BTH 25321

Bacheloroppgave - Prosjektledelse

Bacheloroppgave

The Lean Compass: Tandem Application of the Project Manager's Compass and Lean Organizational Theory

Navn:	Natassja Alexandra Kokonaski

Abstract

This research study seeks to identify and explore the ways in which tandem application of the Project Manger's Compass and Lean philosophy can optimize project management activities using a studied organization as a practical example. The study explores its guiding research questions and hypothesis by examining data gleaned from informant interviews in terms of existing project management and Lean theory, positing that implementation of an integrated "Lean Compass" will enhance project efficacy. The Lean Compass delineates the project manager as the driving force behind project communications, as well as the workflow optimizations to be carried out in the Lean Lifecycle. The project manager is thusly responsible for not just controlling the project lifestyle, driving results, and managing stakeholder relationships, but also appropriately identifying value in the workflow, mapping the value system, creating flow, establishing pull, and seeking perfection. This process allows for the correction of reported non-value added activities in the organization and in turn optimization of the project workflow.

Acknowledgements

This research study has been conducted as the culminating moment in the researcher's Bachelor's Degree in Economics at BI Norwegian Business School. 2015 was a difficult year for the student researcher—as was the case with many professionals in the Stavanger region, the researcher was impacted by the wave of layoffs occurring in this year as a result of the downturn in oil prices. Prior to this incident, she had hoped to move forward professionally as a project manager within the oil and gas industry. To strengthen her CV, she enrolled at BI in the fall of 2015 in hopes of strengthening skillsets related to economics and project management. Now, three years later, this effort is culminating with this Bachelor's Thesis.

The past three years have been rich in both learning as well as both academic and personal challenges. This capstone project cannot be submitted without thanking a few key actors in the study process:

Thank you to the study participants for their candor and willingness to contribute to this project.

Thank you to this project's advisor, Håkon Brydøy, for both academic support and keen theoretical insight that drove the progression of this study.

Lastly, but certainly not least, thank you to the parents and close friends who have provided emotional, intellectual, and in some cases financial support during the entirety of this process.

Without the support of each of the abovementioned parties, this research study would not have been possible.

Natassja Giske Kokonaski
04 June 2018
Stavanger, Norway

Table of Contents

1.0 Introduction

The discipline of project management centers around not only the technical aspects of generating project results, but also the leadership skills necessary in coordinating the efforts of a diverse group of project participants. For many organizations, the human factors in controlling the project lifecycle, connecting with stakeholders, and driving results can present unique project management challenges. Processes and procedures in the workflow can further compound management efforts in cases where they are not operating at maximum efficiency. As a professional with three years' experience with project work in the oil and gas industry, the student researcher is personally familiar with these challenges and how they can be detrimental to building value in the workflow. Having worked to address some of these challenges using Lean principles and seeing marked improvements in both team morale and project lifecycle efficacy, the researcher carries a particular professional interest in understanding how these principles may bolster the efficacy of the interpersonal and technical aspects of project management endeavors. Therefore, this capstone project seeks to uncover and explore the ways in which project management theory can be enhanced with elements of Lean theory to optimize project workflows in an organization producing measuring equipment in Stavanger's oil and gas industry.

The studied organization[1] has served as a sub supplier in the energy sector for the past thirty years. In recent years, customer satisfaction has taken a dip due to the need for constant reworking and repair of delivered equipment. Most of these corrective measures have been necessitated due to the use of incorrect parts of materials, rendering the equipment unusable when it arrives on the client's platform. The organization therefore wishes to uncover why this problem is occurring, as well as explore measures of correcting these errors in order to improve relations with end customers. This research study aims therefore to aid the organization in accomplishing exactly that, providing a theoretical analysis and tailored recommendations for action anchored in project management and Lean theories.

---

[1] The studied organization shall for the purposes of this capstone remain anonymous. Participation in the study has been contingent upon respect for the condition of anonymity. Please see Section 3 for further information regarding this study's use of conditions of anonymity.

1.1 Contributions and Benefits

1.1.1 Benefits to the Studied Organization and Field as a Whole

The studied organization can benefit from this capstone through the theoretical insights provided as a result of the research process. Analyses of the organization's project management workflow generates theoretical tools and guidelines for future project success. Further, the field of project management can benefit from new theoretical insights into the discipline, allowing for new tools to be applied both internally in the studied organization and in the field as a whole.

1.1.2 Learning Benefits for the Student Researcher

This research study endows the student researcher with the opportunity to apply both theoretical knowledge obtained through project management coursework and professional experience with project-related work to a nuanced exploration of how one might apply these theories in practice. Knowledge gleaned from this process can greatly benefit the student researcher both academically and potentially in future professional role, both in terms of competency and networking opportunities.

1.2 Presentation of the Thesis Problem Statement and Research Questions

The driving research question for this study is as follows:

> **How can integrated application of the Project Management Compass and LEAN philosophy optimize Project Management activities?**

This primary research question is supported by the following queries:

- How can these tools contribute to reduction of waste ("muda")?
- How does this process promote goal-oriented leadership?
- How can these tools drive project success?

The culminating efforts of these questions seek to build a practical link between the existing theoretical principles of the Project Manager's Compass and Lean organizational leadership philosophy.

This research study posits that ***Implementation of the "Lean Compass" Will Enhance Project Efficacy***. Empowering project managers in the organization with tools to develop themselves in their leadership roles will allow for more engaged

and communicative project management. Further, synthesizing these guidelines with Lean principles will give project managers theoretical insight into how they can enact their leadership capabilities in an effort to address challenges experienced in the workflow.

The guiding research questions and hypothesis of this study shall be explored by first outlining the relevant theoretical principles informing the research; outlining this study's research methodology; providing a self-evaluation of the research study; presenting the data gleaned during the research process; discussing the findings; and providing concluding remarks regarding the project as whole.

2.0 Theoretical Foundation

The theoretical foundation for this research study centers around defining the project and role of project manager in stakeholder relationships; outlining the varying principles that comprise the Project Manager's Compass; and exploring elements of Lean organizational philosophy and its applications to the field of project management.

2.1. Defining the "Project," the Role of Project Manager, and Stakeholders

To gain insight regarding the relationship between principles of project management and Lean philosophy, it is important to examine the basic concepts of the project, the project manager, and stakeholders. While several pages could be dedicated to the understanding of these principles, this thesis seeks to provide a basic definition of each for the sake of brevity and precision in answering the guiding research questions.

2.1.1 The Project

A "project" can be described as any organizational endeavor that is based upon a clearly defined goal (or goals); is run with access to a finite number of resources; occurs on a one-off basis; involves interdisciplinary work; and has a clearly established start and end date (Karlsen & Gottschalk, 2017). The project work form, therefore, allows for a specialized approach to a given set of tasks. This degree of specialization in turn allows for an increased focus on the specified

activity, as well as opens the workflow to input from varying areas of expertise where needed.

2.1.2 The Role of Project Manager

The project manager is the individual charged with spearheading coordination of the physical, financial, time, and manpower resources connected to a project (Briner, Hastings, & Geddes, 1996). In other words, the project manager is responsible for the effective coordination of the finite resources available for project execution. He or she must therefore delineate a clear action plan for the project while taking measures to properly inform all acting parties. Further, the project manager must ensure that time constraints are adhered to while guiding the efforts of an interdisciplinary team (Briner et. al., 1996).

2.1.3 Stakeholders

Stakeholders can be defined as those individuals that are actively involved in the project's progression or whose interests are either positively or negatively impacted by its result. The project's relationship to these stakeholders is analyzed and mapped out to understand the nuances of these relationships and how they may influence project progression (Karlsen 2017; Skyttermoen & Vaagasaar 2015). Critical stakeholders include the project's client or end user; therefore, project activities are often directed at maximizing the satisfaction of these parties with the project's result[2].

2.2 The Project Manager's Compass

The Project Manager's Compass is a tool developed by Briner, Hastings, and Geddes to aid in both identifying the right individual for each project task and to lead the project as a whole. Further, the Compass model serves as a means of uncovering hidden project challenges, areas for improvement in the workflow[3], and project critical success factors[4] (1996).

---

[2] See also Section 2.3, Lean and Building Value.

[3] See also discussion in Sections 2.3 and 2.4 regarding Lean and Continuous Improvement.

[4] "Critical success factors (CSFs), also known as Key Results Areas (KRAs), refer to the activities that must be completed to a high standard of quality in order to achieve the goals of your project." ("What are Critical Success Factors in Project Management?" n.d.).

To ensure effective project management, the sum of these factors must be balanced in such a way so as to fulfill their requirements while simultaneously avoiding that any of these influences be neglected. The Project Manager's Compass seeks to secure these objectives by encouraging project managers to "Look Upward; Look Outward; Look Backward; Look Forward; Look Inward; and Look Downward.":
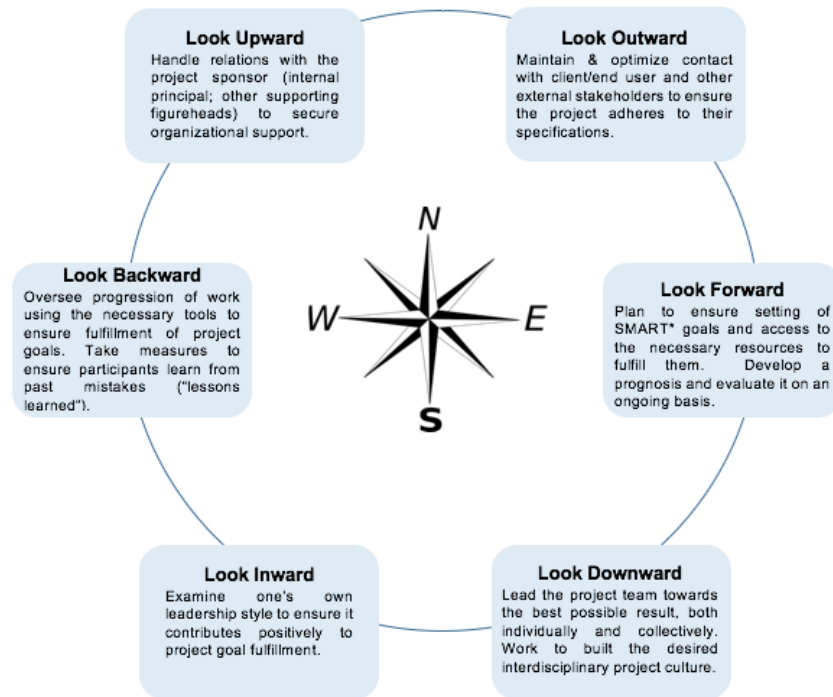
Figure 2.1: The Project Manager's Compass[5]

The compass design is meant to guide the project manager's attentions to the varying elements impacted by project progression. By encouraging the project manager to look "Upward," the Compass allows for the maintenance of relationships with superiors, whether that be within or without the organization. Similarly, directing the project manager's focus "Outward" allows for optimization of client or end user relationships. These activities can be synthesized into the task of managing stakeholder relationships (Briner et al. 1996).

The activities of looking "Backwards" and "Forwards" can be combined to the core activity of controlling the project lifecycle. By looking "Backwards," the project manager can oversee the fulfillment of project deliverables, as well as ensure the team learns from any past mistakes on similar endeavors. These activities can then

---

[5] Diagram - (Briner, Hastings, & Geddes 1996) / Compass Clip Art – (ClipArtPanda.com)

be translated into looking "Forward," engaging previous lessons learned to future plans, and setting SMART[6] project goals (Briner et al. 1996).

By looking "Inward" and "Downward," the project manager can take measures to ensure he or she is driving results for the project. Looking "Inward" allows the project manager to examine his or her own leadership efforts for contribution to positive goal fulfillment, while looking "downward" allows for the same control measure on the project team as a whole. This process involves examining the interdisciplinary efforts of the project group in order to build the desired project culture (Briner et al. 1996).

In this way, the activities of the Project Management Compass can be said to fall into the following integrated process categories: managing stakeholder relationships; control of the project lifecycle; and driving project results. The project manager is responsible for guiding the progression of these integrated processes[7].

2.2.1 The Project Manager as an Integrator

According to Briner, Hastings, and Geddes, the project manager carries the responsibility of balancing interpersonal relations, resource access, and time constraints in relation to the various internal connections and motives and external factors influencing the project workflow (1996).
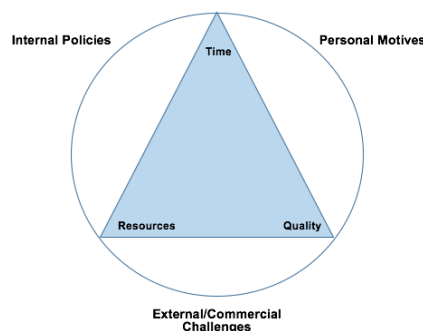
Figure 2.2: Spheres of Influence Exerted on the Project Manager[8]

---

[6] "SMART" Goals can be defined as goals which are Specific, Measurable, Achievable, Relevant to a project's long-term objective, and Timely (or relating to a specific, desired timeframe) in nature (Fjeldstad & Lunnan 2015).

[7] The 14 Integrated Processes of the Project Management Compass are explained in more detail in Section 2.2.2.

[8] (Briner, Hastings, & Geddes 1996)

As the project's "integrator," the project manager is responsible for creating an environment within the project workflow wherein self critique is the standard rather than critique of others, along with ensuring effective delivery of project deliverables. All parties should therefore feel free to provide input to the project's progression if need be (Briner et al. 1996). The project manager can ensure this process' success by enacting his or her Integrator role in engaging the Project Management Compass' 14 Integrated Processes.

2.2.2 14 Integrated Processes
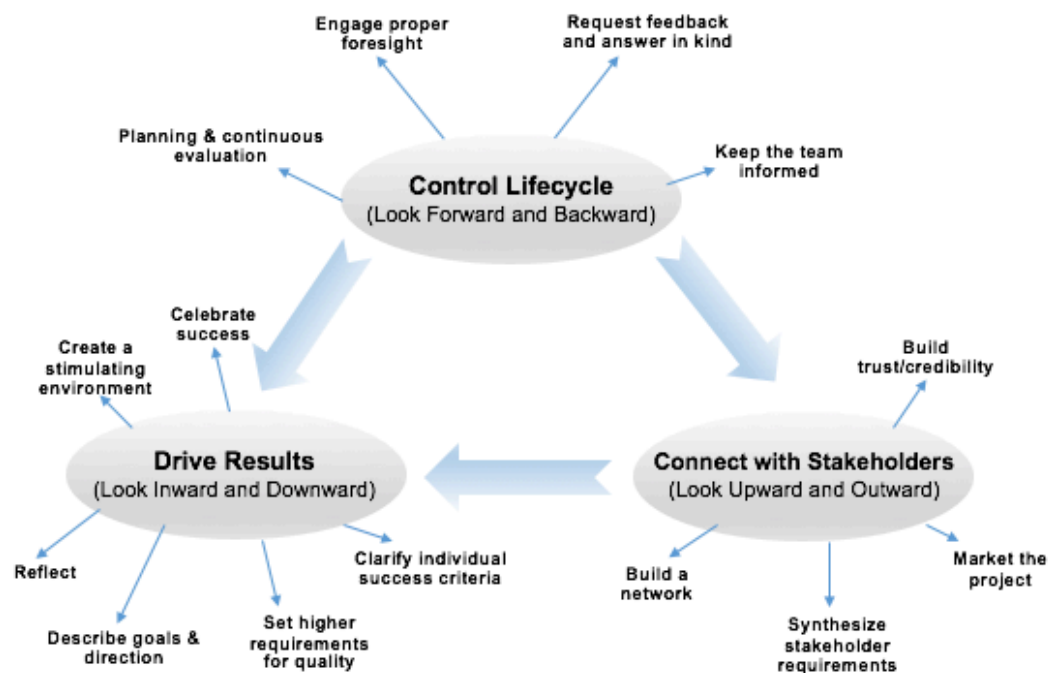
Figure 2.3: The 14 Integrated Processes[9]

The 14 Integrated Processes of the Project Manager's compass serve to align the responsibilities outlined in the compass itself[10] with the synthesized activities of driving results, controlling the project lifecycle, and connecting with stakeholders.[11] In Section2.2, the six directions of the Project Manger's Compass were synthesized into three main activity groups: Driving Results; Controlling the Project Lifecycle; and Connecting with Stakeholders. The 14 Integrated Processes serve to break this

---

[9] (Briner, Hastings, & Geddes 1996)
[10] S*ee Figure 2.1*
[11] *See Section 2.1.3*

model down into specific roles and responsibilities to be executed by the Project Manger against each level of the compass.

Driving Results

The project manager is first and foremost responsible for driving project results, or looking inward and downward as a part of the project management compass. This task can be accomplished by creating a stimulating project environment, setting high standards for quality, clarifying individual success criteria, describing project goals and direction, celebrating success, and reflecting on project results. A stimulating environment can be created by enacting measures to support the team, making work easier and more efficient, and removing any "bottlenecks" or obstacles that might hinder ease of work for the team. Additionally, the project manager is responsible for distributing work so that his or her colleagues do not become overburdened and are able to perform work efficiently. Crucial to this process is the fostering of an environment wherein free discussion is encouraged without devolving into conflict (Briner et al. 1996).

Further, the project manager should drive results by setting high quality standards, both for his or herself and the project team as a whole. Errors should be corrected immediately, and substandard elements of the workflow should be adjusted accordingly throughout the lifecycle. Additionally, individual success criteria should be clear to ensure full and optimal participation from the project team. Project goals and desired progression should be clearly defined from the kick-off phase so that all parties understand why each work requirement is important to the project outcome (Briner et al. 1996).

To further drive the project lifecycle, the project manager should build enthusiasm for the work by celebrating the team´s success and seeking out relevant opportunities for positive feedback and recognition. He or she should then reflect on project results to evaluate both personal and team efforts, particularly as they relate to team morale (Briner et al. 1996).

Controlling the Project Lifecycle

As a part of the "integrator" role of the compass, the project manager is responsible for looking forward and backward, or controlling the project lifecycle. Integrated

processes that go towards controlling the project lifecycle include: engaging proper foresight; requesting feedback; keeping the team informed; and continuously planning and evaluating said plans. In engaging proper foresight, the project manager should look beyond his or own tasks to see the full picture of the project as a whole. This process involves running regular SWOT[12] or risk analyses to determine the next best steps, as well as managing stakeholder impressions (Briner et al. 1996).

To further control the project lifecycle, the project manager should proactively request regular feedback from both the project team and stakeholders alike, and respond in kind. Further, all levels of the team should be kept informed of current status at all times, including new stakeholders or team members. In this activity, it is crucial for an effective project manager to take measures to address the needs of invisible groups, and remember that not all team members have access to the same information. Lastly, plans should be continuously enacted and updated to ensure maximal efficacy of the planning system, as well as allow for an open environment in which the team can learn from past errors and correct for them in the future (Briner et al. 1996).

Connecting with Stakeholders

As a final means of enacting the 14 integrated processes of the project manager's compass, the project manager should look upward and outward to connect with all relevant stakeholders. This process can be done by synthesizing stakeholder requirements so that, despite conflicting requests or needs by each party, efforts are made to maximize the satisfaction levels of all involved. It is crucial therefore that the project manager navigate these relationships through clear communication to determine the best way forward for all parties. Further, the project manager is responsible for marketing the project by curating a favorable reputation; build a network amongst stakeholders and within the project team by maximizing existing relationships and the talents of individual contributors; and by building trust and legitimacy amongst the stakeholders by demonstrating a clear understanding of the technical, economic, and human factors acting on the project (Briner et al. 1996).

---

[12] A SWOT analysis is a process wherein a business strategy or entity is evaluated in terms of the relevant Strengths, Weaknesses, Opportunities, and Threats effecting its potential progress—See Attachment A (Fjeldstad & Lunnan 2015).

The 14 Integrated Processers aim therefore to ensure continuous improvement, maintenance of interdisciplinary relations, and awareness of project goals and the measures necessary to complete them. The sum of this processes serves as a tool providing a framework for navigating both the mechanical and interpersonal aspects of the project (Briner et al. 1996).

2.2.3 The Compass as a Planning Tool

In addition to implementation of the 14 Integrated Processes, the Project Manager's Compass can provide the framework for answering key questions during the project startup phase, as well as identifying invisible actors that may influence project progression.

2.2.3.1 Key Questions During the Start-Up Phase

The workflow generated by the Project Manager's Compass may shed light upon the following questions at the onset of the project (Briner et al. 1996):

- What is the organizational need behind the project?
- What do the stakeholders expect?
- What needs to be done in the project?
- What resources, competencies, etc. are required for project success?

2.2.3.2 Invisible Actors in the Project

Similarly, the 14 Integrated Processes may uncover invisible actors exerting an influence on the project workflow, such as (Briner et al. 1996):

- External services/suppliers
- The organization the project manager operates within (and corresponding lines of production, Human Resources, financing, marketing and sales, tec.).
- The end user (who in some cases may not be the direct client).

2.3 Lean Organizational Philosophy – Building Value
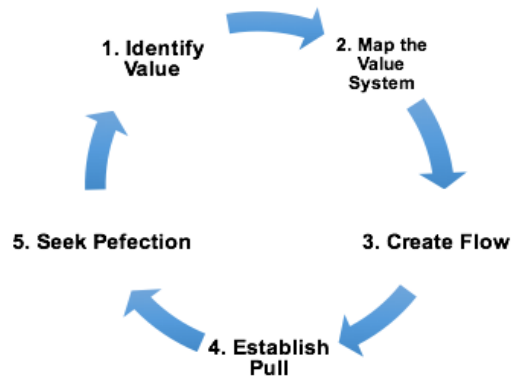
Figure 2.4: Lean Lifecycle[13]

Lean organizational philosophy has its roots in the production processes employed by Japanese automobile manufacturers (famously Toyota) in the 1980s. These workflows were studied by organizational psychologists and broken down into what the modern day business world refers to as Lean. The defining element of Lean thinking is the notion of "continuous improvement," or that operational processes should be constantly evaluated so that they are evolve to be as nearly error free as possible (Womack, J. P., Jones, D. T., Roos, D., & Technology, M. I. o. 1990, pg. 150). This process should occur through standardization of operations[14] (Dennis 2016).

Lean tactics are enacted by engaging an analytical lifecycle rooted in identifying and maximizing value for stakeholders, particularly customers or end users. This process occurs via enactment of five key steps: Identifying Value, Mapping the Value System, Creating Flow in said system, Establishing Pull, and Seeking Perfection. (Womack et al. 1990). The first step in the Lean Lifecycle, Identifying Value, entails defining the notion of "value" from a customer perspective: only those quantities, specifications, etc. that the customer has requested and is willing to pay for. Once this has been completed, the next step in the workflow can begin by Mapping the Value System, or "streamlining" operations so that they are

---

[13] (Womack et al. 1990)
[14] In fact, Lean philosophy cannot be enacted on workflows which cannot be standardized (Womack et al. 1990).

oriented only towards producing results that bring value to the client[15]. Once value has been both identified and work has been tailored against producing these specifications, the lifecycle should focus on Creating Flow. Creating Flow involves removing the activities that do not promote value for the customer, as well as minimizing the amount of time spent on each production activity (Womack et al. 1990).

Once value has been identified, the value system has been mapped, and flow has been created, the lifecycle should Establish Pull in task completion. Establishing Pull involves focusing production on made-to-order operations, only producing as much product as the client demands rather than having a large amount of product constantly available in stock. This process is also known as "Just-In-Time" production.[16] As a final component of the lean lifecycle, the workflow should constantly Seek Perfection. Continuous improvement of a project or production process is an ongoing endeavor. Therefore, the lean lifecycle can be seen as an evolutionary process wherein value-added and non-value-added activities shall be constantly assessed and either emphasized or removed from the workflow as needed (Womack et al. 1990).

2.3.1 Value-Added Activities

As indicated in Section 2.3, workflow activities in Lean can be broken down into "Value-Added," "Non-Value-Added," and "Value Carrying[17]." Value-Added Activities can be described as those workflow activities that contribute directly to the production of the product qualities that the end user or customer perceives as important or valuable (Womack et al. 1990). These elements can include anything from customer communications to specific features of the end product.

---

[15] In other words, promoting value-added activities and removing non-value added activities. These concepts shall be further defined in Section 2.3.1 and Section 2.3.2

[16] This concept will be discussed further in Section 2.4.2.1.

[17] Value carrying activities can be defined as production elements deemed superficial or unnecessary by the client (Womack et al. 1990). This research study shall focus primarily on "Value-Added" vs. "Non-Value-Added" activities, wherein "Value Carrying" activities are grouped together with the "Non-Value-Added" activities.

2.3.3 Non-Value-Added Activities

Types of Waste or "Muda" in Lean Philosophy
1. Overproduction
2. Waiting
3. Transportation
4. Over Processing
5. Storage
6. Re-Work
7. Movement

Figure 2.5: Types of "Muda"[18]

Non-Value-Added activities do not directly contribute to the production of product elements that the end user deems valuable. In fact, they often detract from the value of the product as a whole and are therefore deemed as "waste" or "muda" in Japanese. There are seven main types of "muda" in Lean philosophy: Overproduction, Waiting, Transportation, Over-Processing, Storage, Re-Work, and Movement. These activities should be identified and removed from the workflow so as to maximize its efficiency and value for the client (Womack et al. 1990).

2.3.3.1 TIM WOODS – A Tool for Identifying Non-Value Added Activities and How to Reduce or Eliminate Them

TIM WOODS Pneumonic Device	
T	Transport
I	Inventory
M	Motion
W	Waiting
O	Overproduction
O	Over Processing
D	Defects
S	Skills

Figure 2.6: TIM WOODS Pneumonic Device[19]

---

[18] (Womack et al. 1990)
[19] ("8 Wastes of Lean" n.d.)

Identification of waste or "muda" can be simplified with the help of the TIM WOODS pneumonic device (Figure 2.6). TIM WOODS expands on the existing categories of "muda" by offering in-depth descriptions of each, as well as possible means of correcting them. This model breaks the forms of waste or "muda" down into factors related to Transport, Inventory, Motion, Waiting, Overproduction, Over Processing, Defects, and Skills ("8 Wastes of Lean" n.d.).

Reducing the negative impact of non-value added activities is key to Lean operations. Ideally, these factors should be eliminated altogether. However, reductions in non-value added time or combining of activities can also maximize operational value to the client. Specific measures can be taken in each of the main forms of waste: Transportation, Inventory, Motion, Waiting, Overproduction, Over-Processing, Defects, and Skills.

Transport

Wastes in the form of transport occur when a product is moved from place to place unnecessarily. These movements increase the risk of damage or loss of the unit and bring no additional value for the customer[20].

Value deficiency a result of transportation issues can be mitigated by maximizing the efficacy of inventory management systems. This process can be achieved by ensuring that production phases are set up as close to one another as possible, and that "lengthy or complex material handling systems"[21] are avoided to reduce transport times. Further, multiple storage facilities (for example: locally vs. centrally located) should be utilized to safeguard against delays due to moving of parts or other key pieces of equipment.

Inventory

The product cannot bring added value to the customer if it is sitting in storage rather than being turned over to the client. As long as a product remains stagnant and does not reach the customer, it can be viewed as a lost earning opportunity. Inventory can be a complicated factor to manage as stock items may be works in progress,

---

[20] ("7 Wastes: The 7 Deadly Wastes to Any Business," 2016).
[21] ("Reducing Waste – Toughnickel," 2017 Dec. 11).

raw materials, or finished goods. Therefore, the company's inventory strategy must be carefully adapted to suit exactly the product and client at hand.

Waste as a result of inventory issues can be reduced by optimizing the production process. This adjustment can involve enactment of smaller batch sizes, shortened changeover times, reduced inventory volume (so called "first-in-first out" policies for stagnant materials), and engagement of more specific procedures that all workers are expected to adhere to.

Motion

Not to be confused with transportation, motion refers to the movement of equipment and its operators on the work floor. Time lost while workers search for parts or move between machines can result in delays or other losses in efficacy that detract from the ultimate value of the product to the client. Further, excessive movement can take unnecessary amounts of time, risking product damage and increased worker fatigue[22].

Motion-derived waste can be reduced by optimizing workflow configuration allowing for a "smooth transition" between phases of production. Further, batch sizes can be reduced to optimize this process.

Waiting

When work in progress (WiP) units are not being processed, but instead waiting for the next phase of production, they lose value for the customer. Delays due to waiting can be mitigated through optimization of resource planning, manpower and machine coordination, and emphasizing single unit production over batch production[23].

Overproduction

Overproduction represents the worst of the forms of waste, mostly due to the fact that it encompasses all other forms of inefficacy. Energy, time, and resources are wasted in producing more of a product than the client has ordered and paid for. This

---

[22] This, in turn, can result in further reductions to end product quality.
[23] This process is known as "Just-In-Time" production strategy. See Section 2.4.2.1 for more information.

unfortunate outcome can occur due to a lack of efficient processes or poor quality in production. To offset the potentially negative effects of overproduction, an organization can work with smaller batch sizes, optimize procedures and schedules, and take measures to ensure that forecasting allows production to accurately reflect product demand.

Over-Processing

Over-processing occurs when more work is completed than the customer actually needs or expects (for example: clipping grass with scissors rather than a lawnmower). Non-value added activities derived from over-processing can be corrected by establishing standardized best practices and ensuring product specifications are universally understood.

Defects

Value cannot be added to an item twice—in other words, if a product comes out defective, production cannot ask the client to pay for it to be fixed. Rather, the errors must be corrected at the producer's expense. To prevent defects from detracting from end product value, training should be instituted to ensure that workers possess the necessary skill to produce the desired product. Further, optimizations to supplier sources, process flows, and inventory management can aid in preventing value loss due to product defect.

Skills

Waste in skills occurs when participants in the workflow have special talents or other capabilities that are not being fully realized by their existing role. To ensure that a project team is getting the most out of its manpower, a project manager can encourage ownership in the workflow and emphasize dialectic communications to optimize team performance.

2.4 Lean Organizational Philosophy—The Lean "House" Model
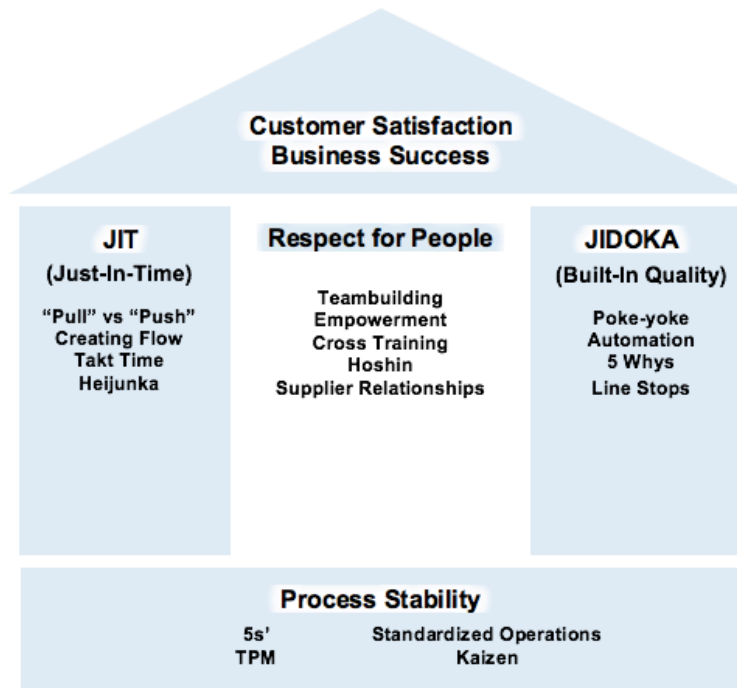
Figure 2.7: The Lean House[24]

The Lean House Model builds upon the process flow and forms of waste previously discussed in this chapter by providing a framework for Lean organizational movement. This framework has process stability at its foundation, and customer satisfaction as its pinnacle. Buttressing the house's roof are JIT and JIKODA, along with an emphasis on teamwork.

2.4.1 Foundation

The foundation of the Lean House consists of People and Purpose and Process Stability. The People and Purpose of a project organization include strong leadership, clearly defined goals, engagement by employees, and mutual trust. These social elements provide the foundation for effective teamwork, while Process Stability outlines a framework for effective goal completion[25].

---

[24] (ToughNickel 2017 november 16)
[25] (Lean Principles | House of Lean | Lean Thinking. n.d.).

2.4.1.1 Process Stability

The foundational notion of Process Stability in the Lean House is encompassed by emphasis on standardized work via the "5 S System," Total Productive Maintenance, and continuous improvement/Kaizen.

5S´

The 5 S System	
1.	Sort
2.	Set in Order
3.	Shine (& Inspect)
4.	Standardize
5.	Sustain

Figure 2.8: The 5 S [26]

The 5 S System advocates a process of standardization wherein a workflow is sorted, set in order, inspected, standardized, and then maintained for as long as it is effective in the immediate future. A shared understanding of how a workflow should take place serves to mitigate the negative impact of non-value added activates, this maximizing value to the end product (Dennis 2016).

Total Productive Maintenance (TPM)

Total Productive Maintenance (TPM) entails the monitoring and continual repair of equipment so that it does not break down or otherwise cause delay in the project workflow. This process also serves to avoid defects and accidents. Operators play a key role in this process, as they should be empowered to be experts in their equipment to ensure its optimal performance ("Lean Principles…").

Kaizen/Continuous Improvement

To fully solidify process stability, a project organization should enact measures of continuous improvement[27] as a means of constantly optimizing the project workflow. This notion, known as Kaizen, encourages an organization to establish an environment wherein "all employees are actively engaged in improving the

---

[26] (Dennis 2016, 44). The 5 S' also have some overlap with principles outlined in Section 2.4.2.2, Jidoka and Visual Management.
[27] This principle can be connected to the notion of "Seeking Perfection" discussed in 2.3.

company" (LeanProduction.com. n.d.). This process should be solidified by involving employees at all levels of the company (particularly the production line), and fostering a work environment where ownership in change process comes naturally to individual workers (LeanProduction.com).

2.4.2 Pillars

2.4.2.1 Just-in-Time (JIT) Delivery

The notion of "Just-in-Time" (JIT) Delivery reflects the Lean principle of establishing pull in the Lean Lifecycle[28]. Establishing pull involves initiating production based on customer demand, rather than producing in large quantities and storing excess inventory (Womack 1990). By enacting so-called "Just-In-Time" production strategies, a project organization allows for optimal use of resources, establishing a more efficient workflow in the process.

2.4.2.2 Jidoka (Built-In Quality) and Visual Management

The second pillar of the Lean House, Jidoka, entails ensuring that each product has a built-in standard of quality that customers can rely on with each order. Further, built-in quality allows for organic integration of optimized workflows through troubleshoot measures via the 5 Whys and Visual Management/Poke Yoke.

5 Whys

The Lean House ensures optimal operations by troubleshooting problems using the 5 Whys Method. The 5 Whys is a method seeking to uncover the root cause of a given problem by asking "why" said error occurred until coming to a clear conclusion regarding its catalyst. The 5 Why's can be utilized using the following process:

1. *Describe the specific problem in writing, and make sure the relevant team is aware of it.*
2. *Ask "Why" the problem occurs and write the answer down below the problem.*
3. *If this answer does not identify the root cause, ask again.*
4. *Continue asking "Why" until the root cause is revealed[29].*

---

[28] See Section 2.3 for more on the Lean Lifecycle.
[29] ("Determine the Root Cause: 5 Whys" n.d.)

This method provides an efficient problem solving tool in its ease of use (it does not require statistical analysis), and allows for clear identification of the human factor in organizational error. A root cause analysis an also be performed using the Ishikawa or fishbone diagram:
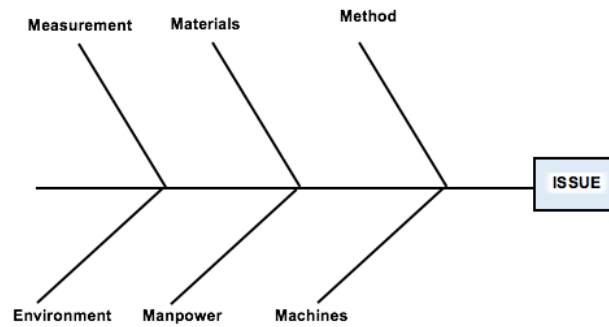
Figure 2.9: The Fishbone Diagram or Ishikawa[30]

A fishbone diagram can be used in tandem with a 5 Whys written/verbal analysis to create a visual representation of a problem's root cause. By using the Ishikawa diagram to visually chart the "Why's," a project organization can come to a quicker and potentially clearer conclusion regarding the best corrective action ("Determine the Root Cause…").

Visual Management and Poke-Yoke
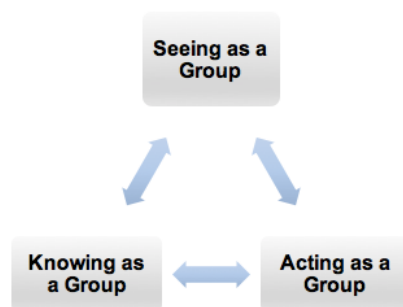
Figure 2.10: The Visual Management Triangle[31]

A further form of ensuring built-in quality occurs in the form of Visual Management techniques. Visual Management reflects and enacts the need for stability and

---

[30] ("Determine the Root Cause: 5 Whys" n.d.)
[31] (Dennis 2016, pg. 42)

standardization in Lean philosophy[32]. This principle relies on the notion that all participants in a project workflow should have shared knowledge of the project lifecycle: they should See as a Group, Act as a Group, and Know as Group. Seeing as a Group refers to equal access to information regarding production status, inventory levels, and machine availability across the project team. Acting as a Group, in turn, refers to Lean philosophy's emphasis on establishing consensus regarding project activities, as well as involving the whole team in project activates. Lastly, Knowing as a Group entails the necessity of a shared knowledge regarding deadlines, goals, schedules, and management rules (Dennis 2016, 42). These three principles are further enacted across the four levels of Visual Management:

The 4 Levels of Visual Management	
Level One	Tells Only (Lowest Power)
Level Two	Change Drives Action
Level Three	Organizes Behavior
Level Four	The Defect is Impossible

Figure 2.11: The Four Levels of Visual Management[33]

The levels of Visual Management begin with Level One, the lowest power. This level refers to visual indicators that simply deliver a message, such as a "STOP" sign. Level Two includes changes that drive action, wherein project participants notice and seek to correct a problem. Level Three then organizes team behavior, whether it be by visually organizing equipment so it can readily be accessed and set back in place, or by optimizing workflows. Level Four concludes the process by taking measures to ensure that the identified defect is impossible ("poke-yoke"). To accomplish this goal, the team must develop a firm grasp of their processes and potential sources of failure, as well as enact measures to optimize procedures to render these errors impossible (Dennis 2016, 43-44).

---

[32] In this way, Visual Management serves to flesh out the foundational notion of process stability as well as practical incorporation of the "Standardization" element in the 5 S system in 2.4.1.1.
[33] (Dennis 2016, pg. 43)

2.4.3 Core

The core of the Lean House is represented by Lean Leadership—or, in other words, the interpersonal leadership tactics engaged by the Project Manager. The essence of Lean Leadership is the notion that a team will "work on this together," collaborating to complete project goals and solve problems along the way. It is therefore essential that the Project Manager take his or her role as Integrator[34] very seriously ("Lean Principles…").

2.4.4 Roof

The roof of the Lean House embodies the aspects of the project which maximize value for the customer: top quality, lowest final cost, shortest lead time, and any other specifications that may enhance value for the customer at hand. All operations throughout the project lifecycle should point towards maximizing the final product[35]—this is no different than in a real house. A home with a poorly finished roof will face leaks, which will in turn ruin the house as a whole.

2.5 Lean Applications in Project Management

Lean philosophy can be applied to the field of Project Management by viewing projects as "temporary production systems… [aimed at] maximizing value and minimizing waste" (Ballard & Howell 2003, pg. 119). A project with a Lean design[36] should be driven by dialogue[37] and employ "Just-In-Time" decision making processes to allow for constant evaluation of project measures and outcomes. Further, "Pull Scheduling" can be employed in Lean projects so that the team works backward from a given deadline and avoids creating waste or non-value-added production elements. This can be accomplished by only completing workflow tasks that release the product to the next phase of production (Ballard & Howell 2003).

---

[34] See Section 2.2.1.
[35] ("Lean Principles...").
[36] See Attachment B: Lean Projects vs. Non-Lean Projects.
[37] In a Lean project, the notion of dialogue can be linked to the conversation-generating responsibility of the Project Manager outlined in Section 2.2.1 and 2.2.2.

3.0 Research Methodology

3.1 Qualitative Research Design

This research study employs a qualitative research design, wherein socially constructed phenomena[38] are examined via informant interviews (Blaikie 2010, 204-205). The study is by nature exploratory, seeking to gain an in-depth understanding of the observed phenomena from the perspective of its participants[39] (Gripsrud, Olsson and Silkoset 2004, 59).

3.2 Data Collection

Data for this research study was conducted using informant interviews. This methodology was strategically chosen due to its more personal nature, allowing the researcher to gain insights from the individual perspectives of study participants (Blaikie 2010, 108). Interview transcripts and notes were thusly treated as raw data representing the study's target study objects[40] (Andersen 2006).

This study has relied on judgmental or purposeful non-probability sampling techniques to delineate its research objects. Judgmental sampling techniques are ideal in cases such as this one, wherein in it is impossible to collect data on every single project organization operating in the corporate world, and thusly even more unrealistic to gain insights from each project manager in these organizations. As this study aims to examine specific phenomena connected to project workflows and Lean, research objects cannot be selected at random. Therefore, the researcher engaged judgmental non-probability sampling to select both the studied organization and its participants from her own professional network (Blaikie 2010, 178).

In discussing the data collection process employed in this study, it is important to note that sample size has been carefully evaluated in terms of its significance to design consistency. Therefore, a sample group of five project managers from the studied organization has been chosen in order to glean a well-rounded perspective on the project workflow (Andersen 2006; Golafshani 2003, 599). In discussing the

---

[38] In this case, project workflows in an organization producing equipment in the oil and gas industry.

[39] Participants in this study include five project managers operating within the studied organization.

[40] As previously indicated: project workflows from the perspective of project managers enacting them, and how these workflows can be improved by enactment of Lean philosophy.

study sample, it is important to further note that this sampling technique does not involve convenience sampling: participants have not self-selected, but were rather intentionally chosen from a pool of potential participants (Blaikie 2010).

3.2.1 Data Sources

Data sources engaged in this research study include primary, secondary, and tertiary sources. Primary sources are comprised of first-hand data gleaned in the informant interview process (Blaikie 2010, 160). Secondary sources consist of the existing and freely accessible research conclusion and theories already existing in the field of project management (Gripsrud et al. 2004). These materials include the textbooks, course material, lectures, and articles discussed in Section 2. Lastly, tertiary sources derived from existing research have been employed to some extent in the form of academic articles and study findings also discussed in Section 2 (Blaikie 2010, 160).

3.2.2 Conducting In-Depth Interviews

Informant interviews have been engaged in the data collection process as a means of gaining personal insights into project workflows (Andersen 2006). Preparatory measures for the interviews were centered around a creation of an interview guide for the research sessions. This interview guide[41] was carefully formulated with project management and Lean theory in mind, with questions written so as to point the conversation in the direction of answering the guiding research questions discussed in Section 1 while at the same time allowing for open answers from participants (Gripsrud 2004; Andersen 2006, 286).

Interviews were conducted during five individual, 45 minute sessions taking place at the studied organization. At the start of each session, participants were given an overview of the interview guide. This process allowed each informant to take the opportunity to ask clarifying questions about the theory or the interview process. As a key component of this debriefing, participants received confirmation of this study's adherence to conditions of anonymity, as well as given the opportunity to give consent to be recorded (Andersen 2006; Gripsrud 2004). Participation by the studied organization and its participants has been contingent upon the researcher

---

[41] See Attachment C: Interview Guide

preserving their anonymity. Therefore, no information shall be included that may specifically identify either the organization or the informants. This measure has been taken to protect informants' professional interests, as their employer, colleagues, and professional contacts are stakeholders in the studied workflows. It has been therefore deemed crucial to the study to protect these interests with the condition of anonymity (Marshall 2010).

3.3 Data Reduction and Analysis

Upon completion of the informant interview process, the collected data was gleaned into categories for analysis based upon this study's guiding research questions and theoretical framework (Blaikie 2010). This process began by transcribing the recordings of the interview[42], synthesizing them with the notes taken live during the session[43] (Wengraf 2001; Clifford 2010).

One interview data was transcribed, the data was run through a threefold coding process consisting of initial, focused, and axial coding. The initial coding phases involved the examination of what was being said or implied by respondents, with initial connections to selected project management theory noted for future analysis. This process allowed for summarization and researcher control against personal bias (Charmaz 2006, 40). Following the initial coding phase, focused coding was conducted to generate data categories for identifying moments in the conversation—that is, words or phrases that might best serve to answer the guiding research questions and generate the results presented in Section 4 (Charmaz 2006, 59-60). Lastly, the data was run through an axial coding process, wherein data was pulled together with the theoretical principles outlined in Section 2 to inform the final analyses to be presented in Section 5 (Charmaz 2006, 62-63).

3.4 Control

3.4.1 Reliability and Validity

To safeguard the integrity of this study's research design, measures of control were taken to ensure its reliability and validity (Marshall 2014).

---

[42] Transcripts represent the raw data for this study. However, the transcripts themselves have been sealed so as to maintain this study's condition of anonymity (Clifford 2010).

[43] Notes were taken during the interview session to capture the nonverbal cues exhibited by informants during the conversation. Transcripts were taken directly following the interviews to preserve the integrity of the conversation (Wengraf 2001).

Reliability

Securing the reliability of a research study entails the ensuring that study conditions are consistent and repeatable; in other words, ensuring a study's reliability assures the researcher that its results can be trusted, and that the same results can be produced using the same methods (Golafshani 2003). Reliability for this study was secured by enacting consistency in measurement, answers, and taking measures to curb researcher bias.

Consistency in Measurements[44]

- Using a common, pre-established interview guide across all sessions employing strategic wording aimed at garnering the desired results.
- Recording the sessions to preserve the integrity of the conversations.
- Taking immediate notes and transcriptions to further preserve the nature of the interview[45].
- Using the same language (English) across all interview sessions.

Consistency in Answers

- Employing the same routine across all sessions: debrief on interview, confirming anonymity, consent to recording, and the interview itself[46].
- Interview guide employed with probes to maintain session focus[47].

Measures to Curb Researcher Bias

- Use of neutral language and tone[48].
- Employment of initial coding to filter out theoretical bias[49].

Validity

Securing a study's validity is to take measures to ensure that the research measures the data it intends to (Golafshani 2003). Further, solid validity indicates that the research design and its results can be applied to outside contexts (Yin 2013).

---

[44] (Golafshani 2003) - Unless otherwise specified.
[45] (Clifford 2010, 11)
[46] (Andersen 2006)
[47] (Golafshani 2003)
[48] (Andersen 2003)
[49] (Charmaz 2006)

Means of Securing Construct Validity[50]

- Careful planning of the interview process to ensure the data gleaned answers the guiding research questions. This was secured primarily through the use of a strategically planned interview guide with theoretical probes.

- Researcher neutrality was safeguarded through the coding process[51].

It is worth nothing that securing research validity when studying subjects acting within an organization can be challenging, as the reality within the organization is constantly changing. This dynamic environment lends to a constant need for adjustments in approach—a phenomenon that could quickly render the data presented in this study irrelevant should the project workflow change dramatically (Golafshani 2003).

4.0 Self-Evaluation of the Research Study

4.1 Strengths

This study possesses strengths in its thorough exploration of both project management and Lean organizational theory. These theoretical principles are further explored in the analysis portion of this research study in a nuanced yet concise manner, allowing for easy understanding of the developed theoretical tool. Lastly, the researcher engages personal professional experience to build arguments and analyses in this study, providing a practical insight that buttresses theory presented in the course material.

4.2 Weaknesses

While this study possesses the key strengths discussed in Section 4.1, it is lacking in terms of its absence of data triangulation[52], potential for researcher bias, application of the condition of anonymity, and weak measures for securing validity. Methods of data collection in this research study could be strengthened via data

---

[50] Construct validity refers to the solidity of research questions, and whether or not they capture the desired information (Yin 2013).
[51] (Charmaz 2006)
[52] Data triangulation involves the application of more than one method of data collection (Charmaz 2006). In this case, the results could be greatly enhanced by tandem application of quantitative data collection methods with the existing qualitative measures. For example: a statistical analysis of the studied organization's projects before and after Lean Compass implementation could provide a stronger grounds for claiming its efficacy. Given the opportunity to conduct this study a second time, the researcher would choose this triangulated approach in favor of the one outlined in this thesis paper.

triangulation—that is, including quantitative data along with the qualitative. Further, the study is not immune to researcher bias, as respondents were pooled from the researcher's own network, rendering her an indirect stakeholder. The researcher my posses an additional theoretical bias a student of project management (Charmaz 2006). A further weakness to the research study presents itself in the form of its application of a condition of anonymity for its participants. This condition prevents inclusion of specific aspects of the workflow that might better inform the data and analysis portion of this study. Further, the condition of anonymity has not been formalized aside from verbal consent, a detail that weakens this study's reliability and validity. Lastly, this study is weak in terms of its measures for securing validity, as only two formal measures have been taken and presented in this document.

5.0 Presentation of Findings

Reported Ideal Project Workflow
Handover→Kickoff→Document Review/Establish Specifications→Production→Inspection→Delivery

Reduction of Waste
Pain Points
Use of incorrect parts/procedures during production, causing delay or need for rework Unclear specifications "This is how we've always done it" Delays in document approval
Time Wasters
Production errors→waste in manpower, materials, etc. "This is how we've always done it"→Delays due to poor communication, conflict Documentation→Long review cycles cause project delay
Identified Root Causes
Lack of communication pre-kickoff Organizational culture Flow of communication Language barriers
Potential Improvements to the Workflow
Establish specifications prior to kickoff Teambuilding to improve relations between teams Standardize documentation, routines, systems

Goal-Oriented Leadership
Project Goal Communication
Internally: Mostly via meetings; adhoc communication varies between management styles Externally: Funneled mostly through project manager after kickoff Communication to suppliers, etc., handled by another department (Procurement)
Project Follow Up
Project Manager responsible for overarching follow up Individual team members responsible for following up own tasks
Common Understanding within Teams Only
The teams understand their own routines, but now each other's. Project lifecycle viewed from several varying perspectives
Workflow Delays Due to Miscommunication
Source of error, conflict, and delay
"We've Always Done it This Way": Biggest Leadership Hurdle
Some participants adverse to change

Driving Project Success
Top Success Criteria
Quality Timely Delivery Customer Satisfaction
The Customer Drives Project Success
Reported Existing Control Measures
Internal inspection process Streamlined document review cycles
Reported Need for Best Practices
Standardization of data and document systems Clearer communication prior to and during kickoff

Figure 5.1: Overview of Findings

As indicated in Figure 5.1, respondents described an ideal project workflow consisting of handover from sales to projects, project kickoff, document and specification review, production, inspection, and then delivery. The findings of this study can be further broken down into elements describing the organization's

project workflow in terms of Project Management's role in management of waste/ "Muda," promotion of goal oriented leadership, and driving project success.

5.1 Management of Waste / "Muda"

Respondents described varying tendencies regarding existing sources of waste in the project workflow. In the interview process, bottlenecks or "pain points" were identified, as well as sources for wasted time, along with their potential root causes. Further, respondents suggested potential improvements to correct these inefficacies in the workflow.

Bottlenecks or "Pain Points"

The largest sources of error were identified in the form of unclear document and product specifications, as well as roadblocks in the form of resistance to change in the workflow. Several respondents cited instances wherein a product was assembled with the incorrect parts or materials, resulting in the need for the equipment to be disassembled and re-worked. Similar disruptions to the workflow were described in terms of delays in document approval. In many cases, errors in assembly or material selection were not uncovered until the final documentation review cycle. At this point, equipment was already assembled or delivered, causing extreme customer dissatisfaction as the item would need to be sent back to the organization and re-assembled. In other cases, delays in document approval prevented production from starting or completing along the desired timeline, adding further stress to the organization's client relationships on certain projects. In both scenarios, a lack of clear specifications was cited as the culprit behind these bottlenecks.

A second trend was uncovered in the form of a trend towards resistance to change in the workflow. In many instances, production or other project teams adhere to outmoded procedures, citing that their methods are "the way we've always done it," and balking at instructions to complete the work in an updated or client specific manner.

Time Wasters

The bottlenecks uncovered in the interview process contributed to a great deal of wasted time for the project workflow. Errors in production due to improper

assembly, part, or material use resulted in unnecessary use of manpower and physical resources. Further, delays in document approval wasted further manpower in the form of overextended review cycles. Lastly, conflicts and miscommunications arising from resistance to change caused delays in production, as well as wasted manpower both on the production floor and for project managers and other team members.

Potential Root Causes

In identifying the workflow's "pain points" and sources of wasted time, respondents identified a few key root causes. These root causes included a lack of due diligence with the customer prior to kick off to clarify material and documentation specifications, blockages in internal communication flows[53], and a change resistant work culture.

Suggested Adjustments to the Workflow

To address the suggested root causes for workflow error, respondents put forth a few potentially corrections to the current procedure. These adjustments included taking measures to clarify specifications with the client prior to handing project work over to production, documentation, procurement, and other key project teams. Additionally, measures of standardization were universally desired, both in offered documentation packages, products, and in-house data systems. Lastly, team building measures were greatly desired to ease tensions between departments and open the flow of communication.

5.2 Promotion of Goal Oriented Leadership

Respondents' assessment of the current workflow's promotion of goal oriented leadership identified the organization's existing goal communication protocol, systems for project follow up, methods of fostering common understanding, leadership's influence on the project workflow, and cultural hurdles within the organization.

---

[53] In many cases, the project manager served as a reported intermediary and single point of contact for project communications. In some instances, team members reported a lack of updated information from project management. Further, information such as specifications and timeframes were not communicated to other members of the project team, production, and assembly part procurement.

Existing Goal Communication Protocol

External goal communication was described as occurring primarily through the project manager as a single point of contact for client communications, while information was transferred to and from procurement, production, and logistics teams and suppliers.

Internal goal communication was reported as occurring primarily during kickoff and other progress meetings. Project schedules were made universally available in the organization's data system; however, ad-hoc updates or delays to this schedule were not consistently communicated by individual project managers. Some project managers reported an ongoing dialogue with project participants, while others expected participants to proactively seek them out for the information they needed. There seemed to therefore be a bit of disagreement amongst respondents as to who bore the greatest responsibility for project follow up.

Project Follow Up

Project follow up was reported primarily as being the main responsibility of project management. This responsibility was described as encompassing communications with internal team members as well as clients to ensure that all parties were acting on the same information. However, some respondents reported an expectation that team participants proactively seek them out if they need more information to complete their work[54].

Fostering Common Understanding

Common understanding of project goals was described as being relatively high within project teams: project managers had a clear overview of their goals, procurement had a clear sense of theirs; production had an understanding of their tasks, etc. However, understanding across departments was not always secured. In some cases, project managers reported dissatisfaction amongst project teams due to lack of information regarding the workflow. This in turn led to conflict in the form

---

[54] In instances where this tendency was reported, project managers expected documentation and production staff to follow up with them to confirm document and part specifications. The same expectation applied to changing deadlines and delivery dates. It is worth noting that the same respondents would engage in the same information seeking process with team members when necessary.

of frustration on the side of the customer and then project management when errors occurred due to lacking information.

Influencing the Project Workflow

Lack of communication or common understanding was described as hindering the project workflow, serving as a root cause for bottlenecks occurring in the form of errors or the need for rework. For example: when specifications were not clear at project kick of or not clearly communicated to procurement, incorrect parts were ordered. This created a chain reaction wherein equipment needed to be reworked at or after delivery.

Cultural Hurdles in the Organization

Many respondents reported resistance to perform work in a manner that deviated from traditional practices. In some cases, these practices were outmoded or not relevant to the customer at hand. In attempting to correct the workflow, project managers were often met with the response "but this is the way we've always done it."

5.3 Driving Project Success

The interview sessions concluded with an exploration of the existing workflow's measures of driving project success. Respondents' identified the organization's customer-driven success criteria. Further, existing and desired measures of control were identified, as well as potential best practices for future workflows.

Identified Success Criteria

Success Criteria were universally defined as encompassing product quality according to client specifications, timely delivery, and customer satisfaction. **Project success** was further defined as being **determined by the Customer** and whether or not the body of work and final product met their expectations.

Existing Control Measures

Existing measures of control were reported in the form of internal and external product and documentation inspection.

Prevention of Future Errors/Roadblocks

Integration to a common data and work system was cited as a potential corrective measure for the workflow, as well as teambuilding efforts to improve relations between departments. These standardization and communication measures were then described as being ideal starting points for establishing **Best Practices** in the workflow.

6.0 Discussion, Analysis and Potential Areas for Further Research

6.1 Project Managers as Integrators

In order to optimize the studied organization's project workflow, the Project Managers must embrace their role as Integrator, taking full responsibility for ensuring that value is optimized throughout the project lifecycle. Respondents reported a mixed view on the official driver of project success—a more united perspective regarding the project manager's integrative role in the workflow would enable project managers to optimize stakeholder relationships, both internally and externally (Briner et al. 1996). Further, the operations of the project itself could then be further improved as the project manager enacts the Integrated Processes and Lean principles in tandem to drive project success.

6.2 "Leaning Out" the Project Workflow—The Integrated Processes of Lean
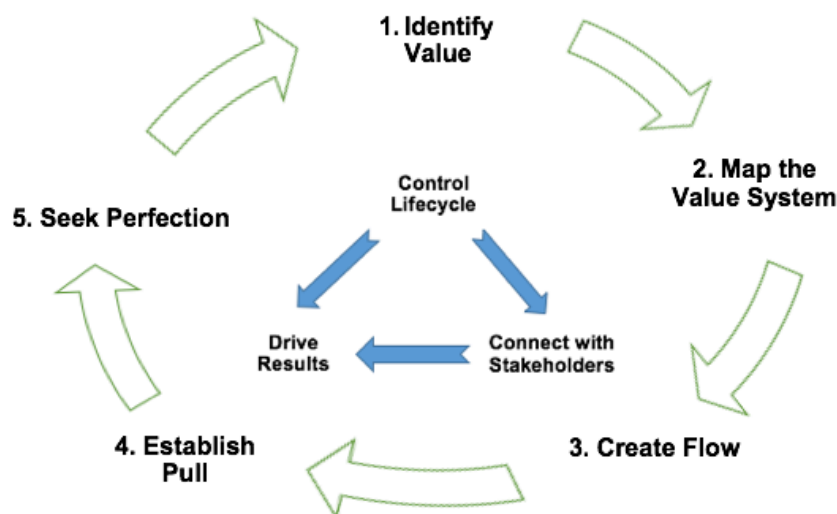

Figure 6.1: Integrated Processes of Lean: The Lean Compass[55]

---

[55] A theoretical hybrid of foundational principles discussed in Section 2.

Project workflows in organization like the one studied in this analysis can be optimized using tandem application of the 14 Integrated Processes/Project Management Compass and the Lean Lifecycles[56]. This integrated model can be descried as the Lean Compass. The Lean Compass fuses the three main functions of the 14 Integrated Processes with the ideology driving the Lean lifecycle. In other words, project managers can control the project lifecycle in the process of identifying value and mapping the value system; they can move the workflow further by connecting with stakeholders as they fine tune the value system and create flow in production; and they can drive results by establishing pull production and seeking perfection[57]. This process can occur on a continual basis until the desired project workflow is achieved.

Data gleaned from study participants provides practical, qualitative data to be analyzed in terms of the Lean Compass to generate recommendations for improvements in the studied organization's workflow. In examining the first portions of the Lean Compass, it is clear that the studied project managers have a good sense of how value is defined and how the system is structured—all activities are aimed towards securing customer satisfaction through product quality and timely delivery. However, the data indicates significant room for improvement in terms of stakeholder connections as they relate to both the value system and creating flow. Here, the project managers can make significant improvements by taking on the role of project Integrator[58], as well as engaging the Looking Downward and Inward portions of the Project Management Compass[59]. By engaging in proactive project communications both prior to, during, and after the workflow concludes, the project managers can ease the stress caused by the reported bottlenecks or "pain points."

Stakeholder relations and results can be further optimized using the Lean Compass to optimize flow and establish pull in the workflow. The flow of activities can be improved by engaging Lean-based troubleshooting methods such as the 5-Whys or Ishikawa diagram[60].

---

[56] See Section 2 for further background information on these theoretical principles.
[57] As indicated in Figure 6.1, this process can entail assessing the value chain from step one (Identifying value/Controlling project lifecycles).
[58] See Section 6.1.
[59] See Section 2.2 for an in-depth description of these elements.
[60] See Section 6.4.

6.3 Identifying Waste/ "Muda" in the Project Workflow

Project managers in the studied organization can further generate flow and drive results by implementing the TIM WOODS[61] pneumonic device to identify and eliminate the non-value activities in the project lifecycle. Non-value added workflow elements identified in the interview data include:

Transport: Transportation between the end user, suppliers, and the workshop during the rework process.

Inventory: Production is storing too many stock parts for the equipment and lacks an organization system. This causes the wrong parts to be picked.

Movement: Information is moved back and forth between project participants during specification and document review. Further, equipment is moved back and forth between departments in an effort to ensure the correct parts are used in assembly.

Waiting: Long periods of time occur between corrective actions in cases where client specifications or update are not clearly communicated by project managers.

Overproduction: Production produces too much equipment for stock, rather than waiting until they receive client specifications.

Over-processing: Occurs in cases where stock parts/procedures are used, but client specifications require a simpler assembly.

Defects: Incorrect assembly or material use results in reworking of equipment.

Skills: The project managers are not fully realizing their role as integrator in the project; they are missing the inward and downward components[62] of the project compass. In other words, project managers are failing to engage in full dialogue with project participants to uncover the skills they may have that could optimize the project workflow.

These reported Non-Value Added activities hinder the efficacy of project workflows. Therefore, it is essential for the studied organization to troubleshoot their root causes and identify the necessary corrective measures to mitigate or eliminate them. In so doing, the organization can greatly improve the value in its workflow for end customers, thusly improving relations with this stakeholder.

---

[61] ("8 Wastes of Lean" n.d.)
[62] (Briner et al. 1996)

Further, easing tensions in the workflow will greatly benefit stakeholders at all levels of the project lifecycle.

6.4 Using the Lean Compass to Correct Non-Value Added Activities the Workflow

By uncovering the root cause of moments of tension in the workflow, the project managers can enact the appropriate corrective measures. Delays due to product re-work can be mitigated using the 5-Whys:

Q: Why are deliveries being delayed due to product re-work?

A: The incorrect parts are being used during assembly.

Q: Why are the incorrect parts being used?

A: Procurement is ordering the wrong parts for assembly; Instructions are not clear, so production just uses stock parts unless otherwise notified.

Q: Why are the incorrect parts being ordered? Why are instructions not clear enough?

A: Specifications are not clarified enough prior to project handover and kickoff.

Q: Why aren't specifications being clarified prior to project kickoff?

A: Projects are not conducted on a made-to-order basis.

Solution: Conduct products on a made-to-order basis, securing Just-In-Time[63] delivery and optimizing the workflow. This way, no parts will be ordered until specifications are confirmed, optimizing project flow. This process will carry over to project documentation and other specifications as well, easing delays connected to both rework and documentation review cycles. By enacting this measure, stakeholder relations both internally with the project team and externally with suppliers and the customer will be greatly improved as expectations will be made clear and easy to follow from project kickoff. Further, ensuring that this directive is followed will aid in driving project results, as customer satisfaction will increase as the end product comes closer to meeting their expectations at delivery. Continual evaluation of this measure will ensure that results are driven on a consistent basis, and that the project workflow is constantly seeking perfection (Briner et al. 1996; Womack 1990).

---

[63] See Section 2.4.2.1

Communicative tensions in the project workflow also must be addressed in order to secure the foundational elements of the Lean House—processes and people[64]. This aspect of improving the workflow relies heavily on project manager's fully embracing their role as integrators in the project, working to engage participants at each phase of development. Further, maximizing value for the end customer is incumbent upon project managers' consistent communication of project and document specifications prior to handover, as well as any changes that may occur underway. Additional follow up will be crucial in communicating material and part specifications to procurement and production, as successful implementation of Just-In-Time production tactics relies on these departments receiving access to adequate information and materials. Successful implementation of these communicative measures will secure built-in quality for the project workflow, preventing errors by ensuring that all participants have access to the same information and can therefore see and know the latest status of the project lifecycle as a collective unit[65].

6.5 Final Answers to the Guiding Research Questions

How can integrated application of the Project Management Compass and LEAN philosophy optimize Project Management activities?
An integrated application of the Project Management Compass and LEAN philosophy takes shape in the form of the LEAN Compass. This tool can be used by project managers to apply synthesized elements of the Project Manager's Compass and LEAN to optimize project workflows.
How can these tools contribute to reduction of waste ("muda")?
As a key component of identifying value, creating flow, and driving results, the TIM WOODS acronym can be used to identify non-value added activates. These actives can then be troubleshooted via root cause analyses.
How does this process promote goal-oriented leadership?
The Lean Compass emphasizes the crucial role of project manager as integrator. The project manager is thusly empowered to identify and build value in the workflow.
How can these tools drive project success?
Project managers can use the Lean Compass to ensure that they are fully engaging the project team at all levels and that they are seeking continuous improvement in the workflow.

Figure 6.2: Final Answers to the Guiding Research Questions

An integrated application of the Project Management Compass and Lean philosophy takes shape in the form of the Lean Compass. This concept applies

---

[64] See Section 2.4.1
[65] See Section 2.4.2.1

synthesized elements of the Project Manager's Compass and Lean to optimize project workflows. Crucial to the Lean Compass is the empowerment of the project manager as an integrator in the workflow. In the case of the studied organization, no clear consensus appeared to exist regarding the communicative responsibility of the project manager. The Lean Compass clearly delineates the project manager as the driving force behind project communications, as well as the workflow optimizations to be carried out in the Lean Lifecycle. The project manager is thusly responsible for not just controlling the project lifestyle, driving results, and managing stakeholder relationships, but also appropriately identifying value in the workflow, mapping the value system, creating flow, establishing pull, and seeking perfection. In the case of the studied organization, project managers can engage their role as integrator to apply the TIM WOODS acronym to identify non-value added activates and the 5s and other Lean systems to thusly troubleshoot them. This process can allow for the correction of the reported errors and delays due to rework of equipment by clarifying product specifications prior to project kickoff and then ensuring that project communications, documentation, and product assembly are conducted on a "made-to-order" basis.

This study has posited that ***Implementation of the "Lean Compass" Will Enhance Project Efficacy***. Information gleaned in the data collection process suggest that corrective measures anchored in the Lean Compass carry great potential for optimizing the organization's project workflow. As indicated in Section 4.2, this study and its theoretical arguments provide a solid basis for further research, perhaps anchored in statistical analysis of the case organization both before and after Lean Compass implementation.

7.0 Concluding Remarks

The field of project management is one relying on both technical and interpersonal competencies for successful goal completion. Project managers carry dual responsibility for both goal setting and planning, as well as managing the nuanced relationships between project participants. This research study has thusly sought to explore the way in which these requirements can be optimized using a tandem application of the Project Management Compass and Lean organizational theory in an organization producing measuring equipment in the oil and gas industry. The culminating effort of this study has produced a new theoretical model known as the

"Lean Compass" which has been engaged in troubleshooting the organization's reported workflow challenges connected to customer dissatisfaction and incorrect material use. By applying the recommendations outlined in this research study, the organization has the potential to both optimize its workflow and improve customer relations. Further, this theoretical model can be applied to contexts outside the studied organization, potentially benefiting the discipline as a whole or providing the groundwork for future research in the field of project management.

8.0 Literature / Works Consulted

7 wastes: the 7 deadly wastes to any business. (2016, May 08). Retrieved March 08, 2018, from http://www.educational-business-articles.com/7-wastes/

8 Wastes of Lean. (n.d.). Retrieved March 08, 2018, from https://www.isixsigma.com/dictionary/8-wastes-of-lean/

Andersen, E.S., Grude, K., & Haug, T. (2016). *Målrettet prosjektstyring*. 7. utg. NKI-forlaget.

Andersen, S. (2006). Aktiv informantintervjuing. *Norsk statsvitenskapelig tidsskrift*, 22, 278-298.

Ballard, G., & Howell, G. (2003). Lean project management. *Building Research & Information, 31*(2), 119-133. doi:10.1080/09613210301997.

Blaikie, N. (2010). *Designing social research: The logic of anticipation* (2nd ed.). Cambridge, UK: Polity Press.

Briner, W., Hastings, C., & Geddes, M. (1996). *Project Leadership*: Gower.

Brydøy, H. (2017). *Forelesningnotater - prosjektledelse*. Handelshøyskolen BI, Stavanger.

Charmaz, K. (2014). *Constructing Grounded Theory*: SAGE Publications.

Clifford, N., Cope, M., Gillespie, T., & French, S. (2016). *Key Methods in Geography*: SAGE Publications.

ClipArtPanda.com. (n.d.). Retrieved March 13, 2018, from http://www.clipartpanda.com/clipart_images/pin-free-compass-clipart-on-1747703

Dennis, P. (2016). *Lean Production Simplified, Third Edition: A Plain-Language Guide to the World's Most Powerful Production System*: CRC Press.

Determine the Root Cause: 5 Whys. (n.d.). Retrieved March 08, 2018, from
https://www.isixsigma.com/tools-templates/cause-effect/determine-root-cause-5-
whys/

Fjeldstad, Ø. D., & Lunnan, R. (2015). *Strategi*. Bergen: Fagbokforlaget.

Gripsrud, G., Olsson, U. H., & Silkoset, R. (2004). Metode og dataanalyse. *Med
fokus på beslutninger i bedrifter. Kristiansand: Høgskoleforlaget AS*.

Golafshani, N. (2003). Understanding Reliability and Validity in Qualitative
Research. *The Qualitative Report*, *8*(4), 597-606. Retrieved from
http://nsuworks.nova.edu/tqr/vol8/iss4/6

Karlsen, J.T. (2017). *Prosjektledelse : fra initiering til gevinstrealisering*. (4th
ed.). Universitetsforlaget.

Lean Principles | House of Lean | Lean Thinking. (n.d.). Retrieved March 08,
2018, from http://www.leanexperience.com.au/about_lean_principles/

LeanProduction.com. (n.d.). Kaizen. Retrieved March 08, 2018, from
https://www.leanproduction.com/kaizen.html

Marshall, C., & Rossman, G. B. (2014). *Designing Qualitative Research*: SAGE
Publications.

Skyttermoen, T & Vaagaasar, A. L. (2015). *Verdiskapende prosjektledelse*. (1st
ed.). Cappelen Damm Akademisk.

Toughnickel. (2017, November 16). Just-in-Time (JIT) Manufacturing. Retrieved
March 08, 2018, from https://toughnickel.com/business/JustInTime

Toughnickel. (2017, December 11). TIMWOOD: The 7 Seven Wastes of Lean
Manufacturing. Retrieved March 08, 2018, from
https://toughnickel.com/business/Seven-Wastes

TPM (Total Productive Maintenance). (n.d.). Retrieved March 08, 2018, from https://www.leanproduction.com/tpm.html

What are Critical Success Factors in Project Management? (n.d.). Retrieved March 13, 2018, from https://www.wrike.com/project-management-guide/faq/what-are-critical-success-factors-in-project-management/

Womack, J. P., Jones, D. T., Roos, D., & Technology, M. I. o. (1990). *Machine that Changed the World*: Scribner.

Yin, R. K. (2013). *Case study research: Design and methods*. Sage publications.

Appendix

Attachment A: SWOT Analysis

Strengths Strengths of the current project are mapped out here.	**W**eaknesses The projects weaknesses are mapped out here.
Opportunities Opportunities for further growth or improvement that are currently untapped go here.	**T**hreats Threats to project progress or goal completion are mapped out here.

A SWOT analysis aims to map out and evaluate the various strengths, weaknesses, opportunities, and threats that may be acting upon a given project. This tool serves as both a visual and verbal representation of factors a project manager should take into consideration as a means of ensuring the project is on target for its goals (or to Control the Project Lifestyle, see section 2.2.2). (Fjeldstad & Lunnan 2015; Briner et al. 1996).

Attachment B: Lean vs. Non-Lean Project Management

Table 1 Lean versus non-lean project delivery

Lean	Non-lean
Focus is on the production system	Focus is on transactions and contracts
Transformation, flow and value goals	Transformation goal
Downstream players are involved in upstream decisions	Decisions are made sequentially by specialists and 'thrown over the wall'
Product and process are designed together	Product design is completed, then process design begins
All product life cycle stages are considered in design	Not all product life cycle stages are considered in design
Activities are performed at the last responsible moment	Activities are performed as soon as possible
Systematic efforts are made to reduce supply-chain lead times	Separate organizations link together through the market and take what the market offers
Learning is incorporated into project, firm and supply-chain management	Learning occurs sporadically
Stakeholder interests are aligned	Stakeholder interests are not aligned
Buffers are sized and located to perform their function of absorbing system variability	Buffers are sized and located for local optimization

From (Ballard & Howell 2003, pg. 122)

Attachment C: Interview Guide (English)
About Me
Third year Economics and Administration student at BI Norwegian Business School. In addition to my current education, I hold an M.S. in Change Management from the University of Stavanger, a B.A. in Communication from the University of Washington, and have worked in Document Control in the Oil and Gas Industry.

This interview process serves as the cornerstone for my Bachelor's Thesis in Project Management. The interviews shall focus **exclusively** on gaining practical disciplinary insight on the topic of Project Management.

Objective of this Study
The objective of this study is to gain a deeper understanding of how Lean organizational philosophy can be applied to and optimize the Project Manager role.

Student Objective:
This research study is the culminating moment in my Bachelor's Degree in Economics and Administration with specialization in Project Management.

Intended Outcome for X Company:
This research study seeks to provide the participant organization with insight and tools to potentially optimize project success and efficiency.

Logistics:
Timeframe: 45 minutes; no longer than 1 hour
Total Questions: 17 (1 introductory, 1 concluding, 15 theoretical).
Total Informants: 5
Interviews will be conducted on a one-on-one basis.

Condition of Anonymity:
Participation in this research study occurs under the condition of anonymity—nowhere in the research material or final text will there appear identifying information about participants, such as full name, age, place of residence, employer, etc. However, vague information (such as role in the organization, ie. Project Manager), may be included so as to confirm participants' relevance to the target study demographic.

Participant Consent:
Participation in this study is on a strictly voluntary basis.

Recording
Interviews may be recorded so as to ensure study reliability. If you do not wish to be recorded, please advise and I will gladly comply with your request.

Should you agree to be recorded, I will confirm your consent first in writing via e-mail, and once again at the start of the recorded interview.

All recordings and interview transcripts will be kept confidential and only made available to myself, the student researcher.

Interview Questions

General:

0. How would you describe your current project workflow?

Reduction of Waste:

1. A "pain point" or "bottleneck" can be described as any aspect of today's project workflow that hinders project success.

What "bottlenecks" or "pain points" do you experience in your current workflow?

2. How do these "bottlenecks" contribute to wasted time, manpower, or other resources in the workflow?

3. Can you identify any potential sources ("root causes") of these "bottlenecks"?

4. What adjustments could be made to the existing workflow to minimize or eliminate these "bottlenecks"?

Promotion of Goal-Oriented Leadership

5. Describe the current way in which project goals are communicated to the project team?
   How does this process involve external participants such as suppliers, end users, etc?
   What does the internal process look like?

6. Who has the primary responsibility for communicating and following up on project goals?

7. In practice, do you feel that all project participants (both internal within the organization and external) have a common understanding of the project goals?

If yes: what measures are taken to ensure that this takes place?
If no: what could be adjusted to foster a common understanding? Does such an adjustment need to occur at all?

8. How does common understanding of project goals (or lack thereof) influence the workflow?

9. How does organizational/project culture influences the way in which participants orient themselves toward project goals?
Is there room for mutual feedback regarding project objectives and workflows?

Driving Project Success

> **10.** How is project success defined in your workflow?
>   *a. Quality of Product?*
>   *b. Timely Delivery?*
>   *c. Other success criteria?*
>
> **11.** Who determines whether or not a project as been completed successfully?
>
> **12.** Based on the current workflow and success criteria, are your projects:
>   *a. Mostly Successful*
>   *b. Both Successful and Unsuccessful*
>   *c. Mostly Unsuccessful*
>
> What factors inform your answer?
>
> **13.** What quality control measures/routines are currently in place?
>
> **14.** In the event of an unsuccessful project, what measures, if any, are in place to troubleshoot potential "bottlenecks" or other errors to prevent them from occurring in the future?
>   *("Continuous Improvement")*
>
> **15**. In the event of a successful project, what measures, if any, are in place to identify the practices that contributed to project success so as to repeat them in the future?
>   *("Best Practices")*

Concluding Question

> **16.** What are your general thoughts regarding the current project workflow practiced in your organization? What adjustments, if any, would you make to the status quo?

Thank you for your participation!