which lead Schneider to hire new employees.
- Existence of fixed-term contracts for certain employees.

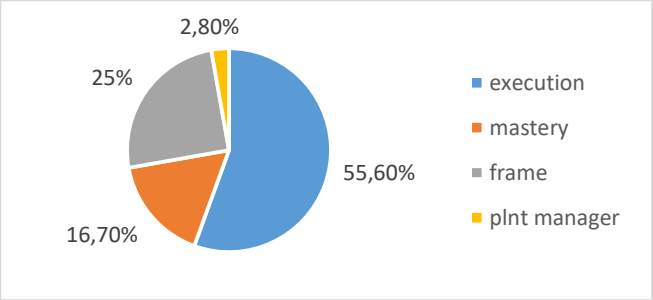
- **The job position**

Table 04: the job position

	responses	percentage
execution	20	55,60%
mastery	6	16,70%
Executive	9	25%
plant manager	1	2,80%
total	36	100%

Source: Made using excel

Figure 04: the job position



Source: Made using Sphinx

Comment: The study is spread over 55.60% of execution, 16.70% mastery, 25% executives and one plant manager. The reason of having more respondents from the execution is that our study is done in the factory, which aimed to analyze their behavior in lean workplace

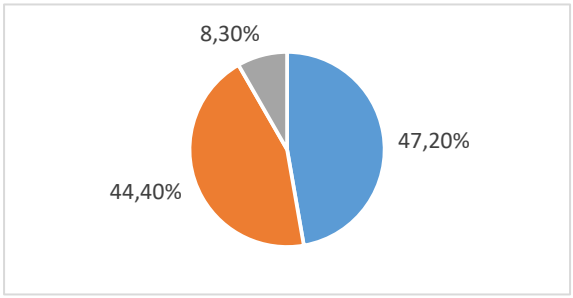
- **Level of education**

Table 05: level of education

	responses	percentage
Professional Training Diploma	17	47,20%
Graduation	16	44,40%
Secondary/BAC	3	8,30%
total	36	100%

Source: Made by the researcher using Sphinx

Figure 05: the level of education



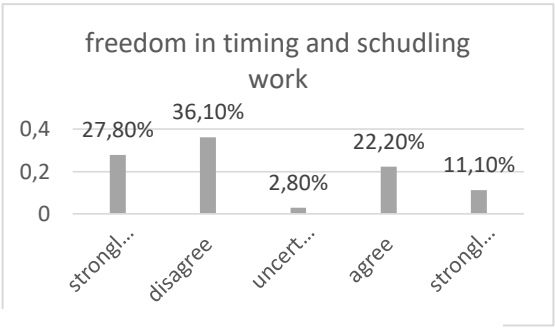
Source: Made by the researcher using excel

Comment : According to this study, we notice that almost the whole population is educated, 47.20% have a university degree followed closely by 44.40% who have a professional training diploma, 8.30 % have secondary level. The results are matching the fact that the company give a high importance to the education level of their workforce, which helps them to achieve its objectives. It also means that the university and professional training centers are the primary talent suppliers of the company.

➢ Second part

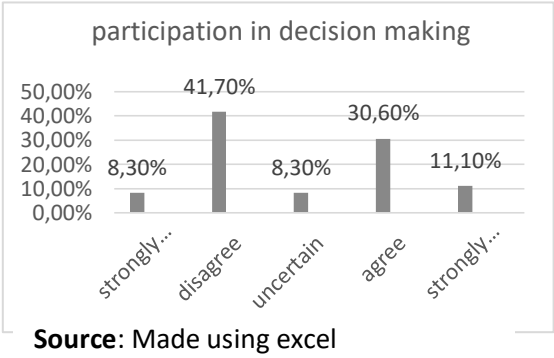
- **Autonomy:**

Figure06: lean and freedom at work



Source: Made using excel

Figure 07: lean and decision-making



Source: Made using excel

Table 06: lean and freedom at work

		responses	percentage
strongly disagree 10			27,80%
disagree		13	36,10%
uncertain		1	2,80%
agree		8	22,20%
strongly agree		4	11,10%
total		36	100%

Source: made using Sphinx

Table 07: lean and decision-making

	percentage	Responses
strongly disagree	8,30%	3
disagree	41,70%	15
uncertain	8,30%	3
agree	30,60%	11
strongly agree	11,10%	4
Total	100%	36

Source: made using Sphinx

Comment: The most respondents deny that lean manufacturing practices gives them a freedom in scheduling their work, with a percentage of 36% are disagree followed by 28% are strongly disagree. We notice the same about participation in decision making where 42% are disagree and 8.3% are strongly disagree that lean job gives them the opportunity to participate in decision making.

The minority who agree that lean gives them the freedom in their work and opportunity to participate in decision-making are frames and managers who are considers as decision makers.

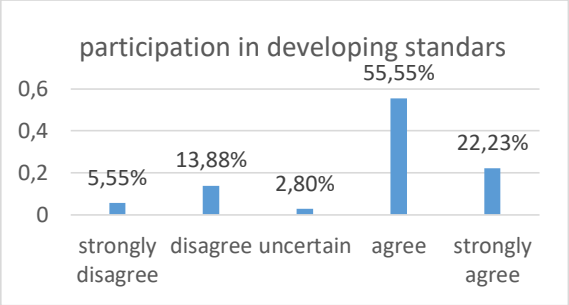
From that, we can say that employees under lean manufacturing practices have a lack of choice, freedom, independence, or discretion in either how the work is scheduled.

Figure 08: lean and participation developing standards standards

		responses	Percentage
strongly disagree		2	5,55%
disagree		4	13.88%
uncertain		1	2,80%
Agree		20	55.55%
strongly agree		9	22,50%
Total	36	100%	

Source: made using Excel

Table 08: lean and participation developing

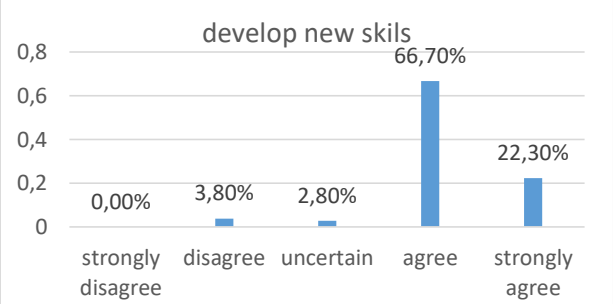


Source: made using Sphinx

Comment: We can see here that 55.55% of respondents agree, 22.50% strongly agree while only 18% disagree .Compared to the questions above the study shows that most of the respondents agree that lean implementation in their job gives them the opportunity to develop standards. The worker plays an active role in setting the rules by which he is bound and whether these rules are congruent with the worker's reasoning.

- **Task variety:**

Figure 09: lean and developing new skills



Source: made using Sphinx

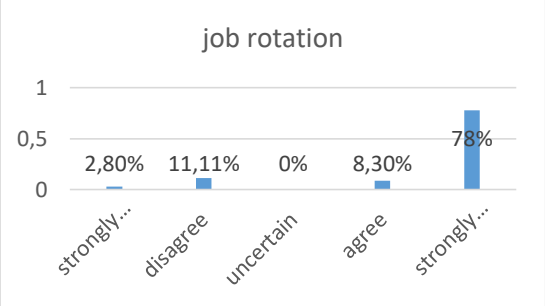
Table09: lean and developing new skills

	responses	Percentage
stronglydisagree	0	0%
disagree	3	8.30%
uncertain	1	2,80%
agree	24	66,70%
strongly agree	8	22.30%
total	36	100%

Source: made using Sphinx

Comment: As it is clear in the figure 09 that almost 67% of respondents agree, followed by 22.30% who strongly agree that lean manufacturing helps them to develop new skills. This confirms that developing new skills is one of the main principles of lean to help the employees accomplish their jobs perfectly, achieve the objectives, and thrive through its organization

Figure10: lean and job rotation



Source: made using excel

Table 10: lean and job rotation

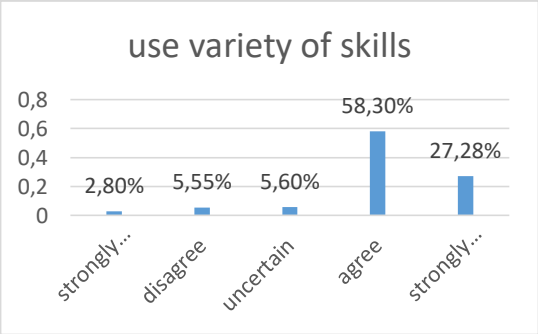
	responses	percentage
strongly disagree	1	2,80%
disagree	4	11.11%
uncertain	0	0%
agree	3	8,30%
Strongly agree	28	77.78%
total	36	100%

Source: made using Sphinx

Comment: we notice that 86% of the respondents agree that job rotation is one of lean manufacturing's principles that really increase the task variety and helps them to develop new skills. This explain the high rate of employees who are agree about developing new skills.

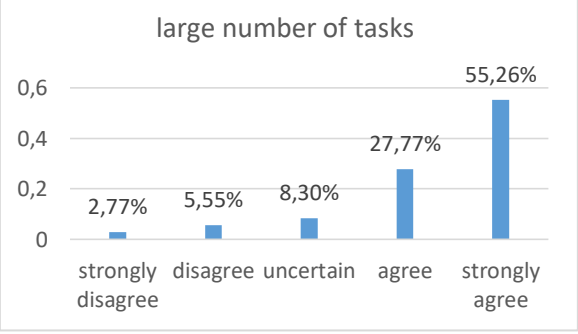
The 14% of the respondents who disagree refer to the nature of their job as frame or responsible which did not allow them.

Figure 11: lean and variety of skills



Source: made using Sphinx

Figure12: lean and the large number oftasks



Source: made using Sphinx

Table 11: lean and variety of skills

	responses	percentage
stronglydisagree	1	2,80%
disagree	2	5.55%
uncertain	2	5,60%
agree	21	58,30%
strongly agree	10	27.28%
total	36	100%

Source: made using Sphinx

Table 12: lean and a large number of tasks

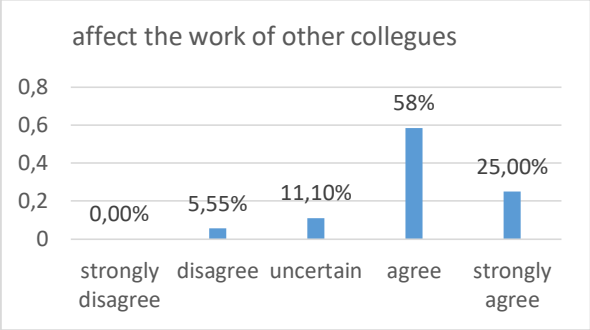
	responses	percentage
Stronglydisagree	1	2.77%
disagree	2	5.55%
uncertain	3	8,30%
agree	10	27.77%
strongly agree	20	55.56%
total	36	100%

Source: made using Sphinx

Comment: According to the replies of the respondents, more than 80% of them agree that their lean job ensures for them a large number of tasks to do using a variety of skills, this explain why lean job is team-based. This variety is necessary to keep the organization in the frame of JUST IN TIME and eliminate errors and wastes in all kinds

- **Task significance:**

Figure13: lean and the others work



Source: made using excel

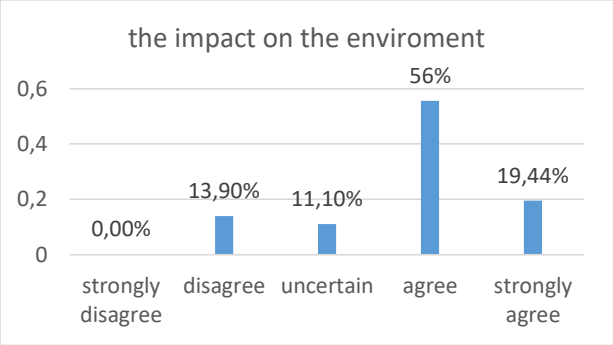
Table13: lean and others work

	responses	percentage
stronglydisagree	0	0%
disagree	2	5.55%
uncertain	4	11,10%
agree	21	58.33%
strongly agree	9	25%
total	36	100%

Source: made using Sphinx

Comment: We can notice that 58% of the respondents agree that the other colleagues are affected by how well the work gets done followed by 25% who strongly agree, and lean practices have a major role of that because it is based on team work, all the team will be affected by how well or bad the work of one of them is done. This feeling that the employees affect positively colleague's work gives them a sense of effectiveness in performing the work.

Figure14: lean and the environment



Source: made using excel

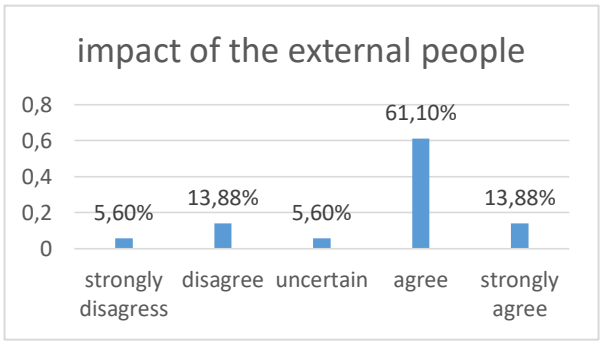
Table14: lean and the environment

	responses	percentage
Stronglydisagree	0	0%
Disagree	5	13,90%
Uncertain	4	11,10%
Agree	20	55.55%
strongly agree	7	19,44%
Total	36	100%

Source: made using Sphinx

Comment: We can see that more than 75% of the respondents agree that practice a lean job have positive effects on the environment and nature, this makes them proud to be part of this organization, which respect of the environment.

Figure 15: lean and people outside the organization



Source: made using excel

Table 15: lean and people outside the organization

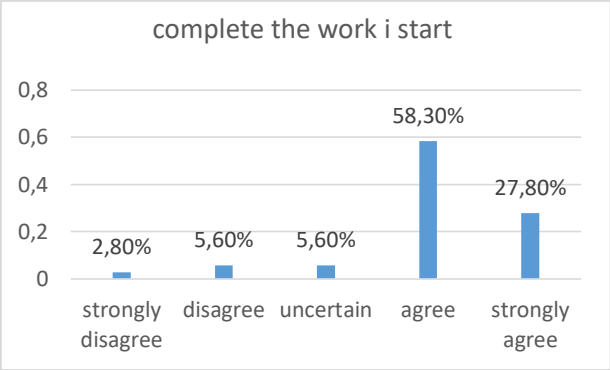
	responses	percentage
Strongly disagree	2	5,60%
Disagree	5	13.88%
Uncertain	2	5,60%
Agree	22	61,10%
strongly agree	5	13.88%
Total	36	100%

Source: made using Sphinx

Comment: it is clear that 75% of employees have the impression that their job under lean practices affect other people outside the organization such as suppliers or customers or even the customer of their customers, and they will be satisfied as much as the work is well done, this feeling of being useful and making others satisfied develop a since of meaningfulness and self-pride

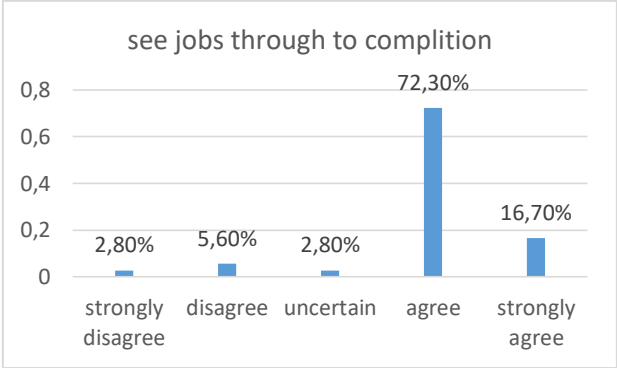
- **Tasks identity:**

figure16: Frequency of complete the task



Source: made using excel

figure 17: the opportunuty to see jobs thruogh complition



Source: made using excel

Table 16: Frequency of complete the task

	responses	percentage
Strongly disagree	1	2,80%
disagree	2	5.60%
uncertain	2	5,60%
agree	21	58,30%
strongly agree	10	27.80%

Source: made using Sphinx

tabel 17: the opportunuty to see jobs thruogcomplition

	responses	percentage
strongly disagree	1	2,80%
Disagree	2	5.60%
Uncertain	1	2,80%
Agree	26	72.30%
strongly agree	6	16.70%

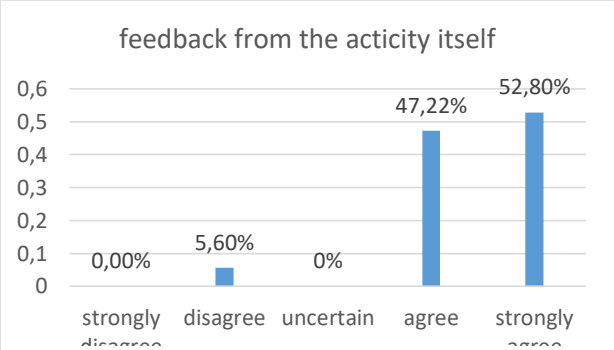
Source: made using Sphinx

Comment: From the result above we can notice that 58.30% of respondents agree along with 27.80% who strongly agree that their work under lean principles allow them to do the whole task from beginning to the end and identifiable piece of work. On the other hand 62.30% agree followed by 16.70% who strongly agree that they have the opportunity to see jobs and projects through completion which gives a visible outcome and develop a sense of satisfaction and achievement and of course this will motivate them to do more.

The minority who are disagree about their task identity it is because the nature of their job, which did not allow them, like the warehouse agent.

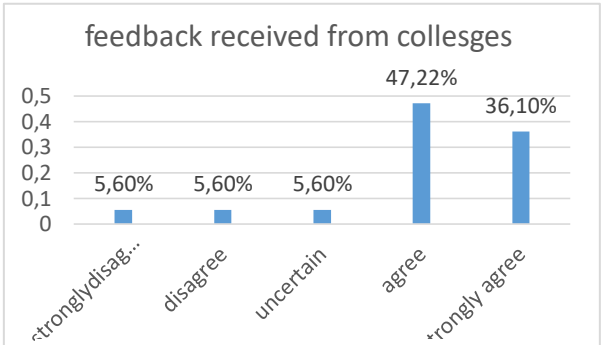
- Feedback:

Figure18: feedback from the activity itself



Source: made using Sphinx

Figure19: feedback from others



Source: made using excel

Table18: feedback from the activity itself

	responses	percentage
strongly disagree	0	0%
disagree	2	5,60%
uncertain	0	0%
agree	17	47.22%
strongly agree	17	47.22%
total	36	100%

Source: made using excel

Table19: feedback from others

	Responses	percentage
stronglydisagree	2	5,60%
Disagree	2	5.60%
Uncertain	2	5,60%
Agree	17	47.22%
strongly agree	13	36,10%
Total	36	100%

Source: made using Sphinx

Comment: It is clear from the figures above that employees in Schneider electric are satisfied with the feedback received as they carry out work activities, it could be from the activity itself which indicate the highest rate with 47.20% who agree and 47.20% who strongly agree. Or they receive direct and clear information from their colleagues or managers concerning performance and effectiveness. In this case the analysis shows that 47.22% agree with 36.10% who strongly agree

The respondents who disagree or are uncertain are employees just hired and they did not integrate in the culture of the company yet.

➢ Summary of the five core job characteristics and MPS

Table 20: summary of job characteristics averages

Items	Average
Freedom in timing and schudling work	2.53
Participation in decision making	2.94
Participation in devloping standards	4.02
Autonomy	**3.16**
Job retation	4.38
Develop new skills	4.02
Use variety of skills	4.02
Large number of tasks	4.19
Task variety	**4.15**
Affect the work of other collegues	4.02
Affect the invirement	4.36
Affect the society	3.63
Task significance	**4.01**
Complete the work I start	4.04
See jobs through to completion	3.96
Task identity	**4.00**
Feedback from managers	4.41
Feedback from the activities itself	4.90
feedback	**4.52**
MPS	**57.90**

Source: made using Sphinx

Comment: The table shows the average of each item concerning the five core job characteristics under lean manufacturing practices, these averages are calculated using 5-point Likert scale, with scores ranging from 1 to 5 from completely disagree to completely agree. These averages aimed at measuring the level of each characteristics under lean implementation. The results obtained according to each are presented in detail below:

- **Autonomy:** Regarding autonomy, we notice that 3.16 is recorded as the lowest average of all the dimensions, this moderate average means that lean manufacturing practices decrease employees' choice and limit their freedom at work. Conversely it increases responsible autonomy by giving the opportunity to employees to participate in developing standard procedures and transferring the authority to lower which is intrinsically motivating.,

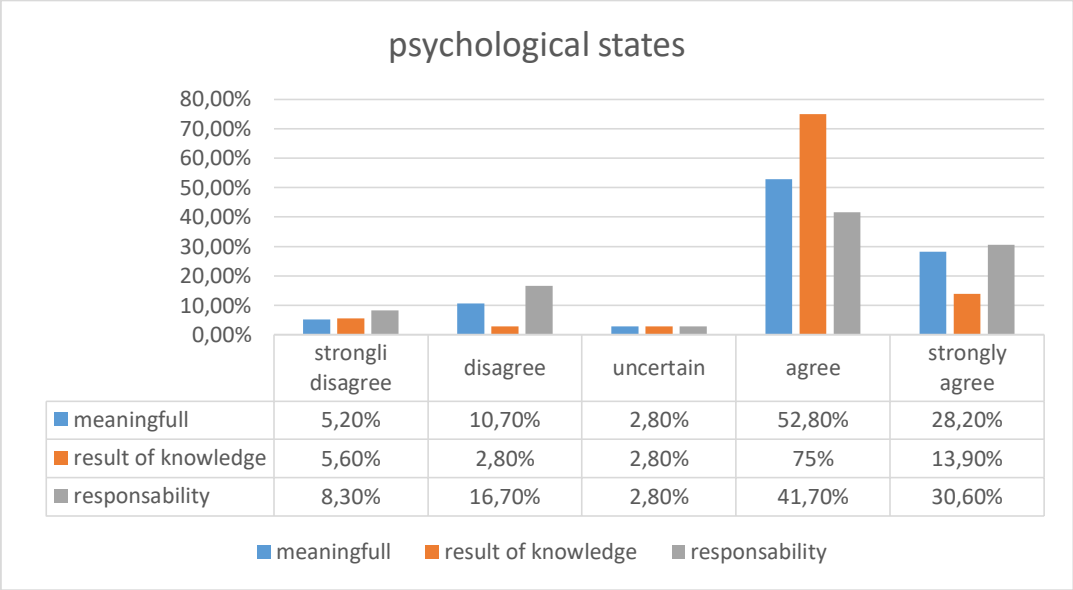
- **Task variety:** recorded an average of 4.15, which is a good average, confirm that lean job ensure a variety in their tasks
- **Task identity:** recorded an average of 4.00 as an average, it is a good level means that lean jobs allow employees doing the whole piece of work, from start to finish and gives them the opportunity to see what they achieve
- **The task feedback:** recorded an average of 4.52, the highest score among all dimensions. As an overall average, we can say that employees under lean manufacturing receive immediate and constant information about how well they are doing their jobs either from colleagues or from the activity itself
- **Task significance**: scored 4.01 as an average, which is good somehow; this means that most the tasks encountered by the employees in a lean job are significant.
- **Motivating potential score:** it is a device for summarizing the overall degree to which a lean manufacturing job is objectively designed in a way that maximizes the possibility for internal motivation**.** The Motivating Potential Score (MPS) has been used throughout our study is objectively designed in a way that maximizes the possibility for internal motivation on the part of the people who perform it. MPS can be calculated through the average of the three job components (job variety, task identity, and task significance) multiplied by autonomy and feedback, as it is mentioned above

The findings of our study which are presented in the table 20 show that the motivation potential score of employees in Schneider electric recorded an average of 57.90. As mentioned in the second chapter and according to John Wagner, jobs with a rate between 40and 70% of the maximum MPS score are a moderate motivating job, in our case the maximum of the MPS is 125, so applying John Wagner' logic will help us to judge that the motivation potential of a lean job is moderated.

➢ Third part

- Psychological states

Figure20: psychological states



Source: made using Sphinx

Comment: According to job characteristics model, the high level of the five core job characteristics will foster this three psychological states, which will absolutely lead to internal motivation. The result of our analysis shows that the employees of Schneider electric factory have a good level of these psychological states present as follows:

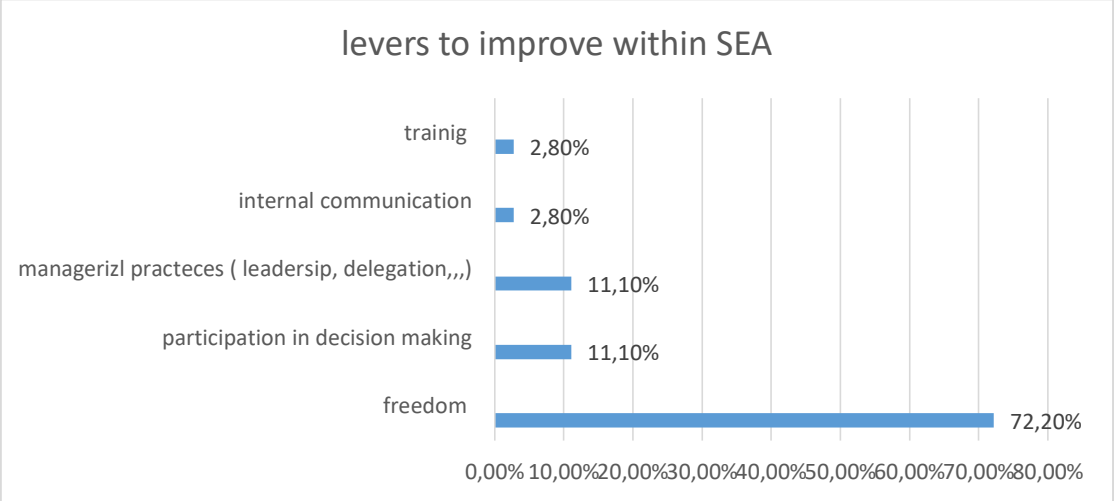
90% of respondents feel grateful and meaningful with the work they do and this is because of lean practices, which give the job a significance, variety and identity as confirmed previously, this high rate makes employees proud of the activity that they achieve.

88% of them have a high level in knowledge of result because the immediate and constant feedback received either from colleagues of from the activity itself.

71% feel responsible about their outcomes this responsibility is given by the opportunity to participate in developing standards and decision-making.

- **Forth part: levers to improve within Schneider Electric**

Figure 21: levers to improve within Schneider Electric



Source: made using Sphinx

Comment: According to the results presented in figure 20 we can easly notice that 72% of the respondents concur that the most effective characteristics to improve is the freedom because almost the whole respondents realize the lack of freedom in their jobs.comes just after 11.10% who wanted to improve the participation in decision making and this confirms the results of the previous analysis.

Respondents who suggest to improve training and internal communication with a rate of 2.80% are recently recruited employees because due to the expansion of the company in sidi rached, this monority feel the need of training due to their lack of experience in the company, the same thing about the internal communication they are not integrate yet in the factory calture.

3.2. Qualitative study

The Interview's guide

- **What do you think Lean Manufacturing is?**

The first response was by Ms. SAMIA ZIDANI the plant manager, who defined Lean as a management technique, which allows to organize the workspace to gain in performance, increase productivity, and eliminate waste within the company.

Secondly, Mr. Nouredine considered Lean as whole tool that optimizes the manufacturing process. The remaining part of the answers shows that Lean is above all a mindset, which drives people to continuously improve.

- **How Lean Manufacturing Ensure A Skill Variety For The Employee?**

The plant manager confirmed that lean jobs ensure a large skill variety; she explained that lean jobs are based on team interdependence which requires operators to move between different tasks to meet production demands. This enhances a number of tasks to do and variety of skills required to perform a job. She added that lean ensures that workers are trained extensively to be able to utilize a wide variety of skills.

Mr. NOURDINE argued that cross training and job rotation resulting in ''multi-skilling' 'principle problem-solving and participation in the development of standard operating procedures cause lean production jobs to embody more skill variety than found in typical assembly line work.

- **What About Task Identity?**

Both interviewees affirmed that Task identity is improved as employees are able to see how their efforts affects the whole product or service, and this is what really happen in a lean manufacturing process. Madam SAMIA explain that because of the flexibility of tasks and removal of buffers promoted by work flow integration gives workers the opportunity to see jobs or projects through to completion

Mr. NOURDINE added that Jobs are combined such that each worker sees a broader span of work activities. Lean manufacturing techniques such as continuous flow, short cycle times and cellular manufacturing, ensure the involvement of the worker in a wider range of production operations, thus participating in activities, which are closer to the product.

- **How can lean job be significant for the employees?**

Both interviewees confirm the results of the quantitative study when they affirm that an overall vision of a waste-free workplace is inculcated in the workforce, emphasizing the importance of each individual's efforts in improving the operation for the benefit of the employees, the organization, and society at large, resulting in a sense of meaningfulness in effectively performing the job.

Mr. Nourdine argued that; applying lean manufacturing techniques such as just in time production, zero error, preventive maintenance the 5S , Kanban and so on, affect positively either the work of their colleagues in the manufacturing process, which makes them work easily and effectively without any waiting time , or the customers which ensure to deliver a final product with high quality and zero error and of cause at time . This makes employees feel significance toward people inside and outside its organization.

- **Do You Think That Lean Practices Gives An Autonomy To Employees?**

The both interviewees agree that Individuals under lean production have almost no freedom, independence, or discretion in how the work is scheduled due to inventory reduction, short cycle times, a flow-based layout, and the process standardization

Madam Samia added that when authority is transferred to lower, by participating in developing standard procedures, Lean might increase responsible autonomy. She explain that Workers are given the tools and the training which help them to play an active role in setting the rules by which he or she is bound and controlling their own production. One of these tools are the AIC (short interval animation), the suggestion system and so on.

The answer of this question is absolutely confirm the questionnaire result, so lean it is about responsibility and participating in decision making and developing standard procedures

- **Are employees under lean manufacturing receive enough feedback and how?**

The answers to this question confirm that Workers under lean production receive substantially more feedback from the process itself than under traditional assembly line manufacturing. As employees carry out work activities, they receive direct and clear information concerning performance effectiveness.

Through a combination of visual controls, posted performance charts and graphs, and plant layout, immediate and constant feedback is available to all employees, said the plant manager, she added that *No third-party input is necessary for the worker to see what has been accomplished.*

Mrs NOURDIN added that Feedback is also encouraged through a flow-based layout, which makes it easier for a downstream worker to communicate demand and defect information upstream. Efforts to reduce variability are also likely to increase process feedback. He explain elso that the implementation of jidoka and poke-a-yoke devices make it immediately clear to the worker whether the piece or fixture is being inserted correctly.

3.3. Summary and recommendations:

➢ Summary

Through the analysis of the results obtained during the interviews and after the processing of the questionnaires, we were able to establish a diagnosis of the lean job characteristics within Schneider electric and how could be motivating. We Followed HACKMAN's theory logic , which based on 5-core job characteristics, the high level of theses characteristic will foster three psychological states such as meaningful, responsibility and knowledge of result which will lead absolutely to an internal motivation. We can summarize our result below:

- **Autonomy**: Lean manufacturing practices decrease employees' choice and limit their freedom at work due to inventory reduction, short cycle times, a flow-based layout, and the process standardization which result a lack of choice for the employees. Conversely Lean might increase responsible autonomy by giving the opportunity to employees to participate in developing standard procedures and transferee the authority to lower which is intrinsically motivating.,
- **Task variety:** Skill variety is increased by incorporating problem solving, appropriate training, and job rotation, which will positively impacts intrinsic motivation
- **Task identity:** Task identity is improved, as employees are able to see how their efforts affects the whole product, or service. Our study assure that this is what really happen in a lean manufacturing process.
- **The task feedback:** we can say that as employees carry out work activities under lean manufacturing, they receive immediate and constant information about how well they are doing their jobs either from colleagues of from the activity itself
- **Task significance**: lean practices in a factory gives a significance to tasks in the manufacturing process. First, applying lean manufacturing techniques affect positively either the work of their colleagues in the manufacturing process, or the customers, which ensure to deliver a final product with high quality and zero error and of cause at time. This makes employees feel significance toward people inside and outside its organization

Second, an overall vision of a waste-free workplace, emphasizing the importance of each individual's efforts in improving the operation for the benefit of environment

- **Psychological states**

The result of our analysis shows that this high level of the five job characteristics under lean implementation foster a high-level of psychological states such as meaningful with the work they do, which gives the job a significance, variety and identity. They also feel responsible about their outcomes. This responsibility is given by the opportunity to participate in developing standards and decision-making. Feedback received either from colleagues of from the activity itself gives them a high level in knowledge of result

- **Motivating potential score**

The finding of our analysis shows that the motivating potential score of employees in Schneider electric is recorded an average of 57.90. This score is between 40% and 70% of the maximum MPS score. This score helps as to judge that the motivation potential of a lean job is moderate

➢ Recommendations

- In order to create a successful culture in the workplace, allow younger employees the freedom to voice their opinions, engage with others and let them be a part of decision making processes. And most importantly, try to encourage a family atmosphere in the workplace, ensure that all employees are happy and productive – try to make work feel more like home.

- Develop Lean-thinking process**;** this can be done by organizing a workshop for staff to introduce Lean tools and techniques, which would help to create future Lean strategy in hospitals. This would also lead to involvement of all employees from the beginning of Lean thinking process.

- Lean implementation requires motivated employees since this will lead to higher job performance and creativity within the hospitals. Usually, employees are motivated by providing incentives. This can be done by creating employee of the month award program within the department to increase the efforts and motivation within the team. In addition, this can be changed to employee of the year by being awarded with a certificate from the company

➢ Research Limits:

Although the study has reached its aims, a number of limitations and cautions could not be avoided for many reasons

- The main limitation of this research is the number of respondents on the questionnaire that did not exceed 36. A study of this kind and especially one that treats such a large number of variables is known to require a number of respondents, yet this could not be achieved. This was mainly due to the small size of the factory and the lack of workers
- This research was based in the Schneider electric factory specialized in energy and automatism, which was difficult for researchers, as business students, to understand some terms and processes, which were relevant particularly to engineering; thus, this required longer time to understand
- For the data collection, the method of recording data was applied. However, we could not fully use this method to ensure that the interview is not disrupted in between because in some cases, the interview time for this research was quite long.

- The hardest limitation that we faced in our study was planning for interviews, since the company was in the process of moving the factory to Sidi Rached when so they were too busy.

- The last limitation was about the administration of the questionnaire which took too long, because we had to explain the concept and the questions one by one.

Conclusion

The analysis and the interpretation of the results of our investigation, as well as our observations made in the field allowed us to retain a set of results, which allowed us to have an answer to our problematic. Confirm or refute the hypotheses made, and develop a series of suggestions and recommendations that will be developed as a conclusion

GENERAL CONCLUSION

General conclusion

The environment is becoming more complex and imposes on companies a growing effort, adaptation and modernization. As a result, the mutual expectations of companies and employees are multiplying and the idea that individuals make the success of the company is increasingly highlighted. As organizations are struggling to meet increasing competitive pressures and to remain competitive, many of them are embracing Lean, as a tool to improve their position

As established by Liker; Lean can be seen as a philosophy that pursuits more than the reduction of waste in manufacturing activities because of its approach and consideration towards the human aspect of an organization by promoting the development of people.

The theoretical framework covered in this research enables us to demonstrate how the lean manufacturing job contributes to improving the motivation of employees in manufacturing process within Schneider Electric Algeria

The first chapter was there to draws a general overview of the production systems and especially the lean manufacturing philosophy, toolbox and its implementation. Then it comes the second chapter to brought us closer to the concept of human resources and motivation, narrowing the circle to reach the human aspect of lean and especially the motivation

At last, a third chapter harbored the projection of these theoretical earnings on our host Company Schneider, in which we were able to conduct our practical study, and verify if they are applicable in a pure Algerian context.

Since the results of our study were previously presented and synthesized at the end of the third chapter, and since recommendations for possible reforms were then given, we are here to Reformulate those results in a trial to answer the sub questions from our general introduction and also verify the veracity of the made hypothesis. The two hypothesis were primary answers for the first sub questions, and the second sub question was to be answered by the third hypothesis. In addition to the possible reformatory recommendations, the current research was to result.

So the first two hypothesis stipulating that “the internal motivation increases following lean implementation” and “lean manufacturing result an increase in skill variety, task identity and task significance and feedback that develop a sense of meaningful, responsibility, and knowledge, which leads to motivate human resources” , according to this study, confirmed. using the questionnaire data analysis. Also interviewees confirmed that these skill variety, task identity and task significance and feedback recorded a high average under lean manufacturing implementation these averages leads us to calculate the MPS which approve that lean job have the potential to increase the internal motivation of workforce

Our second hypothesis states “lack of choice and limit the freedom are the main factor of the negative side of lean manufacturing”. According to the current study, this hypothesis is also confirmed. It could very well be the answer to the second sub question. Our study develop that even the lean practices decrease choice due to the standardized of work, conversely it might increase responsible autonomy by giving the opportunity to participate in developing standards by which he is bound

By adopting the MPS theory, we have finally been able to confirm that lean manufacturing leads to staff’s motivation. This helps us to answer our primary question

Finally, it should be said that our research work remains our first experience in the industrial field, a work that allowed us to deepen our theoretical knowledge and discover the difficulties of scientific research.

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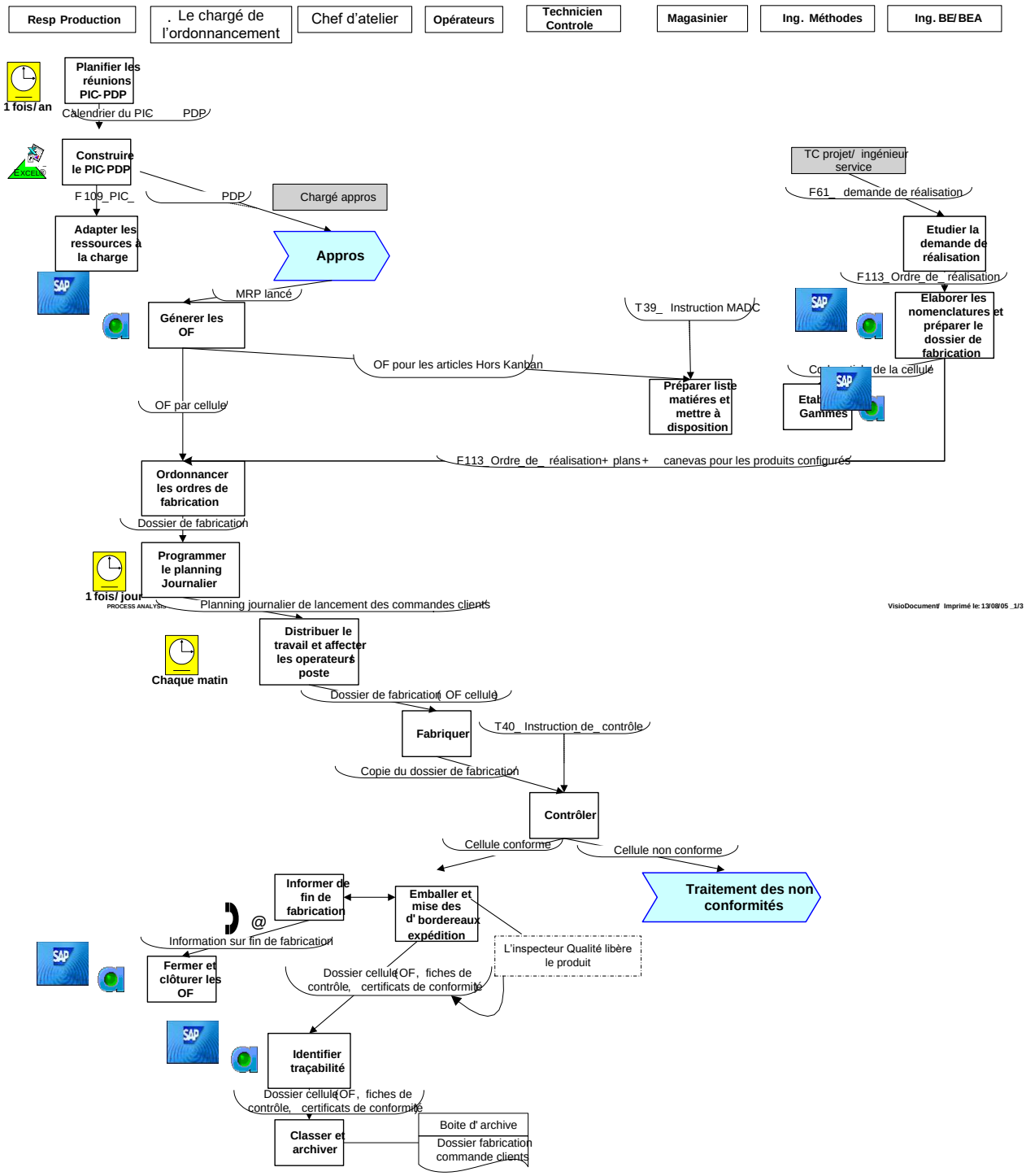
APPENDIX

Appendix 02: launching production



Appendix 03: 5S check list

Annexe N°7 : Grille d'audit-5S mensuel VIII

		Secteur audité : (Production / Magasin / Zones)							Résultat	0			
		Superviseur:							Max	50			
		Auditeur:							Standard	30			
		Date :							Ratio / Target	#####	SPS-0206EN Ver.: AX (2011)		
Méthode d'estimation des standards									Cible en point : XX				
-	0	Non connu / Pas encore démarré / L'ensemble des points nécessitent une action immédiate.											
	1	Connu mais non appliqué ou respecté, nombreuses opportunités d'amélioration.											
	2	Appliqué avec de légers écarts, plusieurs opportunités d'amélioration											
	3	Acceptable, peu d'opportunités d'amélioration (à l'extérieur des machines, bureaux, dossiers ...)											
	4	Excellent, opportunités d'amélioration difficiles à identifier (dans les machines, bureau, dossiers ...)											
	5	Totalement implanté et maintenu depuis plus d'un an											
	N°	Points sur	Description	0	1	2	3	4	5	Sub Total	Remarques / Opportunités d'amélioration		
Trier /Eliminer	1	Zone/Secteur Cellule/Ligne	Il n'y a pas de postes, machines, équipements, matériels, composants ou outils inutiles : ils sont identifiés (n°. #) et en bon état. Il n'y a pas d'en cours inutile. Les produits (bons - défauts) sont identifiés.							0			
	2	Flux d'information	Il n'y a pas de documents / informations inutiles: les documents et dossiers sont en bon état							/ 10			
	N°	Points sur	Description	0	1	2	3	4	5	Sub Total	Remarques / Opportunités d'amélioration		
Ranger	3	Zone/Secteur Cellule/Ligne	Les différentes zones (allées - postes de travail - zones d'en cours ...) sont identifiées et marquées. les outillages, accessoires, fournitures sont placés correctement et de manière appropriée : facile à trouver, facile à ranger : les places sont identifiées et précisées dans l'implantation. Les postes et outillages sont identifiés							0			
	4	Flux d'information	Les documents et dossiers sont identifiés et postés aux endroits appropriés. Les documents sont dans l'ordre, les tableaux de communication sont en ordre : visuels, faciles à comprendre.							/ 10			
	N°	Points sur	Description	0	1	2	3	4	5	Sub Total	Remarques / Opportunités d'amélioration		
Nettoyer	5	Zone/Secteur Cellule/Ligne	Le sol est propre et maintenu de façon continue : les murs, fenêtres, sous structures...sont nettoyées et maintenues périodiquement. Le nettoyage est facilité : outils de nettoyage appropriés, pas de cables sur le sol, accessibilité pour le nettoyage ...							0			
	6	Equipements	Les bureaux, armoires, équipements, outils, tableaux d'information, documents et dossiers sont propres et maintenus continuellement et periodiquement.							/ 10			
	N°	Points sur	Description	0	1	2	3	4	5	Sub Total	Remarques / Opportunités d'amélioration		
Standardiser	7	Zone/Secteur Cellule/Ligne	Les standards 5S prédéfinis par l'usine sont connus et respectés : VISUEL Fiches d'instructions/ maintenance préventive sont mis à jour et respectés le management visuel est en place.							0			
	8	Lisibilité des flux	Le management visuel (signes et marquages) est en place pour améliorer les gens/matériel/flux d'informations : Sécurité/Qualité/management des encours (FIFO, flux Pull ...) Le procédé est facile à lire pour le client. les indicateurs 5S sont suivi en AIC							/ 10			
	N°	Points sur	Description	0	1	2	3	4	5	Sub Total	Remarques / Opportunités d'amélioration		
Maintenir	9	Zone/Secteur Cellule/Ligne	Chaque employé est formé (y compris les intérimaires) et respecte les règles. Des audits journaliers sont réalisés par les opérateursDes audits mensuels sont réalisés par l'équipe de management. Les flux physiques sont en amélioration continu: en cours.							0			
	10	Management AIC	5S est managé en AIC: indicateurs, suggestions, plan d'action, encouragement ... Méthodologie 5S est encouragée et valorisée							/ 10			

Appendix 04/ AIC 3

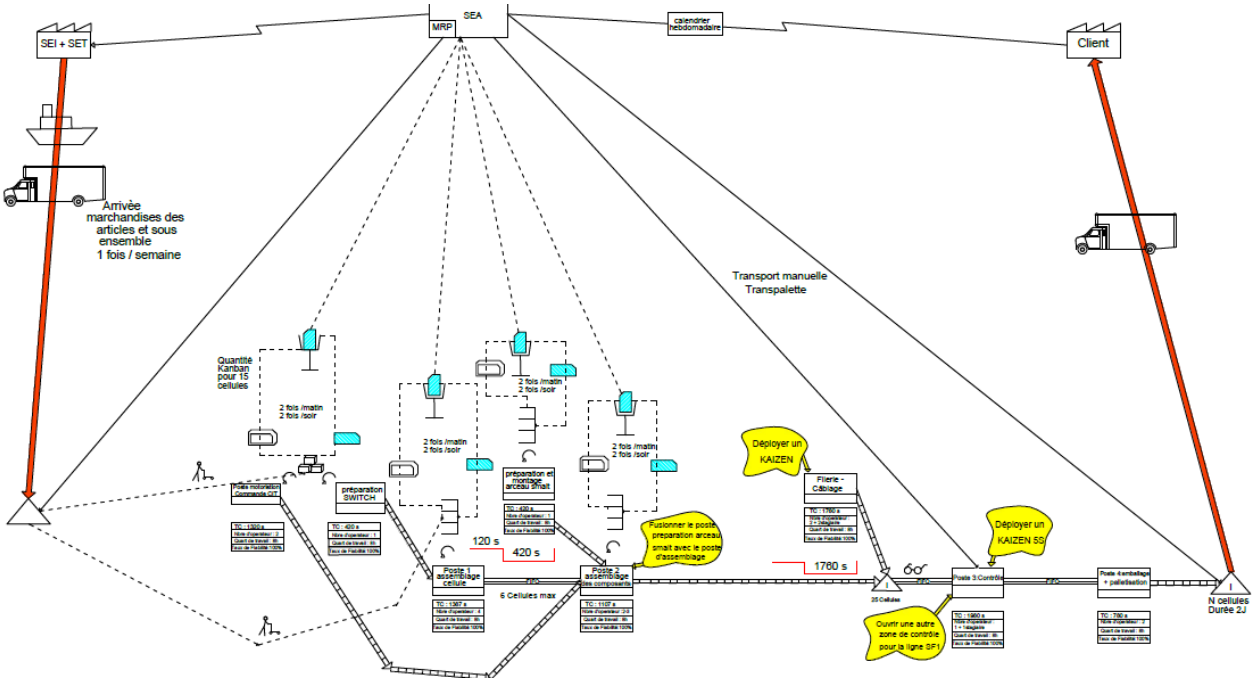
Schneider Electric

ANIMATION INTERVALLE COURT 3 (AIC3) Date : 01/04/2018
FONCTIONS SUPPORTS INDUSTRIE/LOGISTIQUE

Personnes	Emis par :	Rachid Ikhlef
Participants	Réunion du :	
Noms: Samia Zidani Ali Haddour Nourdine Bettahar Mohamed Khodja Djafar Rachid Ikhlef GHADHEB Bachir Said Moudir	Prochaine réunion : 01/04/2018	A l'usine à 10h.
	Ce compte rendu tient lieu de convocation	

Acteurs	Détails	QUI	QUAND
Sécurité	1 - Sensibilisation des opérateurs sur les situations à risques en AIC1 (port de gants obligatoires + stop bruit) :	Pilote de ligne/ Djamel et Responsable	Chaque AIC1
	- Les managers sont tenus de communiquer avant fin de semaine 03 near miss et les communiquer au responsable HSE, une amélioration est remarquable dans ce volet.	Managers	
	- Pour la partie CDL, 02 SO sont déclarés seulement.	Djamel	
	- Faire un état des SO déclarés chaque semaine.		
	- Discuter des sujets safety différents lors des AIC1 et demander aux opérateurs de remonter et communiquer les presque accidents et les situations à risque.	Managers et responsables AIC1	Chaque AIC1
	- Cota de Near Miss à déclarer, et envoyé pour chaque Manager	Djamel	Q1-18
	- Cota 1 near miss/employé/mois		
	- Prévoir une visite à sidi rached pour faire une inspection	Managers & HSE	Prochain AIC
	Situations à risque communiquées :		
	- Problème d'ergonomie pour la manutention des tôles de toit : prévoir une table élévatrice pour éliminer les charges et sensibiliser le personnel pour respecter le nombre de tôles à charger dans chaque rotation : action réalisée, et sera opérationnelle au nouveau site. En cours, reste l'implémentation.	Action prévue à sidi Rached/Djamel	En cours
	- Ergonomie TP36KV, Fabriquer l'équipement pour le magasin MT : Action réalisée à 95% pour le montage des TP, manque la solution pour la partie approvisionnement au niveau du Magasin MT : c'est fait reste seulement l'installation de la potence action prévue à sidi rached. Fait.	Amir/ action prévue à sidi rachad	En cours

Appendix 05: VSM IN SCHNEDER ELECTRIC



Appendix 06: questionnaire

QUESTIONNAIRE

Ce questionnaire s'inscrit dans le cadre d'un travail de recherche, pour l'élaboration de mon mémoire de fin d'études pour l'obtention d'un Master en sciences commerciales, option : Management et entrepreneuriat, de l'Ecole des Hautes Etudes Commerciales HEC (ex INC Alger).
Le thème de mon mémoire porte sur : « le Lean manufacturions et leur impact sur la motivation personnel »
Je vous prie de bien vouloir renseigner le présent questionnaire et je serai gré de l'attention que vous y mettriez pour répondre dûment et entièrement à l'ensemble de ses questions.
Par ailleurs, ce questionnaire est anonyme et je vous assure de l'entière discrétion pour vos réponses. Son usage est d'ordre strictement pédagogique et scientifique.

LILIA BOUCHARABINE -

L'organisatrice de l'enquête

<u>Première partie : profil</u>

Tranche d'âge :

O 20-30 ans O 31-40 ans O 41-50 ans O 51 ans et plus

Sexe :

O Masculin O Féminin

Niveau d'instruction :

O diplôme Universitaire O formation professionnel O Secondaire/bac

Ancienneté chez Schneider Electric Algérie :

O Moins d'un an O 1-6 ans O 6-10 ans O Plus de 10 ans

Catégories socioprofessionnelles/Statut :

O exécution O maitrise O cadre O cadre supérieur

deuxieme partie : caractéristiques du travail

Pour chaque énoncé, nous vous demandons d'indiquer dans quelle mesure la phrase décrit votre poste sous l'implémentation des principes du Lean :

Autonomie

- Lean Practiceces vous donne l'opportunité de participer à l'élaboration de procédures standard.

  1- Pas d'accord du tout 2-pas d'accord 3-Neutre 4-d'accord 5-Tout à fait d'accord

- L'application des principes Lean dans Ce poste m'offre une grande autonomie dans la prise de décisions.

1- Pas d'accord du tout 2-pas d'accord 3-Neutre 4-d'accord 5-Tout à fait d'accord

- L'application des principes Lean dans Ce poste me donne une grande possibilité d'indépendance et de liberté dans la façon de faire mon travail.

1- Pas d'accord du tout 2-pas d'accord 3-Neutre 4-d'accord 5-Tout à fait d'accord

Variété des tâches

- L'application des principes Lean dans Ce poste demande la réalisation d'un grand nombre de tâches différentes.

1- Pas d'accord du tout 2-pas d'accord 3-Neutre 4-d'accord 5-Tout à fait d'accord

- L'application des principes Lean dans Ce poste me donne l'opportunité d'apprendre et de développer de nouvelles compétences

1- Pas d'accord du tout 2-pas d'accord 3-Neutre 4-d'accord 5-Tout à fait d'accord

- L'application des principes Lean dans Ce poste me demande d'utiliser une variété de compétences différentes afin d'accomplir mon travail.

1- Pas d'accord du tout 2-pas d'accord 3-Neutre 4-d'accord 5-Tout à fait d'accord

- L'application des principes Lean dans Ce poste Donne la possibilité de rotation des postes et des tâches avec mes collègues

1- Pas d'accord du tout 2-pas d'accord 3-Neutre 4-d'accord 5-Tout à fait d'accord

Signification/importance des tâches

- Les résultats de mon travail sous l'application des principes Lean affecté directement le travail d'autres collègues.

1- Pas d'accord du tout 2-pas d'accord 3-Neutre 4-d'accord 5-Tout à fait d'accord

- Je senti que L'application des principes Lean dans ce poste lui rendre très important et significatif pour la société au sens large.

1- Pas d'accord du tout 2-pas d'accord 3-Neutre 4-d'accord 5-Tout à fait d'accord

- L'application des principes Lean dans ce poste a un grand impact sur l'environnement externe de l'organisation.

1- Pas d'accord du tout 2-pas d'accord 3-Neutre 4-d'accord 5-Tout à fait d'accord

Identité de la tâche

- L'application des principes Lean dans ce travail me donne l'occasion de voir des emplois ou des projets jusqu'à leur achèvement

1- Pas d'accord du tout 2-pas d'accord 3-Neutre 4-d'accord 5-Tout à fait d'accord

- L'application des principes Lean dans Ce poste me donne la possibilité de terminer complètement les parties du travail que je commence.

1- Pas d'accord du tout 2-pas d'accord 3-Neutre 4-d'accord 5-Tout à fait d'accord

Feedback du travail

- L'application des principes Lean dans Ce poste m'aider à recevoir Les activités de travail elles-mêmes fournissent des informations directes et claires sur l'efficacité (par exemple, qualité et quantité) de ma performance au travail.

1- Pas d'accord du tout 2-pas d'accord 3-Neutre 4-d'accord 5-Tout à fait d'accord

- D'autres personnes dans l'organisation, comme les responsables et les collègues, me fournissent des informations directes et claires sur l'efficacité de ma performance au travail.

1- Pas d'accord du tout 2-pas d'accord 3-Neutre 4-d'accord 5-Tout à fait d'accod

États psychologiques

- Le travail que je fais Ce travail est très significatif pour moi.

1- Pas d'accord du tout 2-pas d'accord 3-Neutre 4-d'accord 5-Tout à fait d'accod

- Je ressens un très haut degré de responsabilité personnelle pour le travail que je fais pour ce travail.

1- Pas d'accord du tout 2-pas d'accord 3-Neutre 4-d'accord 5-Tout à fait d'accod

- J'ai généralement une bonne idée de mes performances et si mon travail est satisfaisant dans ce travail.

1- Pas d'accord du tout 2-pas d'accord 3-Neutre 4-d'accord 5-Tout à fait d'accod

Troisième partie : Quels sont d'après vous les leviers les plus importants à améliorer pour développer la motivation au sein de Schneider Electric ? (Plusieurs réponses possibles)

1/les pratiques managériales (reconnaissance, délégation …..etc.)

2/le partage de la stratégie de l'entreprise, des objectifs.

6/La politique de formation

7/l'autonomie

8/la participation au décision

Appendix 07: interview guide

Interview guide

- **What do you think Lean Manufacturing is?**
- **How lean manufacturing ensure a Skill Variety for the employee?**
- **What about task identity?**
- **How can lean job be significant for the employees?**
- **Do you think that lean practices gives an autonomy to employees?**
- **Are employees under lean manufacturing receive enough feedback and how?**

Summary