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Improving Service Quality and Utilization of Space at Almayar Food Supplies Company in Ramallah Using Lean Six Sigma Methodology

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Declaration

I hereby declare that this master's degree thesis entitled "Improving Service Quality and Utilization of Space at Almayar Food Supplies Company in Ramallah using Lean Six Sigma Methodology" was carried out by me for the master's degree of quality management, and it has been generated by me as a result of my own original thesis.

For the presented thesis, which I am submitting to the university, no degree or other qualifications has been submitted either in this or any university. Moreover, I have not used sources or means without declaring them in the text, and if so have been referenced.

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Abstract

This study has a significant contribution to the clarification of the benefits of implementing Lean Six Sigma methodology in food service sector. It examined the impact of adopting Lean Six Sigma at Almayar Food Supplies Company in order to improve service quality and utilization of space by eliminating wastes and organizing the work environment and ultimately become more efficient in providing food distribution service.

This research aims to improve service quality at Almayar Company through improving warehouse layout, improving stock management, and improving preparing sales order process by applying DMAIC (Define, Measure, Analyze, Improve, and Control) methodology phase by phase. The define phase included identifying opportunities of improvement by identifying and defining problems in the current status and the tools used for this purpose are project charter, SIPOC (Supplier, Input, Process, Output, and Customer) diagram and problem context diagram (PCD). In the measure phase, data were collected to measure current performance and the tools used for this purpose were flow chart, data collection sheet, and value stream mapping (VSM). In the analyze phase the collected data were analyzed to identify root causes of the problems and the tools used for this purpose were cause and effect diagram known as Fishbone diagram as well as Interrelationship diagram. In the improve phase, the root causes were targeted to reach the desired improvement and the tools used for this purpose are flow chart, 5S and VSM. Finally, in the control phase the improvements are sustained and monitored through work forms, flow charts, and checklists. It is recommended that the efforts should be repeated and target other areas.

The importance of this study lies in the contributions it offers for improving the layout of the warehouse, stock management system, and preparing sales order process at

Almayar Company in order to eliminate wastes in these processes such as defects, expired products, delayed orders preparation, unutilized resources, and unorganized work place.

After applying the Lean Six Sigma methodology to the targeted areas and processes, the resulting output (the gains) were as follows: improving the work environment contributed to reducing the values of defective products by 74% per year, reducing the value of expired products on shelves by 75% per year, reducing the value of defected products in trucks by 80% per year, reducing stock value of low sales products by 67% per year, reducing warehouse stock value by more than 20%, improving the efficiency of preparing sales order process from 64% to 78%, reducing cycle time of this process from 110 to 73 minutes, and reducing its lead time from 175 to 94 minutes.

After organizing the workplace, improving stock management and reducing cycle time of prepare sales order process, the sales agent was able to start the process of distributing products to customers two hours earlier than the old position and ultimately reaching 55 to 65 customers per day.

It is recommended that the company train other staff members on implementing Lean Six Sigma methodology to target other areas for the purpose of continuous improvement. Furthermore, the company should sustain gained improvements by utilization of monitoring forms.

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List of Abbreviations

- DMAIC: Define, Measure, Analyze, Improve, and Control.
- LSS: Lean Six Sigma.
- VSM: Value Stream Mapping.
- SIPOC: Supplier, Inputs, Processes, Outputs, Customers.
- PCD: Problem Context Diagram.
- TQM: Total Quality Management
- QM: Quality Management.
- CI: Continuous Improvement.
- SCIM: Supply Chain Inventory Management.
- 5S: Sort, Set in order, Shine, standardized, Sustain.
- SME: Small and Medium Enterprises.
- SMED: Single Minute Exchange of Die.
- TPM: Total Productive Maintenance.
- TPS: Toyota Production System.
- SOP: Standard Operating Procedure.
- DPMO: Defect Per Million Opportunities.
- DT: Down Time.
- LT: Lead Time
- CT: Cycle Time.
- VA: Value Added
- NVA: None Value Added
- NVAR: None Value Added but Required

Chapter One
Introduction

1.1 Background

Food products suppliers in Palestine are facing high competition due to the huge facilitation from the Palestinian National Authority for importers and ultimately the large number of substitutes of the products. According to member's directory of Ramallah Chamber of Commerce, 187 firms are registered as wholesalers for food products and larger number of distributors of food products is not available, this proves the high competition in this industry (member directory, 2020). Also (Herzallah et al., 2014) declared in their research that 20.3% of Palestinian firms belong to food and beverages industry.

Within the current economic situation in Palestine, customers are seeking cheaper products keeping in mind the product quality. Since the majority of food supplies distributors and wholesalers are not importers and they cannot control product quality or provide products according to customer demand, they can only control the price. In order to offer competitive prices, they have to improve service quality by eliminating the waste, reducing variability in their processes and have a good utilization of their resources.

Lean Six Sigma Methodology is one of the best methodologies to help organizations achieve the above-mentioned objectives. Lean tools will lead to better utilization of resources and Six Sigma tools will help in reducing the variability in the processes and ultimately reducing the running cost. In addition, LSS will enable the organization to offer a competitive price to their customers.

The implementation of Lean Six Sigma methodology requires some conditions to achieve the required goals. The first one is top management commitment. The second one is employee's involvement. At the final phase of the project the organization should sustain

the improvements and communicate the results as lessons learned which will help in moving to another improvement project and ultimately seeking continuous improvement.

1.2 Company Profile

Almayar food Supplies Company was established in April 2014 as food and beverages products distributor. Owned by four partners with a working capital of 800,000 shekels the company is located in Al Bireh district with a warehouse of 400 square meter area divided into one floor with internal upper floor.

The company started with three employees (manager, accountant and a sales agent), one vehicle and a wide variety of products from local importers and manufacturers. The targeted customers were in Al Bireh and Ramallah cities with an average monthly sale of 221,000 shekels in retail basis.

It also expanded the distribution network to six vans, six drivers, four warehouse employees divided to manager, warehouse supervisor, accountant, and one worker. The working capital was increased to 1,500,000.

The drivers are the sales agents and responsible for preparing their orders, delivery to customer and dues collections. The collection policy is on cash payments and checks upon order delivery which is known in the market as cash vans.

The company used to be the sole distributor of several brands such as ETI, Ulker, Bebeto gummy and Torku. This included more than 400 products of chips, beverages, energy drinks, soft drinks, sweets, canned food and cleaning products. The current average sales exceed 1,350,000 shekels per month on retail and wholesale basis.

The company follows the Palestinian labor law in regard to worker’s rights. The company is registered at Ramallah chamber of commerce and ministry of national economy.

1.3 Problem Statement

While the variation in processes is inevitable, it is critical for it to be reduced to achieve consistency and improve service quality. All forms of waste should also be eliminated to provide a continuous flow. By doing so, organizations will be able to improve their service quality and gain customer satisfaction.

It should be stated that Almayar is facing the following problems:

1- Bad utilization of space.

2- Late sales order preparation.

3- Poor organizational structure.

4- Bad stock management.

1.4 Research Objectives

The aim of this research is to point out areas for improvement in relation to the above mentioned problems. Ultimately it hoped this will help resolve their storage problems, streamline their processes, and improve their inventory/warehouse management systems.

1.6 Thesis Structure

This thesis is presented in nine chapters. Chapter one introduces a background and overview of the study, chapter two introduces literature review about definitions, theoretical background, and previous studies of Lean Six Sigma methodology, chapter three introduces the adopted DMAIC methodology of Lean Six Sigma, chapter four introduced the achieved work in implementing the steps of the define phase of DMAIC, chapter five introduces the achieved work in implementing the steps of the measure phase

of DMAIC, chapter six introduces the achieved work in implementing the steps of analyze phase of DMAIC, chapter seven introduces the achieved work in implementing the steps of the improve phase of DMAIC, chapter eight introduces the achieved work in implementing the steps of the control phase of DMAIC, and chapter nine summarizes the conclusions and the recommendations of this study.

Chapter Two

Literature Review

2.1 Overview

This chapter introduces a summary of some of the published articles regarding DMAIC methodology and other related concepts in addition to the adopted tools in this research. It included Total Quality Management (TQM), Continuous Improvement (CI), Space Loyout, Inventory Management, Lean Six Sigma (LSS), DMAIC Methodology, Wastes Reduction/Elimination, The 5S System (Sort, Set in order, Shine, Standardize, & Sustain), and Value Stream Mapping (VSM).

This chapter is divided into two sections. The first section presents a theoretical background about the above-mentioned concepts and tools, and the second section presents previous studies on LSS implementation.

2.2 Theoretical Background

This section introduces the theoretical background of the above-mentioned topics including definitions and coverage of the various topics from different points of view.

2.2.1 Total Quality Management

According to Martínez-Lorente et al. (1998) TQM was launched in 1949 after World War II, when union of Japanese scientists & engineers formed a committee to improve productivity and enhance quality of life. While TQM was noticed by American firms around 1980.

Furthermore, Martínez-Lorente et al. (1998) confirmed that the term and philosophy of TQM as a whole appeared around mid-80's; the term was initially coined in

1985 by Naval Air Systems Command in Japan to describe its style management approach to quality improvement.

On the other hand, Rahman (2004) concluded that TQM was adopted by many organizations around the world over the last two decades such as Motorola, Ford, Xerox, Federal Express, Proctor and Gamble and others. The result was higher quality, lower product and service costs that respond faster to customer needs.

Jehangiri (2017) described TQM as a collective, interlinked system of quality practices that is associated with organizational performance. And Attakora-amaniampong et al. 2014) concluded that there are many different terms used in literature when discussing TQM which lead to little agreement on what it means. Companywide quality control, total quality improvement, total quality control, and strategic quality management. One reason is the development of TQM over time.

While Dean Jr & Bowen (1994) concluded that the emergence of TQM is one of the major developments in management practices. Its recognition as a competitive advantage is wide spread especially in western countries. Very few companies can afford to ignore it especially manufacturing.

On the other hand, Mann & Kehoe (1995) concluded that TQM was found difficult to be implemented as an effective policy by many organizations where it was realized as the way forward for long-term business success. One of the main reasons is the failure in identifying what to be changed and achieved which will result in a lack of commitment and resources allocation.

In addition, Folaron (2003) confirmed that despite the success of TQM in providing excellent quality tools and organization-wide mindset to improve quality, it had shortfalls

where it did not have quantifiable dollar benefits that can be tied to the bottom line and as a result the cost-benefit implementation of total quality management could not be justified.

In comparison to Six Sigma, Simmons (2002) stated that TQM created constancy of purpose and urged improving constantly of the product or service, Six Sigma establishes deliverable quality improvement in a specific time frame.

Hendrick & singhal (1999) concluded that organizations cannot seek quick gains through TQM and it cannot be judged on short-term returns. They must be patient with TQM since it is not a quick fix, it improves performance in the long haul. And Steiber & Alänge (2013) confirmed that more recent studies also indicate that TQM restrains ability to innovate and flexibility of the companies to change especially in uncertain and fast-moving industries.

2.2.2 Continuous Improvement (CI)

According to Mayle (2009) the roots of improvement programs can be traced back to initiatives undertaken in the 1800s, where employee-driven improvements were encouraged, and employees were rewarded by incentive programs that brought positive changes in the organization.

Regarding the definitions of CI, Zang will & Kantor (1998) defined continuous improvement as an array of powerful techniques that has produced radical improvements in many companies and organizations. CI provides perhaps the most central and universal component of TQM which has helped in achieving high quality and productivity.

Moreover, Deming described Continuous improvement as a philosophy consisting of “Improvement initiatives that increase successes and reduce failures”. (Juergensen, 2000)

Another definition of continuous improvement is “a company-wide process of focused and continuous incremental innovation”. (Bhuiyan & Baghel, 2005)

While Bessant & Francis (1999) defined CI as an ‘organization-wide process of focused and sustained incremental innovation‘. It represents an important element in such dynamic capability since it offers high involvement in innovation and learning processes. While others view CI as either as a completely new approach of enhancing creativity and achieving competitive excellence in today’s market or as an offshoot of existing quality initiatives like total quality management (TQM)

In regards to objectives and gains of CI, Bhuiyan & Baghel (2005) concluded that CI targets the elimination of waste in all systems and processes of an organization. Huge investment is not necessarily required to make improvements. CI improvements are incremental or radical that takes place as a result of new technology or innovative ideas. As a result of these incremental improvements the major improvement takes place overtime. These improvements are achieved through the use of various tools assigned to search for sources of problems, variation, waste, and finding roots causes and ways to minimize or eliminate them.

Fryer et al. (2007) concluded that CI aims to increasing the effectiveness and/or efficiency of an organization through gradual never-ending changes. It means getting better all the time by improving results, business strategy, and customer, employee and supplier relationships.

Moreover, Ahmed et al. (1999) concluded that CI allows seeing beyond the present and creating the future. Regardless of resources and excellence companies cannot be protected against changes that bring uncertainty and risk while it also creates opportunities. Deciding the necessity of learning is not sufficient unless backed by actions that create an

environment where employees are comfortable with continuously leveraging improvement. Finally, Elmuti & Kathawala (1997) confirmed that one of the popular tools of continuous improvement is benchmarking. 30% to 40% or more cost savings can be achieved through the use of benchmarking. Benchmarking can support the processes of budgeting, strategic planning, and capital planning.

2.2.3 Space Layout

According to Lean thinking, transportation, material handling techniques and layout management are main factors of the efficiency of warehouse operations. Accordingly, each type of items should be allocated to maintain high efficiency. (Parveen et al., 2011).

Zhang et al. (2016) in their research confirmed that layout is one of the key issues in warehouse management where its space is one of the key resources of production and enhancing space utilization can improve production output and increase profit. An effective layout can reduce operating cost while storage constrains affect scheduling and planning. They also highlighted the importance of warehouse layout design to use space efficiently while providing most economical storage location of each item to minimize handling cost. This will lead to eliminating the inefficiencies in warehouse functions and make them reliable in terms of cost.

On the other hand, Hsieh & Tsai (2006) confirm that one of the key factors in the success of supply chain is to rapidly respond to customer demands. Arranging orders into batches before picking customer orders can significantly speed the movement of products and accordingly reducing cost even by small reduction in picking distance. Therefore, the storage area planning is considered as one of the very important factors affecting the order picking system.

2.2.4 Inventory Management

Giannoccaro & Pontrandolfo (2002) defined supply chain inventory management (SCIM) as an integrated approach to the planning and control of inventory throughout the entire network of co-operating organizations, from the source of supply to the end user.

White et al. (2008) concluded that the main concern is how much inventory a company should keep. Too much inventory consumes physical space, and increases the possibility of damage. Further, excessive inventory frequently compensates for sloppy and inefficient management, and poor forecasting. On the other hand, too little inventory often disrupts manufacturing operations, and increases the likelihood of poor customer service.

While Michalski (2008) concluded that one of the essential problems of financial management is a compromise between limiting of risk by having a greater inventory level and limiting a cost of inventory. And Cardoso et al. (2017) confirmed that in the seeking of lower storage costs and greater customer loyalty, an efficient inventory management system is a reflection of the operations efficiency of the firm.

2.2.5 Lean Six Sigma (LSS)

According to Andersson et al. (2006) Lean and Six Sigma roots can be traced back to early development at General Electric where they realized that they complement each other, i.e. lean addresses waste and flow while Six Sigma targets reducing variability and design.

The Evolution of LSS had started in the 2000s. The term lean sigma had been used to describe a system that combines both Lean and Six Sigma. Some companies still calling it Six Sigma and others use the term Six Sigma Lean. Also, some companies call it LSS or Six Sigma lean, depending on which methodology they choose as the leading initiative. (Salah et al., 2010)

In conclusion, if lean is implemented without Six Sigma, then there is a lack of tools to leverage improvement to its full potential. Conversely, if Six Sigma is adopted without lean thinking, then there would be a cache of tools for the improvement team to use, but no strategy or structure to drive forward their application to a system. Although lean and Six Sigma (to a certain extent) evolved independently, there are a number of encouraging articles discussing the use of an amalgamated approach. (Pepper & spedding, 2010)

Lean mandate removing waste by all members of the organization from all areas of the values stream, it is considered as a cost-reduction mechanism. Lean strives to make organizations more competitive increasing efficiency, decreasing costs incurred due to elimination of non-value-adding (VA) steps and inefficiencies in the processes as well as reducing cycle times and increasing profit for the organization. (Näslund, 2008)

If implemented together, Six Sigma and lean are very powerful continuous improvement methodologies with common goals and grounds to achieve customer satisfaction. They form a superior methodology when integrated (LSS) since they complement each other. (Salah et al.,2010)

Regarding gains of LSS, Maleyeff et al. (2012) concluded that a Lean Six Sigma (LSS) organization would capitalize on the strengths of both lean management and Six Sigma. A LSS Organization would include the following three primary tenets of lean management: (1) It would incorporate an overriding philosophy that seeks to maximize the value-added content of all operations. (2) It would constantly evaluate all incentive systems in place to ensure that they result in global optimization instead of local optimization. (3) It would incorporate a management decision-making process that bases every decision on its relative impact on the customer.

While Alsyouf et al. (2011) concluded that Lean Six Sigma has been equally

beneficial both for manufacturing or service concerns and Large or small-scale organizations. It is quite beneficial for different industries with little modifications as per industry requirement.

In regards to success factors for the implementation of LSS, Habidin& Yusof (2013) concluded from the empirical data survey of critical success factor for Lean Six Sigma implementation in Malaysian automotive industries, the two extremely important factors are leadership and customer focus..

While Prajogo & Sohal (2003) concluded that in order to have a successful Lean Six Sigma, company must develop a unique combination of resources and competencies that "bring home" the benefits of Six Sigma, and must have combination of competences and resources for sustainability on the long term. Where top management commitment, organizational culture and employee competence and involvement are a critical success factors for LSS implementation.

Antony et al. (2012) also concluded that the extent to which top management allow middle management greater responsibility in the creation of solutions and strategy formulation in critical to the future success of LSS. This grass root approach as a result of greater role of front line staff in the value creation process.

2.2.6 Wastes Reduction/Elimination

According to Chiarini (2012) Lean Six Sigma is an integration of two important and powerful management systems. The first is lean thinking which is focused on the creation of value through the elimination of seven wastes:

(1) Overproduction.

(2) Inventories.

(3) Defects.

(4) Motion.

(5) Transportation.

(6) Waiting.

(7) Processing.

The second, Six Sigma is a methodology whose target is to increase the customer's satisfaction and reduce costs through reducing variation in the processes.

Lean aims at the utilization of resources such as human resources, invested capital, space, time required to carry out a process, and other issues.

On the other hand, Mezgebeetal (2013) confirmed that organizations should understand the wastes in the first stage of lean thinking. Where waste refers to the overall poor performance from different perspectives such as underutilization of resources, improper assignment of resource to the wrong position, process inefficiency, and ineffectiveness of transforming the right input to the right output. A systematic attack on the factors causing poor quality is a systematic attack on waste.

Regarding the wastes classification, Verrier et al. (2016) concluded that the seven Lean wastes defined by Taiichi Ohno for the TPS (Toyota Production System) are overproduction, defects, unnecessary motion, unnecessary inventory, inappropriate processing, transportation and waiting. The importance of all staff and good human behavior at all hierarchical stages has been defined as the center of success in manufacturing strategies. These wastes all lead to potential disorganizations as well as loss of profits and motivation. In the same way, environmental impacts can be considered as a result of green wastes

Wee & Simon (2009) concluded that the eight wastes highlighted in TPS are

overproduction, waiting, conveyance, over processing, excess inventory, movement, defects and unused employee creativity, and the biggest one being overproduction.

2.2.7 Lean Manufacturing Tools

Lean offers organizations a toolbox of methods that can be used to eliminate waste from business processes. Lean practitioners have traditionally focused on what they refer to as the "Seven Deadly Wastes": defects, overproduction, waiting, transport, inventory, motion, and excessive processing (Fercoq et al., 2016)

Alsyouf et al. (2011) mentioned that the driver of lean principles is customer value. The five basic principles of lean manufacturing are: understanding customer value, value stream analysis, continuous flow, 'pull not push' demand-driven flow and perfection. A variety of lean tools have been developed and applied to achieve these principles. Commonly used lean tools include value stream analysis, layout redesign, Kanbans, total productive maintenance (TPM), quality-at-the-source, single minute exchange of die (SMED), visual aids, 5S, work standards and Kaizen.

2.2.8 The 5S System

Chapman (2005) defined 5S as business system for organizing and managing manufacturing operations that requires less human effort, space, capital, and time to make products with fewer defects. It creates a work environment that is disciplined, clean and well ordered. The 5Ss are as follows:

1. Sort.	2. Set in order.	3. Shine.	4. Standardize.	5. Sustain.

1. **Sort:** The first step, sort, requires employees to sort out what is not needed in the workspace to perform the work.

Valuable workspace can be freed up by clearing out parts, WIP, scrap, documents, packaging material, tools, machinery, equipment and miscellaneous items. Some of this material is needed to meet production objectives, but much of it is not. Piles of extraneous items accumulate and impede the flow of work and extend lead times.

2. **Set in order:** Organizing what essential materials are left to minimize wasted employee motion, walking and material movement.

"A place for everything and everything is in its place" includes the placement of such things as machines, tools, storage areas and files. The location should be clear so anyone including work teams, support personnel and new hires can find anything at any time, and out of standard situations are obvious to everyone.

Creating this kind of visual shop floor will create an environment that talks to you without verbal communications.

3. **Shine:** The shine (and inspect) step focuses on cleanliness. Teams target specific areas to clean, determine how to clean and who will do the cleaning. They define the standards of cleanliness.

Cleaning targets include storage areas, equipment and machinery, and surroundings (for example, Aisles, under chairs and under desks). While employees are cleaning, they should also check the condition of their equipment to identify early warning signs of unplanned breakdowns.

4. **Standardize:** In the standardize step, centralized 5S stations should be set up. These should contain the appropriate supplies such as brooms, mops, wiping rags, labels and tape for color coding whatever is needed to maintain the workplace organization and visual systems. Ideally, employees can quickly access these supplies when needed.
5. **Sustain**: maintenance of the organization systems, management needs to get involved in

5S auditing, verifying compliance, providing feedback on performance to 5S goals and actively participating in 5S improvement implementation events (called *kaizens*), which span several days to blitz a work area.

Regarding 5S implementation, Chapman (2005) concluded that how 5S will work in many companies will embark on implementing 5S only to do the first three S's: sort, set in order and shine. Some rationalize that after cleaning up and organizing, employees will simply fall in line and sustain the visual factory on their own. Further investigation of many companies who tried 5S in the past and it did not work for them. Further investigation uncovered a consistent root cause for their failure. They did not formalize the last two S's: standardize and sustain. They called the initiative 5S when, in fact, it was really only 3S.

Finally, Chapman (2005) confirms that successful implementation of the last two S's of 5S will determine whether you are able to transform your operations from a hidden factory of waste affecting transportation, inventory and motion and resulting in waiting, over processing, overproduction and defects to a visual factory where the environment is self-explaining, self-ordering and self-improving.

2.2.9 Value Stream Mapping

Singh et al. (2006) defined the value stream mapping (VSM) as a collection of t**o**ols that helps in identifying waste in individual value streams. A value stream is defined as the value-added and non-value-added activities required to bring a specific product, service, or combination of products and services to a customer, including those associated with the overall supply chain as well as those in internal operations.

Nallusamy et al. (2015) explained that the Value Stream Map is drawn by finding the cycle time for each process and the environmental effect is also noted. By identifying the wastes, future state map is drawn with improved processes to reduce the wastes.

Different ideas are generated to reduce wastes by Brain storming technique. The methodology is used with different types of small-scale industries like fabrication, textile, food and service workshops.

On the other hand, Alsyouf et al. (2011) concluded that Lean manufacturing is focused mainly on VSM as a critical initial step for developing lean systems and as a communication and business planning tool to manage the change towards a lean environment. Consequently, lean can be viewed as VSM integration of a process value chain, where VSM focuses on value in the context of what the customer is willing to pay for. To this end, VSM graphically represents and divides the manufacturing processes or activities into value-added (VA) and non-value-added (NVA). Key process information and data are then added to the VSM to characterize various stages in the product flow and to quantify the current state of performance. Process data include primarily cycle time, capacity and availability. The distance travelled, the storage and buffer size, and the time delays characterize storage and transfer activities. VSM also includes a representation of the information flow among various flow stages. The primary goals of VSM are to model the process, investigate process wastes and estimate the lead-time associated with a certain product flow throughout a system, as well as the process efficiency.

While Mandahawi et al. (2011) confirmed that a value stream map (VSM) helps management to identify and quantify value and non-value added activities before and after improvement. To identify value, both patients (i.e., external customers) and healthcare professionals or staff (i.e., internal customers) are consulted. Generally, patient requirements include smooth admission, short length of stay, on time operations, zero (or minimum) clinical errors, and a smooth or timely discharge, to name a few. On the other hand, staff requirements include better schedules, enough capacity, better communications,

and safe working environments.

Rahani & Al-Ashraf (2012) confirmed that one of the effective tools for the practicing Lean manufacturing is (VSM). It covers the entire process flow in a three-step method. The first step includes preparing current status diagram of material and information flow by walking through the production line. In the second step the future state map is produced to identify wastes, their root causes and potential improvements. In the final step the improvements are curried out to reach lean process flow.

On the other hand, Rahani & Al-Ashraf (2012) concluded that the use of the VSM improved the approach in lean production initiatives as it reveals obvious and hidden waste that affected the productivity. There is a significant amount of the time products spent on the production system usually was waiting and non-value added. Quantitative evidence showed that many of the Lean tools have an expected impact related to the reduction of this waiting time. The evaluation of these improvements through the use of the CT evaluation highlights the economic impact of time improvements. The VSM applied to assess the expected impact of a change in the production process resulted in savings (lower rejection rates) and to a certain extent, a positive view was due to the fact that there were substantial gaps between standardized work and real work – this gap meant that workers did not follow strictly assembly standards and improvising the SOP could be a key driver in continuous improvement sustainability on the production floor as operators are fully aware on the long-term commitment to practice Lean.

2.3 Previous Studies on LSS

Sokovic et al. (2010)defined DMAICas a data-driven life-cycle approach to Six Sigma projects for process improvement; it is an essential part of a company's Six Sigma program. DMAIC is an acronym for five interconnected phases: define, measure, analyses, improve and control. Identifying, prioritizing and selecting the right project take place in the define phase. Key process characteristics, the scope of parameters and their performances in the measure phase. Analyzing collected data to identify root cause and process determinants in the analyze phase. Changing the process in the improve phase, and sustaining gains in the control phase.

And Antony et al. (2005) confirmed that Six Sigma has evolved into a business strategy in many large organizations with growing importance in SMEs every day. Six Sigma within SMEs is rapidly emerging as the new wave of change in Six Sigma.

Soković et al. (2006) concluded from their application of Six Sigma DMAIC methodology within automotive parts production that there are many achievements including reduced tool expenses by 40 %, reduced costs of poor quality by 55 %, reduced labor's expenses by 59 %, production time reduction by 38 %, and Index cost/volume reduction for 31%.These improvements will give annual benefits of $ 72 000. Expected annual benefits of external clamping system application is $100 000.

Kumaravadivel & Natarajan (2011) used DMAIC to reduce the defects rejection percentage of a flywheel sand casting process. They confirmed that the efficiency and performance level of the sand casting process can be improved by adopting a Six Sigma approach. Enhancing the Job Satisfaction upon Six Sigma Implementation was analyzed. The Tangible results were achieved and defect rejection % level was reduced to 14.78% from 20.65 %

Srinivasan et al. (2014) have applied the DMAIC methodologies in a furnace manufacturing company to reduce the thermal energy in exhaust flue gas which extremely impacts the efficiency of the furnace, DMAIC phases revealed that, the best solution to the shell and tube heat exchanger by increasing heat transfer rate and reducing thermal energy in the waste flue gas through implementation of circular fins over bare tubes. The sigma level was improved from1.34 to 2.01. The monetary savings achieved were about Rs.0.34 million per year.

Khekale (2010) have applied Six Sigma methodology to optimize the variables of cord wastage in Belt Industry. The results obtained are in the form of improvement for cord wastage in DPMO (Previous=549531, Improved= 14908), Sigma level (Previous =1.37, Improved=3.6). It has been found that organization achieved breakthrough in reducing cord wastage due to Six Sigma DMAIC Methodology. Six Sigma was found to be the greatest motivator behind moving everyone in the organization and bringing radical transformation. People in the workplace have developed the required statistical thinking with their involvement in this particular study. Benefits of implementation have been found to be enormous in this case study.

Gijo et al. (2011) reached the following results by implementing Six Sigma methodology to improve the grinding process of an automotive industry. The rejection level of distance pieces after the fine grinding process has been reduced to 1.19% from 16.6%. Once the results were observed, with the help of the finance department, the team carried out a cost–benefit analysis for the project. Due to improvement in the process, cost associated with rejection, repair, scrap, re-inspection and tool came down drastically. The annualized savings resulted from this project were estimated and found to be about US$2.4 million. During the annual appraisal due weighting was given for individuals who actively

participated in the Six Sigma implementation.

On another aspect, Desai & Shrivastava (2008) concluded that Six Sigma provides business leaders and executives with the strategy, methods, tools and techniques to change their organizations. Six Sigma as a powerful business strategy has been well recognized as an imperative for achieving and sustaining operational (process) effectiveness, producing significant savings to the bottom line and thereby achieving organizational excellence. If implemented properly with total commitment & focus, Six Sigma can put industries at the forefront of the global comp

Another case study of DMAIC in an Engine Manufacturing Industry for the purpose of reduction in rework of an engine step bore depth variation has reached the results of reducing the rework to 2.2% from 18%. It made the depth size uniform. Man hours required for rework was brought down to 43 hours per month thus increasing productivity (Dambhare et al., 2013).

Chapter Three

Research Methodology

3.1 Overview

This research targets improving the utilization of space and service quality at Almayar Food Company through the implementation of Lean Six Sigma methodology. The DMAIC phases of LSS were followed to achieve the expected outcomes. Quantitative methods such as cycle time, delay time, lead time, process efficiency, sales reports analysis, and work forms were used and developed in this intervention to validate the achieved improvements. The improvement team conducted meetings during each phase of DMAIC and the team leader arranged several interviews for discussions, data collection, and data analysis.

According to Prashar (2014), DMAIC methodology is used to improve an existing process and is considered as a successful methodology in eliminating defects, improving cycle time, reducing cost, raising customer satisfaction, and increasing profitability in many organizations worldwide. The DMAIC methodology was adopted since it is suitable for the nature of the business of the company, the wide variety of tools which are easy to understand and to implement, and the flexibility of the processes at the company which allows steps elimination or addition.

This study followed DMAIC steps to achieve required improvement assessment, identification, suggested solutions, implementation of suggested solutions and monitor work. The DMAIC phases are presented in figure 3-1:

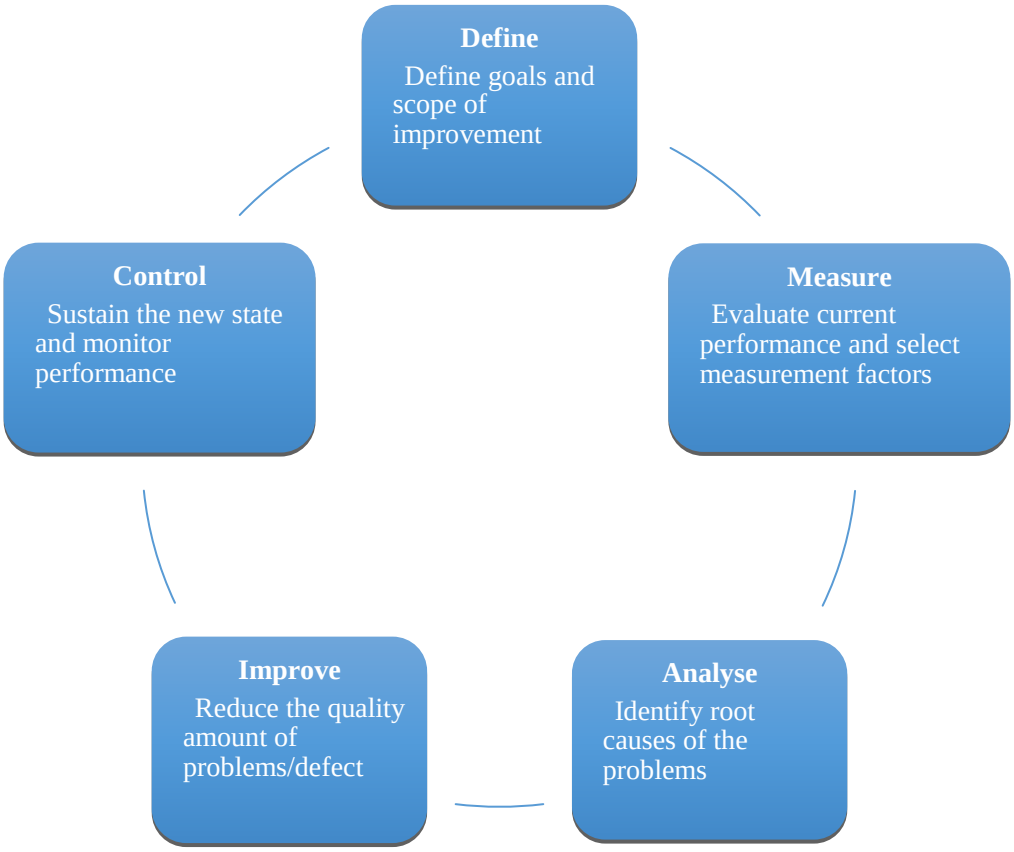


Figure 3-1 DMAIC Cycle

3.2 Activities and the Utilized Tools

Omar and Mustafa (2014) concluded that DMAIC is a powerful tool for reaching consistent level of service in addition to other benefits in service industry such as increased employee morale and improved cross-functional team work.

DMAIC phases were implemented in this research through the following developed activities in each phase:

Define phase:

- Onsite observations and meetings with the management to identify opportunities of improvement and select priorities.
- Develop a problem context diagram to identify the scope of the problems.

- Develop a project charter to define the problem and purpose of the intervention, identify the business case, form the improvement team, identify enablers and barriers, and finally identify the required resources.
- Develop SIPOC table to identify the elements of the process under investigation (supplier, input, process, output, and customer), result measures, estimated results concerns, and finally customer needs were identified through interviews with the customer (drivers).

Measure phase:

- Drawing the current layout of the warehouse and dividing it to zones.
- Analyzing sales report to group products in categories, identify sales of each category, and identify their locations in the developed zones.
- Identifying quality concerns in the current layout.
- Preparing the flow chart of issue purchase order process and identifying the quality concerns in this process.
- Preparing the flow chart of the current status of prepare sales order process, identifying wastes in each step of the process, identifying quick wins, collecting cycle time and delay time for 16 order preparation processes through onsite observations, draw the value steam map of this process, and calculate the process efficiency.
- Draw the current organizational structure and identify roles.

Analyze phase:

- Develop cause and effect diagram to identify potential causes of the problems.
- Develop interrelationship diagram to identify causes of the problems.

Improve phase:

- Develop new organizational structure and job descriptions.

- Draw the layout of the new status of the warehouse.
- Apply 5S to organize the work environment.
- Draw the new flow chart of prepare sales order process.
- Develop sales order collection form.
- Improve the layout of two trucks.
- Develop time attendance form.
- Implement the new flow chart of prepare sales order process, collect data for this process, prepare value stream map, and calculate the new process efficiency to validate the improvement.

Control phase:

- Develop work forms and flow chart to control and monitor performance.
- Develop 5S checklist to ensure conformance to standards and sustain the gained improvements.

Chapter Four
Define Phase

4.1 Overview

In this study, the DMAIC methodology was implemented to improve service quality and utilization of space at Almayar Food Company. The core process of the company is to sell food products to shops and supermarkets through cash vans. The company purchases its products from local importers and manufacturers, receives these products into the stores, sell these products to the drivers who are the sales agents and are considered as the internal customer, and the drivers in turn sell these products on cash bases to local shops and supermarkets.

The purchase process currently includes issuing purchase orders, receiving purchased products, checking products quality, and finishing with sorting these products in the stores. While the current process of selling products to drivers (preparing sales order process) starts with preparing driver's order, write order items on paper, load order items to truck and then issue invoice to driver who will start his distribution duties after loaded the order.

Through several visits to the warehouse and meeting with top management, it was clear that the warehouse layout is not well organized which will delay preparing sales order process.

4.2 Problem Definition

The first phase in the DMAIC methodology is the define phase. It aims to defining the scope and objectives for the six-sigma change initiative. After conducting several meetings with the top management and the improvement team it was agreed that targeted

process for improvement is prepare sales order process which can be achieved through improving layout and service quality in the company.

The improvement team was formed with the support of the sponsor Mr. Ibrahim Abu Moshref, the general manager, the accountant and two drivers. The improvement team discussed the goal of this team formation and prepared the project charter.

The project charter is an important tool in the define phase in order to identify key players, problem definition, project purpose, scope, enablers, barriers and support estimate.

4.3 Project Charter

The project charter presented in Table 4-1 was agreed upon with the top management and the project team to include the following:

1. Project scope: the scope is from issue of the purchase order to loading the sales order to truck.
2. Project Purpose: improving warehouse layout and reducing the cycle time of sales order preparation to enable drivers to reach 60 customers per day.
3. Business Case: unorganized warehouse layout leads to defective products, delayed sales order preparation and ultimately lost sales for internal and external customers.

Table 4-1 Project charter for improving utilization of space at Almayar company

Project Sponsor	General Manager Mr. Ibrahem Abu Moshref
Team Leader	RimaissaHawari
Project Title	Improving service quality and utilization of space at Almayar Food Supplies Company in Ramallah using Lean Six Sigma Methodology
Date	12-7-2018
Issue	1-2018

1. Problem Definition and Purpose:

- Problems: Lack of inventory management system, late deliveries to internal and external customers, delayed sales order preparation process, none utilization of accounting system, lack of organizational structure and work policies.
- Project purpose: improving service quality and utilization of space.
- Improvement measures:
  - Number of reached customers per day
  - Cycle time.
  - Value of defective products.
  - Value of expired products.
  - Value of returned products to suppliers.
- Present performance:
  - Reaching 36 customers per day.
- Goal performance:
  - Reaching 60 customers per day.
- Completion time:
  - 6 months, starting in October, 2018

2. Business Case (Issues to be addressed/process to be improved)

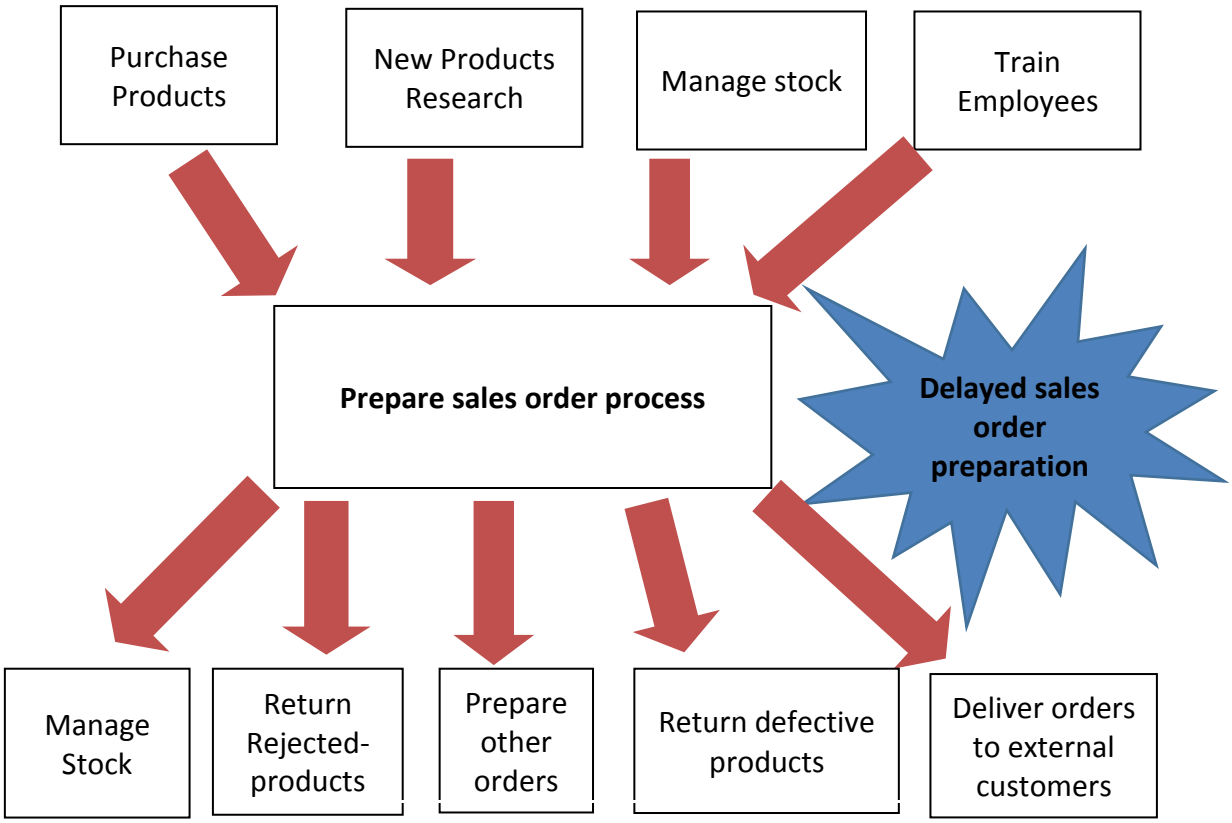
- Customers: delayed sales order preparation therefore lost sales.
- Business: lost sales, damaged products, and expired products.
- Work environment: unorganized products, unutilized space.
- Employees: rework and high motion.
- Key outputs: new layout, organizational structure, new flow charts, work forms.
- Other benefits: improved profitability, gaining new external customers.

<table>
<tr><td colspan="2">Key Players:</td><td>Scope:</td></tr>
<tr><td>Sponsor</td><td>Ibrahem Abu Moshref</td><td rowspan="4">From issuing purchase order process to loading sales order to truck.</td></tr>
<tr><td>Team Leader</td><td>RimaissaHawari</td></tr>
<tr><td>Team Members</td><td>accountant, Store manager, and two drivers.</td></tr>
<tr><td>Other Key People</td><td>remaining drivers</td></tr>
<tr><td colspan="2">Enablers/Risk Mitigation:</td><td>Barriers/Risks:</td></tr>
<tr><td colspan="2">o Free employees for two hours per week to carry out the improvements.
o Frequent meetings between team leader and team members to control progress of the project.
o Staff training.</td><td>1- Resistance to change.
2- Workers literacy.
3- Top management commitment
4- Financial support.</td></tr>
<tr><td colspan="3">Support Estimates</td></tr>
<tr><td colspan="3">1- Accountant software utilization.
2- Shelves.
3- Labels.
4- Computer tablets.</td></tr>
</table>

4.4 Problem Context Diagram

The problem context diagram (PCD) is one of the tools used in the Define phase. It aims to achieve better understanding of problem under study. It introduces the process and problem under investigation in the middle of the diagram, the upstream processes that contribute to the problem and the downstream processes that are affected by the problem. The improvement team prepared the PCD of sales order preparation process as presented in Figure 4-1.

Upstream processes that affect this process



Downstream processes that is affect by this process

Figure 4-1 PCD of Prepare Sales Order Process

The processes that affect the prepare sales order process:

1. The few 20% of upstream processes that contribute mostly to the 80% of the delay in orders preparation:

   - **Manage Stock Process:**
     - The store's layout is not organized according to product's category, sales, quantities, size and weight which results in delaying sales order preparation process.
     - Available forklift is not utilized inside the stores due to low space.
     - Low spaces between shelves hamper movement and accordingly delay sales order preparation.

- Due to low space of store and no labelling, defected and expired products remain near the good ones, and sometimes are prepared and then returned during loading to vehicles or delivery to external customers, which will cause loading delay and rework in addition to financial loss.
- Products are regularly purchased with large quantities and are not organized according to sales or categories which will lead to lower space and hamper worker's movement and delay sales order preparation.
- Many products of same category are given one name due to same price; therefore, stock cannot be managed by any system easily and workers cannot find the required product easily which will lead to long sales order preparation time.
- Unlabeled shelves lead to unorganized products storing and brands are not sorted together which will lead to long time for workers for searching for products to be prepared, in addition to products left on shelves unseen and expire.
- Store layout hamper worker's movement and causes time loss in sorting incoming products and preparing sales orders.

2. The few 20% of downstream processes are mostly impacted by the late order preparation are:

- **Deliver orders process:**
  - Delayed sales order preparation will lead to delayed deliveries to customers.
  - Delayed deliveries will lead to delayed return to stores and accordingly delayed preparation of next order.
  - Delayed orders delivery will result in lost sales.

- Lost sales will result in excess stock, low space and expired/damaged products.

- **Manage Customer Complaint Process:**
  - Delayed delivery due to delayed sales order preparation will cause lost sales opportunities for the customer and thus customer dissatisfaction which will result in more complaint to be managed.
  - Delayed delivery due to delayed sales order preparation will result in losing customers and company reputation which will negatively affect customer retention.

3. Benefits to the business if the problem is solved:

- **Hard benefits:**
  - Delay in sales order preparation of last year resulted in reaching only 36 customers per day which resulted in approximately 62500 NIS financial losses including rework, damaged products, expired products, losing customers, and lost sales opportunities. Reducing the delay in order preparation will result in reaching 60 customers per day and ultimately increase sales opportunities.

- **Soft benefits:**
  - Increase customer satisfaction and thus improve customer retention.
  - Improve employee's satisfaction.
  - Improve company's reputation and thus increase market share.

4.5 SIPOC

SIPOC is the acronym for (Supplier, Input, Process, Output, Customer). Suppliers are those who supply goods or services. Inputs are resources such as people, raw material, information and finance that are put into a system to obtain a desired output. Process

converts inputs into outputs. Finally, it reaches to the customers of the supply chain. In the study SIPOC diagram is constructed to identify the real problems in the manufacturing process, internal or external customers, their requirement for the product as well as input, and outputs of the process. (Mishra & Kumar, 2014)

The improvement team interviewed workers involved in warehouse layout management and preparing sales order process and prepared the SIPOC in Table 4-2. The SIPOC diagram presents the high-level process steps, supplier, input, process under study, output of this process, customer, process measures of each step, present data, goal performance, sources of variation and impact on performance. The improvement team gained better understanding of the processes and was able to identify customer needs, result measures and estimated results concerns as follows:

- Internal Customer needs: on time sales order preparation, intact products, right products in the right place, and right quantities.
- Result measures: number of reached external customers per day, value of expired products and value of damaged products.
- Estimated result concerns: late sales order preparation resulted in reaching only 36 customers per day, 11% of loaded products returned by drivers, 1% of products are damaged in warehouse, 1% of products expire on shelves, and 1% of loaded products damaged in trucks which is estimated by 36000 NIS losses with current stock of around 1200000 NIS.

Table 4-2 Prepare order SIPOC

Key Business Process Name: Prepare Order				
Suppliers	**Input**	**Process**	**Output**	**Customers**
Wholesalers Local importers Local manufacturers	Trucks products driver information	**Process Purpose:** prepare right products on time. **Process Owner:** drivers (sales agent)	Sales order preparation Invoice hand over to drivers	Drivers of Almayar Food supplies Company

Process Steps (High Level)	Issue purchase order →	Receive purchased products →	Sort purchased products in place →	Prepare driver's order on floor →	Load driver's order to truck	**Results Measures** -Number or reached external customers per day -Value of damaged products -Value of expired products	**Customer Needs** - on time preparation - Intact products - Right products - Right quantities
Process Measures	- order quantities - ordering time	- right product - right quantities - right time	- Sorting time - damaged products	Accuracy of products count	- Loading time - Damaged products - Safe loading		
Present Data	- None	- None	- None	- None	-Driver's invoices		
Goal Performance	- on time ordering - ordering right products - ordering right quantities	- 100% accurate receiving of right products and right quantities. - 100% of received products are intact.	-100% safe sorting in right place	100% accurate preparation of needed items	- 100% of products are loaded intact. - Loading within targeted time. - No accidents	**Estimated Results Concerns** - Delayed sales order preparation resulted in reaching only 36 external customers per day. - 11% of loaded products are returned by drivers - 1 % of products are damaged in warehouse - 1% of products expires on shelves - 1% of loaded products damaged in trucks.	**Date** 20-10-2018
Sources of Variation & Waste	Quantities are identified according to: - Driver's memory - Driver's experience - Store manager and general experience.	- worker's experience - packaging method	- worker's experience - unlabelled shelves	- # of products per order - # of available workers - Distance between products - Weight and size of products -Distance between shelves	- Weather condition - # of products per order - Available floor space - Truck box layout - Distance between products - Weight and size of products		**Version** 2018.1.1
Impact on Performance	- excess inventory and low space that hamper movement and cause high motion.	- expired products - Damaged products	- low space - delay order's preparation	Delay checking prepared products before loading to trucks and accordingly delay loading to trucks	Delay loading to truck and ultimately delivery to external customers		

4.6 Summary

In the define phase the improvement team was formed and it gained better understanding of the problems under investigation, were able to identify priorities for improvement, scope of the problem, key elements of the problem, customer needs, and the project charter was prepared and signed accordingly. It was agreed with the top management that priorities for improvement are the warehouse layout, stock management, and prepare sales order process.

Chapter Five
Measure Phase

5.1 Overview

Measurement is at the heart of the improvement effort to understand the current situation of the process under investigation which is preparing sales order process and warehouse layout. Data will help in identifying what is really happening, establish baseline performance, identifying and understanding variation, and measuring the impact of changes to the processes. This will help identify areas of improvement through using the following tools: Flow Chart, Eight Wastes, Quick Wins, and VSM. While control chart is excluded due to high variation in these processes with regard to number of products, size of products, and weight of products.

The improvement team conducted several meetings to understand current situation of processes and the interaction between them. The team intervention for improvement include the layout, stock management and prepare sales orders process. It was agreed to divide the measurement phase into four steps:

1- Studying the work environment by preparing the drawing of the current layout of the warehouse in order to identify current space utilization, products allocation on pallets, shelves or floors, the result concerns in the current layout, areas where defects or problems occur, and improvement opportunities. The drawings were prepared using AutoCAD software.

2- Study inventory management process to understand current status, present wastes, areas where defects or problems occur, and improvement opportunities.

3- Preparing flow chart for prepare sales order process, collection of cycle time for each process step, delay in these steps, existing wastes, possible quick wins, value added activities, process efficiency, and improvement opportunities.

4- Preparing value stream mapping for prepare sales order process to obtain better understanding of process steps, where the value is added and where it is not, workflow and information flow and most importantly how to improve

5- Drawing the organizational structure to understand current situation, areas of problems and possible improvements.

5.2 Warehouse Layout

Warehouse layout was drawn using AutoCAD software. The total area is around 400 square meters.

Warehouse layout is to be studied for the purpose of space utilization where products assortment should allow minimum motion for order preparation process. Products should be sorted in safe manner, visible to workers, ease of ability to check stock and expiry dates. Sales of products should be taken into consideration in order to keep highest sales products as near as possible to the loading area to minimize cycle time and reduce defects percentage.

After drawing the warehouse layout presented in Figure 5-1 the improvement team agreed to divide the total area to zones in order to gain better visualization of products assortment. Each zone will be zoomed and products categories will be identified in each zone. Six zones were drawn as presented later in this part.

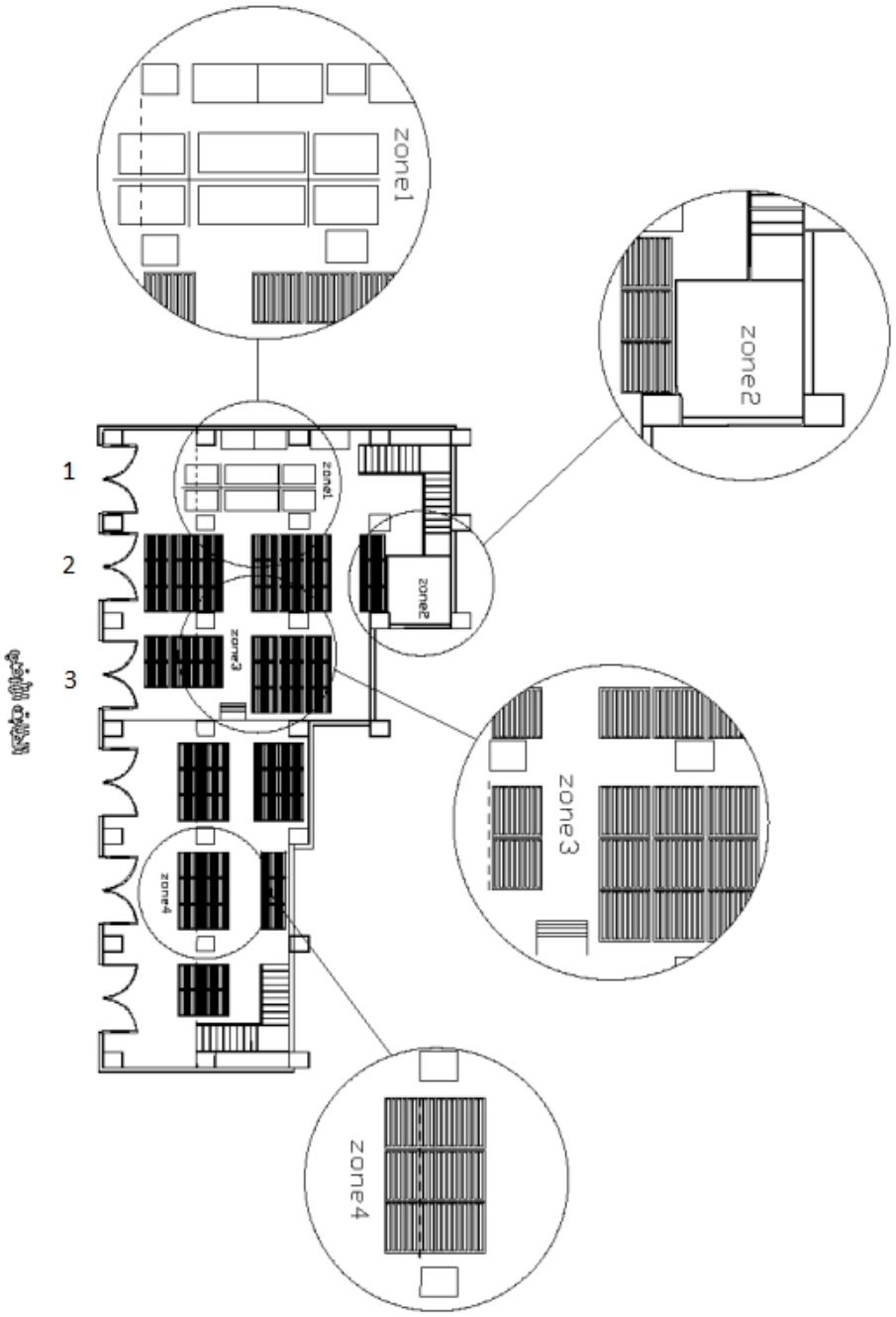


Figure 5-1 Old Warehouse Layout

The total area of the first floor and the upper internal floor were divided into six zones to provide clear description of the goods distribution at the current status of the warehouse layout, where:

- Zone one: Area with all the shelves and lies toward loading area one

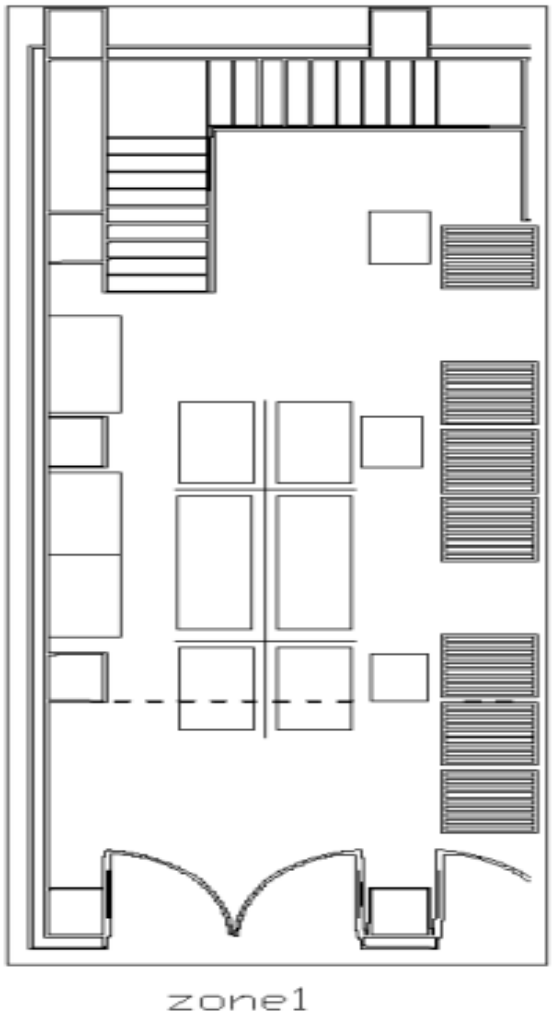


Figure 5-2 Zone One

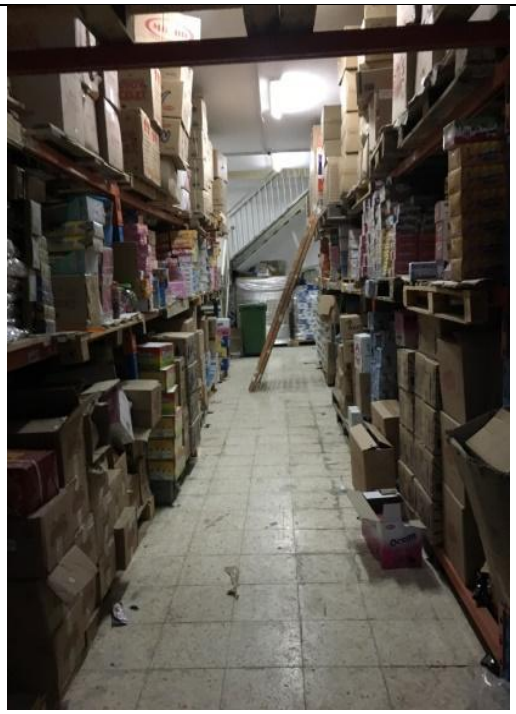


Figure 5-3 Unsorted Zone One

- Zone two: area with no shelves or pallets

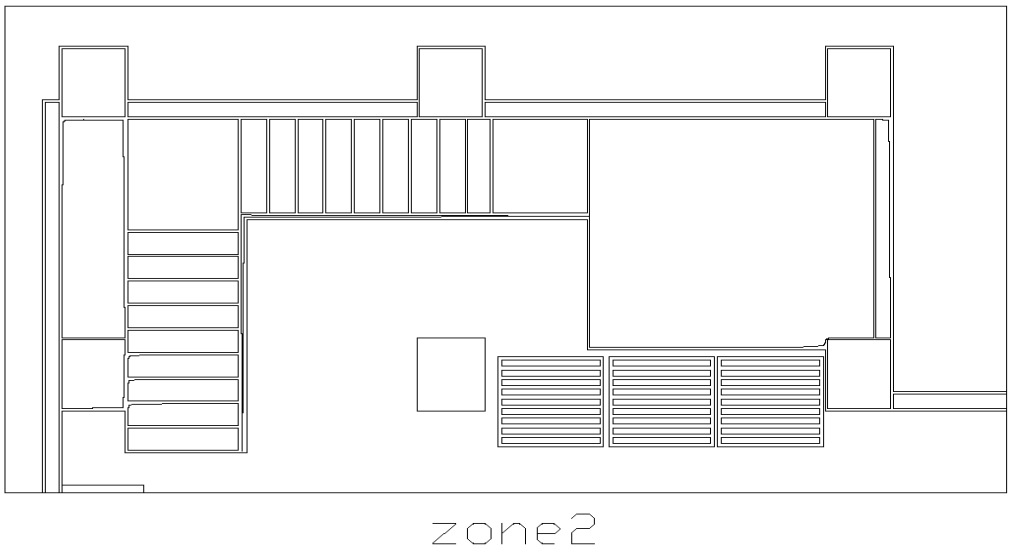


Figure 5-4 Zone Two

Figure 5-5 Unsorted Zone Two

- Zone three: area with goods on floor and lies toward loading area two

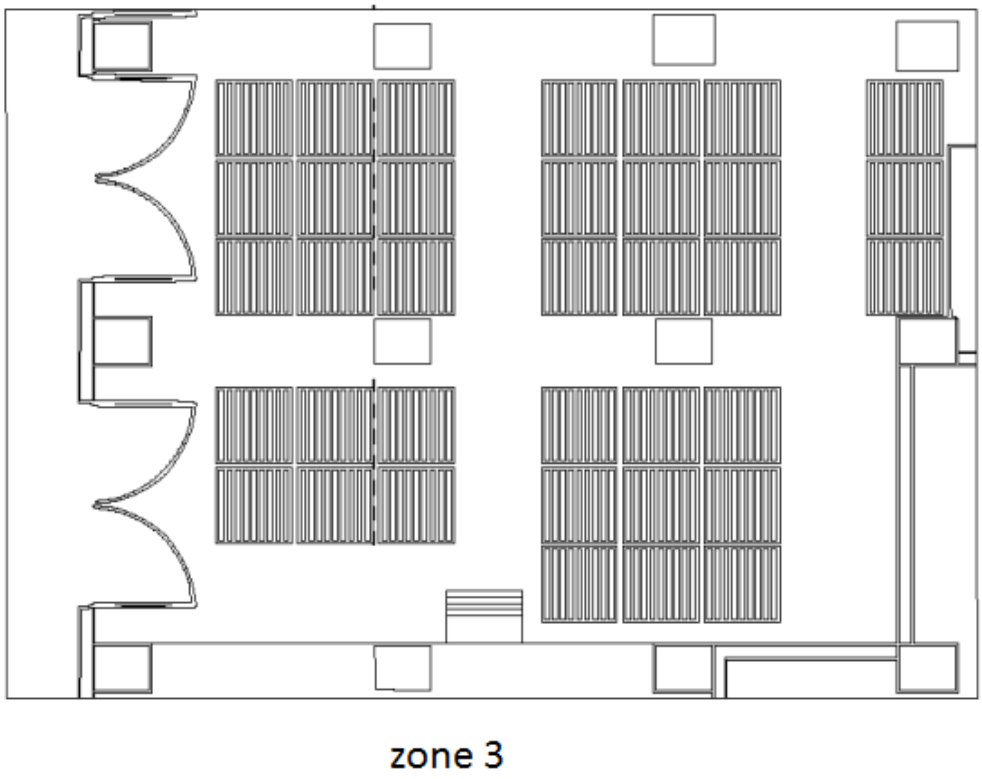


Figure 5-6 Zone Three

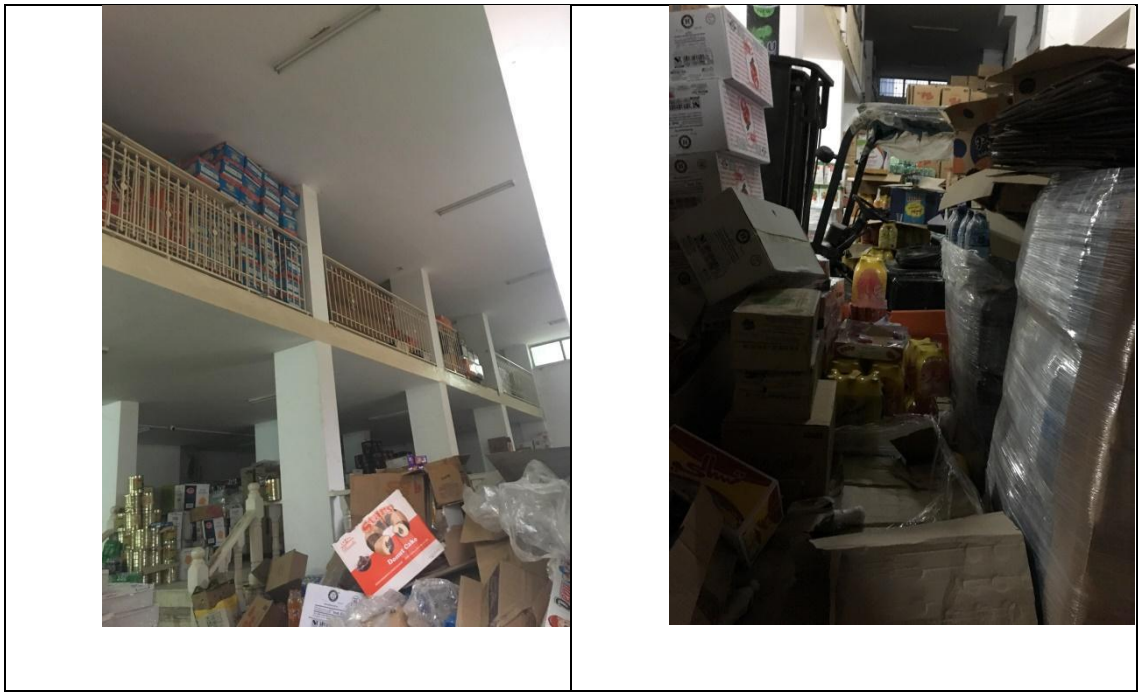


Figure 5-7 Unsorted Zone Three

- Zone four: Area with pallets and heavy goods on floor

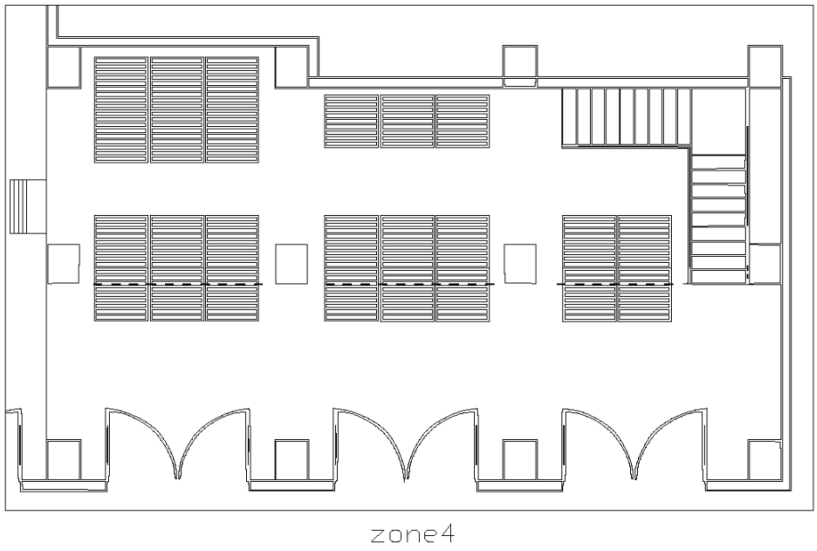


Figure 5-8 Zone Four

Figure 5-9 Unsorted Zone Four

- Zone five: Area with goods on floor, mostly damaged and blocking stairs

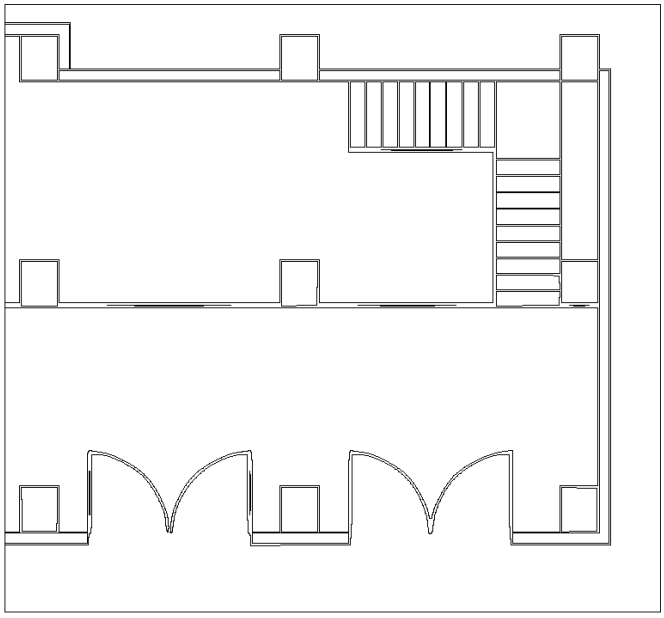


Figure 5-10 Zone Five

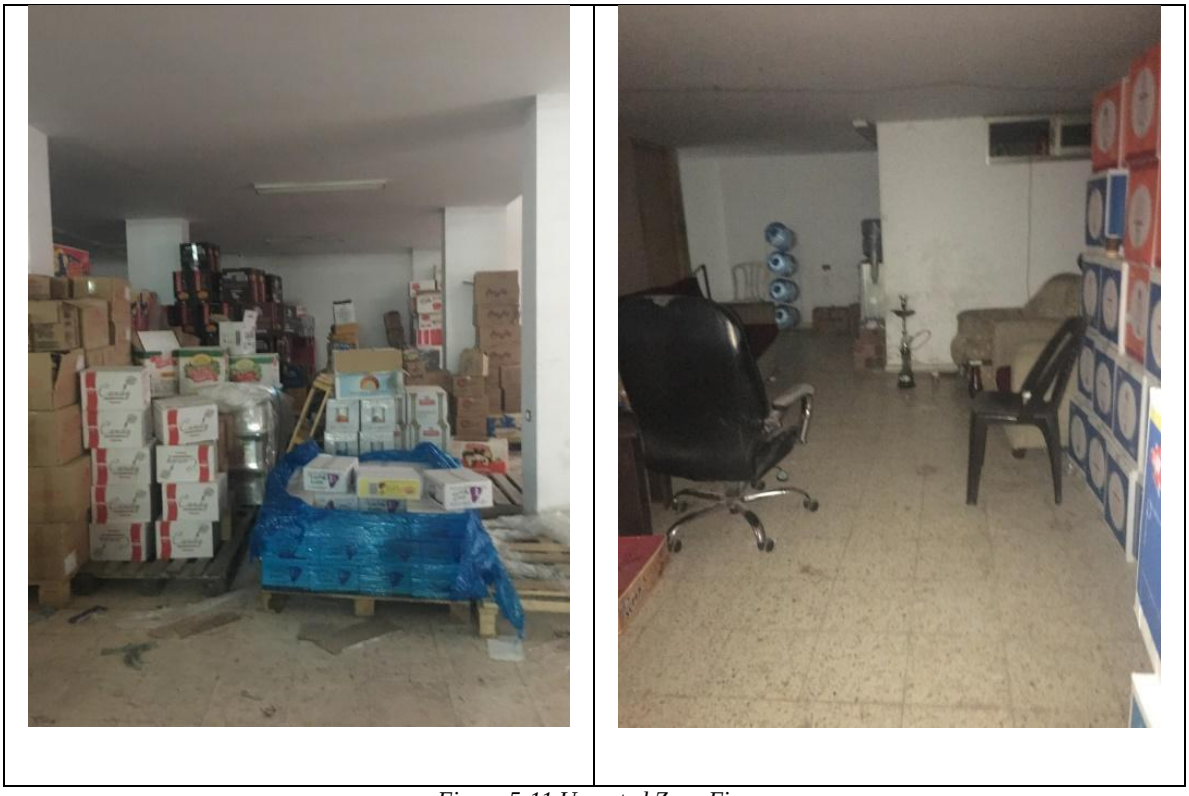


Figure 5-11 Unsorted Zone Five

- Zone six: Area of upper internal floor

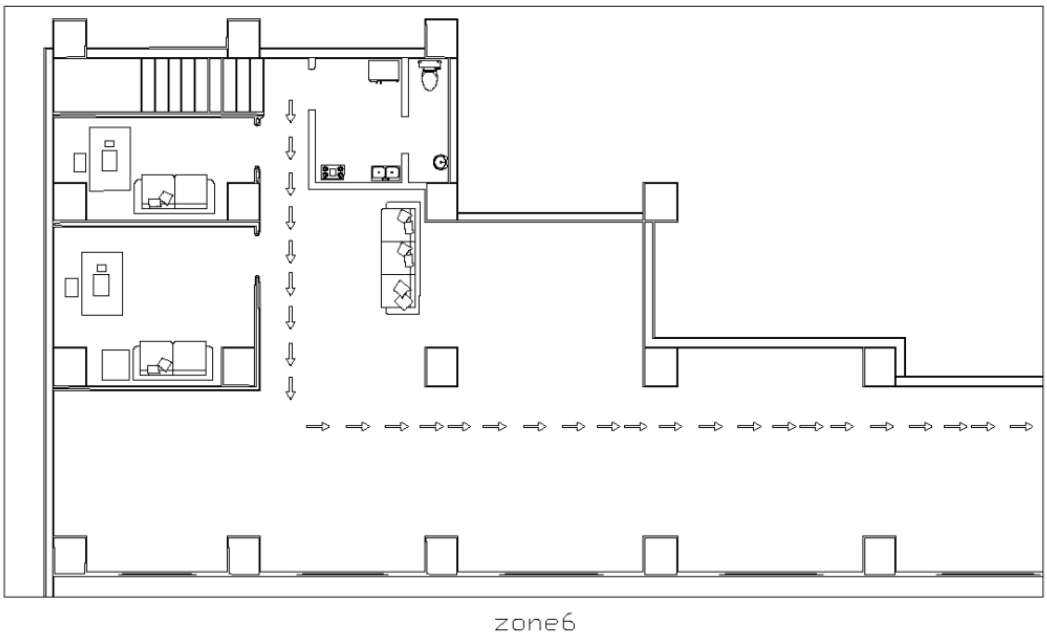


Figure 5-12 Zone Six

Figure 5-13 Unsorted Zone Six

The company unloads purchased products and prepares sales orders at the outside floor in front of doors 1, 2 & 3 as shown in Figure 5-14 where orders are prepared on the floor and then loaded to trucks. While in the winter, the orders are prepared at the inside floor of the doors, trucks park at the door exactly to avoid goods getting wet from rain then products are loaded to trucks.

Below are some photos of loading.

Figure 5-14 Unsorted Loading Area

5.3 Product's Distribution in Zones

The improvement team studied the current status of product's distribution in the zones. The team agreed to categorize similar products into groups, total sales of each group during 2018 are summed, & group location in zones is identified as shown in Table 5-1 below:

Table 5-1 Sales Summary (2018)

#	Zone #	Annual Sales(NIS)	of# Products	Products Category
1	1,3	2475980	7	Drinks
2	4,5,6	2139606	18	Chips and Tortillas
3	1,3,4	1388940	45	Wafers
4	1	1225493	32	Chocolate Bars
5	1	1048184	22	Cake
6	1	586681	7	Confectionary
7	4,5,6	577789	8	Bambinos
8	1	387112	4	Peanuts
9	1	188912	3	Nuts
10	1	152262	2	Pringles
11	2	64088	5	Pickles
12	3	54958	3	Stick Crackers
13	2	35902	1	Indomie
14	1	30107	2	Gum
15	2,4	29116	2	Bottled Mineral Water
16	1	22306	2	Jellies
17	1	17548	2	Chocolate Boxes
18	5,6	15935	1	Oil
19	1	12960	1	Lollipop
20	5,6	10085	1	Toilet Paper

- Number of products grouped in above table is 168 products; this number is not fixed due to new products and also seasonal products.
- Number of products excluded from above table due to low annual sales and low turnover is 231 products, this number is not fixed due to new products and also seasonal products.
- Number or products labeled with same name due to same selling price cannot be identified due to unavailable data.

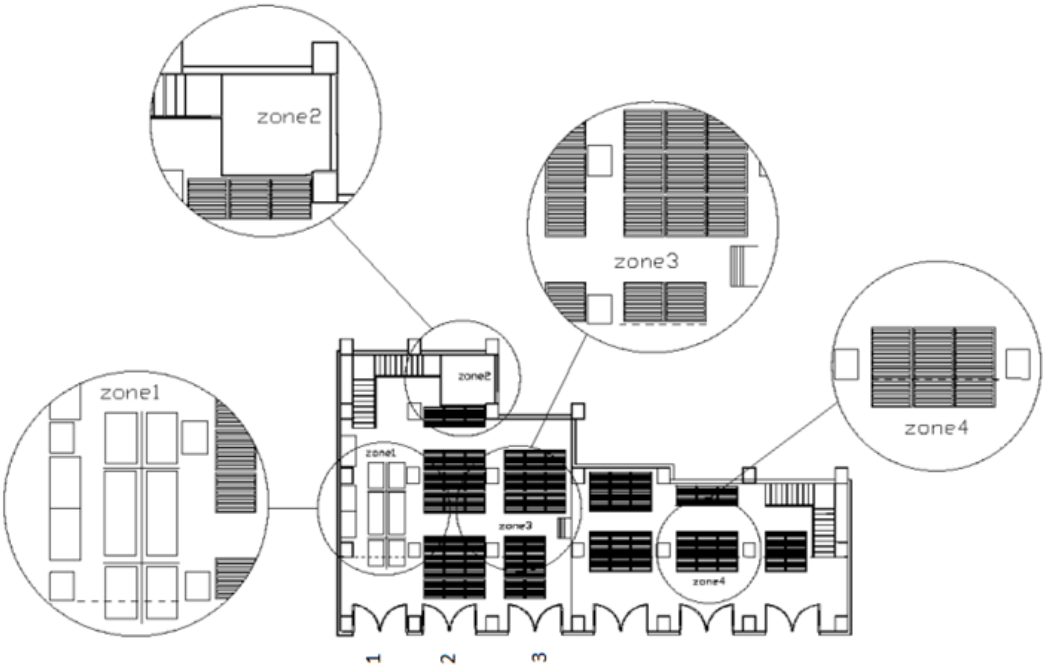


Figure 5- 15 Old Warehouse Layout

Zones one to four are located in the ground floor and zones five and six are located in the internal upper floor.

- Zone one contains twelve different groups of products.
- Zone two contains three different groups of products.
- Zone three contains three different groups of products.
- Zone four contains four different groups of products.
- Zone fine contains four different groups of products.

- Zone six contains four different groups of products.

5.4 Layout Quality Concerns

According to accounting records in 2018 and the current layout, the following quality concerns are concluded:

- Products are distributed without any grouping according to categories or even sales which cause high motion, long waiting and long cycle time for prepare order process.
- The current layout does not allow the company to use the forklift inside the warehouse which is considered as bad utilization of resources. It is only used to unload pallets of products when receiving purchase orders from suppliers and moving these pallets at the doors of the warehouse to be sorted inside.
- Spaces between shelves are low and unsorted products on floor between shelves hamper's workers movement and cause high motion and delay in addition to delaying sorting and order preparation.
- There is no labeling for the shelves or zones.
- There is no specified area for defective products.
- Accumulation of products on floor and unorganized sorting on shelves lead to unseen products that will expires without being noticed.
- Some products are consumed by workers without permission and left in its place.
- The value of returns to suppliers is around 82500 NIS.
- The value of defective products is 11450 NIS.
- The value of expired products is 6740 NIS.
- The financial loss in selling products on discount due to bad stock management which resulted in products with small period of shelf life left is around 14300 NIS.

- The value of customer returns cannot be identified due to absence of data since the accounting system does not include customer's sales record where sales are recorded under the name of the drivers.
- The stock value during the year is from 1200000 to 1500000 NIS and the stock value of low sales products is from 47000 to 53000 NIS.

5.5 Inventory Management

The basic financial inventory management aim is to hold the inventory to a minimally acceptable level in relation to its costs. Holding inventory means using capital to finance inventory and links with inventory storage, insurance, transport, obsolescence, wasting and spoilage costs. However, maintaining a low inventory level can, in turn, lead to other problems with regard to meeting supply demands. (Michalski, 2008)

In order to understand the current status of the inventory management at the company, the improvement team conducted a meeting and prepared the flow chart for the "prepare purchase order process|" in order to track the products from ordering point and until being sorted in store. The flow chart is presented in Figure 5-16 below.

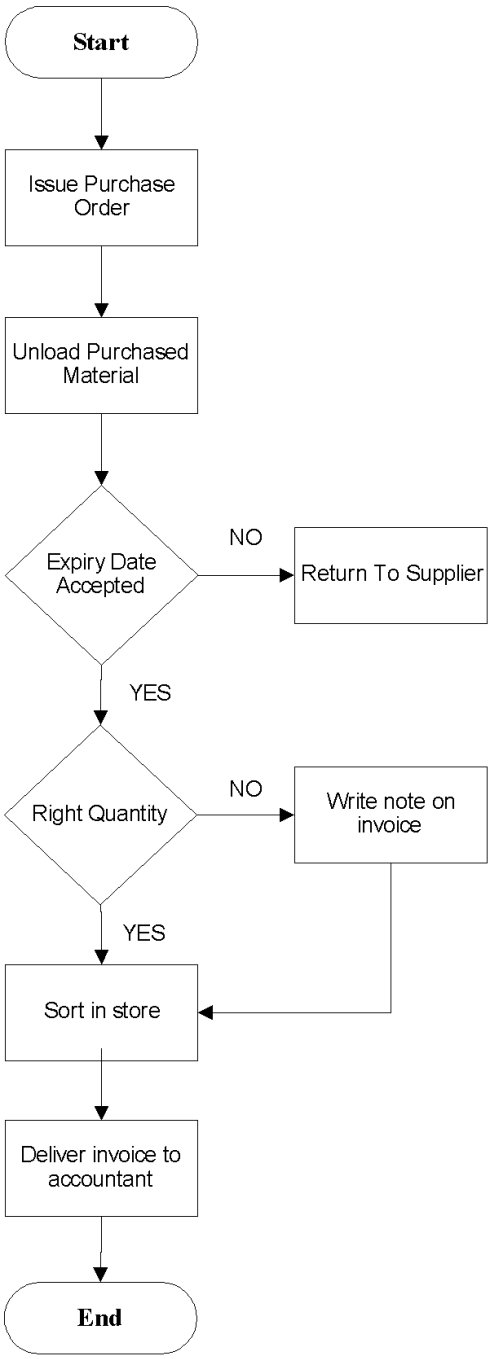


Figure 5-16 Issue Purchase Order Flow Chart

After preparing the flow chart and walking through the whole process the improvement team agreed about the following quality concerns presented in Table 5-2.

Table 5-2 Quality Concerns

Process Step	Current Performance	Quality Concerns
Issue Purchase Request	quantity is determined upon experience of store manager or drivers	- Sales are not taken into consideration and extra stock or low stock may result in this step - No regular check for stock
Unload Purchased Products	Products are unloaded at the floor in front of doors 1,2, and 3	- Early arrival of supplier during preparing sales order will delay sales order preparation
Right Quantity Check	If quantity is higher or lower a note is written on the invoice	- Higher quantity is accepted which will result in excess inventory and affect space utilization - Delayed quantity checking if order is received during sales order preparation or delayed sales order preparation.
Sort in Stores	Products are sorted near similar products or beside it if no space is available	- Available stock is not moved to the front and it will be covered by new products which may lead to obsolescence and expiration on shelves. - Products are sorted on floor in case of low space and it will hamper movement and may be damaged. - no labels for shelves or storage areas
Deliver invoice to accountant	Accountant register order in the accounting system	- Expiration date is not inserted in the system and can only be tracked manually. - Some of products of same category and same selling price are given same name and as a result stock cannot be checked.

5.6 Prepare Sales Order Process

In this part the improvement team studied preparing the sales order process. The process owner is the driver who also handles sales to external customer. Sales process is on cash basis where driver prepares his orders on floor in front of warehouse doors, after the preparation is finished the store manager, the accountant, or the general manager will write order items on paper, then the driver loads the items to the truck and the final step is the preparation of the invoice by the accountant. The invoice is recorded in the accounting system under the name of the driver who is the internal customer and after sales to external customers the driver collects dues and delivers it to the accountant next day morning and start preparing his order and the process is repeated. The flow chart of the current status is presented in Figure 5-17 below:

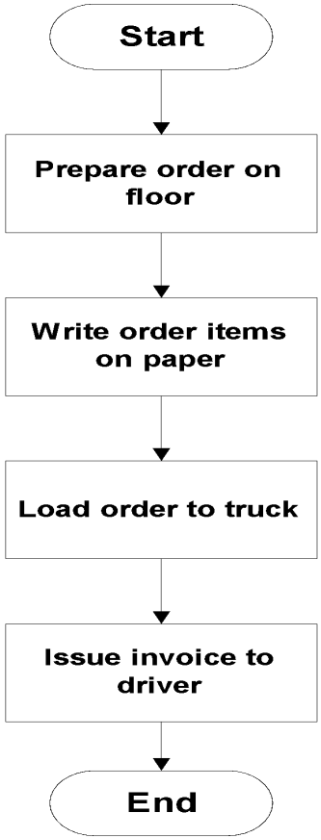


Figure 5- 17 Current Sales Order Flow Chart

From the flow chart it was found out that:

- Non value added steps exist in the process
- Driver prepares order according to his memory and experience without writing down customer demand.
- Drivers start order preparation late.

The improvement team analyzed the process steps in order to identify waste in each step and possible quick wins.

Table 5-3 presents each process step and the existing waste where wastes are categorized to defects, overproduction, non-utilized talent, transportation, inventory, motion, and excessive processing.

Table 5-3 Eight Wastes of Prepare Sales Order

Waste / Process Step	**Defects**	**Over Production**	**Waiting**	**Non-Utilized Talent**	**Transportation**	**Inventory**	**Motion**	**Excessive Processing**
Prepare order items on floor	×						×	
Write order items on paper	×		×	×				
Load order to truck	×							×
Issue invoice	×		×					

a. Prepare Order on the Floor:

- defects occur because of preparing orders on the floor without pallets, carrying products in unorganized area, and during loading to trucks
- high motion in searching for products on shelves or floor

b. Write Order Items on Paper:

- defects (error) take place in counting items due to unorganized preparation
- driver wait until someone writes the items on paper and then start loading to truck
- unnecessary step since order items will be recorded on invoice manually

c. Load Order to Truck:

- Defects take place during loading due to unorganized preparation and unorganized truck.
- Excessive processing due to unloading some items from truck and reloading again due to unorganized truck.
- No supervision on the driver during loading to truck.

d. Issue Invoice to Driver:

- Defects take place due to error in items counting and when drivers add other items after writing items on paper.
- Driver waits until invoice is issued to drive to customers due to busy accountant with other invoices or duties.

After identifying the wastes, the improvement team agreed on quick wins criteria where it should be reversible, within two days, cost does not exceed 500 NIS and within team authority. The team agreed to eliminate the step of writing order items on paper since it

fulfills the criteria and it is unnecessary step where order items are recorded manually on invoice.

The team agreed that the step of issuing invoice manually to driver will be done in parallel with loading order to truck to save time and prevent possibility of adding other items to order without being recorded.

5.7 Value Stream Mapping

Value stream mapping gathers the tools and methodology to look at an entire process – including back office support – and identify which areas, if improved, would offer the most benefit to the entire system. (Lummus et al., 2006)

The improvement team collected critical to schedule metrics for this process, cycle time and delay in each process step is collected and documents using data collection sheet presented in Appendix A Data was recorded for 16 orders preparation for different drivers to identify areas of problems, were defects occur and possible improvements. Collected data is summarized in Table 5-4 below.

Table 5-4 Prepare Order Process Times

Process Step	**Cycle Time (Minute)**	**Delay Time (Minute)**	**Lead Time (Minute)**
Prepare order on floor	56	32	88
Write order items on paper	13	10	23
Load order to truck	24	11	35
Issue invoice to driver	17	12	29
Total	**110**	**65**	**175**

After collecting cycle times and delay times, process flow and information flow are presented in the Value Stream Mapping (VSM) tool for current status in Figure 5-18 below:

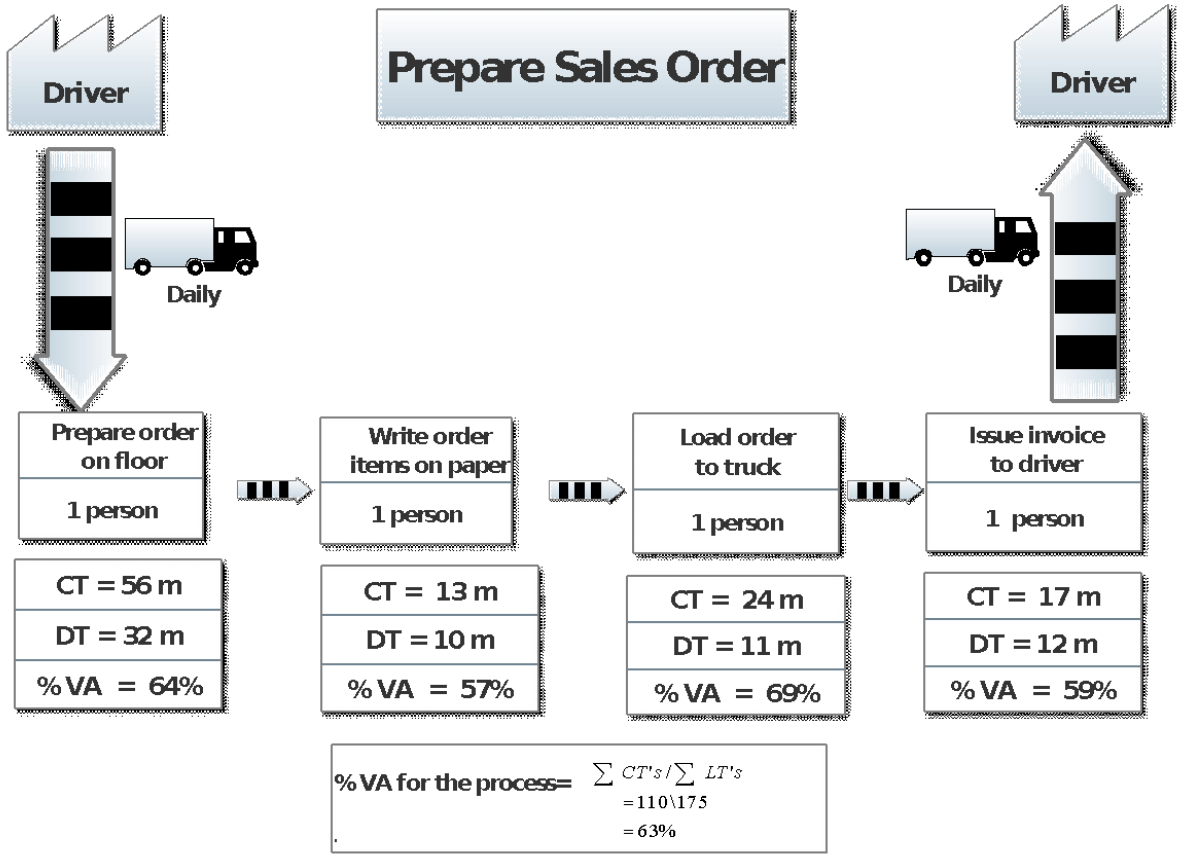
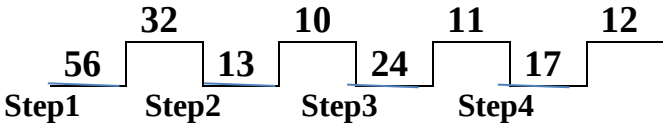


Figure 5-18 Old Value Stream Mapping for Prepare Sales Order Process

Process steps are categorized for value added (VA), none-value added (NVA), and none-value added but required (NVAR). The percentage value added for each process step is calculated by diving cycle time by lead time, where lead time is the sum of cycle time and delay time of each process step.



The lower numbers are cycle times and the upper numbers are delay times.

- % VA of prepare order on floor = 56/88 = 64%
- % VA of write order items on paper = 13/23 = 57%
- % VA of load order to truck = 24/35 = 69%
- % VA of issue invoice to driver = 17/29 = 59%

While Process efficiency is calculated by dividing summation of cycle times by summation lead times and is represented below:

- % VA for Prepare Sales order process = $\sum CT's / \sum LT's$

$$= 110/175$$

$$= 63\%$$

- Some data are not available such as products to be prepared for each driver and products available in truck unsold.
- Products in truck are not sorted.

5.8 Organizational Structure

The current organizational structure is shown in Figure 5-19 below:

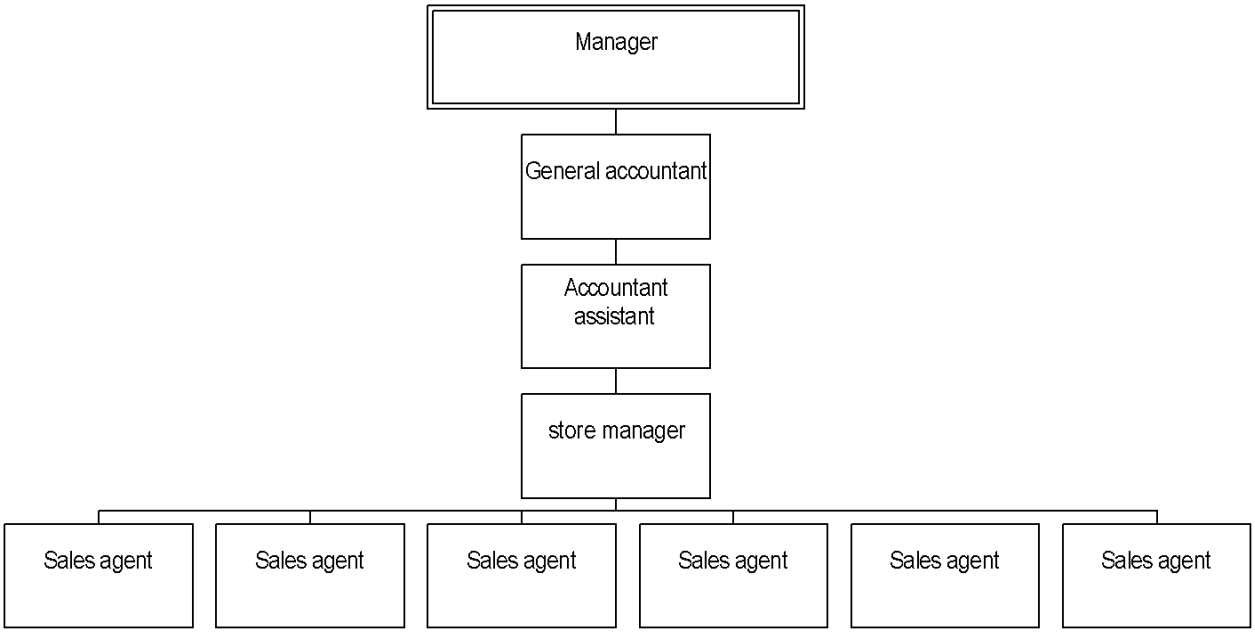


Figure 5-19 Organizational Structure Current Status

- There are no job descriptions for any of the above posts and there are no clear assigned duties and responsibilities.
- The manager is a business partner and does not work in the stores at regular basis.
- The store manager is a business partner who runs the stores.
- The general account is a business partner who runs the accounting duties.
- The account assistant helps the accountant in performing some accounting duties.
- The store supervisor is responsible for receiving and sorting incoming goods with help of drivers, accountant, and accountant assistant when available, follow up of orders preparation and delivery to drivers, and receiving returned goods.
- Driver is the Sales Agent who is responsible for preparing and loading orders to trucks, deliveries to customers, collecting dues from customers, and delivering dues to accountant.

5.9 Summary

At the end of the measure phase the improvement team gained better understanding of the current performance in the layout, stock management, and preparing sales order process. The team was able to identify quality concerns in these areas which can be summarized as follows:

- No grouping of products according to categories or sales.
- Low spaces between shelves.
- No specified area for defective and expired products.
- No regular check for stock.
- Quantities of purchased products are estimated according to experience without referring to sales reports.
- Poor organizational structure and lack of job description.
- Low process efficiency of prepare sales order process.

Chapter Six

Analyze Phase

6.1 Overview

This is the third phase of DMAIC in which the collected data are analyzed and the causes of problems are discovered (Kapur & Feng, 2005). Through brain storming session, the improvement team studied the current situation of the processes to identify the root cause and agreed to divide the phase into the following steps:

1- Creating cause and effect diagram to identify possible causes of late sales order preparation.
2- Identifying root causes of late sale order preparation through interrelationship diagram.
3- Identifying root causes for the problems in the current layout.

6.2 Cause & Effect Diagram

The fishbone diagram is an analysis tool that provides a systematic way of looking at effects and the causes that create or contribute to those effects. Because of the function of the fishbone diagram, it may be referred to as a cause-and-effect diagram (Arvanitoyannis &Varzakas, 2007).

After understanding the preparing sales order process at Al-Mayar Food Company, the project team conducted brainstorming session and created a cause and effect diagram. As shown in Figure 6-1, the standard major categories used in the service industry are the four Ps: policies, procedures, people, and plant. (Simon, 2010).

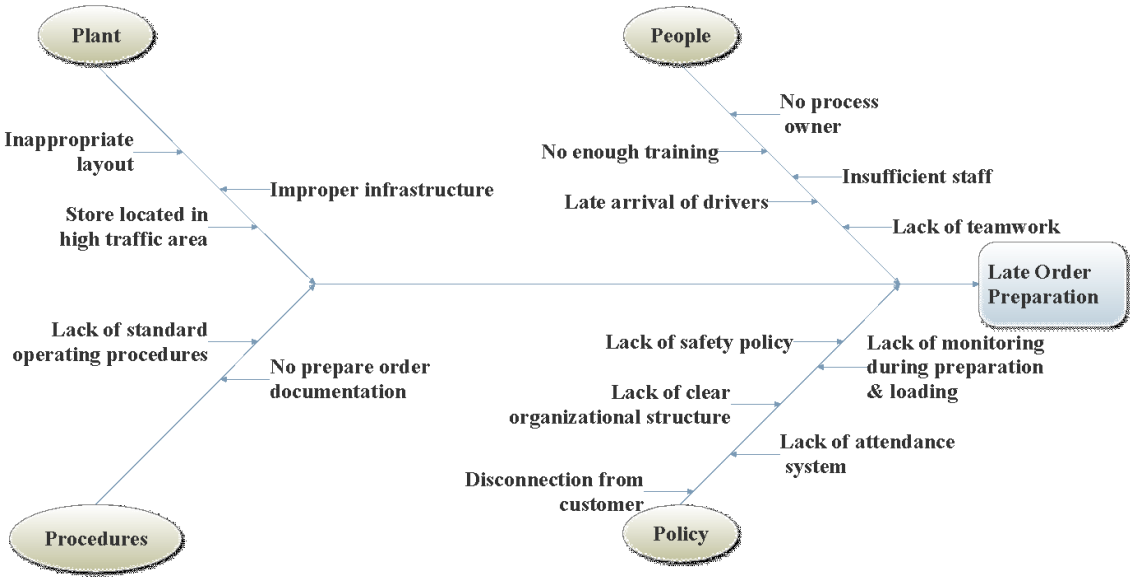


Figure 6- 1 Cause & Effect Diagram for the Late Order Preparation Process

6.3 Interrelationship Diagram

The relations diagram was designed to clarify the intertwined causal relationships of a complex problem in order to identify an appropriate solution. Interrelationship diagram takes complex, multivariable problems and explores and displays all of the interrelated factors involved. It graphically shows the logical (and often causal) relationships between factors". (Doggett, 2005)

The improvement team prepared the interrelationship diagram presented in Figure 6-2 Arrows represents cause\effect relationship between factors. The relationship between each factor and all other factors are checked, if there is a causal relationship from this factor to other factor the arrow is drawn and so on until all factors are done.

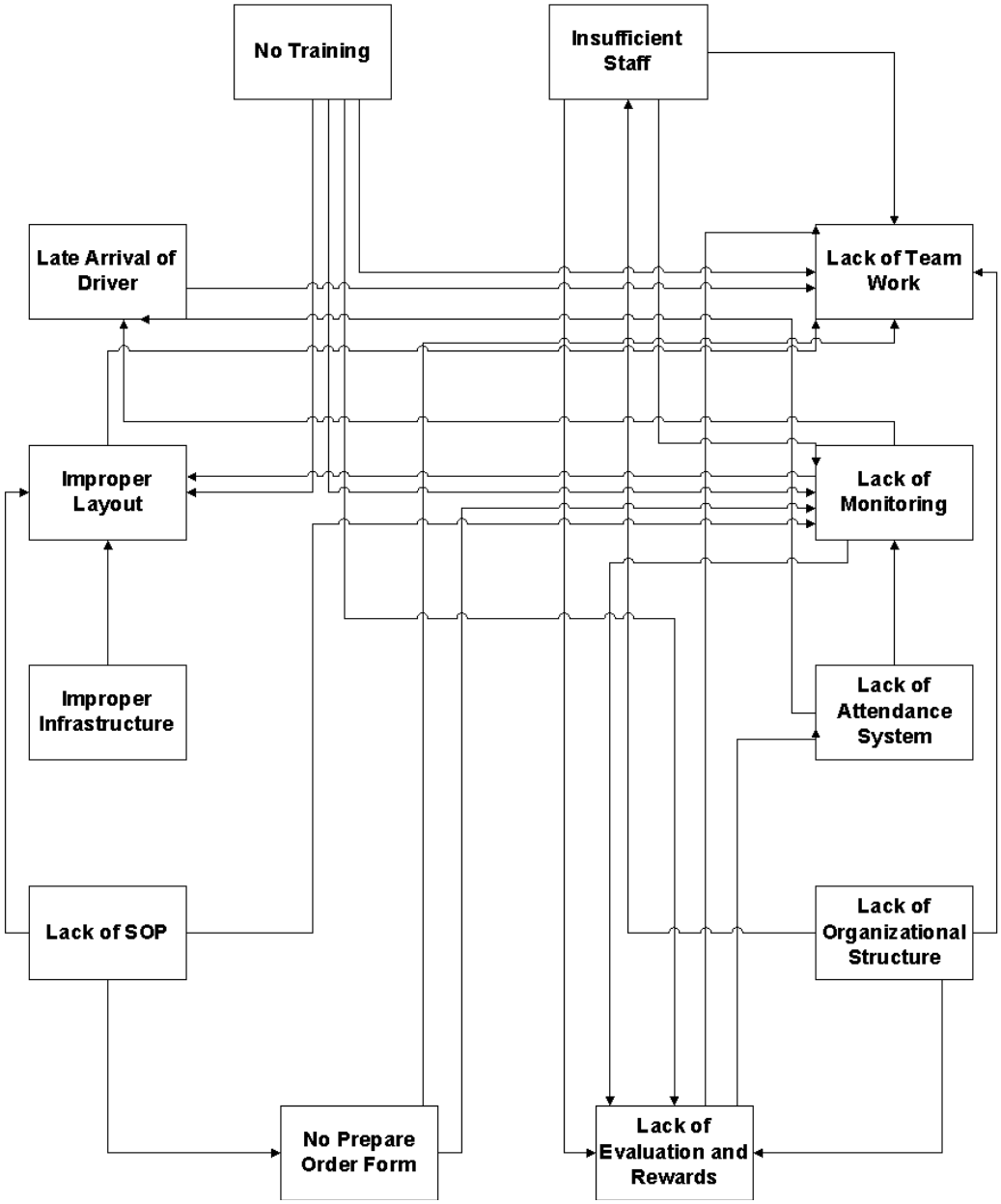


Figure 6- 2 Interrelationship Diagram

The number of incoming arrows and outgoing arrows for each factor was counted and presented in Table 6-1 factor with zero outgoing arrows is considered as an effect, factor with zero incoming arrows is considered as cause, factor with higher number of outgoing arrows is a cause more than an effect, and factor with higher number of incoming arrows is an effect more than a cause.

Table 6-1 Interrelationship Table

Factor	# of outgoing arrows	# of incoming arrows	Outgoing - Incoming	Conclusion
No Training	4	0	4	Cause
Insufficient Staff	3	1	3	Cause
Lack of team work	0	7	-7	Effect
Lack of monitoring	2	5	-3	Effect
Lack of attendance system	2	1	1	Cause
Lack of organizational structure	3	0	3	Cause
Lack of evaluation and rewards	2	4	-2	Effect
No prepare order form	2	1	1	Cause
Lack of SOP	3	0	3	Cause
Improper infrastructure	1	0	1	Cause
Improper layout	1	4	-3	Effect
Late arrival of driver	1	2	-1	Effect

Results of table 6-1 are summarized in figure 6-3.

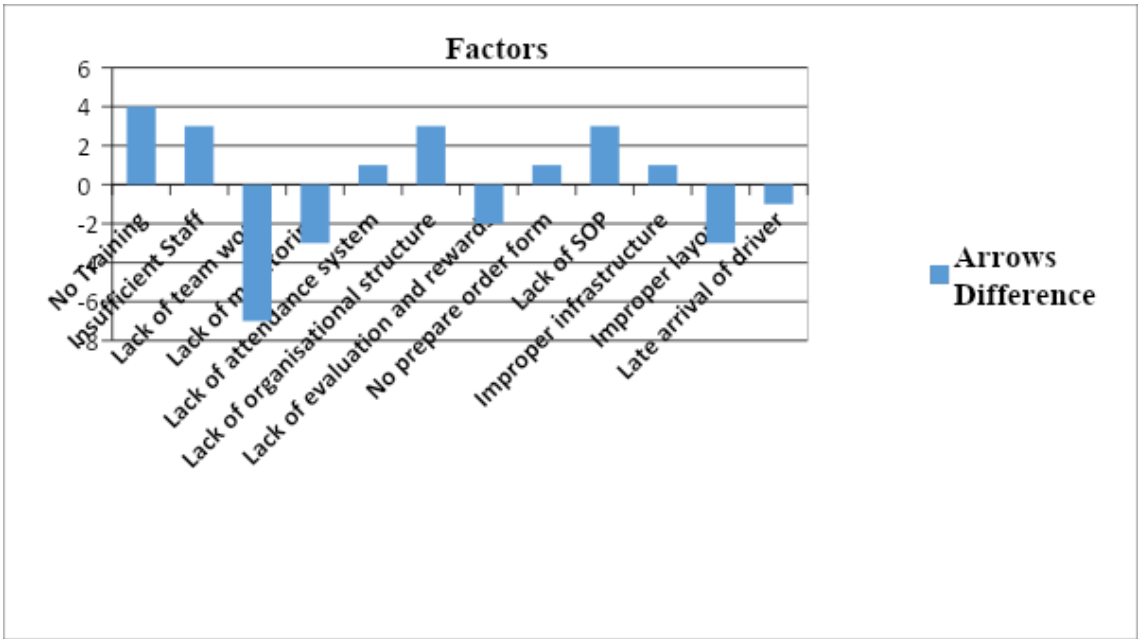


Figure 6-3 Interrelationship Diagram Results

Factors above zero level are causes while factors below zero level are effects.

According to figure 6-3, factors with zero or positive difference between outgoing arrows and incoming arrows are considered as causes which are presented below:

- No training
- Insufficient staff
- Lack of attendance system
- Lack of organization structure
- No prepare order form
- Lack of SOP
- Improper infrastructure

6.4 Layout and Inventory Management

After the measure phase was completed the company took a strategic decision of moving to a new location. The main reasons were that the current warehouse is located in high traffic area, improper infrastructure, and it is not proper for customer's locations. The company moved to Al-Jalazoun Camp where its trucks can reach surrounding villages and cities without passing through the traffic areas inside Ramallah and Al-Bireh cities. The new warehouse consists of two separated stores with suitable doors, suitable altitude, and proper infrastructure.

According to this decision the improvement team agreed to design the layout for the new warehouse taking into consideration problems in the current warehouse's layout. This will also help improving the inventory management for the company. Other advantages of the new location are lower rent and more familiar address to customers. After preparing the new layout of the new warehouse the company will move directly.

6.5 Summary

The improvement team was able to identify the potential cause of late order preparation through preparing the cause and effect diagram and then identifying the causes among these potential factors using interrelationship diagram. This cause will be targeted in the improve phase to achieve the expected results.

Chapter Seven
Improve Phase

7.1 Overview

The improvement phase has the objective of examining the causes found in the analysis phase, and then selecting and targeting solutions to eliminate such causes.

According to the analyze phase findings and the decision of moving to a new location the improvement team proposed the following solutions:

1- Develop job descriptions for current posts to identify duties and responsibilities in addition to new organizational structure.

2- Preparing layout design for the new location taking into consideration problems in current warehouse layout.

3- Preparing and implementing the new flow chart of prepare sales order process.

4- Training employees on the new processes and procedures in the control phase.

7.2 Developed Job Descriptions & Organizational Structure

The improvement team conducted a meeting, discussed current posts according to current organizational structure, and prepared job descriptions for current posts in order to identify duties, responsibilities which will be circulated to all staff. The improvement team also agreed to amend the current structure where the manager will be the direct supervisor of the store manager.

Job descriptions for current posts were prepared for the following posts:

- Manager
- Accountant
- Store manager
- Salesman

The job descriptions presented in Appendix B,C,D, E included:

- Job description
- Direct supervisor
- Qualifications and experience
- Duties and responsibilities

The new organizational structure is presented in Figure 7-1 below:

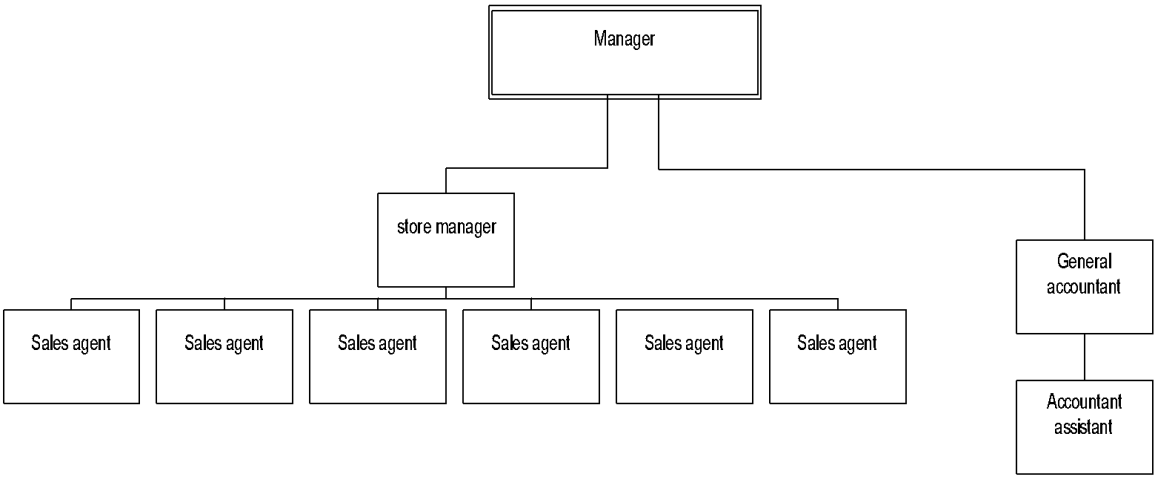


Figure 7-1 New Organizational Structure

The final job descriptions and organizational structure were adapted after circulation to all staff confirming that the main objective is to identify duties and responsibilities of all staff members to facilitate supervision, evaluation of performance, strengths, and weaknesses identification in the future.

7.3 Layout Design of New Warehouse

The improvement team took a walk through the new warehouse (two stores) and checked space, infrastructure, and best locations for shelves, pallets, offices and loading areas.

The new location presented in Figure 7-2, Figure 7-3 and Figure 7-4 has a total area of 378 square meters; this area is divided into two stores with 16 meter distance in

between. First store has one floor while second store has two floors as below, the layout was drawn using AutoCAD software with the help of external Architectural engineer Moayad Alrimawi.

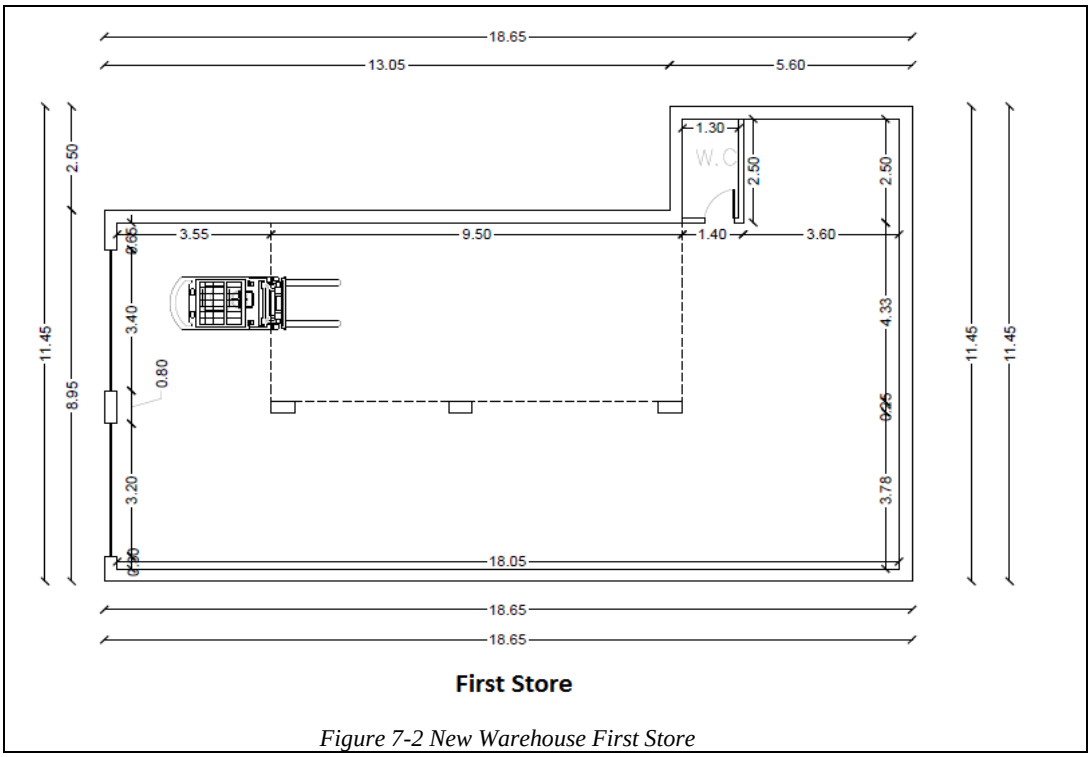


Figure 7-2 New Warehouse First Store

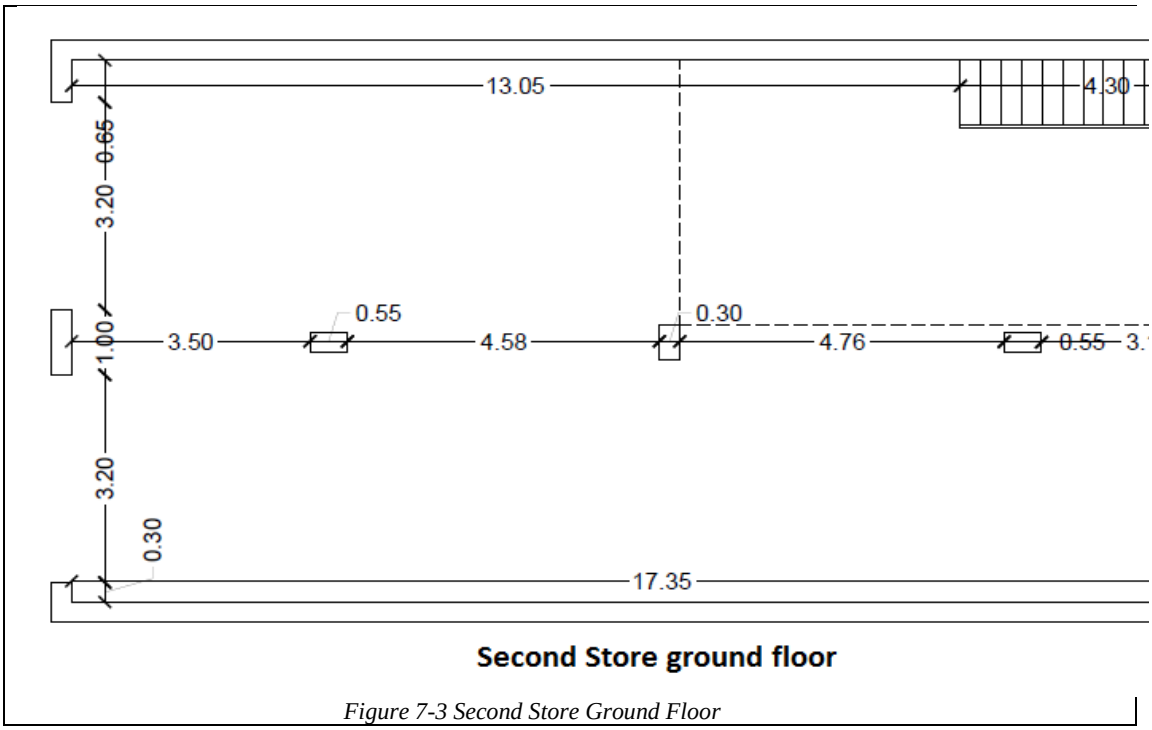


Figure 7-3 Second Store Ground Floor

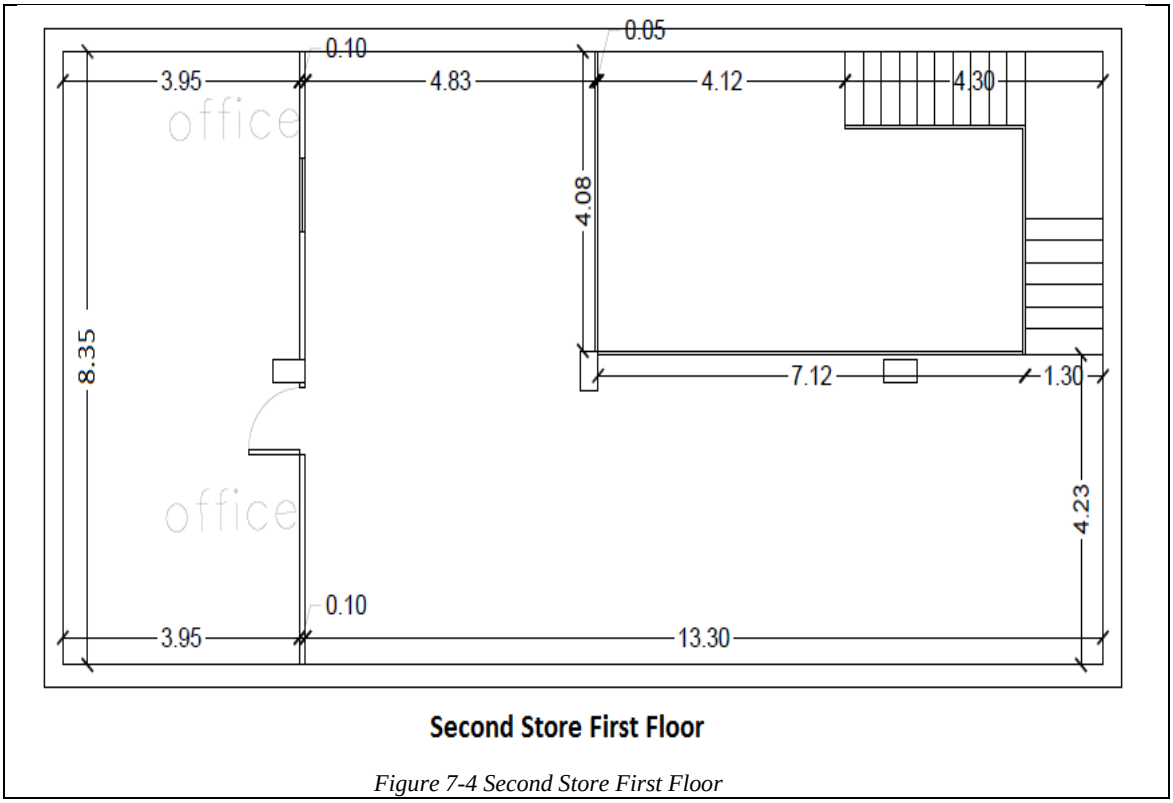


Figure 7-4 Second Store First Floor

The improvement team prepared the new layout with the support of 5S tool of lean production. The aim of 5S is to create a work environment that is disciplined, clean and well ordered. The 5S's are sort, set order, shine, standardize, and sustain.

7.3.1 Sort & Shine

The aim of this step is to sort out what is not needed in order to free up space to sort needed. Relying on 2018 sales report, the team sorted out stagnant products, defective products, in addition to unutilized shelves and wooden pallets. The agreed criteria are to sort out products with annual sales below 5000 NIS. These products are listed in Table 7-1 below:

Table 7-1 Products with Annual Sales Below 4000 NIS

#	**Product Name English**	**Annual Sales**	**Current Stock Value**
1	Metro ½ NIS	391	341
2	Gami cake	167	418
3	Unbacked Smarties	1332	1220
4	Chinese 22 NIS price	1909	2340
5	Marshmallow 220g	820	1560
6	Marshmallow 100g	672	1426
7	Chinese 200 piece	1586	2047
8	Aldor lollipop	1122	1094
9	Honey ginger 6 bags	3276	2628
10	Bon bon wafer	2653	2684
11	Mayasi 3 NIS	1831	1725
12	Jelly bar 48 piece	2013	1575
13	Chinese 100 piece	957	1120
14	Millennium chocolate 16 piece	2485	2827
15	Dorina chocolate	2324	1733
16	Millennium chocolate 38g	939	3238
17	Gofretbifa	426	174
18	Borileo wafer	1257	960
19	Bottled tomato sauce	1911	4920
20	100% juice 1 LT	1084	990
21	I biscuit 12	663	231
22	Wafer 36 piece	1284	1340
23	Jelly 40 piece	822	947
24	Dasha wafer 3 bars	216	1440
25	Croissant morno	3507	4406
26	Wafer 72 piece	2762	2889

27	Karnosh bag	1318	1354
28	Tiffanie creamer	692	595
29	Hexagon gifts	1985	1210
30	Iron gifts	921	493
31	Fresh drink 3 LT	0	1320
32	Sahlab+ Choco +coffee mate	2412	1675
33	Salty biscuit 1 NIS	1526	1325
34	Corn 40g	705	1071
35	Badoko wafer 117g	619	957
36	Cracker badoko	580	550
37	Badoko biscuit	580	946
38	Lolo bambino 60 piece	1190	1053
39	Zalmot crackers 2 NIS	635	714
40	Tady snowball	435	442
41	Tio corn	1706	1989
42	Swiss roll big	1691	3200
43	Cracker tok	211	833
44	Off time 6 displays	1347	1080
45	Z- gum 120 piece	1981	2336
46	Barsh wafer	1112	1349
47	Popeye wafer	298	686
48	Lilo shan biscuits	625	835

Forty eight products were identified with total annual sales of 60978 NIS while the total value of current stock of these products is 72286 NIS which confirms that these products are tying resources with low sales and low turnover. The company will contact suppliers to return these products and the ones that could not be returned will be assigned to sales agents to sell it as soon and possible and to offer discount on these products where

necessary. All defective products, expired products, damaged pallets and unutilized shelves were discarded.

The improvement team agreed on the following steps to be performed by the accountant:

- The accountant will print sales report each two months to check stagnant and low sales products to be returned to suppliers and new quantities of new products will be purchased in case supplier does not allow returns. This will help to free more space in addition to monitoring expiry date of low turnover products.
- The accountant will also insert expiry date of each product in the accounting system, supplier name and contact information, and zone number. The accounting system will give warning message four months prior expiry date.

7.3.2 Set-In Order

In order to sort remaining products in place, the team agreed to divide the new warehouse to zones and identify which products will be sorted in each zone.

First floor was divided into 4 zones as presented in Figure 7-5 below:

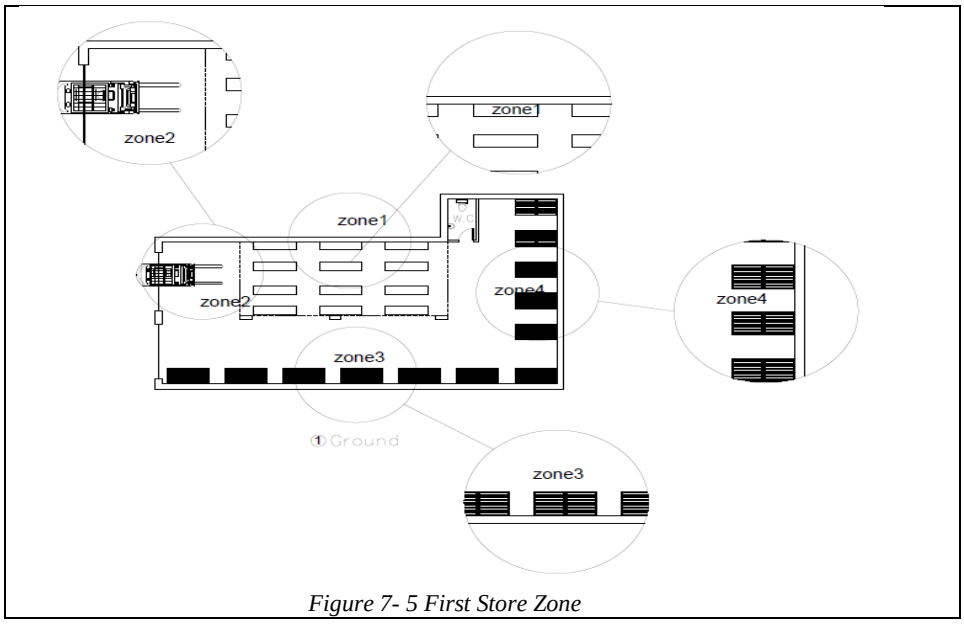


Figure 7- 5 First Store Zone

Second store has two floors, ground floor and first floor. The ground floor was divided into two zones as presented in Figure 7-6 below while the first floor will be assigned for offices and show room.

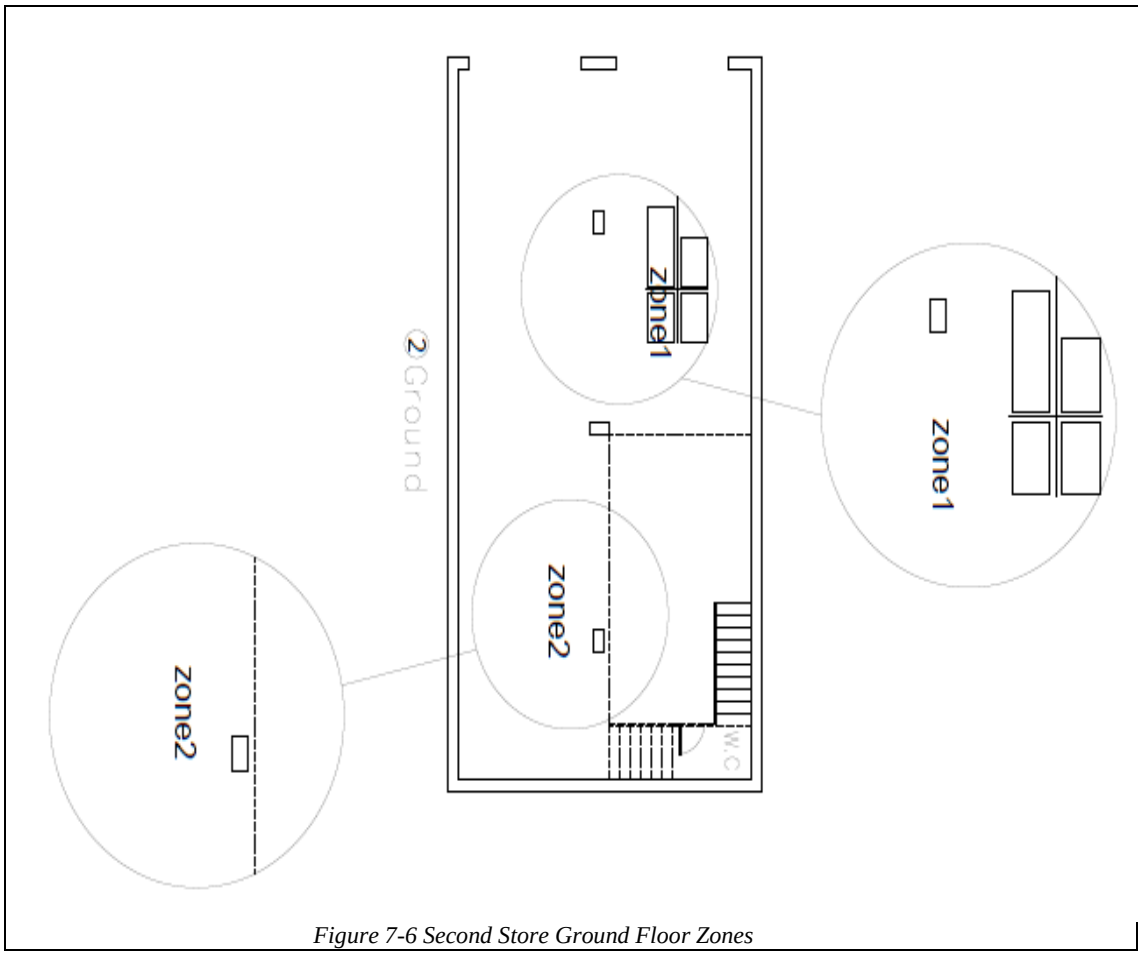


Figure 7-6 Second Store Ground Floor Zones

The improvement team agreed to sort products in zones according to sales, weight and volume to minimize motion in sorting and sales order preparation. Zones distribution according to 2018 sales report is presented in Table 7-2. There are four zones in first store and two zones in second store. Symbols are added to zone symbol to identify store location, S1 symbols for first store and S2 symbols for second store.

Table 7-2 Zones Distribution According to (2018) Sales Report

Zone #	Sales(NIS)	Products Category	#
Z3-S1	2475980	Drinks	1
Z1-S2	2139606	Chips and Tortillas	2
Z1-S1	1388940	Wafers	3
Z1-S1	1225493	Chocolate Bars	4
Z1-S1	1048184	Cake	5
Z2-S1	586681	Confectionary	6
Z2-S2	577789	Bambinos	7
Z4-S1	387112	Peanuts	8
Z4-S1	188912	Nuts	9
Z4-S1	152262	Pringles	10
Z4-S1	64088	Pickles	11
Z4-S1	54958	Stick Crackers	12
Z4-S1	35902	Indomie	13
Z2-S1	30107	Gum	14
Z3-S1	29116	Bottled Mineral Water	15
Z4-S1	22306	Jellies	16
Z1-S1	17548	Chocolate Boxes	17
Z4-S1	15935	Oil	23
Z4-S1	12960	Lollipop	24
Z2-S2	10085	Toilet Paper	25

First Floor Zones:

- Loading/unloading area is on the front of the two doors.
- Z1-S1 the first zone of the first store contains shelves with wafers, chocolate bars, chocolate boxes and cake due to high sales, medium weight, and small to medium volume and is located near loading area.
- Z2-S1second zone of first floor contains shelves with confectionary and gum due to light weight.
- Z3-S1 the third zone in the first floor contains pallets on ground with drinks and mineral water due to high sales and high weight to minimize motion.
- Z4-S1 fourth zone of the first floor contains pallets on ground with Peanuts, nuts, pringles, pickles, stick crackers, indomie, jellies, and lollipops due to lower sales and lower inventory.

Second Floor Zones: it contains all chips, tortillas and bambinos due to high volume and light weight in addition to ability of easily moving pallets of these products in front of first store to speed sales order preparation.

- Loading/unloading area is on the front of the two doors.
- Z1-S2 first zone of the second store contains pallets with chips and tortillas due to high sales and high volume.
- Z2-S2 second zone of second store contains pallets with Bambinos and toilet papers due to light weight and high volume.

Labeling shelves and pallets were excluded since there are more than 168 active products and the company adds new products in addition to seasonal products. There is also cancellation of some products due to low demand.

The standardize and sustain steps will be implemented in the control phase.

The new layout allows utilization of forklift in sorting incoming goods in pallets, moving other products inside warehouse to be sorted on shelves which will reduce motion, and also moving heavy weight products near loading area to reduce motion in order preparation. Photos for some of the sorted products are presented in Figure 7-7 below:

Figure 7-7 Sorted Products in The Improved Layout

7.4 Improving Prepare Sales Order Process

According to the findings in the analyze phase the improvement team agreed to the cancel the step of writing order items on paper since order items will be written in invoice and it was also agreed that issue invoice step will be performed in parallel with loading order to truck to avoid loading other products to truck without being registered. A new step was added which is writing order items in a form and delivering it to the store manager before the end of working day using the form presented in Table 7-3 and the Arabic form of the Sales Order Form is presented in Appendix F. Accordingly, the improvement team prepared the new flow chart for Prepare Sales Order Process as presented in Figure 7-8 below:

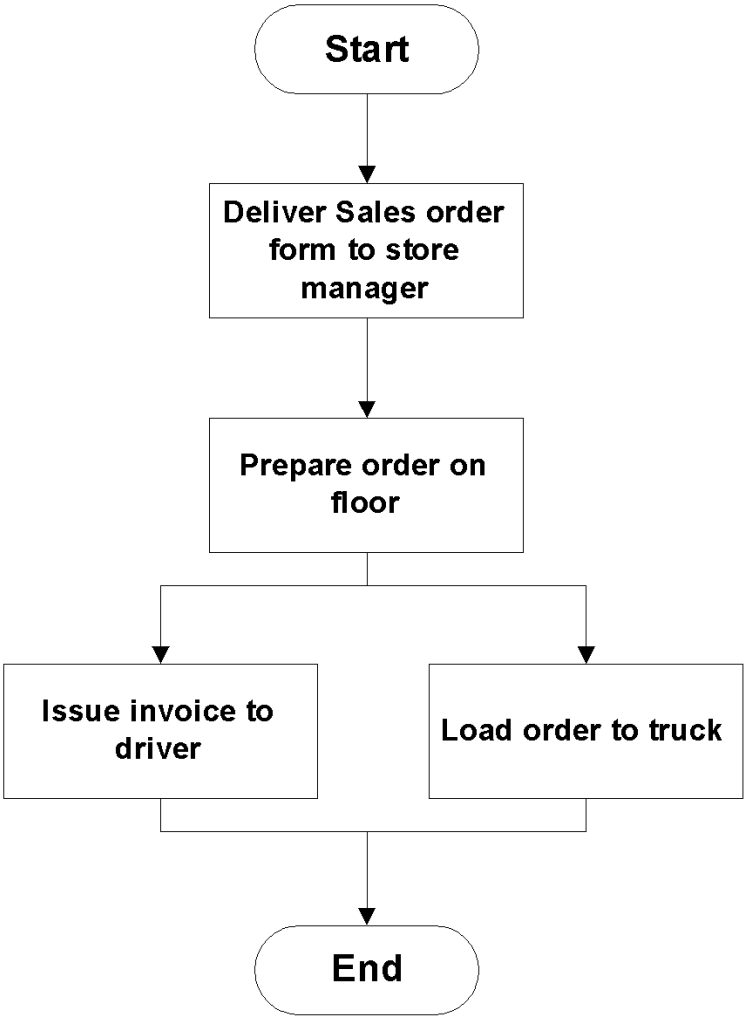


Figure 7-8 Sales Order Process Flow Chart

The newly added step of writing order items in the sales form will speed order preparation since the warehouse manager will write zone number beside each item and drivers will not depend on their memory in preparing their orders or searching for products to be prepared.

Table 7-3 Sales Order Form

Sales Order Form			
Driver Name: ……			**Date** / /
#	**kind**	**quantity**	**Storing area number**
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			

The improvement team also agreed to improve the layout of two truck's boxes with total cost of 2700 NIS. The current status of truck boxes is presented in Figure 7-9 below:

Figure 7-9 Current Status of Truck Boxes

The current status layout causes long cycle time in loading orders due rework in unloading some products then loading them to truck again.

The improvement team agreed about providing the truck with shelves for biscuits, wafers, chocolate products, confectioneries, and other light weight and small size products. While heavy products like drinks, pickles and high-volume products will be loaded on truck box floor.

This step will help in:

1- Reducing loading time to trucks.

2- Facilitate stock check in trucks.

3- Reduce time of unloading customer order.

4- Allow better visibility to customer to pick items from truck.

5- Reduce number of defects.

The new layout example photo of truck box is presented in Figure 7-10 below:

Figure 7-10 New Layout Truck Box

Due to late arrival of drivers to store in the morning the improvement team agreed to adopt an attendance form that includes time of attendance. Since drivers have basic salary of 1000 NIS and commission, late drivers will face warning & then deduction from basic salary based on store manager evaluation. This step was approved by all employees and the attendance form was adopted. Attendance form is presented in Table 7-4 and the Arabic form of the Time Attendance is presented in Appendix G.

Table 7-4 Time Attendance Form

Time attendance Form		**Date:** / /	
name	**Arrival time**	**Departure time**	**Notes**

The next step is implementing the new flow chart of prepare sales order, after improving the flow chart by removing the step of writing order items in paper and performing writing invoice in parallel with loading order items to vehicle the new flow chart has two steps only and the improvement team collected data for the new process for 16 orders preparations as presented in Table 7-5:

Table 7-5 Prepare Sales Order Process Collected Data

Process step	Average Cycle Time (Minute)	Average Delay Time (Minute)	Average Lead Time (Minute)
Prepare order items on floor	40	11	51
Issue invoice and load order to vehicle	33	10	43
Total	**73**	**21**	**94**

The average of cycle time, delay time, and lead time were calculated by dividing the sum of these times by 16 since the data were collected for 16 orders.

From the previous table we found that:

- %VA prepare order items on floor = 40/51 = 78%
- %VA Issue invoice and load order to vehicle = 33/43 = 77%
- Process efficiency = $\sum CT's / \sum LT's$

  = 73/94 = 78%

The improvement team prepared the value stream mapping for the new process as presented in Figure 7-11 below:

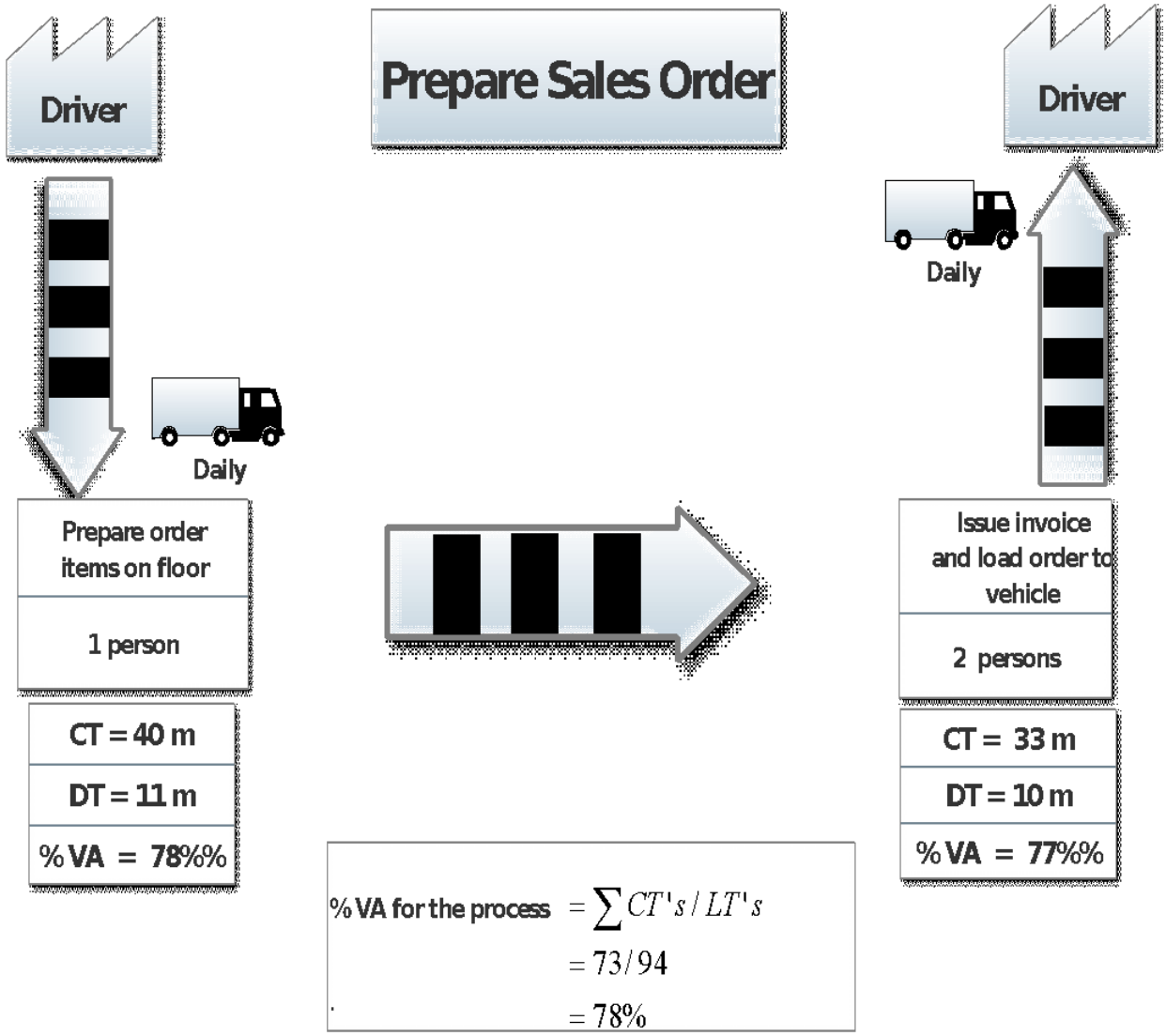


Figure 7-11 VSM For New Prepare Sales Order Process

From previous VSM map we found that:

- %VA of prepare order item on floor has improved from 64% to 78%
- %VA of issue invoice and load order items to vehicle has improved after merging the two steps to 77%
- Process Efficiency has improved from 63% to 78%

- Process Cycle was reduced from 110 minutes to 94 %
- Delay time was reduced from 65 minutes to 21 minutes
- Accordingly lead time was reduced from 175 minutes to 94 minutes
- Drivers are able to move to start delivery to customers between 10:00 and 10:30 am while in the old status they used to move between 10:30 pm and 2:30 pm
- Drivers attend to work between 8:00 and 8:40 am while in the old status they were used to attend between 8:30 am and 12:30 pm.
- The improved layout also helped in speeding order preparation process, driver were able to start delivering orders early and were able to reach 58 customer per day on average.
- The company was able to return sorted out products to supplier with value of 48520 NIS, the value of remaining stock is 23766 NIS which will be sold on discount.

7.5 Summary

At the end of this phase the causes of the problems in the layout, stock management, and preparing sales order process that were concluded from the analyze phase were targeted and the improvement team succeeded in organizing the work environment and products storage, introducing and circulating new organizational structure and job descriptions, improving the efficiency of prepare sales order process from 63% to 78%, reducing lead time of prepare sales order process from 175 minutes to 94 minutes, and ultimately the company were able to reach 58customers per day instead 30 customer per day before the improvement.

Chapter Eight
Control Phase

8.1 Overview

This is the final phase of DMAIC methodology with the objective of implementing ongoing measures and actions to sustain the improvements by monitoring, standardizing, documenting and integrating the new process on a daily basis. (Banuelas et al., 2005)

The improvement team agreed on dividing the control phase into two sections

1- Controlling and monitoring purchase order process, receiving incoming products, and sorting incoming products to keep everything sorted in the right place.

2- Controlling and monitoring preparing sales order process.

This will help controlling and monitoring products starting with issuing purchase order and until products are loaded to trucks.

8.2 Controlling & Monitoring Stock

The aim of this section is to discuss:

- Controlling issue purchase order process, monitoring, and controlling sorting incoming products
- What about Controlling and monitoring preparing sales order process.

The improvement team prepared new flow chart for issuing purchase order process as presented in Figure 8-1.

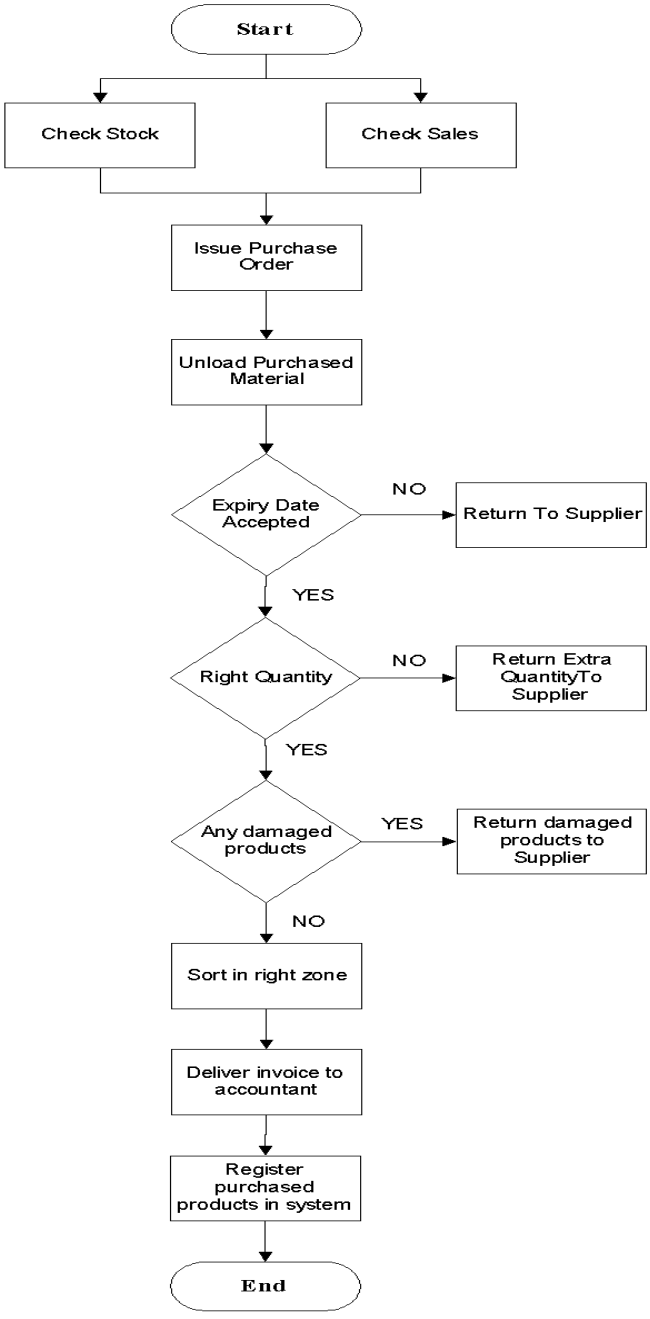


Figure 8-1 Issue Purchase Order New Flow Chart

In the new flow chart for issue purchase order:

- The accountant checks stock of the needed product/s in system and match it with stock in stores.
- The accountant checks and writes last two month sales of the needed product/s.
- The general manager identifies needed quantity and contact the supplier.
- The form presented in Table 8-1 is completed by assigned staff members until products are sorted in the right place the Arabic form of the purchase order management form is presented in Appendix H.

Table 8-1 Purchase Order Management Form

Purchase Order Management From			Date: / /	
Required product	Current stock	Sales of the last two months from its date	Required quantity	
General manager signature				
Received quantity	Returned quantity Damaged/ not damaged	Expiration date	Soring area	
Quantity received checked	Returned check	Expiration date checked	Soring in correct area checked	
General manager signature Date: / /.				

- The ordering part is signed by general manager
- The receiving and sorting part is checked and signed by store manager
- It was confirmed to suppliers that the company receives incoming products after 12:00 pm to avoid receiving products during preparing sales orders and giving the store manager some time to resort products if needed after preparing sales orders.

- The store manager checks and confirms received quantities, returned quantities, expiry date, number of zone to be sorted in, and being sorted in the right zone.
- This form helps monitoring and controlling purchased quantity, shelf life, and being sorted in right zone.
- This form is returned to the accountant who inserts the purchased products in the system including quantities, shelf life and will also confirms the quantity to be inserted in the system to give a warning message in case of low stock (minimum needed stock) depending on sales and delivery time from suppliers.
- The accountant checks stock according to the system every three months and the store manager identifies the right quantity by manual count.
- According to the last step, low sales products with large quantities are returned to suppliers to avoid getting expired in warehouse.
- The flow chart is implemented for each purchase order and the form is followed to guarantee controlling purchase process.
- Value of defected products after sorting products in the new location is 680 NIS in three months. While value of expired products on shelves is 430 NIS in same period.
- Value of damaged products in trucks is around 600 NIS in three months which is paid by drivers since they loaded these products intact.
- Staff was trained on using purchase order management forms and new process flow chart.

8.3 Controlling & Monitoring Prepare Sales Order Process

The improvement team already prepared the new flow chart of sales order preparation and implemented this flow chart and then validated the results with data. This flow chart

presented in figure 7-8 was implemented and will be implemented for all future prepared orders and in order to avoid too much documents or forms the improvement team agreed that the updated prepare order form is considered as a controlling and monitoring tool for this process. The updated prepare order form is presented in Table 8-2 the Arabic form of the Prepare Sales Order is presented in Appendix I.

- The required products will be filled by the drivers and sent to store manager at the end of each working day by social media means. If not possible, it will be delivered in hand at the beginning of the day before delivering dues to the accountant.
- The store manager will fill zone number beside each product
- The store manager will fill start time and finish time to monitor process lead time which should be in range of 2 to 2.5 hours as concluded from data collection sheets.
- The store manager will write notes at the end of the table to collect important data such as delay in preparing the order, damaged products, products in wrong zone and unavailable products. This data will be analyzed to identify root causes and potential solutions to be solved shortly for the purpose of continuous improvement.
- This form will also help monitoring driver's attendance in case of manipulation in time attendance table.
- The general manager will review these forms after order preparation is finished and provide store manager and accountant with feedback.
- The company hired two workers on part time basis to help in preparing sales orders, sorting incoming products and resorting in-store products after order preparation.
- Concerned staff was trained on using prepare sales order form.

Table 8-2 Prepare Sales Order Updated Form

Prepare Sales order form			
Driver name: ……			date
Start Time:		Finish Time:	
#	Kind	quantity	Storing area number
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
Notes:			
General manager signature			

8.4 Sustaining 5S Achievements

To sustain the achieved results of 5S initiatives, the improvement team prepared a check-list, presented in table 8-3. The check list guarantees conformance to standards and provide the required action in case of nonconformity. The Arabic form of the check list is presented in Appendix J . The store manager/accountant will be responsible for filling the check list, taking the necessary action, and keeping the form in the assigned file.

Table 8-3 "5S" Check List

Process / Step	**Check if conform**	**Action for nonconformity**
Maintaining cleanliness of warehouse	**Yes** ☐ **No** ☐	Clean warehouse at the end of the day
Maintaining cleanliness and proper sorting of products in trucks	**Yes** ☐ **No** ☐	Clean trucks and sort products every Thursday
Sorting stock in the assigned area/shelf	**Yes** ☐ **No** ☐	Sort stock in the assigned area/shelf at the end of the day
Sorting damaged/expired products in the assigned area	**Yes** ☐ **No** ☐	Sort damaged/expired products in the assigned area at the end of the day
Checking stock every three months	**Yes** ☐ **No** ☐	Check stock every three months and keep check report in assigned file
Compliance to prepare sales order form	**Yes** ☐ **No** ☐	Arrange a meeting with the concerned staff and issue warning in writing if repeated
Compliance to purchase order form	**Yes** ☐ **No** ☐	- Check missing steps - Talk to concerned staff members - Issue warning in writing if repeated
Inclusion of new products and the expiry dates in the accounting system	**Yes** ☐ **No** ☐	Arrange a meeting with the accountant and issue warning in writing if repeated
Staff knowledge of work standards	**Yes** ☐ **No** ☐	Arrange training sessions

8.6 Documentation

It was agreed with the company manager that all forms will be organized in separate files which will be kept for at least two years duration. After this period the company is authorized with the disposal of the forms. The accountant/store manager is responsible for filing and the general manager is authorized with the disposal of the work forms.

A visit was arranged to the plant after one month and it was assured that all forms were implemented, organized, and kept as agreed.

8.7 Summary

The improvement team was able to monitor and control purchasing and sorting products in the assigned area through the new flow chart and purchase order management form. Monitoring and controlling preparing sales order process through the new flow chart and prepare sales order form. And finally sustaining the improvements in warehouse and ensuring conformance to work standards through the 5S check list.

Chapter Nine
Conclusions & Recommendations

9.1 Conclusions

Lean Six Sigma is a powerful improvement methodology for service industry. LSS have a variety of tools as means for reaching the desired output. In the define phase, the project charter, SIPOC and PCD helped in identifying areas of improvement and accordingly forming the improvement team from staff members working in these areas. In the measure phase the flow chart, VSM, data collection sheet helped in validating output concerns raised in the define phase. In the analyze phase, cause and effect diagram and interrelationship diagram helped in proposing possible causes and then identifying root causes to be targeted in the improvement phase. In the improve phase, 5S, flow chart and VSM helped in improving the targeted areas. In the control phase, 5S, flow chart and work forms helped in sustaining the improvements.

The improvement efforts were dedicated to the warehouse layout, stock management, and prepare sales order process. The concluded outputs are:

- An organized workplace with products sorted according to sales and product category.
- Reduced value of defects in warehouse from 11450 NIS to 2720 NIS.
- Reduced value of consumed products by the workers (almost zero).
- Reducing value of returns to suppliers from 82500 NIS to 48520 NIS
- Reducing value of defects in trucks to around 2400 NIS per year per 6 trucks.
- Reducing value of expired products in warehouse from 6740 NIS 1720 NIS.
- Reducing company stock around 1000000 NIS and accordingly less tied resources by around 200000 NIS.
- Improving %VA of prepare sales order process from 64% to 78%.

- Reducing cycle time of prepare sales order process from 110 minutes to 73 minutes.
- Reducing lead time of prepare sales order process from 175 minutes to 94 minutes.
- Sales agents (drivers) were able to reach 55 to 65 customers per day on average in the new status of prepare sales order process while in the old status they used to reach 36 customers per day on average.

9.2 Recommendations

To continuously improve services of Almayar Company, it is recommended that the company takes the following actions:

- Hire a full-time employee to help the store manager free some time to better manage stock and follow up of sorting the warehouse after sales order preparation on daily basis.
- Installing surveillance system which will help identifying areas where defects occur in addition to responsible personnel and being able to review daily activities.
- Installing GPS tracking systems for two trucks as a pilot project to be able to track their route and utilization of the vehicles.
- Labeling storage areas by signs handed on the ceiling.
- The company should establish a research and development unit for the purpose of identifying new opportunities through adding new products (market research), importing products in addition to purchasing from local importers and manufacturers, gaining new customers, and measuring customer satisfaction.
- Improving the layout of other trucks boxes like the two trucks that have been already improved.
- The company should have a list of all manufacturers, importers, and wholesalers of food and beverages products in Palestine to expand their variety of products and add new

categories of products after conducting market research. Some products have higher margin of profit and can contribute to company growth and help in gaining new customers.

- The company should provide computer tablets to the sales agent to be able to present all of the company's products to customers instead of asking them to take a look at the products loaded in the truck.

9.3 Future Researches

1- Measuring customer satisfaction at Almayar Company.

2- Investment opportunities in food industry in Palestine.

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Appendices

Appendix A Data Collection Sheet

Process name :					
Driver Order Number	①Start-time **(mm:ss)**	Finish-time **(mm:ss)**	Cycle time (-) **(seconds)**	⑦ Finish time of the previous process step **(seconds)**	Delay Time (①-⑦) **(seconds)**
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

③Sum of Cycle times **(Seconds)**		Sum of Delay Time ⑥ (Seconds)	

④Duration of the round **(Seconds)**	
Downtime (④- ③) (Seconds)	
number of Defects	
amount of Rework	
⑤ Total Number processed	
Average Cycle Time (③/⑤) **(Seconds)**	
Average Delay Time ⑥/⑤ (Seconds)	

Appendix B Job Description For Manager

بطاقة وصف وظيفي: مدير الشركة
الهدف الاساسي للمنصب: التقيد وعمل جميع المهام المطلوبة، المبادرة في الحلول المبتكرة، المساعدة في رسم الاهداف والخطط والعمل بها ، العمل على السير في تحقيق اهداف المنشأة بما يضمن مصلحة المنشأة
المهام والمسؤوليات: -المشاركة في وضع الخطط والنصائح والمشورات التي تثري عمل المنشأة. -الاشراف المتكرر على الموظفين والعمال والمشاكل -متابعة المهام الموكلة للموظفين -توزيع المهام على الموظفين بما يناسب وصفهم الوظيفي -تمثيل الشركة امام الغير في المعارض والمناسبات التي تشارك فيها الشركات المماثلة -رئاسة الاجتماعات الدورية الخاصة بالشركة واصدار القرارات المناسبة -تنسيق الخطط والبرامج التي تسعى لرفع كفاءة الشركة -الاهتمام بتوظيف موظفين كفؤ لعمل المنشأة -التعامل مع كافة الموظفين وسماع آرائهم وتحفيزهم للمشاركة في الاجتماعات من اجل التعرف على الانجازات والتحديات التي تواجههم. -الموافقة على اصناف جديدة وادخالها لمجال العمل. -اقتراح الميزانية المناسبة للعمل -مراجعة التقارير التي ترسل من المسؤول باستمرار والتقارير الدورة والسنوية

Appendix C Job Description General Accountant

بطاقة وصف وظيفي: محاسب رئيسي
الهدف الاساسي من الوظيفة: العمل على ادارة العمليات الحسابية الخاصة بالمنشأة، ومتابعة التقارير المالية والميزانيات ، والاهتمام بالأمور الضريبية والعوائد الربحية والتكاليف للمنشأة
المسؤول المباشر :المدير العام
المؤهلات والخبرات: -دبلوم فما اعلى في مجال المحاسبة -خبرة 3 سنوات فأكثر في مجال المحاسبة -القدرة على التعامل مع مختلف البرامج المحاسبية
المهام والمسؤوليات: -تطبيق النظام المحاسبي الموجود في المنشأة بطريقة دقيقة والتأكد من دقة المعلومات والقيود المالية الموجودة ومتابعتها -الاشراف على الضرائب ومتابعتها مع الجهة المسؤولة -الاهتمام باستلام الفواتير اليومية والعمل على حفظها بطريقة تسهل الرجوع لها -توثيق المعلومات المالية وفق النظام المحاسبي -الاشراف على ادخال الفواتير والاصول المالية للنظام حسب الاصول -متابعة الشيكات والعوالق المالية مع البنوك والزبائن. -تحليل الوضع المالي باستمرار وتقديم التقارير السنوية والدورية -توثيق كافة المبيعات وفق تواريخها المدرجة -متابعة الرواتب الخاصة بالموظفين وتسليمها في الوقت المحدد -تأمين المعلومات المالية من خلال استكمال النسخ الاحتياطي لقاعدة البيانات -استلام الدفعات من الموزع وتسجيلها على النظام وفق الاجراءات

.

Appendix D Job Description Store Manager

بطاقة وصف وظيفي: مدير المخازن
الهدف الاساسي من الوظيفة: تخطيط وتنظيم كل الامور المتعلقة بالتوزيع والتخزين والاشراف على عمل المخازن وتحديد الاحتياجات المطلوبة وتنظيم خروج ودخول المخزون وفق السياسات والاجراءات المعتمدة
الرئيس المباشر: المدير العام
المهام والمسؤوليات: -المشاركة في الاجتماعات وابداء الرأي في القرارات. -إصدار القرارات المناسبة لكيفية التخزين بما يتوافق مع طبيعة المخزونات -إجراء جرد دوري للمخازن كل ثلاث شهور ورفع نسخ منه لكل من المدير العام ونائبه -اقتراح المواصفات للسلع والمواد وضمن كلفة معقولة بحسب الكميات والنوعية -اقتراح الميزانية المناسبة لإدارة التوزيع والتخزين في حدود إمكانيات الشركة بناءً -إصدار القرارات المناسبة في حدود سلطاته و التي قد تكون سبباً في تحسين الأداء في إدارة التوزيع والتخزين -مسؤول عن إدارة السجلات المخزنة ومتابعة أعمال التخزين وإصدار القرارات بكيفية التخزين -مسؤول عن إصدار طلبات الشراء بالتنسيق مع المحاسب. -المحافظة على ترتيب المخازن والنظام -الاشراف على عملية تحضير الطلبيات وتحميلها. -متابعة دوام العاملين

Appendix E Job Description Sales Agent

بطاقة وصف وظيفي: موزع بضائع
الهدف الاساسي من الوظيفة: العمل على توزيع البضائع لكافة زبائن الشركة والعمل على تسويق البضائع الجديدة وكسب زبائن جدد وتمثيل الشركة في ابهى صورة، العمل ضمن فريق والالتزامات بالقوانين والاجراءات التي تخص الشركة
الرئيس المباشر: -مدير المخازن المسؤول المباشر
المؤهلات والخبرات المطلوبة: -امتلاك رخصة مركبة سارية المفعول -اجادة اللغة العربية قراءة كتابة ومحادثة -اللباقة وحسن المظهر والتعامل مع الزبائن
المهام والمسؤوليات: -الالتزام بالتعليمات والاجراءات الوظيفية -الالتزام بالأسعار المدرجة لكل صنف والتقيد بها -المحافظة على سلامة البضاعة والتعامل معها كما يجب -تسجيل طلبية المبيعات على النموذج المخصص وتسليمها لمدير المخازن في الوقت المناسب -تحضير طلبيات المبيعات -تحميل الطلبيات الى المركبة -بيع البضائع للزبائن واصدار فواتير بذلك -تحصيل قيمة البضاعة المباعة من الزبائن واصدار سند قبض لكل زبون -تسليم مبلغ التحصيل للمحاسب -عمل جرد دوري للبضائع الموجودة في المركبة -المحافظة على المركبة والاهتمام بالصيانة الدورية لها -ترتيب البضاعة داخل المركبة بما يحفظ سلامتها -يتحمل تكلفة البضائع التالفة بعد استلامها

Appendix F Prepare Sales order form

نموذج تحضير طلبية مبيعات			
التاريخ	..... :اسم السائق		
/ /			
رقم	الصنف	الكمية	رقم منطقة التخزين
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
17			

Appendix G Time Attendance From

جدول دوام الموظفين		التاريخ / / :	
الاســـــــــم	وقت الحضور	وقت المغادرة	ملاحظات

Appendix H Purchase Order Management Form

نموذج ادارة المشتريات			:التاريخ
الصنف المطلوب	المخزون الحالي	مبيعات آخر شهرين من تاريخه	الكمية المطلوبة
توقيع المدير العام			
الكمية المستلمة	الكمية المرتجعة تالف/غير صالح	تاريخ الانتهاء	مكان التخزين
تم احصاء الكمية المستلمة	تم تسجيل المرتجع	تم تسجيل تاريخ الانتهاء	تم التخزين في المكان المخصص
توقيع مدير المستودع :التاريخ			

Appendix I Prepare Sales Order Updated Form

نموذج تحضير طلبية مبيعات				
التاريخ				
/ /	.....:اسم السائق			
:وقت البدء		:وقت الانتهاء		
رقم	الصنف	الكمية المطلوبة	الكمية التي تم تحضيرها	رقم منطقة التخزين
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
:ملاحظات				
توقيع مدير المستودع				

Appendix J "5S" Check List Form

العملية / الخطوة	ضع علامة بحسب التقيد	الاجراء الواجب اتخاذه بحال عدم التقيد
المحافظة على نظافة مكان العمل	نعم ☐ لا ☐	تنظيف مكان العمل في نهاية يوم العمل
المحافظة على نظافة وترتيب البضائع في السيارات	نعم ☐ لا ☐	تنظيف السيارات وترتيب البضاعة كل يوم خميس
ترتيب المخزون في المكان المخصص/ الرفوف	نعم ☐ لا ☐	ترتيب المخزون في المنطقة المخصصة/ الرفوف في نهاية يوم العمل
ترتيب البضاعة التالفة/ المنهي صلاحيتها في المكان المخصص	نعم ☐ لا ☐	ترتيب البضاعة التالفة/ المنتهي صلاحيتها في المنطقة المخصصة في نهاية يوم العمل
التأكد من المخزون كل ثلاث شهور	نعم ☐ لا ☐	التأكد من المخزون كل ثلاث شهور والاحتفاظ بالسجل في الملف المخصص
الالتزام بنموذج تحضير الطلبيات	نعم ☐ لا ☐	ترتيب اجتماع مع الموظفين المعنين وإصدار تحذير مكتوب في حال عدم الالتزام
الالتزام بنموذج تحضير طلبية المبيعات	نعم ☐ لا ☐	*التأكد من الخطوات المفقودة *التحدث مع الموظفين المخصصين لهذا الموضوع *اصدار انذار مكتوب في حال عدم الالتزام
تضمين البضاعة الجديدة وتاريخ انتهاءها في النظام	نعم ☐ لا ☐	ترتيب اجتماع مع المحاسب وإصدار تحذير مكتوب في حال عدم الالتزام
معرفة الموظفين بإجراءات العمل	نعم ☐ لا ☐	ترتيب عمل تدريبات للموظفين

الملخص

هذه الدراسة لها مساهمة كبيرة في توضيح فوائد تطبيق منهجية لين ستة سيجما في قطاع الخدمات الغذائية. اختبرت أثر اعتماد منهجية لين ستة سيجما في شركة الميار للمواد الغذائية من أجل تحسين جودة الخدمة والاستفادة من المساحة من خلال التخلص من الهدر وتنظيم بيئة العمل وأصبحت في نهاية المطاف أكثر كفاءة في تقديم خدمة توزيع المواد الغذائية.

هدفت هذه الدراسة لتحسين جودة الخدمة في شركة الميار من حلال تحسين تصميم المخازن، تحسين ادارة المخزون، وتحسين عملية تحضير طلبيات المبيعات من خلال تطبيق منهجية لين ستة سيجما بجميع مراحلها الخمس. مرحلة التعريف تضمنت تحديد أولويات التحسين وتحديد وتعريف المشاكل القائمة. في مرحلة القياس تم جمع البيانات لقياس الأداء الحالي باستخدام عدة ادوات.

في مرحلة التحليل تم تحليل البيانات التي تم جمعها لتحديد الاسباب الجذرية للمشاكل. بينمافي مرحلة التحسين تم استهداف الاسباب الجذرية للمشاكل للوصول إلى التحسينات المرجوة. واخيرا في مرحلة الضبط تم المحافظة على التحسينات ومراقبتها من خلال نماذج العمل، قائمة الرصد، وأدوات اخرى. أوصي بتكرار هذه الجهود من خلال استهداف عمليات اخرى في الشركة.

تنبع اهمية هذه الدراسة في المساهمة التي التحسينات التي قدمتها في تصميم المخازن، نظام إدارة المخزون، وعملية تحضير طلبيات المبيعات في شركة الميار من أجل التخلص من الهدر في هذه العمليات مثل البضاعة التالفة، البضاعة منتهية الصلاحية، التأخر في تحضير طلبيات المبيعات، الموارد الغير مستغلة، وبيئة العمل الغير منظمة.

بعد تطبيق منهجية لين ستة سيجما في العمليات المستهدفة كانت النتاج كما يلي: تحسين بيئة العمل ساهم في تقليل قيمة البضاع التالفة بنسبة 74% سنوياً، تقليل قيمة البضاعة منتهية الصلاحية بنسبة 75% سنوياً، تقليل قيمة البضاعة التالفة في سيارات الشركة بنسبة 80% سنوياً، تقليل قيمة مخزون البضاعة ذات لمبيعات المنخفضة بنسبة 67% سنوياً، تقليل قيمة مخزون الشركة من البضاعة بنسبة 20%، تحسين كفاءة عملية تحضير طلبيات المبيعات من 64% إلى 78% ، تقليل الوقت المخصص لتحضير طلبيات المبيعات من 110 دقائق إلى 73 دقيقة، وتقليل الوقت المستنفذ منذ البدء في تحضير الطلبيات ولغاية الانتهاء من التحضير من 175 دقيقة إلى 94 دقيقة.

بعد تنظيم مكان العمل، تحسين ادارة المخزون، وتقليل وقت تحضير طبيات المبيعات أصبح بإمكان مندوبي المبيعات البدء بتحضير طلبيات المبيعات قبل بساعتين من الوضع السابق وكذلك تمكنوا من الوصول إلى 55-65 زبون يوميا.

أوصي بأن تقوم الشركة بتدريب باقي العاملين على تطبيق منهجية لين ستة سيجما في عمليات اخرى لدى الشركة بهدف التحسين المستمر. وعلى الشركة ان تحافظ على التحسينات التي تم تحقيقها من خلال متابعة استخدام نماذج العمل التي تم اعدادها.