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The Influence of Lean on employee work performance

Master thesis

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INTRODUCTION

Relevance of the topic. Lean is about a process to create value. The Lean was introduced by Womak and Jones to explain the production management process in Toyota (Womack and Jones, 2003). This management system is being adopted for the past years, applied and implemented in the different industries successfully (Womack and Jones, 2007). Lean has been implemented in different industries. At the beginning it was launched and introduced in the manufacturing companies, however later on the other companies adopted Lean and use now the Lean can be found even in the services companies (Farshid Abdi, Sohrab Khalili Shavarini, Seyed Mohammad Seyed Hoseini, 2006). Lean can be considered as a management methodology or even working method and can be used in different level of the organization, however whatever the organization level is the Lean deals with people and employees. On the other hand, the main factor for implementing the Lean is employee of the organization since they are in charge of execution of the company strategies, policies, procedure and systems, therefore without people the Lean cannot be implemented.

To see the employee progress within the company, it is important to see the employee performance. The employee performance contains different items such as implementing the responsibilities, capability and potentiality of the employee and the employee efforts and success rate (Iqbal N, Anwar S, Haider N, 2015). The organizations try to increase the employee performance through different ways such as training, entertainment and rewards. They also try to optimize the procedures and methods of execution in order to maximize the employee performance.

The influence of Lean on the employee performance is very crucial to find out how Lean method can influence employees behavior. It is important to find out whether Lean accelerates the performance or not.

Current state of scientific research. There is different definitions for the Lean management and in operational management there is a debate for the comprehensive definition. However Lean is define mostly as an integrated and comprehensive technical and professional system that main aim is eliminating waste by minimizing and reducing internal variables as well as suppliers and customers (S. Vinodh , S.G. Gautham & Anesh Ramiya R, 2011).

Lean has five different basic principles, one of the main principles is adding value, value stream mapping, and creating flow, pull from the customers and aim for perfectionism (Womack and Jones, 2003).

It is very important to have an understanding of Lean as definition of Lean in different industries is vary with another industry. However in general it is recommended to consider Lean in two different levels as follow:

1- In the level of strategic in order to find out what are the values.
2- In the level of execution in order to understand how to remove the wastes (Peter Hines, Matthias Holweg and Nick Rich, 2004).

On the other hand the employees are the key of success in any businesses. They are knows as the brand ambassador so the way of hiring is very important and after that providing right and on time training is very crucial and in addition to keeping them satisfy the employer needs to measure their level of performance. The employee performance may get negative affection if there is no appropriate management in the organization in terms of strategic and long term management as well as short-term and daily task management (Iqbal N, Anwar S, Haider N, 2015).

The performance evaluation is mostly done annually by managers to subordinates in order to help them to understand their role, the company and role objectives and expectations. It is a role for managers to utilize the best performance of the employees and manage their performance level by creating an atmosphere and environment in the company to let everyone show their best performance and capabilities (Belcourt, Bohlander and Snell, 2008).

There are different type of technique for measuring the performance. The goal setting technique (Locke and Latham , 2002) which is developed more than 25 years ago based on the field studies. According to this theory if the goal is specified and hard then the high performance will be caused while vague and easy goals lead the task performance to lower level. In general there is different ways to measure the employee performance which is vary in industries, however in general it is about the excellence of executed job and based on different criteria such as quantity of executed job, level of quality, innovation level, total improvement, customer feedback and punctuality can be measured.

Problem statement. In fact the managers of the enterprisers always trying to boost employee's performance. Implementation of Lean methodology is also another way to maximize the

employee performance, however the employees are the main players of operation and they need to apply the changes in their routine job.

The scientific problem of this research is to measure and find out about the relation between the Lean and employee performance in the organization and if there is any relationship between these variables try to understand the level of impact and influence.

A significant problem is acceptance of changes from employees. In order to get employees involve with the process of execution, the expected outcomes needs to be communicate with them directly. Their performance is actually one of the outcomes. Although, it is undeniable that not all employees would put their maximum efforts to apply new changes in their job, but communicating the expected performance with them would help and accelerate the procedure. Therefore, this research intends to find out the effect of Lean methodology on employee performance.

Aim of the study. The main objective of this study is to investigate the influence of Lean on employee performance.

The object of the research. The object of this study is to determine the scope of effect of Lean implementation on employee performance, through a quantitative research and exploring about employee performance of manufacturing company in Lithuania (Germanika Company).

Research question. Considering the knowledge and previous researches and data availability, the main question of this research and study is:

- How big is the impact of Lean on the employee work performance?

Research methodology. This research study was based on quantitative research technique. The study is designed to be done in Germanika Company which different methods of Lean is implemented there and focus on the employees who have joined the company at least six months ago and already got familiar with the procedures and techniques. Total number of employees in Germanika Company is 523 people and approximately 90% of the employees working in the field and factory side and the rest working in the office as the administration employees.

Novelty of the research. In spite of large number of research on the relationship of Lean and manufacturing performance, or the relationship between some other factors like training, reward and motivation on employee performance, there is a gap concerning the effect of Lean

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on employee performance. The purpose of this study is to investigate the influence of Lean on employee performance deeply and close the current gap.

Although Lean hasn't been introduced in the recent years but still many companies don't use it and the knowledge of managers and decision makers of the organizations is not very comprehensive about it, moreover the number of Lean organizations in Lithuania is very limited too, thus this study provides more chances to the key persons in order to find out about the Lean and the possible influence on the employees performance.

Limitations. The main limitation of this study is data collection which needs to be done in an organization which Lean is being implemented already. Usually the Lean organizations are not a small companies and that makes persuading process more complicated.

The other limitation in this study is the time of data collection which is occurred at the same time with Covid-19 pandemic and caused some accessibility and availability of respondent issue.

Structure of the thesis. The study structure is based on four main parts. The first part is about the literature review which is composed of different sub categories such as Lean and employee performance. The second part is related to the empirical research and contains parts about the model, questionnaire, and sample and research methodology. The third part is in regard of analysis of empirical research results and conclusion and at the end there would be about the conclusion and suggestions for the future studies.

1. LITERATURE REVIEW

1.1 Review of literature on lean

In the past years, the trend of end user demand is toward quality of products and day by day the customers asking for a better quality goods and in addition they look for the better packaging and faster delivery and on the other hand eager to pay lower price. This issue become an advantage for some companies who can meet customers' expectation and for some other organizations become a headache to find out how make people satisfy. In addition the globalisation let customers to purchase whatever they are looking for from any resources in the world. Therefore the manufacturing organizations see the solution in the appropriate production system (Cardon & Bribiescas, 2015). In this situation Lean has been chosen as one of the available solutions by some companies, producers, managers and researchers (Womack & Jones, 2003).

In manufacturing procedure Lean has its own philosophy which is focus on different concepts like avoiding wastes in the resources and economic, keep providing value for the customers and doing more by less efforts and try to removing the not necessary procedures (Womack & Jones, 2003).

There is different definition for Lean. Lean is combination of methods and philosophy in operation management in order to decrease the waste and waiting time to achieve more customer satisfaction (S. Vinodh et al. 2011). The main focus is getting employees involve, pay attention on customer needs and improvement. The lean actually helps the organization to apply changes in the values and way of thinking which will cause transformation in culture of the company after a period of time (Smith G, Poteat-Godwin A, Harrison LM, Randolph GD, 2012). The Lean is introduced by Toyota and based on the model the main question in any steps of process is about customer value and how the resources is being used (Campbell RJ, 2009). It is all about improving the system process, managing the level of inventory of inventory, reducing the waste and increasing the quality of job (Sensel J, Black J, Miller D, 2016).

Moreover Lean has its own written context which let the organization employees and all relevant people to follow up and understand the principles, which is confirmed that Lean has benefits on the internal process, customer satisfaction and decreasing the suppliers (Shah & Ward, 2007). It is also cleared that Lean has positive impact on the employee spirit at work

(Melton, 2005). The Lean has positive impact on the product quality and the improvement of quality in long-term as well as increasing the profit based on the reduction in the wastes and optimizing the cost of production and procedure (Melton, 2005).

1.1.1. The Kaizen basics

Kaizen is a Japanese word, which can be translated to constant improvement in English typically. This word refers to the improvement that done during a period of time gradually. The Kaizen is about the improvement that can be done in environment and operational process of workplace. Kaizen makes a channel for employees to participate in the organization development. The simplify concept is "with every pair of hands, you get a free brain" (Bessant, 2000). Kaizen has three main features as follow:

1. Kaizen is a constant process. It would never stop and continue its route to achieve the desire quality and efficiency and during the process it is mixed with practices completely.
2. Kaizen is a steady process which is growing step by step like installing a new technology in the company
3. Kaizen is process which needs all employees' involvement and consideration and would cause physiological and quality in work and life balance of the employees accordingly. (Adam Paul Brunet, Steve New, 2003)

1.1.2. The 5S Event

5S is a method of Lean which is used for workplace organization. In fact 5S is an abbreviation of five Japanese words Seiri, Seiton, Seisou, Seiketsu, and Shitsuke which are translated as sort, set in order, shine, standardize and sustain that refers to the keeping cleanness. (Shogo Kanamori,Seydou Sow, Marcia C. Castro, Rui Matsuno,Akiko Tsuru & Masamine Jimba, 2015). These 5S brings a methodology for the organizations to develop the working environment through cleaning and making a sustainable production system.

The 5S methods are:

1- Sort, eliminating the wastes and make the working area clear or on the other word separating what is needed with unnecessary items

2- Set in order, specify and classify the working tools with labelling which enable the operators to find the required items easily and quickly.

3- Shine: cleaning the appearance of the work place in order o make sure that working atmosphere is clean and not messy. Shine is translated and communicated as sweep as well.

4- Standardize: listing and documenting the work methods, sharing the best practices internally. This method is making an standard of all past 3Ss as a guideline in order to keep the operation process as it should be.

5- Sustain, keep improving and use 5S as the main organization culture and use it in all working methods (Raid A. Al-Aomar, 2011).

After introducing the 5S and in the past years a new S is being added to 5S as the sixth S which is stand for Safety which tries to mix the 5S and safety together and create a unify method called 6S (Gnoni, Andriulo, Maggio & Nardone, 2013).

1.1.3. The TPM

The TPM is the abbreviation of Total Productive Maintenance which is defined in various studies differently as follow:

- TPM is a methodology to improve the production capability in order to maximize the machinery reliability and durability in order to make sure the best equipment management (Ahuja, I.P.S. and Khamba, J.S, 2008)

- The main goal of TPM is to make sure the availability and efficiency of the equipment in the certain moment and procedure by maintaining them in an optimum level to reduce the life cycle cost and also investment in the employees and human resources to utilize the machineries in a better way (Chan et al, 2005).

- TPM aims to find the issues as soon as possible in order to escape from any errors and problems to be happened. The TPM slogan is no mistake, no accidents, and no losses (Kiran, 2016).

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1.1.4.   The ASAICHI

There is several activities which help the teams to improve their performance and communications like starting a shift with a short meeting between the team members, the team leader will explain the team members about the daily plans and remind them about the policies, talk about the expected performance and the required quality of the job as well as talking about the safety and other key points (Saari, Suomalainen, Kuusela, & Hämeen-Anttila, 2016). Having a short meeting in the morning will let the team leader to understand about people absence at work, to check that everyone is aware about the assignments and tasks, to find out that the employees have enough knowledge about the safety and also to increase the team confidence and reach better atmosphere. The short morning meeting is part of ASAICHI method (Imai, 2012).

The main idea in ASAICHI is to check the progress of the job which is done in the past day based on the employee's feedback and report and adjust the current day operation activities accordingly (Imai, 2012). ASAICHI is a Japanese word which is translated as "first thing in the morning" or "morning market" (Imai, 2012). ASAICHI is not only about meeting inside them team and it can be held between the departments and functions managers.

1.2. Review of literature on employee performance

Employee performance is basically the outcome of employee job from a procedure, provided services or produced product which is relevant to the organization goals that can be measured financially or non-financially (Saif Ahmed, 2014).

The employee performance is a procedure which usually done annually or twice in a year by supervisors to subordinate in order to provide feedback on their activities and also define the business objectives and company expectations. During the performance review procedure usually the managers provide the improvement plans for employees to develop themselves in order to cover the gaps. A comprehensive definition of employee performance is the procedure to identify the employee capabilities, measuring the process and achievements and developing

and improving their career path and make sure that the organization is on the way to reach its goals and strategies and on the other hand providing feedback to employees and relevant rewards (Rafikul Islama, Shuib bin Mohd Rasad, 2006). However there is an idea that it is a challenge to define the performance measurement since organizations have multiple goals which may have conflict with each other (Rafikul Islama, Shuib bin Mohd Rasad, 2006).

Employee performance review has a long history and happened for many years in the organization. Although it is debated by many researchers, however as the result, it is clear that employee performance review has to be done in the organizations. The formal and wide employee performance appraisal system is required in any type organizations in order to justify the compensation packages, promotions and demotions as well as terminations (Rafikul Islama, Shuib bin Mohd Rasad, 2006). The fact is effective employee performance review can lead the company to growth and success while the improper system can make employee dissatisfaction and if the employees become dissatisfy, then it would cause lower motivation in their work and as the result of lower motivation we can expect less productivity and less support for the organization (Rafikul Islama, Shuib bin Mohd Rasad, 2006).

According to the HR specialists, an effective performance review system has following benefits (Rafikul Islama, and Shuib bin Mohd Rasad, 2006):

- Let employees to understand their weak points and strength points
- It would motivate the employees to show their best performance
- It helps the company to decide about the salary and stock program of employees, like increasing or decreasing the wage
- The training requirement will be cleared
- It can be a base for the future goal setting and performance review

In order to measure the employee performance different factors and criteria can be considered. Productivity is an undeniable factor which is very important for all organizations. In fact one of the main aims in all organizations is increasing productivity. Productivity has different definition and can be observed from different angles, however the main considerations are produced unit and spent time (Abdulraheem Sal, Mohammed Raja, 2016).

However measuring the performance is a very complicated subject and involve many different factors to measure (Wu 2005). Therefore it is very important that supervisors and subordinates make an agreement about the evaluation criteria in advance and measure the exact criteria while

they review the performance. In addition different evaluation factors need to have different weight in the evaluation process based on their level of importance. Finding the relevant and crucial evaluation criteria is a very important matter for performance evaluation process in kind of levels (Sidin, Hussin, & Soon. 2003).

Employee performance evaluation methods. There are different type of performance reviews which are designed long time ago. The companies believe that they use the best available way to measure their employees' performance, however the employees usually have different idea and in some cases they feel lack of justice. Considering the advantages and disadvantages of each evaluation methods, in this study we evaluate employee performance based on self-evaluation method, since it is more convenient to collect the data than other ways and measure the effects of employee performance from their own perspective (Mazen J Al Shobaki, Samy S Abu Naser. 2016).

Self-Evaluation. In the self-evaluation system, the employee evaluate their own performance privately based on the evaluation criteria. In fact the self-evaluation is not a completed process and supervisor provide feedback to employees after reading the self-evaluation. (Mazen J Al Shobaki, Samy S Abu Naser. 2016).

Behavioral checklist. This checklist as it is clear from the name is about the expected behavior at work. This evaluation is usually used in service provider companies such as hotels and restaurants. In this method, the supervisor fill a checklist by answering yes or no questions about employee manner at work. (Mazen J Al Shobaki, Samy S Abu Naser. 2016).

360 Degree feedback. In this method, the main evaluation is based on people who work with the employee such as:

- Supervisors, in order to find out how employee achieve to the business objectives, punctuality and…
- Subordinated, to understand the people management skills like goal setting, leadership, support, guidance and…
- Customers or suppliers (external), the feedback from external resources is very important as the employees act as company ambassadors and present the organization culture to the out of company
- Colleagues, the main aim is to understand how the employee act against other colleagues (Mazen J Al Shobaki, Samy S Abu Naser. 2016).

Method of critical facts. This method is a modern one which get employees involve in the goal setting process. The goals basically design based on the business strategies and objectives. Then the way to measure the achievement level will be set in addition to the time. Finally after specific period of time which is usually one year (depends on the business might be vary), the performance review session will be happened based on the fact and figures. The employees feel more justice in this method since there is no emotional or personal criteria, although they may not reach to the goals due to uncontrolled factors (Mazen J Al Shobaki, Samy S Abu Naser. 2016).

Rating scale. This method is probably the most up to dated way to measure employee performance. There will be a set of criteria for the employee like, completing the project, employee capabilities, employee achievement, employee development and… The supervisor give importance weight to each criteria and inform it to the employee at the beginning of the period. The employee goal is reaching to those criteria. The factor with higher weight has more importance. Then after the end of period the employer evaluate by giving rates (usually 1 to 10 scale) to each factors. The provided rate would be multiply by the weight of that factor. The total numeric score will be calculated based on the total score of each criteria, which shows employee failure or success rate (Mazen J Al Shobaki, Samy S Abu Naser. 2016).

Employee performance criteria. The employee performance is a statement which comes from direct supervisor to the employee based on the employee authority and responsibilities in a certain period of time like six month or one year (Hendri, M. I. 2019). There is different criteria to be measured for an employee performance. Some of the criteria are based on business development objectives and some of them are based people development objectives.

Based on studies in Singapore, Thailand and Philippine, the employee performance has different criteria to measure as follow (Vallance, 1999):

- o Singapore:
  - "Helicopter quality", which means ability of each employee in individual form to examine the problem or considering the important subjects.
  - "Intellectual quality", that is about the power of analyzing the situation and sense of reality.
  - "Result orientation", the sense and ability toward the result.

- "Leadership quality", which is about the capability of communication, motivation and giving assignments
  - o Thailand:
    - Output of work in terms of quality of job and quantity of job
    - The ability to execute the job based in the planning
    - Decision making ability in order to meet the due dates, solving the problems, coordinating with other units and helping to achieve organization goals.
    - Capability to improve the job, implementing the new ideas and providing solutions and identifying the issues and problems in order to execute the job with a high quality.
  - o Philippine:
    - Work management
    - People management
    - Resources management
    - Relationship management
    - Management of limitations
    - Creativity

1.2.1. Employee performance management guideline

The employee performance review is a very sensitive concept which can effect positively or negatively on the employee. However the following guideline items would be the support for mangers to apply the evaluation system more smoothly (Rafikul Islama, and Shuib bin Mohd Rasad, 2006):

Employee involvement in process. In case that employees find or feel some errors in the evaluation process like unfairness, not accurate goals, improper timing, they will not accept the whole process easily. Therefore it is recommended to get them involve during the whole process. The goals needs to be set and agreed between employer and employee and it would have better outcome if some feedback would be given to the employee during the performance

period. There will be kind of cooperation and consultation atmosphere if the employees participation rate would be high in an organization privacy (Rafikul Islama, and Shuib bin Mohd Rasad, 2006). More feedback from employee and employer create better understanding of expectation and job description.

Creating development standard. Having a standard to measure the job roles and responsibilities is a must. As mentioned before getting employees involve in the process would make the standards more reliable and acceptable (Rafikul Islama, and Shuib bin Mohd Rasad, 2006).

Goal setting. The goal setting is a very important function, since it can create motivation for employees. The goal setting in performance review system will have direct and positive effect on employees' satisfaction and performance Recently managers say that the goals needs to be SMART and have following characteristics (MacLeod, Les, EdD, MPH, LFACHE, 2012):

- Specific, to show what exactly the aim is and what needs to be catch.
- Measurable, how the measurement will be done and how can they know when they meet the goal
- Attainable, shouldn't be very easy to each or too difficult to catch, however it needs to be done in a proper timeline
- Relevant, the goal need to be relevant to the business objectives and company strategies
- Timely, there should be an ending point for the goals and it cannot be open ended one that means the deadline for the goals needs to be set

Perfect performance evaluation interview. The interview session is the window and face of all procedure, so if it doesn't go perfectly then the whole system will be effected negatively. It is important to pay attention on confidentiality of the information and assure employee on the privacy (Rafikul Islama, and Shuib bin Mohd Rasad, 2006). It is very crucial to allocate enough time for the interview session and do it without any interruptions. It is suggested to ask open ended question not the questions with yes or no answers and try to get employee engage with the interview. Like instead of asking "Are you happy with your job?" better to ask "how do you feel about your role in the company?" in order to get more information from the employee (Rafikul Islama, and Shuib bin Mohd Rasad, 2006).

Employee self-evaluation. Giving this opportunity to the employee to talk openly and raise their requirements, complains or sharing their thought is very important. In previous researches

indicated that usually the employees coming up with a very innovative solutions if they have chance to do self-evaluation and asses their own performance in compare with only one side (manger) talk (Rafikul Islama, and Shuib bin Mohd Rasad, 2006).

Management feedback. The management feedback on the performance is very necessary. The employees expect a positive feedback and also if they couldn't perform well and there is an area to improve then the managers needs to give constructive feedback. The feedbacks can be divided in three different answers like (Mazen J Al Shobaki, Samy S Abu Naser. 2016):

- Needs to be improved, for the ones which failed to reach the target
- Meet expectation or satisfactory, for the tasks which are completed and the target is reached
- Outstanding, in case that employee came up with an extra ordinary result and more than expectation

The appropriate evaluation system is the one that has formal and informal feedback session

Define the understandable procedure. The whole process needs to be understandable between the supervisors and subordinate. It is better to document the procedure from the beginning to avoid making any miscommunication or misunderstanding because it may caused a behavioral problem for both sides. Sometimes the behavioral problems can be happened for the evaluator like being in personal biases trap or having willingness to moderate the evaluation and on the other hand the behavioral problem can be related to the subordinate like they don't understand the evaluation system and they may not know what exactly the evaluator may expect from them (Mazen J Al Shobaki, Samy S Abu Naser. 2016).

Specific evaluation per person. The employees may complain if they are measured by an evaluation system and based on the criteria that they have no control on that, it means the evaluations needs to be specifically designed per person not per whole organization and the criteria should be clearly relevant and direct to the employee and the job (Rafikul Islama, and Shuib bin Mohd Rasad, 2006).

The evaluator capabilities. The rater who conduct the interview session, who give feedback, who set the goals and who set the standards needs to get enough training in advance and be capable with the whole procedure, otherwise it may damage the whole process. It is recommended that evaluators getting proper training to have enough knowledge about the compensation and rewarding schemes such as incentive and bonuses and understand the

importance of the evaluation system and try to spread this importance to the employees and subordinates (Mazen J Al Shobaki, Samy S Abu Naser. 2016).

Modify the evaluation system regularly. It is very important to check the evaluation system very carefully. The in appropriate evaluation system may decrease the employee sprit and effect the performance of the organization negatively or even can caused low support and cooperation inside the company, therefore having a regular feedback on the procedure in a timely manner is highly recommended (Mazen J Al Shobaki, Samy S Abu Naser. 2016).

1.3. The influence of Lean on employee performance

There is many factors that may influence on employee performance and perceptions. Some factors are external factors like politics, social, economic and technology, however there is several internal factors which have influence on employee performance (David Losonci, Krisztina Demeter & Istvan Jenei. 2011).

In case that organizations managers wants to implement Lean and they want to have smooth transaction period, they have to know about the possible effect of Lean on the employees and prepare for it in advance (David Losonci, Krisztina Demeter & Istvan Jenei. 2011).

As it is mentioned every single aspect in work can influence on the employee performance. The influence can be big or small as well as positive or negative.

On the other hand, implementing Lean in a company is very depends on employee engagement and they must participate in order to make sure about successful implementation. For example as a result of case study, a new system needs participation of certain number of employees to be set up into an organization (Samson, D., Sohal, A.S. and Ramsay, E. 1993) Therefore it is clear that Lean has influence on the employee performance and it is expected to find a significant impact. Actually when Lean applies on production system, it would affect not only on technical section but also on the human resources and therefore human resources and technological parts both needs to optimized in order to implement the Lean successfully (Paez, O.D., Genaidy, J., Tuncel, A., Karwowski, W. and Zurada, J. 2004).

As mentioned earlier, Lean is not limited to car industry and Toyota specificly and it is implemented in different categories, however the main barrier in Lean implementation is the

employees who don't think that Lean is applicable in their industry or organization (Fillingham, 2007, Kim et al., 2007; Laursen et al., 2003). The Lean implementation would be successful if the employee of the company get involve in the process.

The highlighted item about Lean influence on performance is about the report that was published by International Motor Vehicle Program at the Massachusetts Institute of Technology. According to the report Toyota manufacturing performance was twice more capable than General Motors. More precisely in Toyota production system a car needs 16 hours to be produced while in General Motors 31 hours required which is almost double (Womack, Jones, and Roos, 2003). According to this significant result implementing Lean in other industries become more interesting, however there is some cases that Lean was not successful due to lack of employees involvement in the process or they lack of interest as the employees believed that Lean is only applicable in automotive industry only .

Referring to the previous researches, there is an improvement in the performance, in case of relationship between the Lean and human resource management and employee participation and engagement (Bonavia and Marin-Garcia 2011, Das and Jayaram 2003; Holman et al. 2005; Kochan and Lansbury 1997; Yates, Lewchuk, and Stewart 2001). However and contrary to what is mentioned, some reseaches indicated that employee involvement is not directly effecting performance and in fact it is effecting on the Lean implementation and Lean implementation would be the reason of performance improvement (Fullerton and McWatters 2002; Sakakibara et al. 1997; Sila 2007).

There is some researches and case studies which focused on the Lean implementation and employee performance, however the studies in this regard was not sufficient as both the methodologies and field works can be improved (Ash M. Genaidy and Waldemar Karwowski 2003).

1.4. Conclusion

Having said all above, the study came to the following conclusions:

1. The employees of the company are responsible for their performance and their performance would be evaluated in different ways based on a periodic process.

According to the evaluation results, the employees will be awarded or penalized by promotion, demotion or termination. The evaluation process may effect the employee compensation package like salary and bonuses.

2. Implementing the Lean has any relation on the organization performance and organization performance depends on employee performance.

3. In case that employee understand that Lean implementation would increase their level of performance.

2. RESEARCH METHODOLOGY OF THE INFLUENCE OF LEAN ON THE EMPLOYEE PERFORMANCE

2.1. Questions, Model, Hypothesis of the research

Research questions. According to the literature review and based on the data availability and the possible information to gather, the following questions were considered in order to proceed and conduct the study:

- o RQ1: How big is the influence of Lean on employee performance?
- o RQ2: How big is the influence of Lean on employee quantity of work?
- o RQ3: How big is the influence of Lean on employee quality of work?
- o RQ4: How big is the influence of Lean on employee planning ability at work?
- o RQ5: How big is the influence of Lean on acceleration of employee organization ability?
- o RQ6: How big is the influence of Lean on the employee's working initiative?
- o RQ7: How big is the influence of Lean on the employee's commitment at work?
- o RQ8: How big is the influence of Lean on employee teamwork at work?
- o RQ9: How big is the influence of Lean on employee cooperation with others at work?
- o RQ10: How big is the influence of Lean on employee communication?
- o RQ11: How big is the influence of Lean on the employee contribution with social responsibility?

Referring to the literature review, The Lean itself is a very wide concept. The Lean can be implemented in the management level as well as working level. In addition Lean has different tools and methods.

The research model is designed based on two main components and variables of Lean and employee performance. However in order to measure the employee performance different deliverables needs to be measured. The deliverables which determine the employee performance in this study are (Rafikul Islam and Shuib bin Mohd Rasad, 2006):

- Quantity or quality of work, this is about completion of job and tasks according to the defined result in a timely manner and accuracy. Every individual employees needs to consider about the company goals and try to achieve that in an effectively way by

handling different tasks. In order to get clients' trust and confident it is very important to provide the reliable products or services.

- Planning or organization, having a planning ability in order to utilize the available and limited resources of the company in addition to organizing his or her activities in order to reach to the company goals. The right planning of manpower and other resources and maximize usage of man power would be possible if there is a comprehensive knowledge of the project. There is an expectation from the employees to identify the required resources to accomplish the job. It is also expected from the ideal employees to search for guidance if the goals or priorities are not clear.

- Initiative or commitment, this indicates the level of responsibility of the employee while they do duties. It is also about not only implementing the own tasks but also supporting and others in order to achieve the company goals with the lowest possible supervision by the managers.

- Teamwork or cooperation, which is about keeping the business relationship with colleagues and co-workers. They must be able to choose between the priorities and needs. They need to share information and other resources with co-workers in order to improve the collaborate environment of the organization.

- Communication, this criterion evaluates how effectively the employee deliver the messages and communicate with others in both verbal and written ways. They also need to listen carefully and understand the given task fully and also seek for the clarification if it is required.

- Social responsibility, the companies are usually not focusing on profit only and they would contribute on the social responsibilities as well. This is about how employees engage with company social activities.

In another word, the independent variable in this study is the implanted Lean methods and the dependent variable is employee performance, however in order to understand the impact on the independent variable, the mediating variables are measured.

Figure 1. The research model
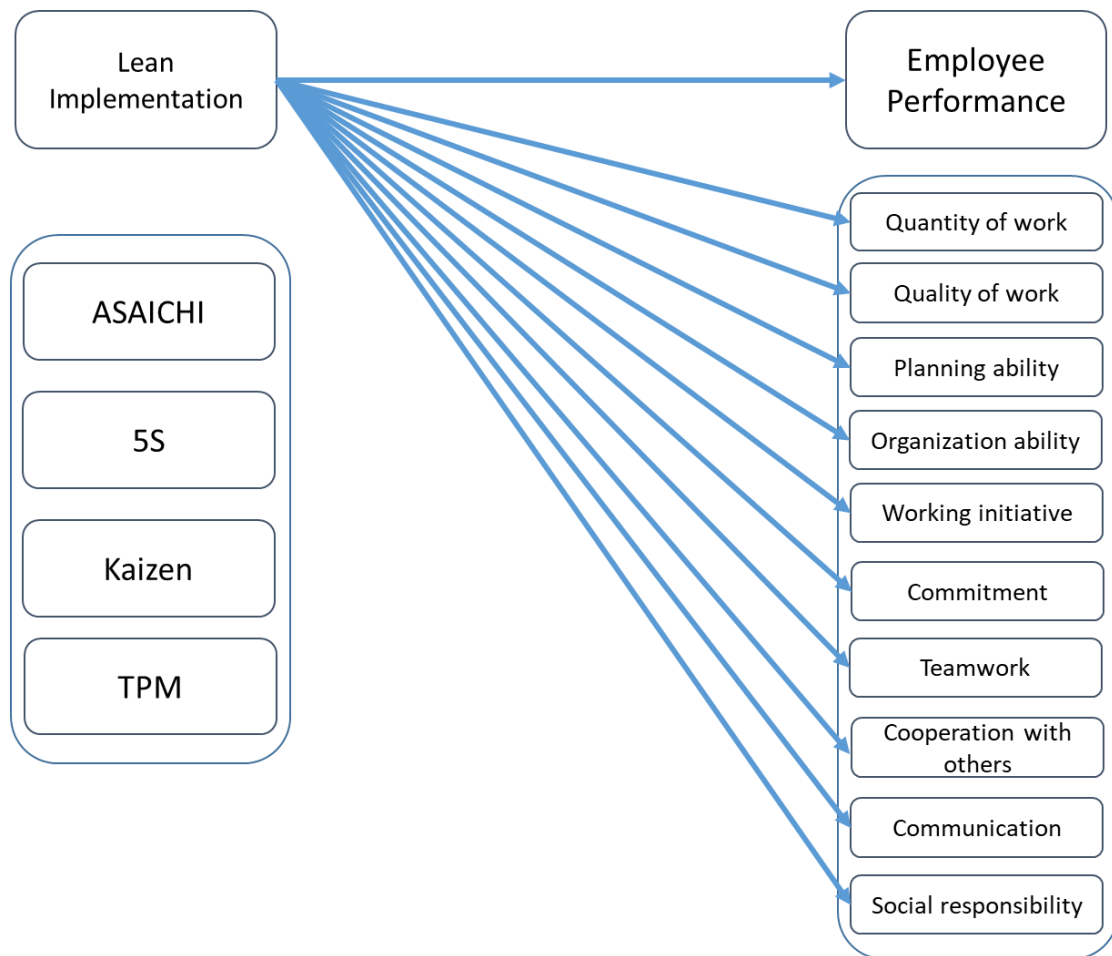
Source: Author

The basis of hypothesis creation in this study is about the relationship of Lean implementation and different employee performance in general as well as employee performance deliverable elements. It means in this study we aim to understand the impact of Lean on quantity and quality of work, planning and organization ability, working initiative and commitment to work, teamwork and cooperation with others, communication and social responsibilities factors. In this research the components of the employee performance is used in order to have a clear measurement about the employee performance since it is more tangible of research about Lean or Lean methods on employee performance. The research hypothesises are (Rafikul Islam and Shuib bin Mohd Rasad, 2006):

H1: The implementation of Lean (in the organization) influence the employee performance

H2: The implementation of Lean (in the organization) influence the employee quantity of work

H3: The implementation of Lean (in the organization) influence the employee quality of work

H4: The implementation of Lean (in the organization) influence, the employee planning ability

H5: The implementation of Lean (in the organization) influence, the employee organization ability

H6: The implementation of Lean (in the organization) influence, the employee's working initiative

H7: The implementation of Lean (in the organization) influence, the employee's commitment

H8: The implementation of Lean (in the organization) influence, the employee teamwork

H9: The implementation of Lean (in the organization) influence, the employee cooperation with others

H10: The implementation of Lean (in the organization) influence, the employee communication

H11: The implementation of Lean (in the organization) influence, the employee social responsibility

2.2 Research goal and sample

In this empirical research the main goal is to gather required information in order to be able to determine implementation of Lean in an organization has impact on employee performance of the company. In addition Lean companies are not the small organizations however inside the Lithuania the Lean organizations are growing rapidly.

In order to make sure that the research will have enough respondents, different companies such as manufacturers, service providers and traders were contacted and asked for their cooperation in the study. In addition to those organization, the companies who teach, consult, coach and implement the Lean as the third party were corresponded too, however not so many feedback received from them but Germanika company which is part of SBA Furniture in the Lithuania that is a big holding company has accepted to spread the questionnaire. The total population of the company is 523 employees.

In this research a non-probability sampling techniques would be used which is called convenience sampling. The reason that of this method selection was less complication and the target population was the employee of company which was in hand. The convenience sampling is the process to gather the proper data from the sample or unit of study which is accessible (Zikmund, 1997). Convienince sampling is an economic way of sampling which is the target population has easy to access or they have willingness to participate in the research (Etikan, 2016). Considering the COVID-19 pandemic situation, the data collection method would be online questionnaire which will be done through company HR department and Lean management.

In order to find out the expected respond rate, the similar studies about the employee performance in Europe were analyzed per following table and it is cleared that expected response rate would be around 57%:

Table 1. The expected response rate table

Author	Country	Potential Respondents	Respondents	Response rate
Osman M. Karatepe et al. (2006)	Cyprus	872	677	77%
Ko De Ruyter et al. (2001)	Netherland	350	154	44%
Adelien Decramer et al. (2012)	Belgium	552	199	36%
Cunha et al. (2002)	Europe	29540	6289	21%
Lydiah Wairimu Wambugu (2014)	Finland	63	59	94%
Bert H. J. (2012)	Belgium	168	160	95%
Flora F. T. Chiang & Thomas A. Birtch. (2007)	UK	600	186	31%
Total		32124	7495	57%

It is important to mention that based on different studies which has been done in Europe about the employee performance which is shown in the above table, the average response rate is 57% of total. The table shows that there is higher response rate in smaller sample sizes which is mostly because of more control possibilities.

The research will be done in Germanika Company which is part of SBA organization. There is different methods of Lean using in the company such as Kaizen, 5S, SMED, SD, ASAICHI, TPM, PDCA. Each employee of the company deal with Lean methods. In general administration part and office based employees deal mostly with ASAICHI, while workers in the factory deal with 5S, Kaizen and TPM mostly.

As explained about the sampling method, there will be a sample of 104 employee among all organization employees who would be asked for the level of implementation of Lean in their workplace as well as its impact on their working performance such as quantity and quality of their work, planning and organization ability, initiative and commitment, teamwork or cooperation, communication and contribution to the external factors.

In order to minimize the risk of non-response from the employee or collecting wrong information, the identity of the employees who answered the questionnaire would remain anonymous and the HR employee of the company as well as Lean coordinator would remind them employees to fill the questionnaire. Moreover the questionnaire would be translated from English to the Lithuanian language, again in order to reduce the risk of non-response due to lack of English language proficiency.

2.2. Instrument of the research

Questionnaire. The study quantitative questionnaire has two main structures. In the first part of the study the employee would be asked about the name and level of implementation of the Lean method in their workplace and the interval data would be measure by using a five Likert scale. The respondents would be asked about their frequency of usage of each different Lean methods specifically and the aim is to find out which method is being used by the respondents. The questions are about four different Lean methods which are Kaizen, 5S, ASAICHI and TPM. The possible answers in the Likert scale are Never to Always and the total questions for this section is four questions.

The second part of questionnaire would be about the specific implemented method of Lean and its influence of the different criteria of the performance which would be measured through the five Likert scale. There is ten different statements about ten main deliverables of the employee performance and the respondents possible answers are from Very bad to Very good. The statements investigate about working quantity, working quality, planning ability, organization ability, working initiative, commitment, teamwork, cooperation with others, communication and social responsibilities.

Data analysis. In this study the level of implementation of Lean would be measured and then the work result would be determined and then the influence would be calculated mathematically and statistically through SPSS program. The regression analyze would be used in order to measure the influence of Lean on the employee performance.

In addition to find out the construct validity, the factor analyze would be used and in order to make sure about the data reliability Cronbach alfa would be utilized.

3. ANALYSIS OF THE EMPRICAL DATA

## 3.1. Descriptive analysis of the research respondents

First of all, it needs to be emphasized that questionnaire has been distributed among the employees who worked at least six months in the company and got proper understanding of the procedure and schemes. The respondents have been chosen among the employees who work in the factory and workshop and also the employees of the office. The employees had experience of working with Lean method depends on their job. It should be mentioned that some that the usage of type of Lean method was depends on the position and function of the employee.

As noted in the last chapter, 104 respondents filled the electronic questionnaire based on the convenience sampling method which is a non-probability sampling approach.

Gender: Although Gender was not considered as a variable in the purpose of the study, however it is worthy to know that in this research population gender distribution was calculated as 65% male and 35% female which means 68 respondents were male and the rest which is 36 respondents were female.

Age: The study target was the employees and professions, therefore basically adult persons were questioned and targeted. Therefore, the age categories started from 18 years old and the last age category considered as plus 51 years old which is close to the retirement. The age distribution of the study shown in the figure 2 as follow:

Figure 2. The age distribution table
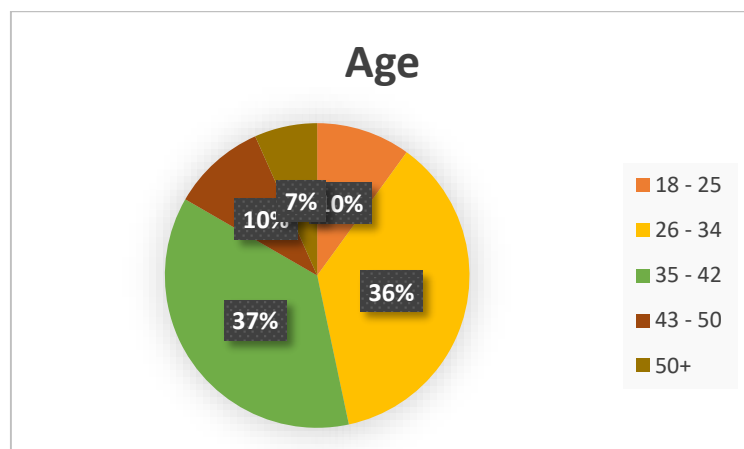
Source: Author

As it is shown in the table 10% of the respondents are between 18 and 25 years old, 36% of the respondents are between 26 to 34 years old, 37% of the respondents are between 35 and 42 years old, 10% of the respondents are between 43 and 50 years old and there is only 7% of the respondents more than 51 years old.

3.2 Descriptive analysis of the research result about the frequency usage of Lean method, employee performance and employee performance deliverable

The first segment of the study and questionnaire, the respondents asked about the frequency of usage of Lean methods. The respondents were asked to grade on a Likert scale from 1 to 5 about their usage frequency of the implemented Lean methods (Kaizen, 5S, ASAICHI and TPM). In the scale 1 was defined as "Never" and 5 was defined as "Always". The result is shown in the following table 2:

Table 2. The Lean method frequency table

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
How often do you use ASAICHI in your workplace?	104	1	5	4.31	1.034
How often do you use 5S in your workplace?	104	1	5	4.22	.892
How often do you use Kaizen in your workplace?	104	1	5	4.17	.915
How often do you use TPM in your workplace?	104	1	5	3.25	1.236

Source: SPSS Outcome data

As indicated in the above table ASAICHI, 5S and Kaizen were more in used by the employees rather than TPM. The average of usage in ASACHI was 4.31 with standard deviation of 1.034 and in 5S was 4.22 with standard deviation of 0.892, and in Kaizen was 4.17 with standard deviation of 0.915 while the average usage of TPM was 3.25 with standard deviation of 1.236. The average of standard deviation is 1.01 which shows the distribution of the data is around the mean. In fact TPM was being used between the production employees mostly in order to keep using the machineries and equipment based on the guidelines and maintenance programs and the office based employees were not in touched with TPM method, therefore the average usage of TPM is less than average usage of other Lean methods.

The next part of the questionnaire was about employee performance and the employee performance deliverables such as quality of work, quantity of work, planning and organization, working initiative and commitment, teamwork and cooperation, communication and social responsibilities. The respondents were ask to evaluate their level of performance by using a five Likert scale from very bad to very good and the result of their evaluation is presented in the following table 3:

Table 3. The employee performance evaluation table

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
I would say my working quality is:	104	1	5	3.99	.960
I would say my working quantity is:	104	1	5	4.00	.924
I would say my planning ability is:	103	1	5	3.92	.936
I would say my organization ability is:	104	1	5	3.96	.891
I would say my working initiative is:	104	1	5	3.82	.983
I would say my commitment to work is:	104	1	5	3.94	1.253
I would say my teamwork is:	104	1	5	4.07	1.073
I would say my cooperation with others at work is:	103	1	5	4.11	1.038
I would say my communication with others at work is:	103	1	5	4.20	.984
I would say my contribution to social responsibility is:	104	1	5	3.66	1.187

Source: SPSS Outcome data

As presented in the table, the employees evaluated themselves close to the highest level. The average of responses for the quality of work is 3.99 and for quantity of work is 4.00. In regards with planning and organization ability the average of the responses were 3.92 and 3.96. The working initiative and commitment to work average answers were 3.82 and 3.92. The respondents averagely answered to the questions of teamwork and cooperation with others 4.07 and 4.11. The employees evaluated their level of communication as 4.20 averagely and finally their level of social responsibilities average answer was 3.66.

As presented in the table the 3 the standard deviation of the variables average is 1.02 which explain that our data is centred and distributed around the mean with 1.02 deviation which is good.

3.3. Testing of research hypothesis

In order to test the research hypothesis statistically the data was loaded into the SPSS program. After entering the data and updating the variable structure the reliability of the scales were measured. The reliability analysis for the independent variable which is Lean was 0.862 as the result of calculation of four different variables such as Kaizen, 5S, ASAICHI and TPM. The data is shown in the table 4 as follow:

Table 4. The reliability analysis of Lean

Reliability Statistics

Cronbach's Alpha	N of Items
.862	4

Source: SPSS Outcome data

After checking the independent reliability analysis the dependent reliability analysis has been done. As the result of calculation of 10 variables the Cronbach's Alpha of 0.824 was cleared. The data is shown in the table 5 as follow:

Table 5. The reliability analysis of employee performance variables

Reliability Statistics

Cronbach's Alpha	N of Items
.824	10

Source: SPSS Outcome data

Next step was checking the validity of the data, therefore factor analysis test has been done and as presenting in the table 6 the data is validated by 0.880 KMO and the significant which is lower than 0.05%.

Table 6. The validity analysis of the data

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.880
Bartlett's Test of Sphericity	Approx. Chi-Square	588.201
	df	91
	Sig.	.000

Source: SPSS Outcome data

Later on the average answer all 10 deliverables of employee performance were computed and the mean answer has been considered as the rate of employee performance variable. Also different type of Lean methods (Kaizen, 5S, TPM and ASAICHI) have been computed and the mean answered considered as the Lean variable. This is because of measuring the correlation and regression of main independent variable (Lean) on the main dependant variable (employee performance).

According to the research model, the hypothesis were tested through the Linear regression analysis in order to find out the influence of Lean as independent variable on the employee performance as the maid question of the research and employee performance deliverables as follow:

- **H1**: The implementation of Lean (in the organization) influence the employee performance.

Table 7. The regression analysis of Lean on employee performance

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	2.164	.236		9.156	<.001		
	LeanMet	.452	.058	.612	7.807	<.001	1.000	1.000

a. Dependent Variable: Performance

Source: SPSS Outcome data

Based on the table 23 and Anova table the F is equal to 60.942 and it is significant, so the regression is confirmed, however based on the model summary table and R-square data 0.374 which is more than 20%, we can say that 37.4% of the employee performance can be explained by Lean. According to the coefficient table the t value is 7.807 and significant and the impact of Lean on the employee performance is calculated as standardized coefficient beta which is 0.612.

The hypothesis accepted and there is significant positive impact of Lean on the employee performance.

Regression equitation: $Y=2.164+0.452X$

- **H2**: The implementation of Lean (in the organization) influence the employee quantity of work.

Table 8. The regression analysis of Lean on quantity of work

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.492	.404		6.165	<.001		
	LeanMet	.378	.099	.353	3.815	<.001	1.000	1.000

a. Dependent Variable: I would say my working quantity is:

Source: SPSS Outcome data

As per table 24, to analyse the hypothesis 2, firstly the Anova table has been investigated. The F=14.556 and it is statistically significant, next is about the model summary the R2 is 0.125 which means 12.5% of the dependent variable can be explained by the independent variable. The R2 is less than 20% which is the acceptable rate in the social sciences. Therefore it is not possible to accept the hypothesis.

- **H3**: The implementation of Lean (in the organization) influence the employee quality of work.

Table 9. The regression analysis of Lean on employee quality of work

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.220	.412		5.393	<.001		
	LeanMet	.444	.101	.399	4.401	<.001	1.000	1.000

a. Dependent Variable: I would say my working quality is:

Source: SPSS Outcome data

Based on the table 25 and according to the Anova table the F value is 19.365 and statistically significant, thus there is linear regression. Based on the model summary table 15.1% of the

working quality can be explained by Lean which is not really a good rate since the R-square is 0.151. Thus the model cannot be confirmed and the hypothesis cannot be accepted.

- H4: The implementation of Lean (in the organization) influence, the employee planning ability.

Table 10. The regression analysis of Lean on employee planning ability

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.853	.385		4.817	<.001		
	LeanMet	.520	.094	.480	5.505	<.001	1.000	1.000

a. Dependent Variable: I would say my planning ability is:

Source: SPSS Outcome data

As per table 26 and referring to the Anova table the F is equal to 30.300 and significant so the regression exist. Based on the R^2 which is 0.231 in model summary table, 23.1% of the employee planning ability can be explained by Lean which is a good and acceptable rate. Based on the coefficient table the standardized coefficient beta shows the influence of independent variable on the dependent variable by 0.480 and in the same table the t=5.505 and statistically significant.

Having said that, we can confirm that hypothesis is accepted and Lean has significant positive influence on the employee planning ability.

Regression equitation: Y=1.853+0.520X

- **H5**: The implementation of Lean (in the organization) influence, the employee organization ability.

Table 11. The regression analysis of Lean on employee organization ability

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.296	.381		6.025	<.001		
	LeanMet	.417	.093	.405	4.471	<.001	1.000	1.000

a. Dependent Variable: I would say my organization ability is:

Source: SPSS Outcome data

Based on the table 27 and to check the hypothesis the F value in Anova table has been checked that is 19.991 and significant. It states that the regression exist. According to the model summary and R2 data 16.4% of the dependent variable can be explained by independent variable which is not so good since it is less than 20%, so the model is weak and the hypothesis cannot be accepted.

- **H6**: The implementation of Lean (in the organization) influence, the employee's working initiative.

Table 12. The regression analysis of Lean on employee working initiative

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.177	.428		5.081	<.001		
	LeanMet	.411	.105	.361	3.915	<.001	1.000	1.000

a. Dependent Variable: I would say my working initiative is:

Source: SPSS Outcome data

According to the table 28 and based on the F value which is 15.329 and significant in the Anova table above the regression available and according to the model summary only 13.1% of the dependent variable can be explained by independent variable since the R2 is 0.131 and lower than 20% and it shows the weakness of the model so the hypothesis cannot be accepted.

- **H7**: The implementation of Lean (in the organization) influence, the employee's commitment.

Table 13. The regression analysis of Lean on employee commitment

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.343	.563		4.162	<.001		
	LeanMet	.401	.138	.277	2.908	.004	1.000	1.000

a. Dependent Variable: I would say my commitment to work is:

Source: SPSS Outcome data

Referring to the table 29 and as per above Anova table the F value is 8.454 and statistically significant so the existing of regression is confirmed. According to the summary model the R-square is 0.077 which means 7.7% of the dependent variable can be explained with independent variable which is very low number considering the fact that R2 is a range between 0 to 1 and lower than 20% in social sciences is not really good, thus the hypothesis cannot be accepted.

- **H8**: The implementation of Lean (in the organization) influence, the employee teamwork.

Table 14. The regression analysis of Lean on employee teamwork

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.800	.446		4.037	<.001		
	LeanMet	.568	.109	.458	5.202	<.001	1.000	1.000

a. Dependent Variable: I would say my teamwork is:

Source: SPSS Outcome data

Based on the table 30 and according to the Anova table F=27.065 and significant statistically so there is linear regression between variables. per analysing R2=0.210 in the model summary it is cleared that 21% of the dependent variable can be explained by independent variable which is good rate and based on t=5.202 in the coefficient table the t test is significant and the

influence of independent variable on the dependent variable is 0.458 and positive significant according to standardized coefficient beta.

Having said all above the hypothesis is accepted and Lean has influence on the teamwork of employees.

Regression equitation: Y=1.800+0.568X

- **H9**: The implementation of Lean (in the organization) influence, the employee cooperation with others.

Table 15. The regression analysis of Lean on employee cooperation with others

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.714	.420		4.085	<.001		
	LeanMet	.600	.103	.502	5.835	<.001	1.000	1.000

a. Dependent Variable: I would say my cooperation with others at work is:

Source: SPSS Outcome data

According to the table 31 and referring to the Anova table the F value is 34.052 and significant based on the p value and the regression is available. In the model summary R2=0.252 which means 25.2% of the dependent variable can be explained by the independent variable and according to the coefficient table t value is 5.835 and significant and the influence of Lean on cooperation of employee with others is 0.502 as per standardized coefficient beta.

The hypothesis is accepted and Lean has positive significant influence on the employee cooperation with others at work.

Regression equitation: Y=1.714+0.600X

- **H10**: The implementation of Lean (in the organization) influence, the employee communication.

Table 16. The regression analysis of Lean on employee communication with others

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.994	.401		4.969	<.001		
	LeanMet	.554	.098	.489	5.636	<.001	1.000	1.000

a. Dependent Variable: I would say my communication with others at work is:

Source: SPSS Outcome data

As per table 32, there is linear regression between the variables based on the F value which is significant in the Anova table. 23.2% of the dependent variable can be explained with independent variable since R^2 is equal to 0.239 in the model summary table and Lean influence on the employee communication is 0.489 based on the standardized coefficient beta and significant t test result which is 5.636 in coefficient table.

The hypothesis accepted and confirmed that Lean has positive and significant impact on the employee communication variable.

Regression equitation: Y=1.994+0.554X

- **H11**: The implementation of Lean (in the organization) influence, the employee social responsibility.

Table 17. The regression analysis of Lean on employee social responsibility at work

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.766	.548		5.051	<.001		
	LeanMet	.225	.134	.164	1.676	.097	1.000	1.000

a. Dependent Variable: I would say my contribution to social responsibility is:

Source: SPSS Outcome data

Based on table 33 and according to the provided information in the Anova table and since the p value is not less than 0.05, there is no regression between the variables and Lean has no impact on the employee social responsibility at work.

The hypothesis is rejected and there is no influence from independent variable on dependent variable.

4. CONCLUSION OF THE STUDY AND RECOMMENDATION FOR THE FUTURE RESEARCHES

Conclusion of the study. Based on the empirical data result, it is confirmed that Lean has influence on the employee performance and the impact is also positive. It is also cleared the employees who deals with Lean methods have better planning ability since Lean has positive influence on planning ability. The teamwork spirit and cooperation with others of the employees is influenced significantly and positively by Lean. In addition Lean has positive and significant impact on the employees' communication.

Moreover, needs to be mentioned that impact of Lean on working quantity, working quality, organization ability, working initiative and commitment is not significant and the model is weak to be confirmed. However Lean has no impact on the employees' social responsibility at work.

Figure 3. The approve hypothesis model
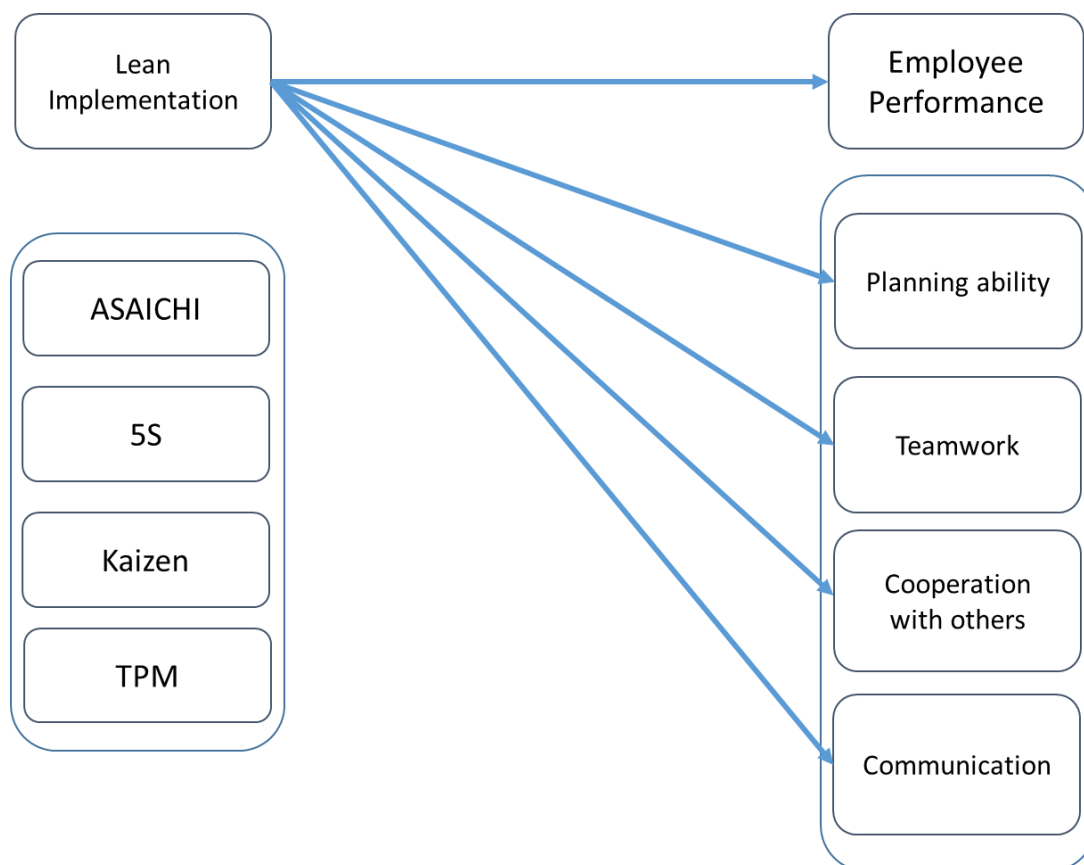
Source: Author

Limitation of the study. In case of limitation of study about Lean implementation, it is essential to say that data collection should be done in a Lean organization. Since the researcher has to operate the study within an organization which Lean has been implemented, otherwise the respondents wouldn't know about the Lean. Apparently there is not a lot of Lean organizations and the existing ones are not a small company to approach them easily and convince them for the cooperation.

The other barrier was the COVID-19 pandemic situation and the restriction which didn't let the data collection to be done by face to face interview.

Recommendation for the future researches:

1. Lean has different methods and tools and in this study the focus was on 4 techniques due to the lack of data collection source. In the future studies the researchers may ask on implementation of other Lean methods like Production Kanbans, Kaizen workshops (Kaizen events), Information boards (actual data), Value stream mapping (VSM), Setup time reduction (SMED), Root cause analysis ("5 Why?"), Cellular layout, Statistical process charts (SPC), Cross-functional training, Standard operation procedures (SOP), Error proofing (Poka-Yoke), Visiting actual place (Gemba), Problem solving standard (A3), Strategy deployment (Hoshin), Consensus decisions (Ringi) and Alert system (Andon). The same model and procedure can be used for the further researches on other Lean methods.

2. In this study the self-evaluation method has been used and the respondents were asked about their performance. It is clear that people can be evaluated differently by a third person. It is recommended to use different type of employee performance evaluation system like 360 degree method which is a very comprehensive way to understand about employee performance or collecting the data from the employee supervisor about the employee performance.

3. Taking into account that different people may have different thought and understanding about the subjects, the future studies can add gender or age as a moderator variable to the model and see how the sex and age group can influence the study result and find out whether any correlation between the moderators and the employee working performance or not.

4. It is also recommended to have a cross study between two similar organizations in terms of size, industry and structure but different in terms of implementation of Lean and study on the employee performance while they use Lean methods and while they use different type of techniques. On the other word having the same study on Lean organization and not Lean organization in order to compare the outcome.

REFERENCES

Ahuja, Inderpreet & Khamba, Jaimal. (2008). Total productive maintenance: Literature review and directions. International Journal of Quality & Reliability Management. 25. 709-756.

Al-Aomar, R. (2011). Applying 5S Lean Technology: An Infrastructure for Continuous Process Improvement. *World Academy of Science, Engineering and Technology, International Journal of Mechanical, Aerospace, Industrial, Mechatronic and Manufacturing Engineering, 5*, 2645-2650.

Anwar, H. (2015). Iqbal.(2015). Effect of Leadership Style on Employee Performance. *Arabian Journal of Business and Management Review*, *5*.

Belcourt, M., Bohlander, G., & Snell, S. (2008). Managing Human Resources (5th Canadian ed.). Torento: Thomson-Nelson.

Bessant, J. (2000), "Creating and maintaining high involvement innovation", Seminar on kaizen from Understanding to Action, 30 March, Institute of Electrical Engineers, London.

Black, J. R., Miller, D., & Sensel, J. (2008). *The Toyota way to healthcare excellence: increase efficiency and improve quality with LEAN* (Vol. 1). Chicago: Health Administration Press.

Bonavia, Tomas & Marin-Garcia, Juan A. (2011). Integrating human resource management into lean production and their impact on organizational performance. International Journal of Manpower. 32. 923-938.

Brunet, A. P., & New, S. (2003). Kaizen in Japan: an empirical study. *International Journal of Operations & Production Management*.

Campbell, Robert James. "Thinking Lean in Healthcare" Journal of AHIMA 80, no.6 (June 2009): 40-43.

Cardona Mora, Jose & Bribiescas, Francisco. (2015). RESPECT FOR PEOPLE: THE FORGOTTEN PRINCIPLE IN LEAN MANUFACTURING IMPLEMENTATION. European Scientific Journal. 11. 45-61.

Chan FTS, Lau HCW, Ip RWL, Chan HK, Kong S (2005) Implementation of total productive maintenance: a case study. Int J Prod Econ 95(1):71–94.

Chiang, F. F., & Birtch, T. (2007). The transferability of management practices: Examining cross-national differences in reward preferences. *Human Relations*, *60*(9), 1293-1330.

Clark, D. M., Silvester, K., & Knowles, S. (2013). Lean management systems: creating a culture of continuous quality improvement. *Journal of clinical pathology*, *66*(8), 638-643.

Cunha, R. C., Pina e Cunha, M., Morgado, A., & Brewster, C. (2002). Market forces, strategic management, HRM practices and organizational performance, A model based in a European sample.

Das, A., & Jayaram, J. (2003). Relative importance of contingency variables for advanced manufacturing technology. *International Journal of Production Research*, *41*(18), 4429-4452.

Daultani, Y., Chaudhuri, A., & Kumar, S. (2015). A decade of lean in healthcare: current state and future directions. *Global Business Review*, *16*(6), 1082-1099.

Dávid Losonci, Krisztina Demeter, István Jenei. (2011), Factors influencing employee perceptions in lean transformations, International Journal of Production Economics, Volume 131, Issue 1, Pages 30-43.

De Ruyter, K. O., Wetzels, M., & Feinberg, R. (2001). Role stress in call centers: Its effects on employee performance and satisfaction. *Journal of interactive marketing*, *15*(2), 23-35.

Decramer, A., Smolders, C., Vanderstraeten, A., & Christiaens, J. (2012). The impact of institutional pressures on employee performance management systems in higher education in the low countries. *British Journal of Management*, *23*, S88-S103.

Drotz, E., & Poksinska, B. (2014). Lean in healthcare from employees' perspectives. *Journal of health organization and management*, *28*(2), 177–195.

Etikan, Ilker. (2016). Comparison of Convenience Sampling and Purposive Sampling. American Journal of Theoretical and Applied Statistics. 5. 1.

Farshid Abdi, Sohrab Khalili Shavarini, Seyed Mohammad Seyed Hoseini. 2006, GLEAN LEAN: HOW TO USE LEAN APPROACH IN SERVICE INDUSTRIES? Journal of Services Research. Jul2006 Special Issue, Vol. 6, p191-206. 16p.

Fillingham, D. (2007), "Can lean save lives?", *Leadership in Health Services*, Vol. 20 No. 4, pp. 231-241.

Fullerton, R. R., and C. S. McWatters. 2002. "The Role of Performance Measures and Incentive Systems in Relation to the Degree of JIT Implementation." Accounting, Organizations and Society 27 (8): 711–735.

Genaidy, A. M., & Karwowski, W. (2003). Human performance in lean production environment: Critical assessment and research framework. *Human Factors and Ergonomics in Manufacturing & Service Industries*, *13*(4), 317-330.

Gnoni, M. G., Andriulo, S., Maggio, G., & Nardone, P. (2013). "Lean occupational" safety: an application for a near-miss management system design. *Safety science*, *53*, 96-104.

Hendri, M. I. (2019). The mediation effect of job satisfaction and organizational commitment on the organizational learning effect of the employee performance. International Journal of Productivity and Performance Management, 68(7), 1208–1234.

Hines, Peter & Holweg, Matthias & Rich, Nick. (2004). Learning to Evolve: A Review of Contemporary Lean Thinking. International Journal of Operations & Production Management. 24.

Holman, D., T. D. Wall, C. W. Clegg., P. Sparrow, and A. Howard. (2005). The Essentials of the New Workplace: A Guide to the Human Impact of Modern Working Practices. Chichester, West Sussex, UK: John Wiley & Sons.

Imai, K. (2012), Gemba Kaizen: A Commonsense Approach to a Continuous Improvement Strategy, McGraw-Hill, New York, NY.

Islam, Rafikul & Rasad, S.M.. (2006). Employee performance evaluation by the AHP: A case study. Asia Pacific Management Review. 11. 163-176.

Kanamori, S., Sow, S., Castro, M. C., Matsuno, R., Tsuru, A., & Jimba, M. (2015). Implementation of 5S management method for lean healthcare at a health center in Senegal: a qualitative study of staff perception. *Global health action*, *8*(1), 27256.

Karatepe, O. M., & Uludag, O. (2007). Conflict, exhaustion, and motivation: A study of frontline employees in Northern Cyprus hotels. *International Journal of Hospitality Management*, *26*(3), 645-665.

Kim, C. S., Hayman, J. A., Billi, J. E., Lash, K., & Lawrence, T. S. (2007). The application of lean thinking to the care of patients with bone and brain metastasis with radiation therapy. *Journal of oncology practice*, *3*(4), 189-193.

Kiran, D. R. (2017). Total quality management: key concepts and case studies. Butterworth-Heinemann is an imprint of Elsevier.

Kochan, T. A., & Lansbury, R. D. (1997). Lean production and changing employment relations in the international auto industry. *Economic and Industrial Democracy*, *18*(4), 597-620.

Lawal, A. K., Rotter, T., Kinsman, L., Sari, N., Harrison, L., Jeffery, C., ... & Flynn, R. (2014). Lean management in health care: definition, concepts, methodology and effects reported (systematic review protocol). *Systematic reviews*, *3*(1), 1-6.

Lian, Y., & Landeghem, H. (2002). An application of simulation and value stream mapping in lean manufacturing.

Locke, Edwin & Latham, Gary. (2002). Building a Practically Useful Theory of Goal Setting and Task Motivation: A 35Year Odyssey. American Psychologist - AMER PSYCHOL. 57. 705-717. 10.1037/0003-066X.57.9.705.

Macleod, Les. (2013). Making SMART goals smarter. Physician executive. 38. 68-70, 72.

Marin-Garcia, J. A., & Bonavia, T. (2015). Relationship between employee involvement and lean manufacturing and its effect on performance in a rigid continuous process industry. *International Journal of Production Research*, *53*(11), 3260-3275.

Mazen J Al Shobaki, Samy S Abu Naser. The reality of modern methods applied in process of performance assessments of employees in the municipalities in Gaza Strip, International Journal of Advanced Scientific Research, Volume 1; Issue 7; October 2016; Page No. 14-23

Melton, T. (2005). The Benefits of Lean Manufacturing: What Lean Thinking has to offer the Process Industries. Chemical Engineering Research and Design, 83(6), 662-673.

Paez, O.D., Genaidy, J., Tuncel, A., Karwowski, W. and Zurada, J. (2004), "The lean manufacturing enterprise: an emerging sociotechnological system integration", Human Factors & Ergonomics in Manufacturing, Vol. 14 No. 3, pp. 285-306.

Rotter, T., Plishka, C., Lawal, A., Harrison, L., Sari, N., Goodridge, D., ... & Willoughby, K. (2019). What is lean management in health care? Development of an operational definition for a Cochrane systematic review. *Evaluation & the health professions*, *42*(3), 366-390.

Saari, L., Suomalainen, T., Kuusela, R., & Hämeen-Anttila, T. (2016, November). Workshop-based corporate foresight process: a case study. In *International Conference on Product-Focused Software Process Improvement* (pp. 580-589). Springer, Cham.

Saif Ahmed. (2014). Study of Impact Of Effective Induction On Employee Performance And Satisfaction, Centre for Management Studies Jamia Millia Islamia, New Delhi-25

Sakakibara, S., Flynn, B. B., Schroeder, R. G., & Morris, W. T. (1997). The impact of just-in-time manufacturing and its infrastructure on manufacturing performance. *Management Science*, *43*(9), 1246-1257.

Sal, A., & Raja, M. (2016). The impact of training and development on employees performance and productivity. *International Journal of Management Sciences and Business Research*, *5*(7).

Samson, D., Sohal, A.S. and Ramsay, E. (1993). "Human resource issues in manufacturing improvement initiatives: case study experiences in Australia", The International Journal of Human Factors in Manufacturing, Vol. 3 No. 2, pp. 135-52.

Schreurs, B. H., Hetty van Emmerik, I. J., Günter, H., & Germeys, F. (2012). A weekly diary study on the buffering role of social support in the relationship between job insecurity and employee performance. *Human Resource Management*, *51*(2), 259-279.

Sensel, J., Black, J. R., & Miller, D. (2016). The Toyota Way to Healthcare Excellence: Increase Efficiency and Improve Quality with Lean, Second Edition. Health Administration Press.

Shah, Rachna & Ward, Peter. (2007). Defining and Developing Measures of Lean Production. Journal of Operations Management. 25. 785-805. 10.1016/j.jom.2007.01.019.

Sidin, S., Hussin, S.R., & Soon, T.H. (2003). An Exploratory Study of Factors Influencing the College Choice Decision of Undergraduate Students in Malaysia. *Asia-Pacific Management Review, 8*, 259-280.

Sila, Ismail. (2007). Examining the Effects of Contextual Factors on TQM and Performance through the Lens of Organizational Theories. Journal of Operations Management - J OPER MANAG. 25. 83-109.

Smith, G., Poteat-Godwin, A., Harrison, L. M., & Randolph, G. D. (2012). Applying Lean principles and Kaizen rapid improvement events in public health practice. *Journal of Public Health Management and Practice*, *18*(1), 52-54.

Teeuwen, B. (2011). Lean for public sector: the pursuit of perfection in government services. Boca Raton: CRC Press Productivity Press.

Vallance, S. (1999). Performance appraisal in Singapore, Thailand and the Philippines: A cultural perspective. *Australian Journal of Public Administration*, *58*(4), 78-95.

Vinodh, S., Gautham, S. G., & Ramiya R, A. (2011). Implementing lean sigma framework in an Indian automotive valves manufacturing organisation: a case study. *Production Planning & Control*, *22*(7), 708-722.

Wambugu, L. (2014). Effects of Organizational Culture on Employee Performance (Case Study of Wartsila-Kipevu Ii Power Plant). *European Journal of Business and Management*, *6*(32).

Womack, J. P., & Jones, D. T. (2003). Lean Thinking: Banish Waste and Create Wealth in Your Corporation. London: Simon & Schuster

Womack, J. P., Jones, D. T., & Roos, D. (2007). The machine that changed the world: how lean production revolutionized the global car wars. London: Simon & schuster.

Wu, H. (2005). A DEA approach to understanding the performance of Taiwan's steel industries 1970~1996. *Asia-Pacific Management Review, 10*, 349-356.

Yates, C., Lewchuk, W., & Stewart, P. (2001). Empowerment as a Trojan horse: new systems of work organization in the North American automobile industry. *Economic and Industrial Democracy*, *22*(4), 517-541.

Zikmund, W.R., (1997), Business Research Methods (5th Ed.), the Dryden Press, Fort Worth, Texas

SUMMARY IN ENGLISH

The Influence of Lean on employee work performance

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Master thesis

Global Business and Economy Program

VILNIUS UNIVERSITY

FACULTY OF ECONOMICS AND BUSINESS ADMINASTRATION

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80 pages, 34 tables, 3 figures, 59 references.

The main purpose of this master thesis in to analyse the impact of Lean on the employee work performance and different components of employee performance.

This study includes three main categories, the first category is the analysis of literature, the second part is analysing the empirical data and the last part is about the conclusions and the recommendations for the future studies.

As per the literature review, Lean has different methods and techniques which aim to eliminate wastes, refine and accelerate the process and adding value to customers and increase the satisfaction accordingly. On the other hand employee performance consist ten different variables like working quantity, working quality, planning ability, organization ability, working initiative, commitment to job, teamwork, cooperation with others, communication and social responsibilities.

Based on the empirical data result, it is confirmed that Lean has influence on the employee performance and the impact is also positive. It is also cleared the employees who deals with Lean methods have better planning ability since Lean has positive influence on planning ability. The teamwork spirit and cooperation with others of the employees is influenced significantly and positively by Lean. In addition Lean has positive and significant impact on the employees' communication.

Moreover, needs to be mentioned that impact of Lean on working quantity, working quality, organization ability, working initiative and commitment is not significant and the model is

weak to be confirmed. However Lean has no impact on the employees' social responsibility at work.

SUMMARY IN LITHUANIAN

Lean įtaka darbuotojų darbo rezultatyvumui

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80 puslapiai, 34 lentelės, 3 paveikslai, 59 šaltiniai.

Pagrindinis šio magistro darbo tikslas - išanalizuoti „Lean" poveikį darbuotojų darbo rezultatams ir skirtingiems darbuotojų darbo komponentams.

Šis tyrimas apima tris pagrindines kategorijas, pirmoji - literatūros analizė, antroji - empirinių duomenų analizė, o paskutinė dalis - apie išvadas ir rekomendacijas būsimiems tyrimams.

Kaip rašoma literatūros apžvalgoje, „Lean" turi skirtingus metodus ir metodus, kuriais siekiama pašalinti atliekas, patobulinti ir pagreitinti procesą bei pridėtinę vertę klientams ir atitinkamai padidinti pasitenkinimą. Kita vertus, darbuotojų veiklą sudaro dešimt skirtingų kintamųjų, tokių kaip darbo kiekis, darbo kokybė, planavimo gebėjimai, organizaciniai gebėjimai, darbo iniciatyva, atsidavimas darbui, komandinis darbas, bendradarbiavimas su kitais, bendravimo ir socialinė atsakomybė.

Remiantis empiriniais duomenimis, patvirtinama, kad „Lean" turi įtakos darbuotojų rezultatams, o poveikis taip pat yra teigiamas. Taip pat aišku, kad darbuotojai, dirbantys su „Lean" metodais, turi geresnius planavimo gebėjimus, nes „Lean" daro teigiamą įtaką planavimo gebėjimams. „Lean" reikšmingai ir teigiamai įtakoja komandinio darbo dvasią ir bendradarbiavimą su kitais darbuotojais. Be to, „Lean" turi teigiamą ir reikšmingą poveikį darbuotojų bendravimui.

Be to, reikia paminėti, kad „Lean" poveikis darbo kiekiui, darbo kokybei, organizaciniams gebėjimams, darbo iniciatyvai ir įsipareigojimui nėra reikšmingas, o modelis yra silpnas, kad jį būtų galima patvirtinti. Tačiau „Lean" neturi jokios įtakos darbuotojų socialinei atsakomybei darbe.

Research Questionnaire

Table 18. Survey questionnaire

5 Likert scale about frequency usage of Lean method	Never	Occasionally	Sometimes	Often	Always
How often do you use ASAICHI in your workplace?	1	2	3	4	5
How often do you use 5S in your workplace?	1	2	3	4	5
How often do you use Kaizen in your workplace?	1	2	3	4	5
How often do you use TPM in your workplace?	1	2	3	4	5
5 Likert scale about employee performance	Very bad	Bad	Mediocre	Good	Very good
I would say my working quality is:	1	2	3	4	5
I would say my working quantity is:	1	2	3	4	5
I would say my planning ability is:	1	2	3	4	5
I would say my organization ability is:	1	2	3	4	5
I would say my working initiative is:	1	2	3	4	5
I would say my commitment to work is:	1	2	3	4	5
I would say my teamwork is:	1	2	3	4	5
I would say my cooperation with others at work is:	1	2	3	4	5
I would say my communication with others at work is:	1	2	3	4	5
I would say my contribution to social responsibility is:	1	2	3	4	5

Source: Author

SPSS Output data

Table 19. Reliability analysis of Lean scale

Case Processing Summary

		N	%
Cases	Valid	104	100.0
	Excluded[a]	0	.0
	Total	104	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.862	4

Table 20. Reliability analysis of employee performance scale

Case Processing Summary

		N	%
Cases	Valid	101	97.1
	Excluded[a]	3	2.9
	Total	104	100.0

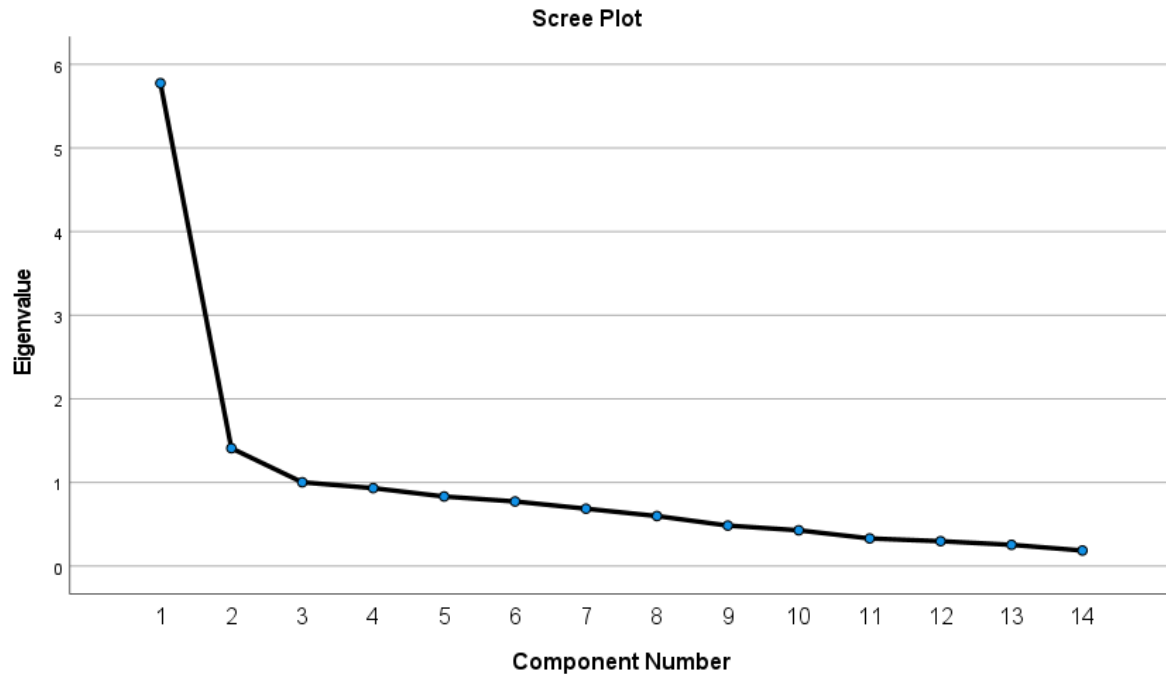a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.824	10

Table 21. Validity analysis of the data

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.880
Bartlett's Test of Sphericity	Approx. Chi-Square	588.201
	df	91
	Sig.	<.001

Scree Plot

Pattern Matrix[a]

	Component		
	1	2	3
How often do you use ASAICHI in your workplace?		-.809	
How often do you use 5S in your workplace?		-.738	
How often do you use Kaizen in your workplace?		-.839	
How often do you use TPM in your workplace?		-.822	
I would say my working quality is:	.654		
I would say my working quantity is:			.512
I would say my planning ability is:		-.481	
I would say my organization ability is:	.620		
I would say my working initiative is:	.443		
I would say my commitment to work is:			.843
I would say my teamwork is:	.726		
I would say my cooperation with others at work is:	.791		
I would say my communication with others at work is:	.648		
I would say my contribution to social responsibility is:			.464

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization. [a]

a. Rotation converged in 10 iterations.

Total Variance Explained

Component	Rotation Sums of Squared Loadings[a] Total
1	4.558
2	4.336
3	2.263

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

Structure Matrix

	Component		
	1	2	3
How often do you use ASAICHI in your workplace?	.460	-.845	
How often do you use 5S in your workplace?	.581	-.851	
How often do you use Kaizen in your workplace?	.472	-.877	
How often do you use TPM in your workplace?		-.788	
I would say my working quality is:	.661		
I would say my working quantity is:	.478		.619
I would say my planning ability is:	.449	-.586	
I would say my organization ability is:	.646		
I would say my working initiative is:	.585		.545
I would say my commitment to work is:			.816
I would say my teamwork is:	.783		
I would say my cooperation with others at work is:	.840	-.444	
I would say my communication with others at work is:	.747	-.458	
I would say my contribution to social responsibility is:	.416		.541

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.

Component Correlation Matrix

Component	1	2	3
1	1.000	-.464	.326
2	-.464	1.000	-.202
3	.326	-.202	1.000

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.

Table 22. Correlation analysis

Correlations

		LeanMet	I would say my working quality is:	I would say my working quantity is:	I would say my planning ability is:	I would say my organization ability is:	I would say my working initiative is:	I would say my commitment to work is:	I would say my teamwork is:	I would say my cooperation with others at work is:	I would say my communication with others at work is:	I would say my contribution to social responsibility is:	Performance
LeanMet	Pearson Correlation	1	.399**	.353**	.480**	.405**	.361**	.277**	.458**	.502**	.489**	.164	.612**
	Sig. (2-tailed)		<.001	<.001	<.001	<.001	<.001	.004	<.001	<.001	<.001	.097	<.001
	N	104	104	104	103	104	104	104	104	103	103	104	104
I would say my working quality is:	Pearson Correlation	.399**	1	.263**	.293**	.317**	.338**	.193*	.396**	.500**	.415**	.099	.595**
	Sig. (2-tailed)	<.001		.007	.003	.001	<.001	.049	<.001	<.001	<.001	.316	<.001
	N	104	104	104	103	104	104	104	104	103	103	104	104
I would say my working quantity is:	Pearson Correlation	.353**	.263**	1	.339**	.247*	.310**	.327**	.362**	.441**	.445**	.274**	.631**
	Sig. (2-tailed)	<.001	.007		<.001	.011	.001	<.001	<.001	<.001	<.001	.005	<.001
	N	104	104	104	103	104	104	104	104	103	103	104	104
I would say my planning ability is:	Pearson Correlation	.480**	.293**	.339**	1	.325**	.282**	.171	.278**	.383**	.337**	.128	.546**
	Sig. (2-tailed)	<.001	.003	<.001		<.001	.004	.085	.005	<.001	<.001	.198	<.001
	N	103	103	103	103	103	103	103	103	102	102	103	103
I would say my organization ability is:	Pearson Correlation	.405**	.317**	.247*	.325**	1	.302**	.181	.500**	.384**	.365**	.208*	.594**
	Sig. (2-tailed)	<.001	.001	.011	<.001		.002	.067	<.001	<.001	<.001	.034	<.001
	N	104	104	104	103	104	104	104	104	103	103	104	104
I would say my working initiative is:	Pearson Correlation	.361**	.338**	.310**	.282**	.302**	1	.354**	.491**	.502**	.432**	.163	.663**
	Sig. (2-tailed)	<.001	<.001	.001	.004	.002		<.001	<.001	<.001	<.001	.098	<.001
	N	104	104	104	103	104	104	104	104	103	103	104	104
I would say my commitment to work is:	Pearson Correlation	.277**	.193*	.327**	.171	.181	.354**	1	.270**	.170	.242*	.183	.521**
	Sig. (2-tailed)	.004	.049	<.001	.085	.067	<.001		.006	.086	.014	.064	<.001
	N	104	104	104	103	104	104	104	104	103	103	104	104
I would say my teamwork is:	Pearson Correlation	.458**	.396**	.362**	.278**	.500**	.491**	.270**	1	.610**	.545**	.262**	.750**
	Sig. (2-tailed)	<.001	<.001	<.001	.005	<.001	<.001	.006		<.001	<.001	.007	<.001
	N	104	104	104	103	104	104	104	104	103	103	104	104
I would say my cooperation with others at work is:	Pearson Correlation	.502**	.500**	.441**	.383**	.384**	.502**	.170	.610**	1	.610**	.330**	.778**
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001	<.001	.086	<.001		<.001	<.001	<.001
	N	103	103	103	102	103	103	103	103	103	102	103	103
I would say my communication with others at work is:	Pearson Correlation	.489**	.415**	.445**	.337**	.365**	.432**	.242*	.545**	.610**	1	.234*	.727**
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001	<.001	.014	<.001	<.001		.018	<.001
	N	103	103	103	102	103	103	103	103	102	103	103	103
I would say my contribution to social responsibility is:	Pearson Correlation	.164	.099	.274**	.128	.208*	.163	.183	.262**	.330**	.234*	1	.480**
	Sig. (2-tailed)	.097	.316	.005	.198	.034	.098	.064	.007	<.001	.018		<.001
	N	104	104	104	103	104	104	104	104	103	103	104	104
Performance	Pearson Correlation	.612**	.595**	.631**	.546**	.594**	.663**	.521**	.750**	.778**	.727**	.480**	1
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	
	N	104	104	104	103	104	104	104	104	103	103	104	104

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 23. The influence of Lean on employee performance regression analysis

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LeanMet[b]	.	Enter

a. Dependent Variable: Performance

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.612[a]	.374	.368	.50813	1.494

a. Predictors: (Constant), LeanMet

b. Dependent Variable: Performance

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.735	1	15.735	60.942	<.001[b]
	Residual	26.336	102	.258		
	Total	42.072	103			

a. Dependent Variable: Performance

b. Predictors: (Constant), LeanMet

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.164	.236		9.156	<.001		
	LeanMet	.452	.058	.612	7.807	<.001	1.000	1.000

a. Dependent Variable: Performance

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	LeanMet
1	1	1.978	1.000	.01	.01
	2	.022	9.383	.99	.99

a. Dependent Variable: Performance

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.6166	4.4254	3.9685	.39086	104
Residual	-1.19490	1.30510	.00000	.50566	104
Std. Predicted Value	-3.459	1.169	.000	1.000	104
Std. Residual	-2.352	2.568	.000	.995	104

a. Dependent Variable: Performance

Table 24. The influence of Lean on employee quantity of work regression analysis

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LeanMet[b]	.	Enter

a. Dependent Variable: I would say my working quantity is:

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.353[a]	.125	.116	.869	1.760

a. Predictors: (Constant), LeanMet

b. Dependent Variable: I would say my working quantity is:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.990	1	10.990	14.556	<.001[b]
	Residual	77.010	102	.755		
	Total	88.000	103			

a. Dependent Variable: I would say my working quantity is:

b. Predictors: (Constant), LeanMet

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.492	.404		6.165	<.001		
	LeanMet	.378	.099	.353	3.815	<.001	1.000	1.000

a. Dependent Variable: I would say my working quantity is:

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	LeanMet
1	1	1.978	1.000	.01	.01
	2	.022	9.383	.99	.99

a. Dependent Variable: I would say my working quantity is:

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.87	4.38	4.00	.327	104
Residual	-2.193	1.374	.000	.865	104
Std. Predicted Value	-3.459	1.169	.000	1.000	104
Std. Residual	-2.524	1.581	.000	.995	104

a. Dependent Variable: I would say my working quantity is:

Table 25. The influence of Lean on employee quality of work regression analysis

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LeanMet[b]	.	Enter

a. Dependent Variable: I would say my working quality is:

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.399[a]	.160	.151	.885	2.035

a. Predictors: (Constant), LeanMet

b. Dependent Variable: I would say my working quality is:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.157	1	15.157	19.365	<.001[b]
	Residual	79.834	102	.783		
	Total	94.990	103			

a. Dependent Variable: I would say my working quality is:

b. Predictors: (Constant), LeanMet

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.220	.412		5.393	<.001		
	LeanMet	.444	.101	.399	4.401	<.001	1.000	1.000

a. Dependent Variable: I would say my working quality is:

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	LeanMet
1	1	1.978	1.000	.01	.01
	2	.022	9.383	.99	.99

a. Dependent Variable: I would say my working quality is:

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.66	4.44	3.99	.384	104
Residual	-2.329	2.004	.000	.880	104
Std. Predicted Value	-3.459	1.169	.000	1.000	104
Std. Residual	-2.633	2.265	.000	.995	104

a. Dependent Variable: I would say my working quality is:

Table 26. The influence of Lean on employee planning ability regression analysis

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LeanMet[b]	.	Enter

a. Dependent Variable: I would say my planning ability is:

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.480[a]	.231	.223	.825	2.159

a. Predictors: (Constant), LeanMet

b. Dependent Variable: I would say my planning ability is:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20.626	1	20.626	30.300	<.001[b]
	Residual	68.753	101	.681		
	Total	89.379	102			

a. Dependent Variable: I would say my planning ability is:

b. Predictors: (Constant), LeanMet

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.853	.385		4.817	<.001		
	LeanMet	.520	.094	.480	5.505	<.001	1.000	1.000

a. Dependent Variable: I would say my planning ability is:

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	LeanMet
1	1	1.977	1.000	.01	.01
	2	.023	9.356	.99	.99

a. Dependent Variable: I would say my planning ability is:

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.37	4.45	3.92	.450	103
Residual	-1.451	1.458	.000	.821	103
Std. Predicted Value	-3.446	1.176	.000	1.000	103
Std. Residual	-1.759	1.767	.000	.995	103

a. Dependent Variable: I would say my planning ability is:

Table 27. The influence of Lean on employee organization ability regression analysis

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LeanMet[b]	.	Enter

a. Dependent Variable: I would say my organization ability is:

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.405[a]	.164	.156	.819	1.958

a. Predictors: (Constant), LeanMet

b. Dependent Variable: I would say my organization ability is:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.412	1	13.412	19.991	<.001[b]
	Residual	68.434	102	.671		
	Total	81.846	103			

a. Dependent Variable: I would say my organization ability is:

b. Predictors: (Constant), LeanMet

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.296	.381		6.025	<.001		
	LeanMet	.417	.093	.405	4.471	<.001	1.000	1.000

a. Dependent Variable: I would say my organization ability is:

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	LeanMet
1	1	1.978	1.000	.01	.01
	2	.022	9.383	.99	.99

a. Dependent Variable: I would say my organization ability is:

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.71	4.38	3.96	.361	104
Residual	-2.175	1.660	.000	.815	104
Std. Predicted Value	-3.459	1.169	.000	1.000	104
Std. Residual	-2.655	2.027	.000	.995	104

a. Dependent Variable: I would say my organization ability is:

Table 28. The influence of Lean on employee working initiative regression analysis

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LeanMet[b]	.	Enter

a. Dependent Variable: I would say my working initiative is:

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.361[a]	.131	.122	.921	1.523

a. Predictors: (Constant), LeanMet

b. Dependent Variable: I would say my working initiative is:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.004	1	13.004	15.329	<.001[b]
	Residual	86.525	102	.848		
	Total	99.529	103			

a. Dependent Variable: I would say my working initiative is:

b. Predictors: (Constant), LeanMet

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.177	.428		5.081	<.001		
	LeanMet	.411	.105	.361	3.915	<.001	1.000	1.000

a. Dependent Variable: I would say my working initiative is:

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	LeanMet
1	1	1.978	1.000	.01	.01
	2	.022	9.383	.99	.99

a. Dependent Variable: I would say my working initiative is:

Casewise Diagnostics[a]

Case Number	Std. Residual	I would say my working initiative is:	Predicted Value	Residual
96	-3.064	1	3.82	-2.822

a. Dependent Variable: I would say my working initiative is:

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.59	4.23	3.82	.355	104
Residual	-2.822	2.001	.000	.917	104
Std. Predicted Value	-3.459	1.169	.000	1.000	104
Std. Residual	-3.064	2.172	.000	.995	104

a. Dependent Variable: I would say my working initiative is:

Table 29. The influence of Lean on employee commitment regression analysis

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LeanMet[b]	.	Enter

a. Dependent Variable: I would say my commitment to work is:

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.277[a]	.077	.067	1.210	1.893

a. Predictors: (Constant), LeanMet

b. Dependent Variable: I would say my commitment to work is:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.372	1	12.372	8.454	.004[b]
	Residual	149.281	102	1.464		
	Total	161.654	103			

a. Dependent Variable: I would say my commitment to work is:

b. Predictors: (Constant), LeanMet

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.343	.563		4.162	<.001		
	LeanMet	.401	.138	.277	2.908	.004	1.000	1.000

a. Dependent Variable: I would say my commitment to work is:

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	LeanMet
1	1	1.978	1.000	.01	.01
	2	.022	9.383	.99	.99

a. Dependent Variable: I would say my commitment to work is:

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.74	4.35	3.94	.347	104
Residual	-3.347	2.256	.000	1.204	104
Std. Predicted Value	-3.459	1.169	.000	1.000	104
Std. Residual	-2.767	1.865	.000	.995	104

a. Dependent Variable: I would say my commitment to work is:

Table 30. The influence of Lean on employee teamwork regression analysis

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LeanMet[b]	.	Enter

a. Dependent Variable: I would say my teamwork is:

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.458[a]	.210	.202	.958	1.611

a. Predictors: (Constant), LeanMet

b. Dependent Variable: I would say my teamwork is:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24.856	1	24.856	27.065	<.001[b]
	Residual	93.673	102	.918		
	Total	118.529	103			

a. Dependent Variable: I would say my teamwork is:

b. Predictors: (Constant), LeanMet

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.800	.446		4.037	<.001		
	LeanMet	.568	.109	.458	5.202	<.001	1.000	1.000

a. Dependent Variable: I would say my teamwork is:

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	LeanMet
1	1	1.978	1.000	.01	.01
	2	.022	9.383	.99	.99

a. Dependent Variable: I would say my teamwork is:

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.37	4.64	4.07	.491	104
Residual	-2.647	1.779	.000	.954	104
Std. Predicted Value	-3.459	1.169	.000	1.000	104
Std. Residual	-2.762	1.857	.000	.995	104

a. Dependent Variable: I would say my teamwork is:

Table 31. The influence of Lean on employee cooperation with others regression analysis

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LeanMet[b]	.	Enter

a. Dependent Variable: I would say my cooperation with others at work is:

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.502[a]	.252	.245	.902	1.743

a. Predictors: (Constant), LeanMet

b. Dependent Variable: I would say my cooperation with others at work is:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	27.692	1	27.692	34.052	<.001[b]
	Residual	82.134	101	.813		
	Total	109.825	102			

a. Dependent Variable: I would say my cooperation with others at work is:

b. Predictors: (Constant), LeanMet

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.714	.420		4.085	<.001		
	LeanMet	.600	.103	.502	5.835	<.001	1.000	1.000

a. Dependent Variable: I would say my cooperation with others at work is:

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	LeanMet
1	1	1.977	1.000	.01	.01
	2	.023	9.337	.99	.99

a. Dependent Variable: I would say my cooperation with others at work is:

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.31	4.71	4.11	.521	103
Residual	-2.265	1.786	.000	.897	103
Std. Predicted Value	-3.441	1.167	.000	1.000	103
Std. Residual	-2.511	1.980	.000	.995	103

a. Dependent Variable: I would say my cooperation with others at work is:

Table 32. The influence of Lean on employee communication regression analysis

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LeanMet[b]	.	Enter

a. Dependent Variable: I would say my communication with others at work is:

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.489[a]	.239	.232	.862	1.841

a. Predictors: (Constant), LeanMet

b. Dependent Variable: I would say my communication with others at work is:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	23.619	1	23.619	31.764	<.001[b]
	Residual	75.100	101	.744		
	Total	98.718	102			

a. Dependent Variable: I would say my communication with others at work is:

b. Predictors: (Constant), LeanMet

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.994	.401		4.969	<.001		
	LeanMet	.554	.098	.489	5.636	<.001	1.000	1.000

a. Dependent Variable: I would say my communication with others at work is:

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	LeanMet
1	1	1.977	1.000	.01	.01
	2	.023	9.338	.99	.99

a. Dependent Variable: I would say my communication with others at work is:

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.55	4.76	4.20	.481	103
Residual	-2.303	1.621	.000	.858	103
Std. Predicted Value	-3.442	1.163	.000	1.000	103
Std. Residual	-2.671	1.880	.000	.995	103

a. Dependent Variable: I would say my communication with others at work is:

Table 33. The influence of Lean on employee social responsibility regression analysis

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LeanMet[b]	.	Enter

a. Dependent Variable: I would say my contribution to social responsibility is:

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.164[a]	.027	.017	1.177	1.871

a. Predictors: (Constant), LeanMet

b. Dependent Variable: I would say my contribution to social responsibility is:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.891	1	3.891	2.808	.097[b]
	Residual	141.330	102	1.386		
	Total	145.221	103			

a. Dependent Variable: I would say my contribution to social responsibility is:

b. Predictors: (Constant), LeanMet

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.766	.548		5.051	<.001		
	LeanMet	.225	.134	.164	1.676	.097	1.000	1.000

a. Dependent Variable: I would say my contribution to social responsibility is:

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	LeanMet
1	1	1.978	1.000	.01	.01
	2	.022	9.383	.99	.99

a. Dependent Variable: I would say my contribution to social responsibility is:

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.99	3.89	3.66	.194	104
Residual	-2.891	1.672	.000	1.171	104
Std. Predicted Value	-3.459	1.169	.000	1.000	104
Std. Residual	-2.456	1.420	.000	.995	104

a. Dependent Variable: I would say my contribution to social responsibility is: