SAKARYA UNIVERSITY
INSTITUTE OF SCIENCE AND TECHNOLOGY

BARRIERS TO BE FACED IN TRANSITION TO LEAN CONSTRUCTION - AFGHANISTAN

M.Sc. THESIS

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Department of Institute : CIVIL ENGINEERING

Supervisor : Assist. Prof. Dr. Zeynep YAMAN

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This thesis has been accepted unanimously / with majority of votes by the examination committee on 09. 08. 2021

Head of Jury **Jury Member** **Jury Member**

DECLERATION

I declare that all the data in this thesis was obtained by myself in academic rules, all visual and written information and results were presented in accordance with academic and ethical rules, there is no distortion in the presented data, in case of utilizing other people's works they were refereed properly to scientific norms, the data presented in this thesis has not been used in any other thesis in this university or in any other university.

Ehsanullah SHAHEEDMAL OMARI
09.08.2021

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LIST OF SYMBOLS AND ABBREVIATIONS

ABCE	: Assembly-Based Conurrent Engineering
CPM	: Construction Project Management
CSFs	: Critical Success Factors
CIDB	: Construction Industry Development Board
CPP	: Construction Percentage Program
EC	: Egan Committee
ENVA	: Essential Non-Value Added
ILCG	: International Lean Construction Group
JIT	: Just In Time
LC	: Lean Construction
LPS	: Last Planner System
NGO	: None-Governmental Organization
NVA	: Non-Value Adding
NAP	: Network Analysis Process
PMBOK	: Project Management Body of Knowledge
PMS	: Proformance Measurement System
PPC	: Production Planing Control
PPRA	: Planning Performing Review Action
SS	: Six Sigma
VA	: Value Adding

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SUMMARY

Keywords: Lean Construction, Lean Success

This study hypothesizes the being of Lean idea in an optimal way, suitable performance and tolerable concepts that contribute to Lean construction and explain the barriers to be encountered in transition to lean construction in a country such as Afghanistan. Lean construction (LC) is an optimal way in managing to gain the object of projects and the construction procedures by eliminating waste.

For the implementation of the lean construction variables necessary determined and a questionnaire survey prepared to use the Likert scale in 5 points. The survey study done by engineering students, engineers, practitioners, and managers who are working in construction companies and actively operating in Afghanistan, where lean construction practices are not practiced, constitutes the sample group. Statistical analysis was done by applying Crosstab and T-Tests on the obtained result for this survey study.

The statistical analyses identified the variable factors that prevent the enactment of Lean production culture in countries like Afghanistan in addition to the obstacles to be encountered in transition to lean construction Afghanistan, where lean construction is not yet applied despite it being prevalent in many countries.

From the accumulated information data, it was found that formal training for project managers and coworkers is available in most organizations is not available. Very few organizations have some knowledge of the lean concept, but it is not sufficient for them to implement it, the managers' experience limits the usage of the lean method within the organizations. Moreover, some organizations already use some lean methods, firgure that these methods are lean methodology, however, the data indicated that the lean construction method is negligible. As well as the absence of knowledge and understanding of the lean concept, many organizations showed to be reluctant towards making any change, even if these changes will predominantly increase performance and better the quality and production standards and rules of their organization. The accumulated data suggest that organizations have resisted the new tools and techniques provided by the lean construction philosophy and in some cases, that is not applicable to their organization.

This study assessed some of the main barriers which are to be faced to successful LC transition, and the respondents rated four of them as significant: 1. War and no security 2. Absence of enough lean awareness and recognition. 3. Civilization culture and human attitudinal matters 4. Senior management obligation.

YALIN İNŞAATA GEÇİŞTE KARŞILAŞILACAK ENGELLER – AFGANİSTAN

ÖZET

Anahtar Kelimeler: Yalın İnşaat, Yalın Başarı

Bu çalışmanın hipotezi, "Yalın" kavramının optimal çözüm özelliğini, uygun performansı ve yalın inşaata katkıda bulunan tolere edilebilir kavramları ve Afganistan gibi bir ülkede yalın inşaata geçişte karşılaşılması gereken engelleri açıklamaktır. Yalın inşaat, boşa harcanan unsurları ortadan kaldırarak projelerin amaçlarına ve inşaat prosedürlerini doğru uygulamaya yönelik en uygun yoldur.

Yalın inşaatın uygulanması için gerekli değişkenler belirlenmiş ve Likert ölçeğini kullanmak üzere 5 puanlık bir anket çalışması hazırlanmıştır. Yalın inşaat uygulamalarının yapılmadığı Afganistan'da inşaat şirketlerinde çalışan ve aktif olarak faaliyet gösteren mühendislik öğrencileri, mühendisler, uygulayıcılar ve yöneticiler tarafından yapılan anket çalışması örnek grubu oluşturmaktadır. Bu anket çalışması için elde edilen sonuç üzerinde Crosstab ve T-Testleri uygulanarak istatistiksel analiz yapılmıştır.

Çalışmada anket verilerine uygulanan istatistiksel analizler sonucunda, pek çok ülkede yaygın olmasına rağmen yalın inşaatın henüz uygulanmadığı Afganistan gibi ülkelerde yalın üretim kültürünün yasalaşmasına engel olan değişken faktörlerin yanı sıra, yalın inşaata geçişte karşılaşılabilecek engellerin de neler olduğu belirlenmiştir. Edinilen bilgi verilerinden, çoğu organizasyonda proje yöneticileri ve takım çalışanları için resmi eğitimin mevcut olmadığı, çok az sayıda kuruluşun yalın kavramı hakkında kısmen bilgi sahibi olduğu, ancak bunu uygulamak için yeterli imkânlarının bulunmadığı ve yöneticilerin deneyimlerinin yalın yöntemin kuruluşlar içinde kullanımını sınırlar mahiyette olduğu anlaşılmaktadır. Bunun yanında, bazı kuruluşların, bu yöntemlerin yalın bir metodoloji olduğunun farkına vararak bazı yalın yöntemleri kullanmakta olduğu görülmüştür. Eldeki veriler, kuruluşların yalın inşaat felsefesi tarafından sağlanan ve bazı durumlarda kendi kuruluşlarına uygulanamayan yeni araç ve tekniklere direndiğini göstermektedir.

Bu çalışmada, başarılı LC geçişinde karşılaşılması gereken bazı ana engeller değerlendirilmiştir. Yapılan ankette, katılımcılar bu engellerden önemli olarak gördükleri ilk dördünü şu şekilde sıralamışlardır: 1. Savaşın devam etmesi ve güvenliğin olmaması. 2. Yalın İnşaatın yeterince tanınmaması ve yeterli farkındalığın olmaması. 3. Medeniyet kültürü ve insani tutum konularında yaşanan problemler.
4. Üst yönetimde sorumluluk alma eksikliği

CHAPTER 1. INTRODUCTION

Lean construction (LC) is a new way and method of production purposed at decreasing material, time, cost, and endeavor in construction projects. Essentially, in this methodology of lean construction the outcome of the desired would be to maximize and output of the project's value while minimizing time delay and wasteful aspects. It means, it maximizes the good and minimizes the bad [1].

The producer of this outcome when approaches of professional construction which is merged with a concise and clear understanding of information and materials of project and two group of archetypes of management, control, and planning. To understand this may seem complex, to use this system the essence for what is necessary without extra. This strategic planning and the act can just be accomplished by a management team for the help and aid of all members [2].

It must comprehend that lean construction (LC) is a concept and philosophy with ideologies and principles, and it is not a real plan for action with a set of tools and methods [3]. The principles of lean construction are the same by many various schools of thought. The main principles include Based on data and planning to create a predicable atmosphere, decreasing of the overflow of losess from careful planning and incrementing of communication flows between ongoing project and customer [4]. Based on the notion lean is a way of thought that less is more. the methods and principles of lean mindset are explicitly stated in the below part [5].

For management concept into the construction industry, Lean Construction is a new shape of the application. and these projects are simple to manage speedly completion, decreased cost, safe, and of enable quality. (Gregory Howel,1999) [5].

1.1. Purpose and Method

The Construction industry in Afghanistan has been seeing fundamental and optimal changes in the last twenty-two. Indeed, after agriculture and mining the construction industry is the third sector that has a straight trace on the development of the national economy but the ongoing situation and war throughout affects the construction industry in Afghanistan.

Between 2004 and 2014 Afghanistan enjoyed a high economic growth rate, but it declined to 6.79% in the last 3 months of 2015. (World Bank, 2018) Afghanistan is still investing in the Construction industry and has been partnering with the personal sector. In the countries with poor economies such as Afghanistan, the challenges are more effects and severe the operating of the construction industry [6].

In this study:

1. Literature reviewed,
2. For the transition to the lean construction variables necessary determined.
3. A questionnaire survey which was send to 70 different organizations for responding. From the 70 organizations 37 responded completly, 17 of them responded for some of the question and 26 organzation didn't responded to the survey questions. The survey: (Engineers, practitioners, and managers whose actively working in construction companies, Organization and NGO's which currently operating in the construciton feild in Afghanistan),
4. The conclusion and result of the survey study in which the lean construction is practices or not practices, constitutes the sample group of ideas.
5. Statistical analysis was done by applying Frequency Crosstab, T-Tests, and Anova on the obtained result from the survey study.
6. As a result of these statistical analyzes, the variables (barriers) that frobid the formation of this production culture in the countries like Afghanistan, where the lean construction culture applied, in many countries hav been not formed still now.

1.2. Original Value

There are two original values in this thesis study. When the literature examined in the second chapter, it is seen that the method of lean construction on construction projects is a new and optical method for control wastes, which were aimed at determining the implementation process of construction project and alongside it determined the obstacles which are face to the implementation of lean construction.

Another exclusive value of this research study is the statistical analysis obtained from the questionnaire survey done in the professional field and this Statistical analysis was done by applying Frequency Crosstab, T-Tests on the information data.

1.3. Thesis Stages

The thesis study covered in 5 chapters:

Chapter 1. This chapter introduced the subject of the study, the reasoning, and objectives; Along with a brief method of studying and how to study the topic.

Chapter 2. literature, information about the objectives and general body and framework of the thesis is given. (Questionnaire survey and it's analysis).

Chapter 3. Material and the method of survey which used for evaluation and tools that is used for the survey (Crosstab, Anova and T Tests) explained.

Chapter 4. Result of the research study that: Is the new lean construction and its method is applicable in a country like Afghanistan?

Chapter No 5. The result and conclusion of this study evaluated, and the statical analysis and show that the lean construction and obstacles which faced to transition explained.

CHAPTER 2. LITERATURE REVIEW

The literature studies Lean construction, obstacles to face in the implementation of lean construction, sustainability through Lean Construction, the concept of lean construction also study the benefits and drawbacks of lean construction, The literature review was explained not according to the classification of the methods, but according to the publication order of the studies.

Studies on lean construction and obstacle to be faced in implementation of lean construction made between 1992 and 2020 summarized below in chronological order.

2.1. Lean Construction Industry

Lean construction has 11 main principles that to reduce the: variability, cycle time, amount of steps, the share of non-deal activities, linkages, and parts, maximize the output value as per the customer requirements, maximize the flexibility of output, maximize transparency of the process, control and focus on all process, improvement of build continous into the process, benchmarking and conversion improvement with balance flow improvement. (1992) Koskela[7].

The 11 principles of Koskela (1992) for lean construction are simplified to five principles for lean construction that are: value from doner's prospect, monitoring the value stream, making of the value-creating stream, and make client pull for continuous improvement at the pursue perfection and the right time. (1996) Later, Womack and Jones [8].

Added that one of the important and major aspects in the lean construction industry to can slowed the implementation is human relation and attitude. (1999) Howell [9].

Lean construction is an emerging concept that is considered from the critical part of the view. This debate is allegedly based on a correctly selected interpretation of the existing literature. The usability of lean manufacturing methods beyond the Japanese context is still controversial. A wide range of critical theories argues that the use of lean methods depends on the dominance of management overwork. While Lean words of flexibility, quality, and teamwork are convincing, critical observers claim that the translation in practice means to control, exploitation, and oversight. The accepted research program for Lean construction is primarily limited to the limitations of instrumental rationality. Carelessness has been directed at the externalities that lie beyond narrow definitions of technical efficiency. In this sense, the activities of construction scholars seem to be shaped and controlled by the dominant ideology of neoliberalism. Financing agencies are constantly putting insidious pressure to produce outputs "related" to the requirement of the industry of construction. As a result, conservatism is inevitable, according to which the only research that is evaluated is the research that maintains the status quote. This is a widespread failure to challenge advertising that forms and controls the DIS research community - empowering the service workforce and eroding intellectual capital in the industry. Industry and society, in general, are becoming increasingly impoverished due to the triumph of dogma overthinking. (1999) Stuart D. Green [10].

Lean thinking is a new way to manage construction. Production-oriented goals require a new path of coordinating actions, a technique that can be applied in industries far from industry and manufacturing. The need to implement power action is shaped by a deeper understanding of the aims and methods. This method explains the concepts of the main goals and principles of production, and how they come together to lead to a different way of managing production. Lean implementation in construction becomes the issue of development and performance of this new knowledge. Implementation advice is provided. (2003) G. Howell and G. Ballard [11].

One of the biggest endeavors in the construction industry is lean construction. This dissertation analyzes the performance of construction companies in Turkey in terms of lean construction. Before analyzing the question, lean thinking, and lean construction

provided that the necessary information about the change in the construction industry. (2007) Tezel, B. Algan [12].

Occupational Accidents produce useless and Non-Value-Adding (NVA) accidents in any form of system. Since the goal of lean principles is to reduce the NVA elements of work processes, it is concluded that protecting construction workers from occupational hazards can be an ideal natural result of lean construction eliminating waste. A review of the International Lean Construction Group (IGLC) Conference from 1998 to 2008 was conducted to summarize safety management research by searching for keywords related to safety, seventeen articles have identified that deal with safety management and its relationship to the principles and methods of lean construction. (2007) S. Ghosh, D. Young-Corbett [14].

Over the past 10 years, more companies have implemented lean construction practices to improve performance in construction projects. The satisfactory result of most companies and some researchers were reported for their performance. However, until now they should prepare a broader analysis of the available experimental proof to assess the strike of lean construction performance. The owner of this researched the implementation of the latest system planner and other lean construction tools and methods over the past decade of more than 150 construction projects. For developing strategies and support of tools for the performance they have a plan. In this study, some of the fundamental changes apperceived in the reviewed projects and more lessons of experience from its implementation. This article argues the obstacles and problems to implementation, improving productivity, reducing diversity, and the changes of performance tactics. The study also indicates recommendations for the next performance and research. (2008) O. Rojo, R. Calderón, F. Alarcón, S. Diethelm, [15].

Conventional construction theory has been seen as an obstacle to construction innovation. The concept of LC uses the lean concept in the construction industry. Anyway, there is some reasoning to support the view in lean construction that "common production theory or more specifically construction theory" is counterproductive and leads to additional costs and reduced performance. "Kelly is

based on theory through a lack of production control." Currently, the construction industry and other organizations are facing various problems due to the uncertainty of the global economic environment, including downsizing, delays in projects, and zero-margin contract proposals. The construction industry is looking as one of the arrant performers in the field of innovation. This raises concerns about the poor case of construction novation. The advent of lean construction to bring about fundamental reforms in the construction industry to achieve sustainable environmental goals in the construction of important economic, environmental, and social aspects. Lean Construction is increasingly offering new ways to build sustainable projects. It becomes more efficient in reducing the cost of cutting waste, innovating by attractive people, and organizing the workplace. Therefore, the aim of this study is to highlight the value and benefits of the lean industry's potential contribution to achieving supportable innovation in construction. A heuristic research method has been used to get the aim of this article by critically examining, exploring, and combining literature and industry case studies belong to the subject. Evidence in the literature shows that improvement through lean improvement in the construction process has proven to be sustainable results in terms of reducing waste, effort, and time. Therefore, lean construction significantly increases innovation by increasing competitiveness, innovation, and resource efficiency in the construction industry. (2011) Adebayo Akanbi and Goulding, Ogunbiyi, O., Oladapo, Jack Steven [16].

- Lean Construction Concept in UK:

Lean construction management efforts can be very beneficial in the UK construction industry. That was emphasized by the Egan Committee, which expresses that the concepts of lean thinking are the result of the British construction industry's efforts to improve quality and productivity. Although countries around the world have benefited greatly from the usage of Lean Construction (LC) concepts, there seems to have been lean performance in the United Kingdom construction manufacture over the past twenty years, even since the Egan report was published that numbers of cultural and structural barriers to its successful implementation. Without recognizing the factors which are result in the successful transition of lean construction, organizations and

companies will not be capable to know that what betterment struggles should be made, which efforts need to be focused on, that which efforts can achieve the best results. (Tilley & Leong, 2008). This proof of the study seeks to indicate and assess potential obstacles to successful LC implementation in the UK. Due to the large literature review and following the statistical analysis of data from a questionnaire targeting physicians in the UK construction industry, several barriers have been identified as major barriers. Further analysis showed that only four of these obstacles are significant. The outcome of this study could help researchers, practitioners, and UK construction companies use their monitoring and resources on important problems, which are crucial to supporting the result of a successful implementation of LC. (2013) Sarhan, S., and Fox [17].

- Lean construction concept in Malaysia:

Lean Manufacturing (LC) is excellent and optimal at managing the construction procedures and achieving project aims by disposing of waste. The target of this article is to prepared basic knowledge for Lean construction and shows the obstacles to its implementation. They found that more comprehensive approaches were needed to implement LC like health, Six Sigma, and safety. Research and principled training are also critical to building good Interaction and cooperation with stakeholders and customers. LC is also able to increase sustainability in construction and thus the quality of life for Malaysia's future construction industry. (2013) A Jaapar, M Zawawi N, A, M, A Marhani, [19].

- LC concept in road construction projects:

Civil engineering is largely a low-productivity discipline. This actuality can be attributed to different reasons, including the lack of standards in their projects, insufficient attention to construction, or insufficient automation details. The lean approach as a management method to reduce the waste of the whole project leads to higher production and lower cost. Since the introduction of this concept after World War II, it has been successfully implemented in several disciplines such as industrial

engineering or aerospace. However, due to its features, application in the area of civil engineering is not so simple. Among civil engineering, road projects are one of the economic and environmental costs. For that reason, special care is necessary to increase productivity and reduce the cost of such projects. To fill this space, this article examines the current situation of the art for using lean methods to manage road projects. This study indicates the main contribution of this manner in the field of road management to encourage scientists and physicians to use this method. (2014) A. Elkherbawy, J.A. Lozano, G. Ramos, J. Turmo [20].

In the construction life cycle of the project, the design phase significantly contributes to the efficiency of a project. Poor results in the development process of the construction project design phase are considered as many of the most important reasons for project delays, poor performance, and overdraft budget. The aim of this study is innovation in the design process is designed to improve process performance, in which conventional design processes are not applied effectively or efficiently. The compatibility of lean principles is assessed by identifying waste in the design process and identifying capabilities in the design process. The innovative design procedure model presented in the study is due to the ability of the core to be used for known waste disposal. 15 wastes have been identified and Assembly-Based Concurrent Engineering (SBCE) is thought out as a fundamental factor in the design process model. (2015) Ismawi Hj Md Yusof, Min An1 and Mahsa H. Barghi [21].

The lean development method, which is more used in the manufacturing industry, also has a huge possibility for the construction industry. works in the construction sector are assembled with financial and work level risks. The study critically indicates the profits of using lean techniques in construction. (LC) Lean construction management called (LPS) Last Planner System is applied here. This paper uses a case study method, the UT Arlington College Park Constructions case study has been selected. The latest planning system and its method were applied for the case study. The profits of running the latest scheduler are proven by the amount of Production Planning and Control (PPC) recorded before and after running the latest scheduling system. PPC values have increased. The paper of research concludes that LPS must be major investigated for benefits construction projects in Civil Engineering, and it is recommending for use in

Project management. This research suggests the latest planning system should be further explored and used in construction projects for the benefit of civil engineering and project management. (2015) Ashwin Amarshi Maru [22].

Production management is in the Lean Construction Center (LC) and continues from the start of the project through project transfer to maintenance. Over the past decade, several powerful lean manufacturing techniques & methods have been developed to control construction projects, some of these methods are conceptual and others are in programming. In addition, while some of these techniques and methods are simple, there are complexities around the rest, for example, the latest scheduling system is considered convened. This set of different tools is more effective In the hands of provocative managers by lean ideation and project management. That has been found in Danish contractors have increased productivity by 20%, reduced project duration by 10%, increment productivity by 20%, and decrease project efficiency by 20% - 40% Have increased. However, no list will be definitive and detailed for long so innovation is advancing and new tools and methods are constantly appearing. In this study, we identify appropriate lean construction techniques due to their application and ability to control latency in construction projects of Malaysia. The article provides construction management with appropriate lean construction tools to create a lean, realistic and logical application guide. (2016) G. Duvvuru G. Duvvuru S. Mustafa, R.H Ansah, S. Sorooshian [23].

- LC Concept in India:

Lean construction is an effective management technique to increase construction productivity. Some research has been accomplished in the recent last 10 years and it is a continuing procedure to accord lean rules from the production up to the construction. To better productivity, reduce waste, the lean structure has been indicated as a modern management technique. There are more problems to performing the thinking of Lean in the Indian construction industry.

Due to the absence of focus and no education on the principle of lean management, shareholders are associated with this company, such as builders, contractors and engineering and project management companies, and so on. They are still adopting this element for construction projects. In this paper, the attempt made to inquire the main obstacles in the performance of lean methods in the Indian construction industry by the using of a questionnaire and to make real site performance to prepare process maps for continuing projects. The outcome of the survey appeared that some lean tools and methods should be given more attention to improving the procedures. These results of the framework show that NVA and ENVA processes have the greatest effects on project duration. so, with the performance of the offered lean methods, ENVA & NVA processes have been improved and their duration has been significantly reduced. (2016) Madhulika Sinha, Dr. Shrikant Charhate and Vinaya D. More1 [24].

More project management methods have transpired to improve implementation in the construction industry. Lean manufacturing is one way for design devices to decrease time, material waste, and effort to produce the high amount possible. Lean Six Sigma is a combination of two popular Lean and Six Sigma techniques that focus on improving quality, reducing changes, and removing waste. This study aims to prepare a review of lean thinking as well as to include the barriers to implementing this method. A plenary review of the literature has been accomplished with the target of collecting the related information necessary for the article. A questionnaire was used to find effective barriers to its implementation. Which was found that there are six main obstacles in implementing the implication of lean construction. These pieces of information were statistically analyzed and the necessary precautions to reduce the identified barriers are recommended. With Lean implementation, it has been creating that there is a significant reduction in losses, cost, and time. (2017) Radhika R, S.Sukumar [25].

Lean construction tools (LC) have been proposed to solve construction waste problems. LC is a continuous improvement in the construction process that can effectively manage construction waste. LC implementation also ensures a better health and safety environment and results in the sustainable growth and profitability of an

organization. This study was accomplished to rate the availability of LC tools and their consequences on the quality of a construction product through a survey questionnaire. The questionnaire was sent to contractors who are members of the Malaysian Manufacturing Industry Development Board (CIDB) in the G7 subclass in Malaysia. According to the findings, the most common LC tools used in the Malaysian construction industry are teamwork, daily barrier sessions, and 5S. Implementation of LC tools can have a surefire effect on the quality of the construction project. This shows that construction projects with LC implementation produce higher product quality. The findings mentioned in this paper can be essential for the future framework of LC tools that can increase the quality of the contractor product towards the sustainable development of low carbon emissions. (2018 A, M Zawawi, , A Jaapar, N, M, A Marhani [26].

The goal of lean implementation is to increase customer contentment while minimizing losses. therefore, the lean concept of the construction industry is until now not well aware based on the intricate and running nature of construction projects. Although lean construction efforts have recently become popular, implementation processes are still problematic. Therefore, identifying critical success factors (CSFs) in lean performance is essential for more effective project implementation. Due to the absence of studies on CSF detection in lean execution and the requirement for an up-to-date Lean performance roadmap, this study provides a wide range of CSFs for construction profiteers in their projects. In this context, 27 differents were specified through an in-depth literature review. In addition, a survey is designed to be given to lean physicians to rank different based on their importance. This survey findings show that management obligation is rated as the very significant factor in Lean implementation, while the supportive nature of government regulation in Lean is the least important. CSF factor analysis leads to six groups of factors, namely stimulant factors, strategic and policy factors, project effects, technical effects, company factors, and labor and resources. (2019) S. Demirkesen & Hasan Gokberk Bayhan) [27].

The construction industry is a dangerous endeavor. so, it is necessary to good professional safety measures to reduce risks and ensure safety ongoing projects.

Therefore, due to a large number of coincidences in the work area, safety applications are not yet being developed. Meanwhile, lean programs can improve safety rules and increase safety performance. In this context, this paper provides components for lean execution and construction safety implementation and provides a conceptual framework for studying the relationship between them. To determine the quantity of effect of to components, a questionnaire was designed and provided to lean physicians. A structural model of equations is using to analyze the framework and update the coordination between lean execution and safety performance. This study appears that there is a remarkable connection between lean efficiency and protected function.

These findings also suggest that companies that perform well in the implementation of lean methods have good safety performance. The main additive of this research is to provide that lean methods closely belong to safety implementation, with the purpose of incentive construction physicians to work in a safe environment using lean methods. In addition, the purpose of this research is to develop the use of lean methods to get good and safe implementation by revealing strong relationships between safety and lean. In addition, this study could guide construction physicians to adopt lean techniques and use them in their projects to increase safety performance. (2020 S. Demirkesen) [28].

2.2. Different Between Lean and Other Construction Methods

A project managed under the philosophy of lean is greatly different from a project managed under the standard view of construction. Every area from start until the finish of the project is drastically changed. The main differences are the tactic planning of the lean concept. Lean construction forces have a specific benchmark, to set targets and objects for the end process for all parties. The whole idea became to increase the performance at all steps for the customer by using the lean philosophy. all managing parties, distributors, and employees include in this. All the parties are obligated to work cohesively with one another and rein the stresses of production over the entire project. Every part of the project works together as an oily machine, However, if one piece is loose then everything falls apart. The continuing construction models employ the mass

production mindset. it means that one group is allocated to do every job with slight or no interplay. In lean focus causes all group works as one, so for increasing time and permission more effective planning and performance. In the standard construction procedure absence of predictability is the original problem. unpredictability is the reason for lost time, stress, and waste. The philosophy of lean is centered on being predictable and flow so for removing the most nonprofit aspects.

simply put, lean construction is inspired by that is lean production, but these two logics are not replaceable. And from other ideologies, Lean Construction has also been inspired. If lean production explains the decrease of time for turnover, decrease of waste and achieved by the cancellation of waste, lean construction using on production management, complexity theory, and social science. Although the construction industry is very variously from production industry. There are no generalities between these two rules. where production attends focuses on mass volume, but construction more focuses on real construction than production construction industry.

- Construction difficulties:

The construction part in Afghanistan has practiced challenges for several years, It not only the effect of ongoing war but also the statistics of the economy and as well as because of the rising cost of construction. The critical situation against the country and the elimination of energy, on the other, made construction materials more expensive. The location of Afghanistan has greatly affected the real estate market, which is a general investment environment for afghans, which is significantly affected. While investment in public infrastructure is largely government-funded, Small private companies that dominate the actual estate part are anticipated to be more smart and active " At this part of the time, we will increase investment activities in the construction of new housing units as a general feeling that finishing of war and peace affected the access to construction materials easier at fewer prices, which eventually Increases demand. All the Immigrant and homeless afghans will come back to their homes, also some international companies find Afghanistan as an investment chance and more than 100,000 Afghans will find work.

2.3. Shortcomings in the System of Project Management

Exclusive attention is showed by Koskela & Howell (2000). And for their main study to introduce a new technique of construction management. That they trusted to the study was impractical and needed to be bettered hold up with the convolution and danger of the projects. And the other paragraph, a statement of the business management method will be provided, showing the disadvantages of this strategy: “Project management is the use of knowledge and technique skills tools for project activities to meet or trespass the expectations and necessity of project stakeholders”. Monitoring or over-meeting stakeholder wants and hopes alternately include balancing competitive requirements with the following:

- Variable want and requesting of stakeholders.
- Quality, Cost, Scope and time.
- "Anonymous requirements (expectations and identification requirements (needs))"

Figure 2.1. Life Cycle of Project Management

The (PMBOK) Project Management Boday of Knowledge bucket provides the guidance needed for the usual life cycle of the project. The stages of the project life cycle indicated in (PMBOK) which areas the bellow:

1. Initiation Process
2. Planning Process
3. Execution Process
4. Monitoring & Controlling Process
5. Closing process

Howell (2000) described deficiencies as the result of misconceptions and misconceptions in current project management. For example, clear coordination between guaranteed processes is guaranteed in the conclusion of process metrics.

Morris described the platform of project management as a technique and an optical way to perform a pattern of production change that had formerly been applied to production (Howell and Coskella, 2000).

- The general drawbacks are summarized:

Other production features can make the result important, the efficiency of using the sources and those who take benefits is the safest desirable (Howell, 2000). The procedures were made at the argument contemporary management method is possible by performance the production management manner, which includes not only transformation but also workflow management and value creation methods. Thus, lean philosophy and systems were adapted for use in construction. (2000 Howell,).

Due to Coskella and Howell (2002), the use of traditional building management theory is obsolete, so it needs to correct that theory. They have the disadvantages of using traditional methods like as:

The basic and important purpose of project management is not implemented properly. Its methods and tools are not working satisfactorily. Few controllable and gradual projects can solve theory-related problems outside large fines. However, in complex, large and speed projects, project management is easily ineffective. This approach generates problems that severely threaten the death penalty. (, 2000, Howell).

2.4. What is Waste?

Waste is usually the result of inadequately maintained operations and processes that are costly and time-consuming. Laker (2004) also categorized Toyota as an important type of waste in production, and also decided to attach extra waste, especially the unused creativity of those involved in the business. It might be supposed that minor losses are not necessary, however, this waste accumulates and causes significant inefficiencies. People often know to be skinny with the words Muda or Chain. However, the unique attention on waste disposal can also hurt people's creativity.

In addition, activities should be classified when the procedure has been analyzed respectively to detect and dispose of waste. Moden (1993) identified three distinct processes in regional production.

These actions are :

1. (VA)
2. (NVA)

The steps of losses related to the inefficiency of planning, construction, mobilization, and protection measures, which nextly belong to building plans, which was reported to be 50% (2013, O’Connor).

(2010) Sacks explain the purpose of LC as losses increasing. The problem of losses increasing guides the method of waste identification in projects to belong to the construction industry. losses disposal is about to start in the design bed. Waste types

must be identified so that the waste can be disposed of by construction. 8 particles of damages are generally agreed. (Smith and Terry, 2011..

- Transport
- Catalog
- Movement
- Waiting
- Overproduction
- Over-Processing
- Deficiency

The various types of waste already mentioned can be decreased or eliminated using some appropriate tools. The simple of this method are 5S and time, but transparency plays an optimal role in decrease the losses and helps to minimize instability as an embodiment. Waste generation is achieved both through implementation (material damages, productivity) and the bellow of documentation and information of the construction industry.

In accordance with (2005) Saukkoriipi & Josephson, many industry members or those affiliated with the industry acknowledge that it is conceivable to decrease manufacturing costs. Therefore, they argue that costs have to be prioritized. There have not been many efforts to attend to building activities or trying to do them by reducing waste more effectively. Sakuropi argues that industry is resulted by the damages that is witnessed in the industry.

2.5. Lean Concept

Lean philosophy was generated in the production environment. For the first explained by later in (1990) and Krafcik Womack, Jones & Roos (1990), (1988) by Womack.; Jones & Roos. described Lean Production in detail as a way of mixing the benefits of handicrafts and series production, such as prevention the loud costs of handicraft production and avoiding the hassle of series production. The original idea for lean

manufacturing was presented to Toyota by engineer Ohno. Toyota is known that the Founder (Shingo, 1989) (TPS). Ohno was explained to get rid of the garbage. Research teams working on international car manufacturing use the term lean to describe both the nature of Toyota's minimization system and its comparison to handicrafts and mass production. (Womck et al. 1991). Instead of producing handicrafts, he focused on the worker, mass and machine, on the whole, production plan. Henry Ford inspired him to develop flow-based production management. Ford's idea was to demand a standard product, but Ohno wanted to build a car for the customer to order. "He set a manageable goal for designing the production system: manufacture the device in accordance to the specific necessity of the client, deliver it immediately and do not keep any inventory or intermediary store." Defining waste with the performance criteria of a system. Failure is generated to meet the exclusive needs of the defined customer, wasted time, as well as time is too inactive and the inventory is idle (1999, Howell,). He found that there is a waste generation system in every line. Japan is not capable of implementing the methods of series production. Hence, they developed a new method of production called lean manufacturing. Lean production is the 3rd leap in the production procedure that seeks to produce handicrafts and mass production. The main feature of lean manufacturing is the use of fewer resources (per resource) compared to mass production.

The lean theory has gradually developed over lean production and its development has not stopped. Hence, lean progress creates confusion about what makes you thin and what does not. A model was proposed by Holwe, Hines & Rich in 2004. covers this total idea of lean and is known at two steps: strategic (lean concept) and operational (lean manufacturing). Any administration that makes customer price can use a customer-centric strategic concept but does not use storefront techniques. To understand the all opinion of lean and be able to implement appropriate factors and methods to provide customer value, it is most significant to know the diversity between these two levels.

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factors are not. The model proposed by Rich in 2004 Holwe & Hines, covers the concept of lean and is known at both strategic (lean thinking) and operational (lean manufacturing) levels. Any administration that makes customer value can use a customer-centric strategic concept but does not use showcase tools. To comprehend the total concept of lean and be able to perform appropriate factors and methods to provide customer price, you should know the diversity between the two levels.

2.5.1. Principles of lean and lean thinking

Howell and Lichting (2008), modification of the work system is necessary to improve project execution and aims to bring projects closer as systems of production (2008. Lichtig & Howell). Using the lean concept of process optimization, it is done through waste removal, Customer consent, and continuous recovery (Enache-Pommer et al. 2010). Lean construction efforts have focused on fault prohibition (Salem. O. et al. 2006). The system of lean is fully determined and finalized in a book by Jim Womek and Don Jones (The Device That Changed the World 1990). The two engineers indicated the basic rules for realizing lean concepts in the organization. specified by clean methods for reducing waste in organizations by Women and Jones, 2003. They knew the lack of strategic structure in changing lean manufacturing in various industries and their performance. These 5 principles are; Identify valency from the customer's standpoint, plot quantity flow, workflow in methods and perform customer traction and strive for integrity and ongoing betterment. These principles point to the compulsive path of the lean concept.

2.5.1.1. Identifying value

The amount can be indicated by the customer's understanding. So, because it has complex and different definitions, it has a mental meaning. Due to (Koskela, 2000), price and value can be considered as tool value and market value. A number of researchers in this section confirm this description of valence. Due to (1998, Ballard), there is value throughout a method of consulting about the client's goals and desires. (Linforce, 2000) believes that it is the care of services or products that increase profits,

reduce time and costs. In addition, it maiming the quality of the company and makes it profitable. Huovila & Leinon (2000) presented There are 3 separate sets of exchange value, consumption value, and respect price. However, the price of respect has a deeper scope which is not just about the product understanding the customer.

(2003 Womack and Jones) The concept of lean thinking, value is described as a part that refers to materials, parts of a product that are understandable and definable. (2005, Emmitt al.) classifies price into both internal and external value. Each project must have a customer value that is indicated as the external value, however, the internal value has generated the participants and members who are work in the project. (2005, Emmitt al.) stated that this goal is the terminals goal in overall construction projects. In addition, hence, value characteristic review and judgment are necessary to successfully increase productivity and customer/customer satisfaction.

2.5.1.2. Mapping flow value

The become principle in lean concept and philosophy is value flow mapping. Each step is determined for the production and surrender of services to the client by the flow of value. (Jones and Womack (1996). To understand this principle, it is much significant to map the current situation. Therefore, a thorough understanding of this operator is necessary to apply for the philosophy of lean. In addition, the value flows The map can be a frame of methods that lead to the worthy successor of the product and identify a variety of periods to increase performance in the manufacturing process. (2013) Fewings determined that value flow requires all levels of value-added to design, manufacture, and supply a product. Value flow mapping often uses standard symbols to describe cases and methods, so knowing these symbols is essential to accurately assessing barriers to the production system.

2.5.1.3. Flow

The basic process is to complete the activities and adjust these to improve the product, flow. The description of flow is the reduction of the time duration from raw materials

to complete products, which leads to the best quality, and affordable price, and fastest delivery time. This lies in the reality that the developed flow reduces the "water line" and reveals the problems. Fixing these matters or wastes is essential to creating flow. Here it needs to recourse to method mapping, which is used to specify waste. Laker (2004) argues that continuous flow is not possible always, but can be considered a target. This target can arrive and there is great expectations for improving this procedure. Therefore, there are often 2 wrong rules by the organization. (1) Implementing the stream misunderstood by them while in truth, they set up the fake stream. (2) That something becomes wrong, attempt to run it the stream is stopped without delay, and what they use That should be done back. (2004 Liker).

(1992) Koskela; his opinion of a modern production philosophy. The levels show you how to achieve the flow of minimizing or disposing of waste and achieving transformation. They include waste decreasing, the focus of customer, detract diversity, detract cycle time, maximized flexibility, reduction, maximized procedures transparency, and ongoing improvement. The last stage of evaluation, increase strengths with the good foreign organizations can create superiority (1989, Kamp,). However, benchmarks can also use to explain an organization's goals. (Eriksson, 2010). An appropriate technique for estimating the flow rate using the Completed Percentage (PPC) program is to understand the rate. or, observing the relationship between the activities performed due to the planned actions, and therefore the originality of the workflow can be tested (1998, Ballard,).

2.5.1.4. Activate the customer to pull

Tensile scheduling as an appropriate production plays the main role in lean strategy. This factor is known as a very important lean method to strengthen in construction projects the workflow. (2003, Thomas et al.).

2.5.1.5. Seeking perfection

That is the very great factor in the lean approach because it is necessary to work and organize to address the results to promote a lifestyle with a genuine culture Achieving perfection means constantly examining what is being accomplished and how it is being accomplished and prepare expertise and knowledge to all those related in the stages of improving and changing it (Womek & Jones, 1996; Dolaimi & Tanamas, 2001).

The rule of completeness includes the production of quite what the customer wants in a period of quantity and quality at the able period at the right value and with the minimum waste, the actual aim of zero waste (Bicheno, 2000). Perfection is achieved by continuously improving the reduction of various barriers and non-value-added tasks during the below procedure (Tanamas and Dulaimi 2001).

2.6. The 3 Stages of Lean

It started by (2005) Green that completely lean endeavors are arranged into three different steps, with increasing degrees of perfection. According to the researchers, Stage No. 1: lean step is to focus on removing waste technically and operationally. single workers are not answering for commitments and focus. Therefore, managers circle these elements. May and Green (2005) expressed that phase one consists of four Important areas to consider. These include reducing unnecessary costs, optimizing the elimination of unnecessary workflows, and sharing the benefits of better implications. So, the most significant ingredient of a lean body is minimizing waste (2003, Ballard). Amit and Jorgensen (2008) Zhang and Mao (2008) also introduced that the transportation and storage of stock of materials, often referred to as timely delivery (JIT), is necessary to minimize waste in lean manufacturing. Another perspective is to minimize waste, build off-site materials and components (2005 Green May). Prefabricated has many advantages such as manufacturing industries like material losses reduction, reducing construction time, strengthening the working atmosphere. So, advanced prefabrication resembles lean construction into lean manufacturing in manufacturing industries.

(2005) Green stated that Stage No. 2: focuses on decreasing conflicting connections as well as improving shared communication and performing a common task between participants in the supply chain. Elements required for participation are solid residences and so on. Continuous improvement will also the conclusion of shared information and shared learning. Workshops and coordinator performance play the main figure in enhancing healthy communication between project partners, which in turn improves composition and coordination (Fang, 2005).

This can be accomplished by proper training in training environments in which the project partners are regularly engaged in communicating experiences and information, as well as offering ideas for the very clear difficulty in the work area (et al, Salem, 2006). The prospects associated with the second phase are limited invitation invitations, soft parameters, agreements for the long-term, partnership factors, and a broad partnership unit. The second step of the opinion of association is not done because this stage is about reducing the waste of sub-optimizations and hostile relations by increasing integration and cooperation. Hence, advanced prefabrication increases LC in Lean Principle in manufacturing industries..

Stage No.3: May and Green (2005); Is a very complex stage because it needs a main overhaul of project governance. That was vital parts are information technology, pre-construction, bottom-up operations, the latest planner, and stress on people, redesign, and construction, long-term contracts, reduction of contesting forces, teaching at all steps of staff, and its vision of both systems. Aspects of Level 3 include common IT tools, prefabrication, concurrent engineering, latest planner, exclusive bid invitation, restraint, soft parameters, communicative intentions, long-term contracts, special concern groups, training, proposals from members, . Only when trying to get stage No. 3 is a solstitially change from other types of project governance required (2010, Erickson).

2.7. Techniquies and Methods of Lean Construction

Many techniques can find in a company that can be implemented within construction projects. These factors and techniques include 5S, ocular management, value flow, continuous development exercises. Adopting a lean strategy within a business is of potential importance in periods of productivity, service transfer, and quality, which ultimately outcome in significant cost benefits. (Salem et al. 2005) conducted investigation to rate the performance of a certain lean technique. the below summary of some of the apparatus and slimming tools. Several methods in lean concept philosophy can be performed to maximize the quality and quantity of the construction industry. A number of these methods are defined below.

2.7.1. The last planner device

(LPS) is a technique that directs project changes in construction by creating a workflow. LPS became a control method that aims to highlight the links between planning and production control to increase resource flow. This mechanism is accountable for progressions in the operational sector and seeks to increase workflow and control the production part (2000, Ballard). The flows required to incorporate the company to allow the transformation of the construction, information, materials, and operational atmosphere are secure. The LPA executes any task by establishing communications, generating communications, and ensuring performance responsibilities (1994) Howell and Ballard, (Mossman 2008). describe the use of Lean-based accessories in the latest retreat rate planner. Due to (1997) Ballard, the aim of the latter method is to increase productivity by overcoming barriers to workflow. The very significant benefit of this method is bringing realistic planning rather than ideal planning.

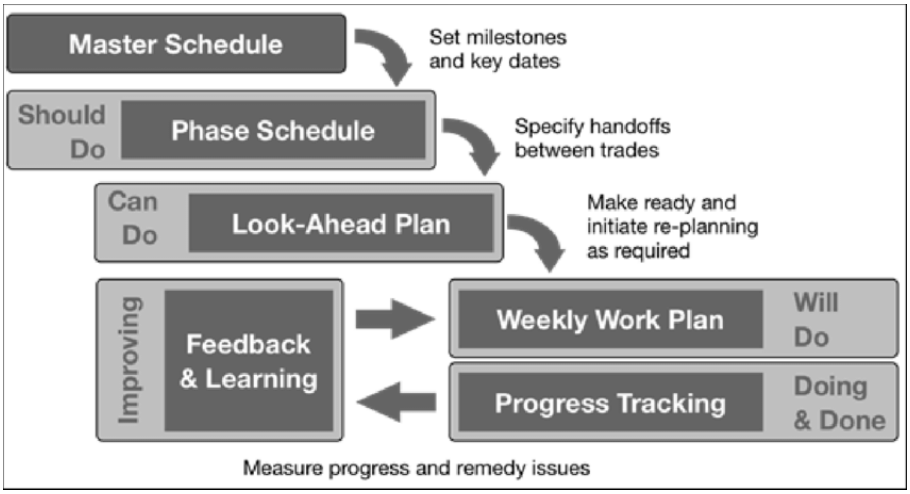


Figure 2.2. Measure Progress and remedy issues.

2.7.2. Management of seeable

(2006, O. Salem et al.) daresay that visualization in the manufacturing with the help of visualization, it will be too easy to recognize the workflow at the construction site. With the help of visualization, it is very easy to identify the workflow at the construction site. The lean approach can be supported by this method if it is properly adapted to the manufacturing process. This approach refers to the state of the practical success of previous actions, this applicability of elements, any changes in the design and position of other devices (2009, Treckmann , Sacks, and Rozenfeld). These shapes show some visualization tools and methods.

2.7.3. First run studies

Studies are the first performance of a technique for redesigning professional tasks and considering fertility and analyzing operational procedures by planning and simplifying various related roles. Due to (2005, Salem and Abdolhamid) the use of photos, videos, or graphics in the first studies has been accepted because they can be beneficial to display the working method or indicate the work instructions. For first execution of a selected task should be examined in detail, prompting comments and opinions on other methods of performing the work. A PDCA (planning, performing, reviewing, acting) period was proposed to amend the perusal (2011 Ahmed and Forbes). Planning: This

step refers to selecting the working mechanism for assembling. Team members, research on work steps, innovative opinion on how to decrease stages, and quality control and fecundity.

- Do: Refers to exploring new thinking in the first run.
- Review: includes methods of explanation and measurement.
- Action: Explain the reassembly of the crew and shows advanced training.

Achievement as a standard to meet. This tool seems to be a compound of the lean manufacturing method, graphical instructions and conventional production method, motion research, and time.

2.7.4. Five S

This technique was originally established to identify household chores in factories. This means that any resource which doesn't have a good suggestion is a waste that is removed from the mechanism. (2006 et al, O. Salem). this method contains 5 stages: fix, standardized, type, sparkle, and sustain. This technique consists of five steps: sorting, smoothing, standardizing, polishing and maintenance. In places where construction projects are underway, this method helps to create a transparent environment and thus a good workflow. The system is equipollent to the 5S household system of lean manufacturing (2005, Salem). The body layout is done to hasten the 5S program on the construction field. Benefits of using 5S include increased safety, efficiency, quality, and increased tuning time, space creation, reduced lead time, cycle time, maximized machine time, betterment morale, teamwork, and continuous improvement (Kaizen activities).

2.7.5. Simultaneous engineering

(1995, Rolstadås,) Simultaneous engineering is specified as the same performance of various developing tasks in integrated teams and the aim of acceding optimal outcomes in performance, quality, and efficiency. This method executes charts, tables, and

algorithms. This needs an interdisciplinary team effort in which information and communication sharing is essential to understanding ideas (Camara, 2003). (Gale et al., 2000) believes that the contention of all contributors in the initial design is the key to completing the lean production methods. Hence, customer relationships do no need to be overlooked because the customer may reduce concurrent engineering goals that reduce project costs. Partnerships with suppliers and subcontractors can also trace the outcome of simultaneous engineering efforts..

2.7.6. Value stream mapping

Jones and Womek (1996) argue that a value stream is a set of specific procedures that are expected to produce a particular commodity in the three main control tasks of each industry. The first duty is to solve the difficulty, which must work through the concept through the special design. The second case is engineering to start production. The last case is data management, which from the elements and raw elements to a complete income in the outcome for the customers.

The last case is information management, which from the elements and raw elements to a complete income in the outcome for the customers. Paez listed the enable methods used in lean manufacturing at 3 levels. The different steps are described here, and the companies are reviewed in Table 2.1.

1. Step One: Direct use of lean manufacturing tools.
2. Step Two: Modification of methods derived from lean industry.
3. Step Three: Specific Lean Making Techniques in General.

Table 2.1. The steps of lean construction.

Levels	Method for Lean Construction	The Relevant Method of Lean Manufacturing
First Level	- Elements Kanban Cards	- Kanban System
Second Level	- Tools for Quality Management - Simultaneous engineering - Visual Inspection	- Visual Audit (Poka Yoke Devices) - Multifunctional Layout - (S.M.E.D.)Single Minute Exchange of Dies - (TQM)Total Quality Management - Standard Transactions
Third Level	- Last Planner - Daily Huddle Meetings - (P.C.W.E.) Plan Conditions of Work Environment	- Kanban System (KS) - (T.V.A.L.)Toyota Verification of Assembly Line - Manufacture Leveling

2.8. Advantages and Benefits of Lean Construction

The implementation and influence of lean thinking in the construction industry modify the business construction management approach. (1992) Koskela provided the basics of how to use lean building situations with the target of Accessing the same advantage as in the industry automotive in 1992 Koskela studied the rules of lean industry and manufacturing in order of its main ingredients and concept. He studied the principles of the lean industry in terms of its basic ingredients and its perceptual background. He describes construction as a production process. In addition, he noted that the problems that professionals have in adopting the strategy are well known. Koskela Catagories lean manufacturing periods as follows:

- A production machanism that is efficient and can material waste.
- A philosophy of general management
- A set of system for continuous quality improvement

Construction manufacturing should be a process flow rather than a transformation of process. Elimination of non-value-added processes such as waiting, examining the elements is one of the benefits of implementing steps flow perspective. The concept of the lean industry is determined as the rearrangement of the workforce to boost and streamline new work practices and main cultural changes that are produced within the company and single to achieve lean manufacturing. So, a company needs to choose

the Lean theory to examine how it can reach the most appropriate organizational framework on which this device can work. Likewise, it seems necessary for a company to modify lifestyles to meet its unique circumstances or to use other techniques and methods to maintain its new structures' management. It has to be noted that methods and tools have been solved to help the two remaining factors discussed earlier. Some of the benefits of lean techniques are listed below.

- Supply chain of construction
- On-Site assessment of subcontractor
- Completing transactions in buildings
- Building subsets
- labor Improving in construction workflow
- Template Engineering:
- (Structure and Finishes) Construction projects
- Making prefabricated concrete
- Infrastructure projects.

2.8.1. Benefits of lean construction

- Reduce all-around costs by using a small number of materials and having fewer losses. Lean construction philosophy is not reduction just for profit, but it focused on overall reduction, utilizing this principle has explained to increase the bottom line.
- Increased planning and strategic vision can greatly be reduced the construction time.
- Increased worker focus and understanding for the higher rate of safety and fewer accidents.
- Raised predictability and schedule reliability.
- Due to fewer workers and increased communication improved of the overall result.
- Decreased stress or no stress for members and management due to a small number of workers.

- High rate of planning to increased productivity all around.
- Increased satisfaction for a customer can increase turnovers and profits
- Increasing accountability of workers.
- More performance commitment to increased job satisfaction resulting.

2.8.2. Drawbacks of lean construction

- For effective of this method, all parts of management and members must be in accordance with the rule, if there is a space in the chain, the lean methodology can not work.
- That is not simple to be getting overall onboard with new rules of production, maybe some worker ambivalent for the change.
- Managing officials should be able to leader employees efficiently and directly for successful results and implementation. The operation method of lean is derived from how well a management leader can work with their employees with standard procedure, so clashes of personality and other issues may arise.
- Maybe some of the workers do not like or deal well with change, and on another side the training and give knowledge to employees in the rules of lean takes dedication and time.
- Maybe for some managers it is hard and for some may grow frustrated, to stay on the course with a new operating system.
- Cohesive teamwork is a key point for lean production. every member must be well in their position, but if space will occur to all workers rely on one other.
- Training of workers with update system take time maybe this effect on the overall time on project or design.
- Space in the system can simply occur, Management should control all production issues, but all employees can not be staying notice of the change in operation.
- From the occurrence of a change in production the suppliers and distributors must be notified but this could cause a problem.
- The change of policy may be decreasing the morale of employees for a temporary time.

2.9. The Difference between Lean Construction and Traditional Project Management

Currently, the construction project planning process is performed with the failure of the project into activities. Resources, value and are estimated after each of these is assigned to every activity. The Logical order of actions is then determined using the CPM method, with different parts of the work thus outsourced or the workgroup doing it internally.

Using schedules, project managers arrange the start time and, using pressure, start the process at the first start time. Project managers are controlled activities and evaluated. If deviance is seen, the control unit works to correct it. The unit also determines whether every activity meets 2 main objectives (estimated general project cost and timing).

Why does this seemingly logical approach often fail, and the cost and time of projects go beyond initial predictions?

In terms of lean construction, the usual routine in project management due to on the wrong model based on the reality that the project management is currently trying to manage projects relevant to the central schedule and the control relies on outcome criteria In this kind of management, the workflow and added value for the stakeholders are ignored. In fact, value-added processes are eliminated when value-added activities are implemented in the project, so it is impossible to manage all related activities.

Today, the procedure of construction projects is becoming more diverse, complex, and rapidly evolving. The complexity and variety of projects are based on the necessity of the user (employer), technology, and market. The pressure to accelerate the project also increases overhead costs. In this running environment, a series of activities (assuming a critical path method) is rarely linked. That model of schedule uses the activities to specify the project and accept the workflow between operations. Reliable

performance and transfer of processes inside working teams are also supposed and eliminated.

In generic, project control is controlling real performance, compared to the program, and detecting deflections from the program to make the right decision. (2007, Banki). By looking to the past, if you decide the future (2009, Orumchi). The effect of project control on the tendency of activities to prepare activities for implementation in a systematic procedure through which it is performed a specific commitment by the customer in charge of the site. The business system, based is defined by the implementation of an activity or project, while the decreased waste, description of value, is accepted. From a lean construction view, using a pursuit activity has three goals: performance (traditional), value flow (accelerating and minimizing damages), and perfection.

Lean Construction is a variable tactic because it involves a precise set of goals and is most successful for the customer during the project phase, designing the results all at once, as well as controlling production over the life of the product from perception to exposure (1999, Howell,). The researchers hypothesize that the much important target of LC is waste disposal, which is indicated in non-value-added measures and the effectiveness of value-added measures.

However, Kuskehla (1992) argues that the concept includes: timely training (JIT), the use of traction-based planning, reducing diversity in labor productivity, improving flow reliability, and eliminating waste. Construction operations and implementation of standards.

(Massman, 2009) argues that endorsing the use of lean concepts has proven that there are innumerable benefits from performing lean beliefs to constructing. These claimed benefits include maximized productivity, increased reliability, increased quality, greater customer convenience, greater predictability, decreased ordering, less waste, lower cost, development improvements to design, and increased safety.

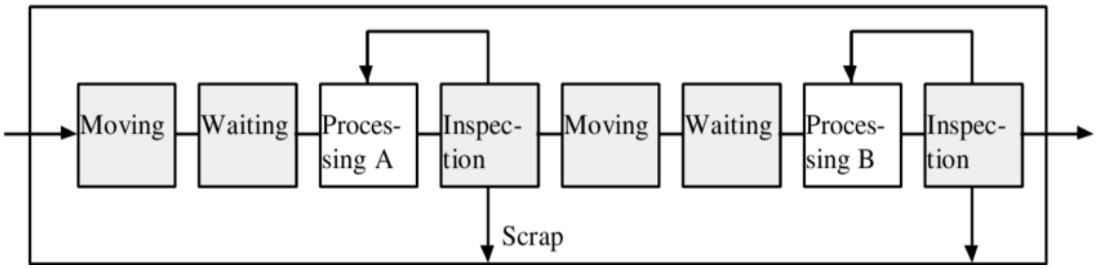


Figure 2.3. Simplistic Process of a production.

LC is also determined as an idea that includes multiple other implications from the construction management industry like as (LPS) Last Planner System, (TQM) Total Quality Management; Concurrent Engineering (CE), Business Procedures Reconstruction (BPR), Product Circles (PCs) and group value-based management in (2009, Alinaitwe). The mentioned ideas are shown in Figure 2.7. are related and all goals to better performance while decrease losses. (2009, Alinaitwe,)

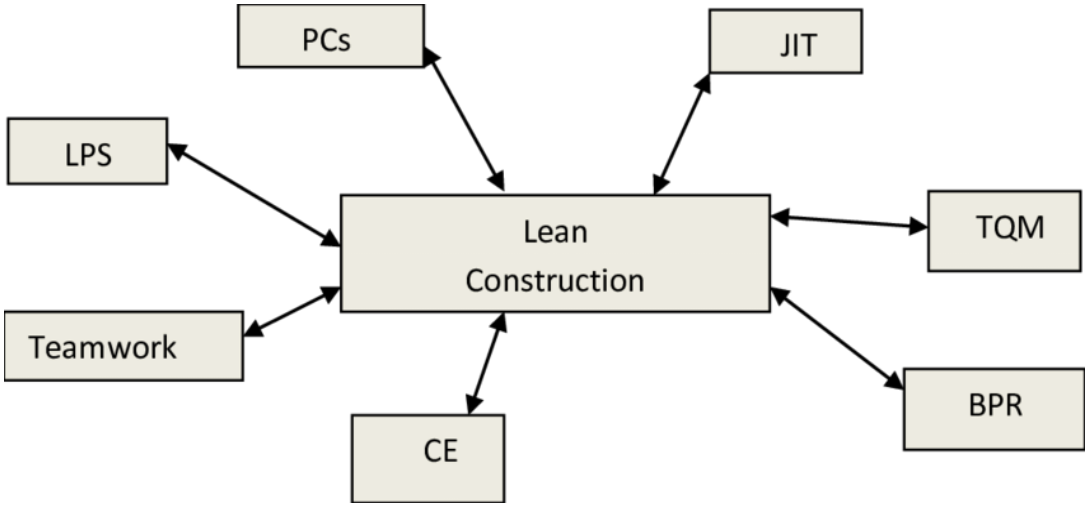


Figure 2.4. Method and tools of Lean construction.

Table 2.2. Diversity between the Lean approach and traditional method. (Sicat 2012, G. Ballard, 2000, H. G. Ballard 2000, Howell, 1999).

Activity	Approach of Traditional PM	Methods of Lean Construction
Control	Project control is demonstrated in performance monitoring (program and cost) and takes corrective action after negative identifying variances. (Ballard. H. G. 2000).	To assure the reliable workflow the roles of project control by measurement and bettering the system operations. (Sicat 2012)
Activities	Project control is shown in performance monitoring (program and cost) and takes corrective action after identifying negative variances. (Sicat 2012)	The first goal is to increase the amount with minimal waste in the project steps to assure a trustworthy workflow (G. Ballard, Delivery System of Lean projcet 2000). (Sicat 2012)

Table 2.2. (Continued)

Value	Due to the lower cost as value. As well as, the users must define all their neccessities at the start of the project, due to of changes in new markets and tools. (2012, Sicat).	A project is controlled as a value generation process in which customer acceptation is done and developed (G. A., Howell. What is the Lean Construction 1999).
Work tactics	Pressure programs are used to disseminate information and content (2012, Sicat). (For example, elements are ordered to a predetermined schedule to get to work before work is done. If stocks are not used, the supplier will continue with the schedule.	Pull-based applications control data and worked to the flow of material (Ballard H. G. 2000). etc... The group pulls back (pulls) from the last date to the begining of the stage to determine the process necessary to achieve the "end" goal. (Build only what is needed, if necessary, without wasting the procedures
Centralization	Making decision is sometimes centralized through a manager.	Decision-making by changing by involving project participants in the system which control the production process and empowering them to act (Sikat 2012) (Ballard.H. G. 2000).
Bellow loading	PMI - No consider for adjustments	The amount of the object unit as well as the inventory is redacted so it can absorb the diversity (2000, H. G. Ballard).
Conversion	Modification and change management are not considered.	Efforts to reduce diversity in final product quality and workload (Ballard. H. G. 2000)
Cooperation	Such a policy does not apply in traditional ways.	LC continues to provide ongoing support by creating new business contracts that motivate suppliers to work reliably and participate in the all product betterment (1999, Howell. G. A., Lean Construction).
Transparency	The transparency method is not considered in the business management method.	Increase transparency among all project customer and stakeholders to people give the permission to make decisions for reducing the need for main management What is Lean Construction?). (Howell. G. A. 1999,
Ongoing development	The customary techniques do not take in the account continuous improvement.	LC considers continuous betterment of workflow and workflow (Howell. G. A., Lean Construction 1999).
Interplay and interdependencies		Preparing the combined impact of dependency and diversity on performance is necessury because it impacts on the cost and time of every project (1999. Howell. G. A., What is Lean Construction?).

2.10. Barriers to Face in Transaction of LC.

(Salem 2006) explains that people working in the construction industry believe that construction projects are exclusive, so the theory of lean thinking was rejected.

Based on the (1998) Egan; This industry contains many repetitive principles. Egan has an idea that contemplation construction as an exclusive procedure prevents learning new lessons or exploring new endeavors. In addition, according to (2000, Koskela) the obstacles are only temporary. They can reduce dispersion but cannot prevent it. The lean concept shows that useless actions in behavior can be recognized and helped. This leads to a satisfactory understanding of such processes and improves overall performance.

Around the world number of studies conducted to specify obstacles in the usage of lean structure. Few studies focus on barriers that bound the extension and use of lean construction (2009, Abdullah). Others, however, focused on recognizing the barriers they show when performing lean manufacturing techniques.

These barriers have an unexpected impact on project performance and, if not properly managed, can affect the application of lean construction. If the factors influencing the successful use of LC are not understood, companies cannot know what exercises need to be done to better the procedures.

Thirty-one obstacles were categorized as obstacles for the good implementation of LC by construction companies in (2009) Uganda in by Alinaitwe. The author reminds ten obstacles that are to be easily removed. These limitations can be mentioned as follows: lack of equipment in suitable places, lack of buildable programs, lack of participatory management techniques for the workforce, lack of continuous management, not using standard elements, Lack of intra-team communication, lack of continuous work commitment, lack of understanding of user's needs, lack of project team skills and lack of specific focus for the group. (2009) Alinaitwe strict that one of the basic obstacles in important aspects is the absence of buildable designs. Certainly, the production

activities and the presentation of criteria also played a role in the performance of Lean Construction as the main obstacles. Otherwise, Tindiwensi (2006) discovered that most architectural designs lacked structural elements because of limited knowledge of construction practices. In addition, the method for the fracture of the production procedure in time of construction is the separation of design from construction paved. This can affect LC performance specifically in worker productivity. Therefore, all stakeholders must participate in the procedure step by step start from pre-construction steps and intently consider the ability to construct, design, and other process. Such behavior during the production process prevents disturbing design changes during the manufacturing phase.

Howell (1999) also stated that, particularly in the physical execution phase, the HR is one of the main and important aspects that slows down the performance of Lean Construction in the industry and manufacturing. As explain to Park and Kim (2006); the LC concept and the success of its implementation was in fact majorly influenced by the critical factor of the stakeholders' reaction towards the Lean Construction concept in construction project. In (2009) et. al. Abdullah further determined that the success of a shareholder in the implementation of the LC depends entirely on this reactance, in other words, the stakeholder must have some tendency towards purpose, commitment and cooperation. Therefore, their performance and fertility of a construction project can be determined through this type of thinking.

In addition, the dull application term of the LC method was considered as lean construction problem. (2006) Kim, during his research, found that the performance of LC in the construction projects has provided the necessary meetings and information for discussion. Also, if you have poor management and must hold regular meetings. This is mainly right in the pre-construction phase, but a good-managed session will certainly bring profitability and affirmative impacts to the construction company itself and especially in increasing their credibility.

(Sarhan, S., and Fox, 2013) Based on previous studies on obstacles to the use of the lean manufacturing approach, it categorizes barriers on 10 different types. These researchers briefly explain these factors. These barriers are listed below:

- Lack of attention and responsibility from senior management.
- Challenges in realizing lean construction theory.
- Do not face the necessity of the usage of the concept of lean manufacturing.
- Absence of generic education.
- Poor communication between customers, consultants, and contractors.
- The propensity of construction companies to apply business management ideas to the concepts of QM Quality Management and productivity.
- Tendency and professionalism to work in a team or group (teamwork.)
- For the lean concept a long performance period in construction procedures.
- Poor connection causes detrimental damage to the whole project and prevents the impact of synergy in the use of LC concepts. (2009, Abdullah))

2.10.1. Subcontracting and fragmentation

Participants in a project feel less willing to work and learn to forget a common target if they are fragmented and subcontracted. Every contributor will have their private context and methods, but their goal is to finish the project vigorously. Thus, establishing a clear communication path between all in accordance with (Forbes and Ahmed 2004) also implies the following attitudes, roles, relationships, actions, and relationships between relevant parties in the construction manufacturing like as contractors. In addition, (Abdullah, 2009) classifies various obstacles that prevent interference in the implementation of lean concepts.

2.10.2. Contracts and procurement

Traditional buying methods and contracts may create relationships between the contributors who are preoccupied with this project and do not lead to success., subvert the implementation of lean principles (2009, Massman), add unnecessary protocols,

and impede progress. Contradictory relationships are achieved when contract forms provide one party to overcome the other. The cost of the deal with these warlike relations is futile and contrary to lean philosophy. (2009, Abdullah)

In addition, the performance frame entrusts outside design contractors with the work, it prevents all-out involvement in the project and separates the Design stage from the construction manner, thus achieving the lean goal of continuous collaboration and integration is prevented. For the successful development of LC, creating a participatory environment with stress on the direct relationship between them is essential to design and manufacturing. (2009, Abdullah)

2.10.3. Human attitudinal issues and civilization culture

A synergistic and creative approach is needed for the right application of the principles of lean thinking for the construction industry, the elimination of "waste", the creation of "continuous flow" and the betterment of the value of the outcome for the users. A fundamental change in business and actions is necessary if a country is to fundamentally increase and benefit from lean construction. A study by Massman (2009), Abdullah (2009), and (joint 2000) identified duality, lack of teamwork, lack of self-assessment, clandestine attitudes, and the dangers of anemia of communication between involved parties in the construction activities. It found that cultural bias hindered the ability to adopt a general framework in selecting subcontractors and qualified members and co-workers. These many strong biases include risk tolerance, misconceptions about positive re-development, neglect of continuous monitoring, non-cooperative and hostile attitudes, unbridled zeal, over-dependence, lack of motivation, lack of loyalty, contractual fights, and fear.

2.10.4. The subordination in traditional management idea and concepts

The priority of construction companies to rely on traditional and non-progressive thinking about production and management must be considered a major obstacle to the useful performance of the Lean Construction principle. (., 2009, Abdullah et al) Joint

2000 shows that production problems often change only when a catastrophe occurs. For this reason, (Massman 2000) warns organizations did not wait for a crisis to occur before responding, because it would be too late to learn new ways of thinking and thinking. (2000) Abdullah emphasizes in the time they are not informed of the good ways to achieve their goals, there is a tendency for construction to cling to their current managerial ideas, making them inclined to change, even though In reality, these differences help to maximize their mainline It also increases quality and output principles.

2.10.5. Financial matters

Success use of lean construction requires adequate funding to get the important infrastructure, award schemes, adequate significant salary, and reasons for promotion and development programs and investment training. Hiring a lean expert to guide both organizations and members through a perfect review of all processes helps ensure achievements. (Massman (2009) (2010, Bashir et al.) has identified local financial barriers that must be carefully addressed: inflation, adequate project funding an unstable construction environment, absence of basic social infrastructure to accelerate lean adherence, absence of ownership and motivation, low salaries and the unwillingness of some companies to properly train and equip their staff outside what is completely necessary.

2.10.6. Absence of top management obligation and backing.

Senior management displays the main role in using lean construction and performing a reasonable method for success. Top management must have sufficient resources and time to produce an efficient method for modernizing management and implementing new LC concepts. Therefore, studies by (2009, Alinaitwe) and (Abdullah, 2009) identified the reluctance of top management to prepare fact leadership as a main barrier to promoting lean structural ideals.

concerns middle management and not the upper steps of organization. The profits of Lean Construction for middle management are not as obvious as for top management. In addition, their degree of experience and learning is generally not enough to make a fundamental difference by doing traditional tasks along the way. Otherwise, the positive effects of implementing lean construction ideas must be quite clear to senior management. (Massman, 2009) in the end, a several studies have recognized many management-related problems, including inadequate design, lack of ownership and staffing regulations that guidance to a higher step of the workflow, lack of full understanding of customer needs, absence Lack of inclusive labor force participation, logistical challenges, lack of vision planning and poor coordination.

2.10.7. Construction dichotomy /design

Seasonal construction strategies such as planning, and design are identifying as leading contributions. Instead of the value of these concepts, an important loss of revenue and time can result in significant losses. (Common 2000) Because of the traditional method of accomplishing things, their design and application are often unrelated and dealt with separately. (2009, Bank) This causes friction at two points which is leads to defects or inaccuracies in the design, unnecessary overhauls in the construction and design, Not effective buildable designs, a significant correlation between conceptual design and performance, due to late adjustments work schedule delays and made by designers. (2000, Seymour and Rock,) found that production considerations are often overlooked by designers whose design needs to be implemented. Some other problems should be specified, including how to ensure consistent quality. While some see achievement as focus on good communication and coordination, adherence to other qualification and codes. (Toma et al., Shammas –1998)

2.10.8. Absence of enough lean understanding /awareness

"The production of lean thinking ideas is compatible with the construction industry. (Erickson, 2009) So, many lean construction ideas are directly related to lean production. There is opposition thinking about how to use lean techniques in lean

manufacturing. (1999, Green) Some lean manufacturing models should be modified and adapted because they might not be the same usable in manufacturing. Et. al, Abdullah. and (Eriksson, 2009).

(2009) recommend that the lean concepts of production must first be fully understood to have an overview of Lean Construction philosophy. In addition, numbers studies have Featured the Lack of Familiarity with the need to own LC and the problems of indicating its conceptual framework as important barriers to the successful implementation of lean construction. It might be due to the lack of a universally and public accepted commentary of Lean concepts.

(2002 Abdullah et al.) believed that better interpretation and understanding could be betterment by evaluating its key elements, such as partnership, as a sample of innovative management actions.

In addition, LC introduced the use of new rules for construction products that are identified variously from those used in traditional ways. (2009) pointed out that these differences have to be considered to make good use of these techniques. Several researchers now believe that lean is much basic than methods or tools, and that it requires cooperation, thinking, flexibility, Extensive, obligation, and discipline reflection in the system. (Rock et al., 2007; Musman, 2009; Terry et al.

Lean implementation must be extended to the entire business and value chain to fully understand the promised consequences, any separate effort may even lead to Extra damage (HA, 2009). It must be noted, the article was conducted by subscribers and colleagues. (2000) show that construction companies do have not a substantial identifying of the essential concepts and lean application. For example, many respondents are concerned that lean concepts are not enough for the construction industry according to the high required for faster and nonvalue projects by customers.

2.10.9. Educational matters

Despite some efforts to prepare education and guidance on lean manufacturing by scholars, academics, physicians, and significant institutions in various countries, it shows that educational barriers can now threaten the use of LC. Some of these barriers include innovative management and development of HR Human Resources, inadequate training, poor understanding, lack of skills for the poor, absence of technical skills, and illiteracy to counteract illiteracy. (Massman, 2009, Abdullah 2009,).

2.10.10. Absence of process-based and customer-oriented performance measurement devices

Despite the desire to measure industry implementation alone, little research has focused on customer convenience (2002, Forbes). These traditional performance tournament tests (price and timetable) do not lead to lasting development because they cannot effectively assess underlying quality and productivity loss. Conventional Performance Measurement Systems (PMS) are based on financial steps. Until the project is completed, not measured, so for, the information received for corrective action is realized late in the process. There is no measurement until the endpoint of the project, Hence, the information obtained for corrective action is realized late in the procedures. Based to the (2009, Abdullah), conventional control systems focus on conversion activities and reject flow processes. In this method, nearly all non-value-added activities become invisible. Instead, this is forcefully recommended to action about discretionary measures aimed at giving early and on time warnings, identifying potential barriers and difficulties, and emphasizing future research guideline.

CHAPTER 3. MATERIAL AND METHODOLGY

This chapter presents the materials used in the research and the research method. In the materials section, information about the questionnaire and responders are provided.

3.1. The Material of the Research and Study

This study attention to the obstacles to be faced in transition to Construction (LC). This research has used various methods including questionnaires and an online survey to collect qualitative and quantitative information. This research is to find from a questionnaire survey that includes 35 questions.

The questionnaire in Appendix A included 35 questions. These questions were from 1-5 which were about general details, background, and data about the respondents, and 4 other questions which were awareness about the company or organization in which they work. Then (questions 10 to 16) was asked to identify the participants' awareness of LC along with any efforts to implement a lean culture in the construction companies in the Afghan construction industry.

Question No. 15 the respondents for this question which was “To what limit do you agree/disagree with the bellow sentences?” For the rate on the method of (strongly disagree to strongly agree) on awareness of lean culture. Information about their pieces of information is shown in Table 4.1.

Questions 17-27 were used for LC tools and methods and questions 17-27 were used for the benefits of lean manufacturing. These questions include the 7 cornerstones of the management implication, same, namely purchase, planning and control design, design supply, installation, performance evaluation, and measuremen..

Question No. 27 was: "Please rate out of 10 the following " non-financial "actions according to their importance (10 most important and 1 least important)" the answers for this question were asked to measure every aspect on the scale take. Information about their response is shown in Figure 4.13.

The questions from 29-32 were about the successful results of LC implementation.

Questions No.33 and No.34 were about the challenges of successful LC performance.

Question No. 33 showed: "To what limit do you agree or disagree?" the obstacles to face in the successful transition of Lean Construction?" for this question respondents in the survey were asked to rate every one of the eight aspects on a scale.

The questionnaire was filled out by experts and academics.

Almost number of these contributors were civil engineers (85%). In addition, many respondents (15%) were participants who had managerial jobs and had more than ten years of experience currently in Afghanistan in the construction industry.

3.2. Study Method and Procedure

The method was to identify the first framework that is the conclusion and summary of the topics mentioned in the survey. A general review of the literature was conducted to learn the basics of LC and feasible obstacles to its performance. One of these studies conducted by Fox and Sarhan (2012) on obstacles to the successful performance of LC in the United Kingdom was useful as a method that could be pursued for research in Afghanistan. Therefore, the questionnaire applied by these authors has been pursued to the necessity of the study area and the facts for this research. The main questionnaire was 36 years old, but two of these questions were omitted because they were not related to the Afghan construction industry.

Then, an invitation for an online survey and an invitation was sent to complete a questionnaire for 40 professional physicians in the Afghan construction industry is also a few samples of academics. respondents were randomly selected from some technical teams (contractors and consultants) representing many professional organizations involved in the Afghan construction industry. This shows a response evaluation of 72%. The results show that this research has been enabled to distribute a combination of individuals and organizations well.

The provinces in which the questionnaire survey was distributed (Kabul, Kandahar, Paktya, Balkh, and Jalalabad) Kabul is the center of Afghanistan which has more than 500 big and small construction companies but 157 active construction companies alongside consultants and contractors in the city. Kandahar has 76 active companies which are ongoing participating in the construction industry. Paktya has 51 active companies which are ongoing participating in the construction industry. Jalalabad which has 82 active companies which ongoing involvement in the construction industry.

Qualitative and quantitative information from info was collected by the questionnaires survey from variant sectors of the construction industry, like contractors, construction companies, NGOs, and consultants. These collected information data were rated and the very important LC barriers to improving recommendations for future decisions were identified statistically.

CHAPTER 4. RESULTS AND DISCUSSIONS

Questions No.1 until question N.10 which were asked for gathering detailed data on the general information of the members and their companies; and the information data prepared from there which is tabloid in Tables 4.1. and 4.2. below.

Table 4.1. General information of organization and construction companies.

Thousand dollar / AAT			Organizations size /Employees			Client		
<100	50-100	10-50	250<	<100 employees	>50 employees	Private	NGO's	Public
54%	28%	18%	4%	26%	70%	14%	56%	30%

Table 4.2. General information according to the answers.

Experience / Years			(Managerial level) / Current role				Education Level		
0-5	5-10	15+	Graduate /Junior	Middle management	Senior management	Other	Practical qualification	Bachelor's degree	Master's Degree & above
51%	36%	13%	60%	21%	14%	5%	29%	52%	19%

To reveal trends in the expansion of lean concept within the companies and organizations. Questions 11 -14 were designed to both relevant data. The bellow is a summary of these questions.

The assess the organization's construction readiness for progress during the lean trip, participants who were asked to rate the bellow aspects:

- The number of impacts in an organization that provides lean training.
- For the motivation of personnel, the action of leaders,
- The level of focus assigned by group leaders to better procedures that do not process technical difficulties (Lean responsibility).
- The Lean education steps of leadership which groups is got through official training/induction.

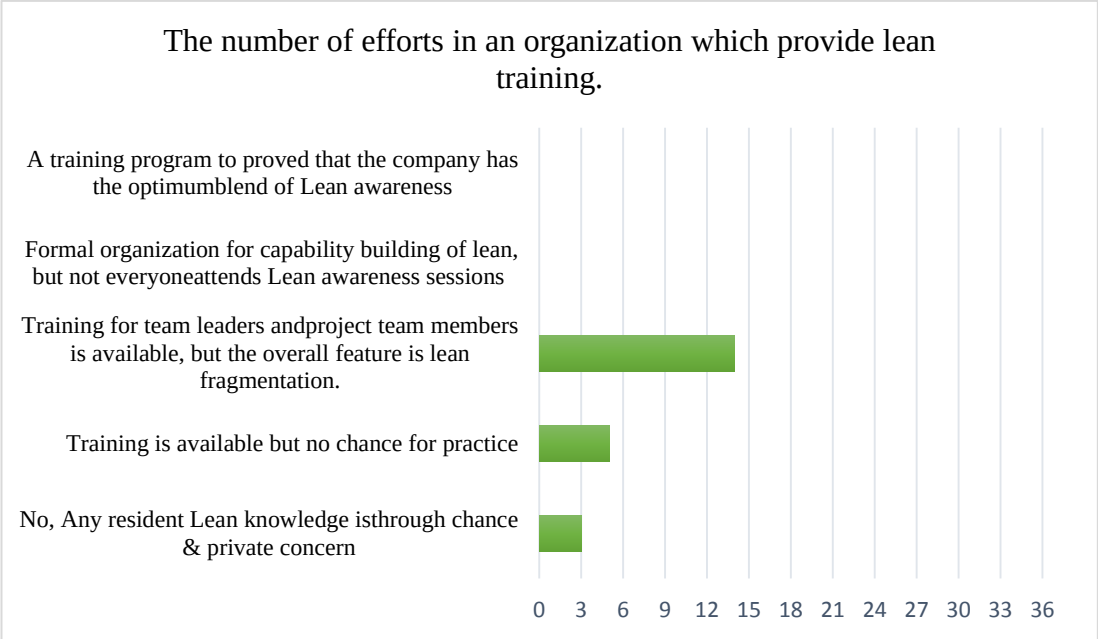


Figure 4.1. The number of efforts in an organization which provide lean training.

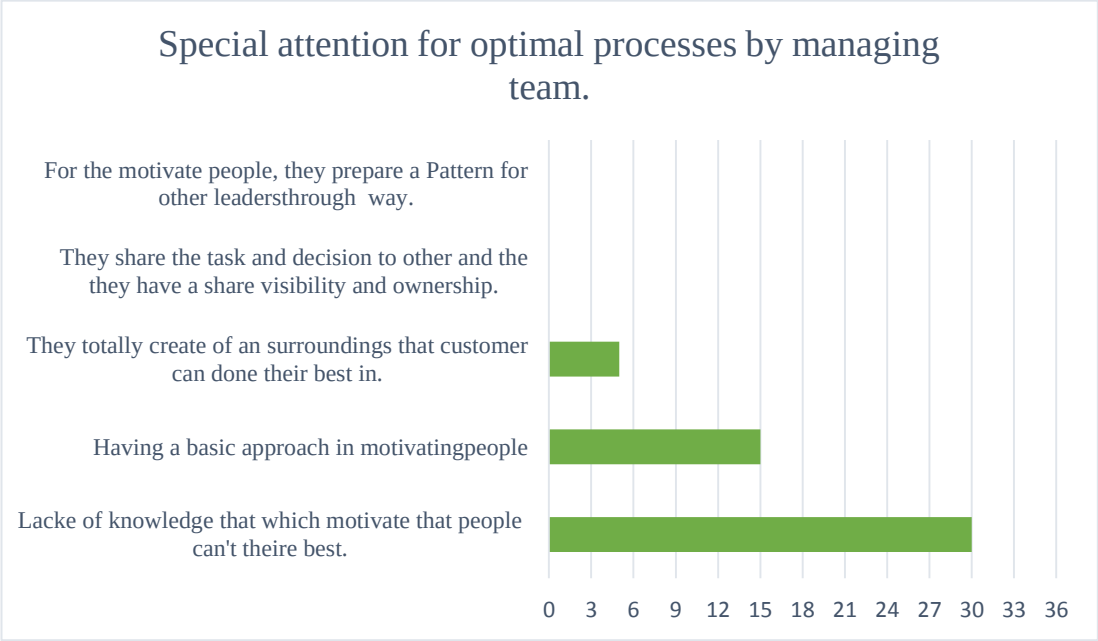


Figure 4.2. For the motivation of personnel, the action of leaders.

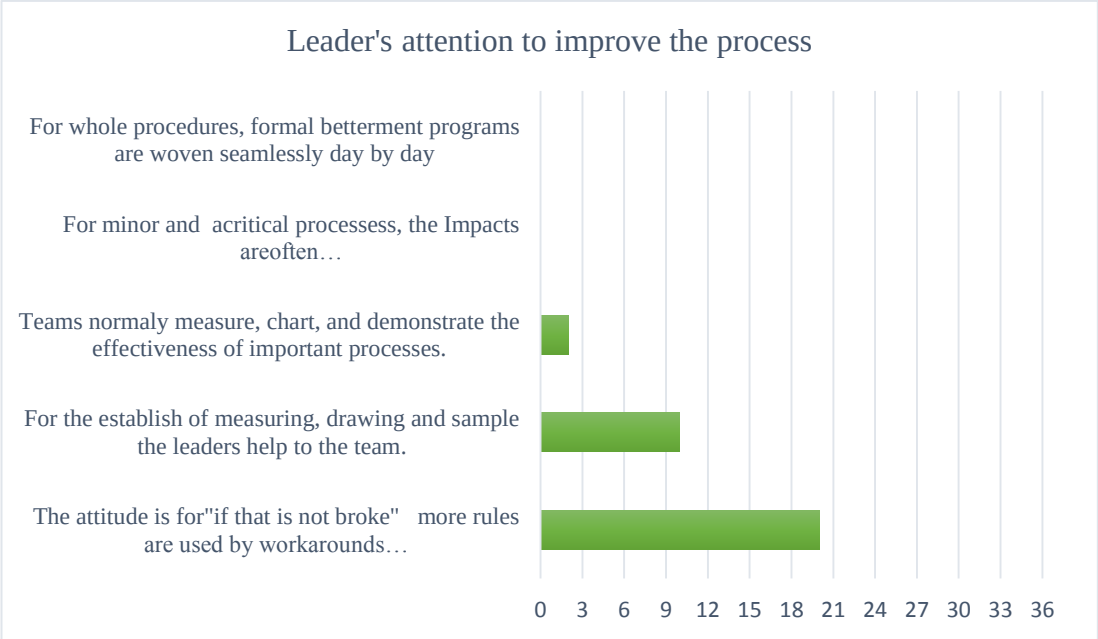


Figure 4.3. Leaders' performance evaluation in the organization, in section of motivating customers.

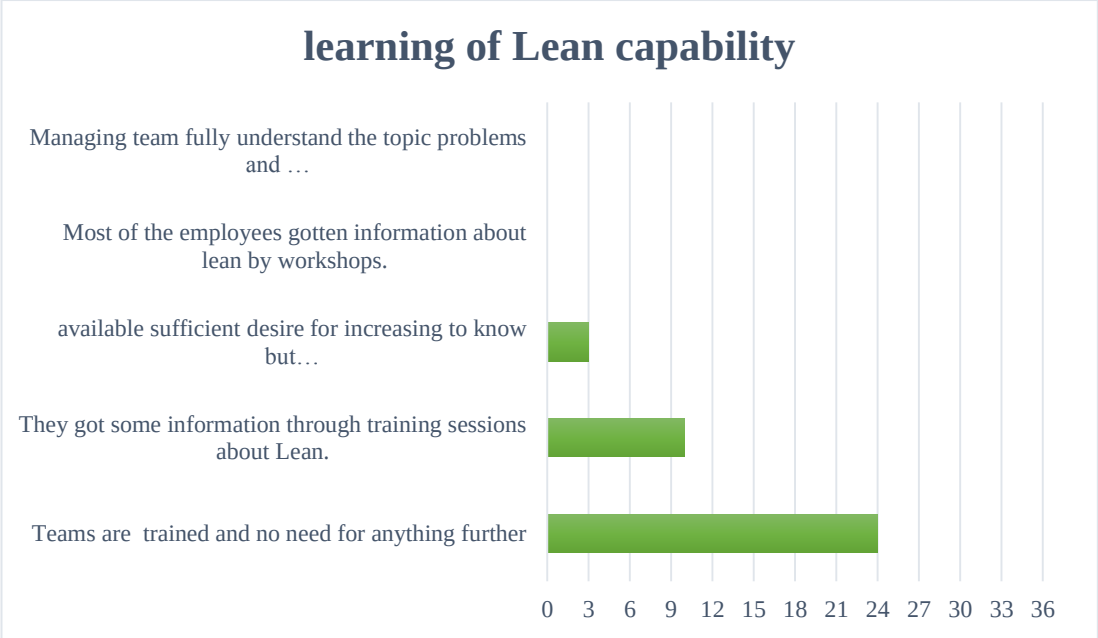
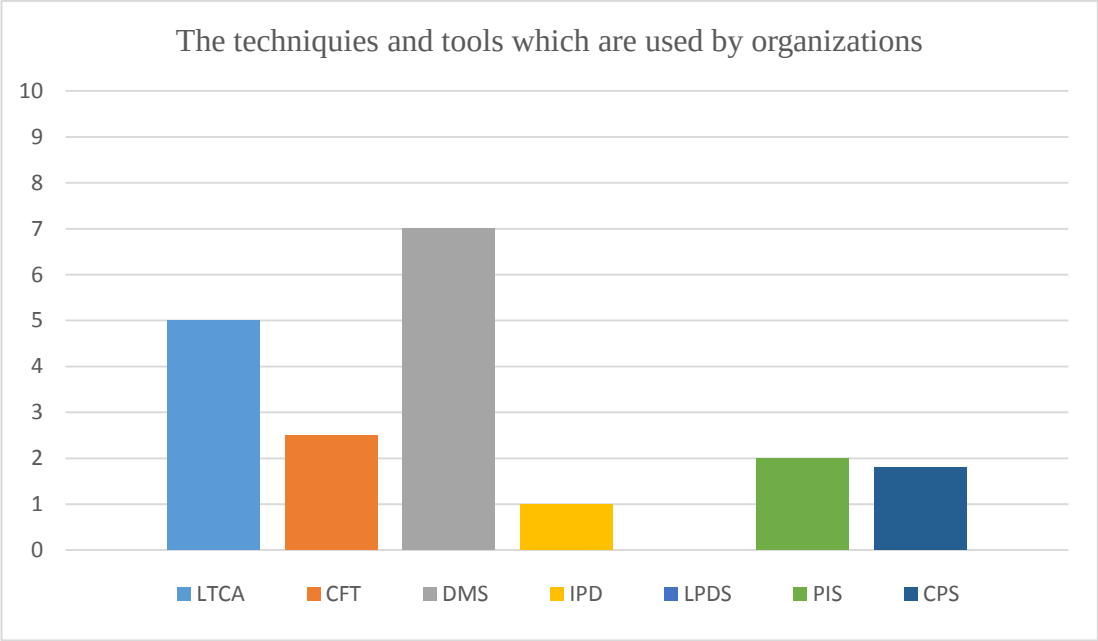


Figure 4.4. Attempt to show formal lean training is present in their organizations (Learning of lean capability).

Question No. 14 was about the methods to use by the companies to simplify both external and internal collaborative relations and as show from the following in the table as per DMS stands which as being the very provided and IPS is the final used.



CFT= Cross-functional teams; PIS= Project information systems; DMS= Document management System
CPS= Collaborative Planning Schedules. IPD= integrated project delivery; LTCA= Long term contractual agreement, LPDS= Lean project delivery System.

Figure 4.5. The techniques and tools these are used by companies.

Question no. 15 which was stand on Eleven concepts of Lean Construction; and I asked the participants to arrange the answer to (strongly disagree - strongly agree) on the rating system of a 5- point Likert. In more situations, a small amount of scale was mean that an answer was supporting the new concept, in some other situations, a higher point may mean that the answers were opposite to the concept. therefore, respondents to the questions are given in Table 4.3. which a final column shows most answers that show positive or negative results regarding the concept.

Table 4.3. Orientation of answers to the concept of LC in question no. 15

ID	Respondents Scale* (1-5 (strongly disagree - strongly agree)					Respondents to Qs		Attitude of majority to Lean Construction concept
	5	4	3	2	1	Supporting (5+4)	Opposite (1+2+3+4)	
For the construction industry of Lean concept is not appropriate because of the cheap and quick demands of client in project.	1	6	5	21	4	30% N	70% P	Positive
No need for processes improving because it is not presenting big matters.	0	2	13	17	5	7.3% N	92.7% P	Positive

Table 4.3. (Continued)

Forms of contract that give permission one party to show power on another party, creating hostile relations. These hostile relations generat exchange costs, that are weighed losses	9	21	4	2	1	84% P	16% N	Positive
Lean must be performed through the tradation and value chain so that the promised objects of each individual effort are even wasted.	11	19	4	2	1	89% P	11% N	Positive
The use of performance measurements is recommended for self-defense or evidence of claims and counterclaims.	11	11	6	5	4	61% P	39% N	Positive
Usage of bills of quantity (BoQ) in foundation of the civil engineering rules procedures of measurement (CESMM), can manage to price different and delivery problems.	0	8	7	18	4	29% N	71% P	Positive
Traditional implimantation settings measured in projects, specifically costs and applications, are not suitable for ongoing treatment.	3	14	7	9	4	69% P	31% N	Positive
All actions of the organization / site must be constantly Improvement.	10	21	4	1	0	95% P	5% N	Positive
First is quality, not profit.	5	6	11	12	3	70% P	30% N	Positive
Any purchasing form that tends to outsource design work unjoing the design from the manufacturing procedure and thus loses the lean purpose of integration and cooperation.	0	6	5	21	5	31.6% P	68.4% N	Negative
Lean is more than just a method or technique that expects a shift in thinking, collaboration, enability, commitment, rules and a broad focus on the system.	19	16	0	0	2	95% P	5% N	Positive

Question No. 16 was for using the duties which can be good for companies to appoint Lean approach Figures 4.6. shows 66 % of participants to willing to use workplace companies to prepare a safe and important field environment to appoint the job but 33% discuss that visual leadership is the proper method for the Lean approach.

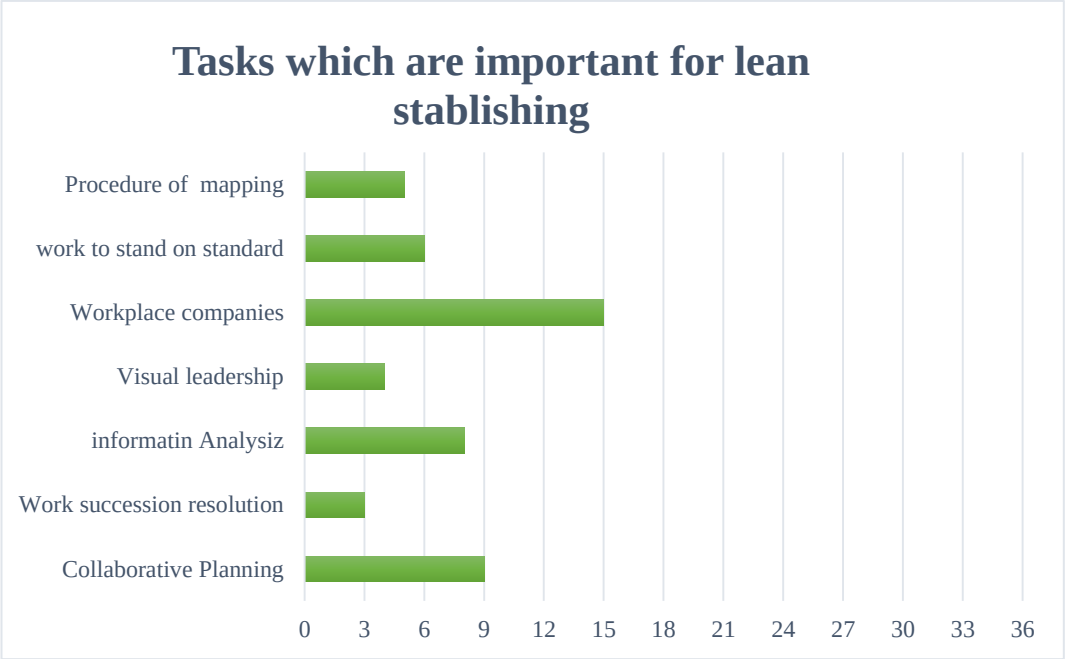


Figure 4.6. Task data useful for companies to achieve a lean approach.

Question No.17 was about the control and planning methods used in the participating companies. Most responses use the critical path method in their companies, which is an algorithm for planning several project operations. (Figure 4.7.)

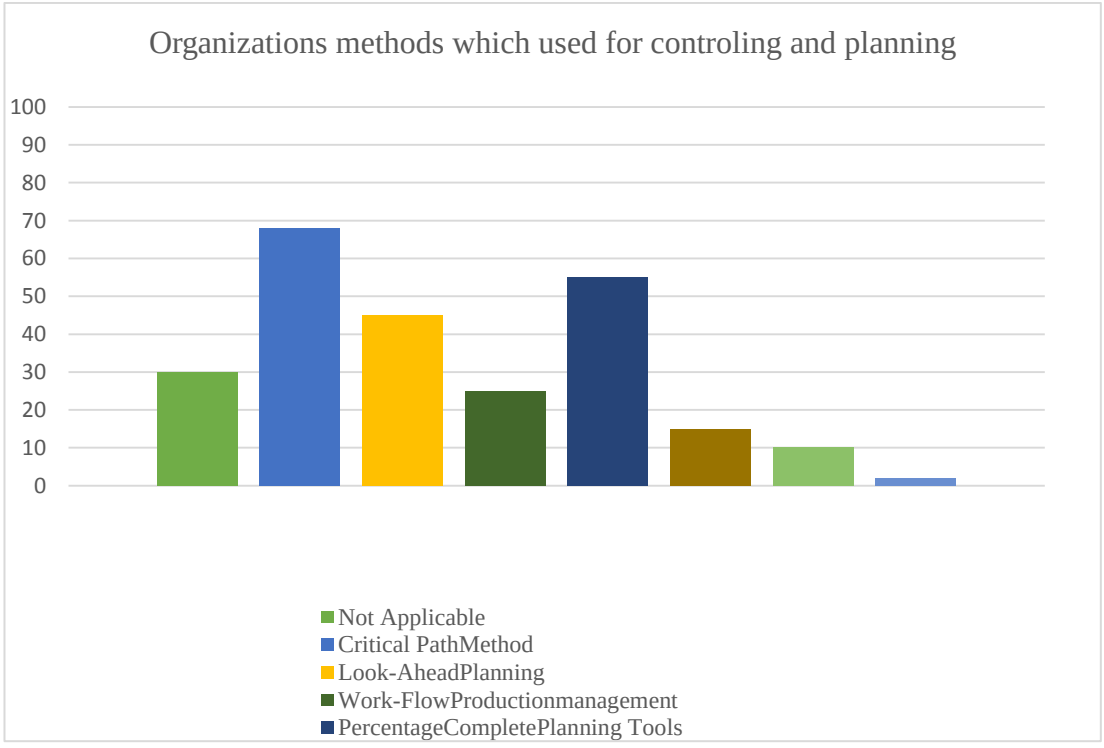


Figure 4.7. Applied method by organizations for data planning.

Question no.18 was for the methods used in the company to minimize uncertainty in the production procedures. which shows in Figure 4.8., preliminary studies are the first techniques to minimize organizational uncertainty.

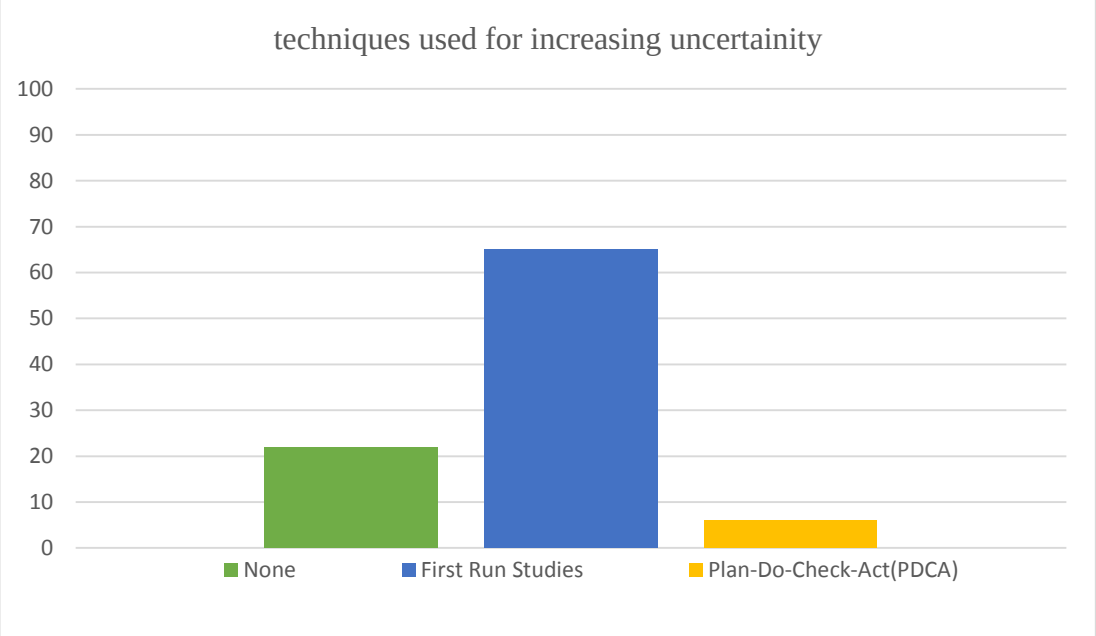


Figure 4.8. Methods used by companies to minimize uncertainty.

Question no. 21 is for the techniques and methods used by suppliers to procure materials for the workplace. Due to Figure 4.9., 63% of answers believe that these concepts are not enabled in their company in addition 27% of them are not identified the possibility of these methods.

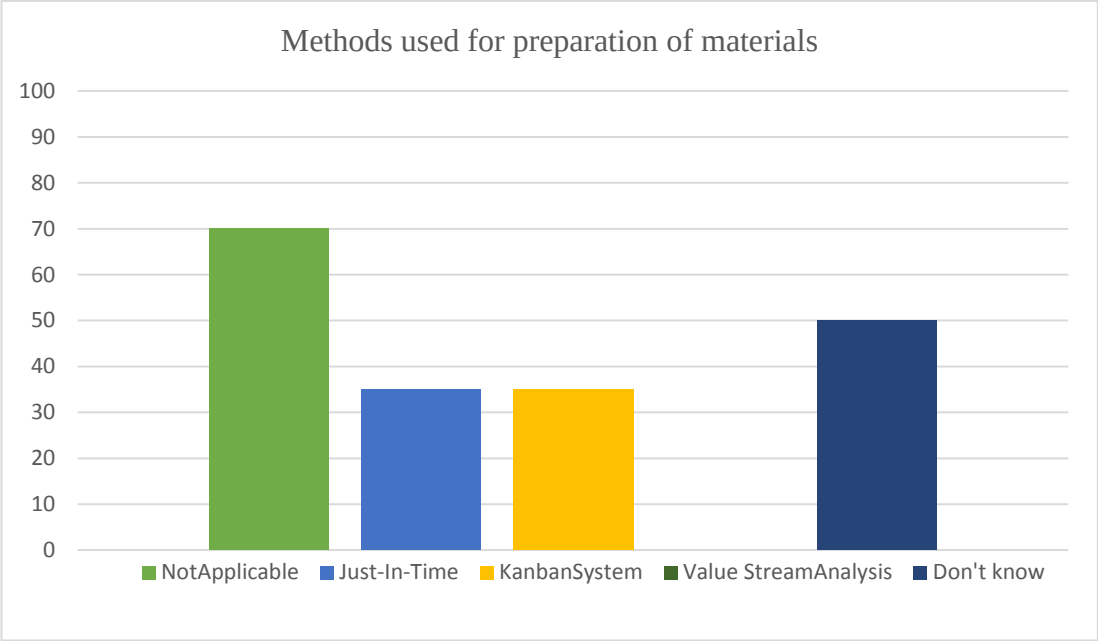


Figure 4.9. Methods used for preparation of materials.

Question No. 22 asked participants which methods/tools they use in their companies to simulate the flow by strengthening the relationship and information methods. Most respondents answered this question by citing the fact that lean methods are not useable in their companies or their companies do not use any of the mentioned methods.

Question No. 23 was conflicting with the techniques/method which used by the company to ban value losses by decreasing decision making. (Figure 4.10.) shows that 70% of the companies do not use any methods and techniques to ban cost damage.

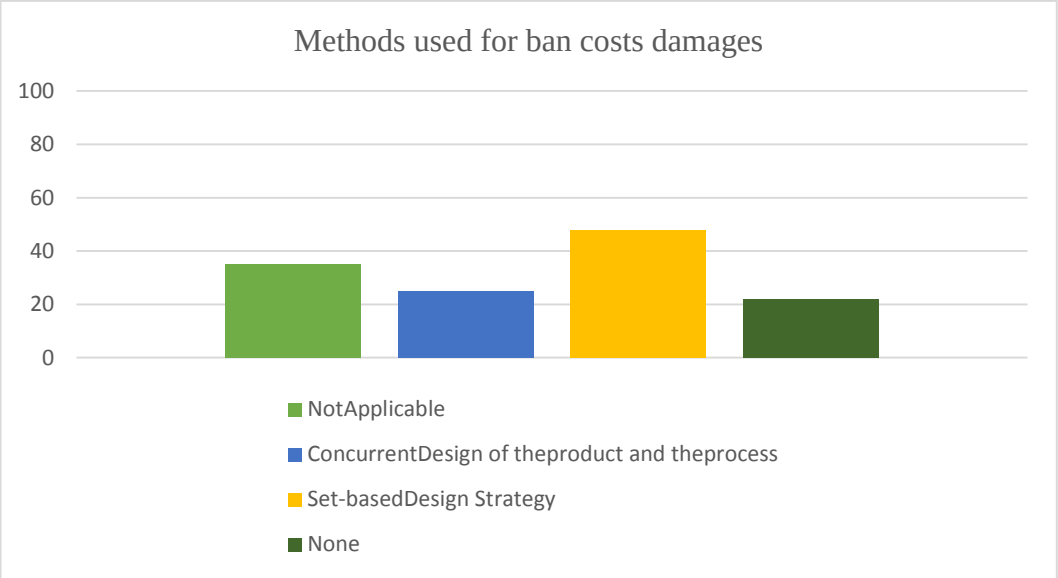
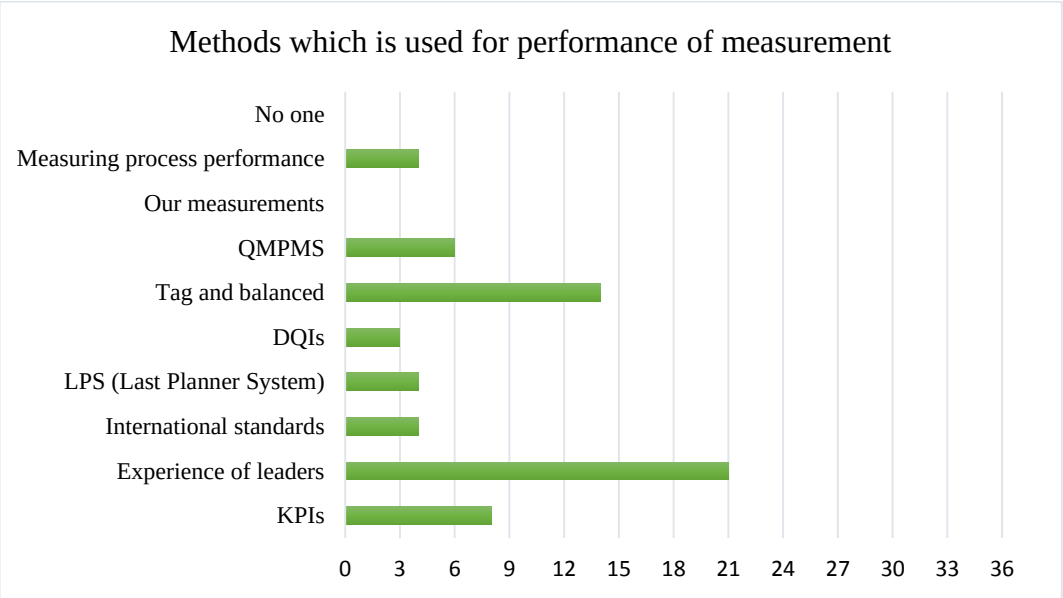


Figure 4.10. Methods used for ban costs damages.

Question no. 24 which was for using LPS (Last Planner System) in companies. therefore, 76% of contributors answered for this question as not suitable.

The question no. 26 which was about tools that organization use for performance evaluation. The Figure 4.11. shows the experience of leaders stands out as the greatest factor for implication measurements which followed by moderated scorecards.



Quantative Models for Performance Measurement Systems = QMPMS.
KPI= Key Performance Indicators,

Figure 4.11. Methods which is used for performance of measurement.

Question no. 27 answers which were asked to rate 7 Non-financial operation measures due to their needs. Quality shows to be the very significant measure of implementation, followed by customer/customer satisfaction and performance. Respondents, followed by customer/customer satisfaction and performance, rated quality as very important. It shows that the quality of production work or product affects the reputation organization and the received amount of business.

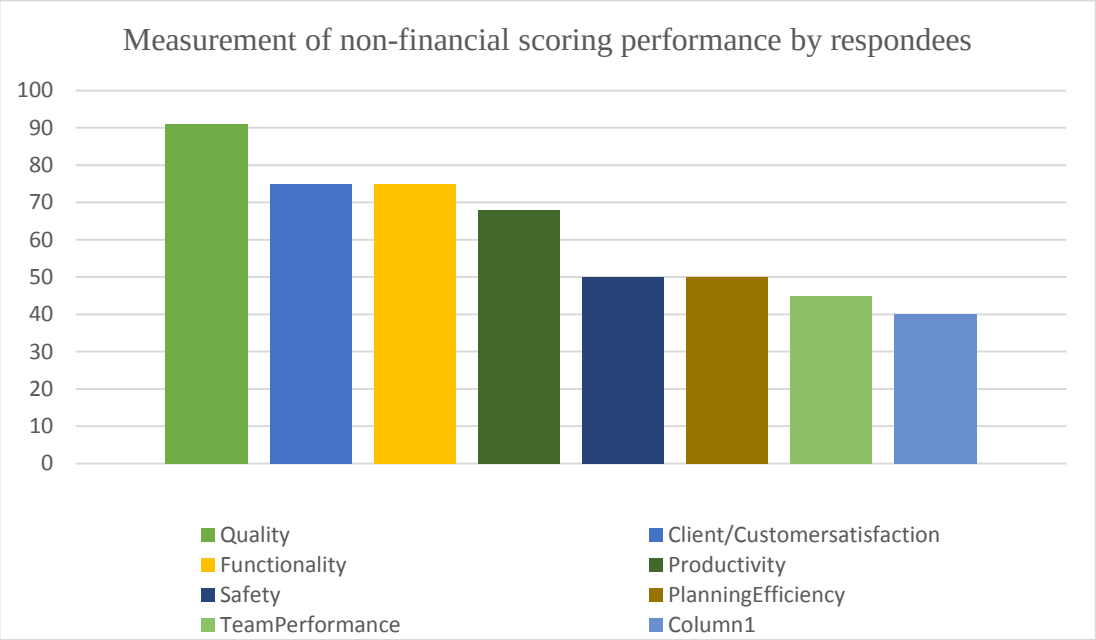


Figure 4.12. Measurement of non-financial scoring performance.

Question n. 28 was about the potential benefits of lean construction if used in the construction area. Due to the information, productivity improvement is highlighted as the very important advantage of lean manufacturing from the respondent's point of view.

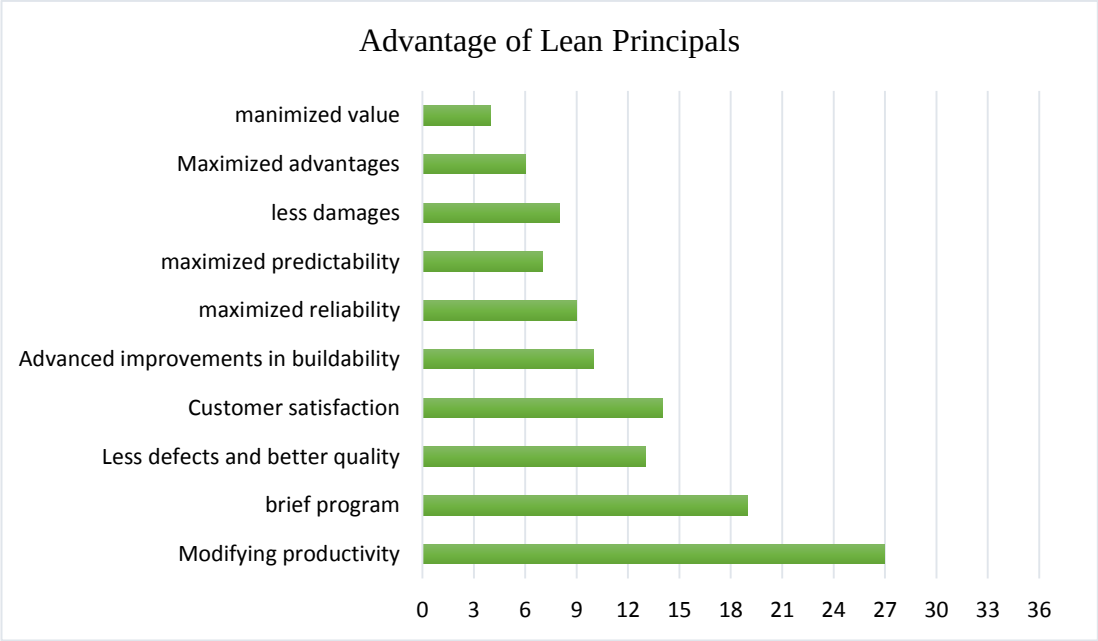


Figure 4.13. Benefits of Lean thinking if applicable in construction.

Question No. 29 was about the concepts these draw on financial success in companies. Figure 4.14. shows value and cost management as the most main tools for getting financial success which pursuing by reducing and risk management.

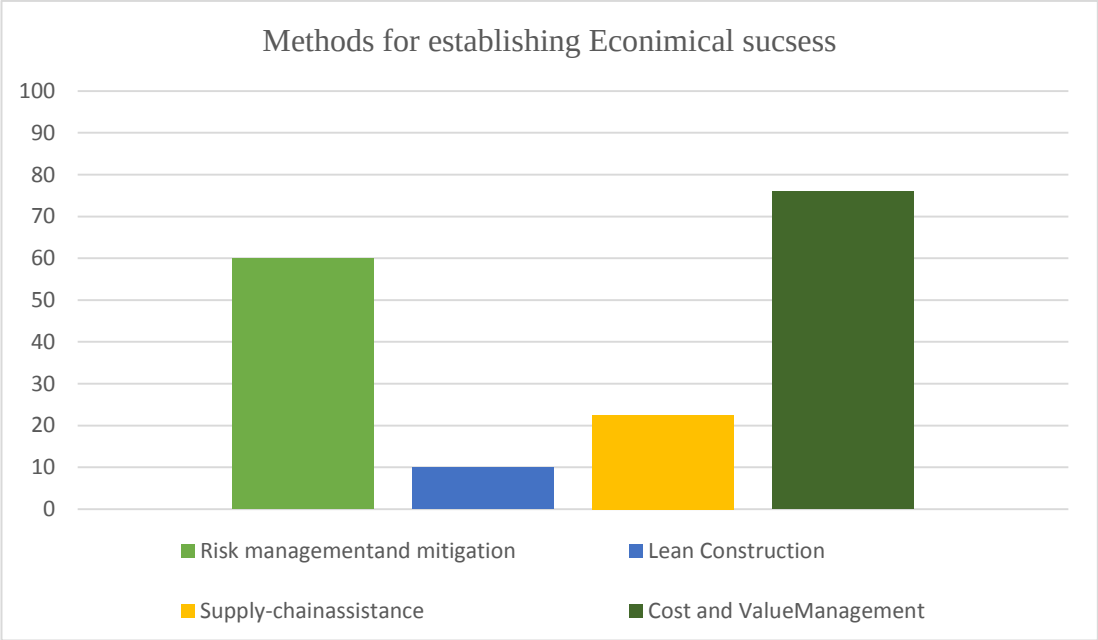


Figure 4.14. Technique for establishing economic success.

Based on the gathered information from question No. 30, surroundings regards are arrived at by cosmopolitan standards and validation, including ISO 14001, which is the most popular and important method among other methods. Figure 4.15. shows that lean construction is not a choice for anyone.

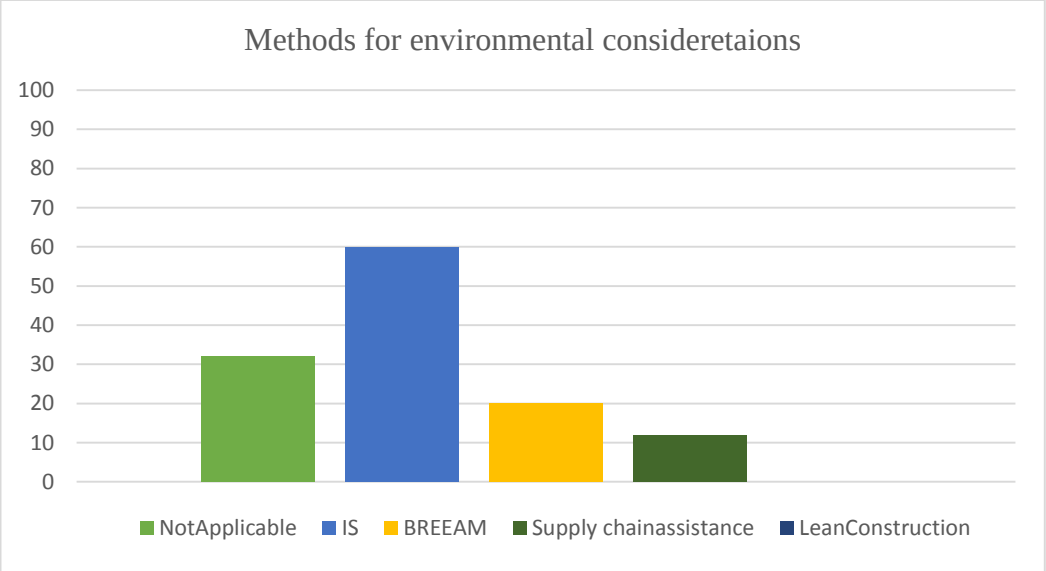


Figure 4.15. Environmental attentions.

Based on the Figure 4.16. more of the companies get social regards stand on Job skill and proficiency scheme (information on question No. 31th).

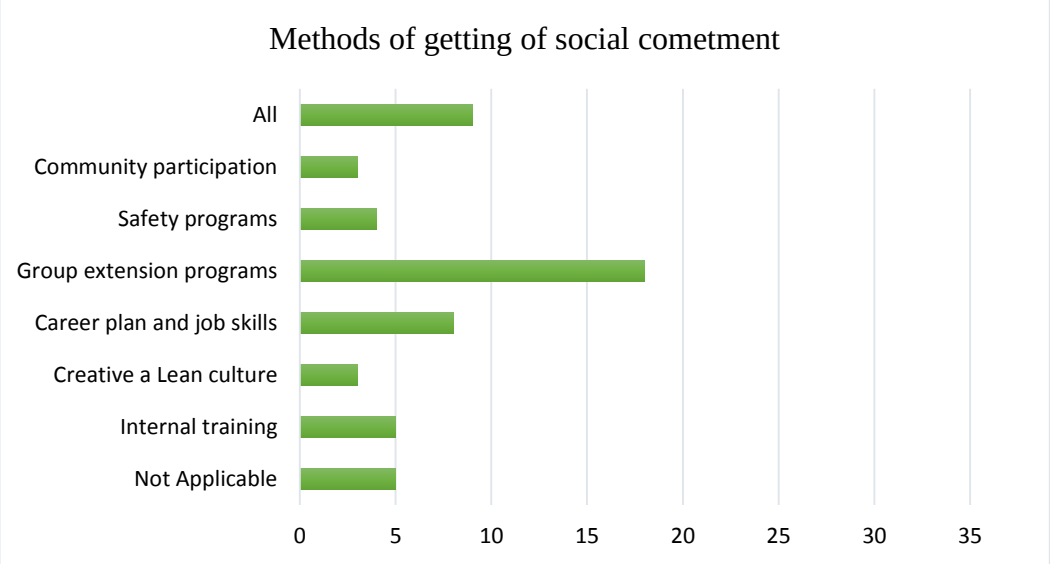


Figure 4.16. Tools for getting of social attentions.

Question no. 32 was about because that make companies Lean. The Figure 4.17. shows that curing the quality is the very important factor of Lean.

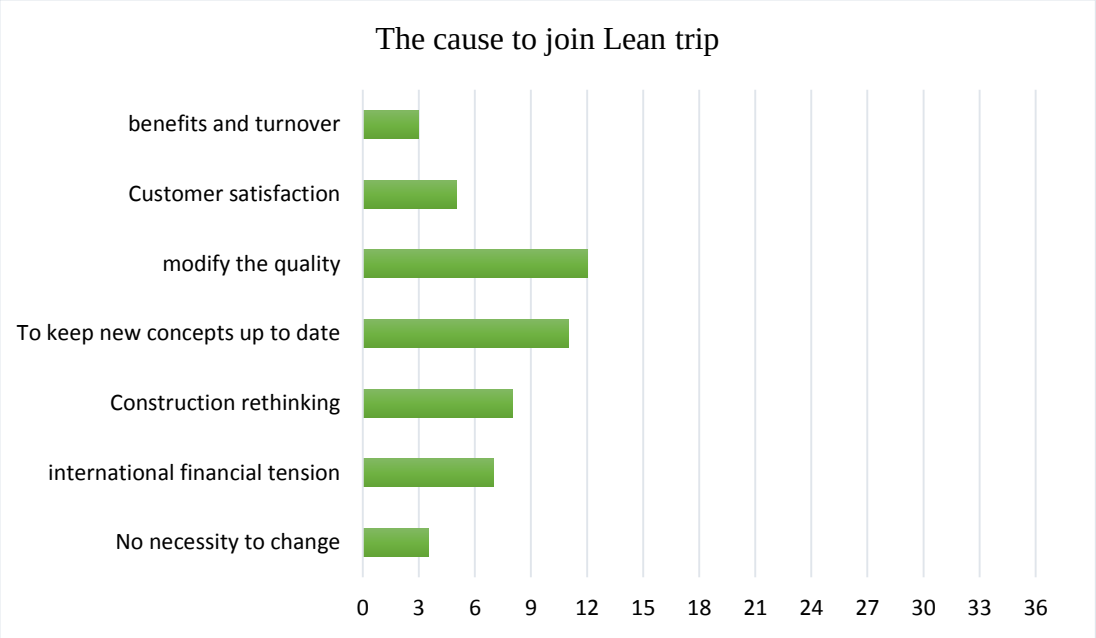


Figure 4.17. Reasons to start lean trip.

Question No. 33 which was about the problems of successful performance of Lean concepts and answers were asked to be numbering the obstacles on a scale of 5-point Likert as an symptom of their tendency, rating from “1” equal to disastrously agree up to “5” equal to strongly agree.

The Figure 4.18., the tendency percentage of 3 obstacles, namely B3, B4 & B10 were considered as the important obstacles to the successful performance of LC.

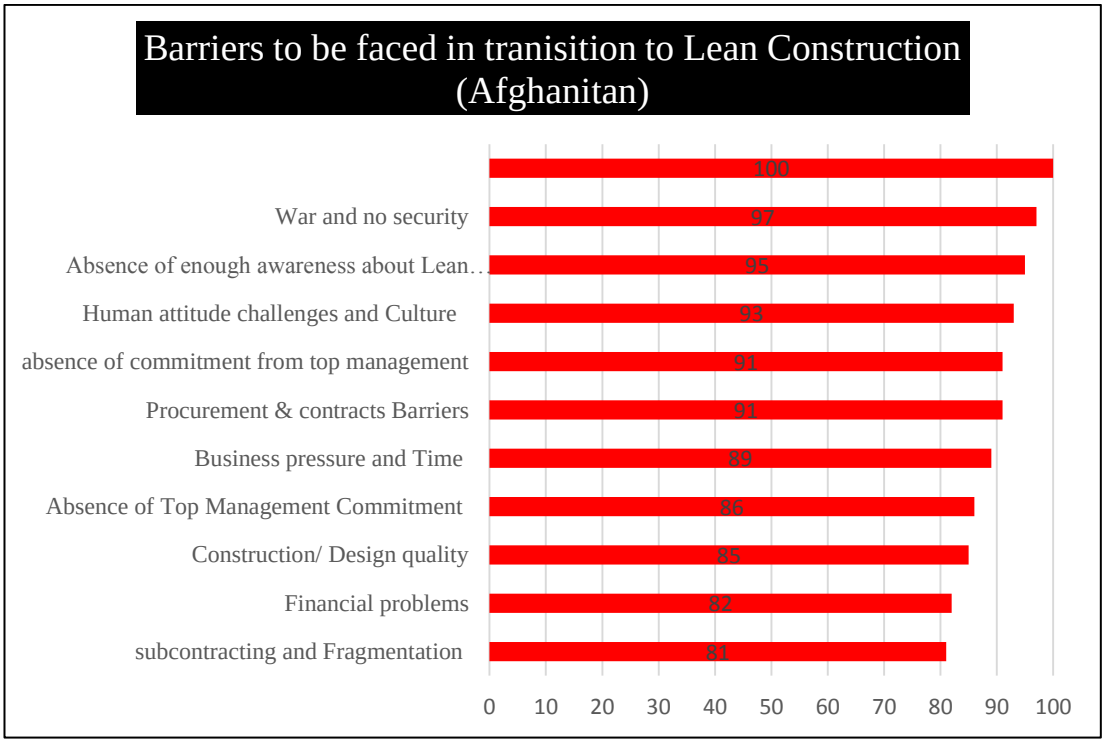


Figure 4.18. An abstract of the Barriers to face in transition of LC in Afghanistan.

Table 4.4. The professional obstacles to face the successful transition of LC.

ID	The key barriers	Respondents Scale* (1-5) (Strongly Disagree - Strongly Agree)					Attitude	
		1	2	3	4	5	Agreement (4+5)	Disagreement (1+2+3)
O1	War and No security	0	0	0	7	30	100%	0%
O2	Subcontracting and Fragmentation	1	1	2	10	22	95%	5%
O3	Absence of enough knowledge about Lean awareness & knowing	1	0	1	7	28	98%	2%
O4	Human attitudinal challenges and culture	0	1	0	7	29	99%	1%
O5	Business pressure and time	2	3	4	4	24	92%	8%
O6	Financial matters	0	3	4	7	23	94%	6%
O7	Absence of high commitment of management	0	0	1	7	29	97%	3%
O8	Separation in Design/Construction	2	5	4	7	19	89%	11%
O9	Educational problems	1	2	6	9	19	92%	8%
O10	Absence of procedure-due to the implementation rated method,	0	1	3	11	22	95%	5%

* Scale 3 is discussed useless and is classified within the difference team.

CHAPTER 5. CONCLUSION

Striving to implement the principles of (LC) lean construction can be a very satisfactory construction industry in none-developing countries like Afghanistan. but many countries around the world achieved great effectiveness using lean concepts. Otherwise, the construction sector frequently suffers from important difficulties, and the industry calls for a lean approach to revolutionizing the field, some organic, attitudinal, fiscal, technical, and lettered barriers seem to hinder the progress of construction organizations in the direction of Achieve a lean strategy.

Many studies have been done in various countries of the world to identify it limitations of implementing the LC approach. The barriers in the process of LC can affect the proper activities of LC acceptance and hinder performance projects if properly removed or avoided. but the requirement for variation in construction manufacturing by lean thinking, not sufficient research has been accomplished in this field. “Without recognizing the reasons that impact the successful performance of the LC, organizations which will no enable to show what betterment efforts should be made, where these impacts should be centralization, or which centralization can arrive the best outcomes.

According to this reason, the study is to know the potential obstacles which be faced to the successful LC transition. As a section of the research, a revision of the literature, which was treatment, and a questionnaire survey was divided among specialists and academics working in the area. The result of this questionnaire shows the respondents' attitudes about lean principles and their readiness to transform and identify obstacles in performing lean principles.

From the accumulated information data, which was found that formal training for project managers and coworkers is available in most organizations is not available. Very few organizations have some knowledge of the lean concept, but it is not sufficient for them to implement it, the managers' experience limits the usage of the lean method within the organizations. Moreover, some organizations already use some lean tools, realizing that these methods are lean methodology, however, the data indicated that the lean construction method is negligible. As well as the absence of knowledge and understanding of the lean concept, many organizations showed to be reluctant towards making any change, even if these changes will predominantly increase performance and better the quality and production rules of their organization. The accumulated data suggest that organizations have resisted the new tools and techniques provided by the lean construction philosophy and in some cases, that does not apply to their organization. Also, most of these companies do not show consideration to prevent devaluation.

This study assessed some of the main barriers which are to be faced to successful LC transition, and the respondents rated four of them as significant::

1. War and no security
2. Absence of enough lean awareness and recognation.
3. Civilization culture and human attitudinal matters
4. Absence of Top Management Commitment.

Including:

- Conclusion of the contract and Fragmentation,
- Procurement and Contracts,
- Time and business pressures,
- Financial problems,
- Construction Dichotomy/Design .
- Educational problems, Absence of activites based implemenation measurement system.

The conclusion of this study can be applied to help researchers, technicals, and construction companies focus their attempts and resources on the important problems needed to be baking the performance of LC standers. One of the significant effects of this research was that the repartition of questionnaires among different experts made them conscious in the construction industry of the lean rules and their wide benefits.

- Recommendations

The mentioned given obstacles, special recommendations are provided to overcome them. Without the main comprehension of the techniques of lean manufacturing, it is not able for companies to use the principles of lean industry in their system. Workshops and tutorials should be provided to provide basic principles, explain programs, and prepare direction on learning. By providing learning plans, team workers also understand how they are suitable into the whole procedures and how their applying impact the climb up to downs of the procedures.

Lean philosophy guidance to suitable management behavior and responsibility. Management needs that it be fully engaged in this concept to meet the problems that arise as a chance and turn any problem into an educational adventure. If these ideas are implemented collectively, managers can take full benefits of lean methods and significantly increase their results. What is required more is for managers to fundamentally change their management concept. Organizational transition is never simply, and fundamentals must change fundamentally, roles and responsibilities must change. Senior managers must be satisfied that lean organizational growth is appropriate, as well as leaders, who must constantly instill and assign costs of responsibility to all workers of the company. A social culture must be created, and the shared costs of the aims must be spread by the company. A new thinking approach is crucial to using lean standards in the industry of construction. Human culture and attitudes of people are informed as significant aspect in the transition of lean philosophy. Hence, companies must compare their work culture before using a lean system.

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ANNEXES

Annex 1: Questions

Questionnaire used in the survey

1. What is your profession?

- ☐ Academic
- ☐ Technician
- ☐ Civil Engineer
- ☐ Quantity Surveyor
- ☐ Architect
- ☐ Designer
- ☐ Consultant
- ☐ Construction Manager
- ☐ Project Manager
- ☐ If other, please specify
- ☐ _____

2. Where are you based?

- ☐ Kabul
- ☐ Herat
- ☐ Paktya
- ☐ Balkh
- ☐ Kandahar
- ☐ If other, please specify
- ☐ _____

3. Current role?

- ☐ Academic/Researcher
- ☐ Graduate Engineer
- ☐ Junior Engineer
- ☐ Team Leader
- ☐ Site Manager
- ☐ Project Manager
- ☐ Regional Manager
- ☐ Department Manager
- ☐ Managing Director
- ☐ If other, please specify
- ☐ _____

4. Highest level of education?

- ☐ Primary School
- ☐ High School
- ☐ Bachelor
- ☐ Master's Degree
- ☐ Doctorate
- ☐ If other, please specify
- ☐ _____

5. Years of experience?

- o 0-5
- o 5-10
- o 10-20
- o 21+

6. How many employees working in your organization?

_____ __

7. Operations area of your organization? (Multiple choice)

- ☐ Higher education
- ☐ Residential and/or Commercial buildings
- ☐ Highways and Transportation
- ☐ Logistic
- ☐ Design and Consultancy
- ☐ Dams
- ☐ Industry
- ☐ Infrastructural facilities

8. Annual Turnover Average (in Thousand/Dollar)?

- ☐ 10 – 30
- ☐ 30 – 50
- ☐ 50 – 100
- ☐ 100+

9. Major Customer/Client?

- ☐ Public Organizations
- ☐ Private Individuals and Organizations
- ☐ Both

5 principles of Lean Construction:

- ☐ Determine the value from the customer's aspect.
- ☐ Identify and complement the proceedings that hand over value (value stream). This is the series of procedure from rare materials to production (the supply chain). For achieving of this, Need to: (i) plan the value series and (ii) removing the losess.
- ☐ Create value by eliminating bottlenecks and disrupting flow and never interrupt the value-added phase with the non-value-added phase.
- ☐ Allow the customer to pull the product out through the manufacturing process. When asked, it produces only what is asked.
- ☐ Seek perfection through continuous improvement. It is not just about quality; it involves producing exactly what the customer wants when it comes to a reasonable price with no losess.

10. Have any efforts been made to provide official Lean education throughout your Company?

- ☐ No, Any resident Lean knowledge is through chance & private concern
- ☐ Training is available but no chance for practice
- ☐ Training for team leaders andproject team members is available, but the overall feature is lean fragmentation.
- ☐ Formal organization for capability building of lean, but not everyoneattends Lean awareness sessions
- ☐ A training program to proved that the company has the optimumblend of Lean awareness

11. What would your method for evaluation of the performance in terms of motivating of managers in your company?

- ☐ Lacke of knowledge that which motivate that people can't theire best.
- ☐ Having a basic approach in motivatingpeople
- ☐ They totally create of an surroundings that customer can done their best in.
- ☐ They share the task and decision to other and they have a share visibility and ownership.
- ☐ For the motivate people, they prepare a Pattern for other leaders through way.

12. Is team leaders paid attention to improving procedures that do not have big problems?

- ☐ The attitude is for"if that is not broke" more rules are used by workarounds.
- ☐ For the establish of measuring, drawing and sample the leaders help to the team.
- ☐ Teams normaly measure, chart, and demonstrate the effectiveness of important processes.
- ☐ For minor and acritical processess, the Impacts are often.
- ☐ For whole procedures, formal betterment programs are woven seamlessly day by day

13. Has your organization's managing team experienced any formal induction of lean concept?

- ☐ Teams are trained and no need for anything further

- ☐ They got some information through training sessions about Lean.
- ☐ Yes, we have a public tendency to improve knowledge, but the pressure of time makes its difficult.
- ☐ Some lean knowledge training sessions which are sufficient for the participates.
- ☐ The managing team has know the issues, and at least has basic knowledge about it.

14. Which of the bellow method use by your company for internal and external co-relationships. (Multiple choice)

- ☐ Contractual Agreements for Long-Term (e.g. Frameworks & Partnering)
- ☐ Multitasking teams
- ☐ File Management Systems
- ☐ Integrated Project Delivery
- ☐ Lean Project Delivery System
- ☐ Project Information Systems
- ☐ Joint planning programs (e.g. with subcontractors or suppliers)
- ☐ All
- ☐ If other, please specify
- ☐ _____

15. With the following sentences, to what limit do you agree/disagree??

	STRONGLY AGREE	AGREE	NOT SURE	DISAGREE	STRONGLY DISAGREE
FOR THE SPEEDER DEMANDS OF CLIENT AND FOR THE CHEAPER PROJECT THE METHOD OF LEAN IS NOT POSSIBLE IN CONSTRUCTION IDUSTRY.	☐	☐	☐	☐	☐
FOR SHOWING OF THE BIG PROBLEMS NO NEED FOR IMPROVING OF THE PROCESSES.	☐	☐	☐	☐	☐
FORMS OF CONTRACT THAT CAN ASSERT PARTY AND POWER OVER THE OTHER CREATE HOSTILE. THE RELATIONS ADVERTISING GENERATE TRANSITION FOR VALUE WHICH INICATE THE LOSESS.	☐	☐	☐	☐	☐
LEAN MUST BE IMPLEMENTED THROUGH TRADE AND VALUE CHAIN TO SEND THE ALLOW CONCLUSSION, ANY DETACHED SUCESS MAY EVEN THE RESULT IN LOSESS.	☐	☐	☐	☐	☐
THE USE OF PERFORMANCE MEASURMENT FOR SELF-DEFENSE OR EVIDENCE FOR LITIGATION IS RECOMMENDED.	☐	☐	☐	☐	☐
THE (BOQ) BILL OF QUANTITY ACCORDING TO THE METHOD AND STANDARDS OF MEASUREMENT CAN INDICATE FOR DIFFERENT	☐	☐	☐	☐	☐

PRICE AND SENDING PROBLEMS.					
BUSENIESS ACTIVITIES, SPECIFIC MEASURED FOR PROJECT, VALUE AND TIME TABLE, ARE NOT ENABLE FOR ONGOING OF BETTERMENT.	□	□	□	□	□
ALL ACTIVITIES OF THE ORGANIZATION/SITE SHOULD BE CONTINUOUSLY IMPROVED	□	□	□	□	□
PRIORITY TO QUALITY THAN PROFIT.	□	□	□	□	□
A PROCUREMENT FORM WHICH JOIN AND DESIGN FOR EXTERNAL DESIGNERS, CAN SEPARATES THE FORM OF CONSTRUTION. PROCESS; AND HENCE THE LEAN CONCEPT IS LOST	□	□	□	□	□
LEAN METHOD IS TECHNIQUES WHICH NEED FOR CHANGING OF FIGURES, THINKS, CO-REALATIONSHIP, FLEXIBILITY, METHODOLOGY AND FOCUS IN A WIDE SYSTEM.	□	□	□	□	□

16. Which of the below functions is best for achiving of lean approach in your company? (Multiple-choice)

- □ Collaborative Planning
- □ Work sequence analysis - indicate losess and risks, and desired logistics
- □ Data Analysis - Set targets, monitor, and improve
- □ Partial performance, optical management indicate the difficulty before accuring.
- □ Workplace organization - create a sure and best workplace environment to done the duties.
- □ Standardized work - specify good tools for achiving the quality, time, and value, surley and safely.
- □ Process mapping - identify who does what, when, why and how
- □ For solving of difficulties - specify root-causes of difficulties
- □ None
- □ All
- □ If other, please specify
- □ _____

17. Which of the following method and control planning is use in your company? (multiple choice)

- □ Not Applicable
- □ Critical Path Method
- □ Look-Ahead Planning
- □ Production management Work-Flow as a tool for construction planning.
- □ Percentage Complete Planning Tools
- □ Last Planner System
- □ Constraint Analysis
- □ Reverse-Phase Time table
- □ If other, please specify
- □ _____

18. Which of the below method use by your company for doubt in procedure of production? (Multiple choice)

- ☐ None
- ☐ First Run Studies
- ☐ Plan-Do-Check-Act (PDCA)
- ☐ Pre-Fabrication Strategies
- ☐ If other, please specify
- ☐ _____

19Which of the below tools is use by your company for materials, planning, production process and movement of work. (Multiple choice)

- ☐ Not Applicable
- ☐ Continuous flow processing (CFP)
- ☐ Visual Management
- ☐ Last Planner System (LPS)
- ☐ For transportation system of integrating vertical and horizontal movements. (e.g. Crane)
- ☐ If other, please specify
- ☐ _____

20. Is your company has a success from : (TQM)Total Quality Management , (CE)Concurrent Engineering and (SCM) Supply Chain Management.

- ☐ No
- ☐ If yes, please identify which?
- ☐ _____

21. What methods your company use in construction site for procurement of materials? (multiple choice)

- ☐ Not Possible
- ☐ (JIT) Just-In-Time
- ☐ Kanban System
- ☐ Price Stream Analysis
- ☐ Don't know
- ☐ If other, please specify
- ☐ _____

22. What methods your company use for simulation and proportion for information process? (Multiple choice)

- ☐ Not Applicable
- ☐ Design Structure Matrix
- ☐ Virtual Design Studios
- ☐ Virtual Reality Tools
- ☐ Building Information Modeling (BIM)
- ☐ None of above
- ☐ If other, please specify
- ☐ _____

23. Which of the following methods are use in your company for exclude of value and reducing of waste? (Multiple choice)

- ☐ Not Applicable
- ☐ Simultaneous product design and workflow
- ☐ Set-based Design Strategy
- ☐ None
- ☐ If other, please specify
- ☐ _____

24. Is the LPS Last Planner system is using in your company?

- ☐ Not Applicable
- ☐ Planning as an activity Time table method.
- ☐ Production Control
- ☐ Tuning Logistics Operations during Production
- ☐ Performance measurement & organizational learning
- ☐ Management Control

☐ If other, please specify
☐ _____

25. The (PPC) Percentage Plan Complete value in LPS Last Planner System:

☐ Size of the level of utilization of a workflow (efficiency).
☐ Size of production planning success and workflow validity
☐ Both of above
☐ Not Possible

26. What method your company use for measurement? (Multiple choice)

☐ (KPIs) Results oriented Key Performance Indicators , Like value and time indications.
☐ Experience of managers
☐ International Benchmarking
☐ Last Planner System
☐ Design Quality Indicators (DQIs)
☐ Balanced Scorecards
☐ Quantitively Models for Activities Size Systems.
☐ The metrics system of company which indicate of leading indicators purposing to give an early notic.
☐ business strategy
☐ Process active size (e.g. cycle time, Rework, waste, etc.)
☐ None
☐ If other, please specify
☐ _____

27. Please rate from 10 the below 'Non - Financial' performance measures, for their importance (10 to 1 being the least important).

	Rate from 10
• Quality	• ……
• Safety	• ……
• Client/Customer satisfaction	• ……..
• Functionality	• ……..
• Planning Efficiency	• ……..
• Team Performance	• ……
• Productivity	• ……

28. What of the below profits can be achieved by lean concept? (Please choose Up to 5 benefits only)

☐ Improved productivity
☐ Increased reliability
☐ Fewer defects and improved quality
☐ More client satisfaction
☐ Increased predictability
☐ Shortened schedules
☐ Less waste
☐ Reduced cost
☐ Advanced improvements in design ability.
☐ Increased profit
☐ Improved safety and health conditions
☐ If other, please specify
☐ _____

29. Achieving of success at your company by:

☐ Risk management and mitigation
☐ Lean Construction
☐ Supply-chain assistance
☐ Value Management and Cost

- ☐ All
- ☐ If other, please specify
- ☐ _____

30. In your company the considerations of environment is through:

- ☐ Not Applicable
- ☐ Accreditation and International standards, like the ISO 14001
- ☐ BRE Environmental Assessment Model (BREEAM)
- ☐ Supply chain assistance
- ☐ Lean thinking as a basic method for decreasing physical losess.
- ☐ All
- ☐ If other, please specify
- ☐ _____

31. In your company the social considerations by:

- ☐ Not Applicable
- ☐ In-house training
- ☐ Generat a Lean culture
- ☐ Job knowledge and Skills scheme
- ☐ Team development programs
- ☐ Safety programs
- ☐ Community engagement
- ☐ All
- ☐ If other, please specify
- ☐ _____

32. Why your company planned to start the lean trip? (Multiple choice)

- ☐ No need for change and we indicate the objective
- ☐ In the time of accruing a big problem. (e.g. global financial crisis)
- ☐ Answer toEgan's report (Rethinking Construction)
- ☐ For keeping of emerging management concepts.
- ☐ For the betterment of income quality
- ☐ For rate of client satisfaction
- ☐ To high the income
- ☐ If other, please specify
- ☐ _____

33. To what limit do you agree that the below problems are considered obstacles in transition of Lean Construction?

	STRONGLY AGREE	AGREE	NOT SURE	DISAGREE	STRONGLY DISAGREE
FRAGMENTATION & SUBCONTRACTING	□	□	□	□	□
PROCUREMENT & CONTRACTS	□	□	□	□	□
LACK OF ADEQUATE LEAN AWARENESS & UNDERSTANDING	□	□	□	□	□
CULTURE & HUMAN ATTITUDINAL ISSUES	□	□	□	□	□
TIME & COMMERCIAL PRESSURE	□	□	□	□	□
FINANCIAL ISSUES	□	□	□	□	□
LACK OF TOP MANAGEMENT COMMITTMENT	□	□	□	□	□
DESIGN/CONSTRUCTION DICHOTOMY	□	□	□	□	□
EDUCATIONAL ISSUES	□	□	□	□	□

ABSENCE OF MEASUREMENT ACTIVITIES SYSTEM.	□	□	□	□	□

34. Other barriers that be face and occur in implementation of successful of lean construction.

- □ No
- □ Not Sure
- □ If yes, could you please mention them?
- □ _____
- □

Annex 2: Statistics

Survey Analysis

Frequency Table
ID

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	001	1	2.7	2.7	2.7
	002	1	2.7	2.7	5.4
	003	1	2.7	2.7	8.1
	004	1	2.7	2.7	10.8
	005	1	2.7	2.7	13.5
	006	1	2.7	2.7	16.2
	007	1	2.7	2.7	18.9
	008	1	2.7	2.7	21.6
	009	1	2.7	2.7	24.3
	010	1	2.7	2.7	27.0
	011	1	2.7	2.7	29.7
	012	1	2.7	2.7	32.4
	013	1	2.7	2.7	35.1
	014	1	2.7	2.7	37.8
	015	1	2.7	2.7	40.5
	016	1	2.7	2.7	43.2
	017	1	2.7	2.7	45.9
	018	1	2.7	2.7	48.6
	019	1	2.7	2.7	51.4
	020	1	2.7	2.7	54.1
	021	1	2.7	2.7	56.8
	022	1	2.7	2.7	59.5
	023	1	2.7	2.7	62.2
	024	1	2.7	2.7	64.9
	025	1	2.7	2.7	67.6
	026	1	2.7	2.7	70.3
	027	1	2.7	2.7	73.0
	028	1	2.7	2.7	75.7
	029	1	2.7	2.7	78.4
	030	1	2.7	2.7	81.1
	031	1	2.7	2.7	83.8
	032	1	2.7	2.7	86.5
	033	1	2.7	2.7	89.2
	034	1	2.7	2.7	91.9
	035	1	2.7	2.7	94.6
	036	1	2.7	2.7	97.3
	037	1	2.7	2.7	100.0
	Total	37	100.0	100.0	

Profession

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Academic	2	5.4	5.4	5.4
	Other	3	8.1	8.1	13.5
	Civil Engineer	11	29.7	29.7	43.2
	Quantity Surveyor	3	8.1	8.1	51.4
	Architect	6	16.2	16.2	67.6
	Designer	4	10.8	10.8	78.4
	Consultant	1	2.7	2.7	81.1
	Construction Manager	2	5.4	5.4	86.5
	Project Manager	4	10.8	10.8	97.3
	other	1	2.7	2.7	100.0
	Total	37	100.0	100.0	

Province

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Kabul	10	27.0	27.0	27.0
	Herat	7	18.9	18.9	45.9
	Paktya	5	13.5	13.5	59.5
	Balkh	4	10.8	10.8	70.3
	Kandahar	6	16.2	16.2	86.5
	Other	5	13.5	13.5	100.0
	Total	37	100.0	100.0	

Position

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Academic/Researcher	3	8.1	8.1	8.1
	Graduate Engineer	2	5.4	5.4	13.5
	Junior Engineer	17	45.9	45.9	59.5
	Team Leader	2	5.4	5.4	64.9
	Site Manager	4	10.8	10.8	75.7
	Project Manager	4	10.8	10.8	86.5
	Regional Manager	2	5.4	5.4	91.9
	Department Manager	2	5.4	5.4	97.3
	Managing Director	1	2.7	2.7	100.0
	Total	37	100.0	100.0	

Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High school	2	5.4	5.4	5.4
	Bachelor	27	73.0	73.0	78.4
	Master's Degree	8	21.6	21.6	100.0
	Total	37	100.0	100.0	

Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 - 5	24	64.9	64.9	64.9
	5 - 10	13	35.1	35.1	100.0
	Total	37	100.0	100.0	

Employees

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5 - 10	5	13.5	13.5	13.5
	10 - 20	10	27.0	27.0	40.5
	20 - 50	14	37.8	37.8	78.4
	50	8	21.6	21.6	100.0
	Total	37	100.0	100.0	

OperationA

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Higher education	4	10.8	10.8	10.8
	Residential and/or Commercial buildings	15	40.5	40.5	51.4
	Highways and Transportation	8	21.6	21.6	73.0
	Logistic	5	13.5	13.5	86.5
	Design and Consultancy	5	13.5	13.5	100.0
	Total	37	100.0	100.0	

ATA

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10000 - 30000	5	13.5	13.5	13.5
	30000 - 50000	19	51.4	51.4	64.9
	50000 - 100000	9	24.3	24.3	89.2
	100000+	4	10.8	10.8	100.0
	Total	37	100.0	100.0	

Client

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Public Organization	16	43.2	43.2	43.2
	Private Individuals and Organizations	3	8.1	8.1	51.4
	NGO's	18	48.6	48.6	100.0
	Total	37	100.0	100.0	

FiveLeanP

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Determine the value from the customer's aspect;	3	8.1	8.1	8.1
	Identify and complement the proceedings that hand over value	14	37.8	37.8	45.9
	Make value flow by eliminating bottlenecks and disruption	9	24.3	24.3	70.3
	Let the customer pull the product through the manufacturing process	6	16.2	16.2	86.5
	Pursue perfection through continuous improvement	5	13.5	13.5	100.0
	Total	37	100.0	100.0	

LeanTraining

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No, any resident Lean knowledge is through	6	16.2	16.2	16.2
	Some had training, but there has not been any chance	10	27.0	27.0	43.2
	Training is available for team leaders	7	18.9	18.9	62.2
	There is a formal structure for Lean capability building	10	27.0	27.0	89.2
	There is a training program that ensures that the	4	10.8	10.8	100.0
	Total	37	100.0	100.0	

ELforM

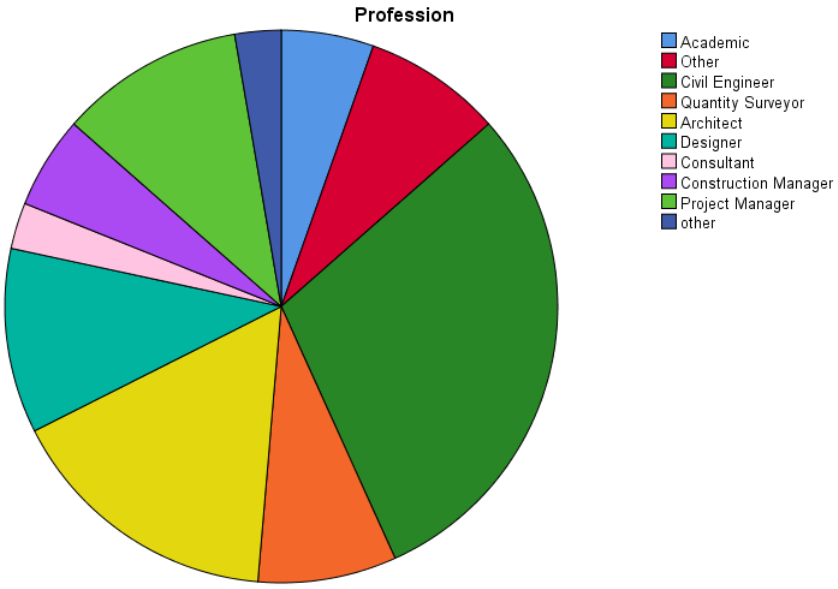
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	They do not know what motivates	4	10.8	10.8	10.8
	They have a basic approach in motivating people	11	29.7	29.7	40.5
	They generally create an environment that	10	27.0	27.0	67.6
	They always delegate tasks and decisions down	8	21.6	21.6	89.2
	They provide a role model for other leaders	4	10.8	10.8	100.0
	Total	37	100.0	100.0	

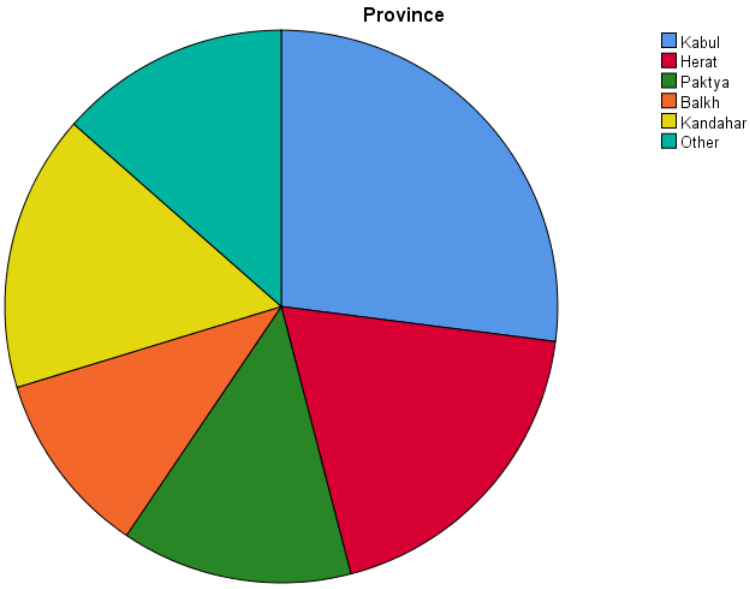
TLimproveMP

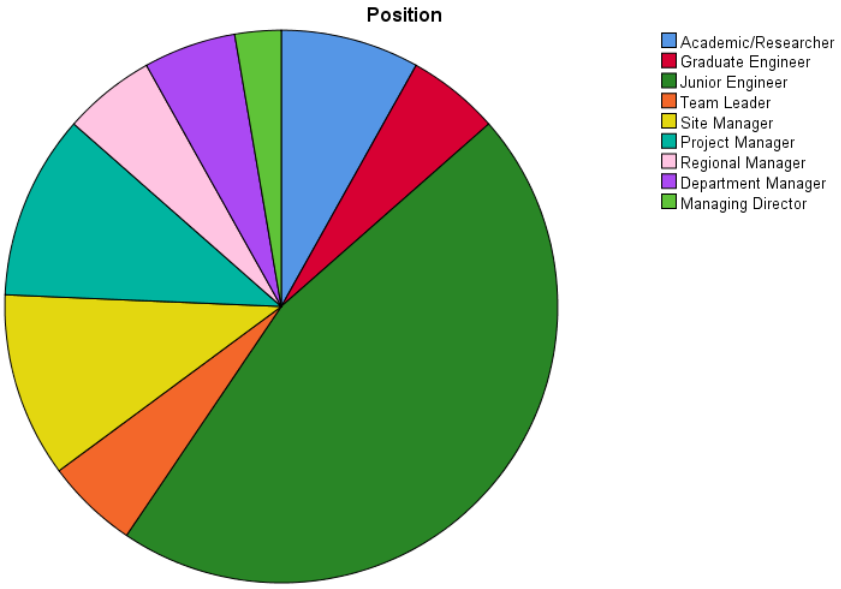
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Little, the attitude is ‘if it is not brok	8	21.6	21.6	21.6
	Leaders are helping teams to establish	10	27.0	27.0	48.6
	Teams regularly measure	8	21.6	21.6	70.3
	For all critical processes	7	18.9	18.9	89.2
	For all processes, formal improvement	4	10.8	10.8	100.0
	Total	37	100.0	100.0	

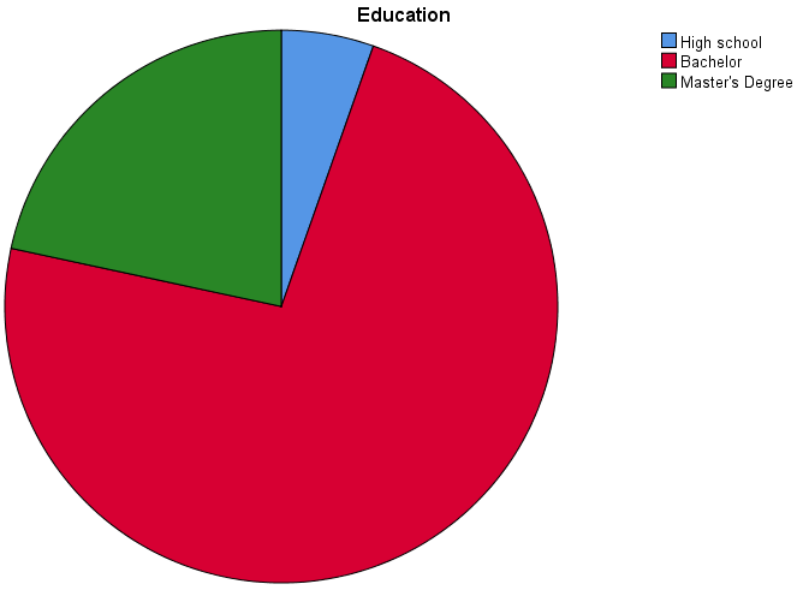
MethodInOrg

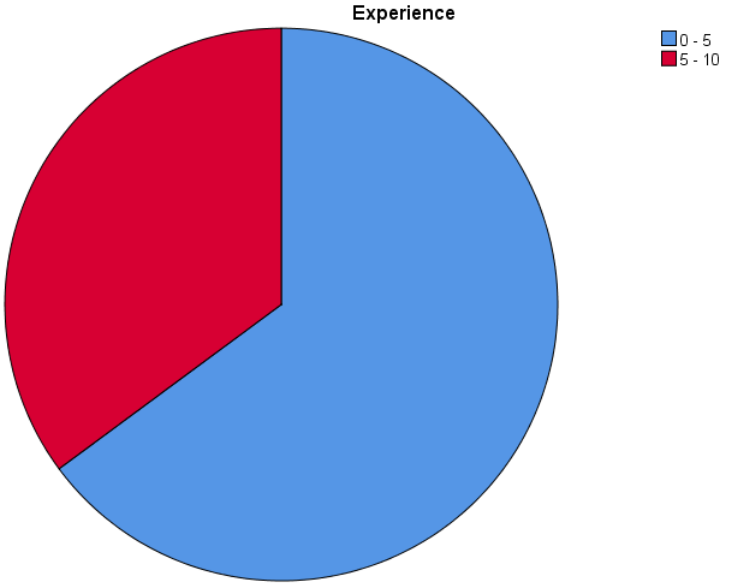
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Long-Term Contractual Agreements	5	13.5	13.5	13.5
	Cross-Functional Teams	7	18.9	18.9	32.4
	Document Management Systems	11	29.7	29.7	62.2
	Integrated Project Delievery	8	21.6	21.6	83.8
	Lean Project Delivery System	6	16.2	16.2	100.0
	Total	37	100.0	100.0	

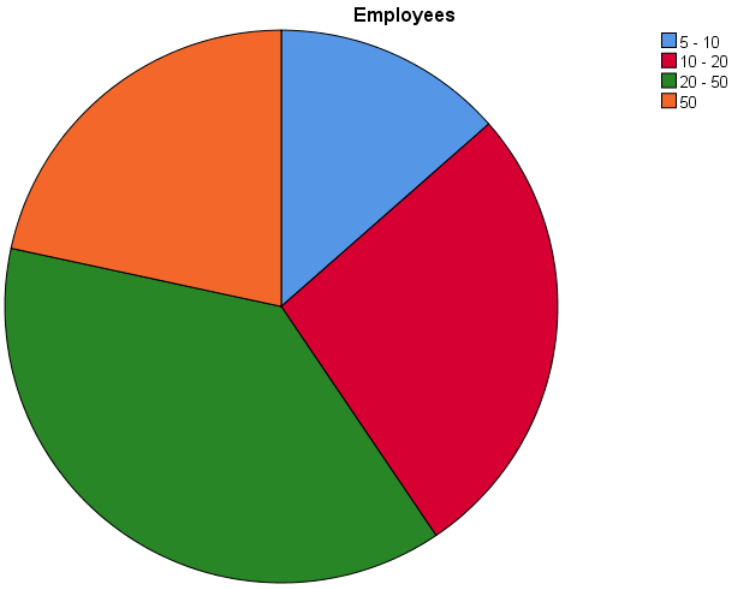

Profession
Academic
Other
Civil Engineer
Quantity Surveyor
Architect
Designer
Consultant
Construction Manager
Project Manager
other

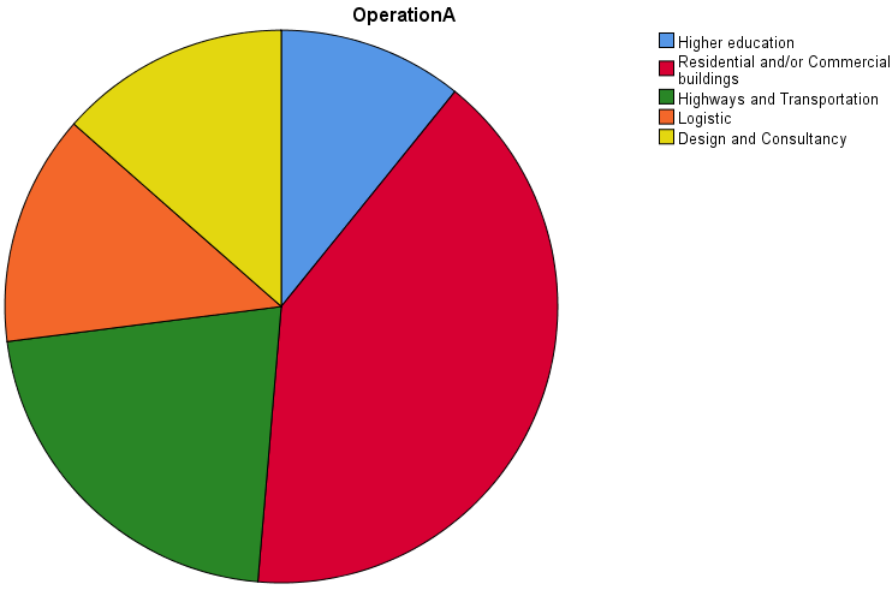

Province
Kabul
Herat
Paktya
Balkh
Kandahar
Other

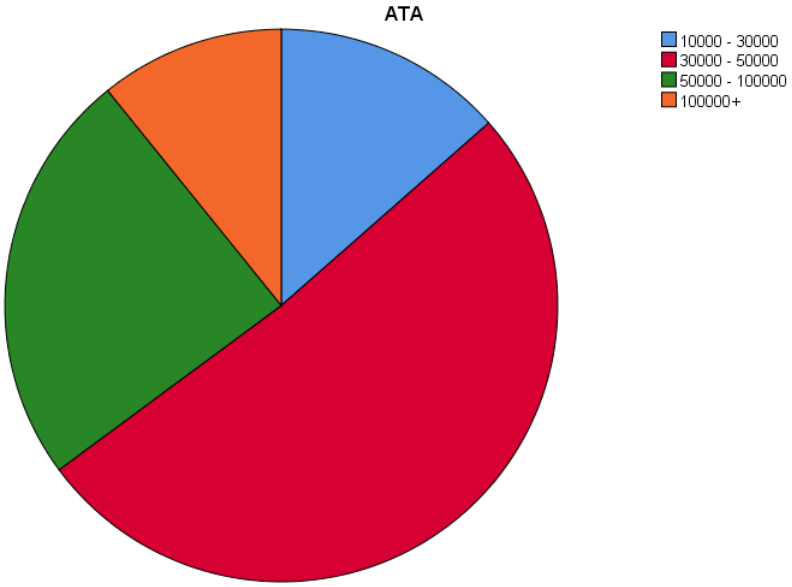

Position
Academic/Researcher
Graduate Engineer
Junior Engineer
Team Leader
Site Manager
Project Manager
Regional Manager
Department Manager
Managing Director

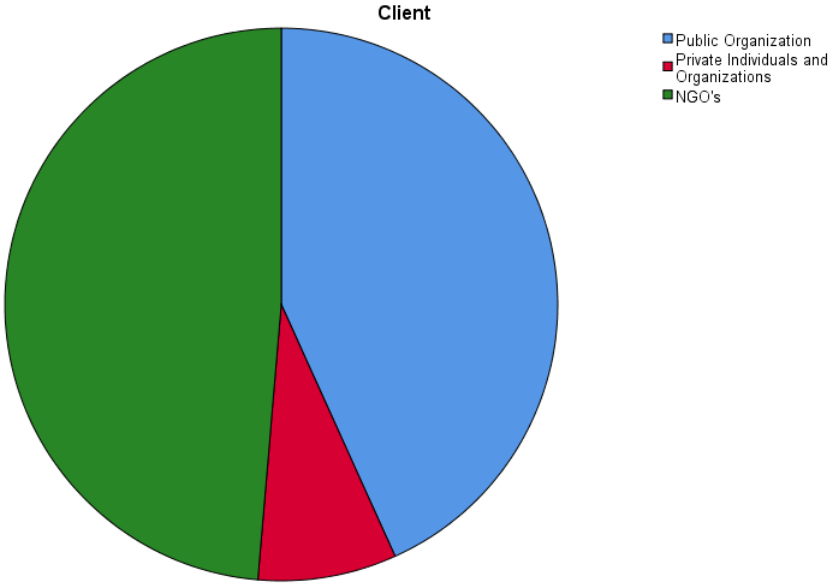

Education
High school
Bachelor
Master's Degree

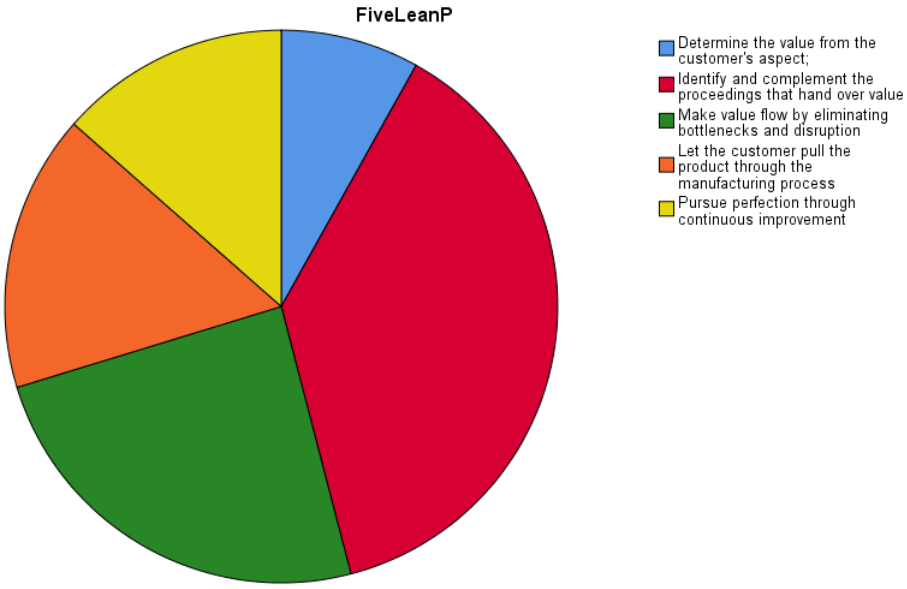

Experience
0 - 5
5 - 10

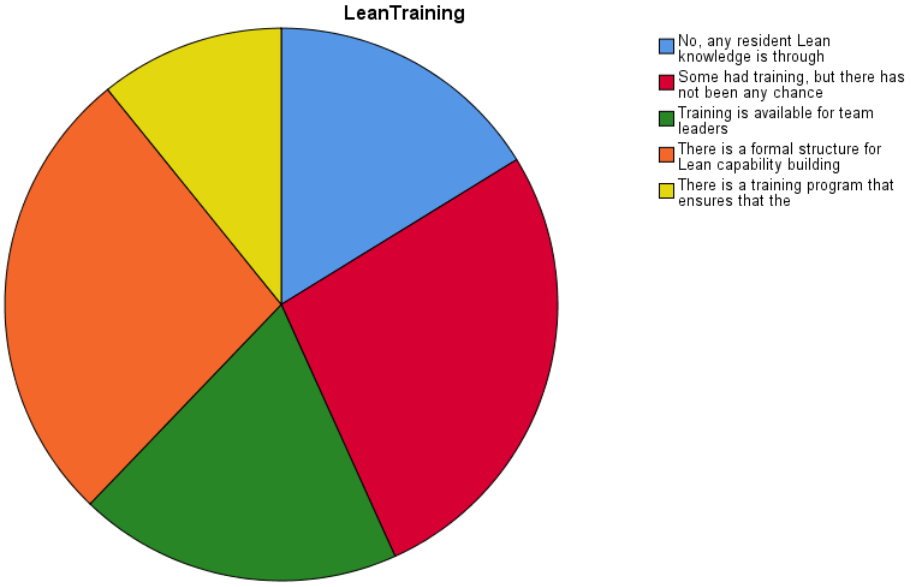

Employees
5 - 10
10 - 20
20 - 50
50

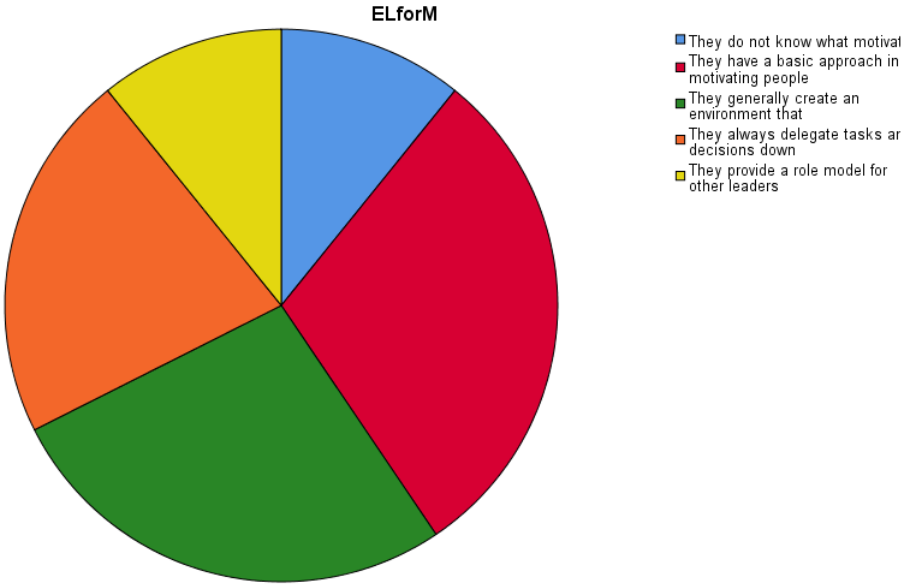

OperationA
Higher education
Residential and/or Commercial buildings
Highways and Transportation
Logistic
Design and Consultancy

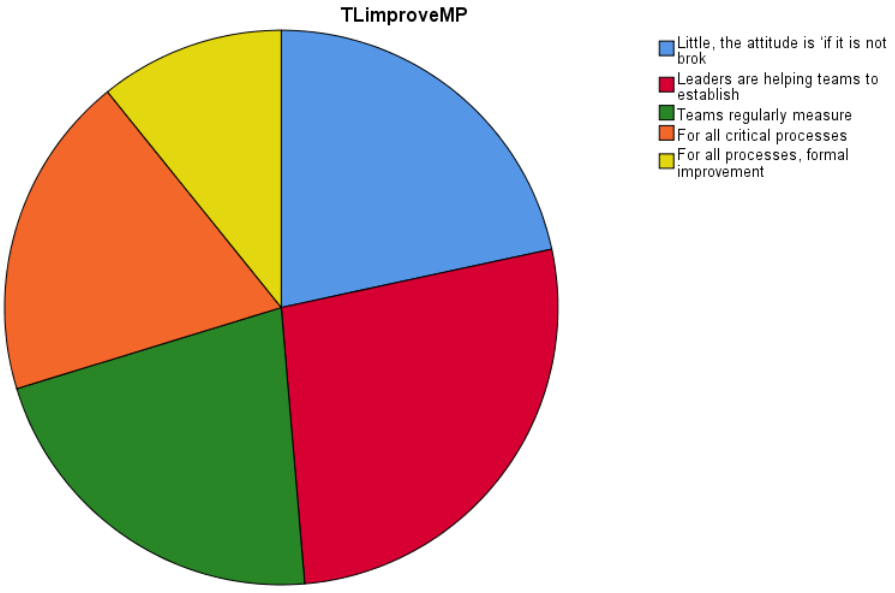

ATA
10000 - 30000
30000 - 50000
50000 - 100000
100000+

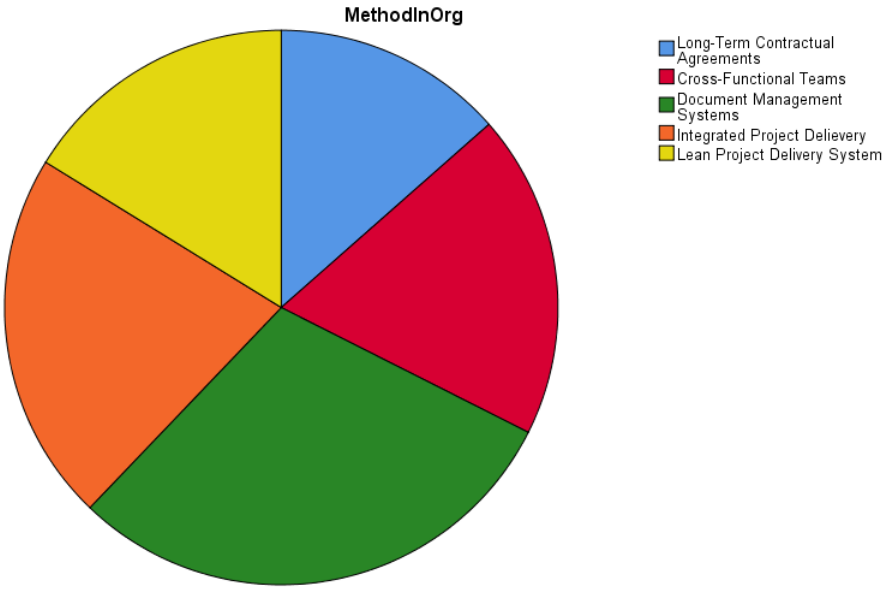

Client
Public Organization
Private Individuals and Organizations
NGO's


FiveLeanP
Determine the value from the customer's aspect;
Identify and complement the proceedings that hand over value
Make value flow by eliminating bottlenecks and disruption
Let the customer pull the product through the manufacturing process
Pursue perfection through continuous improvement


LeanTraining
No, any resident Lean knowledge is through
Some had training, but there has not been any chance
Training is available for team leaders
There is a formal structure for Lean capability building
There is a training program that ensures that the


ELforM
They do not know what motivat
They have a basic approach in motivating people
They generally create an environment that
They always delegate tasks ar decisions down
They provide a role model for other leaders





LC1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	8.1	8.1	8.1
	Disagree	12	32.4	32.4	40.5
	Not Sure	12	32.4	32.4	73.0
	Agree	7	18.9	18.9	91.9
	Strongly Agree	3	8.1	8.1	100.0
	Total	37	100.0	100.0	

LC2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	6	16.2	16.2	16.2
	Disagree	15	40.5	40.5	56.8
	Not Sure	9	24.3	24.3	81.1
	Agree	4	10.8	10.8	91.9
	Strongly Agree	3	8.1	8.1	100.0
	Total	37	100.0	100.0	

LC3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	7	18.9	18.9	18.9
	Disagree	9	24.3	24.3	43.2
	Not Sure	12	32.4	32.4	75.7
	Agree	6	16.2	16.2	91.9
	Strongly Agree	3	8.1	8.1	100.0
	Total	37	100.0	100.0	

LC4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	4	10.8	10.8	10.8
	Disagree	12	32.4	32.4	43.2
	Not Sure	12	32.4	32.4	75.7
	Agree	7	18.9	18.9	94.6
	Strongly Agree	2	5.4	5.4	100.0
	Total	37	100.0	100.0	

LC5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5	13.5	13.5	13.5
	Disagree	14	37.8	37.8	51.4
	Not Sure	9	24.3	24.3	75.7
	Agree	5	13.5	13.5	89.2
	Strongly Agree	4	10.8	10.8	100.0
	Total	37	100.0	100.0	

LC6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	8.1	8.1	8.1
	Disagree	15	40.5	40.5	48.6
	Not Sure	6	16.2	16.2	64.9
	Agree	9	24.3	24.3	89.2
	Strongly Agree	4	10.8	10.8	100.0
	Total	37	100.0	100.0	

LC7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	6	16.2	16.2	16.2
	Disagree	13	35.1	35.1	51.4
	Not Sure	6	16.2	16.2	67.6
	Agree	8	21.6	21.6	89.2
	Strongly Agree	4	10.8	10.8	100.0
	Total	37	100.0	100.0	

LC8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5	13.5	13.5	13.5
	Disagree	15	40.5	40.5	54.1
	Not Sure	8	21.6	21.6	75.7
	Agree	4	10.8	10.8	86.5
	Strongly Agree	5	13.5	13.5	100.0
	Total	37	100.0	100.0	

LC9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	4	10.8	10.8	10.8
	Disagree	13	35.1	35.1	45.9
	Not Sure	9	24.3	24.3	70.3
	Agree	8	21.6	21.6	91.9
	Strongly Agree	3	8.1	8.1	100.0
	Total	37	100.0	100.0	

LeanApproach

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Collaborative Planning	1	2.7	2.7	2.7
	All	6	16.2	16.2	18.9
	Work sequence analysis - identify wastes	7	18.9	18.9	37.8
	Data Analysis - Set targets	3	8.1	8.1	45.9
	Visual management - clear process	6	16.2	16.2	62.2
	Workplace organization	4	10.8	10.8	73.0
	Standardized work	3	8.1	8.1	81.1
	Process mapping	1	2.7	2.7	83.8
	Problem solving	2	5.4	5.4	89.2
	None	3	8.1	8.1	97.3
	Other	1	2.7	2.7	100.0
	Total	37	100.0	100.0	

TechniqueInOrganization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Applicable	2	5.4	5.4	5.4
	Critical Path Method	10	27.0	27.0	32.4
	Look-Ahead Planning	2	5.4	5.4	37.8
	Work-Flow Production	5	13.5	13.5	51.4
	Percentage Complete Planning Tools	4	10.8	10.8	62.2
	Last Planner System	5	13.5	13.5	75.7
	Constraint Analysis	3	8.1	8.1	83.8
	Reverse-Phase Scheduling	3	8.1	8.1	91.9
	Other	3	8.1	8.1	100.0
	Total	37	100.0	100.0	

TechniqueForMPP

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	11	29.7	29.7	29.7
	First Run Studies	15	40.5	40.5	70.3
	PDCA	6	16.2	16.2	86.5
	Pre-Fabrication Strategies	5	13.5	13.5	100.0
	Total	37	100.0	100.0	

TehniquesForPP

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Applicabe	9	24.3	24.3	24.3
	CFP	8	21.6	21.6	45.9
	Visual Management	6	16.2	16.2	62.2
	LPS	8	21.6	21.6	83.8
	The use of a transportation support...	6	16.2	16.2	100.0
	Total	37	100.0	100.0	

TQMandSCMandCE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	12	32.4	32.4	32.4
	Yes	25	67.6	67.6	100.0
	Total	37	100.0	100.0	

ConstrucitonSite

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Applicable	9	24.3	24.3	24.3
	JIT	10	27.0	27.0	51.4
	Kaban System	9	24.3	24.3	75.7
	Value Stream Analysis	6	16.2	16.2	91.9
	Don't Know	3	8.1	8.1	100.0
	Total	37	100.0	100.0	

TechniqueForSimulate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Applicable	7	18.9	18.9	18.9
	Design Structure Matrix	9	24.3	24.3	43.2
	Virtual Design Studios	4	10.8	10.8	54.1
	Virtual Reality Tools	8	21.6	21.6	75.7
	BIM	4	10.8	10.8	86.5
	None	5	13.5	13.5	100.0
	Total	37	100.0	100.0	

TechniqueForPreventValue

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Applicable	10	27.0	27.0	27.0
	Concurrent Design of the Product and the process	16	43.2	43.2	70.3
	Set-based Design Strategy	7	18.9	18.9	89.2
	Note	4	10.8	10.8	100.0
	Total	37	100.0	100.0	

LPS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Applicable	10	27.0	27.0	27.0
	Planning as an activity scheduling tool	10	27.0	27.0	54.1
	Production Control	5	13.5	13.5	67.6
	Tuning Logistics Operations during Production	3	8.1	8.1	75.7
	Performance measurement & organizational learning	8	21.6	21.6	97.3
	Management Control	1	2.7	2.7	100.0
	Total	37	100.0	100.0	

inLPSthePPC

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Measures the level of utilization of a workflow (efficiency).	15	40.5	40.5	40.5
	Measures production planning effectiveness and workflow reliability	14	37.8	37.8	78.4
	Both of above	2	5.4	5.4	83.8
	Not Applicable	6	16.2	16.2	100.0
	Total	37	100.0	100.0	

TforPerformacneMeasurment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	KPIs	3	8.1	8.1	8.1
	Process performance measures	5	13.5	13.5	21.6
	None	1	2.7	2.7	24.3
	Other	2	5.4	5.4	29.7
	Experience of managers	3	8.1	8.1	37.8
	International Benchmarking	1	2.7	2.7	40.5
	Last Planner System	4	10.8	10.8	51.4
	Design Quality Indicators (DQIs)	4	10.8	10.8	62.2
	Balanced Scorecards	3	8.1	8.1	70.3
	(QMPMS)	3	8.1	8.1	78.4
	Our own metrics which consists	6	16.2	16.2	94.6
	business strategy	2	5.4	5.4	100.0
	Total	37	100.0	100.0	

Quality

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	5.4	5.4	5.4
	2.00	6	16.2	16.2	21.6
	3.00	12	32.4	32.4	54.1
	4.00	5	13.5	13.5	67.6
	5.00	8	21.6	21.6	89.2
	6.00	1	2.7	2.7	91.9
	7.00	1	2.7	2.7	94.6
	9.00	1	2.7	2.7	97.3
	10	1	2.7	2.7	100.0
	Total	37	100.0	100.0	

Sefety

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	7	18.9	18.9	18.9
	2.00	19	51.4	51.4	70.3
	3.00	5	13.5	13.5	83.8
	4.00	1	2.7	2.7	86.5
	5.00	1	2.7	2.7	89.2
	7.00	1	2.7	2.7	91.9
	8.00	1	2.7	2.7	94.6
	9.00	2	5.4	5.4	100.0
	Total	37	100.0	100.0	

ClientSatis

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	8	21.6	21.6	21.6
	2.00	17	45.9	45.9	67.6
	3.00	2	5.4	5.4	73.0
	4.00	5	13.5	13.5	86.5
	5.00	3	8.1	8.1	94.6
	7.00	1	2.7	2.7	97.3
	8.00	1	2.7	2.7	100.0
	Total	37	100.0	100.0	

Functionality

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	5	13.5	13.5	13.5
	2.00	12	32.4	32.4	45.9
	3.00	6	16.2	16.2	62.2
	4.00	8	21.6	21.6	83.8
	5.00	2	5.4	5.4	89.2
	6.00	2	5.4	5.4	94.6
	7.00	1	2.7	2.7	97.3
	10	1	2.7	2.7	100.0
	Total	37	100.0	100.0	

PlanningEfficiency

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	5	13.5	13.5	13.5
	3.00	1	2.7	2.7	16.2
	4.00	10	27.0	27.0	43.2
	5.00	12	32.4	32.4	75.7
	6.00	2	5.4	5.4	81.1
	7.00	3	8.1	8.1	89.2
	8.00	4	10.8	10.8	100.0
	Total	37	100.0	100.0	

TeamPerformance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	5.4	5.4	5.4
	2.00	1	2.7	2.7	8.1
	3.00	1	2.7	2.7	10.8
	4.00	6	16.2	16.2	27.0
	5.00	14	37.8	37.8	64.9
	6.00	3	8.1	8.1	73.0
	7.00	5	13.5	13.5	86.5
	8.00	3	8.1	8.1	94.6
	9.00	2	5.4	5.4	100.0
	Total	37	100.0	100.0	

Productivity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	12	32.4	32.4	32.4
	3.00	2	5.4	5.4	37.8
	4.00	9	24.3	24.3	62.2
	5.00	6	16.2	16.2	78.4
	6.00	3	8.1	8.1	86.5
	7.00	3	8.1	8.1	94.6
	8.00	2	5.4	5.4	100.0
	Total	37	100.0	100.0	

LeanBenefit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Improved productivity	4	10.8	10.8	10.8
	Increased profit	3	8.1	8.1	18.9
	Improved safety and health conditions	3	8.1	8.1	27.0
	Other	3	8.1	8.1	35.1
	Increased reliability	8	21.6	21.6	56.8
	Fewer defects and improved quality	1	2.7	2.7	59.5
	More client satisfaction	2	5.4	5.4	64.9
	Increased predictability	4	10.8	10.8	75.7
	Less waste	2	5.4	5.4	81.1
	Reduced cost	4	10.8	10.8	91.9
	Enhanced build-ability improvements to design	3	8.1	8.1	100.0
	Total	37	100.0	100.0	

EconomicSuccess

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Risk management and mitigation	9	24.3	24.3	24.3
	Lean Construction	2	5.4	5.4	29.7
	Supply-chain assistance	3	8.1	8.1	37.8
	Cost and Value Management	16	43.2	43.2	81.1
	All	7	18.9	18.9	100.0
	Total	37	100.0	100.0	

EConsideration

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Applicable	11	29.7	29.7	29.7
	International standards and accreditation, such as the ISO 14001	5	13.5	13.5	43.2

	BRE Environmental Assessment Model (BREEAM)	2	5.4	5.4	48.6
	Supply chain assistance	7	18.9	18.9	67.6
	Lean Construction as a primary tool for reducing physical waste	7	18.9	18.9	86.5
	All	4	10.8	10.8	97.3
	Other	1	2.7	2.7	100.0
	Total	37	100.0	100.0	

SConsideration

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Applicable	7	18.9	18.9	18.9
	In-house training	3	8.1	8.1	27.0
	Creating a Lean culture	1	2.7	2.7	29.7
	Job knowledge and Skills scheme	6	16.2	16.2	45.9
	Team development programs	11	29.7	29.7	75.7
	Safety programs	3	8.1	8.1	83.8
	Community engagement	3	8.1	8.1	91.9
	All	3	8.1	8.1	100.0
	Total	37	100.0	100.0	

LeanJourney

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	14	37.8	37.8	37.8
	We are satisfied with achieving our intended objectives. No need to change	16	43.2	43.2	81.1
	When a major problem occurs/occurred (e.g. global financial crisis)	3	8.1	8.1	89.2
	As a respond to the Egan's report (Rethinking Construction)	1	2.7	2.7	91.9
	To keep up to date with any new emerging management concepts	2	5.4	5.4	97.3
	Other	1	2.7	2.7	100.0
	Total	37	100.0	100.0	

Obstacle1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	8	21.6	21.6	21.6
	Disagree	13	35.1	35.1	56.8
	Not Sure	2	5.4	5.4	62.2
	Agree	4	10.8	10.8	73.0
	Strongly Agree	10	27.0	27.0	100.0

	Total	37	100.0	100.0	

Obstacle2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5	13.5	13.5	13.5
	Disagree	10	27.0	27.0	40.5
	Not Sure	7	18.9	18.9	59.5
	Agree	6	16.2	16.2	75.7
	Strongly Agree	9	24.3	24.3	100.0
	Total	37	100.0	100.0	

Obstacle3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	6	16.2	16.2	16.2
	Disagree	12	32.4	32.4	48.6
	Not Sure	5	13.5	13.5	62.2
	Agree	4	10.8	10.8	73.0
	Strongly Agree	10	27.0	27.0	100.0
	Total	37	100.0	100.0	

Obstacle4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5	13.5	13.5	13.5
	Disagree	16	43.2	43.2	56.8
	Not Sure	1	2.7	2.7	59.5
	Agree	5	13.5	13.5	73.0
	Strongly Agree	10	27.0	27.0	100.0
	Total	37	100.0	100.0	

Obstacle5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	11	29.7	29.7	29.7
	Disagree	13	35.1	35.1	64.9
	Not Sure	7	18.9	18.9	83.8
	Agree	4	10.8	10.8	94.6
	Strongly Agree	2	5.4	5.4	100.0
	Total	37	100.0	100.0	

Obstacle6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5	13.5	13.5	13.5
	Disagree	12	32.4	32.4	45.9
	Not Sure	2	5.4	5.4	51.4
	Agree	5	13.5	13.5	64.9
	Strongly Agree	13	35.1	35.1	100.0

	Total	37	100.0	100.0	

Obstacle7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	6	16.2	16.2	16.2
	Disagree	8	21.6	21.6	37.8
	Not Sure	1	2.7	2.7	40.5
	Agree	4	10.8	10.8	51.4
	Strongly Agree	18	48.6	48.6	100.0
	Total	37	100.0	100.0	

Obstacle8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	4	10.8	10.8	10.8
	Disagree	10	27.0	27.0	37.8
	Not Sure	2	5.4	5.4	43.2
	Agree	6	16.2	16.2	59.5
	Strongly Agree	15	40.5	40.5	100.0
	Total	37	100.0	100.0	

Obstacle9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	4	10.8	10.8	10.8
	Disagree	9	24.3	24.3	35.1
	Not Sure	7	18.9	18.9	54.1
	Agree	7	18.9	18.9	73.0
	Strongly Agree	9	24.3	24.3	97.3
	12.00	1	2.7	2.7	100.0
	Total	37	100.0	100.0	

Obstacle10

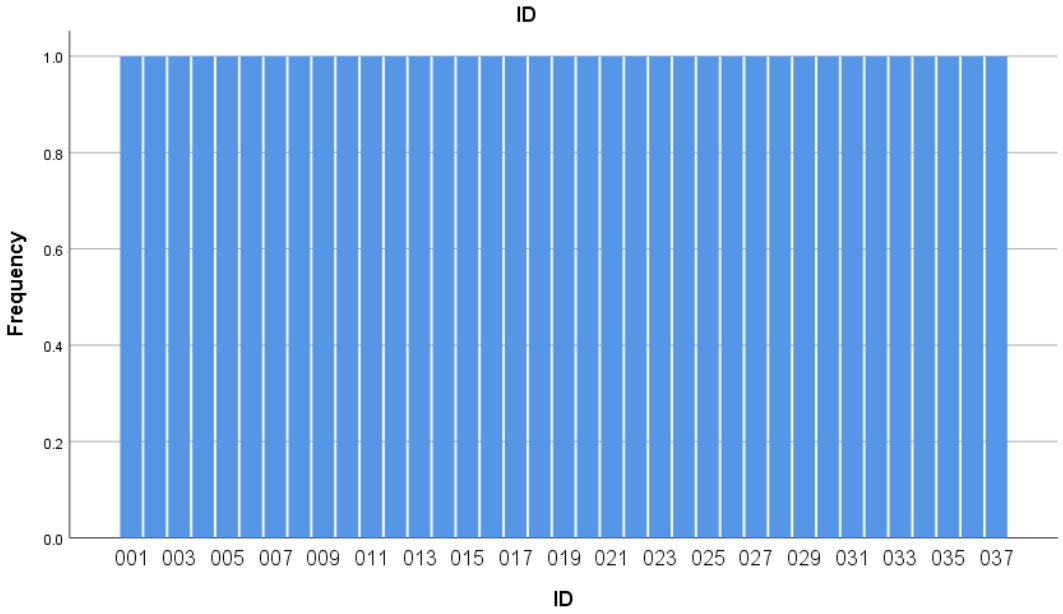
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	7	18.9	18.9	18.9
	Disagree	15	40.5	40.5	59.5
	Not Sure	2	5.4	5.4	64.9
	Agree	4	10.8	10.8	75.7
	Strongly Agree	9	24.3	24.3	100.0
	Total	37	100.0	100.0	

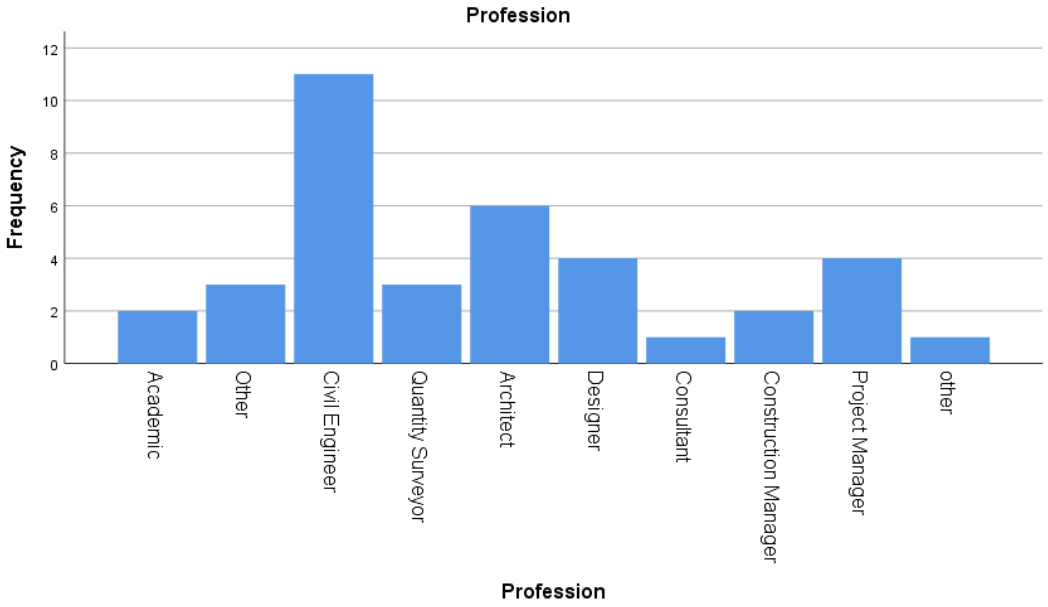
ObstacleEffect

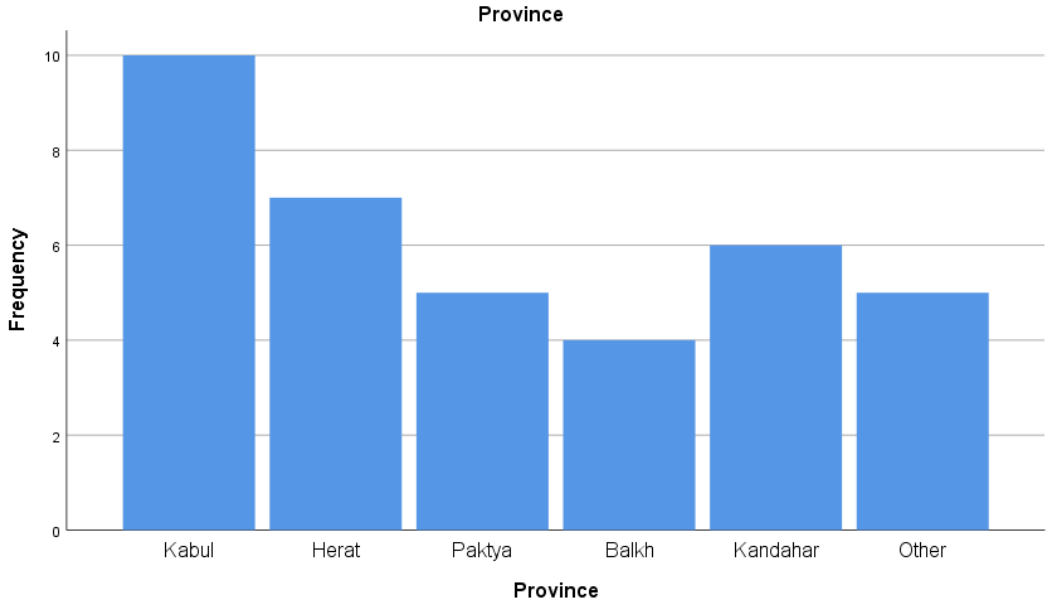
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	3	8.1	8.1	8.1
	Not sure	21	56.8	56.8	64.9
	Yes	10	27.0	27.0	91.9
	Other	3	8.1	8.1	100.0

Total	37	100.0	100.0	

Bar Chart



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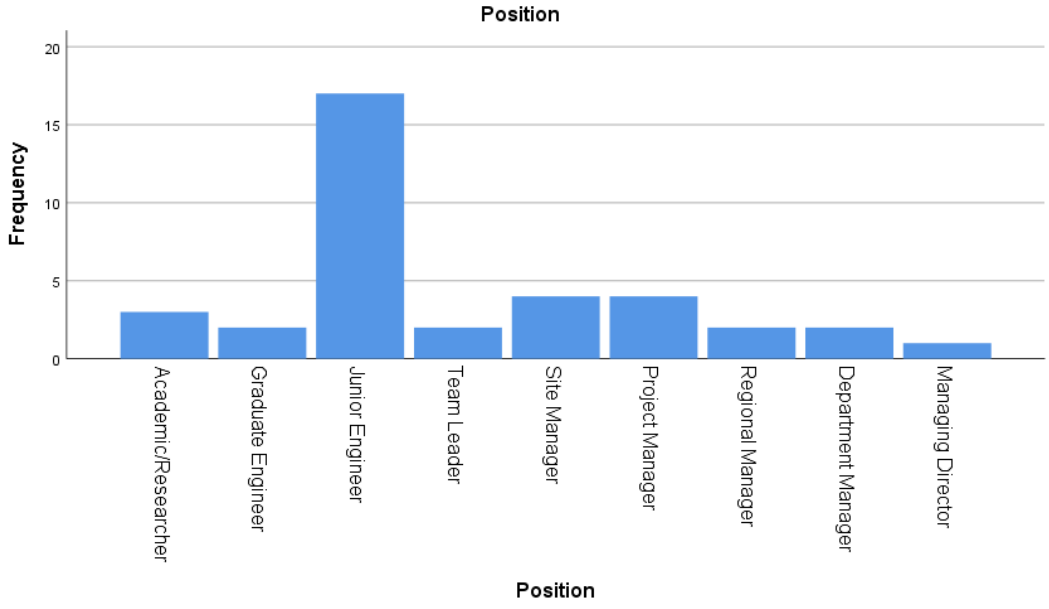
8
6
4
2
0
Kabul
Herat
Paktya
Balkh
Kandahar
Other
Province


Position
Frequency
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10
5
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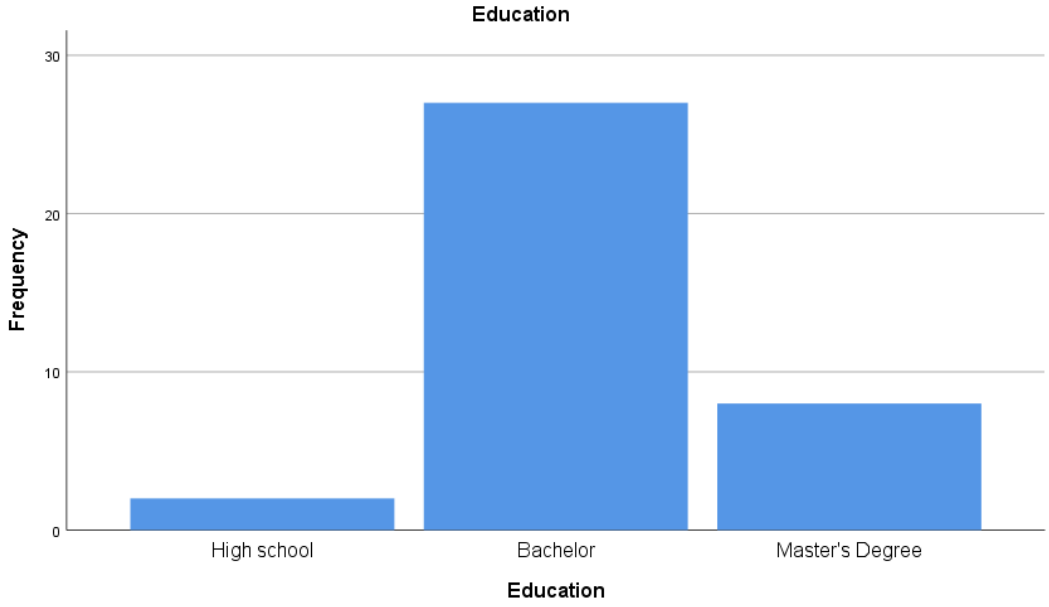
Academic/Researcher
Graduate Engineer
Junior Engineer
Team Leader
Site Manager
Project Manager
Regional Manager
Department Manager
Managing Director
Position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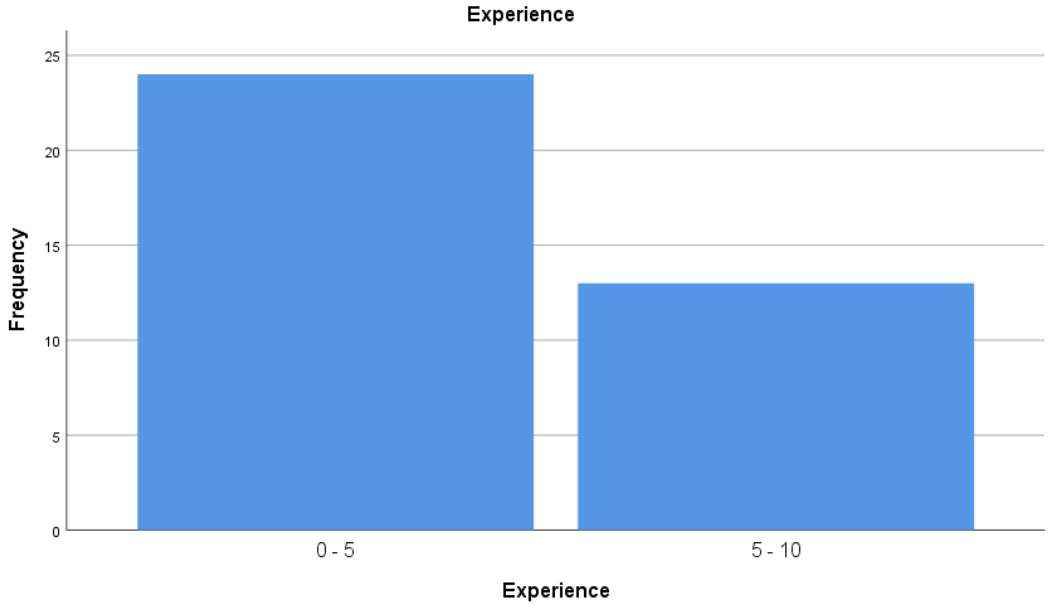
20
10
0
Frequency
High school
Bachelor
Master's Degree
Education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20
15
10
5
0
Frequency
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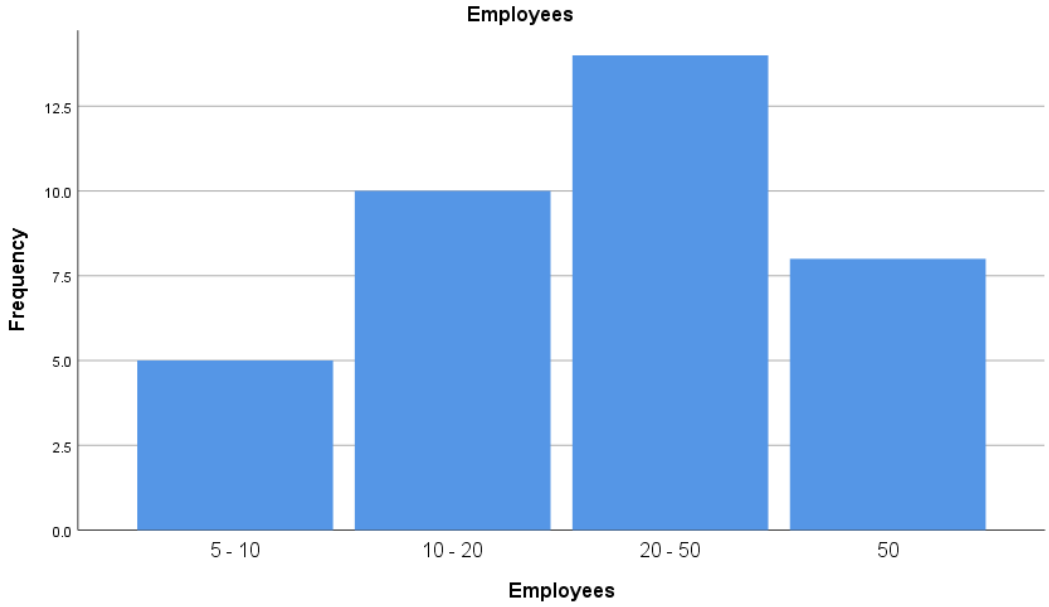
5 - 10
Experience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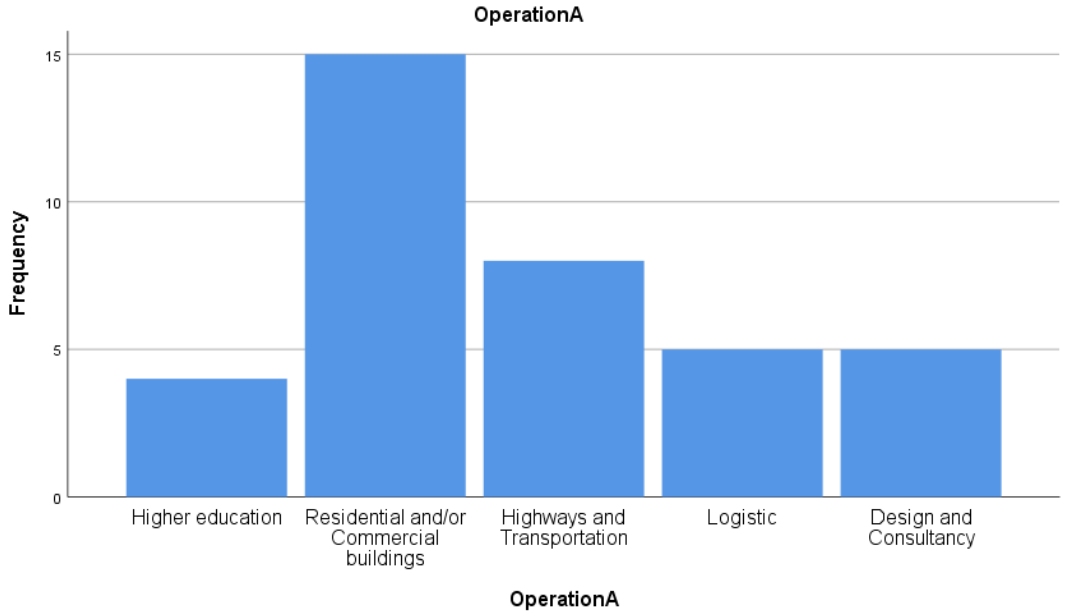
7.5
5.0
2.5
0.0
5 - 10
10 - 20
20 - 50
50
Employees


OperationA
Frequency
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10
5
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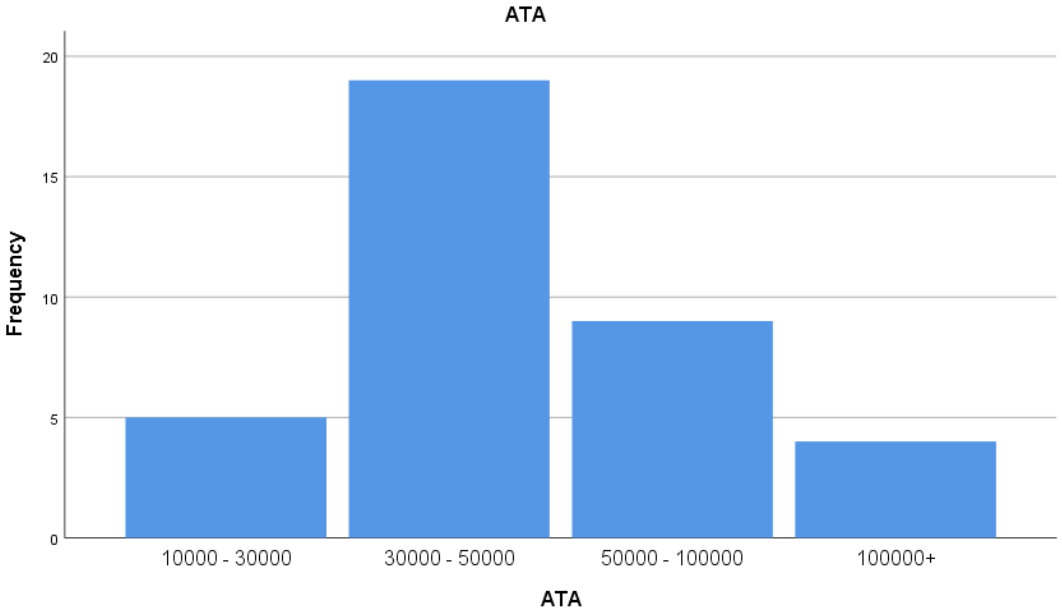
Higher education
Residential and/or Commercial buildings
Highways and Transportation
Logistic
Design and Consultancy
OperationA


ATA
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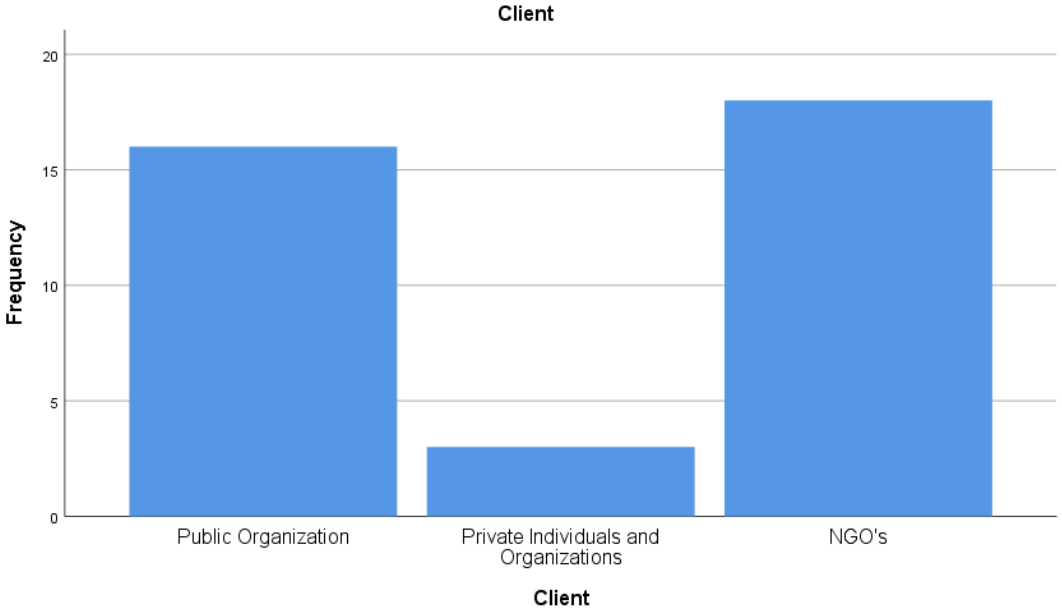
15
10
5
0
10000 - 30000
30000 - 50000
50000 - 100000
100000+
ATA


Client
Frequency
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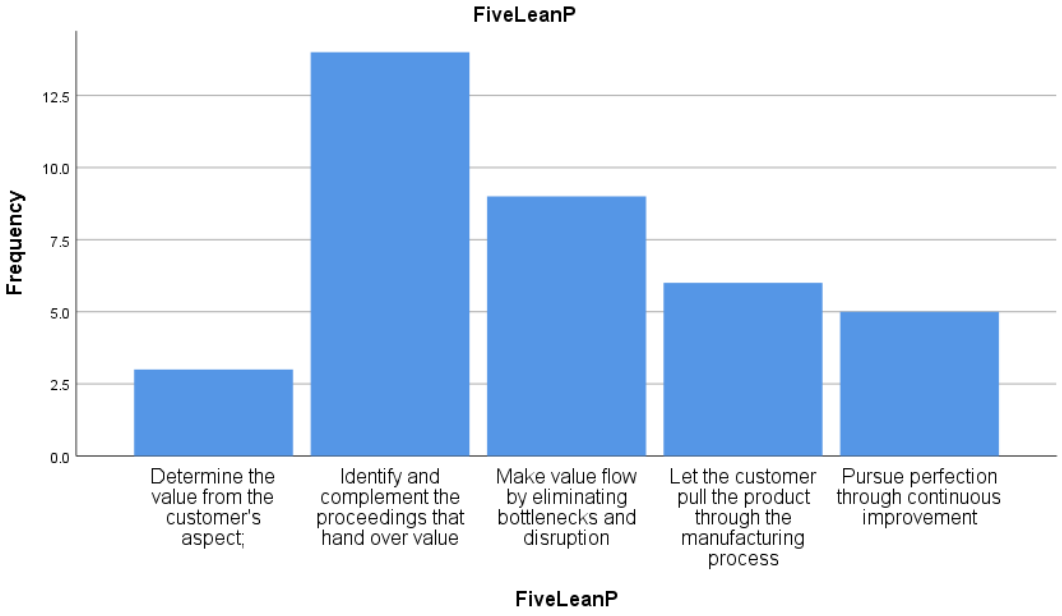
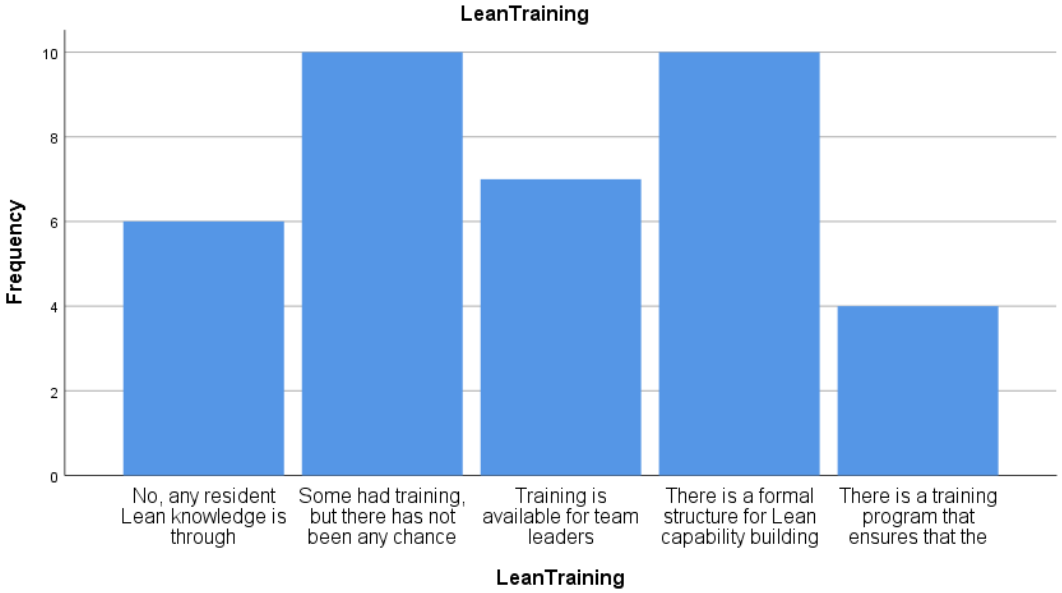
15
10
5
0
Public Organization
Private Individuals and Organizations
NGO's
Client


FiveLeanP
Frequency
12.5
10.0
7.5
5.0
2.5
0.0
Determine the value from the customer's aspect;
Identify and complement the proceedings that hand over value
Make value flow by eliminating bottlenecks and disruption
Let the customer pull the product through the manufacturing process
Pursue perfection through continuous improvement
FiveLeanP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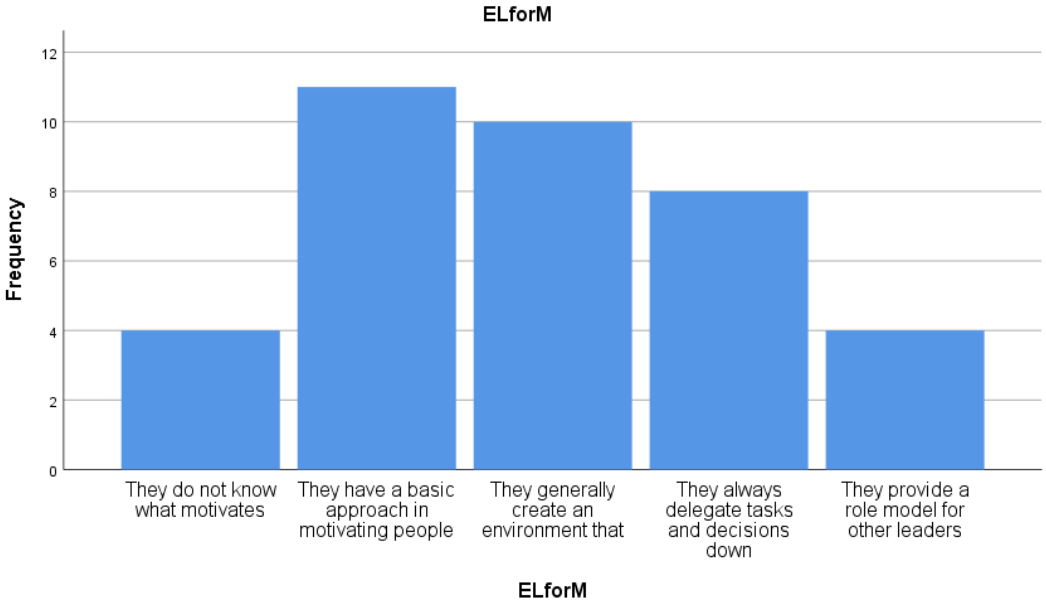
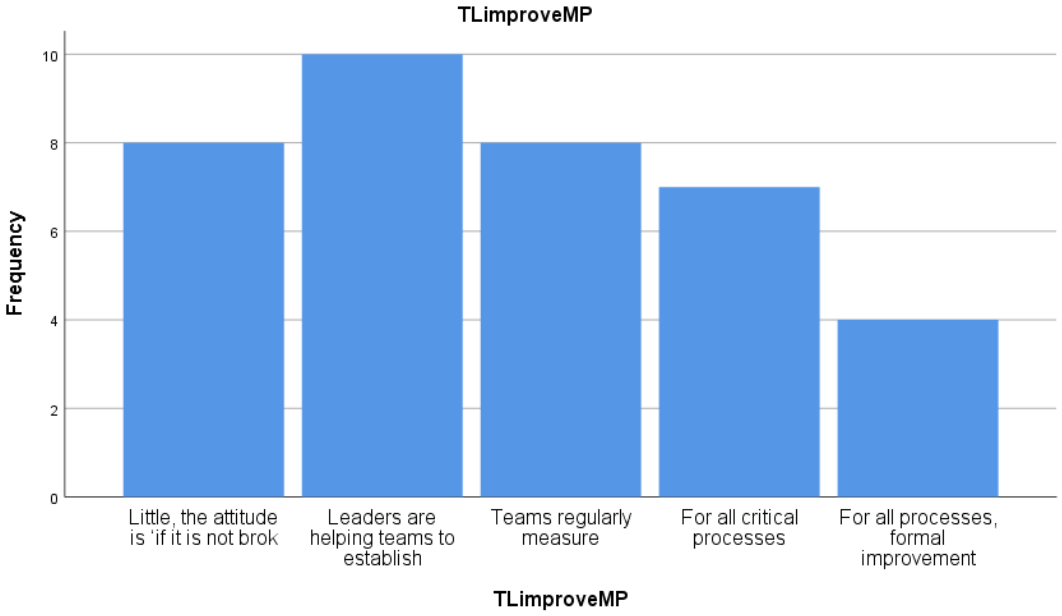
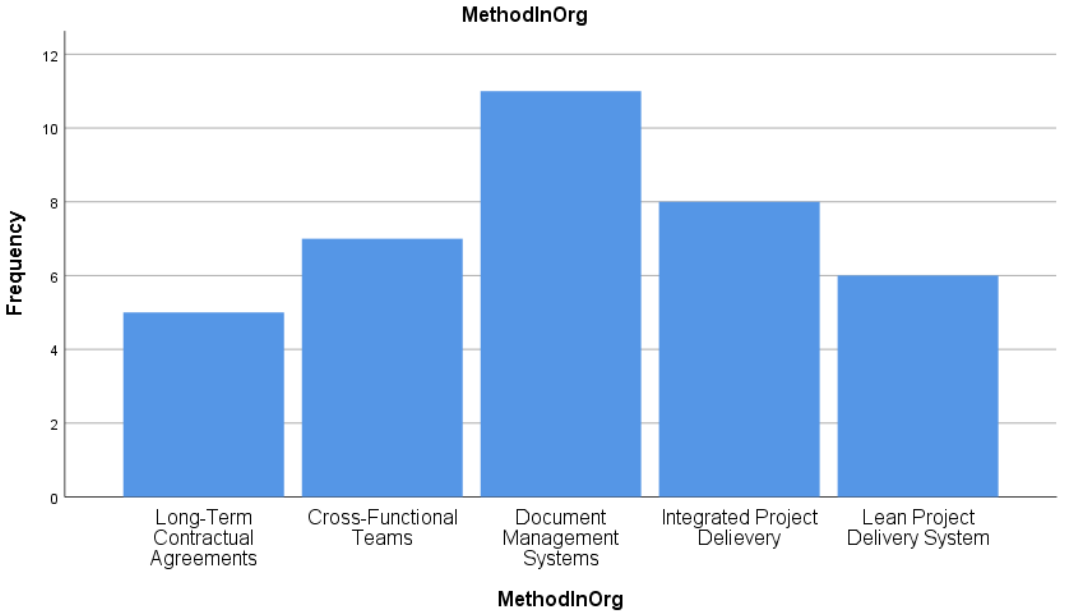
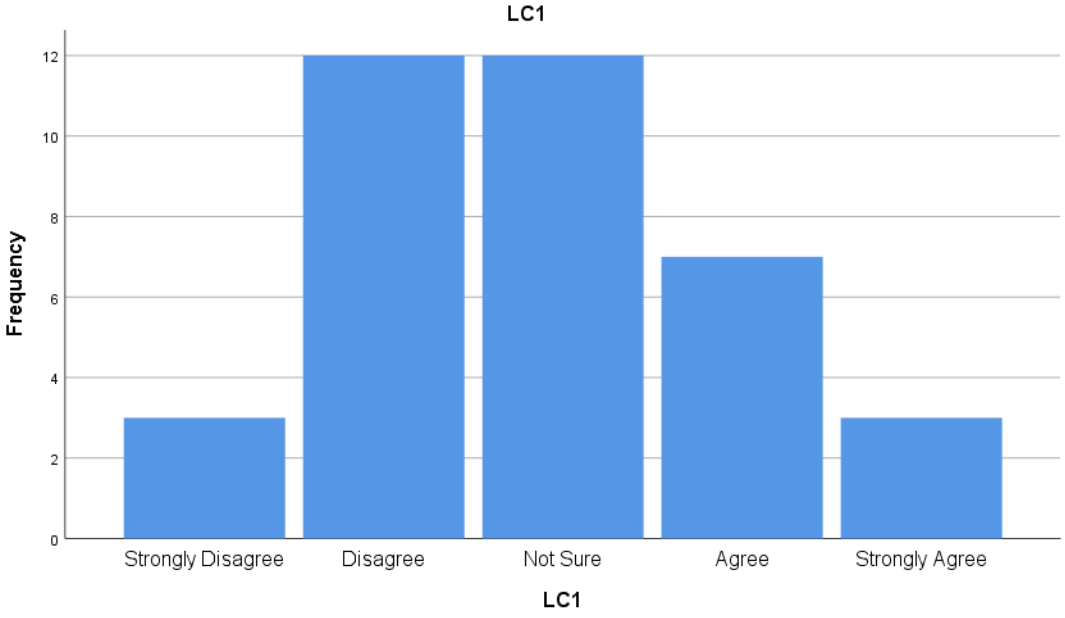
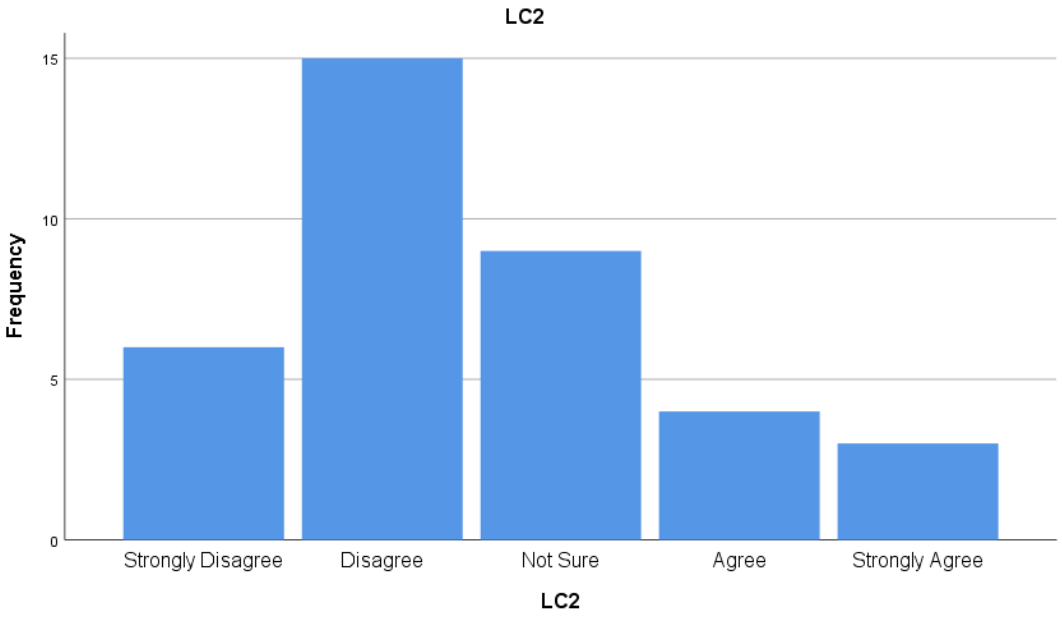
Frequency
10
8
6
4
2
0
No, any resident Lean knowledge is through
Some had training, but there has not been any chance
Training is available for team leaders
There is a formal structure for Lean capability building
There is a training program that ensures that the
LeanTraining

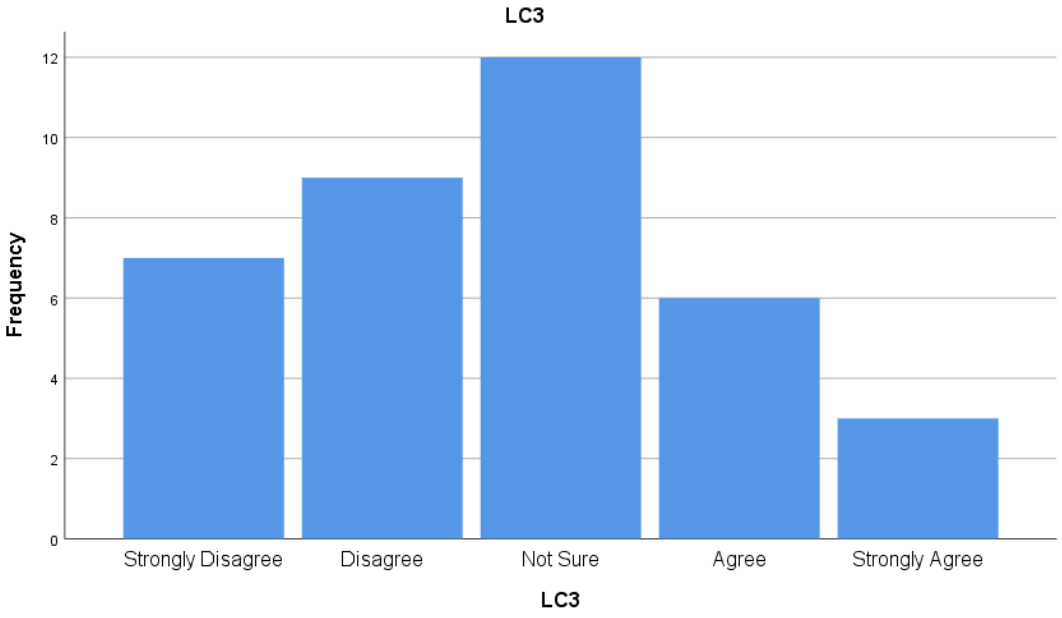

ELforM
Frequency
12
10
8
6
4
2
0
They do not know what motivates
They have a basic approach in motivating people
They generally create an environment that
They always delegate tasks and decisions down
They provide a role model for other leaders
ELforM

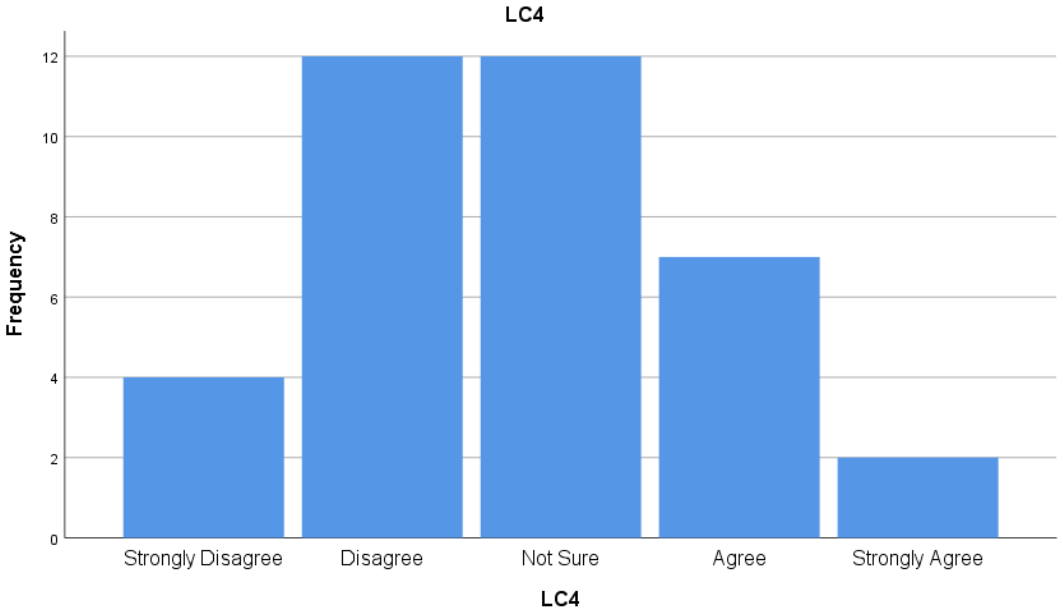

TLimproveMP
Frequency
10
8
6
4
2
0
Little, the attitude is 'if it is not brok
Leaders are helping teams to establish
Teams regularly measure
For all critical processes
For all processes, formal improvement
TLimproveMP

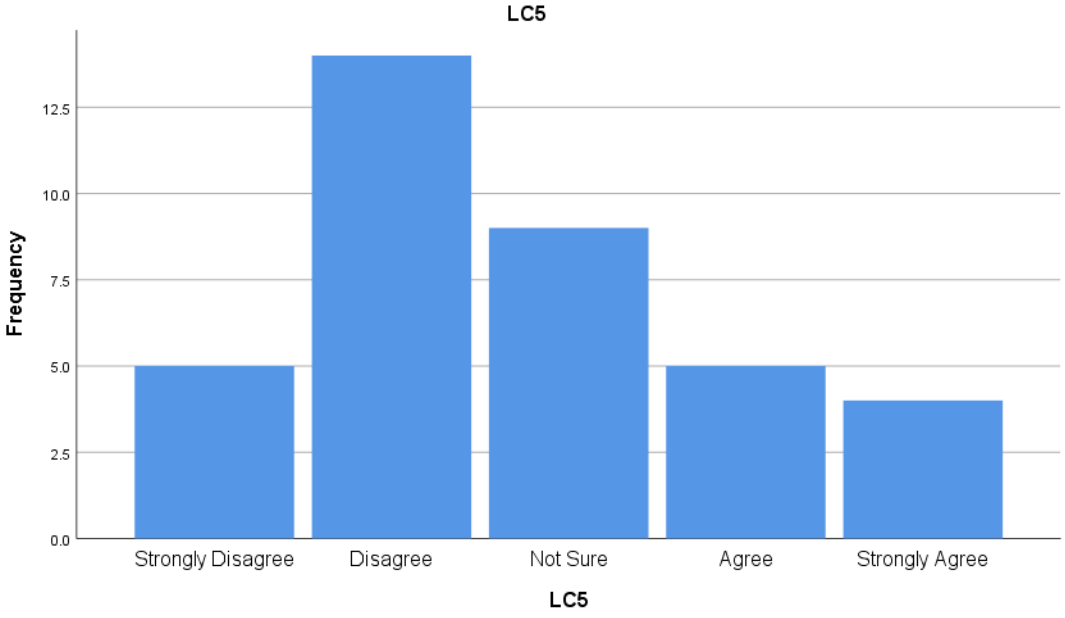

MethodInOrg
Frequency
0
2
4
6
8
10
12
Long-Term Contractual Agreements
Cross-Functional Teams
Document Management Systems
Integrated Project Delievery
Lean Project Delivery System
MethodInOrg

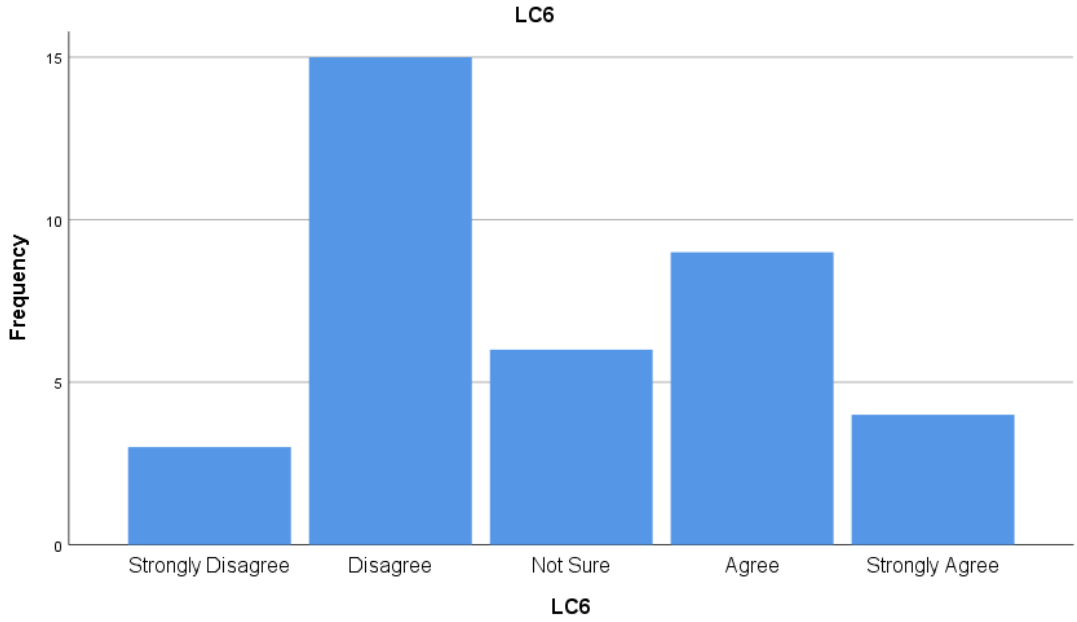

LC1
Frequency
0
2
4
6
8
10
12
Strongly Disagree
Disagree
Not Sure
Agree
Strongly Agree
LC1

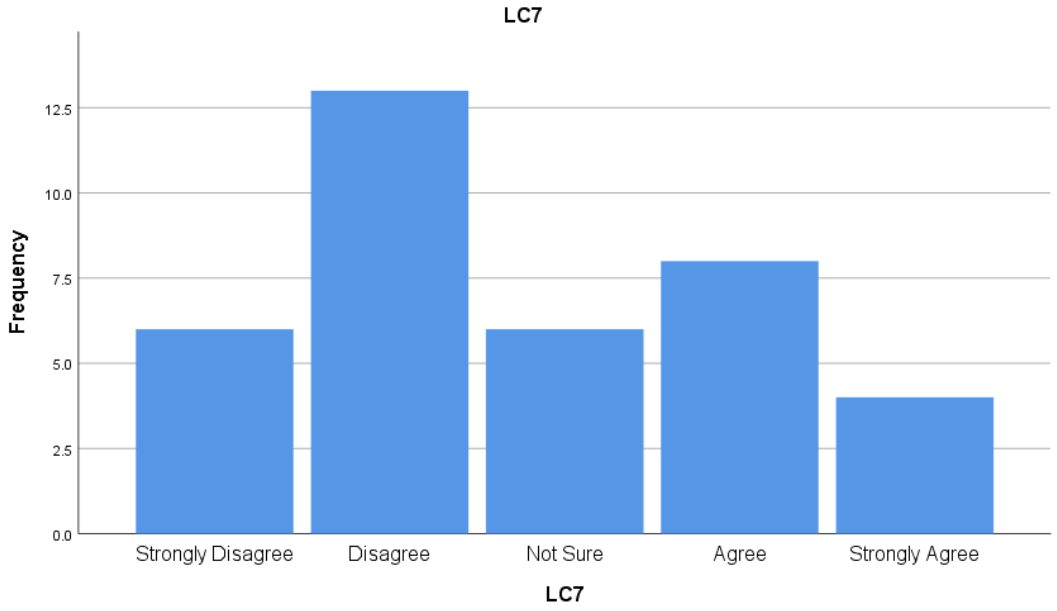

LC2
Frequency
15
10
5
0
Strongly Disagree
Disagree
Not Sure
Agree
Strongly Agree
LC2


LC3
Frequency
12
10
8
6
4
2
0
Strongly Disagree
Disagree
Not Sure
Agree
Strongly Agree
LC3


LC4
Frequency
12
10
8
6
4
2
0
Strongly Disagree
Disagree
Not Sure
Agree
Strongly Agree
LC4


LC5
Frequency
12.5
10.0
7.5
5.0
2.5
0.0
Strongly Disagree
Disagree
Not Sure
Agree
Strongly Agree
LC5


LC6
Frequency
15
10
5
0
Strongly Disagree
Disagree
Not Sure
Agree
Strongly Agree
LC6


LC7
Frequency
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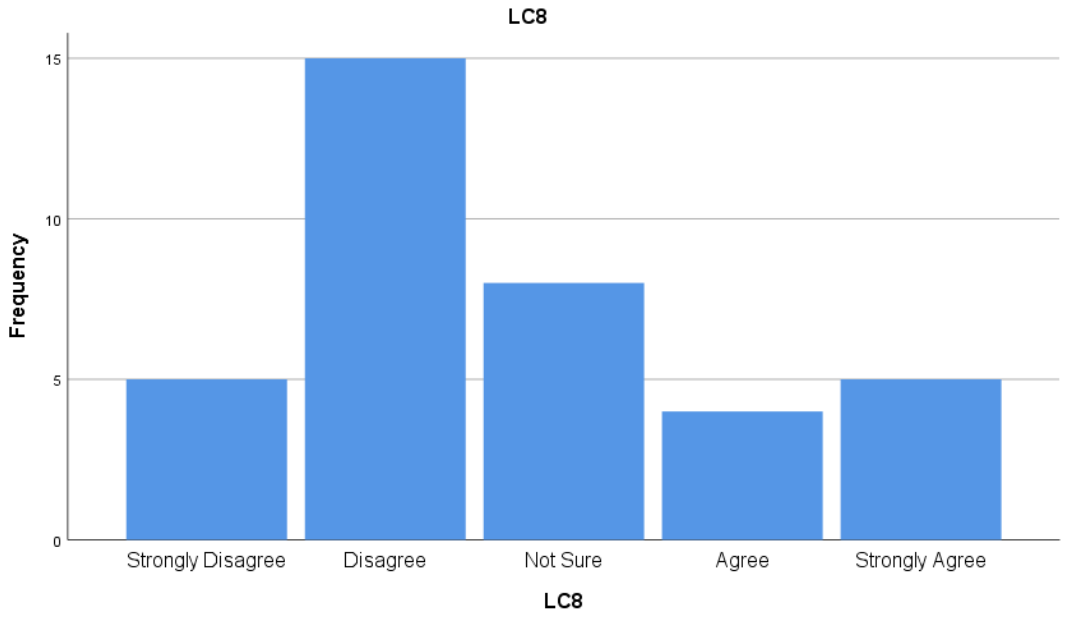
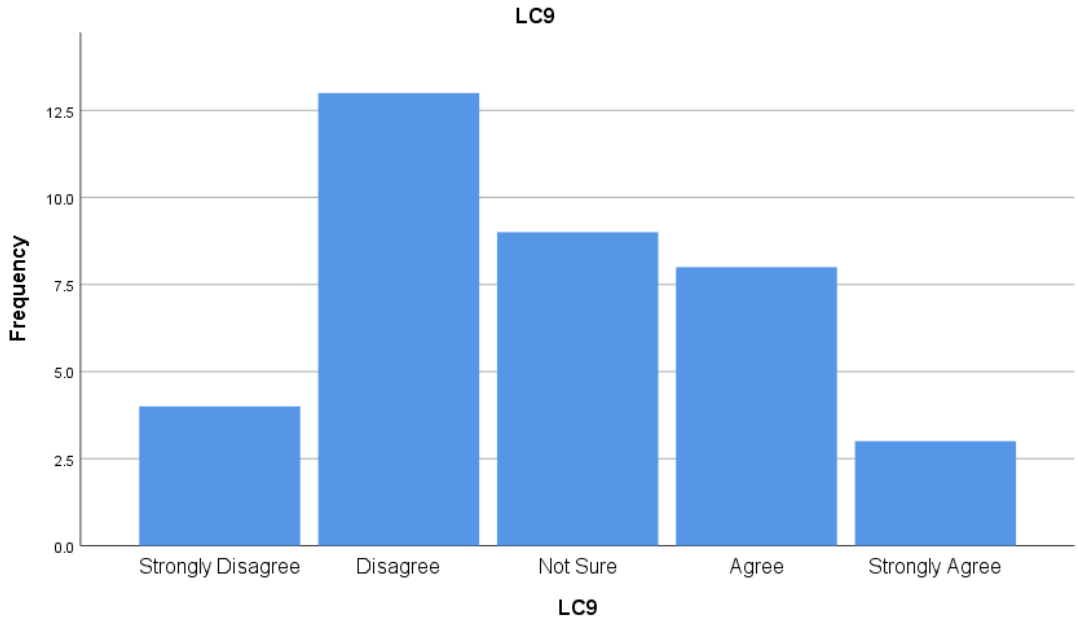
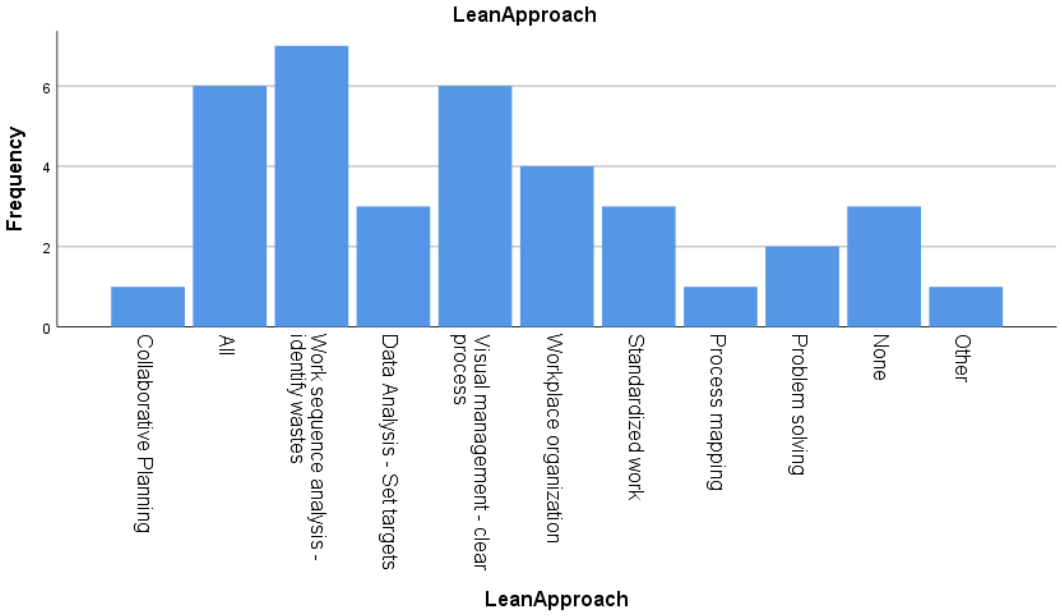
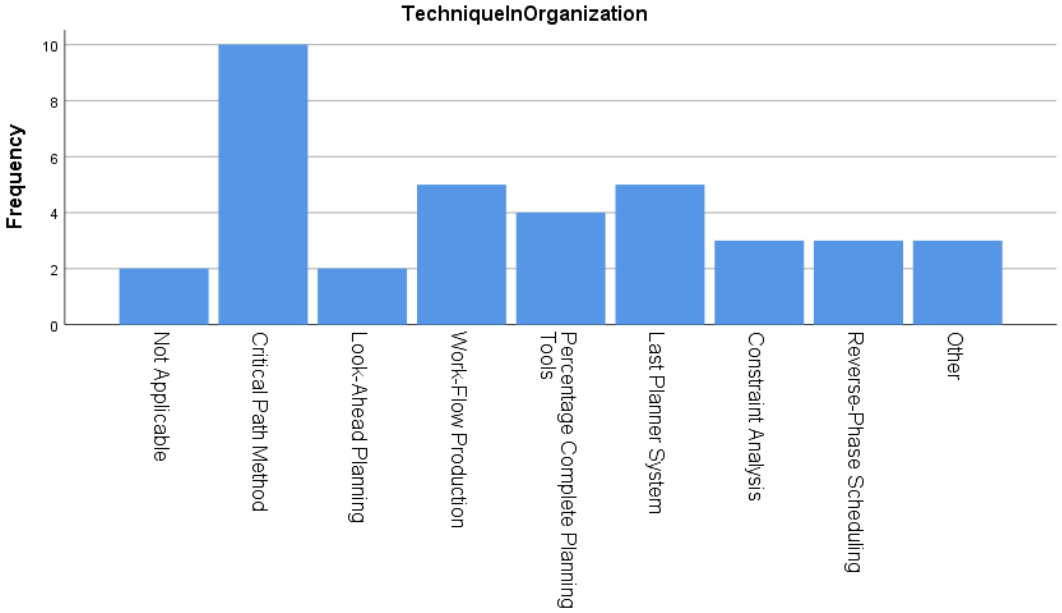
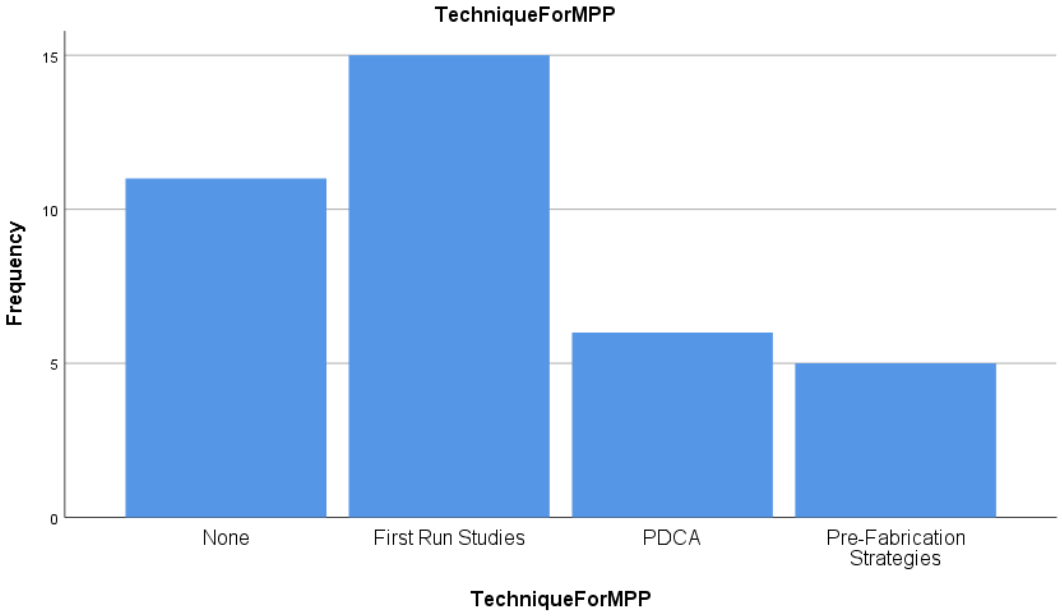
10.0
7.5
5.0
2.5
0.0
Strongly Disagree
Disagree
Not Sure
Agree
Strongly Agree
LC7

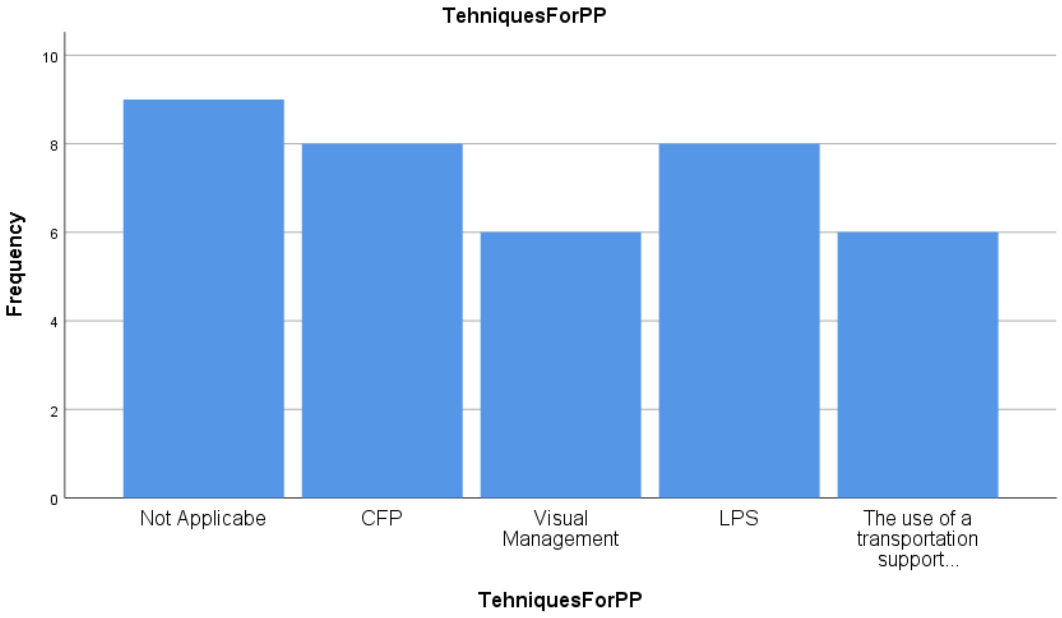

LC8
Frequency
15
10
5
0
Strongly Disagree
Disagree
Not Sure
Agree
Strongly Agree
LC8

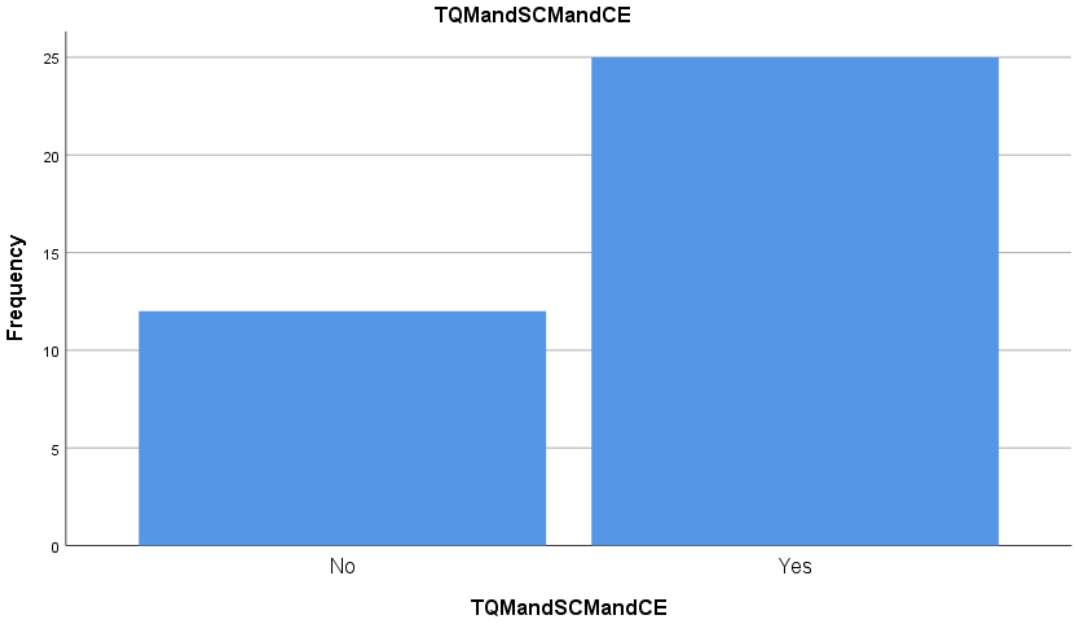

LC9
Frequency
12.5
10.0
7.5
5.0
2.5
0.0
Strongly Disagree
Disagree
Not Sure
Agree
Strongly Agree
LC9

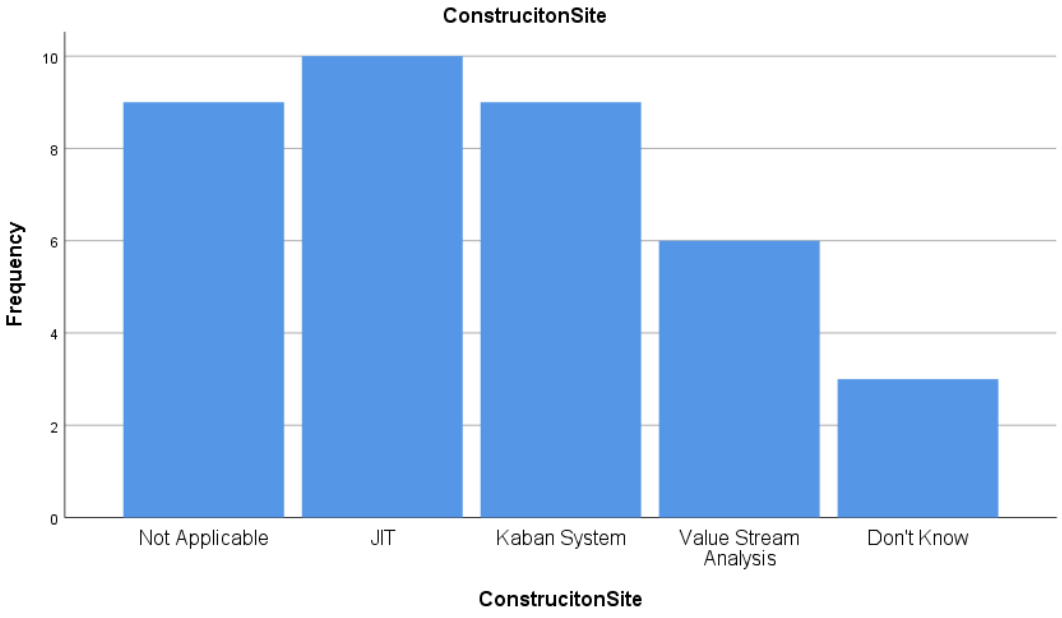

LeanApproach
Frequency
0
2
4
6
Collaborative Planning
All
Work sequence analysis - identify wastes
Data Analysis - Set targets
Visual management - clear process
Workplace organization
Standardized work
Process mapping
Problem solving
None
Other
LeanApproach

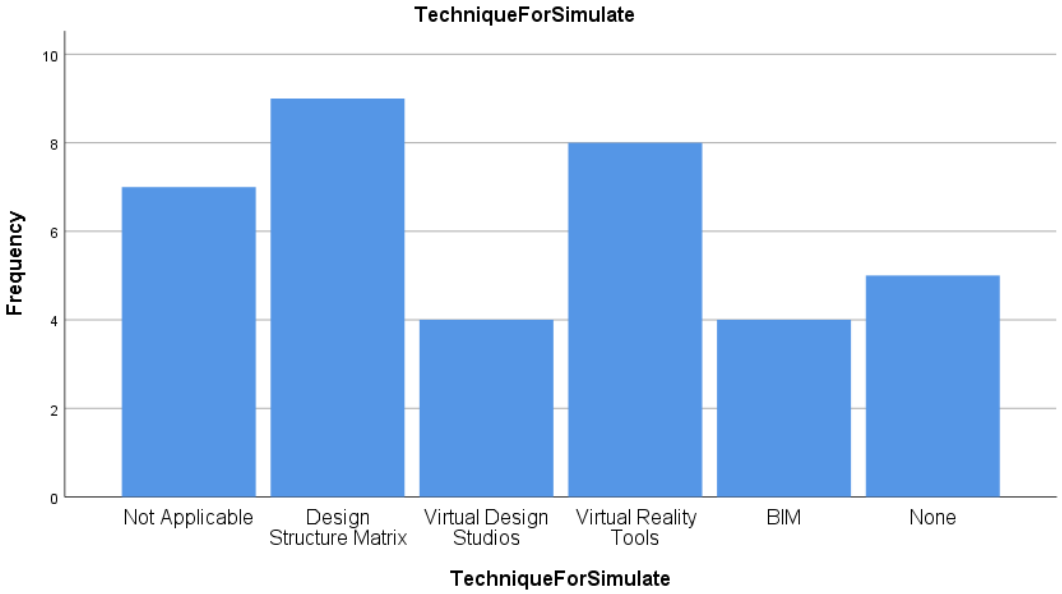

TechniqueInOrganization
Frequency
0
2
4
6
8
10
Not Applicable
Critical Path Method
Look-Ahead Planning
Work-Flow Production
Percentage Complete Planning Tools
Last Planner System
Constraint Analysis
Reverse-Phase Scheduling
Other

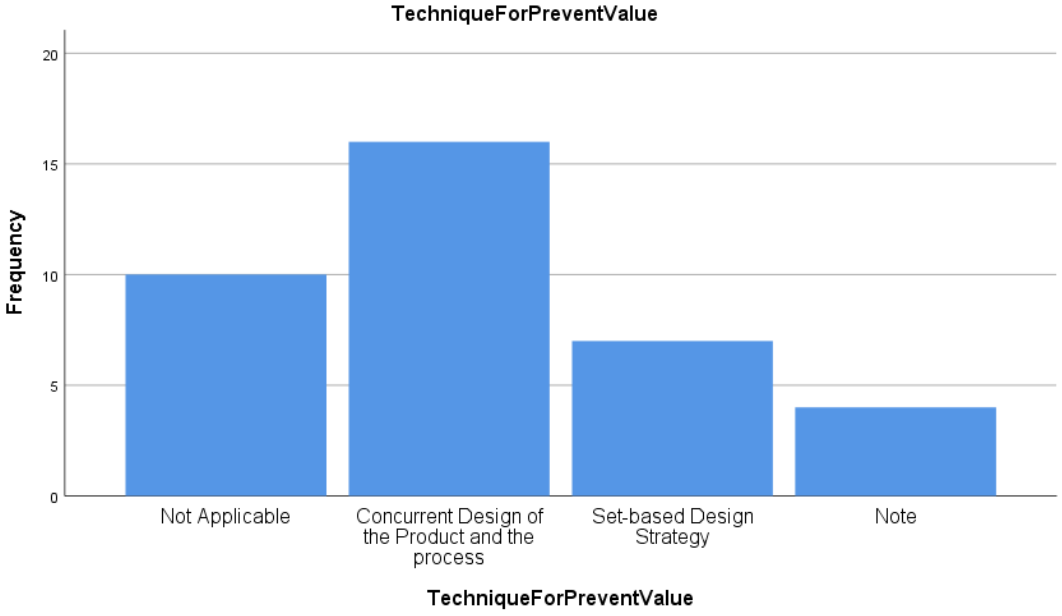

TechniqueForMPP
Frequency
15
10
5
0
None
First Run Studies
PDCA
Pre-Fabrication Strategies
TechniqueForMPP

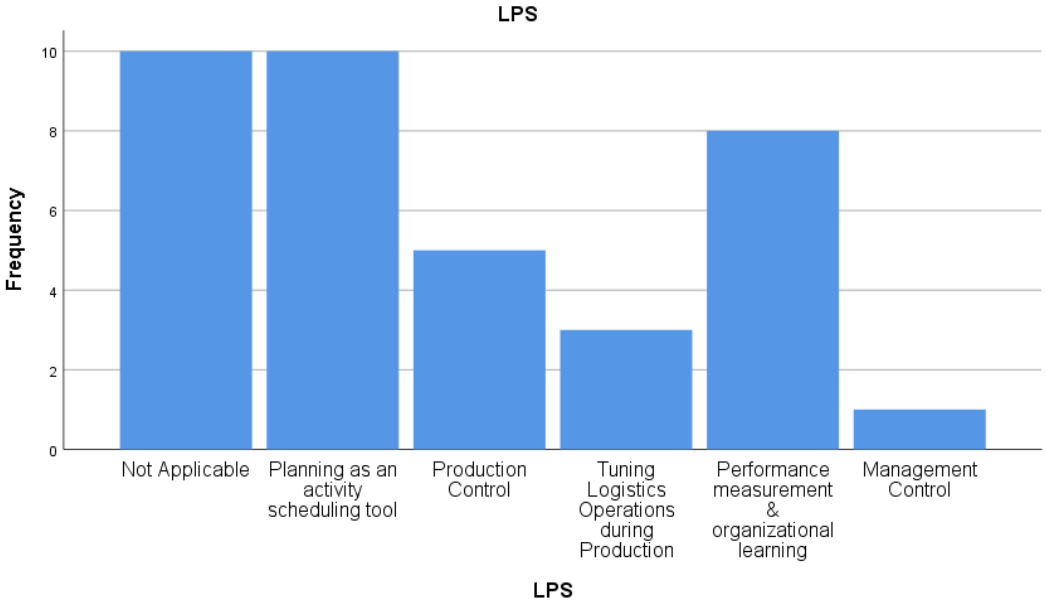

TehniquesForPP
Frequency
10
8
6
4
2
0
Not Applicabe
CFP
Visual Management
LPS
The use of a transportation support...
TehniquesForPP

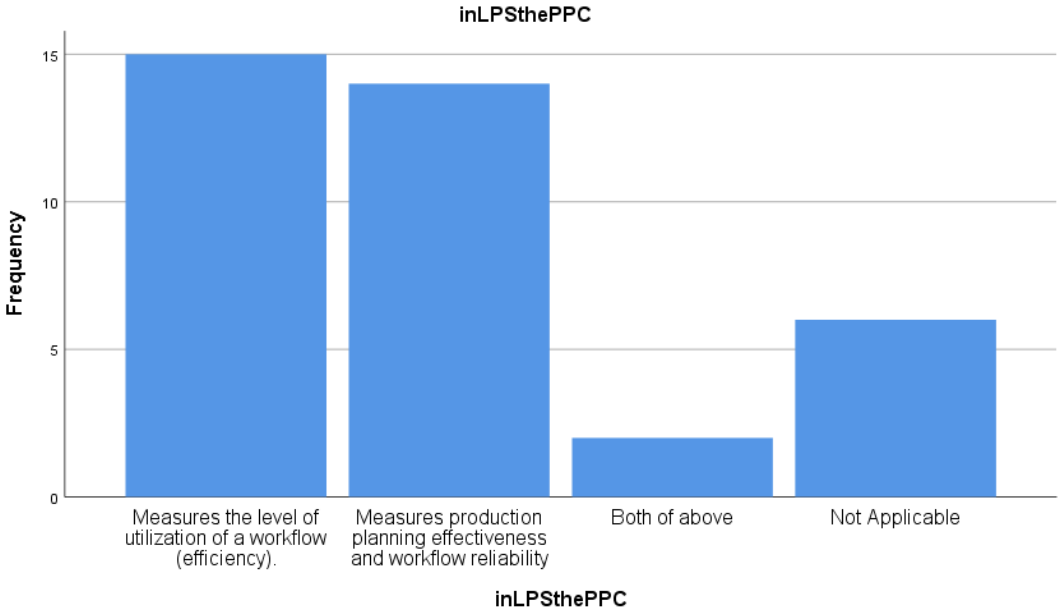

TQMandSCMandCE
Frequency
25
20
15
10
5
0
No
Yes
TQMandSCMandCE

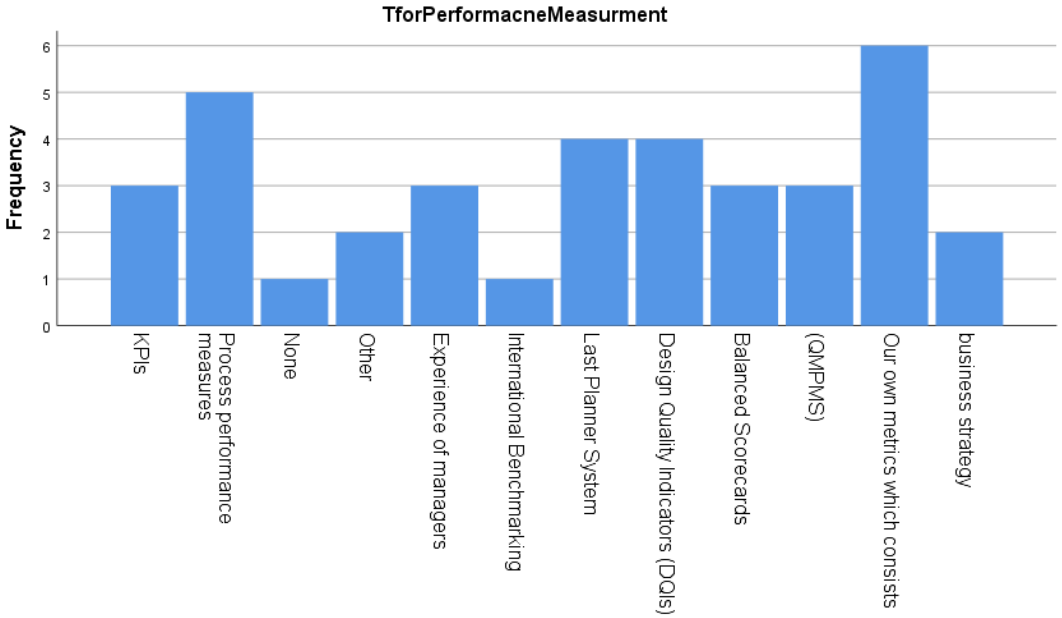

ConstrucitonSite
Frequency
10
8
6
4
2
0
Not Applicable
JIT
Kaban System
Value Stream Analysis
Don't Know
ConstrucitonSite

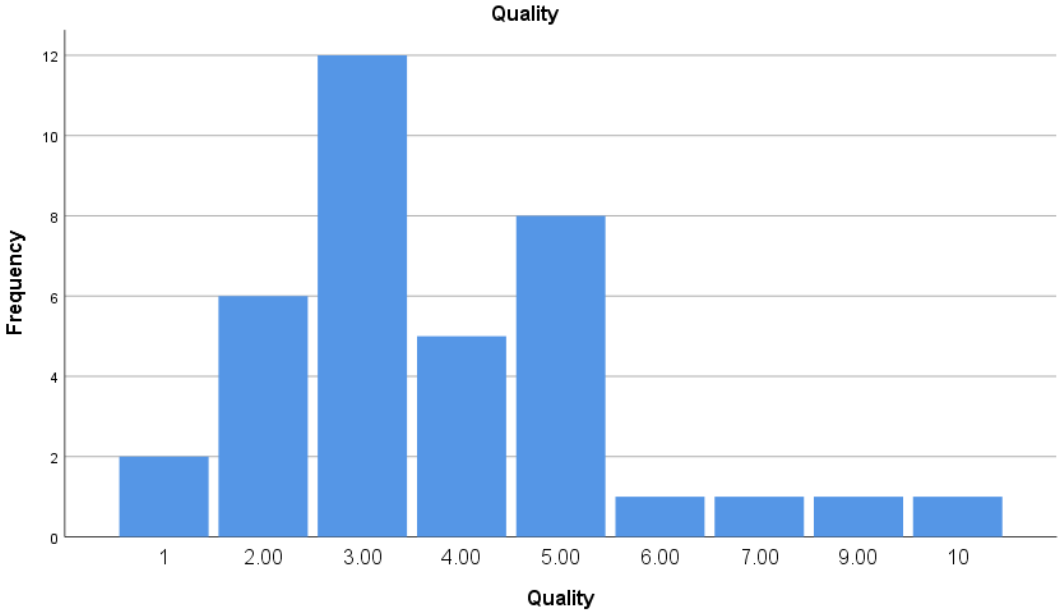

TechniqueForSimulate
Frequency
10
8
6
4
2
0
Not Applicable
Design Structure Matrix
Virtual Design Studios
Virtual Reality Tools
BIM
None
TechniqueForSimulate


TechniqueForPreventValue
Frequency
20
15
10
5
0
Not Applicable
Concurrent Design of the Product and the process
Set-based Design Strategy
Note
TechniqueForPreventValue


LPS
Frequency
10
8
6
4
2
0
Not Applicable
Planning as an activity scheduling tool
Production Control
Tuning Logistics Operations during Production
Performance measurement & organizational learning
Management Control
LPS


inLPSthePPC
Frequency
15
10
5
0
Measures the level of utilization of a workflow (efficiency).
Measures production planning effectiveness and workflow reliability
Both of above
Not Applicable
inLPSthePPC


TforPerformacneMeasurment
Frequency
0
1
2
3
4
5
6
KPIs
Process performance measures
None
Other
Experience of managers
International Benchmarking
Last Planner System
Design Quality Indicators (DQIs)
Balanced Scorecards
(QMPMS)
Our own metrics which consists
business strategy


Quality
Frequency
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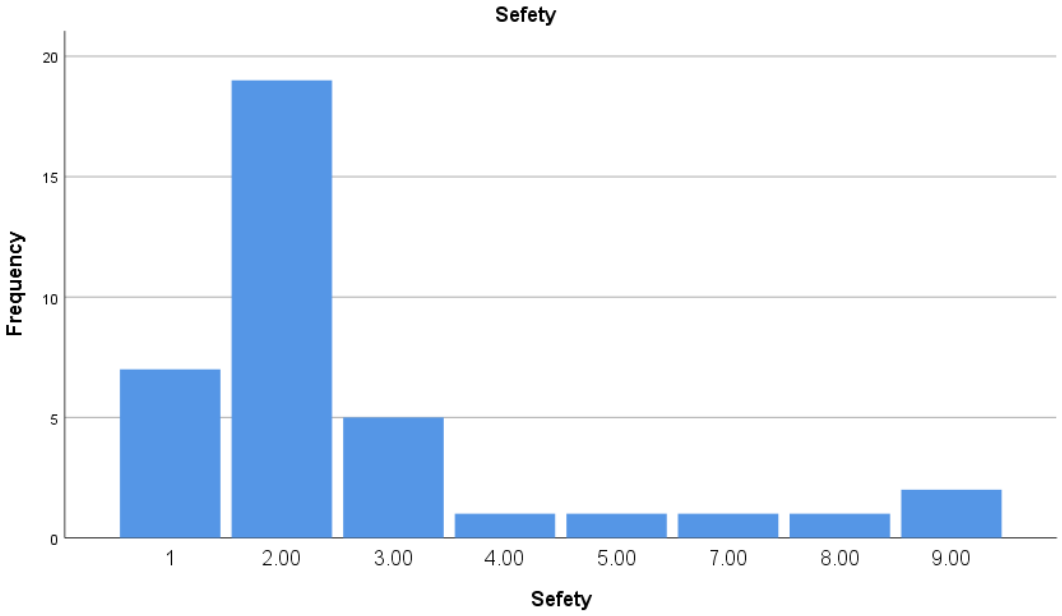
2
4
6
8
10
12
1
2.00
3.00
4.00
5.00
6.00
7.00
9.00
10
Quality


Sefety
Frequency
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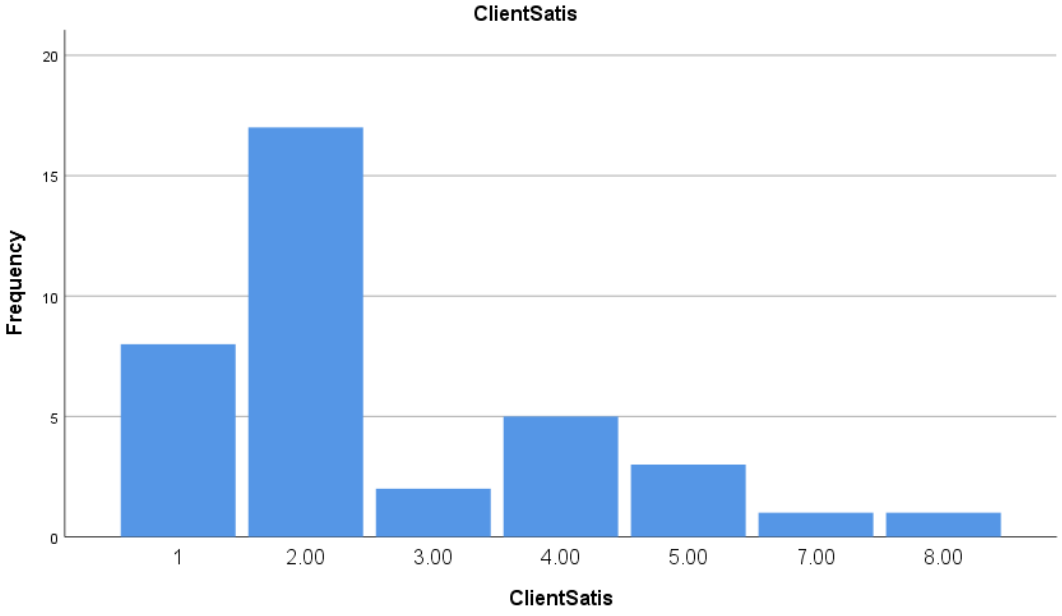
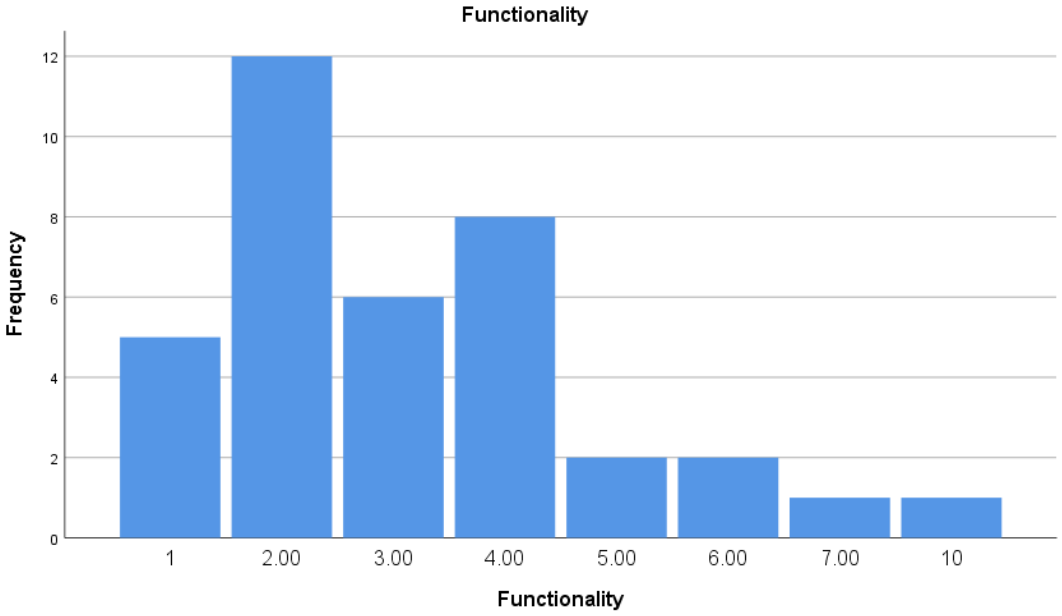
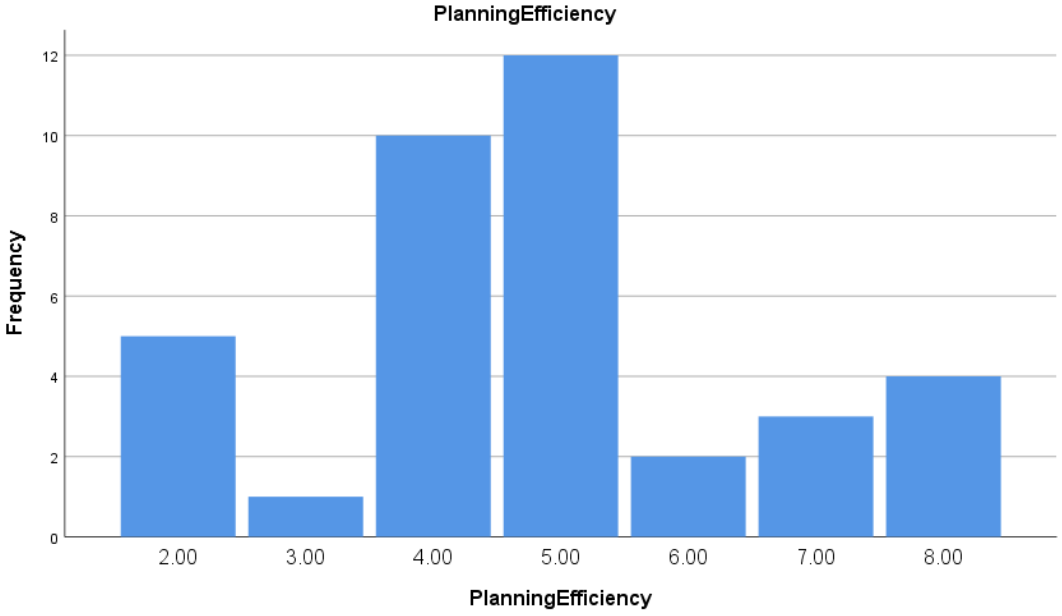
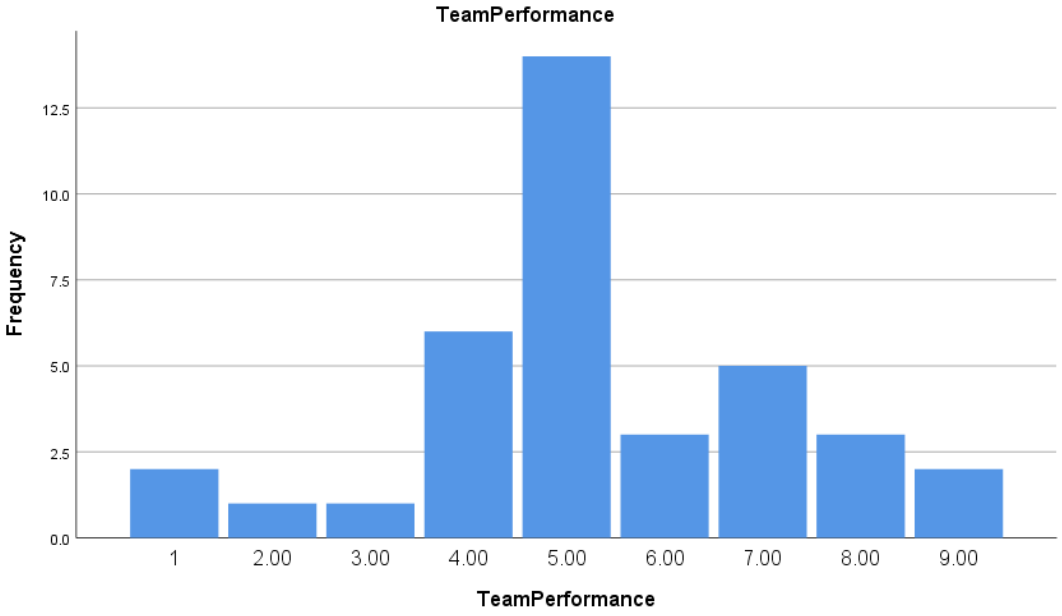
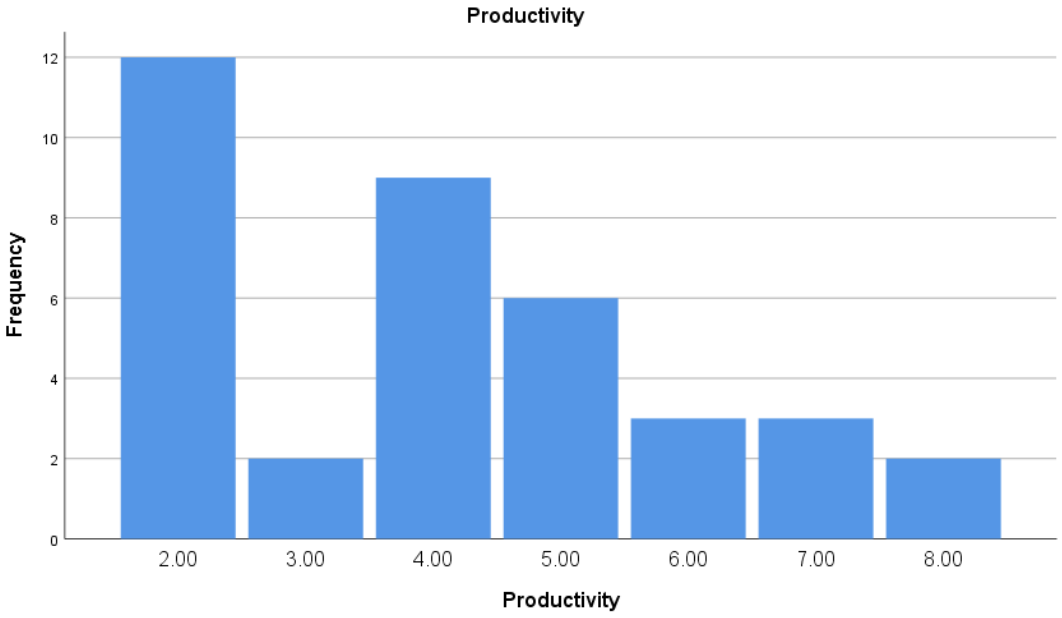
5
0
1
2.00
3.00
4.00
5.00
7.00
8.00
9.00
Sefety

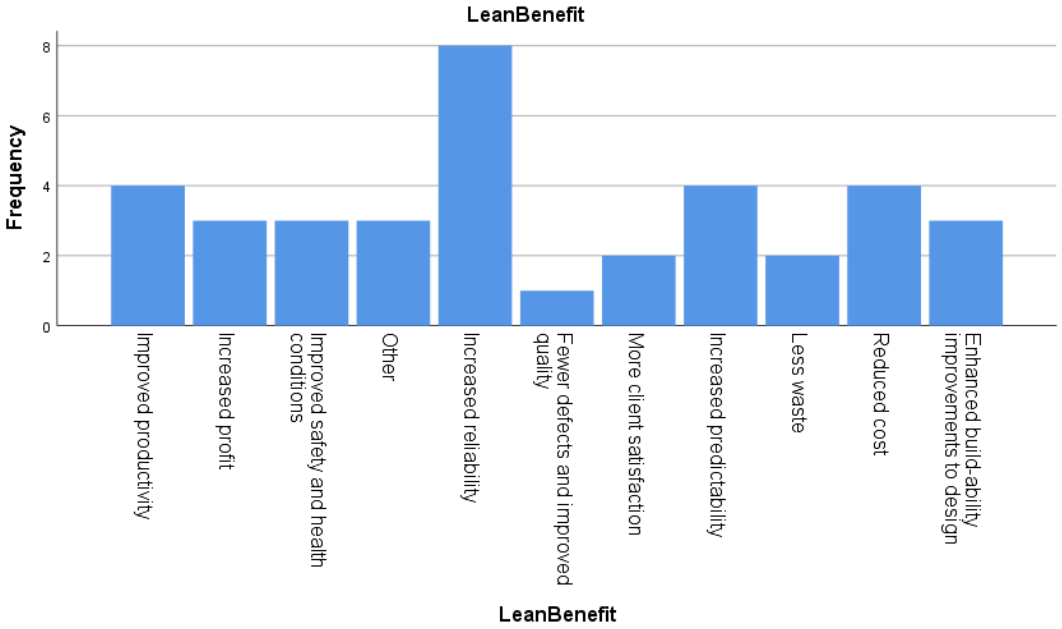

ClientSatis
Frequency
20
15
10
5
0
1
2.00
3.00
4.00
5.00
7.00
8.00
ClientSatis

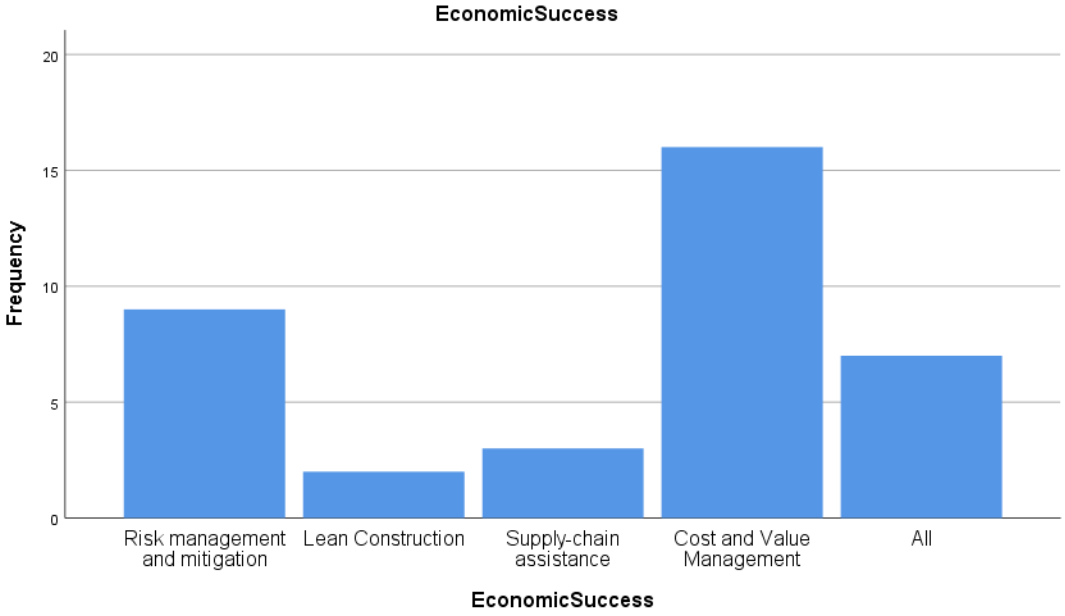

Functionality
Frequency
12
10
8
6
4
2
0
1
2.00
3.00
4.00
5.00
6.00
7.00
10
Functionality

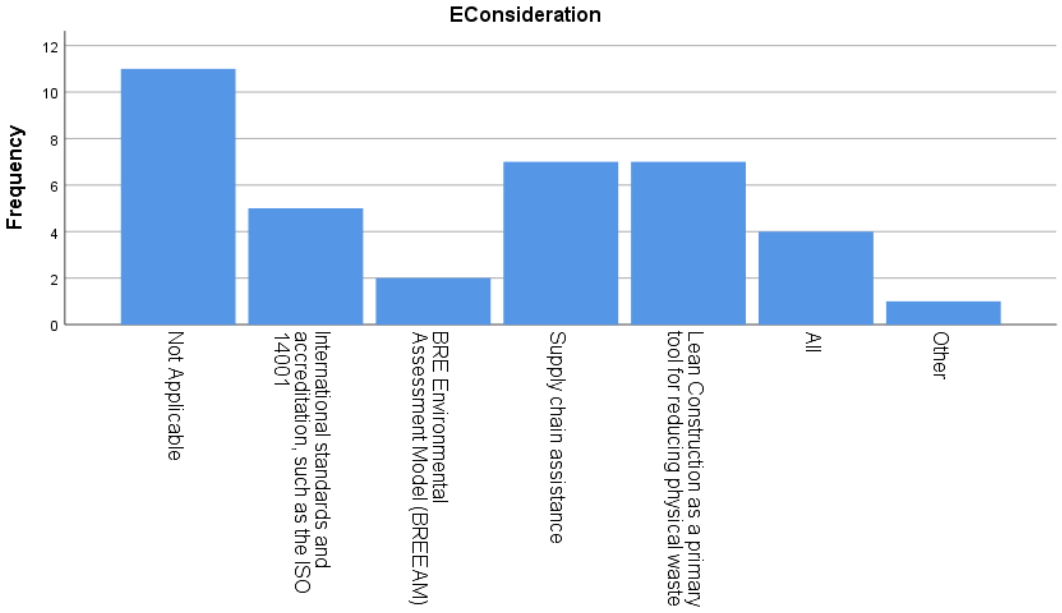

PlanningEfficiency
Frequency
12
10
8
6
4
2
0
2.00
3.00
4.00
5.00
6.00
7.00
8.00
PlanningEfficiency

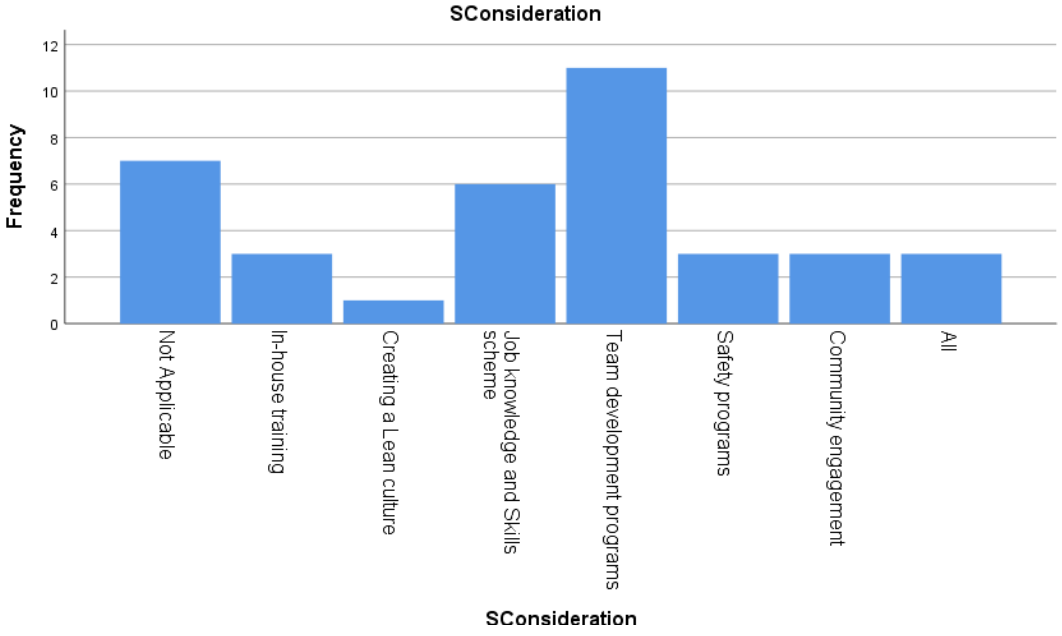

TeamPerformance
Frequency
12.5
10.0
7.5
5.0
2.5
0.0
1
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
TeamPerformance

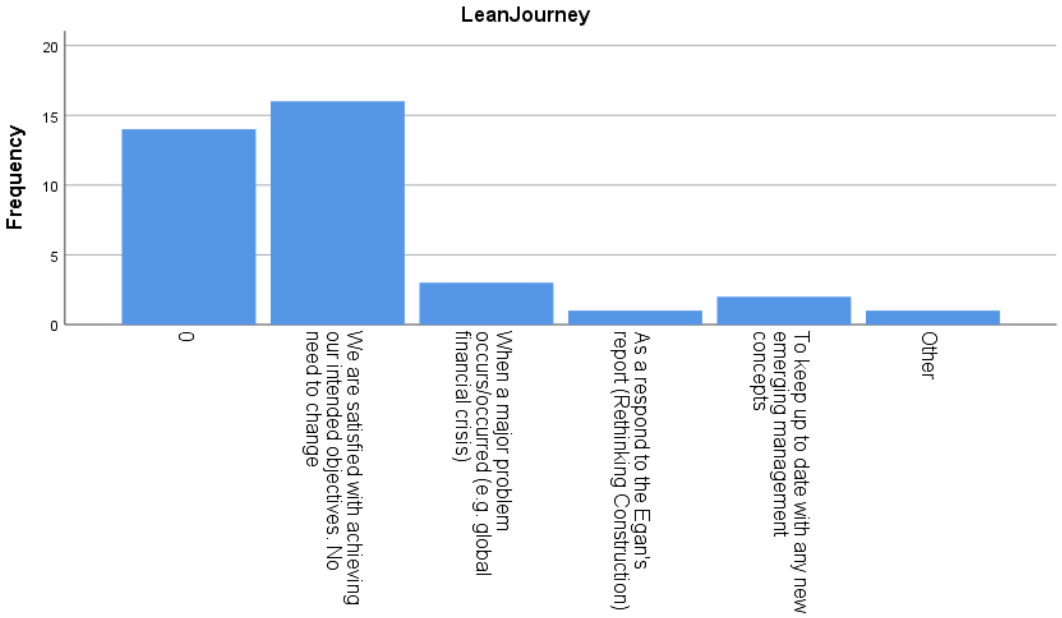

Productivity
Frequency
12
10
8
6
4
2
0
2.00
3.00
4.00
5.00
6.00
7.00
8.00
Productivity

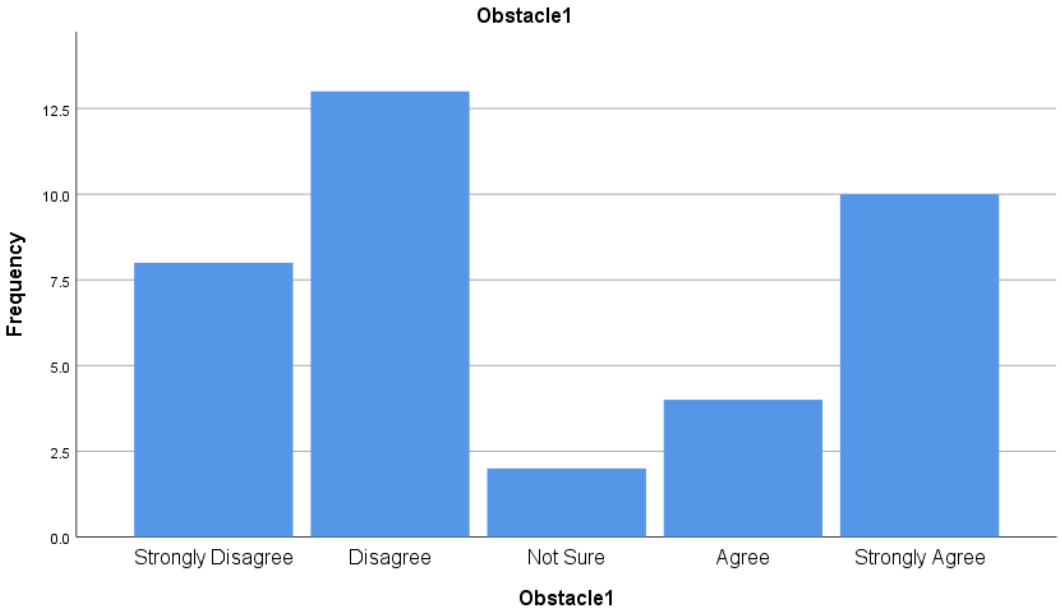

LeanBenefit
Frequency
0
2
4
6
8
Improved productivity
Increased profit
Improved safety and health conditions
Other
Increased reliability
Fewer defects and improved quality
More client satisfaction
Increased predictability
Less waste
Reduced cost
Enhanced build-ability improvements to design
LeanBenefit

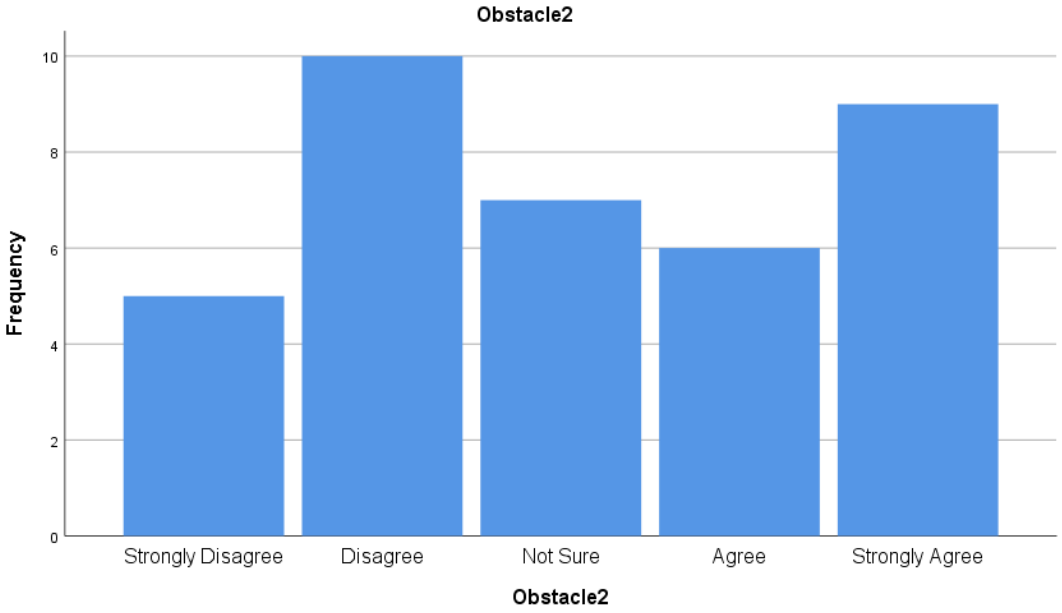

EconomicSuccess
Frequency
0
5
10
15
20
Risk management and mitigation
Lean Construction
Supply-chain assistance
Cost and Value Management
All
EconomicSuccess

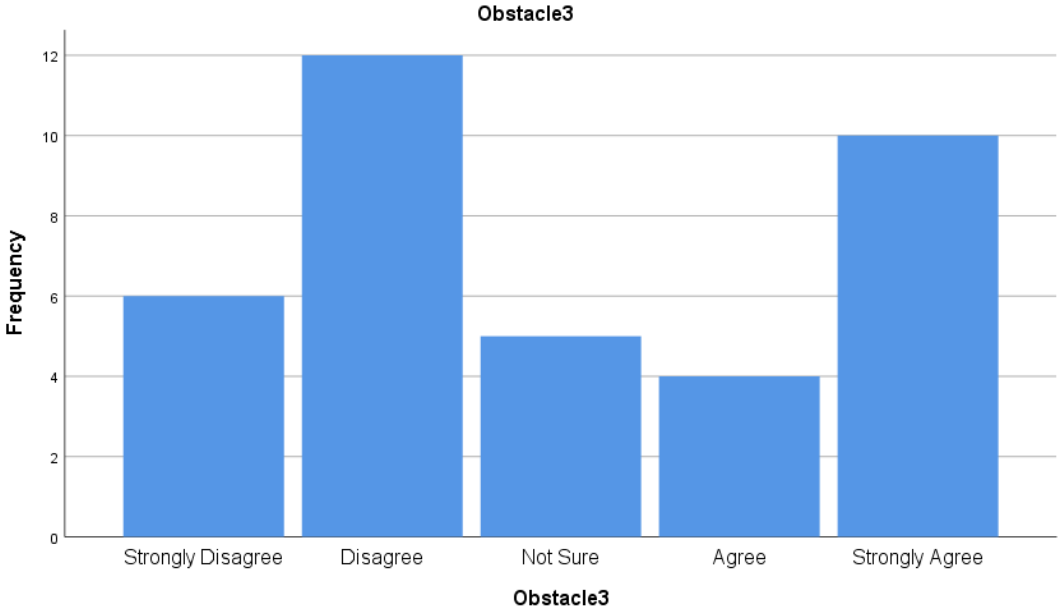

EConsideration
Frequency
0
2
4
6
8
10
12
Not Applicable
International standards and accreditation, such as the ISO 14001
BRE Environmental Assessment Model (BREEAM)
Supply chain assistance
Lean Construction as a primary tool for reducing physical waste
All
Other

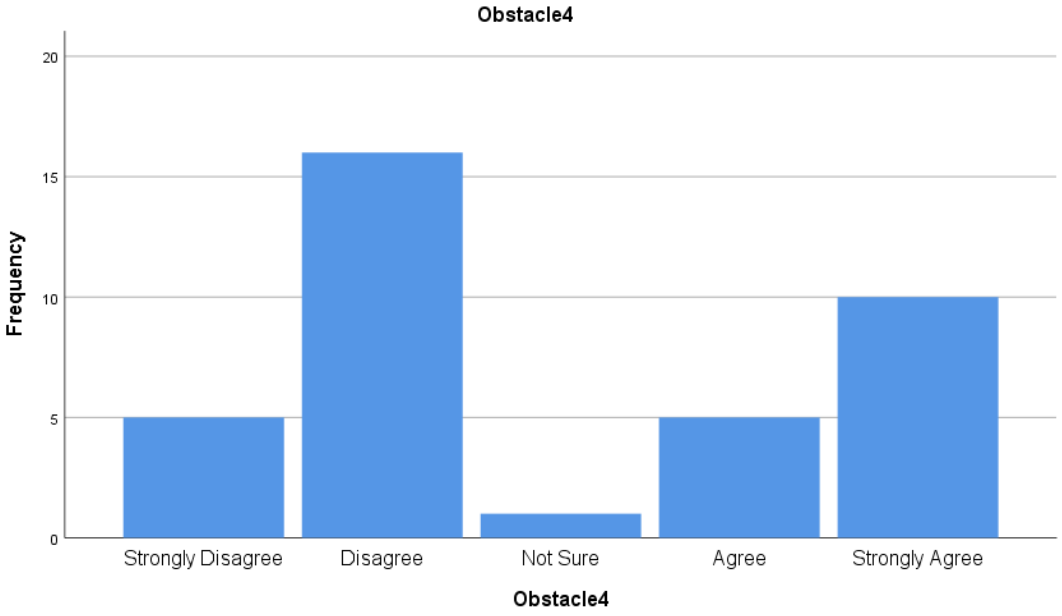

SConsideration
Frequency
0
2
4
6
8
10
12
Not Applicable
In-house training
Creating a Lean culture
Job knowledge and Skills scheme
Team development programs
Safety programs
Community engagement
All
SConsideration

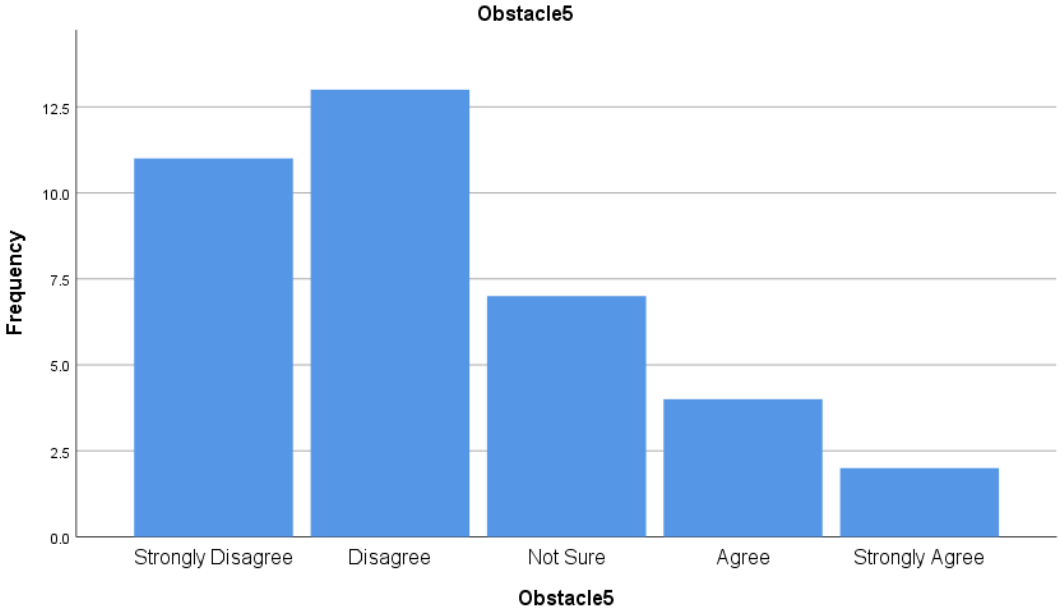

LeanJourney
Frequency
20
15
10
5
0
0
We are satisfied with achieving our intended objectives. No need to change
When a major problem occurs/occurred (e.g. global financial crisis)
As a respond to the Egan's report (Rethinking Construction)
To keep up to date with any new emerging management concepts
Other

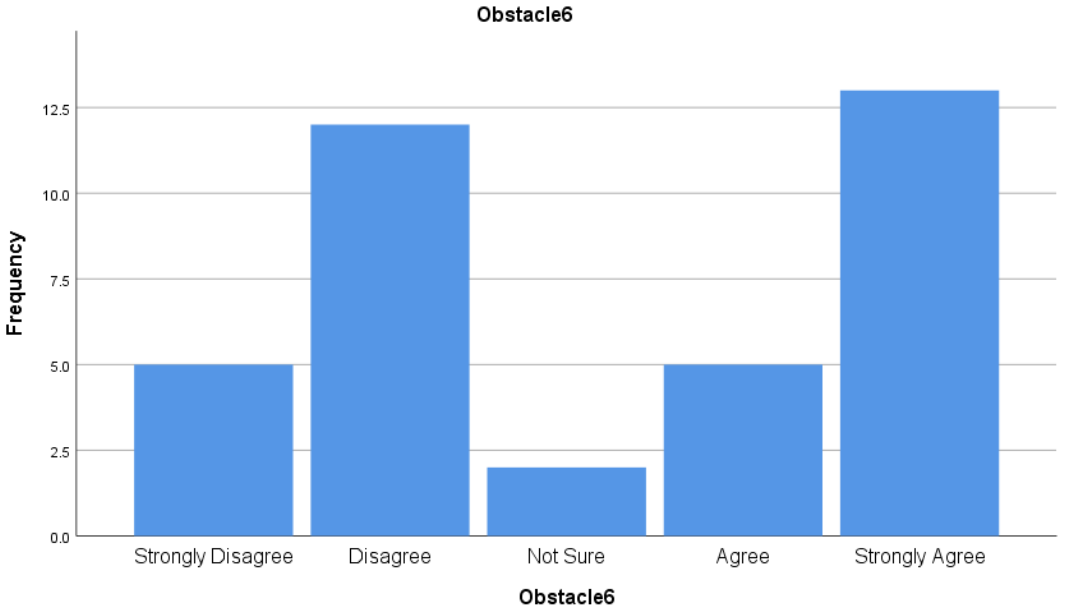

Obstacle1
Frequency
12.5
10.0
7.5
5.0
2.5
0.0
Strongly Disagree
Disagree
Not Sure
Agree
Strongly Agree
Obstacle1

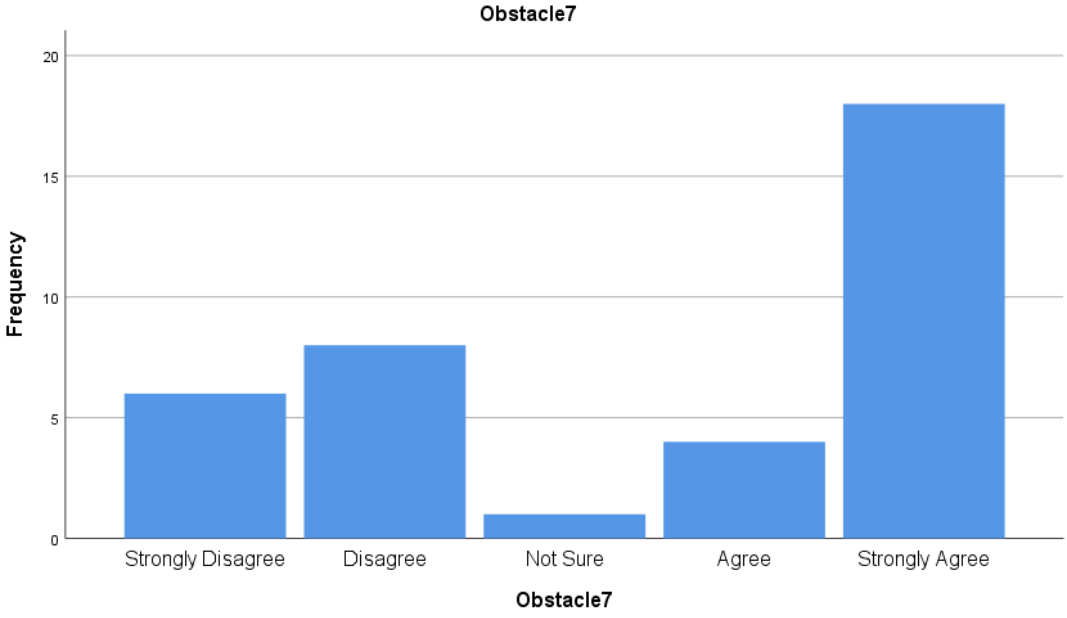

Obstacle2
Frequency
10
8
6
4
2
0
Strongly Disagree
Disagree
Not Sure
Agree
Strongly Agree
Obstacle2

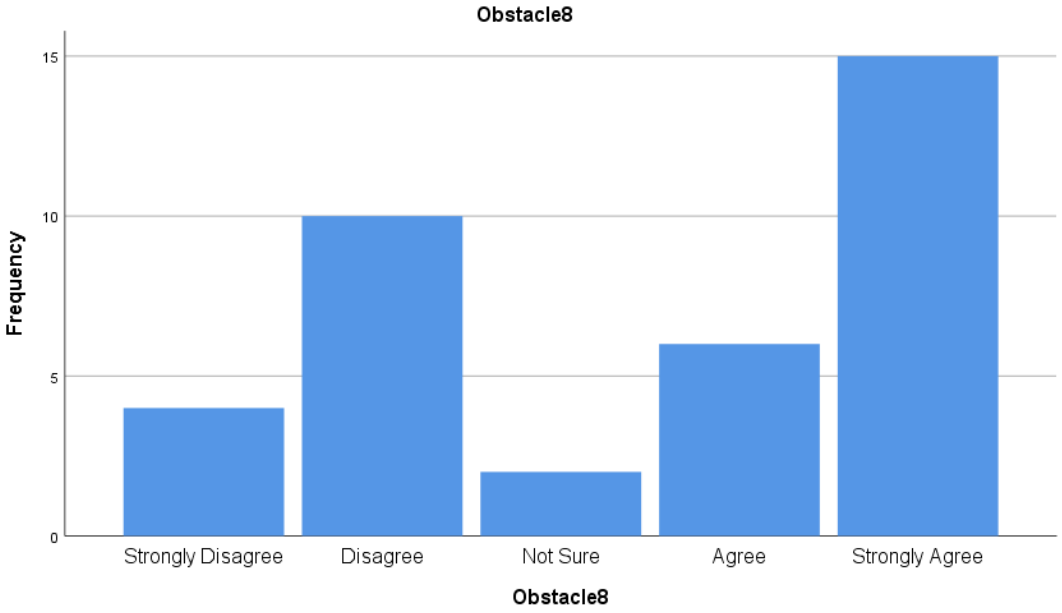

Obstacle3
Frequency
12
10
8
6
4
2
0
Strongly Disagree
Disagree
Not Sure
Agree
Strongly Agree
Obstacle3

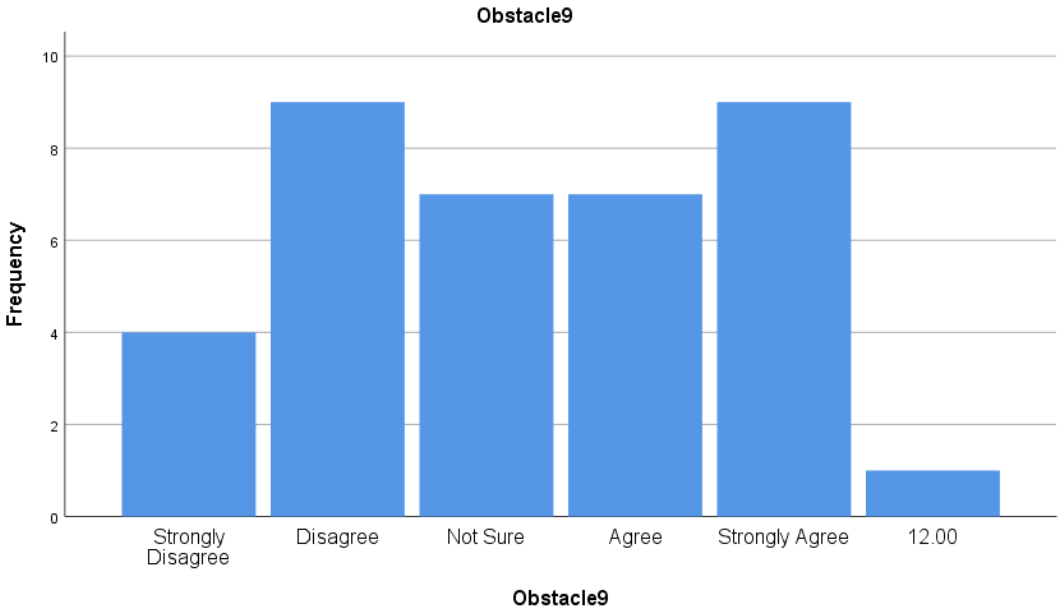

Obstacle4
Frequency
20
15
10
5
0
Strongly Disagree
Disagree
Not Sure
Agree
Strongly Agree
Obstacle4

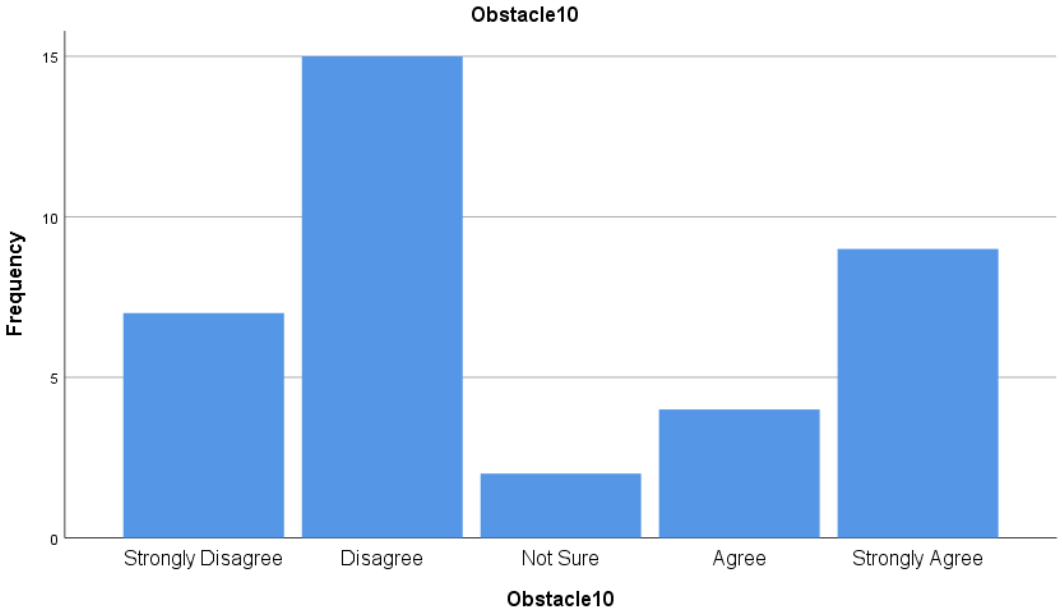

Obstacle5
Frequency
12.5
10.0
7.5
5.0
2.5
0.0
Strongly Disagree
Disagree
Not Sure
Agree
Strongly Agree
Obstacle5

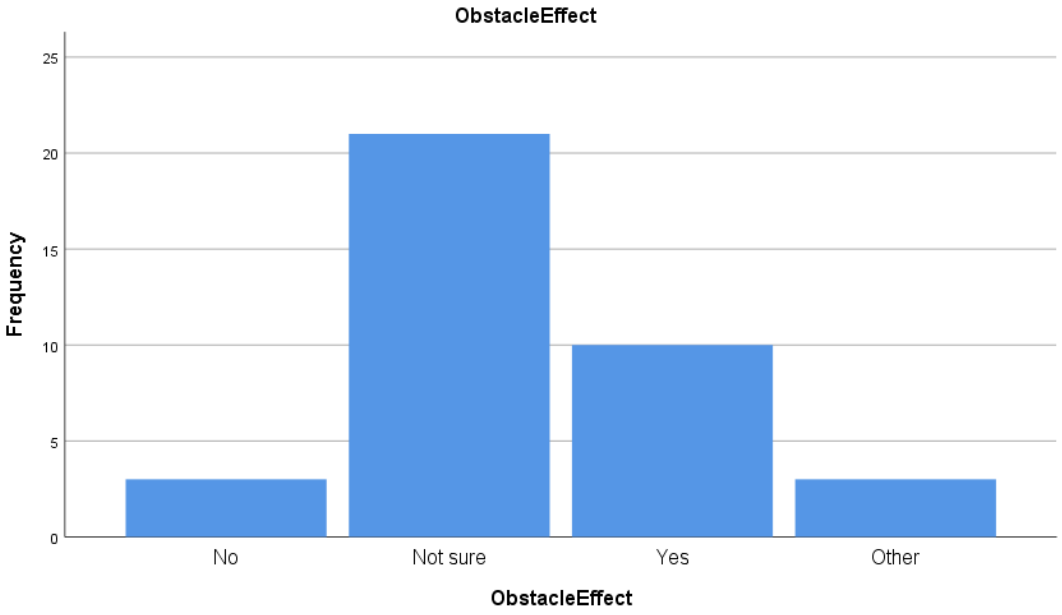

Obstacle6
Frequency
12.5
10.0
7.5
5.0
2.5
0.0
Strongly Disagree
Disagree
Not Sure
Agree
Strongly Agree
Obstacle6


Obstacle7
Frequency
20
15
10
5
0
Strongly Disagree
Disagree
Not Sure
Agree
Strongly Agree
Obstacle7


Obstacle8
Frequency
15
10
5
0
Strongly Disagree
Disagree
Not Sure
Agree
Strongly Agree
Obstacle8


Obstacle9
Frequency
10
8
6
4
2
0
Strongly Disagree
Disagree
Not Sure
Agree
Strongly Agree
12.00
Obstacle9


Obstacle10
Frequency
15
10
5
0
Strongly Disagree
Disagree
Not Sure
Agree
Strongly Agree
Obstacle10


ObstacleEffect
Frequency
25
20
15
10
5
0
No
Not sure
Yes
Other
ObstacleEffect

RESUME

Name Surname **:** Ehsanullah SHAHEEDMAL OMARI

EDUCATION

Degree	School	Graduation Year
Master	Sakarya University / Institute of Science / Civil Engineering.	Continue
Bachelor	Shaik Zayed University / Institute of Science / Civil Engineering.	2014
High School	Sayedabad High School	2009

JOB EXPERIENCE

Year	Place	Position
2016-2019	KEEN Group	G. Office Manager
2013-2016	EVG	Project Manager

FOREIGN LANGUAGE

Pashto, Persian, English, Turkish

HOBBIES

Study, play cricket, watch movies.