CRANFIELD UNIVERSITY

ALVARO RAFAEL SAENZ-CORTABARRIA APRELL

DISCOVERING GEMBA WALKS GOOD PRACTICES WITHIN
INDUSTRIAL LEAN APPLICATIONS

SCHOOL OF AEROSPACE, TRANSPORT & MANUFACTURING
Global Product Development and Management

MSc
Academic Year: 2017 - 2018

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the degree of MSc Global Product Development and Management
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based solely on examination of the thesis)***

ABSTRACT

Gemba is a Japanese term meaning the real place, the place where value is created. In manufacturing, the shop-floor. Gemba Walk is the lean practice referred to the action of visiting the Gemba. Top management involvement is required to achieve high levels of employee engagement, and that is where Gemba Walks take part allowing a direct two-way communication. Moreover, the walk provides executives with the opportunity to check if standards are followed, and to find waste and areas of improvement.

Gemba Walks have been studied by different authors and are conducted in most of the world-leading companies. Nevertheless, there is no defined methodology on how to carry them out, so its practice varies from one company to another. Hence, the aim of this thesis is to develop a framework to facilitate an effective implementation of Gemba Walks according to industrial best practices obtained from companies such as Airbus Defence and Space, Rolls-Royce Motor Cars, CEMEX, Interface, Termo Fisher Scientific, BOCAR Group and Instituto Modelo de Cardiología Privado S.R.L. The implementation should start by training both leaders and shop-floor employees, followed by a standardisation of the practices. In the Gemba, managers should make use of lean tools such as visual management or problem-solving methods, and document and share the insights from the walk. Finally, executives must return to the Gemba to sustain the practice and check if corrections are filled.

Therefore, the result of this research will act as a framework for companies that do not yet consider them within their lean leadership tools, as well as in a way to assess the application of Gemba walks for those companies that already carry them out.

Keywords:

Leadership involvement, employee engagement, visual management, problem-solving

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LIST OF ABBREVIATIONS

CI   Continuous Improvement

GW   Gemba Walk

I.M.C.   Instituto Modelo de Cardiología Privado S.R.L.

KPI   Key Performance Indicator

LAA   Lean Analytics Association

MBWA   Management by Walking Around

TPS   Toyota Production System

1 INTRODUCTION

1.1 Problem Definition

Nowadays, there is no methodology or framework that outlines which are the best practices to implement Gemba walks within a company and by this project a clear definition of the steps to follow will be achieved. Proving that Gemba walks are beneficial to companies will increase their desire to turn into a lean thinking way, increasing at the same time the benefits obtained from the design and manufacturing processes.

The project will aim to discover, document and diffuse best practices of world's leading companies from different industrial sectors which have been focusing on the implementation of lean thinking and using "Gemba Walks" as key element in their lean management applications.

1.2 Research Questions

To define the scope of the literature review selection, proper research questions have been considered as these will ease the process of gathering theoretical information about the topic.

The research questions according to which the literature review will be carried out are the following:

1. Where does Gemba lay among lean?
2. What are the good industrial Gemba walk practices?
3. Is there a Gemba walk framework?

1.3 Aim and Objectives

The project aims to discover, document and diffuse best practices of world-leading companies from different industrial sectors which have been focusing on the implementation of lean thinking and using "Gemba Walks" as key element in their lean management applications. This is to develop a Gemba framework based on the captured industrial practices to facilitate an effective implementation of Gemba Walk.

To achieve the defined aim, the following objectives need to be met:

1. To capture the Gemba walks good practices and their role in lean management via extensive literature review

2. Develop a semi structured questionnaire to facilitate field study capture of industrial good practices of Gemba walk.

   a. Discover and document the Gemba walks experiences of at least four companies from different industrial sectors

3. Develop a Gemba framework based on the literature review and the captured industrial practices to facilitate an effective implementation of Gemba Walk.

4. Evaluate the documented case studies and framework via expert judgement.

2 RESEARCH METHODOLOGY

To carry out the thesis research the LEAD (Learn, Energise, Apply and Diffuse) model (LAA, 2018) will be followed as outlined in Figure 2-1. Using this method, it is proven to achieve the expected results within the defined timescale, by clarifying the tasks required to develop at each stage of the project.

PHASE			
1. LEARN	2. ENERGISE	3. APPLY	4. DIFFUSE
KEY TASKS			
1.1 LAA Requirements 1.2 Literature Review	2.1 Design a Semi-Structured Questionnaire 2.2 Industrial Field Study	3.1 Analyse Data 3.2 Generate Framework for Gemba Walks Good Practices	4.1 Communicate Results
DELIVERABLES			
Research Brief Literature Review Report	Questionnaire AS-IS Analysis of at Least 4 Companies	Gemba Walks Framework	Conference Paper Academic Report Poster Presentation

Figure 2-1 Research Methodology

2.1 Learn

The learning phase is carried out at the beginning of the project, where the project is defined by the sponsoring company and a common understanding of it is achieved. For that aim, the following key tasks are accomplished.

2.1.1 LAA Requirements

a. Face to face and via WebEx meetings to define the requirements of the sponsoring company, to align the academic and company's objectives.

2.1.2 Literature Review

a. Perform literature review on lean and understand where does Gemba lay on the lean philosophy.
b. Define Gemba walks key elements and benefits, as well as search for existing Gemba frameworks.

At this phase, a list of at least four companies where Gemba walks are used as one of the lean management tools is also completed, to capture their good practices using Gemba walks.

2.2 Energise

Once the project is defined and a good overview of the topic is achieved, and the industrial companies are contacted and agreed to meet for the project's purpose, the energise phase starts. From this stage, a clear As-Is analysis of the procedures in the different companies is obtained.

2.2.1 Design a Semi-Structured Questionnaire

a. Generate a questionnaire to facilitate the capture of the good Gemba walks practices in industry.

2.2.2 Industrial Field Study

a. Interview at least four companies to capture their practices.
b. Gather the information of the Gemba walks: tools, methods and responsibilities.

2.3 Apply

At this stage, the gathered data is analysed and compared to the methods found on the literature review, assessing the industrial practices. The output of this phase is the main goal of the project, a framework for the Gemba walks good practices.

The key tasks accomplished to achieve the desired outcomes are the following:

2.3.1 Analyse Data

a. Analyse the information obtained from the interviewed companies.

2.3.2 Generate Framework for Gemba Walks Good Practices

a. Create a framework outlining the best practices according to literature review and industrial findings.

2.4 Diffuse

The final phase of the research methodology focuses on spreading the knowledge acquired throughout the project through reports, presentations and conferences.

2.4.1 Communicate Results

a. Write the academic report and present the outcomes of the project at the university, creating a poster to sum up the results obtained.
b. Write a conference paper and potentially present it in Mexico.

3 LITERATURE REVIEW

3.1 Lean Overview

Lean is defined as efficiency (Cambridge Dictionary, 2018). Regarding a company, a lean enterprise is the one that searches for a continuous flow and improvement in operations. In short, lean is about doing more with less (Bicheno and Holweg, 2016). But where does the term lean come from?

Before World War I, craft production was the common way of manufacturing, as there were no standardised gauge systems. Later, mass production arrived to tackle the problems arising from craftwork, enhanced by Ford and General Motors, where the production was highly dependent on very expensive machines, so an economy of scale was needed to make it sustainable. This resulted in a miss-synchronicity between production and demand, generating excessive overheads. To solve this incoordination, after World War II, Toyota Motor Company started developing a philosophy focussed on waste elimination, aimed to deliver high quality to customers at the exact time, reducing drastically the costs related to rework and stocks: the Toyota Production System (TPS) or lean production (Womack, Jones and Roos, 1990).

This philosophy cannot be sustained if the three main pillars in which it stands are not considered: waste, value and people (Bicheno and Holweg, 2016). Waste, also known as *muda* for its Japanese translation, is any activity during a manufacturing or service process where no value is added, and therefore needs to be eliminated. These *muda* take resources from the operators when there is no need and can be classified in seven different categories: overproduction, inventory, rejects, motion, processing, waiting and transport (Imai, 2012). In addition, there is an eighth waste referring to under-utilised human potential (Liker, 2004).

Additionally, value needs to be defined and enhanced from the customer point of view. A product or service needs to meet or exceed the customers' expectations, being delivered at a specific time and price (Womack and Jones, 1996). Finally, related to the eighth identified waste, people need to be involved and adapted to the lean production system. Employees need to be aware of the changes,

understand them and participate in the lean journey (Bicheno and Holweg, 2016). To reduce these wastes, James Womack and Daniel Jones (1996) introduced five lean principles as illustrated in Figure 3-1.
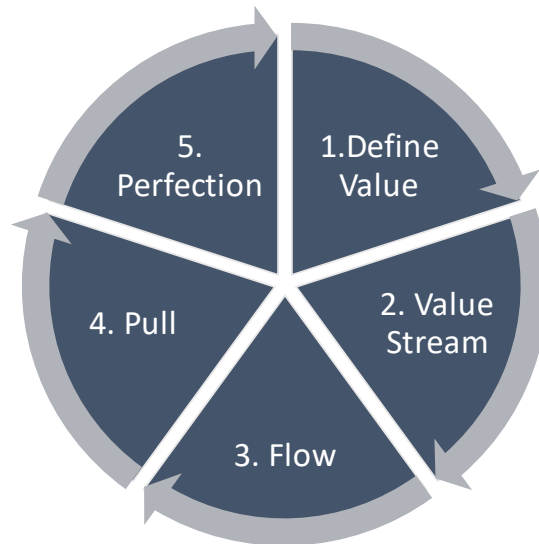
Figure 3-1 Lean's 5 Principles

To help these principles happen, there are several tools available which can be grouped over the so called lean house, originally developed by Toyota as shown in Figure 3-2, explained in Appendix A.

Figure 3-2 The Lean House. (Liker, 2004)

To achieve this continuous improvement, everyone in the company from top management to shop-floor employees must be involved, understand the problems and solve them in the place where they happen, the workplace, also known as *gemba* (Liker, 2004; Imai, 2012).

3.2 Gemba and Gemba Walks

3.2.1 Definition

Gemba is also referred to as 'genchi gumbutsu', literally translated from Japanese as go and see by yourself. In other words, the real place, where the attention should be focussed. Gemba is the place where value is created and things happen inside of a company, as for manufacturing the shop-floor although it needs to be regarded in all departments, from product development to finance and accounting (Womack, 2010). Gemba is where improvements shall be done and the main place from which information is gathered, reason for which managers must be in contact with it regularly and be aware of the processes followed. Nevertheless, many managers do not consider the Gemba their concern and avoid it, concentrating on analysing the data obtained from the processes from their desks (Imai, 2012).

As quoted by Taiichi Ohno, inventor of the Gemba walks for the Toyota Production System, it means going to observe without preconceptions and a blank mind, asking to yourself five times why to understand the processes and the problems happening (Liker, 2004).

According to the Aij (2017), there are six essential Lean leadership principles in manufacturing that should be contemplated by managers to be successful with the Lean transformation:
1. Continuous improvement culture
2. Self-development
3. Employee training
4. Going to Gemba
5. Hoshin Kanri
6. Customer value

Not only are Gemba walks one of the main principles of Lean leadership, but do also take part in most of them. A continuous improvement culture is fundamental to provide customers with the highest quality at the lowest cost but it cannot be sustained if leaders are not involved in the processes and in contact with shop-floor employees. Also, the abilities of the employees need to be developed and trained, teaching them how to ask the appropriate questions to themselves and empowering them to find improvement opportunities. Finally, Gemba walks have a deep relationship with *Hoshin Kanri*, which has the focus to align the company's strategy at all levels. This is enabled by leaders by communicating the strategy to employees clearly and clarifying the company's goals and vision (Aij, 2017). Hence, a higher level of communication is always reached if it is done face to face.

Considering all the previous, Gemba walks' main aim can be summarised as the practice that helps leader get in touch with the reality of the company in the place where value is created. Developing on this definition, there are three concepts as shown in Figure 3-3 that need to be aligned to develop successful Gemba walks: purpose, process and people (Bremer, 2016).

Figure 3-3 Key Reasons of Gemba Walks

Appendix A further develops the definition according to the three main pillars of GWs, summarised in Table 3-1.

Table 3-1 Gemba Walks Overview

1. Purpose	2. Process	3. People
Check if people understand their work	Check standard work – improvement chances	Develop employees
Align strategy	Find root-cause of problems	Build trust and engagement
Sustain continuous improvement culture	Promote visual management	Managers become leaders
Reinforce lean practices	Find safety hazards	Share problems

3.2.2 Types of Gemba Walks

Bremer (2016) identified and described four different types of walks: the departmental walk, the leadership team walk, the value stream walk and the outside executives walk.

1. *Departmental Walk*: The focus is on following standard work and checking the progress of change to the future target. Also, it needs to recall abnormalities engaging the employees to improve and propose improvements.

2. *Leadership Team Walk*: Walk carried out by the team leaders of a production area weekly. It is aimed to develop a higher collaboration in the field of study, removing flow impediments.

3. *Value Stream Walk*: Like the leadership team walk but covering the entire value stream. When this level is reached and conducted correctly, the departmental walks change their focus from waste identification to value flowing according to lean's principles.

4. *Outside Executives Walk*: Serves for leaders to understand the value stream and its flow, where more general questions are asked to employees, which gives an insight of their attitude towards improvement.

3.3 How to Do a Gemba Walk

Since being developed by Ohno for the TPS (Imai, 2012), GWs have been studied by different people. This section of the literature review analyses all the published approaches to conduct GWs to gain a deeper understanding of how these should be done.

3.3.1 Bremer's Approach

Bremer (2016) deeply studied GWs. His analysis consists of three steps that further divide in a set of sub-steps: preparing for the walk, doing the walk and debriefing as pictured in Figure 3-4.
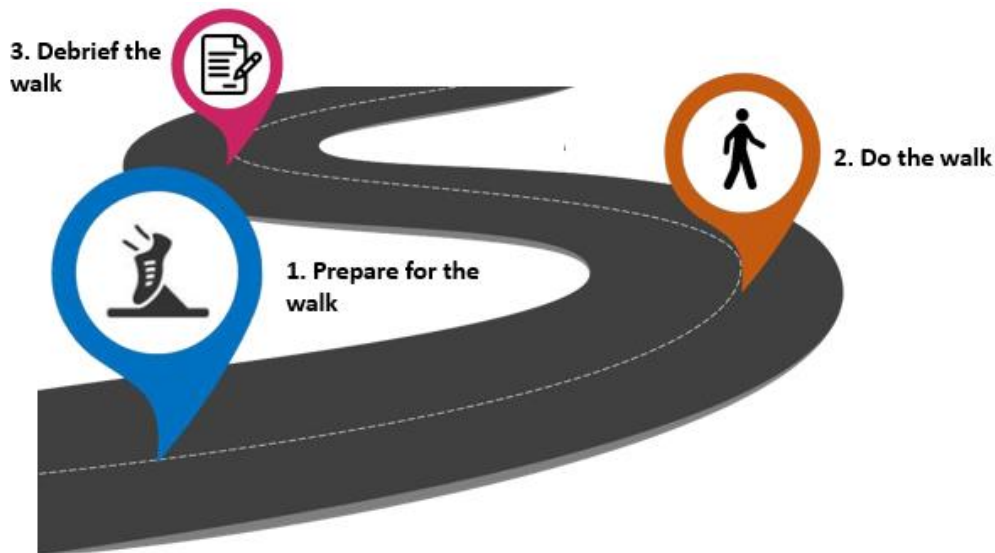
Figure 3-4 Bremer's Approach to Gemba Walks

The approach is further developed in Appendix A. Table 3-2 shows the main tasks to carry out at each stage of Bremer's definition of GWs.

Table 3-2 Tasks in Bremer's Approach

1. Prepare for the Walk	2. Do the Walk	3. Debrief the Walk
Clear purpose: straightforward and well defined	Grasp the real situation of the processes	Note what was seen during the walk
Engage with stakeholders and inform	Interview in a Socratic way: what then why	Note who was present
Coach the walk	Show respect, creating a safe environment	Categorise in terms of value adding or non-value adding

3.3.2 Rother's Approach

Rother (2009) developed a GW as part of his coaching kata (or practice), that aims to create a routine to sustain continuous improvement, consisting of four parts as follows in Figure 3-5:
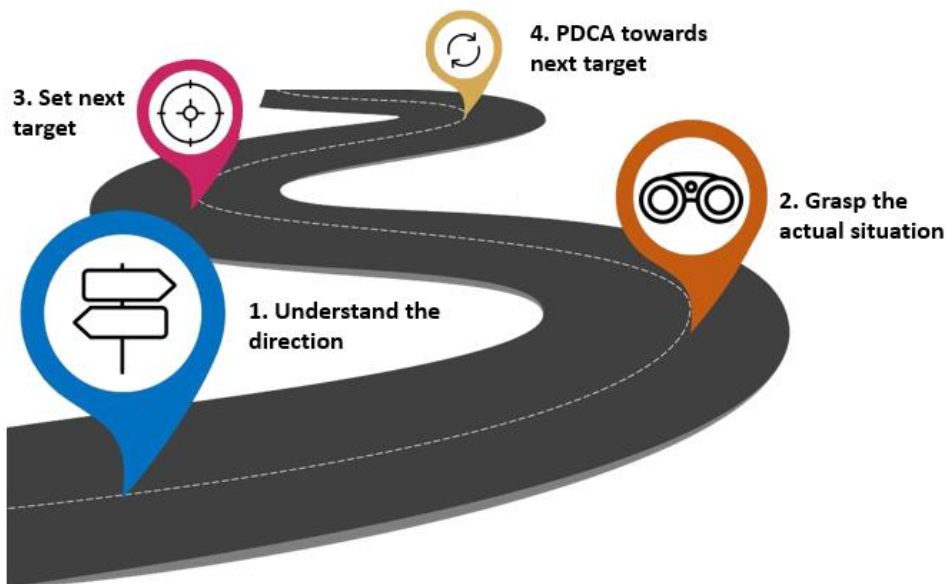
Figure 3-5 Rother's Approach to Gemba Walks

GWs take part mainly in the second step, where the actual situation of the Gemba is grasped. To do so, Rother gives several considerations on how to do GWs. Before going to the Gemba, leaders should approach the employees via team

leader and supervisors and introduce themselves without interrupting operations and bring different tools to take notes and make calculations as a stopwatch. As all the team works together for the customer, leaders must show respect to shop-floor employees and take their hands out of their pockets and explain that their focus is on the process and not on the worker. Once the walk is finished, to engage workers and build trust, managers should show the notes that were taken and be thankful.

3.3.3 Imai's Approach

Masaaki Imai (2012) defined GWs in his book 'Gemba Kaizen', where he focussed on continuous improvement and its practices. The way in which he defined is as shown in Figure 3-6, where the focus is only on process improvement rather than on employee development and raising trust.
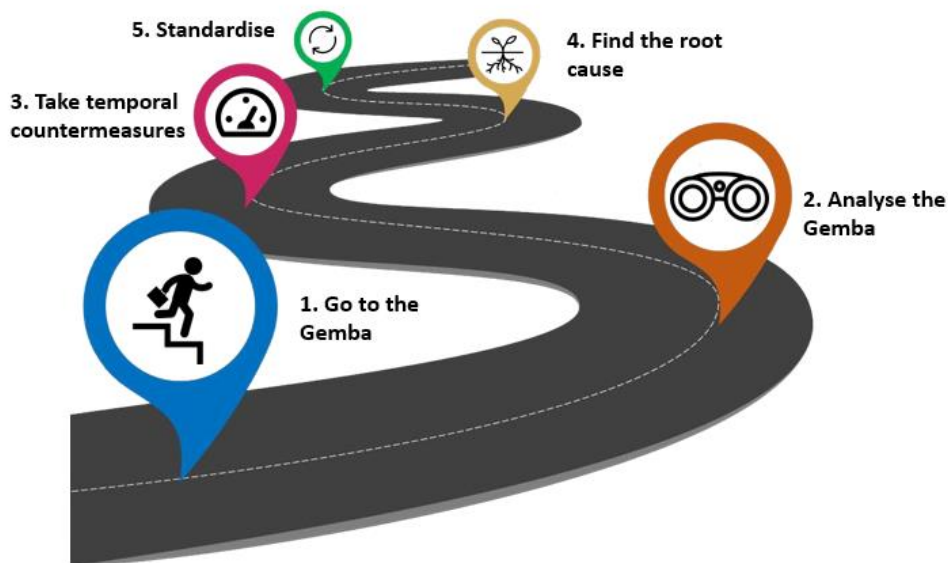
Figure 3-6 Imai's Approach to Gemba Walks

3.3.4 Womack's Approach

Womack (2010) defines GWs as "a management practice to grasp the situation before taking action". His approach, illustrated in Figure 3-7, consists on selecting one of the value streams and gathering people from the different departments involved to take the walk, not focussing in one activity but in the whole selected process. During the walk, managers should look for deviation and check what is

not normal according to standards, as operators may find it the right way to work due to bad habits.
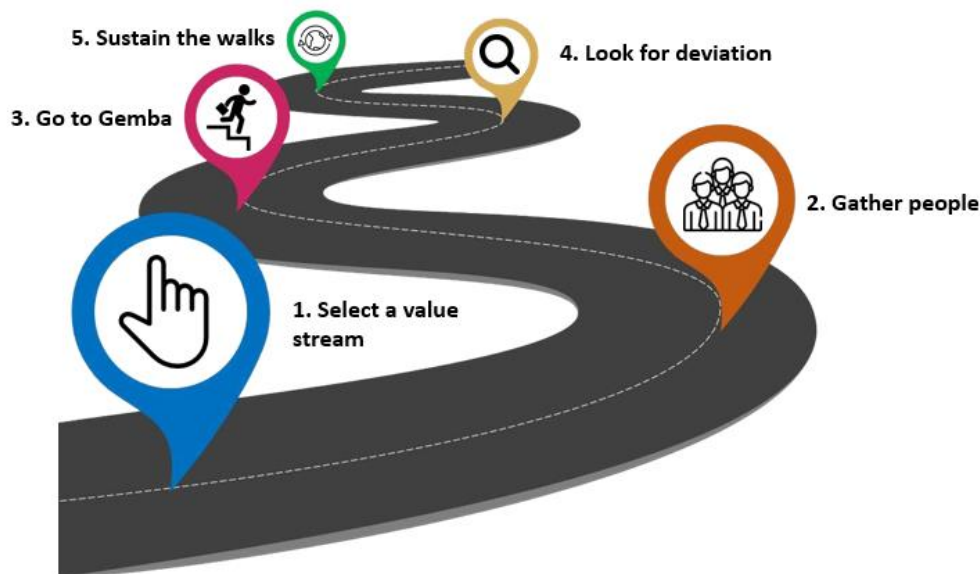
Figure 3-7 Womack's Approach to Gemba Walks

According to Womack, GWs are not an easy task for companies where lean is not embedded, as managers have crowded agendas and do not find the time to do the walks. Lean, and more precisely GWs help creating a social basis for improvement. Ideally the walk should be CEO or COO together with team leaders, customers or suppliers, but in reality, it is carried out by continuous improvement and lean experts or even by consultants external to the company. If the walker lacks process' expertise, he or she should draw a map beforehand and then go to the Gemba to check deviation. Finally, Womack remarks that as performance of the streams keeps changing, GWs should not be done just once, but need to be sustained.

3.3.5 Bicheno and Holweg's Approach

Bicheno and Holweg (2016) define their approach to GWs according to their 5Gs process in Figure 3-8:
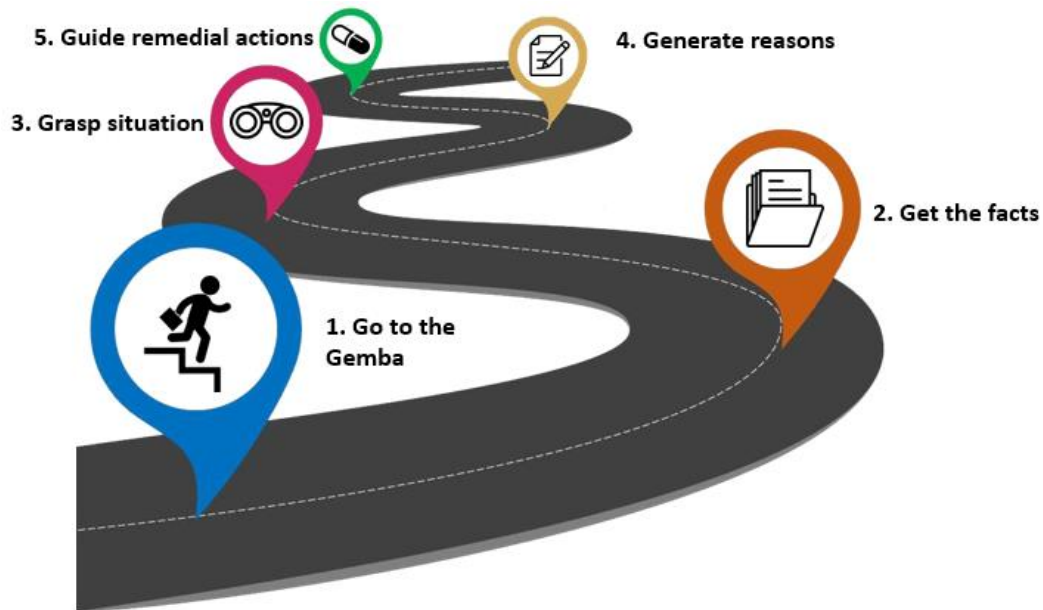
Figure 3-8 Bicheno and Holweg's Approach to Gemba Walks

They highlight that if a problem occurs, managers must first go to the Gemba and see what happens and take corrective measures in the place of action. Also, according to Bicheno and Holweg's approach, GWs should be focussed and include regular visits to identify new and current problems, checking barriers that operators may find by a respectful discussion.

3.4 Tools and Elements of Gemba Walks

As a pioneer in the TPS, Taiichi Ohno developed one of the first practices to conduct GWs in factories. It consisted about drawing a circle in the middle of the factory and standing up inside of it just observing the process (Imai, 2012). Managers should stay there even for hours, observing the processes occurring until he or she understands them. That way, first-hand information is gathered about the problems that may arise, and the decisions taken will be based on facts rather than on data. Ohno, pioneer in the TPS, remarked that leaders should wash their hands at least three times per day, meaning they were involved in process improvements (Dombrowski and Mielke, 2013).

GWs should be done publicly and regularly, answering all the employee's questions making use of visual management boards where the key performance indicators (KPI) are shown (Aij *et al.*, 2017). Karam et al (2017) remarked a lack of visual tools in their analysis of GWs in the pharmaceutical industry. Having a

visual workspace (not only by applying 5S) helps reducing waste within the companies, providing information and allowing employees to find problems by themselves and the ways to overcome them (Kattman *et al.*, 2012).

Gemba boards ease evidence-based practices (EBP), where a high level of leadership engagement is required. The boards encourage transparency, partnership and impartiality. The boards need to be standardised, even though different areas may have different or customised contents aligned with the company's strategy. Well-designed boards are proved to link employee understanding of their work with organisational success, as information is shown transparently and involves them in the idea generation. All in all, Gemba boards facilitate a collaborative approach, with leaders and employees involved in the processes (Upvall, 2018).

Within visual management, scorecard data may be used to measure factory-level lean implementation, studying JIT, TQM, TPM, KPIs and continuous improvement levels (Netland, Schloetzer and Ferdows, 2015).

As previously stated, GWs aim to find the root cause of the problems. To get to the root of them, the 5-Why approach is a well-developed method, which consists on asking why several times, until the original problem generator is found. Accepting the first reason without inquiring usually leads to a misinterpretation of the problem's origin (Bicheno and Holweg, 2016). Therefore, the 5 Whys are useful to separate processes from people and find the real waste generators in the Gemba, building a culture of trust where problems are analysed objectively.

Appendix A provides examples of how GWs are carried out in industry according to the literature.

3.5 Literature Review Summary

Table 3-3 Literature Review Summary

GW Best Practice / Reference	1. Find process problems and areas of improvement	2. Check standard work	3. Find safety hazards	4. Reinforce the lean culture	5. Debrief and analyse walk	6. Develop employees and build trust	7. Leaders must show respect	8. Need of top management involvement	9. Approach employees via team leaders	10. GW as a tool for VSM	11. Need of KPIs and visual management	12. Set temporal countermeasures
Aij and Tennissen, 2017						■						
Aij et al., 2015											■	
Aij, 2017	■			■								
Alefari, Salinitis and Xu, 2017				■								
Bicheno and Holweg, 2016					■			■				
Bremer, 2016	■	■			■	■		■				
Dombrowski and Mielke, 2013								■				
Dombrowski and Mielke, 2014	■					■						
Gesinger, 2016				■								
Imai, 2012		■						■				■
Karam et al., 2017											■	
Kattman et al., 2012											■	
Knobloch et al., 2018							■					
Liker, 2004					■							
Mann, 2009				■								
Netland, Schloetzer and Ferdows, 2015						■					■	
Raut and Kumar, 2017			■									
Rother, 2009							■		■			
Seth, Seth and Dhariwal, 2017										■		
Tyagi et al., 2015	■	■										
Upvall, 2018											■	
Wallo, 2017				■		■						
Womack, 2010		■						■		■		
Zarbo et al., 2018	■					■						

3.6 Literature Review Analysis

The extensive literature review proved how even if the lean culture has been well researched and defined, there are still gaps in the GW practice. Most of the research is not based on industrial cases, and those that do generally focus on the use of GWs for VSM and finding waste during the visits to the shop-floor. The practice has only been deeply studied by two authors, where the analyses give qualitative rather than quantitative results, which hinders the appreciation of the best practices in an objective way.

The literature stresses the need of leadership involvement to develop employees and empower them to solve problems by themselves in the Gemba, building a culture of trust and continuous improvement. However, there is a lack of information related to how the employee and management training should be carried out. Also, authors remark the need of standardising the processes, but do not consider the standardisation of the GWs as it is done in other lean practices. Furthermore, some authors highlight that the walks should be done in all the companies' departments, but without giving any evidence of this fact.

Several authors highlight the need of problem-solving and visual management tools, but they do not specify how these should be used before, during or after the shop-floor walk. Likewise, the literature does not include what kind of questions should be asked and if complementary lean tools may be used during the walks. Finally, it does not include the way to document and share the walk, neither the technique to evaluate its efficiency and progress in a company.

All in all, the literature is more focused on the benefits obtained from the GWs, rather than on how these should be done or the tools and methods to use.

3.7 Research Gaps

All in all, considering the extensive literature review the following research gaps were unveiled:

1. There is no deep analysis of how GWs are done within different industries, not finding case studies on this field.

2. There is no defined GWs methodology or framework explaining which are the good practices to carry them out.

4 INDUSTRIAL FIELD STUDY

4.1 Semi Structured Questionnaire

Before contacting the companies for the industrial field study and understand how GWs are carried out from different businesses' points of view, a semi-structured questionnaire was developed together with the sponsoring company to thereafter conduct the interviews and gather relevant knowledge of the practice.

The participant companies came from different manufacturing sectors: Airbus Defence and Space, world-leading defence supplier; Thermo Fisher Scientific, from the biotechnology industry; CEMEX, specialised on building materials; Interface, manufacturer of commercial modular carpet; Rolls-Royce Motor Cars, luxury car production company; BOCAR Group, automotive component supplier; and Instituto Modelo de Cardiología Privado S.R.L., private healthcare institution.

As the questionnaire developed with the sponsoring company (not provided due to confidentiality issues) focused on the outputs rather than on the inputs of the walks, another questionnaire was formulated to gather the information for research use as shown in Appendix B. This new questionnaire eased the business cases reporting and allowed a comparison between the different practices.

Some of the questions included in the academic questionnaire answer the following queries, needed to accomplish the project's aim and objectives:

1. What is the trigger of the walks?
2. What is the background of the walkers? What is the right number of walkers?
3. What problem-solving approach do you use during the GWs? How is it done?
4. How is visual management used during the GWs? What is the right arrangement?
5. How are GWs evaluated and shared?

The company documentation carried out throughout the development of the thesis is also provided in Appendix B. Each company has been documented in detail according to the literature review's outcomes, and this will thereafter serve

to develop the GW framework. Moreover, the positive and negative practices encountered in each case study is analysed to find out the best practices and ease the generation of the walk's roadmap.

4.2 Documentation of Good Gemba Walks Industrial Practices

Table 4-1 and Table 4-2summarise the information collected from the participant companies via online interviews carried out throughout the thesis and show the approach that each organisation takes when conducting GWs. This includes where and how the walks are carried out, with what frequency and by whom, as well as the training given to employees and leaders and who the leaders during the walks are. Moreover, the link with other lean tools is considered, in terms of visual management and problem-solving, as the literature review stressed the importance of their use. Finally, the use of complementary lean tools is addressed.

Table 4-1 Documentation of Good Gemba Walks Industrial Practices (1/2)

GW Best Practice / Company	1. GW Definition	2. Training	3. Trigger	4. No. People	5. Background	6. Frequency	7. Champion	8. Path Followed
Rolls-Royce Motor Cars	Practice for leaders to lead learning and performance improvement.	Presentations and one-on-one training with internal lean experts.	Standardised practice.	Maximum 4.	Area related knowledge and Gemba walk training.	Weekly - every Tuesday.	Lean experts coordinate the walk.	Defined in the Gemba board analysis - route to problem root cause.
Airbus Defence and Space	Go, look and see.	Gemba Walk coaching System.	Hoshin Kanri. According to lean expert's prioritisation.	Maximum 12.	1. Coaching skills 2. Background of area 3. Knowledge of lean tools	Top manag: monthly Middle manag: weekly Team Leader: daily	1. Lean expert 2. Change agent 3. Manager	Sensitive Data
CEMEX	Practice where leaders listen to employees, who suggest improvement ideas.	Theoretical and practical training. First, with external consultants. Now internal lean experts.	Scheduled: if metrics decrease, go to root of problem. If not, go to predefined location.	4-6 people.	Employees trained on yellow belt. Leaders trained on GW. Lack of background sometimes is positive.	3 times per week by top management.	1. Lean leader 2. Leaders (Supported by lean leader)	Sensitive Data
Interface	Go and see, and check the difference between the expected situation and the reality in the process.	Not formalised. Trained in lean in general: problem-solving, processes and waste.	Employees: problems found. Clients: complaints. Leaders: deviating metric on Gemba board.	Undefined.	Undefined.	MBWA 4 times per week. GW not standardised.	Lean expert.	Selected value stream.
IMC	Go and see.	Lean leader trains area leaders, who cascade the practice. Lean in general rather than GW training.	Desire to carry out new strategic projects.	Undefined - depends on the visited area, but not standardised.	Top management meeting doctors and employees from the area of study.	Variable - Depending on the area of study. Desire to standardise the practice.	COO and Lean expert.	Selected area in the hospital.
Thermo Fisher Scientific	Go, see and learn. Identify improvement opportunities.	Internal consutants developed first Gemba checklists. Now, develop own GW practices and material.	Gemba Walk System	After the training, leaders on their own, sometimes accompanied by other managers.	Top management trained in Gemba walks.	Daily by top managers, VS managers and front-line managers.	Lean team at the beginning. Then, managers.	Sensitive Data
BOCAR Group	Short-term practice conducted to improve processes.	Lean in general trained by external consultants. Lean experts roll-out the GW nowadays.	Standardised practice. If a metric deviates, leaders go to the root.	8-12 people.	Court team, sometimes accompanied by area expert.	Monthly.	Lean expert acts as facilitator.	Value stream of a selected product.

Table 4-2 Documentation of Good Gemba Walks Industrial Practices (2/2)

GW Best Practice / Company	9. Where to stop	10. Reporting and Sharing	11. Problem Solving Approach	12. Visual Management	13. Checklist	14. Evaluation	15. Types of Walks	16. Complementary Lean Tools
Rolls-Royce Motor Cars	Defined in the Gemba board analysis - route to problem root cause.	Leadership Standard Confirmation. Include it on the Process Boards.	Not formalised - Parallel DMAIC and Six Sigma activities. GW used to gather information.	Employees trained to understand VM. Standardised, with site-specific metrics and contents.	Leadership Standard Confirmation.	In terms of ideas for improvement.	Undefined.	Problem-solving, Visual Management
Airbus Defence and Space	Sensitive Data	Lean expert notes down leader's textual words. Meeting minute for each walk.	Sensitive Data	Sensitive Data	Suggested questions during the first walks provided by lean experts.	Meeting minute review.	Sensitive Data	Visual Management
CEMEX	Sensitive Data	Raise employees´ improvement ideas on visible Gemba boards (e.g. snack bar door). Gemba Walk App.	Ishikawa, 5-Why and A3. Done in the Gemba with employees. Brainstorming is also carried out.	Boards at different levels.	No checklist - to make it more natural.	Sensitive Data	1. Routine Walk 2. Improvement Walk 3. Kaizen Walk	Problem-solving, Visual Management, 5S, PDCA, 8 wastes - use as many as possible if there is a logical connection
Interface	Not scheduled.	Ideas noted and assessed after the walk. Selected ideas are implemented.	Root-cause analysis and 5-Why done after the walk.	Kanban Activity - used to discuss information and validate processes according to measured KPIs.	1. Do you know what is expected from your work? 2. Do you have what you need?	Ideas are assessed post GW.	1. VSM Walk 2. Validation Walk	Problem-solving, Visual Management, Line Balancing, VSM
IMC	Stop in all the VS steps.	Using notebooks and cameras to record and write down information. Considered for the latter VSM.	5-Why, A3 and Root Cause Boards. Carried out after the walk.	Gemba boards with site-specific KPIs. Live tracking KPIs in some areas. A3 board for continuous improvement.	No checklist.	Post Gemba walk debrief meeting doing a problem-solving activity.	1. VSM Walk 2. Process Walk 3. Employee Interaction Walk	Problem-solving, Visual Management, A3, DMAIC, Stand-up meetings, VSM
Thermo Fisher Scientific	Sensitive Data	Gemba idea cards and Gemba idea boards.	Collaborative root-cause analysis performed by managers and shop-floor employees.	Gemba management board, Gemba idea board.	GW idea cards.	According to the ideas generated per walk since GW implementation.	1. Strategy Imp. 2. Safety 3. Quality 4. Practical Process Impr. 5. Top daily concerns	Problem-solving, Visual Management, 5S, PDCA, Stand-up meetings
BOCAR Group	If the path is short: divided in subgroups check different areas. If not, check together each operating area.	Kaizen Journal: As-Is vs To-Be state pictures, define responsibilities.	5-Why, Ishikawa. DMAIC carried out by lean experts.	Kaizen Journal. Site-specific KPIs on boards, checking 5S, scrap, efficiency…	No checklist. If a parameter deviates, focus on finding its cause.	Process indicators and standards audit.	Undefined.	Problem-solving, Visual Management, 5S, DMAIC

4.3 Industrial Field Study Analysis

The following sections aim to globally analyse the capture of GWs in the different participating companies. To have a greater overview of them, the report of each case can be found in Appendix B.

4.3.1 Gemba Walk Case of Rolls-Royce Motor Cars

Rolls Royce Motor Cars proved that not only a training on lean and GWs is needed to achieve success, but also a training on how to use Gemba boards and how to analyse KPIs is needed.

Even if yet there is not a formal problem-solving approach taken in the visits to the Gemba, the walks are afterwards analysed, and the Six Sigma methodology is used to minimise quality errors. The walks are more focused on gathering information for the previous purpose as well as to get improvement ideas and to check if standards are followed. However, the author recommends the use of a formal problem-solving method during the walk to unveil the workers' difficulties.

4.3.2 Gemba Walk Case of Airbus Defence and Space

Airbus Defence and Space embedded its GW practice into the company-specific Lean Implementation Strategy and defined it as "Go, look and see" which makes it easy for everyone within the company to understand the purpose of the walk.

The main good practice of the organisation, is that a corporative methodology to implement GWs is followed adapted to the different areas. This systematic coaching method may not be suitable for all the companies where the lean teams are not big enough as to train all the leaders one by one. Nevertheless, the main core of the practices should be considered for those companies that still do not conduct GWs, training their leaders in divided sessions where first managers learn, then they are coached and finally, only supported by the experts.

4.3.3 Gemba Walk Case of CEMEX

In CEMEX, leaders carry out GWs three times per week, which even if it is not the ideal daily walks, it is a realistic and reasonable number considering the

leaders' agendas. This standardisation is well defined in the company-developed 'Leader Standard Work' practices, where leaders at different management levels share time-slots. On the author's opinion, it would be beneficial if the walks where carried out separately, as this may help achieving more ideas of improvement as proved in other case studies.

Managers in CEMEX do first learn how to do GWs, and thereafter they cascade the practice down to their employees. Even if this method can result in higher employee engagement, the case highlights the need of operators' training prior to the first GWs, as the practice caused controversy at the beginning of the implementation.

4.3.4 Gemba Walk Case of Interface

Interface has not yet standardised GWs, having a varying frequency that go from one to several walks per month and neither are the areas to be visited scheduled on the managers' calendars. Even more, there is no formal training given to employees which results in a misunderstanding of its purpose.

Some of the shop-floor areas within the company do daily stand-up meetings, where problems are analysed in the Gemba and together as a team with operators, assessing the ideas generated during leaders' walks. These practices result in higher employee engagement and an increase on the provided solutions, as shown in the case study.

All in all, the author considers that Interface use MBWA rather than GWs as a tool to gather ideas and coach employees, where leaders give solutions in the place, not having reflected enough on the problems faced. GWs are carried out in Interface only when VSM is required or when KPIs deviate, rather than as a way to build a culture of continuous improvement within the company.

4.3.5 Gemba Walk Case of Instituto Modelo de Cardiología Privado S.R.L.

GWs are still on their early stages in I.M.C., not being standardised. Being a services institution makes it difficult to I.M.C. to standardise GWs, as each

patient's needs differ from one to another, and therefore the only walk with high maturity level so far is the one for VSM. The rest of the walks should be standardised and carried out more often, checking live metrics rather than weekly or monthly KPIs in all the areas. This live tracking practice is considered by the author as a key element to consider for the GW framework.

Good efforts have been done so far implementing GWs, having defined metrics for Gemba boards in different areas, although it should happen across the entire institution. The main weakness of I.M.C. is that not all the leaders are trained on how to do GWs. If this is changed, for which the institution is investing, managers would then fully understand the walks' purpose and teach it to their employees, bringing higher level of improvements and engagement.

4.3.6 Gemba Walk Case of Thermo Fisher Scientific

The case of Thermo Fisher Scientific proves how GWs must be standardised, well defined and carried out every day in a company, which has been awarded the Shingo Prize from the Shingo Institute.

The Gemba management boards displayed across the manufacturing site where the study was developed are regarded by the author as a best practice to consider during the development of the GW framework. These boards ease the daily basis activity, being clear and easy to understand. Moreover, providing not only leaders but also employees with idea cards, increase the number of new ideas generated within the company turning from a rate of 0.4 ideas per walk before the GWs implementation to 0.9 thereafter.

In general, the way in which GWs are coached, standardised and carried out together with visual management tools are considered by the author as world best practices.

4.3.7 Gemba Walk Case of BOCAR Group

Even if BOCAR Group has still not completely standardised GWs, the company has defined that two hours should be the time spent in the Gemba by managers. The author considers this amount of time too long as to carry them out daily, and

that may be the reason why BOCAR Group conducts the walk monthly. Moreover, as each walk does not have a clear purpose and try to cover too many issues, this could result in being too much process focused rather than meanwhile coaching employees and generating a culture of trust. Nevertheless, as managers follow an entire value stream during each walk, this two-hour time may be needed.

Once an improvement opportunity is detected and conducted, within BOCAR Group leaders must go back to Gemba to check the As-Is against the To-Be scenario expected. This has been highlighted by the literature review to be needed to achieve success at the operational level. In addition, the Kaizen Journal provided to employees with improvement actions and which is rolled-out to other plants of the company is considered by the author to be the best way of sharing the knowledge related to continuous improvement within the organisation.

5 GEMBA WALKS FRAMEWORK

Both the literature review and the documented industrial practices helped the author understand the lean practice, and having a consistent overview of the topic, a Gemba walks framework was developed as graphically represented in Figure 5-1.

This roadmap will serve as a guide for companies that do not yet consider Gemba walks as part of their lean leadership tools. Furthermore, the framework could be used by companies that already conduct the walks to assess their practice's implementation and development.
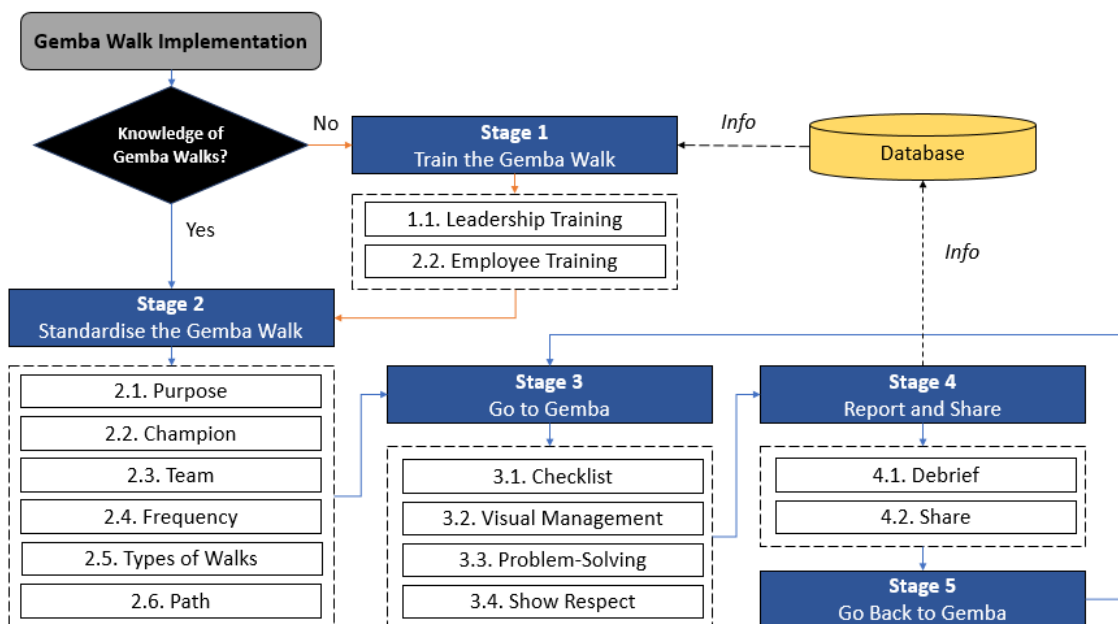
Figure 5-1 Gemba Walks Framework

The framework consists of five steps obtained from the field study as well as from the literature: getting ready for the walks, which explains the training to carry out by the company; standardising the practice, as done with other lean tools; going to the Gemba, which includes insights of tools and methods to apply; reporting and sharing, from which information is collected and stored in a database; and going back to Gemba, a period after the original walk was conducted.

5.1 Train the Gemba Walk

As stated by Womack (2012), conducting GWs has been proved to be a difficult task for companies where a lean culture is not embedded, so a good training needs to be carried out at both managerial and employee levels.

Different authors highlighted the need leaders' understanding of lean concepts, and case studies showed that the training should start in lean in general, as many of these tools are embedded in the practice. Once leaders understand them, they should cascade them down to shop-floor employees.

The very first training can be done by internal or external consultants, depending on if the company has already implemented the walks in other plants or countries. If it is the first time, it is highly recommended that experienced external consultants do the training, explaining to top management which the benefits to expect are.

5.1.1 Leadership Training

Managers must firstly be trained in a theoretical way by lean experts who should highlight the importance practice, giving examples of other companies' success. Once leaders understand what is expected from them and know how to respectfully ask open-ended questions, they should go to the Gemba accompanied by the expert similarly to the Airbus Coaching System.

The first walks, lean experts lead the walk in an informative manner explaining the purpose and expectation. In the following walks, managers carry out the walk with close supervision of the lean expert, who corrects errors that may occur. The last occasions, the expert does only observe how the manager does the walk, having a post walk debrief meeting. Once the managers have the required maturity level, they conduct the walks by themselves.

5.1.2 Employee Training

Employees need to understand the purpose of the walks to generate a culture of trust. If not, improvement opportunities are not raised as employees may think that leaders are not in the Gemba to help but to blame.

Area managers should cascade down their knowledge about GWs doing an onsite presentation and accompanying the walker the first times. Also, industrial study recommends including coaching material about GWs on the company's intranet, so everyone can access it at any time.

5.2 Standardise the Gemba Walk

Literature review highlights the importance of standardising lean practices. Hence, GWs should also be standardised by lean experts (internal or external) during the walks' deployment as stated in several case studies.

5.2.1 Purpose

Bremer (2016) highlights that the walks' purpose must be straightforward and well defined, aligned to customer value adding activities, and all the stakeholders need to be informed of it beforehand. Participant companies include it in their strategy and suggest that it should be included in information shared with employees. Some examples are the following:

1. Check standard work
2. Create a culture of continuous improvement
3. Management and employee development
4. Employee coaching

5.2.2 Champion

The GW implementation requires the presence of a champion. This could be a lean expert, lean facilitator, change agent or, in the best of the cases, the own manager visiting the Gemba. This can be achieved progressively, applying a GW coaching system.
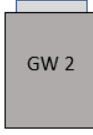
The walk's implementation is led by lean experts. This training is divided in six sessions: two informative sessions explaining the purpose and expectations; two following doing the walk where the lean expert gives close support; and two last session where managers carry out the practice and the expert observes. Once leaders have the required maturity level doing GWs, they carry them out independently.
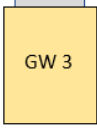
5.2.3 Team

Nor literature neither case studies agree on the right amount of people during the walks. However, case studies showed a good practice where all the managers can visit different areas of the shop-floor daily and on a rotating basis, making use of a Gemba management board as illustrated in Figure 5-2.

Figure 5-2 Gemba Management Board

The use of the board is simple. The column on the left includes a picture of the managers that are doing the walks and for each day of the week, they carry out a GW of a type, distinguished by using different colours. Moreover, the board includes the areas that managers must visit each day during the walk. Finally, pockets with checklists for each kind of walk are provided next to the board.

The leaders doing the walk are the general managers, area managers and line managers, and for each management level a Gemba management board should exist. Anyways, leaders can be joined by shop-floor experts in the processes who can better explain the problems they face at each step of a value stream.

The background of the walkers is more important. To achieve success, three walkers' requirements need to be regarded:

1. Coaching skills
2. Knowledge of the area
3. Knowledge of lean tools

5.2.4 Frequency

Ideally, literature highlights that GWs should be done daily as this means real involvement on the walks and companies have achieved that goal. Nevertheless, most of the case studies do not follow this rule and conduct the walks weekly, monthly or even on a random basis.

Considering that the daily goal is not achievable, the recommendations according to the managerial level are the following:

1. General Manager: monthly
2. Area Manager: weekly
3. Line Manager/Supervisor: daily

Even if the duration of the walks should be primarily driven by their purpose, most walks should be carried out in less than an hour. Similarly, line managers may do several 15 minutes walks during the day.

5.2.5 Types of Walks

The GW should be done with a different focus depending on the manager's level, as shown in Figure 5-3.

TOP MANAGERS
- Is the process flow evenly distributed between departments?
- Identify improvement opportunities between departments
- Coach managers and employees

VALUE STREAM MANAGERS / FUNCTIONAL LEADERS
- Are flow principles maintained? Are there any disruptions?
- Identify improvement opportunities inside value streams
- Coach employees

FRONT-LINE MANAGERS
- Are processes complying with standard work sheets?
- Are there any disruptions? What are the root causes?
- How employees are dealing with the issues?

Figure 5-3 Gemba Walk Focus at Different Level

As the Gemba management board considers daily walks, five different type of walks are recommended to carry out on a rotating basis obtained from the case studies:

1. Gemba walks for strategy implementation and VSM
2. Safety walks
3. Quality-related Gemba walks
4. Process improvement walks
5. Gemba walks for top daily concerns

Moreover, a validation walk needs to be standardised to be carried out after the original GW to check that the settled standards are followed. Hence, managers must note who were present during the walk to visit them again.

5.2.6 Path

Similarly, the Gemba management board indicates the area to visit at each walk. Walks should be focused on a value stream at each time as highlighted by different authors. Each walk may focus on one or two elements that differ from the other daily strolls.

5.3 Go to Gemba

In the Gemba, leaders should be respectful towards employees and ask open-ended questions to gather as much information and improvement ideas as possible. This is encouraged using checklists, visual management and problem-solving activities.

5.3.1 Checklist

The use of question cards helps leaders asking open-ended questions and know what topics to cover depending on the type of walk. Therefore, for each of the walks considered, a checklist should be generated to ease the process and allow leaders to take notes of their perceptions. For the latter purpose, a blank space should be added. Furthermore, as the checklists need to be shared, the name of the walker, date and the responsible of the detected improvements must be added. Figure 5-4 illustrates a template of a Gemba idea card.

Figure 5-4 Gemba Checklist Template

5.3.2 Visual Management

Several authors remark the need of visual management to conduct a valuable GW. Firstly, metrics need to be defined in the different areas where KPIs were not stablished before. If a relevant metric to an issue does not exist, managers should create a new KPI and add it to the Gemba board. These KPIs should be categorised and related to the processes of each area in terms of quality, safety, productivity, efficiency and cost.

Ideally, two different kind of boards should be considered: one with site-specific live metrics being displayed where leaders can observe the tendencies as illustrated in Figure 5-5. The other board should serve to collect the ideas from the area, helping to reflect visually and communicating to the team the current

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state and the areas of opportunity as shown in Figure 5-6. These boards should be located next to each other, on a visible place of the studied value streams.

No. Of Group: GDE 1:121

Current Stand-By Calls	Longest Waiting Time
0	00'00

Agents' Current Status

Phone's Status	Agent's Status	
	● Register	● Log Out
Temporary Leave	1	1
In Conversation	4	1
Ringing	1	0
Free	0	3
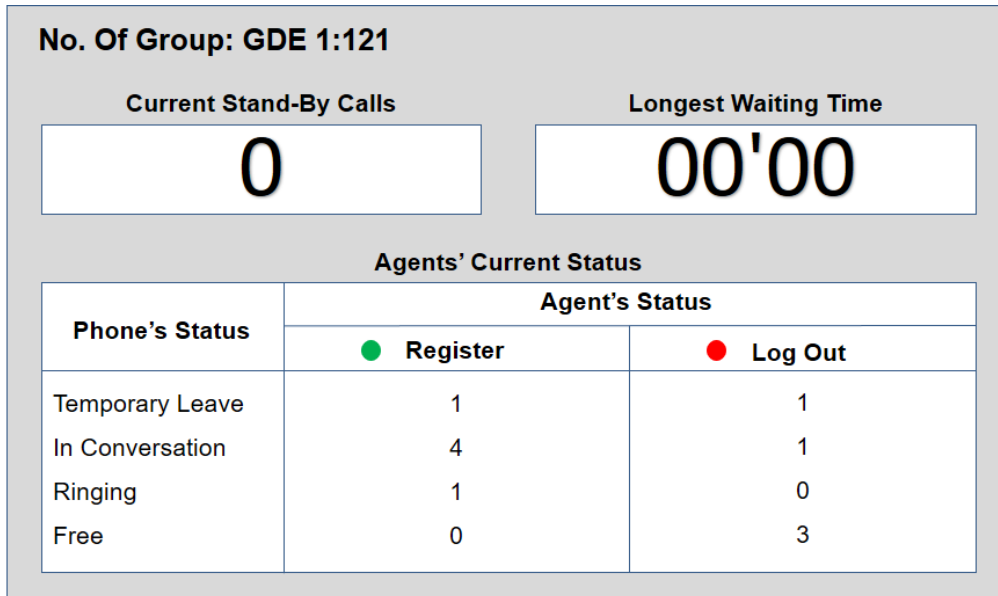
Figure 5-5 Live Tracking Gemba Board

VALUE STREAM			
Area 1	Area 2	Area 3	Area 4
Improvement opportunity: Detected by: Date: Action:	Improvement opportunity: Detected by: Date: Action:	Improvement opportunity: Detected by: Date: Action:	Improvement opportunity: Detected by: Date: Action:

Figure 5-6 Gemba Idea Board

5.3.3 Problem-Solving

Literature enlightens that if the first reason to a problem is accepted the root-cause will not be addressed. Therefore, leaders must use a problem-solving tool. Problem-Solving needs to be taught to employees as to show respect and get all the information from the employees in terms of problems face during work and finding areas of improvement.

There are several problem-solving approaches, for example: root-cause analysis, Ishikawa, A3 or 5-Why. Any approach can be used depending on relevant knowledge of the tools by the walkers. In addition, the use of root-cause Gemba boards can be used together with employees as this is proved by company cases to achieve higher levels of trust.

5.3.4 Show Respect

Leaders must show respect to employees, so they openly share their problems. Case studies highlight its importance to increase employee engagement and to build a lean culture inside the company.

5.4 Report and Share

After the walk, the debrief phase begins, being recommendable a stand-up meeting to share the insights of the walk, where managers show their notes. The problems and improvements raised during the walk should be taken to the Gemba boards, so everyone is able to see them.

A meeting minute should be generated from each walk according to the information collected on the checklists and uploaded to the company's net for everyone to have access to them. This could be done using a GWs app.

To foment GWs and other lean practices, a Kaizen Journal gathering some of the ideas of improvement and their aim and responsible people could be handed out to employees. Finally, to assess and encourage the walks, the ideas generated per walk should be frequently shared and added into the training material to highlight the impact of the practice.

5.5 Go Back to Gemba

As highlighted by authors and companies, leaders must periodically come back to the Gemba for the following reasons:

1. Sustain the practice, having proved that GWs are beneficial not only economically but also building employee and leadership engagement and involvement.

2. Building a culture where employees trust leaders and a blame free relationship exists and where problems are openly shared and solved collaboratively.

3. Check corrections of the defined countermeasures, assuring these improve the working conditions as well as to reduce the amount of waste present on the Gemba.

Appendix C includes an analysis of the framework, subsequently discussed in Section 7.

6 EXPERT JUDGEMENT EVALUATION

To evaluate the effectiveness of the developed framwork for the GWs implementation, experts from different fields were consulted: Mr. Michael Bremer, awarded the Shingo Prize for his book "How to Do a Gemba Walk"; and Mr. Pete Wilson, lean expert at Rolls-Royce Motor Cars.

The brief questionnaire needed to be assessed from 1 to 5 according to Likert scale, meaning completely disagree and completely agree respectively.

1. Considering the GW framework, your first impression is positive.
2. The framework includes all the sections needed to develop successful GWs.
3. All the sections are clearly explained and are easy to understand.
4. The visuals and examples included ease the implementation of GWs.
5. The framework is easy to be adapted or used to improve current application of GWs.

The results are shown in Figure 6-1, proving that the GW framework developed would probably success on its implementation within a company. The answers to the questions are provided in Appendix D.
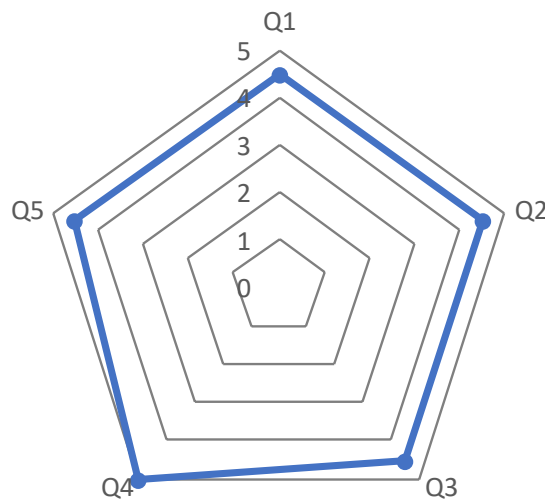
Figure 6-1 Validation Results

"The framework is holistic enough as to cover the whole Gemba walk process. Remember that the walks' primary purpose is for managers to see what really happens" – *Mr. Michael Bremer, Writer of 'How to Do a Gemba Walk'*

"Very good overview of a best practice Gemba walk, but be careful that they do not become too bureaucratic" – *Mr. Pete Wilson, Lean Expert at Rolls-Royce Motor Cars*

7 DISCUSSION

Considering the previous work and having a global view of the topic, the author can now discuss the process of the thesis, giving a holistic opinion of the project.

Firstly, the research questions were answered according to the literature review and field study, which then served to develop the GW framework as shown in Table 7-1.

Table 7-1 Research Questions Answers

RQ	Answer
1	Gemba lays on the foundations of Lean, being required for sustaining a CI culture.
2	Research highlighted the need of visual management, problem-solving, asking open-ended questions and showing respect to employees.
3	There are different approaches, but not covering the entire process of GW. Therefore, these do not serve as a GW framework.

To achieve the aim of the project, the defined objectives were fulfilled as proved in Table 7-2.

Table 7-2 Objective Completion

Obj.	Outcome
1	Captured by considering all the journal papers published about GW and addressing the approaches of several authors.
2	7 companies were documented and analysed.
3	With a global view of the topic and relevant data from literature and companies, the GW framework was developed.
4	Validated by leaders in the practice and by the author of the award-winning book "How to Do a Gemba Walk", with a very positive feedback.

Regarding the research methodology, the author was suggested a methodology developed by the sponsoring company, which is not yet peer-reviewed and therefore could have affected the process of the thesis. However, as the scope was well defined from the beginning of the project, no difficulties were faced throughout the work.

The literature review represented one of the hardest tasks during the thesis, as GWs have not been researched deeply. Several lean tools have been well analysed and documented, but these practices are more related to quality, cost and time. In the author's opinion, this may occur as GWs seem easy to be understood and implemented, without having a high economic impact in the company. Therefore, a low number of journal papers and books were found discussing the topic and only lean consulting companies present their own models of how to do GWs, which lack of peer validation. Anyways, these company-developed approaches allowed the author to have a first contact with GWs and understand their potential.

Each author has its own view of GWs and as analysed, most of them are not based on industrial field study and neither these are validated by research fellows. Additionally, contradictions were found when comparing the literature and the companies' practices: in example, Womack (2010) considered utopic top managers going to the Gemba daily, but Thermo Fisher Scientific proved him wrong by developing their own Gemba Management Board. Moreover, GW training and standardisation were not considered in the literature, which were proved to be needed during the field study. Nevertheless, the results expected from the literature were present in the participating companies that do GWs.

Concerning the field study, firstly a questionnaire was developed together with the sponsoring company, which focused on the outputs rather than the inputs of the practice, and in the author's judgement consisted of too many questions which were not able to be asked during the interviews. For these reasons, a new questionnaire was developed to carry out the thesis' documentation in parallel to the work for the sponsoring company. A negative part from these interviews was

that some of the interviewees answered from a general lean point of view, rather than focusing on GWs.

However, the positive side of doing this kind of work for a sponsoring company is that it provided most of the contacts to interview, as the organisations approached from the academic side were reluctant to be documented. Furthermore, the participating companies eased this labour, as they were very supportive during the work. If the previous this did not happen, the author considers that the framework would have not been consistent enough. Still, if the interviews had been done physically and doing a real on-site GW it would have provided the author with a better understanding of the practice.

The framework offers a good overview of how to implement GWs, providing visual examples that ease its understanding. Even if it is not a breakthrough innovation, it does give the basics and reasons to do each of the highlighted stages, explained clearly and based on the literature and the study of world-leading manufacturing companies that have carried out the walks for a reasonable time.

The author faced difficulties to evaluate which were the best practices in a quantitative way, as the results in terms of impact and benefits obtained from the companies were qualitative. Therefore, the assessment was done regarding the literature review and by comparing the companies with each other. To address this problem, a thorough validation was carried out by contacting back some of the participating companies, as well as by approaching Mr. Michael Bremer, expert on the topic, with five clear and straightforward questions to be rated according to Likert's scale and with the possibility to give comments.

This simplification in the validation may result in the interviewees not spending enough time as to deeply analyse the work. Nevertheless, in the author's opinion, if the questionnaire or the information sent for validation were too long, getting an answer from the experts would have been difficulted.

The research gaps considered after the literature review analysis have been filled as shown in Table 7-3.

Table 7-3 Research Gaps Fulfilment

RG	Conclusion
1	Considered all the literature available on physical and web libraries and journal papers, as well as studied the industrial practices of 7 organisations.
2	Developed a clear framework for companies to follow during the GW implementation, obtaining the validation of experts on the topic with a very positive feedback.

After researching GWs, the author considers the work to bring benefits firstly in academic terms, as the topic has been deeply explored and analysed, and from an industrial perspective, as a valuable framework to implement the lean leadership practice was generated.

8 CONCLUSIONS AND FUTURE WORK

8.1 Conclusions

GWs have been proved to be a lean leadership practice commonly used in industry. However, there is a lack of research and case studies focused on the topic, and therefore this analysis was required, gathering all the relevant information from the literature and documenting in detail the cases of seven world-leading companies.

As these companies did not follow a unified methodology, a framework integrating their best practices together with the knowledge acquired from the literature was developed. This will later serve for organisations that do not carry out GWs as a guide to implement it, as well as for those that already use it to assess their method. In academic terms, this work contributes by fulfilling the existing gap between research and industry.

Even if the results provided are qualitative rather than qualitative, the study found that GWs bring the tangible benefit of a transparent relation between managers and operators. Hence, following the proposed GW framework will potentially improve their engagement, while a culture of continuous improvement is built.

8.2 Future Work

Having studied the GWs deeply and analysed the literature and the industrial case studies, a roadmap covering the most important sections of the practice was developed for those companies that still not consider it within their lean tools or to assess the practice for those that already carry it out.

Yet, due to lack of time, the framework has not been implemented in an organisation or compared to any company's understanding of the practice. Therefore, it is highly recommended that the model is taken to a company where GWs is still not considered, and measure the benefits obtained in terms of idea generation, employee development or leadership involvement.

As the industrial study focused on manufacturing companies where processes are standardised, its application in a services institution is not guaranteed as

every client differs from one to another. Therefore, the author recommends developing a study of this topic with the focus on the services sector.

Word Count: 8,226

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APPENDICES

Appendix A Literature Review

A.1 Lean House

The system starts with the foundations: visual management, standardisation and *heijunka* or levelled production, which has the aim to average the number and type of products manufactured to produce according to a pull demand system (Koide and Iwata, 2007). The roof remarks the lean principle, providing the best quality at the lowest cost and with the shortest lead time, supported by the two Toyota Production System's pillars: Just-in-time, which is related to cost, and *jidoka*, a Japanese term that could be translated as "making the problems visible" and is related to quality control. Finally, in the centre of the house the ultimate focus of any lean company is found: Continuous improvement (Liker, 2004).

A.2 Gemba Walks' Key Reasons

1.   Purpose:

Gemba walks provide the opportunity to check if everyone in the company understands the reason of their work. If they do, it is easier for them to find waste and areas of improvement within the processes. At the same time, it gives the walker the option check if standard work is followed and the problems happening in the current situation (Bremer, 2016). Even more, it allows leaders to identify safety hazards employees may face and check the conditions of machinery and equipment (Raut and Kumar, 2017).

The walks let managers go and see the processes by themselves and see if standards are followed based on first-hand information, based on facts. Therefore, leaders should be located near the Gemba, as they need to constantly be in contact with it. If standards are understood and met, it eases in to a high extent the identification of problems and the discussion with employees (Dombrowski and Mielke, 2014; Zarbo et al., 2018).

From a different perspective, Mann (2009) outlines the main purpose of Gemba walks to be reinforcing lean management practices, sustaining the Lean conversion. In the Gemba, managers can challenge employees during the Lean

implementation and check the problems that arise from it. Management involvement is required to sustain the Lean journey, but that transformation is desirable to happen on the shop-floor (Alefari, Salonitis and Xu, 2017). Hence, Gemba walks provide with the solution to both issues at the same as they are directly involved in the place where value is added.

2.   Process:

As stated by Deming, up to 85% of the problems are process related and therefore, the process needs to be understood as it leads to lack in performance. The final product or service depends on all the activities involved in that process, so the performance of all of them must be regarded rather than focussing just in one of the activities embedded in it. Gemba walks allow to approach the process in a systematic way discovering the performance constraints (Bremer, 2016). Going to the Gemba allows employees to check errors and start a root cause analysis of the addressed problems and inefficiencies, then solve problems together with the employees (Aij, 2017).

Gemba walks are a tool used in daily management that promotes visual management and daily problems solving in the different working places, as problems are made visible. At the same time, it helps standardising leaders' work and aligning processes to the strategic objectives. To conduct a successful Gemba Walk leaders should first understand the Lean concepts and set the standards to be followed, followed by creating management boards with relevant information to the different workspaces (Zarbo et al., 2018). There, problems are made visible and standards are checked in real life and not from a data analysis perspective, giving the possibility to find improvement opportunities (Imai, 2012). Note that for Gemba walks to make sense, the walker must have the capacity to analyse and understand the processes as he or she will evaluate them later (Liker, 2004).

3.   People:

Bearing in mind that one of the lean's principles is that people need to learn to think by themselves, they are the most important reason to do the walk and need to be developed as they are the ones creating the value for the organisation. It

gives the walker the opportunity to learn how to improve the environment, giving the employees the chance to best develop their skills while they feel free to share their improvement options in a blame free culture (Bremer, 2016). Also, due to a higher level of communication, it provides managers with the chance to build employees' trust and engagement, while becoming better leaders and coaching the workforce the principles of Lean (Zarbo et al., 2018).

Using teams to carry the Lean programs in a top-down system, particularly using Gemba walks, leads to employee self-development bringing a higher level of implementation of lean practices. Anyways, after implementing Gemba walks in a company, a bottom-up system should be searched empowering employees, where they are the ones in charge of raising the problems to managers (Netland, Schloetzer and Ferdows, 2015). In the Gemba, managers can develop their workforce with no need of training material, and they can even interrupt the processes to conduct learning activities. This should not be confused with managers giving the answers directly whenever a problem arises. They should wait for employees to conduct their own root cause analysis and share their solutions (Dombrowski and Mielke, 2014).

According to the study conducted by Aij and Teunissen (2017), the main attributes where executives should focus when going to the Gemba are care and recognition towards employees, engagement, communication and fairness. These lead to a deeper value for work culture, trust development, higher levels of involvement and clarified goals and standards. Leaders should listen to employees, supporting a continuous improvement culture but to develop shop-floor employees, leaders should first self-develop themselves with the help of coaches or expert consultors (Aij, 2017).

As lean leaders, Toyota do not condemn the person but do create an environment where problems are made visible, focussing on the process performance and where employees share their issues without fear (Bremer, 2016). All in all, Gemba walks increase credibility and respect towards leaders who are involved, leading to a future independent problem finding and solving by employees with no need of management direction while creating a continuous improvement culture (Gesinger, 2016; Wallo, 2017).

Summarising, Gemba walks are a key tool for companies, as they have impact in process improvement and strategy alignment, sustaining a continuous improvement culture and over all, in developing employees.

Gemba walks are not a way to catch out employees or giving answers on how to solve problems directly (Bicheno and Holweg, 2016). Neither are Gemba walks value stream mapping, even though these are a good tool to start the map of the value stream (Womack, 2010).

Gemba walks should not be confused with management by walking around (MBWA), where the walker does not understand the process or which questions to ask and does not stay long enough as to get relevant answers from employees. Likewise, in MBWA the destination is random and undefined, and observations are not as deep as in Gemba walks, where the questions are clearly defined beforehand. Finally, during Gemba walks leaders ask rather than give answers, and after the walk, they analyse it and check areas of improvement. In MBWA instead, they give solutions in the place, not having reflected enough on the problems faced and therefore these solutions commonly lack a strategy and are often misunderstood by the employees (Luria and Morag, 2012).

A.3 Gemba Walk Approaches

A.3.1 Bremer's Approach

The first step is defining a clear purpose, especially when the Gemba walks are implemented in the company. The purpose should be straightforward and well defined as to check if work is done according to standards and to look for improvement areas.

Leaders should firstly engage all the stakeholders prior to the walk and inform about its purpose, explaining the way in which they may help, followed by the definition of the walk's scope, highlighting the areas to be analysed. Managers must coach the walks to those involved, reminding them the importance of their attitude towards it and their employees and that the final aim of the walk is to understand the real situation.

While in the Gemba, leaders grasp the real situation and seeing the value creation with their own eyes, understanding that their assumptions may not be happening and checking if everyone works according to standards.

There, managers should interview employees in a Socratic way, asking first what and then why. Once the process activities are understood, identification of the root cause of the problems proceeds. A technique for this will be further developed later in this report, so called the 5 Why technique.

Finally, leaders must show respect, creating a safe environment where questions can be asked openly. Only this way real problems and improvement areas arise, as workers are not afraid to give a wrong answer. Furthermore, if the leader behaves in a punishing way the process reality gets distorted as the employees will try to hide the problems in order not to be blamed for them, and they do not develop a critical mind.

Once the GW is finished, the walker should note who was present during the walk as they may need to be approached afterwards to keep track of the progress. At the same time what was seen during the walk needs to be recorded, reflecting on all the elements observed in the process, categorising them in terms of value adding or non-value adding and generating trend charts to evaluate them. That way, mid-management employees would be more involved and start walking by themselves, but top-management commitment is still needed.

A.4 Gemba Walks in Industry

Apart from manufacturing, which is where the lean transformation started and where Gemba walks were applied first in the TPS, once lean was proved to be beneficial for this sector different industries started the implementation of lean. Clearly, Gemba walks were one of the lean tools to be applied. This section aims to study their use in different industries and try to grasp the best practices from them where Value Stream Mapping is regarded as the main field were Gemba walks are applied.

A.4.1 Gemba Walks for Value Stream Mapping

Gemba walks should be used for VSM as part of the process review along with systematic questionnaires to understand the process, wastes and possibilities for

improvement. Getting information for VSM is not direct, and therefore Gemba walks are required to identify issues from a shop-floor point of view (Seth, Seth and Dhariwal, 2017).

Gemba walks should be used both before and after the mapping. A process walk is used before to picture the organisation and identify waste. After applying the value stream mapping and removing non-value-adding practices, the Gemba is visited to check the implemented improvements. Note that used as a tool for VSM, Gemba walks are a way of supporting continuous improvement and standardisation (Tyagi *et al.*, 2015).

A.4.2 Gemba Walks in Other Industries

Knobloch et al. (2018) highlight the use of Gemba walks to connect managers with safety issues arising to front-line patients in healthcare as well as to determine if the best practices are followed in the operations unit. Karam et al (2017) analysed the use of Lean manufacturing tools for pharmaceutical industry, among which Gemba walks were present. The walks were here used to collect changeover process method, from which a root cause analysis begun.

Thorhallsdottir (2016) gives an example of Gemba walks used in the management of an airline cabin as a first step to reduce waste and increase airline passenger and employee's satisfaction. Managers brought stopwatches to measure the time of different tasks during flights and asked questions. The walk provided with improvement opportunities, which matched the results of the questionnaires provided to customers, resulting in impactful changes.

Wallo (2017) studied the effect of Gemba walks as a tool to facilitate HR development, where managers who are involved and carry training activities achieve a higher level of employee development, which seen as necessary to pursue competition. These learning activities can be divided in three categories: planned, partially planned and spontaneous. The latter, among which Gemba walks may be included, focus on solving problems together by employees and leaders. This leads to a future independent problem finding and solving by employees with no need of management direction.

Appendix B Industrial Field Study

B.1 Academic Questionnaire

Gemba Walk Characteristics

1. Who is the champion?
2. Who triggers the walk?
3. Who formulate the team?
4. What is the min and max No of people in a team?
5. What is typical background of the team members?
6. Who lead the team?
7. When the team is formulated?
8. How the path of the walk is determined?
9. Where they stop in the walk?
10. Who decided where and when to stop?
11. Who does the reporting of the Gemba walk?
12. How the report is circulated and documented and stored?
13. If there is a big problem, would they arrange another walk sooner?
14. Is there a problem to solve in every Gemba walk?
15. What is the problem-solving approach is used during the walk? (Root Cause Analysis, Fishbone diagram, A3 Think, 8D, 5 Why)
16. How the problem-solving work is done?
17. What is the right arrangement of the visual management to make an effective Gemba Walk?
18. What is the training back for Gemba Walk and problem-solving?
19. Is there a checklist that would help to perform the Gemba Walk?
20. How the walk is evaluated and by whom?

B.2 Case Studies

B.2.1 Rolls-Royce Motor Cars

When Rolls-Royce Motor Cars accelerated its lean journey in 2015, shop-floor leaders and supervisors started being trained on how to manage process boards and improve their areas. However, not much training was done at management level, so an effort was made later to coach them on how to better support their

people, using Gemba walks as a principal tool until in 2017, Gemba walks were formally standardised in the managers' calendars. Since then, Rolls-Royce defined the purpose of the walks as shown in Figure Apx B-1 and carry them out weekly.

Understand current process performance	See the signs of potential problems	See the impact of process changes
Engagement with Associates	To understand what is happening	Coaching opportunity
Take the team forward as you lead change	Determine route for performance improvement	Obtain accurate data about the 'what' & 'why'
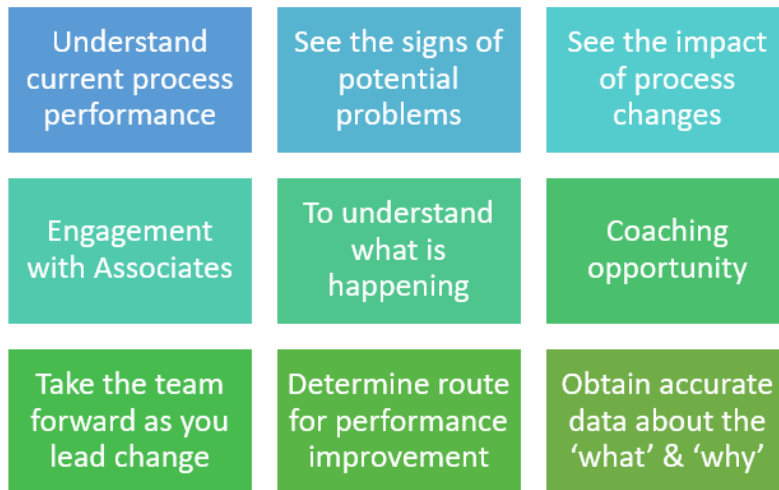
Figure Apx B-1 Rolls-Royce Motor Cars Gemba Walks Purpose

The Gemba walk, illustrated in Figure Apx B-2,starts with a leadership meeting at the Gemba board, who analyse it, define the boundaries of the areas to be covered during the walk and divide in groups of maximum four people. Then, they go to the Gemba having a coordinator to ensure that all the areas are visited on a rotating basis. Once on the Gemba, leaders communicate with their employees, coaching them and trying to understand what is happening by asking open-ended questions not only to middle management but also to the front-line personnel. Finally, the different groups debrief the walk and share their insights with the other teams, so everyone keeps on track.
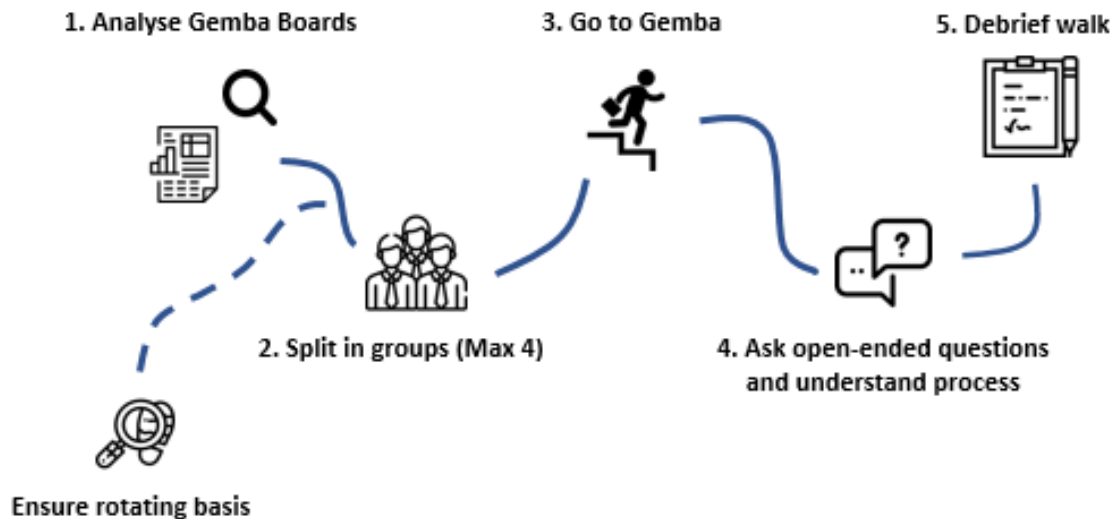
Figure Apx B-2 Rolls-Royce Motor Cars Approach to Gemba Walks

Initially, managers were trained with a presentation about Gemba walks showing the reasons behind them, followed by a one-on-one demonstration with a lean expert. Three months later, leaders learnt how to do a proper walk asking the right questions, even doing the debrief sessions by themselves.

Rolls-Royce has not defined different types of walks and define the boundaries of the path to be followed during the Gemba board analysis. With the standardisation of the walks as the trigger to conduct them shown in Figure Apx B-3, leaders interact with the KPIs prior to the visit to the Gemba. If the metrics deviate, leaders follow the route that take to the root-cause trying to solve the problem together with shop-floor employees. If no problem is raised on the boards, leaders head a predefined location and ask open-ended questions to get improvement ideas from the operators.

Work Organisation UR-T-3: Early Shift Calendar

Activity	Location	Daily/Weekly	PS	PL	PM	GM	Shell 1	Shell 2	Purpose	Supporting Information
GM Communication Cascade (Thu 6:00 - 6:05)	Rest Area	W				X (← info)			**GM CORE TASK** Communicate information to associates	Communication brief from Weekly Comms Sheet
5 Comms (6:00 - 6:05)	Shop floor	D	X (info →)				X (← info)		**PS CORE TASK** Check associate attendance. Cascade core information to team.	Use 5 Comms communication sheet
Production Readiness (6:20 - 6:50)	Shop floor	D	X (info →)	X (← info)					**PS CORE TASK** Communicate start up status to PL. Information flow of KPI status of previous shift.	Use PS Shift Reports
Production Status (7:15 - 7:45)	Shop floor	D		X (info →)	X (escalation →)		X (← info)		**PL CORE TASK** Communicate start up status to PM. Information flow of KPI status of previous shift.	Use PL Shift Reports / Shell 2 join at 7.30
UR-T-3 Production Meeting (7:45 - 8:15)	Meeting area	D			X (info →)	X			**PM CORE TASK** Information Target achievement	Use PM Shift Reports
Process Board Tour 1:1 (8:00 - 8:30)	Shop floor	D	X (escalation →)	X (← coaching)	X (← coaching)				**PL CORE TASK** Review PS board status by coaching. Escalate as appropriate	Visit all PS boards (min twice/week). Use T-Card as prompt
In-line Quality Meeting (9:00 - 9:30)	Shop floor	D	X (escalation →)	X (Feedback → → → →)	X (←)		By invitation		**PL CORE TASK** Problem solving of current issues within Paint Shop	PL's steer the support team to solve the top problems and concerns that have been highlighted in FMS
Process Area Tour 1:1:1 (9:30 - 10:30)	Shop floor	D		X (escalation →)	X (← coaching)	X (← coaching)			**PM CORE TASK** Coaching Escalation Problem Solving	Visit PL boards. PL discusses area status with PM's/GM. Opportunity for PM to support & coach PL. GM (coach-coach) also in attendance.
UR-T-3 Quality Meeting (Tue 10.30 - 12.00)	Room 9 Wrath	W			X (Feedback → → → →)	X	X (← info)		Department quality meeting to give status on all quality metric's	Colin Cooper leading the review meeting with actions assigned as appropriate
UR-T-3 Staff Meeting (Thu 10.30 - 12.00)	Room 9 Wrath	W			X (Feedback →)	X (info →)	X (← Feedback)		Information cascade Review KPI metrics	
UR-T-3 Process Confirmation (11.00 - 11.30)	Shop floor	D	X (←)	X (← coaching)	X (← coaching)	X (← coaching)			**PS CORE TASK** Confirming that associates are working to the standard	All Leadership levels take part to confirm that processes are being completed in a standardised way and to challenge the standard
Shift Production Meeting (13:00 - 13:30)	Room 5	D		X (info → ← info)					**PL CORE TASK** Production schedule alignment	Meeting held with UR-T-1 and relevant PLs from all technologies to discuss the production schedule and alignment with it.
QZ Audit Presentation (13.30 - 14.00)	Presentation area	D		X (Feedback → → → UR-T-36)	X (UR-T-36)	X	X (← info)		Plant audit highlighting concerns which could have escaped to the customer	It is not essential for the Application PL to attend every day
UR-T-3 PQM Meeting (Thu 13.30 - 14.00)	Room 9 Wrath	W		By invitation only	X (Feedback → → →)	X	X (← info)		PQM status review & escalation	Colin Cooper leading the meeting & will send out advance invites
Shift Handover (PS 1:1) (14:40-15:00)	Shop floor	D	X						**PS CORE TASK** Line status Problem solving	Meeting between PS to discuss line status, problems, issues, concerns and other relevant information required to manage the next shift using Shift Report.
Shift Handover (PL 1:1) (14:40-15:00)	Shop floor	D		X					**PL CORE TASK** Line status Problem solving	Meeting between PL to discuss line status, problems, issues, concerns and other relevant information required to manage the next shift using Shift Report.

Figure Apx B-3 Standardised Calendar (Source: Rolls-Royce Motor Cars)

When going to the Gemba, leaders carry a feedback sheet called "Leadership Standard Confirmation" illustrated in Figure Apx B-4, which covers five different standard processes: health and safety, process board, process confirmation, 5S and TPM, and finally, training and skills. The sheet includes questions that are considered as targets for each of the topics, having other columns to take notes about observations, agreed actions and review date. This is used as a formal record of visiting an area and to identify any follow up actions, where a copy is given to the visited area to place onto their Process board shown in Figure Apx B-5 which shows the current situation and key topics of different areas, as well as site-specific KPIs. These boards are standardised and their content differs depending on the area where they are located. Moreover, all the employees have been trained to understand the content of the boards and the parameters embedded on them.

Author: S. Tomlinson, UR-T-1-P Version: 1.0 Page 1of 1 Date: 26/04/17 DID-177546	Production area: UR-T-3 Zone:	Leadership Standards Confirmation		
Standard Process	**Process Target**	**Observations**	**Agreed Actions**	**Review Date**
Health & Safety Where - When - / /	a) Is the area free from unnecessary items (SORT)? b) Accidents / Near Misses investigated? c) Proactive accident prevention demonstrated?			When - / /
Process Board Where - When - / /	a) Layout & documents to the agreed standard? b) Documents up to date & in use? c) Is the board being used as a tool to improve KPI's?			When - / /
Process Confirmation Where - When - / /	a) Gemba Sheets available at point of fit? b) Evidence of Process Confirmation completed & follow up actions taken? c) Used for problem solving?			When - / /
5S / TPM Where - When - / /	a) TPM implemented on all equipment in the area? b) 5S audits conducted weekly? c) 5S actions defined and implemented?			When - / /
Training & Skills Where - When - / /	a) Skills matrix up to date? b) Training & development plans in place? c) Work Org. coaching to team demonstrated?			When - / /

Figure Apx B-4 Leadership Standards Confirmation Sheet (Source: Rolls-Royce Motor Cars)

Figure Apx B-5 Process Board (Source: Rolls-Royce Motor Cars)

In terms of problem-solving, Rolls-Royce has not yet formalised the practice as the walk is primarily used as a Go-Look-See information gathering exercise to get to the root cause of problems when on the shop-floor. In the Gemba, leaders ensure the problem has been accurately defined, review measurement method and give their ideas on how to analyse it. Parallel DMAIC processes and quality meetings exist to solve these problems at the lowest possible level within the organisation according to the Six Sigma methodology.

The key success factors from implementing Gemba walks in Rolls-Royce are the following:

1. Setting expectations and motivating employees to quick change and continuous improvement.
2. Showing respect to employees proving belief in their ideas.
3. Measuring the impact according to the KPIs.
4. Creating a collaborative problem-solving environment.
5. Learning and sharing practices within the organisation.

B.2.2 Airbus Defence and Space

Airbus Defence and Space started Gemba walks in 2013 as a tool to help leaders and staff. The origin of this practice started from the need of top and middle management involvement, making them aware of the problems their employees face during their daily work.

No matter the walk is carried out by lean experts, change agents or managers, Airbus defined a clear methodology that should be followed to be successful, staying between 30 and 45 minutes in the Gemba. As shown in Figure Apx B-6, the walker does firstly check the Gemba panel together with a group of maximum 12 people. There, they check the KPIs and do a problem-solving activity to find the root-cause of the problems. Then, the manager asks if any problem happened prior to the walk and how it was solved, as well as if he/she could provide help with any of them, with the possibility to take the action-plan to another department. Moreover, the leader challenges his/her team to see how they would solve a problem and if they could do it on-site or they would need external help.

From that activity, an action plan is generated raising some of the issues in the Gemba boards, linking them to the responsible person. Finally, a meeting minute is generated and given to the manager to review, who has the help of lean change agents in case they are needed.
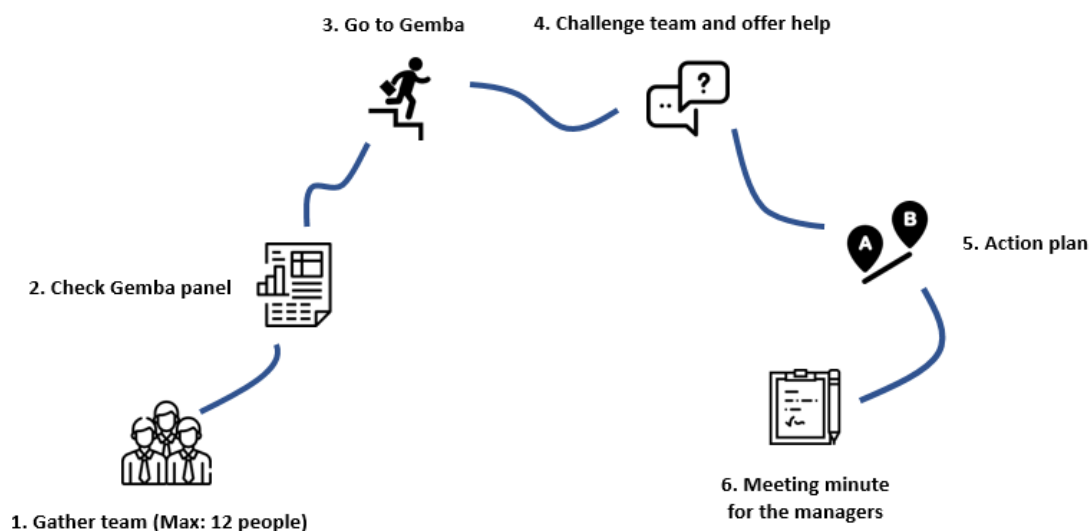

**Figure Apx B-6 Airbus Defence and Space's Approach to Gemba Walks**

The walk's implementation is led by lean experts, who firstly coach change agents who are at a lower management level in the organisation. This first training is divided in six sessions: two informative sessions explaining the purpose and expectations; two following doing the walk where the lean expert gives close support; and two last session where change agents carry out the practice and the expert observes. Thereafter, the latter train executives according to the Gemba Walk Coaching System illustrated in Figure Apx B-7.
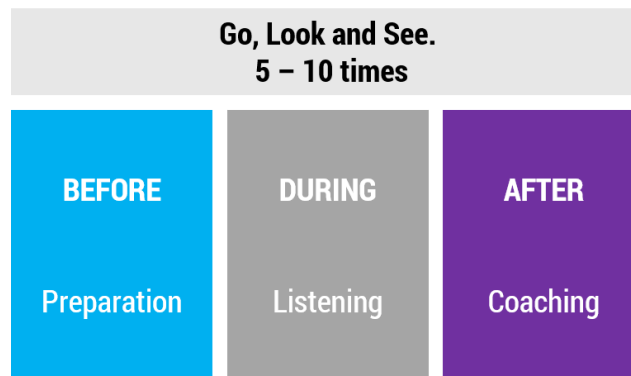
Figure Apx B-7 Gemba Walk Coaching System

The first stage focusses on the preparation, where the change agents accomplish a pre-audit in the Gemba, identifying improvement opportunities and thereafter a brief with the gathered information is provided to the manager, so he/she can see the strengths and opportunities in the following walk. Just before visiting the Gemba, a lean expert visits the manager to remind him/her about Airbus' rules shown in Figure Apx B-8**¡Error! No se encuentra el origen de la referencia.**.
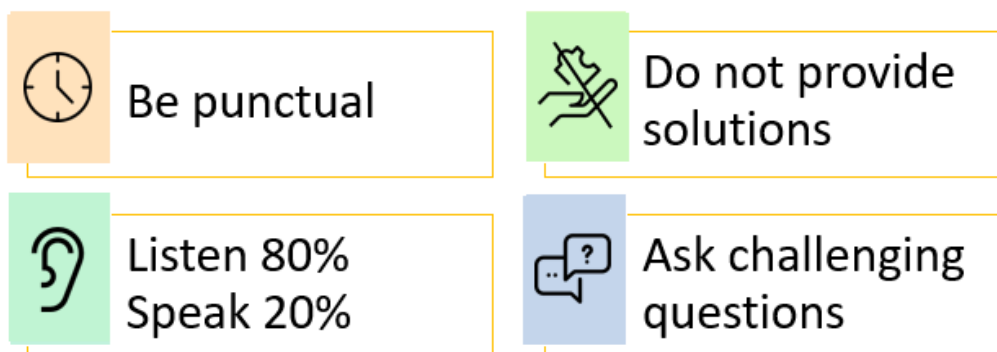
Figure Apx B-8 Airbus Space and Defence's Gemba Rules

During the visit, the manager is joined by the change agent, whom oversees listening carefully, taking notes and noting down the leader's textual words. The

first times, managers are provided with a list of non-formalised suggested questions that should be used during their visit. Finally, the team focuses on the feedback, where the change agent highlights what went well and what should be improved during the following sessions. Once the managers have the required maturity level, they conduct the walks by themselves.

The walks are scheduled depending on the lean experts' prioritisation. Nevertheless, top management carry out the walks monthly, middle management weekly and team leaders do them on daily basis. In any case, leaders going to the Gemba must have a different set of skills apart from understanding the walk's purpose, leading by example:

1. *Coaching skills*: such as emotional intelligence to understand their employee's behaviours and concerns.
2. *Background of the area*: there is no point for a leader to go to an area where he/she does not have the expertise, as their coaching would be irrelevant.
3. *Knowledge of lean tools*: at least of those that are implemented in the visited area.

From the operator point of view, the main benefits obtained are considered to be the following:

1. *Greater engagement levels*: now, employees realise that what they do is important, as leaders listen to them during their visits. Likewise, they feel important within Airbus.
2. *Recognition*: as managers congratulate them and give them feedback of their projects.

Managers recognise the value of doing Gemba walks for the following reasons:

1. *Increase in their coaching skills*: after doing systematic Gemba walks, managers become leaders rather than commanding bosses.
2. *Awareness of problems*: due to direct contact with their teams, managers are aware of the problems that are faced below them. Problems may be solved by middle management without escalating to top management, however top management want to know about them.

B.2.3 CEMEX

Gemba walks began in CEMEX in 2015, as a tool for problem solving and achieving a cultural change. Nowadays these are standardised and systematically conducted in all its sites. The walks are predetermined and carried out 3 times per week by top management: once managers and coordinators finish their review of the metrics together with their teams, they go to the shop-floor to check how the work is being done.
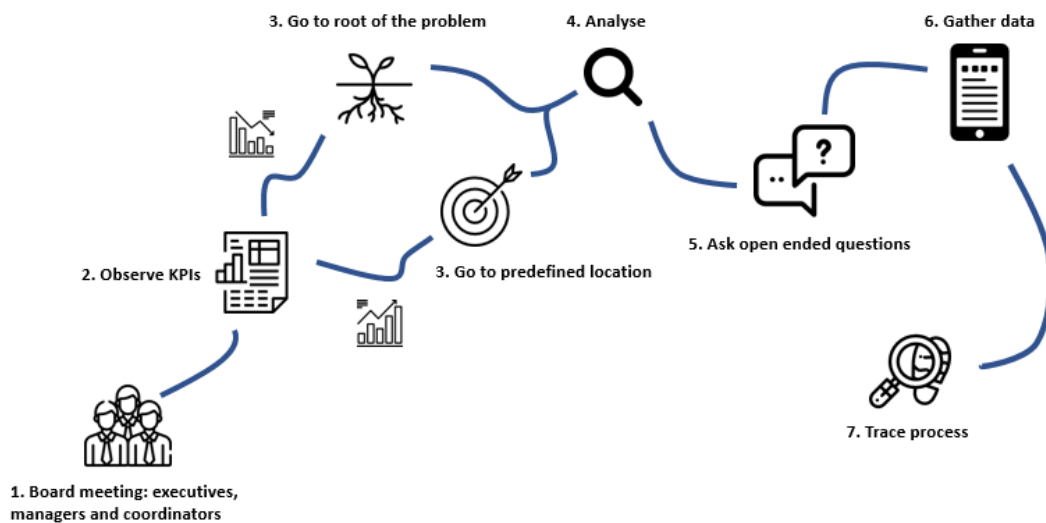
Figure Apx B-9 CEMEX's Approach to Gemba Walks

As shown in Figure Apx B-9, Gemba walks in CEMEX begin with the observation of the KPIs at the board meetings, where projects are revised. During the observation, if any parameter has a negative tendency leaders head to the root of the problem as they consider it an opportunity for improvement. If not, leaders go to the predefined location of the walk and observe the situation as part of a kaizen event. In the Gemba, leaders involved with the process join the shop-floor operators, and start analysing the area, identifying wastes and mapping the process, and finally begin a kata-type questionnaire, asking open ended questions. Once the walk is finished, the information is gathered using an electronic app, from where coordinators can afterwards trace the process captured in Figure Apx B-10. The ideas raised during the walks are also shared on the boards present on communal areas, to make employees proud of their work.

Figure Apx B-10 CEMEX's Gemba Walk App (Source: CEMEX)

When CEMEX started its lean journey, theoretical and practical training was given by external consultants from Caterpillar Inc. Nowadays, the training is given by internal lean experts and the strategy to roll-out Gemba walks across the company, which was carried out in most of the regions at the same time, consists of two steps:

1. Training leaders in green-belt Lean Six Sigma, who thereafter develop continuous improvement activities during Gemba walks.
2. Cascade down Gemba walks knowledge and practices to shop-floor employees, who are trained on yellow-belt Lean Six Sigma.

Top management follow the so called by CEMEX 'Leader Standard Work' practices, where executives, managers and coordinators share time-slots for conducting the board meetings, which are followed by Gemba walks in the production area supported by lean experts. These walks may be of different types and address three purposes:

1. *Routine Walks*: whenever parameters do not show deviation and leaders go to Gemba to see people and ask them process-related questions.
2. *Improvement Walks*: KPIs show a negative tendency and managers address it directly on the Gemba together with employees.

3. *Kaizen Walks*: managers search for improvement opportunities and check the processes to identify waste.

KPIs and Gemba walks are linked according to a tracing method, that tells who did the Gemba visit, and what and when he or she did it. CEMEX uses Gemba boards at three different levels: shop-floor boards, for operators to know where to act without supervision; departmental boards, where global and site-specific metrics are shown; and a board for supervisor-employee use. The boards include KPIs and objectives in terms of people, clients, shareholders and communities as illustrated in Figure Apx B-11. These metrics are reviewed during the walk.

Figure Apx B-11 Gemba Board (Source: CEMEX)

A formalised problem-solving approach is conducted in CEMEX, consisting of three main tools: Ishikawa, 5-Why and A3. Also, brainstorming is applied to obtain as many ideas as possible, without considering any of them invaluable until it is analysed. This process is firstly done in the Gemba together with employees in a didactic way, followed by a top management debrief meeting done in an office where the solutions are also assessed after gathering all the relevant information.

In CEMEX, the Gemba walk allows assessing the Continuous Improvement culture within the workplace and the level to which standard work is implemented. Managers can also help the workers uncover additional improvement opportunities through a process of discovery questioning and give the opportunity

to coach and develop employees through discussion of challenges and ongoing improvements. Moreover, Gemba Walks also helped CEMEX to identify those future leaders within the workplace.

B.2.4 Interface

Interface started using Gemba walks in 2015 to see what happens in their processes, whenever a new project arises. Lean experts take the walk and work together with employees to get a first-hand impression of their tasks, understanding in terms of movements, environment and difficulty the difference between doing it by one-self and seeing how someone else does it. In the Gemba, managers see how work is done and how it is delivered to customers.

During the Gemba walks in Interface, leaders follow the value stream in a non-scheduled way, explaining to their workforce in the area beforehand what they are doing. During the walk they observe and record their observations. These walks vary in frequency from once to several times per month. Even if the walks are not standardised, managers have a common understanding on how to do Gemba walks and they are completed as illustrated in Figure Apx B-12:

1. Go through the process and recall employee's ideas and find gaps, checking the gaps between the reality and the standards in the processes.
2. Note the ideas down to be processed.
3. Review ways to solve those issues and check for ways to improve.
4. Create a scoring system and assess the improvement ideas in terms of cost, change management, impact and effort.
5. As a team, select the ideas which give the best solution with the least cost and effort and implement the changes.
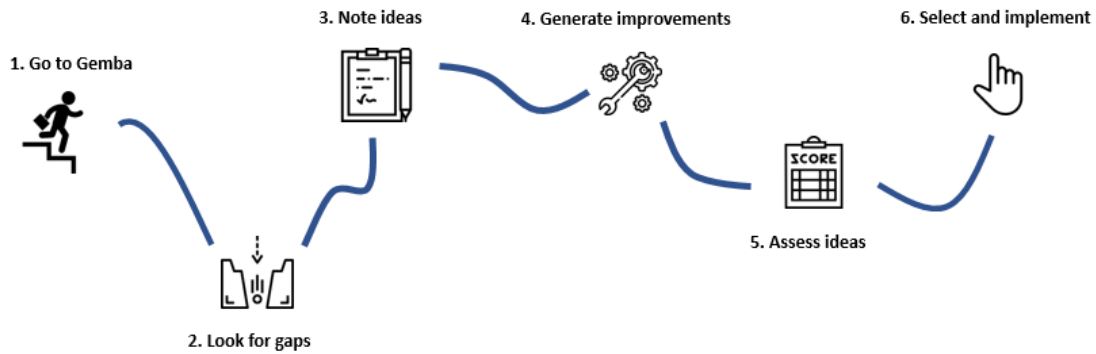
Figure Apx B-12 Interface's Approach to Gemba Walks

Leaders and employees are trained in basic and intermediate lean concepts, to see to what extent these practices are helpful and can make an impact in the organisation. The Gemba walks generate improvement opportunities. Then internal lean coaches' mentor and coach team members according to three main pillars:

1. Root-cause problem solving training, both formally and informally carried out.
2. Understanding takt-time and how processes and subprocesses are connected.
3. Training on how to find and remove waste.

Additionally, leaders are trained on how to ask questions and use the 5-Why or 5W+2H techniques, as well as on how to use visual boards to find gaps. To encourage continuous improvement, leaders are challenged to provide improvement areas in the Gemba boards and make Interface more visual.

Interface conducts two types of Gemba walks, one before value stream mapping and another one to be done afterwards to validate the process. Note that to get new ideas from employees, leaders use MBWA rather than Gemba walks.

1. *Value Stream Mapping Walk:* this kind of walk is done together with the whole team related to the area of study to get a general idea of it. Firstly, leaders gather, go to see the line, walk through it and observe how work is done interacting with the employees. Those insights are then used for the VSM and to find gaps. Once the process is mapped and documented, the next step is not taken until all the employees are engaged in the

70

process and are able to answer the two most basic questions of engagement.

2. *Validation Walk:* when the current and future state value stream maps are completed, this walk is triggered whenever a measured KPI deviates. The lean team goes to see the areas related to that metric and firstly explain the purpose of the walk. Finally, they ask the basic 5W+2H questions to get to the root-cause of the problem.

Using lean tools are not considered in Interface as enough to increase the engagement level. Regarding this, which is considered as the main objective of the walk, lean experts ask two questions to employees and area leaders during Gemba walks:

1. Do you know what is expected from your work?
2. Do you have what you need to your job?

In Interface the Gemba walk is supported by the daily Kanban activity which reflects visually and communicates to the team the current state and the areas of opportunity as shown in Figure Apx B-13. This practice helps align stakeholders and change their perspective and behaviour towards improvement. The lean leaders train the process leaders and stakeholders to read and understand the performance visually displayed. Gemba walks are used to discuss the information with the teams and then validate to confirm what is really happening.
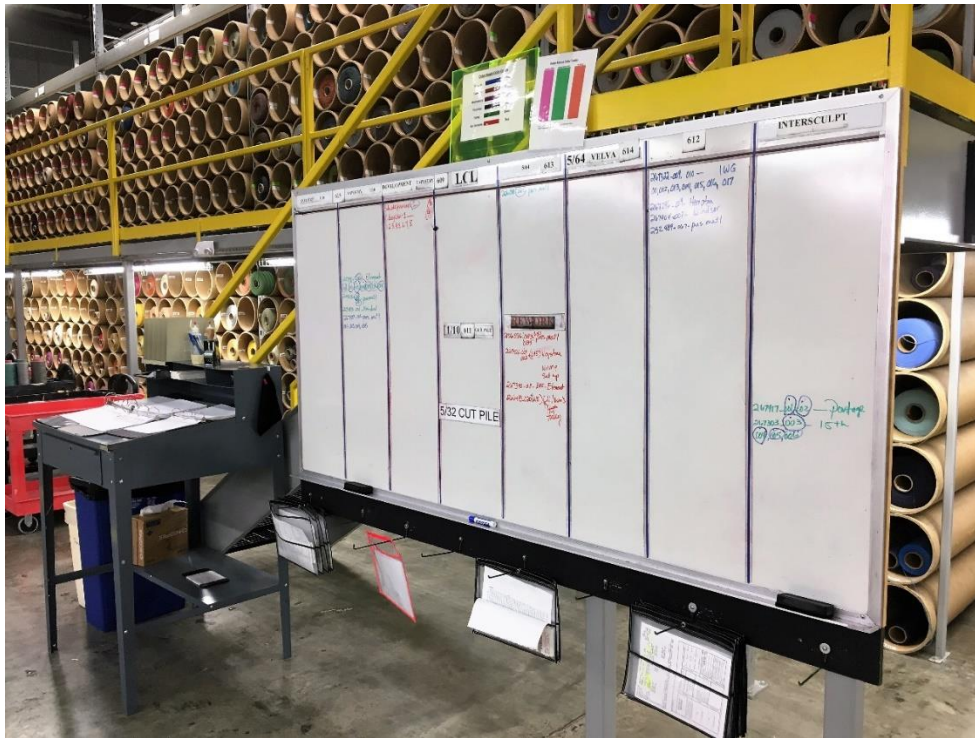
Figure Apx B-13 Interface's Manufacturing Plant Kanban Board (Source: Interface)

Other lean tools are used together with Gemba walks such as root-cause analysis or 5-Why after the walk without employee presence. Moreover, visual communication is fomented by having Kanban boards in different areas, and takt-time and line balancing are used to see and understand how processes flow.

The impacts from the consistent application of Gemba walks with engaged individuals have been dramatic in Interface. From a social aspect, collaboration and individual initiative has increased dramatically. Open and honest communication is at the core of this improvement. Learning together through dedicated practice helps diverse functional areas understand how processes and systems work in similar ways even when there are different reasons for supporting change.

From an environmental aspect, better collaboration leads to more opportunities to ask why and ultimately to more sustainably sourced and produced products. Trust is at the heart of innovation. Innovation, and the change associated with it, can only advance as far as the individuals involved trust each other's intentions. Economically, solutions to root cause problems do not need further

documentation. It should be noted that solutions which consider the social and environmental aspects along with economic feasibility do not diminish robust returns. Projects which begin with Gemba walks and consideration of social, environmental and economic aspects have a much higher probability of successful implementation and a broader positive impact for a larger group of stakeholders.

## B.2.5 Instituto Modelo de Cardiología Privado S.R.L.

Since 2012, Instituto Modelo de Cardiología carries out Gemba walks as tool to see how work is done and know the opinion of the front-line staff. Gemba walks are not protocolised as their implementation is on early stages as it is partly being self-taught. Gemba walks are aligned to customer value-adding activities in the institution, which is basing its practice on international benchmark. Even if there is no current standardisation of the walks, I.M.C.'s leadership have the desire to do it in the short run. Thus, metrics are being defined in all the different areas of the institution so these can be used in future walks.

Gemba walks in the I.M.C. are still on early stages, and are regarded as a tool for process improvement, with no stablished or rigid protocol to conduct them. The frequency with which Gemba walks are done is variable, as there are several areas within the hospital at different maturity levels. Some of the areas are analysed weekly such as secretary, where the site-specific parameters are analysed with per minute indicators.

Nevertheless, and considering the difficulties that implies conducting Gemba walks in a service company compared to a manufacturing one where all the processes are standardised, I.M.C. has implemented three kinds of Gemba walks that are supported and carried out by top management together with front-line employees: value stream map walks, process walks and employee interaction walks.

1. *Value Stream Mapping Walk:* The VSM walk shown in Figure Apx B-14 is the one with the highest maturity level, which is triggered by the desire to carry out new strategic projects. The first step is making the employees of the area aware of the purpose of the walk beforehand, remarking the aim of improvement rather than evaluating. Secondly, managers take

notebooks with themselves and even cameras to record the walks, and write down all the relevant information they find. Once the patient leaves, leaders ask the employees in charge which are the areas of improvement they may find and their doubts, and together make a report of the situation. The person in charge of the walk then meets top management, with whom they develop the process map, and finally the value stream map.
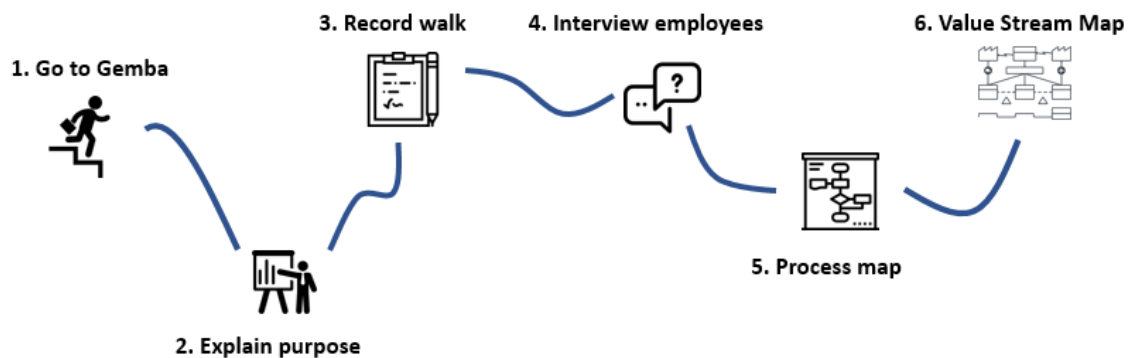
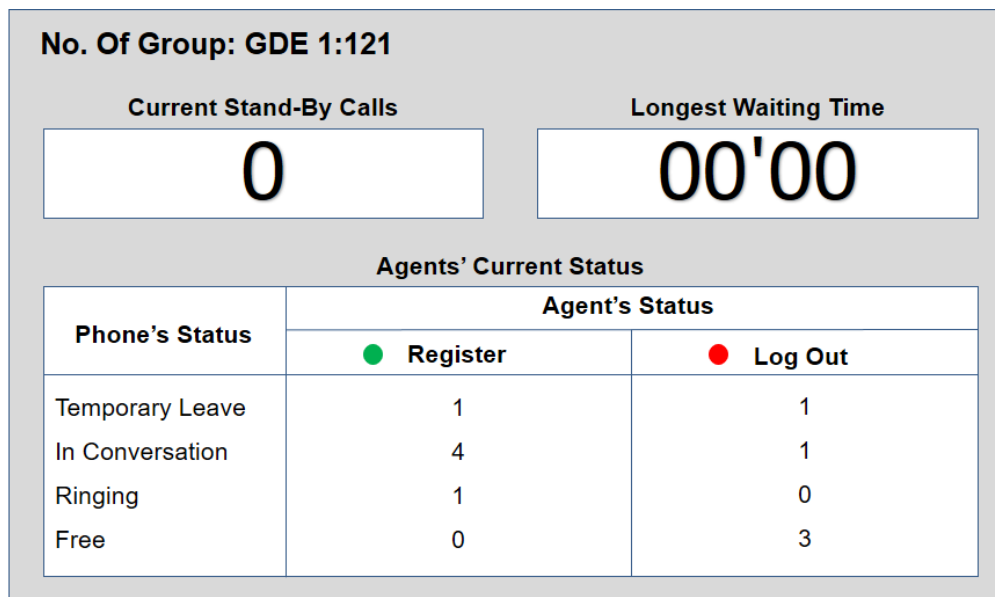**Figure Apx B-14 I.M.C.'s Approach to Gemba Walks**

2. _Process Walk:_ Managers meet and do a walk without asking any question to employees. During this walk, managers just want to see how things are done and how the processes flow, taking notes of the wastes and areas of improvement that arise. Once the walk is finished, managers call back the employees and begin a root-cause analysis applying the 5-Why technique.

3. _Employee Interaction Walk:_ These walks are also called the "Are we having a good day walks". It is done with employees having a 5-minute stand up meeting, where metrics of the different areas are analysed. Those areas without digital management boards where KPIs can be checked live, print the results of the previous week and post them on a common area where these are discussed together with the front-line staff.

The Gemba walks implementation in I.M.C. is leaded by its COO, CMO and Lean Manager, who taught the practices of Gemba walks to some of the area leaders, which likewise trained their team. Furthermore, 24 leaders from the institution have been trained with external coaches from Cardinal Health in the United States in lean.

During the walks, leaders do not bring checklists to make spontaneous questions. However, visual management is a common practice carried out together with the

walks with three areas with the highest maturity level as follow, where KPIs in terms of quality, safety, productivity, efficiency and cost are measured:

1.   _Laboratory Room_: the laboratory room's board includes KPIs in terms of patient waiting time before being analysed, analysis time and number of errors during the analysis. These parameters are checked both by interns and those involved in the walk, who report the reasons for excessive times and errors that may arise.

2.   _Secretary_: in the secretary area, visual management is digitalised as shown in Figure Apx B-15, showing the KPIs in per hour format. The main focus of this area is customer waiting time, where the maximum waiting time is displayed. If the waiting time exceeds 15 minutes, it is shown in red colour, while a time of less than 10 minutes is displayed in green. All the time in between the indicator is coloured in yellow. During Gemba walks in secretary, top management do also observe the metrics related to calls per hour and qualitative aspects such as employee involvement.

No. Of Group: GDE 1:121

Current Stand-By Calls	Longest Waiting Time
0	00'00

Agents' Current Status

Phone's Status	Agent's Status	
	🟢 Register	🔴 Log Out
Temporary Leave	1	1
In Conversation	4	1
Ringing	1	0
Free	0	3

Figure Apx B-15 Live Tracking Gemba Board

3.   _Human Resources_: during the walks on the HR department, leaders observe the key metrics on the Gemba boards provided, chat with the area workers and analyse the reasons that cause deviation on the KPIs' standards. Once the improvement activity is defined, it is assigned to a person within the department. Some of the checked KPIs are the following: absenteeism and its

reasons, rotation, extra hours, labour cost, labour cost per person or in and out of covenant employees.

Moreover, whiteboards as the one pictured in Figure Apx B-16 can be found in different areas of the hospital, where doctors note down the presence of inconveniences for a subsequent root-cause analysis during management visits to the Gemba.

Delay in Surgery

Date Patient Doctor Explanation					
			Main Reason		
Admission	Pre. Nurs.	Stretcher	Lack Insu.	Anest. Surg.	Others

Figure Apx B-16 Root-Cause Gemba Board

I.M.C. is also using A3 Thinking together with Gemba walks as a tool for continuous improvement, displaying boards as illustrated in Figure Apx B-17 on different areas.
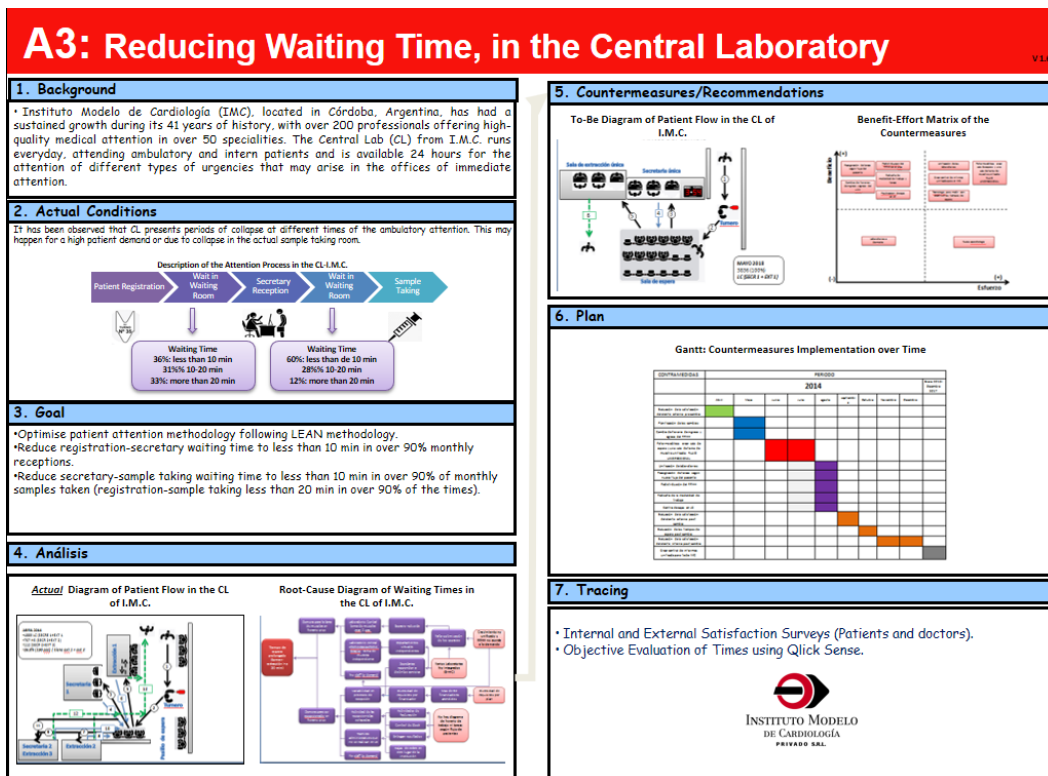
Figure Apx B-17 I.M.C.'s Central Labs A3 Board Template (Source: I.M.C.)

Regarding the Gemba walks implementation and their practice, the benefits in Instituto Modelo de Cardiología can be summarised as:

1. Identification of variability and process improvement opportunities.
2. Increase in employee engagement and satisfaction levels.
3. Increase in interdepartmental collaboration.
4. Customer experience improvement and increase in customer satisfaction.

B.2.6 Thermo Fisher Scientific

Gemba walks started slowly in the Thermo Fisher Scientific's Vilnius Centre due to the lack of management involvement until 2013, when a continuous improvement strategy was adopted. Since then, the company defined the walk as the activity to "go, see and learn to identify improvement opportunities".

The Thermo Fisher's production plant developed a site-specific methodology to implement Gemba Walks practices called Gemba Walk System as shown in Figure Apx B-18**¡Error! No se encuentra el origen de la referencia.**, consisting of four steps.

Figure Apx B-18 Gemba Walks System (Source: Thermo Fisher Scientific)

In the first step Gemba Walks practices are used on a daily basis for strategy implementation purposes. In particular, the information collected through the daily Gemba Walks are a fundamental input to evaluate the alignment between current performance and strategic goals. This is followed by the daily accountability and a subsequent Gemba walk, where managers physically visit the manufacturing front-line (Go), observe how value stream employees operate and interact among each other (See), and develop manager's understanding regarding how shop floor processes generate value together with develop leadership's empathy regarding the problems that line employees experience in their daily work (Learn).

Finally, Gemba Walks practices are used by the company as a way to foster a collaborative problem-solving approach among managers and employees. Indeed, through daily Gemba Walks practices implementation, managers develop a thorough understanding of the value creation process which allow them to collaboratively work together with the front-line employees to identify problems' root-causes and develop improvement interventions.

The first training was provided by internal consultants from the United States, who coached the plant's managers on how to do Gemba walks, explained their purpose and developed the first Gemba checklist. Since then, the site's lean department started developing their own Gemba management boards and checklists with specific topics and questions related to the visited shop-floor location, and managers are involved to an extent that they have daily Gemba walks scheduled. Moreover, managers are also provided with training material

that includes slides on how to ask questions while being on the Gemba and the way to show respect to front-line employees.

The Gemba Walks System defines for each of these organizational levels specific objectives with regards to Gemba Walks implementation as shown in Figure Apx B-19.

TOP MANAGERS
- Is the process flow evenly distributed between departments?
- Identify improvement opportunities between departments
- Coach managers and employees

VALUE STREAM MANAGERS / FUNCTIONAL LEADERS
- Are flow principles maintained? Are there any disruptions?
- Identify improvement opportunities inside value streams
- Coach employees

FRONT-LINE MANAGERS
- Are processes complying with standard work sheets?
- Are there any disruptions? What are the root causes?
- How employees are dealing with the issues?

**Figure Apx B-19 Gemba Walk Levels**

Likewise, this system considers five different types of walks that leaders shall perform on a rotating basis:

1. Gemba walks for strategy implementation: related to value stream mapping
2. Safety walks
3. Quality-related Gemba walks
4. Gemba walks for practical process improvements: aimed to evaluate the lean management tools currently deployed and to identify alternatives of improvements
5. Gemba walks for top daily concerns: aimed to address issues identifies during daily stand-up meetings.

The different levels of management carry out the walks daily, according to the Gemba walk management board illustrated in Figure Apx B-20**¡Error! No se encuentra el origen de la referencia.**. This visual management board is used to firstly define the objectives of the Gemba Walks, letting managers know the area and the type of walk to carry out. Moreover, the board gives the opportunity

to use coloured pins to show if the walk is done (green pin) and the number of ideas generated (yellow pin). Note that if a manager misses a walk due work, he or she will still have to do it the following days to compensate the absence and instil a discipline culture within the company. Since 2014, the General Manager of the Centre has daily Gemba walks scheduled with different site's directors, such as quality or facility managers.
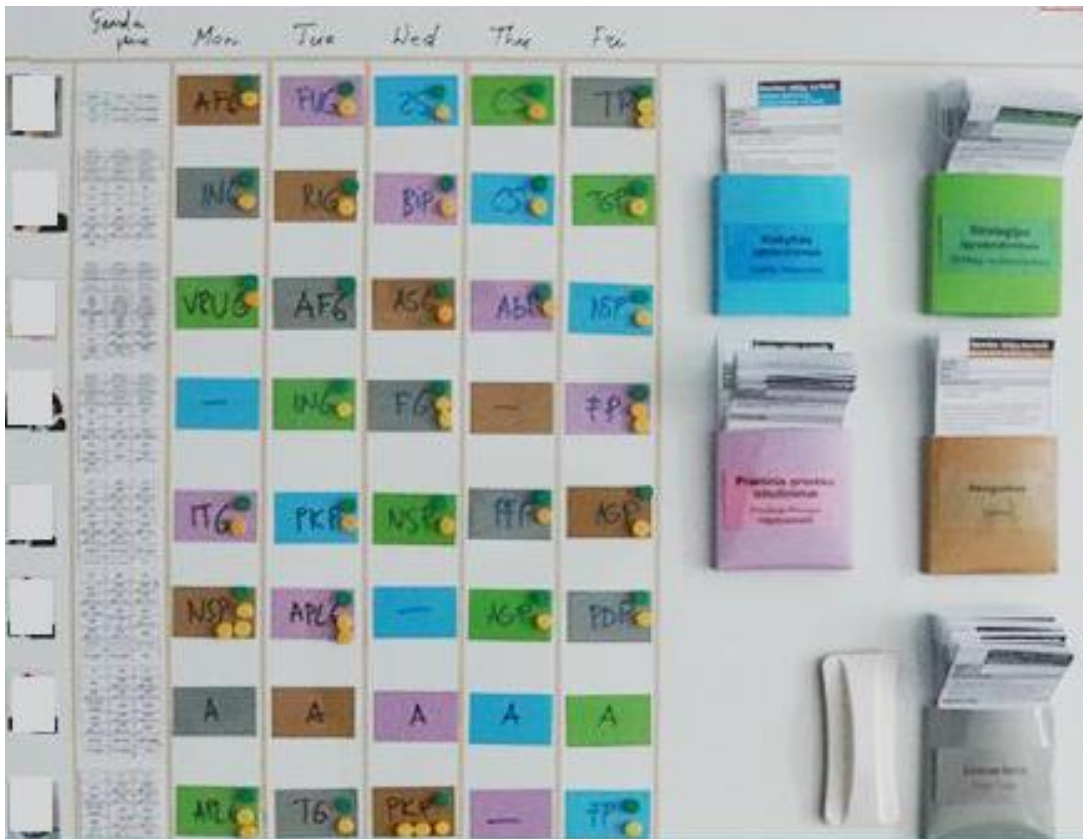
Figure Apx B-20 Gemba Management Board (Source: Thermo Fisher Scientific)

To support managers in the implementation of the Gemba Walks practice, leaders are provided with 'Gemba Walks Idea Cards', that is used as a guideline. The company developed different cards for each of the three managerial levels and differ based on the type of Gemba Walk that will be performed.

As pictured in the example presented in Figure Apx B-21, these cards contain a set of questions aimed to analyse the main characteristics and critical factors related to each type of Gemba Walks. The card also includes a blank space for noting improvements that may come up during the observations and addresses the person responsible for the implementation of the improvement activities.

Figure Apx B-21 Gemba Idea Card (Source: Thermo Fisher Scientific)

An important part of the Gemba Walk System concerns the development of the 'Idea Cards Boards' which are specific visual management boards focused on collecting ideas for improvements. The company deploys 15 Idea Cards Boards spread across the Thermo Fisher's production plant in Vilnius that are used by both managers and shop-floor employees. Figure Apx B-22 shows one of the Idea Cards Boards used within a specific department. The ideas for improvements are clustered in four different columns. The first column starting from the left side, is dedicated to collect all the new ideas that have not been implemented yet. The second column contains the ideas that are currently being implemented. The third column is used to collect the ideas that have already been implemented, and the last column is dedicated to host the ideas provided using a free template. In addition, the Idea Cards Bards include a matrix where ideas are rated in terms of effort and impact, and a bar chart to show the number of ideas generated. Note that even if all the department boards have the same design, the type of cards used depend from the user. The yellow cards contain idea generated by employees while the grey cards contain ideas proposed by managers.

Figure Apx B-22 Gemba Idea Board (Source: Thermo Fisher Scientific)

In the Gemba, leaders do also review KPIs present on site-specific boards, and start a collaborative root-cause analysis together with shop-floor employees. The improvement opportunities found during the Gemba Walks, as well as the ideas provided by the shop-floor employees, are then reviewed and the decision whether to implement them or not is taken. Figure Apx B-23 shows the evolution of number of Gemba Walks and ideas generated since the walks' implementation in 2013.

Figure Apx B-23 Annual Gemba Walk Results since the Implementation (Source: Thermo Fisher Scientific)

Through a systematic deployment of Gemba Walks practices, the company achieved the three main objectives showed in Figure Apx B-24, defined by the company as a crucial prerequisite for the achievement of the overall purpose of strategic alignment.
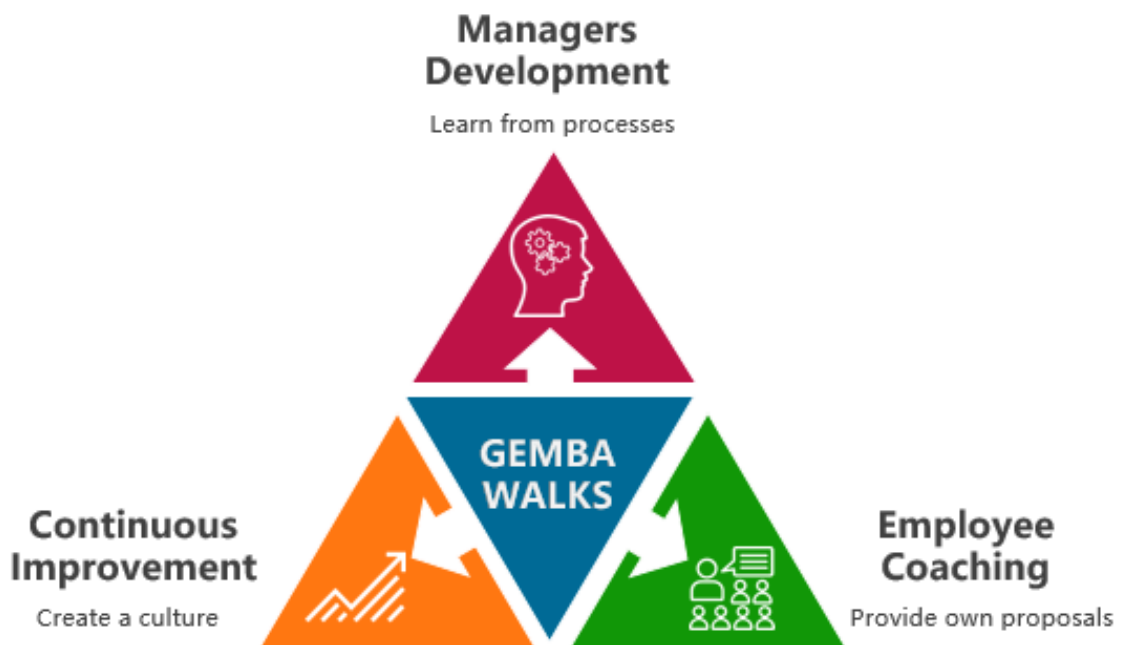
Figure Apx B-24 Gemba Walks Impact

B.2.7 BOCAR Group

BOCAR Group started the Gemba walk practice in 2008 due to the desire of building a lean culture into the group and as a way to check if employees follow standards and look for improvement opportunities.

The organisation calls its practice the BOCAR circle. Once the area of analysis is decided, the court team composed of between 8 and 12 top managers head the Gemba and stay for around 40 or 60 minutes analysing the processes and look for the eight wastes, checking that standards are followed according to takt-time, one-piece flow or waiting times. Thereafter, a 30-minute brainstorm activity begins together with the shop-floor employees, trying to find improvement ideas in terms safety or ergonomics. If improvement opportunities are discovered, a new 30-minute activity begins: the person responsible for each task is defined and as many solutions as possible are given during the timeframe. If standards are followed and no improvement activity is found, leaders propose their own initiatives. Finally, given a time after the implementation of the improvement activities, leaders go back to Gemba with a picture of how the area was and see if the defined actions were conducted correctly and if a positive change happened. Figure Apx B-25 illustrates the BOCAR Circle as conducted on its 10 facilities.
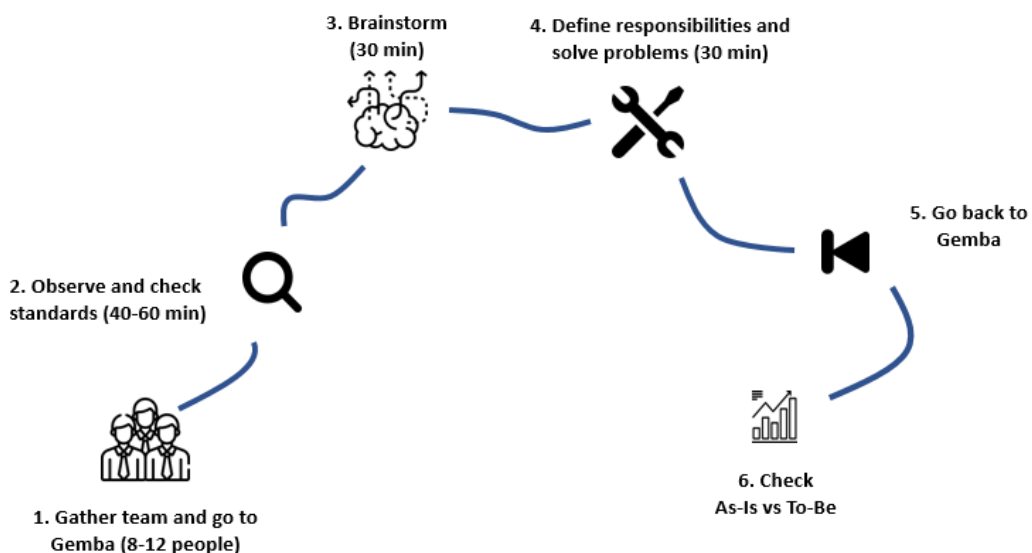

Figure Apx B-25 BOCAR Group's Approach to Gemba Walks

Regarding the training, all the employees are enrolled on a continuous improvement and lean course with a focus on operations where practices as Gemba walks are embedded. This way, operators understand the reason of why leaders attend the shop-floor as a way to help and achieve optimal working conditions, raising employee and leadership engagement. These learning sessions happen during an entire day. However, the practices are refreshed annually considering the proposals given by employees throughout the previous year. Moreover, leaders in BOCAR carry out a lean certification process to understand the benefits of the lean culture in general.

Even if there are weekly meetings to check lean practices in general, BOCAR circles are carried out on a monthly basis by the court team, sometimes accompanied by an expert on the area that is visited. The group does not identify different types of walks and carries them out with the help of a lean facilitator that reminds them of which are the good practices when conducting the walk. The practice is standardised and if metrics deviate, leaders go to the root to try to find the problem generator.

The findings are reported and shared in a visual way via the Kaizen Journal, where the discrepancy with the standards is highlighted as well as the improvement actions, stressing the founder's mission: discipline, order and cleanness. Pictures showing the As-Is and To-Be situations are reviewed monthly by the court team, whom validate the actions taken and share them with other group's plants. Furthermore, there is an online archive where all the actions achieved from the Gemba walks can be checked, available to all the BOCAR Group's employees.

Some of the boards have already been defined for checking if 5S is conducted, with relevant KPIs to assess the practice. Moreover, the As-Is and To-Be situations' pictures are raised on the boards to make visual how the arrangement of the areas should be done and as a way to promote that the standards are followed, making visual any finding from the Gemba walks. BOCAR Group does also use the Kaizen Journals as a way to make the work more visual, as well as to inform of how the best areas work and showing which are the areas of the plant that can be improved, addressing the improvement activities conducted.

Once the leaders meet and observe that standards are not followed, they apply the company-developed "just do it" practice, trying to get back to the standard as soon as possible. This is lately sustained by employees and the management review to the areas where improvements were conducted. The problem-solving approach is taken after the shop-floor visit, most times without the presence of operators, applying the 5-Why technique and Ishikawa. Moreover, black-belts carry out a DMAIC process and the improvement activities are given a due date before which they must be done.

Since the beginning of the practice, BOCAR Group has observed benefits in terms of employees, managers and clients. Employees that no longer work on the shop-floor and have been promoted to middle managerial levels find positive the fact of going back to Gemba and keeping the contact with the processes, where they can see how their decisions have improved the way in which their colleagues work and the processes. Likewise, a continuous improvement conscience has been created on the employees and are now aware that the court team is involved with their work, trying to help them. As leaders spend their time in the shop-floor, employees' work and processes are aligned to the group's strategy, achieving improvements in terms of production, service and customer satisfaction. Lastly, Gemba walks allowed leaders to be in contact with the processes and their people, building a blame free culture where questions are openly asked.

Appendix C Gemba Walks Framework Discussion

Gemba walks are a lean leadership practice commonly used in manufacturing companies. After analysing both literature review and case studies, the roadmap to follow in the implementation of GWs should consist of five stages: training, standardising, going to Gemba making use of lean tools, reporting and sharing the walks, and finally, returning to Gemba to check corrections and sustain the practice.

Even if the results of the study are qualitative rather than quantitative and that the generated framework has not been implemented in a company to measure its results, a global analysis of GWs has proved to bring improvements in different aspects.

1. Employee engagement: as leaders go to Gemba and show respect, coach and congratulate their employees, they feel that what they do is valuable, feeling important inside of the company. Moreover, operators are developed while they learn about the processes together with the managers, whom due to knowing employees at personal level can identify future leaders.

2. Management involvement: when managers visit the shop-floor, they understand how the work is done and learn about the current conditions, becoming aware of the problems thanks to the direct contact with the processes. This results in an increase in collaboration, enhancing their coaching skills and creating a blame-free culture where problems are openly shared.

3. Continuous improvement: GWs allow managers to identify variability and improvement opportunities together with employees, who collaborate eliminating waste from the processes. The practice also serves to align processes and people to the company's strategy and set the expectations of employees towards quick change and the continuous improvement culture.

The findings conclude that to carry out successful GWs and achieve the aforementioned benefits within a company, the following tools and methods need to be applied.

1. Training: to make aware both employees and managers of the benefits to expect from the walks, as well as to do the walks correctly.
2. Standardisation: as most of the lean tools, the practice must be defined to achieve a common understanding. Furthermore, it allows identify waste in the walk itself.
3. Visual management: which enhances transparency and impartiality, meanwhile allowing a clear understanding of the processes in an easy way.
4. Problem-solving: one of the principal reasons to go to the Gemba is collaboratively identifying the root of the problems faced by operators. Therefore, a tool that addressing this need must be considered.

Appendix D Validation

Gemba Walk Framework Validation

Question	Evaluation (1 - 5)	Comments
1. Considering the Gemba walk framework, your first impression is positive	5	VERY GOOD OVERVIEW OF A BEST PRACTICE GEMBA WALK
2. The framework includes all the sections needed to develop successful Gemba walks.	5	THE BACK-UP CHECK-LIST & BOARDS ARE GOOD EXAMPLES
3. All the sections are clearly explained and are easy to understand.	5	SIMPLE LANGUAGE THAT CAN BE FOLLOWED AT ALL LEVELS
4. The visuals and examples included ease the implementation of Gemba walks.	5	THE VISUALS & EXAMPLES ARE BETTER THAN DESCRIPTIONS.
5. The framework is easy to be adapted or used to improve current application of Gemba walks.	4	BE CAREFUL THAT GEMBA WALKS DO NOT BECOME TOO BUREAUCRATIC

Overall impression:

VERY GOOD PIECE OF WORK.

PETE WILSON
23-08-18

Name and date:

Signature: P.S. Wilson

Figure Apx D-1 Mr. Pete Wilson's Validation Results

Gemba Walk Framework Validation

Question	Evaluation (1 - 5)	Comments
1. Considering the Gemba walk framework, your first impression is positive	4	
2. The framework includes all the sections needed to develop successful Gemba walks.	4	Could go deeper on some items, but I understand this is part of a larger thesis. So this is Ok.
3. All the sections are clearly explained and are easy to understand.	4	
4. The visuals and examples included ease the implementation of Gemba walks.	5	
5. The framework is easy to be adapted or used to improve current application of Gemba walks.	5	

Overall impression:

I like your colored matrix for rotating the walks.

In general, I like what you wrote. It is simple, you cite your sources and I think it is holistic enough to cover the whole GW process. Good job!

Name and date: Michael Bremer 23/8/18

Signature: *Michael Bremer*

Figure Apx D-2 Mr. Michael Bremer's Validation Results

Appendix E CURES Approval Form

Cranfield UNIVERSITY

Cranfield University Research Ethics System (CURES)

Part 1: Summary Details

Lead Researcher (Applicant)

Title	First Name	Surname
Mr	Alvaro Rafael	Saenz-Cortabarria

School: Aerospace, Transport and Manufacturing

Course code: MSGPDFTC

Email: A.Saenz-Cortabarria@cranfield.ac.uk

Lead Researcher status   ⦿ Student   ○ Staff

Please confirm mode of study

☑ Full-time
   Part-time

Please confirm method of study

— Taught
✓ Research

Please confirm which project type your application is supporting

⦿ Thesis
○ Group Project
○ Other

Does this research project involve any co-researchers?

○ Yes
⦿ No

Short title of project

Discovering Gemba walks good practices within industrial lean applications

Full title of project

Discovering Gemba walks good practices within industrial lean applications

Abstract

The project aims to develop a Gemba walks framework according to industrial best practices, obtained via questionnaires and company visits.

Lead Supervisor

Title	First Name	Surname
Dr	Ahmed	Al-Ashaab

School   Aerospace, Transport and Manufacturing

Email   a.al-ashaab@cranfield.ac.uk

If the supervisor details above are missing or incorrect, please contact cures-support@cranfield.ac.uk and we will add or amend the information.

Do not sign the form in Part 6 until we have replied to you that the supervisor information has been updated.

Intended start date of data collection   08/05/2018

Please note: you must not begin your research until approval has been given by CURES.

Will the research be sponsored or funded by an external organisation?

    ◉   Yes

    ○   No

Please enter the name of the external organisation

| Lean Analytics Association |

Please click on 'Next' in left hand actions bar to move forward to Part 2

Part 2: Ethical Risk

The following questions will help determine the level of ethical risk that your project entails.

Please select any that apply:

- ☐ Living animals are involved in my research
- ☐ The research will use tissues from deceased animals that have been killed as part of the research project
- ☐ The research involves living organisms/biological agents and could potentially impact other entities outside the laboratory
- ☐ People may be seriously harmed in the course of the research
- ☐ The proposed research could adversely affect the reputation of the university
- ☐ The research data is about illegal activities or will be collected from those engaged in illegal activities, or has itself been collected illegally

- ☑ None of the above

Please select any that apply:

- ☐ The research will involve the collection and use of 'relevant material' under the Human Tissue Act 2004
- ☐ There are significant power differences present, or dual or other complicating relationships exist
- ☐ The research will deal with material that is obscene or violent in content
- ☐ The risk is greater to the participant(s) than they would normally experience in their daily life (physical, emotional, psychological, career, financial)
  The research interacts with members of potentially vulnerable groups (e.g. children, the elderly, those with learning difficulties, prisoners etc.)
- ☐ National infrastructure will be impacted negatively (e.g. power grid)

- ☑ None of the above

Please select any that apply:

- The research involves interviews with or surveys of human participants where sensitive personal data will be gathered
- The research involves interviews with or surveys of human participants where commercially sensitive data will be gathered
- The research will use tissues from deceased animals that have come from the food supply chain, roadkill or an authorised source
- The research will use tissues from living animals that have come from normal husbandry, a therapeutic routine, or operation
- The research has defence or security implications
- The research is based on unpublished material

☑ None of the above

Please select any that apply:

☑ The research involves surveys or interviews with human participants who are fully able to provide their informed consent, and if applicable, organisational approval has been obtained for the employees of the organisation concerned to take part in the research
☑ The research consists of interviews, where any published or recorded material does not contain personal data, unless permission has been obtained for its use (for example, name, job title or years in post)
- Sensitive personal data will not be collected
- The research consists of surveys, which will not collect personal data or identifying information

- None of the above

If you are using animal tissue, please explain where it has come from. If it originates from an animal house provide the details of the university or other establishment in the box underneath and how they comply with the required Home Office approval; and under what license conditions

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With reference to your answers above, please confirm whether your research requires obtaining informed consent

○ Yes
○ No
⊙ not applicable

Will participants be able, during the data gathering phase, to freely withdraw or modify their consent and to ask for the destruction of all or part of the data that they have contributed?

○ Yes
○ No
⊙ Not applicable

Will your research adhere to the duty of confidentiality?

○ Yes
○ No
⊙ Not applicable

Are there any conflicts of interest?

- ○ Yes
- ○ No
- ● Not applicable

Are you collecting commercially sensitive data?

- ○ Yes
- ● No

Please comment on any other ethical issues that may arise from your project

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Please click on 'Next' in left hand actions bar to move forward to Part 3

Part 3: Methodology and Expertise

By completing the following information on your research methodology will help us match your application with the most appropriate reviewer(s).

What type of research design will you be using? (tick all that apply)

- ☐ Experimental
- ☐ Quasi-experimental
- ☐ Cross-sectional or survey
- Longitudinal
- ✔ Case study
- ☐ Comparative
- ☐ Other

If other, please specify

Interviews

What type of research strategy will you employ?

- ● Qualitative
- ○ Quantitative
- ○ Mixed methods

Which methods will you be using? (tick all that apply)

- ☐ Experimental - design
- ☐ Experimental - field
- ☐ Experimental - laboratory
- ☐ Randomized controlled trial / other intervention study
- ☑ Interview
- ☑ Observation (for human participants only)
- ☐ Focus groups
- ☑ Questionnaires/surveys
- ☐ Action research
- ☐ Personal documents
- ☐ Medical records
- ☑ Literature review
- ☐ Systematic review
- ☐ Secondary data analysis
- ☐ Advisory/consultation/collaborative groups
- ☐ Other

Please describe briefly the population that you will study

Managers from different companies will be interviewed during the thesis.

How will you evaluate (validate/verify/analyse) your data?

- ☐ I will collect the data and then determine whether there are significant groupings or trends present (information-theoretic models)
- ☐ I will test a hypothesis
- ☑ Other

If other, please specify

Validate with the sponsoring company (Lean Analytics Association)

Please assign your research project to one of the University Themes

Manufacturing

Please click on 'Next' in left hand actions bar to move forward to Part 4

Part 4: Specialist Studies

This section relates to research around health and defence topics. For most applications the questions will not be applicable.

Have you ensured that your study complies with The Human Tissue Act 2004 and its nine codes of practice?

- ○ Yes
- ○ No
- ⦿ Not applicable

Are you conducting research involving human participants undertaken, funded or sponsored by the Ministry of Defence?

- ○ Yes
- ⦿ No

Is the research taking place in or through the National Health Service (NHS)?

- ○ Yes
- ⦿ No

Please click on 'Next' in left hand actions bar to move forward to Part 5

Part 5: Supporting Documents

You are encouraged to upload a research protocol if this is common practice in your area of study. In addition, please upload any supporting documents you may have that will help reviewers understand your research design such as questionnaires, interview schedules, participant information sheets, consent forms, case for support etc. (dependent on study)

Please click on 'Next' in left hand actions bar to move forward to Part 6

Part 6: Declarations and Signatures

Researcher Declaration

- The completed form is accurate to the best of my knowledge and belief.
- I undertake to abide by Cranfield University's Ethics Policy in undertaking this project.
- I understand that ethical approval for projects, and that the seeking and obtaining of all other necessary approvals and permissions prior to starting the project is my responsibility.
- I understand that I must not begin the research until I have received approval from the Cranfield University Research Ethics System (CURES).
- I understand that any significant changes that I would like to make to this project after receiving approval from CURES, will require a new application to be submitted.

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Researcher Signature

Signed: This form was signed by Mr Alvaro Rafael Saenz-Cortabarria (A.Saenz-Cortabarria@cranfield.ac.uk) on 20/05/2018 21:31

Supervisor Declaration

* I confirm that I have read and fully support this application and will be acting as the supervisor of the lead researcher (student) for this project.
* I have checked that the application has been completed correctly and is of good quality.
* In my opinion, the proposal is viable.
* I understand that the lead researcher I am supervising must not begin the research until they have received approval from the Cranfield University Research Ethics System (CURES).

Lead Supervisor Signature

Signed: This form was signed by Dr Ahmed Al-Ashaab (a.al-ashaab@cranfield.ac.uk) on 21/05/2018 11:05

Students must obtain a signature from their supervisor.
Once your supervisor has signed the form, your application will be automatically submitted.

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