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Can Toyota Kata revitalize the Lean Journey of Hilti Italian warehouse in Carpiano?

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ABSTRACT

The departure point of this master thesis is a topic widely discussed in the academic literature that is the missing sustainability of the advantages gained with the implementation of the lean approach. Indeed until today most of the companies' efforts were directed towards implementing lean tools to improve operational processes while placing little, if none, attention to the people who actually improve these processes. (Hines et al., 2008) As a result, the great majority of the companies failed in their reverse engineering efforts because they focused their attention on the wrong aspects. (Rother, 2010) They all missed to understand that the reason for Toyota's adaptability does not lie in its tools and techniques since "*Toyota's techniques will not work properly without Toyota underlying logic*". (Rother, 2010) Instead, Toyota's advantage is embedded in its people skills and competencies (Rother, 2014), or better in the systematic and scientific approach created to support the development of its people's potential and fined tuned over the decades. (Rother, 2014) This is where the Toyota Kata concept comes into play.

Toyota Kata is a relatively new topic as it was introduced by Mike Rother in 2009 with the book *Toyota Kata: Managing People for Improvement, Adaptiveness and Superior Results*. Nonetheless it immediately gained relevance and popularity among academics and practitioners. This is exactly the case of the Hilti Group where, before the implementation of Toyota Kata at Carpiano warehouse, there was a widespread lack of awareness on the concept. Even so, it was chosen as focus topic for the prestigious Lean Summit held in Schaan during the 14th of September. These, together with the passion for lean, are the reasons that brought to the selection of Toyota Kata as the central subject of this master thesis. In particular in this thesis it is discussed how Toyota Kata was implemented at Carpiano warehouse and what were its major impacts on the lean journey started by the Italian distribution center in the late 2011. The objective of this investigation is that of providing a "Best Practice", anchored on the theoretical frameworks proposed by the literature review, on how to apply this intangible and complex topic in order to support its diffusion into other realities of the Hilti Group.

Lastly, it was found that there are some gaps between theory and practice even though the implementation of Toyota Kata at Carpiano warehouse was mostly founded on academic frameworks. Since the knowledge on the topic was scarce within the Hilti Group, the local management team and, above all, the Global Lean team mostly relied on theoretical frameworks proposed by Mike Rother. Therefore it is believed that the following topics can be generalized with regards to the implementation approach selected at Carpiano warehouse:

- ✓ Toyota Kata is a methodology suited for those companies that are willing to invest in and develop the leadership and problem solving skills of their employees so that these are empowered to be the active promoters of the continuous improvement process at shop floor level. On the contrary this methodology is not appropriate for those firms that need a tool to quickly boost performance of a single process or of the entire organization.
- ✓ Toyota Kata touches several strategic elements of lean that deal with culture and behavior. A company will have to invest time and resources and provide an adequate level of commitment to the initiative otherwise the risk is that of giving up at the first roadblock. Under this point of view a strong vision can guide people towards the right direction if this is then effectively communicated and deployed at shop floor level.
- ✓ The best way to internalize Toyota Kata is through the continuous practice of its patterns. It is hence essential for a company to provide not only an intense in-class training, but also an adequate period of time and a safe environment for the repetition of this methodology on simple topics in order to routinize its structure.

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1 Introduction

This chapter is divided into three sections. The first one introduces the subject of the master thesis and deepens its origins and context. The second one clarifies the research problem addressed by the author and the structure followed throughout the master thesis. Lastly in the third section it is presented the multinational company on which is grounded this master thesis; namely the Hilti Group.

1.1 Introduction to the Subject

It is known that innovative achievements inspire imitation. Although many think of it as something related to sportive and artistic environments, this concept is also relevant in business, as demonstrated by the belief that *"successful imitation rather than innovation may be a better way to make money"*. (Flannery, 2010) It is hence logical why the success achieved by Toyota in the last 25 years has inspired thousands of organizations worldwide to apply the famous lean methods. (Liker & Rother, 2014) European and American companies adapted and developed their own versions of Lean Management with the goal of eliminating waste, reducing costs, improving quality and stabilizing operational processes. (Liker, 2004) Nonetheless, until today very few companies, if none, managed to reach the same level of performance and sustainability in lean of Toyota. (Liker & Rother, 2014) What all of these companies misunderstood is that "*to be successful, you have to learn how to both imitate and innovate.*". (Flannery, 2010)

Even though Lean is regarded by many authors and practitioners as the paradigm of the future, the data on the missing sustainability of this concept speak loud and clear. (Rubrich, 2004) The "MPI Census of Manufacturers" survey conducted by The Industry Week and released in November 2007, showed that even though "nearly 70% of all plants in the U.S. are employing Lean only 2% of companies who responded to the survey have fully achieved their objectives and less than a quarter of all companies (24%) reported achieving significant results". The same concept was reiterated by Robert Miller, Executive Director of the famous Shingo Prize, who in a 2010 interview stated: "We were quite surprised, even disappointed that a large percentage of those organizations that had been recognized had not been able to keep up and to move forward... We studied those companies and found that a very large percentage of those we had evaluated were experts at implementing tools of lean but had not deeply embedded them into their culture." (Liker & Rother, 2014)

The current fast changing business environment requires companies to be able to constantly adapt and innovate. (Rother, 2010) However focusing only on systems and processes is nothing but a temporary remedy. Indeed as market conditions will change, the systems and processes will also become obsolete. (Rother, 2014) The widespread inability of companies to sustain lean over the long-term poses an interesting question whose answer is the departure point of this master thesis and constitutes the context of the research. The question that arises is the following: *Why is it so arduous to sustain the benefits achieved with lean and why is lean at Toyota more successful than at any other company*? The answer to this question can help companies, in this specific case the Central Warehouse of Hilti Italia S.p.a., to rethink and restructure their approach towards lean to make it more sustainable and successful in the long-term. It can also help managers to understand that to fully realize the benefits of this powerful productive paradigm it is required a cultural change that starts from how they lead and promote continuous improvement in the organization.

1.2 Context of the Master Thesis

To have a better understanding of the relevance of the research problem (RP) addressed by this master thesis and the reasons underlying the choice of Toyota Kata as focus topic, it is essential to have a brief excursus about Hilti lean journey within the logistics function. The Global Lean Logistics department, located in Schaan, started to push lean at warehouse level in 2012 by establishing Kaizen workshops with the aim of implementing some tools and methods. One year later the investment made in terms of time, commitment and resources repaid its expectations. Indeed as depicted in figure 1, lean had a visible and positive impact on the efficiency of various warehouses owned by the Hilti Group. (The shown percentage increases apply to the time period from 2011 to 2013 and are expressed in lines per man-hour.)



Figure 1 – Lean impact on efficiency in Global Logistics at Hilti

The biggest impact on efficiency with regards to the initial performance level took place at Bredbury warehouse, Great Britain. To celebrate this achievement, in 2013 Bredbury warehouse was awarded by the Hilti Group with the Hilti Lean Award. However, after the warehouse manager left, the performance level suffered a severe setback. This was the first demonstration of the fact that lean had not been fully understood by those who have to use it daily as part of their job, the employees. Instead of being part of the way of thinking and acting at Bredbury warehouse, lean was simply a method pushed by management to increase efficiency of processes. This is the reason why, as the warehouse manager left so also the various pressures and requests to apply and maintain lean vanished.

Similarly, the inability to sustain the advantages gained with lean was beginning to negatively impact the overall performance of Carpiano Warehouse. A clear example was the sudden drop in the number of quality circles (QC) concluded. From January of 2014 to August of 2015 both team leaders that team members did not proposed any idea for improvement and thus no quality circles were opened. Even short-term oriented actions for improvement proposed during shop floor management (SFM) were very often not completed and as a result, these periodically re-appeared in the AIP list exposed on the SFM board.

These examples are strictly related to the question posed at the end of the first section. They are indeed all part of a problem, widely discussed also by the academic literature, which is the lack of sustainability of the advantages gained with lean. Indeed one of the most common scenarios in lean implementations is that the journey started off great, but it lost momentum after a certain period of time. (Hines et al, 2008) As shown in figure 2 there are two different trajectories that a company can follow along its lean journey. One line (the dotted line) is associated with better short-term performance due to the implementation of single elements of lean such as kanban or 5S. Nonetheless the dotted line shows that the various slumps caused by the lack of sustainability at the end resulted in a complete loss of the benefits achieved. This dotted line resembles the trajectory followed by Bredbury and Carpiano warehouses along their lean journeys that were now facing a period of stagnation where "*improvement leveled off and eventually stopped due to lack of realizing "true" Lean opportunity*". (Hines et al., 2008) On the other side, the green line is related to sustainable competitive advantage, achieved through the holistic implementation of each element of lean and thus the creation of a true lean culture based on "*continuous improvement / pursuit of perfection*". (Hines et al., 2008) Unfortunately, until today very few companies have been able to follow the green line, to conceive lean as something more than just a set of tools and embrace it as a religion. (Ade Asefeso, 2013)



Figure 2 - Lean Journey from Hines et al. 2008

1.3 Definition of the Research Problem and Structure of the Master Thesis

The dotted line in figure 2 depicts the trajectory followed by the lean journey at Carpiano. Lean arrived at the Italian central warehouse as the result of a kaizen event promoted by the Global Lean department. As shown in figure 1, between 2011 and 2013 the implementation of various lean methods had a positive impact on the efficiency of the Italian central warehouse as this improved by 33%. Last but not least, in 2014 Carpiano warehouse was awarded with the "Best in Class" title for the entire Hilti Group. (Figure 26 in the Appendix)

Despite the results achieved with the implementation of lean, already by second half of 2014 the signs of the stagnation were becoming always more discernable. On the one side, discussions with warehouse team members and interviews with team leaders revealed that in their opinion lean had not still much to offer to Carpiano warehouse. Moreover, although most of them positively judged the impact of lean at warehouse level, they also complained about the extra work associated with it. On the other side the management team was even more critical on the topic. They were convinced that lean was not yet part of the way of working at Carpiano warehouse since it was often seen as something on top to the daily job. They were also unsatisfied with the current level of quality of lean as this was remained flat for too long and was still characterized by a strong silos mentality.

Since these same symptoms began to be manifest in other plants and warehouses of the Hilti group, the Global Lean department decided to research on the topic of Toyota Kata and, during the GLOMEX held in November 2014, together with the management team of Carpiano, opted to have the first Kata pilot project in Italy. The attention of the Headquarter on the topic as well as the expectations set by the project-team were and are still very high. Given the relevance of this topic, this master thesis is aimed at analyzing:

RP) "Can Toyota Kata revitalize the lean journey of Carpiano warehouse?"

In order to comprehensively and systematically structure the answer to the research problem the author of this thesis cascaded down from it three major research questions (RQ). Hereafter are listed the three RQs and it is explained their connection with the research problem.

RQ1) "What are the most critical factors that brought to a stagnation of lean at Carpiano warehouse?"

The aim of this question is to understand how managers can recognize the lack of sustainability of lean to then comprehensively unearth and eradicate the major root causes that triggered the problem. This is not an easy task since very often managers like to talk about lean without demonstrating with actions their seriousness and commitment to it. (Liker, 2004) At Carpiano warehouse the management team played a key role in recognizing that lean was starting to signal a slump and in searching for a possible solution to overcome the problem. They were indeed convinced that lean was the right path to follow, even though they were unsatisfied with the trajectory undertaken. The answer to this research question is based on the one hand on the theoretical background about lean and about key success factors for the implementation of the change. On the other hand on the quantitative data) and on the qualitative data gathered with interviews to all the four warehouse team leaders, Aurelio Mariani, Matteo Pozzoli and Fabio Milani.

RQ2) "What are the essential elements to take into consideration during the implementation of Toyota Kata?"

The objective of the second research question is to study what are the reasons that brought to choose Carpiano warehouse as a pilot location and in particular what are the prerequisites for an efficacious implementation of Toyota Kata. This question aims also at explaining the challenges and benefits resulting from the implementation mode selected in order to understand if it can be considered as a "Best Practice" for other companies. Lastly this question is intended at identifying possible differences and similarities between the lean implementation approach followed at Carpiano warehouse and that used for Toyota Kata. By doing so it is hence possible to forecast whether also the change associated to Toyota Kata is destined to vanish with time or not. The answer to this research question is based either on the theoretical background about Toyota Kata and on the qualitative data gathered from interviews with Matteo Pozzoli, Fabio Milani, Andrea Ferrero and Cemil Polat.

RQ3) "What are the major changes introduced by Toyota Kata at Carpiano during the first Roll-out?"

Lastly, the purpose of this research question is to study the major effects that Toyota Kata had at Carpiano warehouse in order to categorize them and then analyze their areas of impact. More precisely this inquiry is aimed at understanding if Toyota Kata supported a more strategic level of lean where the focus is on organizational learning rather than on simply copying already existing solutions. Essentially, the aim of this question is to understand if Toyota Kata can be considered as a driver of lean sustainability and growth. The answer to the third research question is based on the one side on the theoretical background about lean and Toyota Kata. On the other side on the quantitative data gathered from the 1st Kata roll-out and qualitative data gathered from interviews with warehouse team leaders and Matteo Pozzoli, E4 Warehouse Controlling Team Leader.

To conclude, the overall purpose of this master thesis is to analyze how the first changes brought by Toyota Kata at Carpiano are influencing the lean journey undertook by the warehouse 4 years ago. Since the concept of Toyota Kata embeds also various cultural elements of lean, it takes time for an organization to internalize it and to realize its full potential. This is the reason why I decided to focus only on the first outcomes resulting from the roll-out at middle management level.

Lastly, this master thesis is structured into 6 chapters.

- i. Chapter 1 gives an introduction to the topic by defining the overall context, by stating the research problem and research questions and by giving an overview of the Hilti Group and of Hilti Italy s.p.a..
- ii. Chapter 2 explains the methodological approach by clarifying the decision that led me to opt for the action theory, the types of data used for the analytical part and the methods applied to gather them with all the relevant limitations in terms of reliability and validity.
- iii. Chapter 3 discusses the necessary theoretical background and clarifies the framework conditions. It is divided into two sections: the first one outlines the distinction between the operative and strategic levels of Lean and the critical factors to take into consideration during its implementation. The second section highlights the concept of Toyota Kata and distinguishes between the Improvement Kata and the Coaching Kata patterns.
- iv. Chapter 4 is divided into three analytical sections. The first one studies the period of stagnation of lean prior to the introduction of Toyota Kata at Carpiano warehouse. The second one analyzes the reasons underlying the decision to introduce this concept and the implementation approach utilized. Finally the third section highlights the outcomes of the first roll-out at middle management level.
- v. Chapter 5 is divided into three sections as for chapter four. Indeed it discusses the results of the analytical part by comparing them with the framework conditions outlined in chapter 3. Each section of chapter 5 aims at giving an answer to the three research questions on which is structured this master thesis.
- vi. Lastly chapter 6 summarizes the findings of the study, it then answer to the research problem of the master thesis, presents the major lesson learned, further steps and possible limitations of the study.

1.4 About Hilti: Company's Profile

This last section is dedicated to the presentation of the Hilti Group as the settings of this master thesis are located within one of its warehouses. This section is essential for the reader to understand the context of the events described in the analytical part and some of the logics underlying the decisions taken by the Global Lean department and the management team of the Italian Logistics department.

Founded in 1941 by Martin and Eugen Hilti, the Hilti Corporation, also known as Hilti Group, is a Liechtenstein-based company, headquartered in Schaan, which develops, manufactures and markets innovative products and solutions for professional customers of the construction and energy sectors. Known for the "red case" and for the high quality of its products and services, Hilti was able to maintain its prestige, reputation and market leadership position over the years thanks to its particular company's structure. Indeed from 2003, in order to guarantee financial stability and long-term continuity, the Hilti Family Trust holds all of the shares of the Hilti Corporation. Though being a family company, nowadays Hilti is present in more than 120 countries. It employs approximately 22,000 employees, of whom two-thirds work for the customer in sales organizations and in technical service units. The Group, with almost 60 thousand products sold per year, places a strong emphasis on constantly introducing new products embedded with the latest technologies. Actually, it is thanks to its careful focus on leading-edge innovation and quality of the service to the customer that Hilti is able to constantly renovate its worldwide market leader position. And with still a long journey ahead in order to reach the ambitious goals set by Champion 2020, the company concluded a successful 2014 with 7.5% of sales growth and annual sales of approximately CHF 4.5 billions.

1.4.1 Corporate Strategy: Champion 2020

"Champion 2020" is the result of evolution of the past corporate strategy named "Champion 3C" because of a changed market environment. (Figure 3) All the essential elements of the former strategy have been confirmed; in particular the company clear orientation on its core competencies, the emphasis on the customer and the focus on major markets and products. All these concepts are wisely incorporated by the four strategic imperatives where the firm wants to achieve a best in class position in its industry. Hilti's nature of family owned company is stressed also by the new corporate strategy that still plants its foundations on "People". Indeed the company has patiently invested in its employees and leaders in order to build a "caring and performance-oriented culture" able to jointly overcome the challenges posed by Champion 2020. To conclude, the new corporate strategy also renovates Hilti's commitment and interest towards Lean Management. As clearly stated by Hilti's CEO Christoph Loos the new strategic objective set by "Champion 2020"

"is "sustainable value creation through market leadership and differentiation" with lean being the key to efficient customer- and quality-centered operations.





1.4.2 Lean@Hilti

At Hilti, lean is nothing new and with the introduction of "Champion 2020", it has become even more central. The first contacts with the lean philosophy occurred within the production plants through CIP projects during the late 1990s. From the beginning Hilti approached lean with a clear vision in mind, to become a learning organization and spread the Lean Philosophy along the entire supply chain. This is the reason why the company created in Schaan the Global Lean Department whose aim is to support all the different lean initiatives on a theoretical, but also practical level. And later on, in 2011, with the aim of having a



Figure 4 - Hilti House of Lean

global framework to guide and drive all the various lean programs within the company, it was developed the Lean Value Added System, consisting of six key success factors - Continuous improvement, Pull, Disturbance Free, Rhythm, Flow and Cooperation and Leadership. (Figure 4) By leveraging the impacts of the various lean projects undertaken by the group in the last four years along these six dimensions, Hilti was able to develop a corporate culture where mistakes are seen as opportunities, leaders as coaches, employees as actors of change and continuous improvement as a way of working.

2 Methodology

This chapter discusses the research paradigm of the master thesis, as well as the approach utilized to conduct the empirical investigation. Furthermore, it outlines the reasons underlying the choice of the literature sources, the types of data gathered and the process of selection of the interviewees. Lastly it analyzes the criteria that assure validity and reliability of the outcomes derived from this master thesis.

2.1 Research Paradigm – Action Theory

The research paradigm is defined as the predominant framework within which the researcher makes choices about theories and approaches. (Solem, 2003) As Solem claims: "*methods, and techniques, are not just neutral instruments*", but they are derived from the researcher's inherent view of the world, or ontology. (Solem, 2003) This master thesis is grounded on the principles of the action theory because this research paradigm is considered to be the most suited when researchers "*wish to improve understanding of their practice*" and are actively involved in the project as consultants. (O'Brien R., 2001) Moreover, "*since its primary focus is on solving real problems*" and it is usually used for preliminary or pilot research, it perfectly fits the purpose of this master thesis: understanding the causes of lean unsustainability at Capriano WH and analyzing the first results of Toyota Kata implementation for the whole Hilti Group. (O'Brien R., 2001)

Action theory is based on a continuous learning cycle in which the researcher learns by critically observing, interpreting and evaluating the consequences of its own actions. (Meyer, 2000) Its strength lies in the ability to empower the researcher, by getting him to participate both in the research and in the consecutive implementation activities. (Meyer, 2000) Indeed in an action theory - based research "theory informs practice, practice refines theory, in a continuous transformation". (O'Brien R., 2001) The process of drawing up this master thesis followed the same transformational path. It was indeed firstly studied all the relevant theory about lean and Toyota Kata to have a solid framework through which to guide the implementation process at practical level. However, what was learned by applying the theoretical frameworks reviewed during the study of the literature sources and adapting them to the context of Carpiano warehouse, refined and even enhanced the understanding of theory. In action theory there is a dual commitment to study a system and simultaneously collaborate with members of it into the change process (O'Brien R. 2001). That is why "participation and democratic thinking" are two essential characteristics of action research. (O'Brien R. 2001) All participants have to perceive the need to change and are willing to play an active role in the change process in which the researcher acts as a facilitator. (Meyer, 2000) As a matter of fact during the internship at Hilti Italy s.p.a., the author actively participated in the pilot project for implementing Toyota Kata. As a result of this dual role, researcher and internal consultant, in the last section of this chapter are explained the potential influences on the implementation project.

Lastly, action theory embeds a social dimension whose objective is the investigation of actual practices and hence the resolution of real problems. (O'Brien R. 2001) That is why it is often described as context-specific. Indeed action theory generates knowledge through analyses conducted within specific and often practical contexts. (O'Brien R. 2001) However by contrasting the empirical knowledge gained with the theoretical frameworks described in the literature review, it was possible to draw general deductions from the findings of this investigation. This process of reflexive critique is highly important in action theory since it "ensures people reflect on issues and processes and make explicit the interpretations, biases, assumptions and concerns upon which judgments are made". (O'Brien R., 2001) It is thus deepened in the last section of this chapter.

2.2 Research Approach and Design – Single Case Based Study

In this specific master thesis, a single case based study was conducted to explain the impacts of Toyota Kata on lean at Carpiano warehouse by following a descriptive research approach. (Yin, 1994) Indeed, according to Yin (1994), case studies are the most suitable method "when "how" and "why" questions are being posed" and when holistic and in-depth investigation is needed. (Yin, 1994) The analysis is rooted on the literature review of the theoretical frameworks about lean and Toyota Kata, in order to draw logical conclusions on available facts. To ensure *construct validity* were used and gathered multiples sources of evidence, namely documents, archival data, direct observations and interviews. (Yin, 1994) Whilst given the difficulty to attain *external validity* in a single case based study, it was followed the "pattern-matching" analytical mode, namely comparing empirical facts with academic theories and models in order to enhance internal reliability of the master thesis. (Yin, 1994) This is what makes it possible to draw general conclusion from the results outlined in this master thesis. (Yin, 1994) Since case based studies tend to be selective, it was narrowed down the unit of analysis to the leadership, people empowerment and numerical (efficiency and throughput time) outcomes of Toyota Kata at Carpiano. The results that have led me to answer to the research problem derive from the analysis of both qualitative and quantitative data gathered over a period of six consecutive months. The former type of data was acquired through documentation, direct observation and interviews with Hilti's employees of various hierarchical levels, from shop-floor workers to the Head of Logistics of the Region E4. The quantitative data was extracted from the two different information systems used in Carpiano, SAP and WHMS. The reliability and validity of the data is discussed in the last section of this chapter.

2.3 Literature Sources

The point of departure for the analytical part of this master thesis is the literature review of the theoretical frameworks. Given their importance for drawing generally applicable findings and conclusions, in this section are explained the decisions that led to the choice of the literature sources. Lastly, since to enhance external reliability it was applied the pattern-matching analytical mode, it is essential to make transparent to the reader what selection of books and articles was chosen to structure this master thesis.

- a) As a starting point for the research process, it was collected essential information from six books on lean. These were selected because they are among the most cited publications about the topic and because they are strictly connected to the subject discussed by this master thesis. The first three books of the list discuss about the distinction between the operative level of lean, where the focus is on hard-facts, and the strategic level of lean, where the focus is on soft-skills and organizational learning. *Toyota Kata* by Mike Rother discusses about the concept and role played by Kata at Toyota by explaining its elements, Improvement Kata and Coaching Kata and its way of functioning. *Learning to See* describes the concept of Value Stream Mapping that is strictly connected with that of Toyota Kata as the former is considered as a mandatory starting point for the latter. (Rother, 2014) Lastly *How to Prevent Lean Implementation Failures* discusses about the most common and known factors that have led many companies to fail in the implementation and sustainment of lean.
- b) The selection process for the articles took considerable time. During the initial search the articles were clustered into the two major topics discussed in this master thesis; namely lean and Toyota Kata. Then, by using a set of key words based on the research problem, such as "lean failures", "organizational learning", "lean leadership" and "lean sustainability", it was reduced the list of

results to a smaller group of publications. Lastly it was further restricted the research by considering only those articles that were cited by other authors and that were published in academic journals and magazines. At the end of the search process 43 academic papers were selected.

- i. 27 of the articles selected are about Lean.
- ii. 10 of the articles selected are about Toyota Kata.
- iii. 6 of the articles selected are for the methodological part.

2.4 Data collection

The type of data used in the analytical part of this master thesis is both quantitative and qualitative. Indeed only by combining the two it is possible to obtain meaningful information about the level of lean at Hilti Italy s.p.a. and about the impacts of Toyota Kata.

a) Quantitative data

The quantitative data was extracted from Hilti's warehouse management systems (SAP and WHMS). It consists of four consecutive years (2011 - 2015) of daily figures about:

- ✓ Overall performance of Carpiano warehouse (Lines/man/hour)
- ✓ Detailed efficiency for each process (Lines/man/hour)
- ✓ Throughput time measurement (hours)
- ✓ Space utilization (square meters)
- ✓ Stock allocation (percentage of outbound volumes per area)

Given his expertise, the study of these data was conducted together with Matteo Pozzoli. The utilization of the figures resulting from the analysis was mainly driven by the need of measuring the operative changes caused by the introduction of lean tools, namely 5S, Quality Circles, Shop floor Management, Kanban and Heijunka. Moreover quantitative data was also used to assess the impacts that Kata had on processes and Lean at Carpiano. Although the quantitative data is highly reliable for analyzing process level improvements, it presents several limits when it comes to measure the impact of Lean at the people and cultural level. This is the reason why it was decided to combine it with qualitative data gathered through interviews, documents and direct observation.

b) Qualitative data: Interviews

To ensure qualified responses, the selection of interviewees was based on the following objective criteria:

- \checkmark They lead or manage a group of people.
- \checkmark They are aware and involved in Lean activities.
- \checkmark They are employed in the company for at least three years.
- ✓ Moreover, within the Italian Logistics department it was decided to focus attention only within the Warehouse function.

The following selection method led to the choice of 9 interviewees for a total of almost 6 hours, which means an average of 30 minutes per interview. Interviews with the management team of Carpiano had been conducted face-to-face with the use of tape recorders and in English language. All of them have been

successfully transcribed and coded [48, 50, 52] The interview with Cemil Polat, because of the distance and of his various appointments, was conducted via Lync, which is a software for on-line videoconferences, in English language. This interview was not recorded but it was immediately transcribed and mailed to him with questions and answers already filled. [51] Lastly, the interviews with the Operation WH team leader and the four WH team leaders were not recorded because they all did not felt comfortable with this interview mode. Therefore during the interview the author of this master thesis took notes in Italian and only later translated them into English language and finally asked each interviewees to sign them to prove their validity. [44, 45, 46, 47, 49]

To conclude, the type of interview chosen for data gathering is semi-structured. It was prepared a set of questions to guide the interview while leaving the possibility for asking additional questions if the interviewee was revealing unexpected details. All of the questions asked during the 9 interviews are aligned with the three main RQs of this master thesis. Indeed these are the result of a process of drilling down each of the three RQ into a smaller and more detailed set of sub-questions. Lastly, the answers given by the respondents have been confronted, analyzed and clustered especially in terms of topic discussed and organizational level. Below the list of interviewees:

i. Bianchessi Mauro (Team Leader Fast Picking Area); Bricchi Daniele (Team Leader Packing Area); Cafeo Antonio (Team Leader High Bay Area); Corvi Pietro (Team Leader Inbound Area) and Mariani Aurelio (Operation WH Team Leader).

All the team leaders lived and were affected by the process of change brought by lean. They are expert with regards to the operational side and due to the training received they also have a discrete understanding of the concept of lean. Their interviews about the level of commitment, engagement and knowledge about lean are fundamental in order to assess whether at Carpiano the focus was mainly on the operational side or on the strategic one. Moreover, their answers are essential to measure their readiness for Toyota Kata and thus are a good indicator of possible success/failure factors with regards to the implementation of this operational management and leadership approach.

ii. Matteo Pozzoli, Warehouse Monitoring Team Leader

Matteo Pozzoli is the local Lean expert of Carpiano WH. He has a great experience with regards to operational processes, implementation and use of lean tools and warehouse management system. Because of his lean maturity level he was nominated first Kata coach of the entire Hilti Group. During the last six months he mastered his understanding and knowledge about this recent topic. His interview was mainly focused on the changes, challenges and benefits brought by Toyota Kata and the impacts of this concept on lean and leadership style at Carpiano.

iii. Andrea Ferrero, Head of Region Logistics E4

Andrea Ferrero is the Head of Logistics for the Region E4. Together with Fabio Milani he decided to implement lean to bind the negative impacts of the financial crisis and lately Toyota Kata to overcome "*the period of stagnation at Carpiano characterized by monotonous shop floor management, few improvement suggestions and lack of motivation and engagement*". [48] He invested much of his time and resources to promote, introduce and spread Toyota Kata. The interview with him was mainly focused on the stagnation period of Carpiano and the reasons underlying the choice to introduce Toyota Kata at Carpiano.

iv. Fabio Milani, Head of Warehouses Region E4

Fabio Milani, because of many years of experience in Carpiano, has a great knowledge of Hilti's culture, warehouse processes, change management and lean. He played a leading role in the taskforce that introduced lean at Carpiano and he is part of the management team chosen for the first Toyota Kata roll-out. His interview was aimed at obtaining a different perspective compared to the one of the four team leaders, about the changes brought by lean, relative challenges and resulting benefits.

v. Cemil Polat, Global Lean Manager

Cemil Polat is a Global Lean Manager at Hilti and he worked for seven years as lean consultant. Therefore he can be considered a Lean expert both at the theoretical and practical level. In the Toyota Kata pilot project he played a primary role as external consultant, by teaching the topic, guiding the dry runs and supporting and fine-tuning the roll-out. Because of his enormous experience on Toyota Kata his interview was mainly driven by the need to understand the reasons underlying the choice of Carpiano as pilot and the reasons underlying the implementation mode utilized.

c) Qualitative data: Documentation

In this master thesis it was gathered information and data also through the use of internal documentation. It was indeed used Hilti's documentation about Toyota Kata since it represents the first point of contact that the management team of Carpiano had with this concept. The training slides were written by Cemil Polat who majorly took inspiration from Mike Rother's handbooks and from some visits to German companies that have already applied Kata such as Festool Engneering (FE) and Hileman.

d) Qualitative data: Direct Observation

The last source of qualitative data collection used in this master thesis is direct observation. The relevance of this type of data is due to the fact that the author of this master thesis has directly participated in the Toyota Kata pilot project and as a consequence of this it was decided to opt for the action theory research paradigm where the researcher's perspective is internal and he/she acts also as a consultant. Moreover, since the author of this master thesis has been directly involved in the group under study, he also acted in the role of participant-as-observer. (Jorgensen, 2014)

All the behaviors and actions that were directly observed were also immediately transcribed as occurred and also contextualized in terms of period of time at which it took place and specific situation. (Tables #, #, # and # in the Appendix) While recording this type of data it was placed attention on Carpiano top management's and team leaders' behaviors during the Toyota Kata implementation period. More precisely were only transcribed actions, comments and opinions directly related to the level of engagement shown by people in the process of change, their perceptions of leadership and their impressions on Toyota Kata as a method to reorganize and improve processes.

It was used direct observation on the one side to compare differences in attitude towards the implementation and utilization of Toyota Kata between the top management level and the operative level (team leaders). On the other side, it was used this type of data as a supplement to the information gathered with the interviews and more importantly as a point of reference in the process of coding the responses. Indeed by carefully comparing the answers of the interviewees with their everyday behaviors and actions, it was possible to determine whether the two types of data were coherent or contrasting with each other.

2.5 Reliability and Validity

One of the most significant effects of action theory is that the research topic is always relevant to the participants. (O'Brien R., 2001) Relevance is indeed guaranteed by the fact that each project is determined by the researcher and co-researchers that are also the primary consumers of the findings. (O'Brien R., 2001) In the specific case of this master thesis, relevance of the topic was also enhanced by the novelty of the topic for the Hilti Group and by the decision to have a pilot in Carpiano. Moreover, the Toyota Kata topic was also chosen by Harck Mads, Head of Lean Management, to be presented at the annual Lean Summit of 14th September held in Schaan.

Reliability and validity are two other important factors to be discussed since they represent a criticality both for the action theory approach and the case study method. Reliability is concerned with whether analogous research would reach similar conclusions (Saunders, 2008). This concept refers to the possibility to probe and evaluate the quality of the study in terms of explanation and generation of understanding. (Yin, 1994) In this master thesis there are three major threats to reliability, namely quality of archival data, interviewer bias and interviewee bias.

The quality and validity of the archival data is assured mainly by two factors. On the one side, SAP data is subject to internal audits from HQ. Once a year, a specialized team has the responsibility to check whether the information present in the database matches reality and vice versa. In case of incongruences, those are immediately solved in order to always have the "virtual world" aligned with the real world. In this way accuracy and quality of data are always under control and hence assured. On the other side, by having two warehouse systems, the monitoring team can immediately detect some incongruences. Indeed if the two systems are not aligned and the archived data on the two databases is not the same, the IT team is immediately activated and asked support with a realignment action. Therefore, both internal audits from HQ and internal controls from the IT team, always assure correctness and accuracy of data.

In respect of interviewer bias awareness of its presence is the first step towards mitigating it. All interviews, apart from the one with Cemil Polat, were conducted face-to-face in order to ensure that visual signals such as body language and tone of voice could be read and also to promote a better empathy (Saunders, 2003). The topics and the questions for the interview were introduced via email prior to each interview. This allowed the respondents to prepare their thoughts well in advance of the meeting and also helped to improve the credibility of the responses (Saunders, 2003). Lastly to minimize the threat of interviewer bias, all interviews, apart from the one with Cemil Polat because of impossibility and the ones with team leaders because of their express decision, were recorded. Furthermore all of them were transcribed, signed by the interviewee and in the case of team leaders also translated into English. Recording gives a complete and faithful record of each interview, captures the tone of voice and allows the interviewer to focus on carefully listening to the interviewee and to monitor body language. Transcription also provides a full record and facilitates analysis.

Interviewee bias can be a potential threat because of the time-consuming nature of interviews and because of the unwillingness of some individuals to discuss certain topics with the interviewer. To overcome the first cause of interviewee bias the interviews were scheduled well in advance and it was also allowed to each of the respondents to select day and hour for the meeting. In this way each interviewee allotted the adequate timeframe for the interview that helped them to avoid the feeling of being under time pressure. While to minimize the second cause of interviewee bias, all the interviews were held in a private room to maintain privacy and confidentiality. This was of high importance majorly with team leaders since all of them feared

that the author of this master thesis could make public their answers. Moreover, before starting the interview it was asked to each interviewee if there were some questions or even topics that they preferred to skip because of working matters.

Validity measures how truthful the final results of the study are and it is usually used for quantitative research. (Yin, 1994) In this study construct validity was assured by the utilization of multiple sources of data. On the one side it was gathered archival data from two different warehouse systems; SAP that is the software used by the entire Hilti Group in each MO and WHMS that is the external warehouse system utilized at Carpiano. On the other side, different hierarchical levels were interviews to have different perspectives on the same topic. It was discussed about lean and Toyota Kata with senior management, Andrea Ferrero, middle management, Fabio Milani and Matteo Pozzoli, and with shop floor workers of all the four different warehouse processes present at Carpiano, team leaders. Moreover, it was also used documentation coming either from internal and external sources. In this way it was possible to compare implementation methods and first outcomes of Toyota Kata in different scenarios and companies. Lastly, in action theory the researcher "*makes no attempt to remain objective, but openly acknowledges their bias to the other participants*". (O'Brien R., 2001) By having participated to the implementation of Toyota Kata at Carpiano and by having played an active role as Coachee, the author partially influenced the outcomes of the pilot project with his actions. Although these were rooted in the theoretical background and frameworks presented in the literature review, they had a visible and mostly invisible impact on this study.

Lastly, one of the major drawbacks of action theory and single case based study is that it is very difficult to generalize the overall findings. Indeed these approaches are highly context dependent and hence it is possible that within a different scenario the results might change. However, on the one hand the primary intention of this master thesis was to gain insights into a specialist area of the supply chain, namely the application of Toyota Kata at Carpiano Warehouse, which has not received much attention to date. Indeed there are still few academic articles about Toyota Kata and even less practical examples of it. On the other hand, the pattern-matching analytical mode allowed to generalize certain patterns that were present at Carpiano and also discussed in theory. Therefore, because of the various factors mentioned above, not every finding of this master thesis is generalizable. However, the final outcomes of it can raise awareness of some challenges, insights and also limits encountered at Carpiano and thus in the future these can support practitioners in implementing Toyota Kata more smoothly.

3 Literature Review

This chapter serve as the theoretical foundation for this master thesis. It can be divided into two separate sections: the first one about lean in which it is highlighted the difference between its operational and strategic levels. Moreover always in the first section are described the essential elements to take into careful consideration during the implementation of lean. While the second part is mainly focused on the origins of Toyota Kata and it also deepens the Improvement and Coaching Kata patterns.

3.1 History of Lean

The origins of the Toyota Production System (TPS) date back to 1950 and to a country destroyed and decimated by the World War II. (Hines et al, 2004) It was around this period that Taiichi Ohno was assigned by Eiji Toyoda the difficult task to *"improve Toyota's manufacturing process so that it equals the productivity of Ford"*. (Liker, 2004) So the plant manager, inspired by its various study tours of US plants, armed with his shop-floor knowledge and constrained by the Japanese economy, began to develop a smalllot, just in time manufacturing approach characterized by high levels of flexibility. (Cusumano, 1994) Little by little the Toyota Production System evolved. Already by the mid-1970s it was becoming common for the Western manufacturers to ponder the emerging Japanese threat. (New, 2007) Ten years later, in 1980s, Toyota exceeded US competition by achieving extraordinary levels of quality and productivity. (Cusumano, 1994) And during 1990s, thanks to the substantial performance gaps achieved by Toyota against US carmakers and to the publication of the book *The Machine That Changed the World* written by Womack et al., Lean Production became a subject of study for academics and a north star for practitioners.

Today, the notion of lean production not only remains popular in manufacturing, especially in car manufacturing plants, but it got also stretched to several other fields of study and diligently applied by many different types of organizations. (Wang, 2011) For instance the word and concept of lean is now commonly used in the departments of human resources, research & development, finance and even plant maintenance (Ade Asefeso, 2013); whilst its application ranges to several industry sectors such as aerospace, airlines, building & construction, consumer goods and fashion. (Diàz, 2012) Nevertheless, "the popularity of the TPS as a subject of discussion and research seems only to be matched by the widespread inability of organizations to apply the ideas with anything like the success of Toyota". (New, 2007) "Industry Week magazine recently reported that 72% of the 884 U.S. companies responding to their survey were in various stages of implementing an improvement strategy such as Lean. Of these companies 75% reported that they had made "no" or just "some" progress toward their goals." (Rubrich, 2004)

3.2 Operational Vs Strategic levels of Lean

From its conception in 1950s, the scope and significance of academic research on lean changed over time. (Moyano-Fuentes, 2012) The final outcome of this evolution process is that lean is now considered a multi-faceted concept. (Pettersen, 2009) And as Pluto warned in the late 360 B.C., "*linguistic confusion arises because multiple terms may refer to the same object or idea*". (Shah and Ward, 2007) As a matter of fact even though "*lean production has become an integral part of the manufacturing landscape in the United States* (U.S.)", still "*any discussion of lean production… points to an absence of common definition of the concept*". (Shah and Ward, 2007) The interesting fact is that the lack of clarity and ambiguity that surrounds this concept seems only to be matched by the widespread inability of companies to implement and apply lean with the same success achieved by Totoya. (Shah and Ward, 2007)

Liker in *The Toyota Way* states that one of the most important issues linked with unsuccessful lean implementations is that US companies have connected this concept to a particular set of tools and solutions to copy without considering their philosophical and cultural backgrounds. (Liker, 2004) Essentially the author outlines that instead of focusing their efforts on all of the 4Ps promoted by the Toyota Way, (Problem-solving, People, Process and Philosophy) "*most companies are dabbling at one level, the "Process level*". Furthermore the 4P Pyramid Model is intended, to some degree, to be hierarchical, with higher levels building on lower ones. (Liker, 2004) Therefore without a long-term philosophy, lean initiatives at single process level will end up jeopardizing the organization's capacity to learn and innovate. (Wang, 2011) As a matter of fact, Liker outlines the importance to begin the lean journey with a clear understanding of the "*specific way of thinking, philosophy and management system*" adopted by Toyota where operational processes are seen as the setting for challenging and developing your people. (Liker, 2004)



Figure 5 - 4P Pyramid Model (Liker, 2004)

To rationalize the lack of significance given to the strategic and cultural aspects of Lean, Hines et al. in his 2008 book *Staying Lean* explain that when researchers and practitioners visited Toyota plants, they all went to where action was, namely the shop floor. There they only saw the various visible tools and solutions such as 5S, Kanban and Andon. (Hines et al., 2008) Nevertheless, as the author claims "*It's not what you see, it's generally what you don't see that is more important*". (Hines et al., 2008) This is why in this book Hines et al. represent the technology, tools and techniques (hard-facts) as those visible elements of an iceberg that floats on the water. (Figure 6) (Hines et al., 2008) However, the most important portion of the iceberg is beneath the surface and thus invisible. Hines et al. split this part of the iceberg (soft-skills) lying beneath the water into three key areas: Strategy and Alignment, Leadership and Behavior and Engagement. (Hines et al., 2008)



Figure 6 - Lean Sustainable Iceberg Model (Hines et al., 2008)

Strategy and Alignment

The success and sustainability of a Lean implementation is highly connected to the commitment demonstrated and the support devoted by top management. (Rubrich, 2004) If they underestimate the efforts required by a lean implementation and do not stand in front line to face it, this will be perceived by the employees as another "*flavor of the month*" initiative. (Ade Asefeso, 2013) Top management has to abandon its beliefs of omnipotence and its preconceptions and embrace change by involving and engaging everyone within the organization. "*Companies become World Class when every person understands why becoming World Class is important to the company and to themselves*". (Rubrich, 2004) The management team must be aware of the fact that it plays a central role in the implementation of lean and in the process of change as it has to:

i. Develop the Vision / Mission

Lean is not a toolbox from which to pick and choose "what the company would like to do or what is easy to do". (Rubrich, 2004) Nor it is the classic "cost reduction" or "waste hunt" initiative. (Rubrich, 2004) Implementing lean is more like getting a religion; it will boost an organization cultural transformation and hence change its understanding of the world. (Ade Asefeso, 2013) Therefore, unless there is a strong and true reason for it, it is going to be difficult for everyone to develop the passion and motivation necessary to implement it. (Kallage, 2006) This is why one of the most important responsibilities of a top manager is that of developing "a visual picture and verbal description of what the company must look like at some point in the future". (Rubrich, 2004) A vision has to be a motto within a company. It has to encourage employees to leave their "comfort zone" to be active promoters of the change. (Hines et al., 2008) To conclude, "a vision for true north and a clear view of current reality create a tension in the organization that, in turns, feeds creativity". (Flinchbaugh & Carlino, 2008) However if this is not adequately communicated within the organization, it only represents an unused weapon.

ii. Deployment Strategy

Together with a strong vision, the top management group needs also to prepare a clear and comprehensive deployment strategy. (Keller, 2006) Essentially they must determine ahead of time who is going to be involved, for how long and for how many hours per day. They have to decide where to start and how lean will then successively expand throughout the organization. (Keller, 2006) Finally they also have to assign clear responsibilities, provide defined timelines and indicate what resources are to be committed. (Rubrich, 2004) It is indeed not rare that top management relies on a single kaizen event as the sole improvement strategy. (Rubrich, 2004) However a kaizen blitz is only one specific instrument or part of the lean toolkit. (Rubrich, 2004) It will not lead to a successful and sustainable change unless an organization already has a tested and consistent lean culture and continuous improvement methodology base. (Kallage, 2006) Last, but not least a kaizen event is not a substitute for training since it *"will not have a significant impact on the understanding of lean tools and techniques by the people who work daily in the event area"*. (Rubrich, 2004)

iii. Set the correct improvement measurements

The definition of correct key performance indicators to measure is a difficult task for top management as they risk to creating more confusion and misunderstanding than order and alignment. (Kellage, 2006) During a lean implementation initiative measurements are like maps. These must assist top management to assess whether they are following the right path or not and hence if they are aligned with the direction set by the vision or they have to adjust the trajectory. (Rubrich, 2004) For this reason "we believe that there must always be a link between, KPI, the strategy and the Lean improvement project". (Hines et al., 2008) Because of their relevance, measurements should be understood by and visible to everyone so that it is clear to all the employees what is their part of contribution to the overall business. (Hines et al., 2008) Moreover, "ongoing measurements should be displayed visually in the work areas" so that everyone, by simply walking through the company, would be able to see how the area is doing against the targets. (Rubrich, 2004)

Behavior Engagement

At Toyota, people, with their unique capacities and creativity are considered as an essential key to improving processes. (Rubrich, 2004) "It is important to understand that World Class is accomplished 80% through people". (Rubrich, 2004) Employees indeed represent the "secret weapon" of the Japanese manufacturer's success as their skills and abilities cannot be simply copied and replicated in any other organization. (New, 2007) These competences have to be developed and nourished internally by each organization. Nevertheless it is not a surprise to see that one of the most common types of waste is underutilized human resources since employees are far too often considered as "components in the production system". (Pettersen, 2009) This attitude has a negative impact on the process of employees' development and empowerment and as a consequence also on the innovation capability of an organization. (Rother, 2010) Top management need to understand that "getting all the employees on board from the outset is crucial to sustaining lean change". (Hines et al., 2008) Indeed, lean methods are in a "locked tool-box" unless employees are trained and empowered to open the box. (Rubrich, 2004)

i. Training

"Launching even a modest lean initiative without having the required skills is not realistic". (Keller, 2006) In fact inappropriate training is often cited among the major reasons for lean implementation failures. (Rubrich, 2004) This is mainly due to the fact that top management usually considers training as a cost instead of as a

required investment for the future. (Rubrich, 2004) However, lean training is crucial. (Rubrich, 2004) Together with an effective communication, it "*affects an employees' willigness to adopt Lean behaviors*" and hence to be first promoters of the change. (Hines et al., 2008) Training is also an important mechanism for engagement as it gives people the necessary technical, problem-solving and leadership skills to unlock and open the lean toolbox. (Rubrich, 2004) However, it is very important to remember that for a lean training to be effective it has to be appropriate for the lean elements to be deployed and adequate for the organizational level and function in which it is held. (Rubrich, 2004)

iii. Foster Communication

Lack of communication exposes companies to a great threat as it can impact productivity by inhibiting teamwork, engagement and employees empowerment. (Rubrich, 2004) Unfortunately, very often managers develop and discuss the vision only within the management group. They fail to capture the importance of considering and involving also "blue-collar workers". (Rubrich, 2004) Or if they do, they fail to understand that "different audiences need different descriptions of the benefits, risks, changes, and commitments required". (Kallage, 2006) Senior and middle managers, and above all lean leaders, play a central role in promoting and contributing to an open and honest communication culture within the organization. (Hines et al. 2008) During the initial phase, to drive fear and resentment out of an organization, they must establish and maintain effective "two-way communication" channels. (Rubrich, 2004) These must be open and operative 24/7. (Rubrich, 2004) They need to be visible and always available in explaining and clarifying to everyone why lean is going to be implemented and what are the changes that it will bring to the company and to their daily job. (Kallage, 2006) Lastly, top management should organize periodic group discussions and follow-up meetings to analyze the current progress of the process of change and to clarify all the various doubts and questions. (Rubrich, 2004)

i. Create the right environment

"The biggest differentiator between great and less successful organizations was that great organizations create environments that allow their employees to excel". (Hines et al., 2008) In order to eliminate the fear associated to the change and empower employees of being the driver of it, top company managers need to foster a no blame culture based on openness, respect for people, initiative and risk taking. (Kallage, 2006) They need to create an environment where trial and error experimentation is perceived as a mean for creating new knowledge and hence for learning. (Rother, 2010) "In a lean organization, learning is critical, and is line management's direct responsibility". (Flinchbaugh & Carlino, 2008) Lastly, the management team needs to establish a positive and engaged atmosphere based on teamwork and coaching where supervisors are enabled to guide decision making to the lowest possible level in the organization. (Rubrich, 2004).

Leadership

A lean leader plays a crucial role in a lean transformation, mostly in the early phase of the implementation, as he / she "fosters change and creates an environment where change is the norm". (Hines et al., 2008) These people are responsible mainly for the following three activities: team alignment, training and coaching. (Rubrich, 2006) Lean leaders need to eliminate the fear and the stress associated with the change and motivate and direct active engagement by pulling people together and keeping improvement efforts steered in the desired direction. (Flinchbaugh & Carlino, 2008) As a matter of fact, they need to be "both competent and capable of pushing themselves and their teams out of the comfort zone and into the stretch

zone". (Hines et al., 2008) A lean leader has to be demanding and forgiving as a teacher and firm and inspiring as a role model. (Keller, 2006) He / She has to set as an example for everyone to follow by adopting the "*Lean lifestyle*". (Hines et al., 2008) Above all, lean leaders have to be truly respected by the employees in the organization and to be able to encourage them to go beyond their own self-interests for the good of the entire company. (Bass, 2000) Lastly these people must be passionate about lean and willing to assist each employee with the correct stimulus and guidance "*to cross the chasm*". (Flinchbaugh & Carlino, 2008) They have to be capable of leading a person to the solution instead of simply proposing him/her a "pre-chewed" solution. (Rubrich, 2004)

i. Reliance on a Single In-house Champion

Often managers rely too much on a "single in-house campion". (Rother, 2014) They indeed believe that one person, with his / her knowledge and skills can drive the change alone. "Expertise obviously is necessary. So is critical mass". (Keller, 2006) For this reasons it is necessary for a company to continuously develop lean leaders at all levels of the organization who can then train employees on lean and together with them spread it. (Hines et al., 2008) Nevertheless, not always top management supports the concept of "training the trainer" (Hines et al., 2008) and prefers to restrict training to only a certain group of "champions". (Rubrich, 2004) By doing so they promote a behavior that is conductive to the creation of one of the most harmful types of waste, namely underutilized human resources. (Rubrich, 2004)

The three different sections of the iceberg lying below the water are all interdependent. "Effective strategy and alignment can only be delivered through strong leadership which will only be successfully achieved in a positive organizational culture that is receptive to learning and improvement". (Hines et at., 2008) It is indeed this interdependency that contributes to the superior performance associated with lean and makes it difficult to copy by competitors. (Shah and Ward, 2007) Moreover, since the soft-skills part of the iceberg is composed of enabling elements, these three key areas are fundamental in order to deliver an effective and sustainable lean transformation. (Moyano-Fuentes, 2012) The acquisition and adaption of these soft-skills is organizational learning process of lean with the use of an evolution model based on four stages. With the use of this model the author clearly indicates how during its diffusion and subsequent evolution, Lean moved from an operational conceptualization to one based more on strategic variables such as people and learning.

During the first stages of evolution, that are defined as the "*Knowing Organization*" and the "*Understanding Organization*", a company is solely focused on the prescriptive application of tools and techniques. (Hines et al., 2004) Lean is hence mainly applied and depicted as a set of operational methods that assist in the identification and minimization of waste, improvement of quality and reduction of costs. (Wang, 2011) Pettersen defines this practical and operational approach as the "*lean toolbox approach*" where Lean is seen as a toolbox stuffed with different instruments among which to choose the most suited to the occurrence. (Pettersen, 2009) While on the other extreme of the trajectory of evolution of lean there is the "*Thinking Organization*" and lastly the "*Learning Organization*". (Hines et al., 2004) These final stages of evolution are characterized by the so-called "*lean thinking approach*" which is defined as a "*process oriented perspective, focusing on continuous improvements*". (Pettersen, 2009) In these organizations the emphasis is placed on the system's ability to learn and continuously improve. (Hines et al., 2004).

To conclude, lean can be conceptualized as an integrated system made of highly inter-dependent elements linked together by a daily-lived philosophy and culture based on continuous improvement. (Shah and Ward, 2007) As a consequence to successfully implement lean a company has to undertake a holistic process of change that will not only touch operational processes, but that will also affects the way of thinking, behaving and working of every employee. (Rother, 2010) Nevertheless, researchers and managers have often focused their attention only on operational and visible methods while missing the invisible, but strategic links of the system as a whole. (Shah and Ward, 2007) Because of this, most of the implementation efforts and the resulting outcomes were short-lived, jeopardized, unsustainable and limited in power and scope. (Ade Asefeso, 2013) Moreover lean is in a constant state of diffusion and evolution, *"implying that any "definition" of the concept will only be a "still image" of a moving target*". (Pettersen, 2009) Therefore, when embarking on a Lean journey, it is essential to acknowledge the different angles that the topic comprises. (Shah and Ward, 2007)

3.3 Toyota Kata

At Toyota everyone believes that the only way for an organization to prosper over the years and sustain its competitive advantage is by having a systematic routine that aligns and guides human capabilities and skills. (Rother, 2010) These routines are created to support everyone within the organization when dealing with complex and unknown situations. (Rother, 2010) This Toyota pattern has been academically called Toyota Kata, or simply Kata, and it is defined as "*a way of getting better at achieving goals and meeting challenges through teaching and promoting a creative and systematic routine within the organization*". (Rother, 2013) Kata is different from the various and famous lean tools and techniques. By placing at its heart "People", it promotes a radical change of perspective. From a focus on the "*Process level*" of the 4P Pyramid (Liker, 2004) described in the previous chapter, to a renewed emphasis on the other three Ps: Philosophy, People and Problem-solving culture. In other words, thanks to the Kata methodology, Toyota, in the course of the years, has been able to develop and hence pull tools to solve specific problems rather than copy and push tools, as



many companies did, in the hope the some of them would work.

Figure 7 - Toyota Kata (Rother, 2014)

The concept of Toyota Kata was firstly introduced by Mike Rother in his 2009 book *Toyota Kata: Managing People for Improvement, Adaptiveness and Superior Results.* "Kata" in Japanese means pattern, model and it stems from the basic form of movement in martial arts. (Rother, 2010) Essentially Kata is about the internalization of methods and procedures through the continuous and intensive practice of certain patterns. (Chad, 2014) The aim of this daily repetition is not the content, but the structure. (Rother, 2010) Indeed the goal of kata is to establish a self-efficacious way of working that, if applied in the right way, can contribute to a steady improvement of the organization and impact or even change an organization's culture. (Rother, 2014)

The concept of Kata is anchored in the belief that "although conditions are always changing in unpredictable ways, an organization can have a method, kata, for dealing with that". (Rother, 2010) The method used at Toyota, which is different from the traditional command-and-control approach, was named by Rother Improvement Kata (IK) and defined as a 4-step iterative routine of making "systematic, scientific, creative striving a habit, which makes people more effective at achieving challenging goals in complex, dynamic conditions". (Rother, 2010) However, since the Improvement Kata is a learned skill (Rother, 2014), at Toyota coaches guide learners in practicing and learning this pattern of thinking and acting. The Coaching Kata (CK) is the protocol used for "teaching the Improvement Kata to employees at every level of the organization, in order to guarantee that it permeates their thinking and actions". (Rother, 2014)

The Improvement and the Coaching kata promote an approach towards lean that is different from the one followed by many Western companies (Rother, 2010):

i. <u>Periodic Vs Daily improvement activities</u>:

Many firms introduce Lean through periodic projects. By doing so they obtain improvements that are not sustainable in the long run. The results achieved often suffer a severe setback to the initial state.

(Rother, 2010) Indeed a kaizen event, even though represents a "*powerful, team-based activity for making rapid improvements*", is only one of the several elements "of *the lean implementation package*." (Rubrich, 2004) On the contrary, small, incremental and daily steps let us learn along the way. In this way improvement activities become a second nature and thus more sustainable on the long-term. (Rother, 2010)

ii. Operative Vs Strategic level:

Lean is often limited to "*hunting waste*" wherever possible. This entails a rather reactive attitude. (Rother, 2010) To avoid random waste elimination activities, a long-term and comprehensive vision needs to be step up. "*This common mission creates a foundation for everyone to pull in the same direction*." (Rubrich, 2004) Moreover, this statement, by aligning the whole organization towards a unique direction, makes the improvement activities more proactive and builds the basis for a bottom-up culture. (Rother, 2010)

iii. Lean department Vs Middle Management:

The majority of companies working with lean have a designated "lean department". The risk of this organizational structure is to have periodic and jeopardizing improvement activities. (Rother, 2010) On the other side, middle managers, by interacting either with decision makers and employees, have a strong potential for influencing an organization's culture. (Ogbonna and Wilkinson, 2003) Therefore, it should be the middle management level to take over the responsibility of promoting the lean initiatives, assuring in this way daily and comprehensive improvement activities. (Rother, 2010)

iv. What Vs How:

"Westerner and the Japanese mean something different when they talk of making a decision." (Druker, 1971) The former places his attention only on the answer, solution to the question, while the latter focuses more on how to achieve the solution. Not the solution itself but the way to get to the solution moves into focus. (Liker, 2004) In order to standardize the way to get to their solutions, companies need to establish a systematic and experimental trial and error approach based on the empowerment of each single employee. (Rother, 2014)



Figure 8 - The Lean Journey

From the characteristics listed above it is easily understandable why Kata promotes a strategic approach towards Lean. By applying this systematic routine companies can move people from a "*short-term fixes*" thinking to a relentless and continuous improvement mindset. (Rother, 2014) Moreover Kata renovates the centrality given to people and problem solving at Toyota. (Rother, 2014) Taiichi Ohno was in fact convinced that true problem solving is a matter of discipline, attitude and culture. (Liker, 2004) Consequently, he claimed that most problems do not call for complex statistical analysis, but instead require human observation and reflection. (Liker, 2004) This is the reason why "*training exceptional people and building individual work groups*" is the backbone of Toyota's management approach. (Liker, 2004) Lastly, since the "*Problem solving level*" of the 4P pyramid is highly intertwined with the others three layers, Kata enhances a comprehensive understanding of Lean. It helps companies to move from a mere operational perspective on the concept to a strategic perspective where organizational learning and not efficiency is in focus. (Rother, 2009)

3.3.1 Improvement Kata

The Improvement Kata is defined by Rother (2014) as "a habit that aims to change an organization's mental operating system" by providing it with a systematic routine on how to improve, adapt and innovate when the environment is uncertain. The IK is a content-free, scientific routine for moving people "from a predictablezone mindset to an exploratory mindset". (Rother, 2010) This 4-step routine perfectly resembles the Japanese concept of "going slow to then be fast and focused" by combining together a planning phase (Step 1 to 3) which then provides the basis for the executing phase (Step 4). (Rother, 2010) Indeed only in this way an organization can avoid moving ahead based on presumptions instead of taking some time to dig deeper and learn more about the current situation. (Rother, 2014) Lastly the 4 steps of the IK are interconnected with one another. What is done and learned in one step frames the next one; and what is done and learned in the next step adjust what you have done and learned in the previous one. (Rother, 2014)



Figure 9 - 4-steps Improvement Kata Pattern (Rother, 2010)

Step 1: Understand the Direction:

The decision on the long-term direction to follow has to be taken by referring to the overall vision statement (Rother, 2010) A vision is a long-range ideal and hence it is not a good guide for daily improvement efforts because it's too vague and far away. (Rother, 2014) The most influential direction giver in an organization is a closer, more specific strategic challenge that describes a desired state, usually 6 months to 3 years in the future that people can relate to. (Rother, 2010) To be valuable, a challenge has to be measurable, achievable and personally relevant to the members of the organization. (Rother, 2010) Only in this way it is possible to align everyone towards a common direction, connect strategy with execution and guarantee that process-level improvement activities fit together. (Rother, 2010)

Step 2: Grasp the Current Condition:

The clearer the definition of the vision, and consequently of the challenge, the more precise will be the inquiry of the current condition. (Rother, 2014) The purpose of the second step of the IK pattern is to obtain the facts and data needed to define a descriptive and measurable target condition. (Rother, 2014) By applying this scientific approach it is possible to move beyond preconceptions and personal judgments when studying a process. (Rother, 2014) The result of this detailed and specific analysis is then used as an input for defining the next Target Condition and represents your *Current Knowledge Threshold*. (Rother, 2014)

Step 3: Set a Target Condition

A target condition is developed out of a detailed grasp of the current situation, through direct observation and analysis, coupled with an understanding of the direction and vision. (Rother, 2010) Therefore the better the analysis of your current condition, the more precise your definition of the target condition can be. (Rother, 2014) Here it is important to recognize the difference between a target and a target condition. The former is simply a process outcome, while the latter is the description of a process operating in a way required to achieve the desired outcome. (Rother, 2010) At Toyota having numerical outcome targets is considered not as important as having a reference point so that deviations between what is expected and what is actually occurring become apparent. (Rother, 2010) The third step of the IK pattern is thus about the definition of a desired state that a firm wants to have reached at some future point in time. (Rother, 2014)

The target condition should be measurable, with an achieve-by date of maximum three months and should include detailed information about process steps, characteristics and metrics. (Rother, 2010) Once it is set, the path leading to it will not be clear and visible. As a consequence it is very important to move ahead in small cycles in order to be sure to find the current biggest obstacle and thus move in the right direction. (Rother, 2014)

Step 4: Iterate toward the Next Target Condition:

The more precise is the description of the target condition, the better and quicker can be the recognition of obstacles along the path. (Rother, 2014) However, having a challenge without the capabilities to achieve it is ineffective. Indeed, once a meaningful target condition has been defined, a company is forced to move in the learning zone or, as Rother calls it the "*Grey Zone*", to get to it. While proceeding outside of the comfort zone, employees need to enter "*in a mode of rapid learning and discovery*" where they adjust their direction of travel based on the facts gained through experimenting. (Rother, 2014) This is the reason why people in the organization need to practice and master a systematic, scientific way of experimenting toward a challenge. (Rother, 2010) Two daily routines are used here: PDCA by the Learner and Coaching Kata by the

coach. (Rother, 2014) The PDCA loop is an intuitive process based on iterative working that goes back to the Deming cycle from William Edwards Deming. Rother gives four critical success factors for the correct utilization of the PDCA approach (Rother, 2010):

- 1) Firstly, allow solution-free experiments. Since the path towards the target state lies within the *"Grey Zone"*, the only way to move forward is through experiments.
- 2) Secondly, unexpected results are the most effective for learning. Whereas a met expectation is a confirmation of one's existing knowledge, a refuted hypothesis clearly indicates that the threshold of current knowledge gets crossed.
- 3) Thirdly, hypotheses can only be verified by experiments. Intellectual discussions or human judgment are not considered as a scientific working approach.
- 4) Lastly, the key lies in small and gradual single-factor experiments. Indeed only by conducting sequential and specific tests it is possible to readily grasp the cause-effect relationship and solve obstacles at their root.

To conclude, it takes a series of PDCA cycles to reach the target state. After its achievement, the steps of the Improvement Kata are repeated. Since the current condition is changed, it has to be analyzed and grasped again. A new target condition, closer to the vision, has to be set and several others PDCA cycles has to be done in order to achieve it. Before that, however, the Learner and the Coach meet and reflect on what was learned. (Rother, 2014)



Figure 10 - Improvement Kata (Rother, 2010)

3.3.2 Coaching Kata

One of the most vital roles played by a leader at Toyota is to develop people. (Liker, 2014) To accomplish this purpose, leaders can decide whether to use a bottom-up involving style or a traditional top-down directive method. (Liker, 2004) Coaching Kata promotes the first approach by introducing a methodical management pattern for teaching the Improvement Kata within an organization. (Rother, 2014) Indeed since the IK is a learned skill, it needs to be trained and taught by a coach (Rother, 2014). To develop effective coaching habits and to teach employees how to practice the IK on a process level and on a daily basis, it is used a coaching approach based on a dual relationship between a coach, facilitator and responsible for results, and a coachee, learner and responsible for execution. (Rother, 2010) Within this co-dependent relationship the coach is expected to lead and mentor through listening and questioning, while the coachee is held responsible for experimenting and giving his coach updates and action steps about the work content. (Rother, 2010) To support the mentoring process and reinforce the learning pattern, the coach uses five specific questions that mirror the four steps of the IK. These five questions are part of a coaching routine that aims at giving a specific structure for approaching every kind of decision. Indeed at Toyota how you arrive at a decision is considered as important as the quality of the final solution. (Liker, 2004) The "Five Questions" are given by Rother as follow (2010):



Figure 11 - The Five Questions framework, (Rother, 2010)

The concept of the Coaching Kata gets more tangible during the so called Kata coaching sessions; namely a meeting between coach and coachee based on the five coaching Kata question. (Rother, 2014) The purpose of the coaching sessions is to support organizational learning by empowering the coachee to experiment within a trial and error setup. (Rother, 2014) To accomplish this goal and to be effective, this meeting has to meet certain prerequisites among which the most important are having clear objectives prior to the meeting, prepared participants, effective use of visual aids, information sharing for problem solving and lastly the meeting that starts and ends on time. (Liker, 2009)

Lastly, Coaching Kata promotes a different management approach where the leader is expected to create the right learning environment and the employees are held responsible for problem solving and continuous improvement. (Liker, 2004) In order to do so, the leader should act based on the following three lean leadership principles.

The first element is *Hansei* that can be translated as *reflection* (Liker, 2004). This concept, defined also as the Check stage of the PDCA approach (Liker, 2004), resides at the base of learning and kaizen. *Hansei* implies to be honest about mistakes by constructively criticizing a certain project/program so that the next time it can be improved. (Liker, 2004) Indeed at Toyota, mistakes are always seen as opportunities to improve (Liker, 2004). Overall, this concept promotes a no-blame culture forged on trial and error experiments where mistakes are considered to arise from the process and not from the person. (Liker, 2004)

The second element to be considered is called *Genchi Genbutsu* which means "going to the place to see the actual situation for understanding". (Liker, 2004) At Toyota managers and employees are expected to critically evaluate what is going on, to know how to get to the root cause of any problem and to communicate it effectively to others. (Liker, 2004) *Genchi Genbutsu* is of high priority for Kata, since the 4-steps of the IK pattern are all based on thoroughly observation and reflection about the situation (Rother, 2010).

The last element to keep in mind in order to evaluate an organization's maturity level with regards to Kata, is called *Hoshin Kanri* or as translated into English *policy deployment*. (Hines et al., 2008) This concept is defined as the process of cascading objectives from the top of the company down to the work group level and it is based on the belief that "*you get what you measure*". (Liker, 2004) Hoshin Kanri is a policy that ensures the right alignment of the entire company towards a common goal so that progress can be measured and organizational learning can take place.

To conclude, Toyota Kata is an effective method for moving people away from a "*copy and paste*" attitude and for enabling them with the necessary skills to develop lean solutions in an evolutionary way. (Rother, 2014) To accomplish this challenging purpose a company needs both a systematic and scientific routine for how to solve problems and improve processes and a coaching method for converting this routine in an unconscious way of thinking and acting. Fundamentally, these two Kata "*create organizational "muscle memory" for continuous improvements*" and direct companies on the path towards a learning organization. (Rother, 2014)

4 Analysis

4.1 Lean as an antidote to the 2007 financial crisis

The financial crisis of 2007-2008, also known as the Global Financial Crisis, weakened the economies of several countries in almost every part of the globe. Among the many, Italy had been severely hit by the recession. The wave of the crisis quickly spread throughout the country impacting not only small and medium-sized Italian companies, but also medium and large multinationals such as the Italian subsidiary of the Hilti Group, Hilti Italia s.p.a. When the financial crisis reached its peak in 2012, the situation at Hilti was critic and the same equals for the Italian Central warehouse. It was clear to everyone that the "golden age" was over. In 2013 revenues decreased by 25% compared to 2011 mainly driven by a collapse in the number of engaged customers. (Figure 32 in the Appendix) Workforce and workload at Carpiano were highly unbalanced and as a consequence of this, efficiency collapsed. "Carpiano warehouse, when I started, had a big structure, particularly under the people point of view. A lot of people compared to the volumes." [52] In order to tackle this complicated and critical situation, the top management of Carpiano opted for a complete and severe reorganization of the entire warehouse structure. Indeed, as the risk of closure of the Italian central warehouse was high, it was paramount to find a way to rapidly improve efficiency, decrease costs and raise profitability. After several internal discussions, Carpiano top management decided that lean would have been one of the possible solutions to achieve these three objectives. "There are several reasons, but the main reason or input for approaching Lean at Carpiano is because: first, after the crisis we decided that the organization needed to find different solutions and approaches in order to achieve productivity and efficiency in different processes". [50]

4.1.1 The Lean workshop at Carpiano warehouse

The Lean Journey at Hilti's Italian Central Warehouse located in Carpiano (25km south of Milan) started four years ago, in November of 2011, concurrently with that of other four Hilti's European warehouses. (Figure 1) Guided by a taskforce of 7 people from both the Global Lean department (Schaan) and the Italian Logistics department, this workshop marked the introduction of lean within Carpiano warehouse and above all with the logistics function. "We decided to start with the Warehouse function mainly because you have some practical activities that can be visibly enhanced with the implementation of some tools". [48] Since the Warehouse function was the only one fully involved into the implementation of Lean, the core

Since the Warehouse function was the only one fully involved into the implementation of Lean, the core team selected was composed of Fabio Milani, Andrea Ferrero, Aurelio Mariani, Barbara Sorrentino (former Warehouse controlling Team Leader), Alexander Kimming (Global Lean manager) Alberto Dominguez (Global Lean Manager) and Sergio Velarde (Global Lean specialist).

Even though the reasons that led to the decision to implement lean at Carpiano WH differed, these two departments worked almost hand in hand, day and night for 5 weeks in order to restore the lost wealth of the Italian central warehouse. "At the beginning more or less, because it was necessary, 50% of the daily job was dedicated to think in the Lean approach". [50] On the one hand, the Global Lean department wanted to push lean downstream in the supply chain in order to release its full potential. In particular they were aiming at training the Italian management team in the essential theory on lean while supporting them in the practical implementation of certain tools. Indeed from their perspective this was the only possible way to establish a real lean culture at Carpiano WH and hence to have the entire management team autonomous in guiding the journey towards lean maturity.

On the other hand, Carpiano top management was more interested in the short-term benefits of the lean approach and looking at these as a possible treatment to relieve the symptoms of the crisis. Given the criticality of the situation, for Carpiano top management the primary objective was to reorganize warehouse processes by applying lean tools that could give quick results in terms of efficiency (lines/man/hour) and profitability. "We started with only one expectation that was to increase the efficiency during the situation of the crisis without any change in the structure. In this case the main KPI that we took into consideration when discussing about Lean is achieve and increase efficiency". [50]

The expectations on the lean workshop from both sides were definitely high. Overall the lean implementation strategy at Carpiano warehouse was aimed at arriving in 2015 with:

- ✓ -All warehouse team leaders and team members fully involved in the continuous improvement of processes and in the creation and implementation of standards.
- ✓ -Lean completely integrated into daily operations.
- ✓ -Holistic improvements led by value stream analysis instead of reactive firefighting.
- ✓ -Lean Leaders as first supporters of a bottom-up culture where improvements and changes are pushed from the employees rather than imposed by management.

To assure the achievement of all the different expectations and in order to have some "quick-wins" to immediately show and share with warehouse operators, the taskforce followed a 6-steps implementation plan with a pure top-down approach.



Figure 12 - Lean Implementation Approach

The first three steps, "Plan phase", were conducted in the office and with the sole participation of the members of the taskforce as these steps were strictly correlated with planning activities. "So before introducing every lean tool or approach we (the taskforce) received the right training. Only after we decided to introduce the tool in different processes and mainly in those processes where we could receive the biggest impacts in terms of efficiency and productivity". [50] Warehouse team leaders were only involved during the fourth step, plan and execute actions, which was the most practical one. During the "Do phase", the ideas discussed and planned by the taskforce were put into practice. "Management discussed in their offices, but then came to the shop floor to inform on the decisions taken". [49] Again the fifth step, evaluate the results, was still done in the office. However, before the decision to standardize a certain approach or method was taken, the taskforce asked for team leaders' comments and opinions. "At the end however they wanted from us feedback on the experience and the first changes." [49] While the final step, standardize the solution, was

completely entrusted to Carpiano top management which was given by the taskforce the responsibility to sustain all of the results achieved during the workshop by continuously improving them. The selection of a pure top-down approach was mainly due to the fact that the criticality of the situation demanded quick and sure results. "*The sense of urgency due to the crisis has meant that Lean was also sponsored as a mean to relieve or better manage the difficulties*". [49] There was not enough time to train and involve every team leader and team member into the lean workshop. "*I received detailed training on Lean… Also the team leaders were trained, but not so in detail as me… While team members have only been informed instead of being trained because they are not the main actors*". [49] Moreover, since the workshop was held in English language and the operative side did not speak English, a top-down approach with the only involvement of the management level was the only available solution.

With the support of the 6-steps implementation plan the lean taskforce implemented different lean tools that brought at Carpiano warehouse several changes. The selection of these tools and of their relative pilot implementation areas was based on the magnitude of an eventual efficiency impact and on the extent of the efforts required. As a consequence lean tools were introduced mainly in central areas of the warehouse; essentially in those areas that contribute most to the overall performance of Carpiano. Once the Global Lean department left from Hilti's Italian distribution center, the responsibility to sustain all the improvements achieved and to expand lean to other peripheral areas shifted to the local management team. Pushed by the difficulties of the period and guided principally by Barbera Sorrentino (former Local Lean Manager) and Matteo Pozzoli, lean during the first two years had a period of diffusion and growth. Both of them indeed assumed the role of lean experts and assisted warehouse team leaders in the application of lean methods and techniques. They were held accountable for lean and as a consequence participated and lead on-site any initiative and workshop on the topic. However, at the end of 2014 Barbara Sorrentino changed organizational role and moved to the Headquarter in Milan. Therefore Matteo Pozzoli remained the only person responsible for lean at Carpiano warehouse.

4.1.2 Lean at Carpiano warehouse in 2015. What about sustainability?

After four intense years from the lean workshop, for Carpiano top management was time to compare the current situation against the expectations set at the end of 2011. Everyone at Carpiano, from warehouse team members to the Head of Region Logistics E4, Andrea Ferrero, was convinced that Lean has helped to revitalize the warehouse from the period of crisis. "*The impact of Lean is definitely positive… We improved processes, order and cleanliness of the work area … At Carpiano Lean has played a key role*". [49] "*From 2013 until today, the efficiency of the warehouse increased by almost 30%. From 18 lines / man / hour to 23,4 lines / man / hour year to date 2015.*" [52] (Figure 33 in the Appendix) On top of that they were also convinced that it was thanks to all these improvements that at the end of 2014 Carpiano warehouse was awarded with the "Best in Class" title for the entire Hilti Group. "*I think that the approach of Lean helped the organization to improve… Positive results I have to say. Also because in 2014, last year, we received the award of best warehouse in the organization. And this is a result achieved also thanks to the help of Lean approach*". [50]

Nevertheless, by the end of 2014 Carpiano top management begun to share a sentiment of dissatisfaction with the current level of quality of lean. "*I would not describe Carpiano as a lean warehouse*". [52] All of them were indeed aware that some of the expectations set during the definition of the lean implementation strategy were still only a vague illusion. For instance Carpiano management complained about the fact that warehouse operators were not yet completely involved in the continuous improvement process. As a matter

of fact, out of 19 actions for improvement proposed in the last 9 5S audits held between March 2015 and Semptember 2015, only 9 have been finished. This means that more than 50% of the actions have not been implemented. Moreover, all of the actions not implemented were assigned to a team leader or team member of the warehouse. On the contrary 7 out of 9 actions that have been implemented were assigned to a person of the middle management. Lastly, 5S Audits were still pushed by middle management who had to plan and organize these activities for each area of the warehouse. "*The 5S instead depends on the management. When they set an audit then we do the 5S*". [46]

Shop Floor Meetings of level 2 were held every day always at the same hour, 12:40 a.m. Nevertheless, as stated by Andrea Ferrero these meetings were starting to become highly repetitive and hence monotonous. "We were discussing how to improve the quality (of SFM)." [48] From January 2014 to January 2015 five ideas or suggestions for improvement were proposed by team leaders and by team members. (Figure 13) "I think that some team members did not propose ideas because in the past these have never been taken into account. So they believe it is pointless to expose themselves". [46] As a consequence, improvement activities were planned, pushed and implemented always by top and middle management.



Figure 13 - Actions for Improvement proposed (2012-2015)

Last, but not least, the creation and updating of process standards was still highly dependent on middle management efforts. As a matter of fact by looking at work-load-balance the situation was not changed from what was done in 2012. The automatic Fast Picking process from January 2015 to August 2015 delivered exactly 67% of the outbound volumes. This basically means that this figure decreased by 3% compared to 2012. In addition, during the same period the year to date average efficiency of the process was of 106,7 lines/man/hour, which means that it improved by 5,65 % compared to 2012.

A feeling of discontent began to spread also among warehouse team members and team leaders. From the various interviews and all of the discussions emerged that all of the operative employees positively appreciated the order and cleanliness derived from lean. Nonetheless, on the other side, all the four team leaders were unhappy with the level of empowerment and training received. "Ask what is lean to 5 persons in the warehouse and you will get 10 different answers!" [44] Team members and team leaders were also complaining about the lack of involvement and consideration demonstrated by the management team. More precisely, they claimed that during any new initiative or process improvement they were only involved for doing the "dirty work". [44] "One day they are told to do one pack at the time, the other day they are told to do all of them in once". [45] All the four team leaders, during the interviews also revealed that, even though
the management team often advocates that lean should be part of their job, they actually consider it as something on top. Finally all of the team leaders and team members of the warehouse agree on the fact that lean brought additional activities and thus forced them to work harder and more. "Lean for me is a cause of stress... On the one side they tell me implement 5S, Quality Circles and so on. On the other side, the day after they ask me why the efficiency is not 24 lines per man hour?" [44]

A feeling of incomplete satisfaction with the current situation at Hilti's Italian central warehouse was also shared by the Global Lean department who, during the second week of July, 2015, went to Carpiano for a two days on-site practical assessment on lean. The assessment team, composed by Mads Harck, Head of Lean Management, Jochen Neuberger, Global Lean Manager, Thomas Anais, Global Lean Manager and Hans Ulrich Freise, Head of Region Logistics NE, during these two days held several gemba walks in order to evaluate the maturity level of Carpiano warehouse in terms of lean. They assessed lean from 12 different dimensions, by using a questionnaire composed by questions to which the respondent has to give a rating from 1 to 6. At the end of these two days, the assessment team presented the results to the entire management team of Carpiano and together with them defined some focus areas and actions for improvement.

Overall, lean at Carpiano warehouse got 2.02 out of 6. (Figure 14) The Lean Assessment team on the one side congratulated the local management group for the great results achieved in the dimensions of Business Impact, Flow & Lead-time and Leadership & Collaboration. However on the other side they also warned Carpiano top management to reconsider their approach towards Disturbance Free Processes, Standards, Competence Development and Continuous Improvement.

	Headlines	Level	Score %
1	Leadership and Collaboration	2.83	47%
2	Competences Development	1.8	30%
3	Health, Safety and Environment	3.6	60%
4	Order and condition of the workplace	1.67	28%
5	Standards	1.6	27%
6	Quality Management	1.8	30%
7	Continuous Improvement	1.4	23%
8	Flow and Leadtime	2.4	40%
9	Disturbance Free Processes	0.67	11%
10	Value Stream Thinking	2.4	40%
11	Vision and Target deployment	1.6	27%
12	Business Impact	2.5	42%

Figure 14 - Lean Assessment at Carpiano warehouse

To conclude, lean arrived at Carpiano warehouse with the hope of revitalizing the situation of decline in a period of severe recession. During the first two years, also thanks to the great efforts and investments made by the local management team, lean spread within the warehouse till the point that, in 2014 Carpiano was awarded with the title of "Best in Class" distribution center for the entire Hilti Group. Despite the great results achieved in terms of efficiency, performance, order and cleanliness, some of the expectations set during the lean workshop were still only a vague illusion. On the one side the local management was unsatisfied with the low level of engagement showed by team leaders and team members, the low level of quality of lean and the high level of investment still devoted to the cause. On the other side warehouse team leaders and team members were often complaining about their lack of understanding of lean and about the increase of the work pace and of the working hours associated to the concept. Finally, even though the Global Lean department recognized the improvements reached by Carpiano warehouse, at the end of the lean assessment they imposed timely changes in those dimensions that were below the threshold of acceptance.

4.2 The selection of Carpiano Warehouse as a pilot for Toyota Kata

The willingness to increase the level of quality of Lean is among the major reasons why, around November 2014 Andrea Ferrero and Fabio Milani, together with the Global Lean department, decided to have Carpiano warehouse as a pilot location for the implementation of Toyota Kata. "*Top management decided to be pilot of Kata … also because we realized that the improvement curve was becoming very stable. This was mainly driven by a not structured change inside the warehouse*." [52] On the one hand the Global Lean department was convinced that this approach would boost the Lean Journey of the entire Hilti Group. "*Finally Kata will help to find a better balance between learning and performing and hence will be a very important instrument on our* (Global Lean department) vision to became a so called learning organization". [51] On the other hand Carpiano top management considered this approach as a necessary step to assure stability of processes, improve operative efficiency and increase the quality of lean. "*The expectations in terms of results was and are quite high. … Increase in the involvement of people, such number of spontaneous improvement suggestions and potential new tests in Carpiano to improve the economic performance and operative efficiency".* [48]

The decision to have Carpiano warehouse as a pilot location for the implementation of Toyota Kata was taken by the Global Lean department. "We pre-assessed this through various expert chats within the lean team and by checking our internal benchmarking tools like BPPM and Balanced scorecard in which Carpiano takes a leading position and finally through visits on side in which we observed the environment and culture". [51] Overall the choice of Carpiano warehouse was supported by the following three aspects:

- ✓ Management commitment: Toyota Kata was perfectly fitting with the internal attempt to broaden the scope of lean and enhance its quality by increasing the focus on people. "*The first advice is to have some high level of commitment … It requires a lot of resources and thus a high level of commitment within the organization*". [48]
- ✓ <u>Leadership skills</u>: At Carpiano the management group has high acceptance by warehouse people. Furthermore "Andrea is in terms of lean leadership one of the role models we have in Logistics. He represents the values of lean and finds the right approach to give his people direction without overwhelming them with too much dominance". [51]
- ✓ <u>Maturity Level</u>: "We knew that the best pilot would be a site which has already a high maturity level on lean. Talking about both a high level on the tool site of lean and on the mindset side. ... Carpiano has within Hilti Logistics the best pre-setting for Kata". [51]

4.2.1 The introduction of Toyota Kata at Carpiano Warehouse

Since the implementation of Toyota Kata at Carpiano warehouse was a pilot for the whole Hilti Group, the selection of an appropriate implementation mode represented a challenging task.

At the beginning Toyota Kata was new to many at Hilti. There were no written documents, procedures or even trainings on this concept. Also there were no internal "Best Practices" to consult. Therefore, Cemil Polat, Global Lean Manager and responsible for the implementation of Toyota Kata, decided to visit a German company, called Ihlemann, together with Ferdinand Fingerhut, intern at Global Lean department, Andrea Ferrero and Fabio Milani. "We also decided to go and see one company where Kata was implemented. This was for me an eye-opener". [48] The visit to Ihlemann supported the Global Lean team and Carpiano top management in deciding how to implement Kata at Carpiano warehouse.

"We did an external lighthouse visit on Kata pioneers company Ihlemann who has a lot of experience with the topic and shared insights on their journey. This helped Andrea and Fabio to picture what effects this, on the first sight, intangible and elusive topic really has". [51]

When Cemil Polat, Andrea Ferrero and Fabio Milani returned from the visit to Ihlemann they were finally ready to tailor the Toyota Kata implementation mode to the unique reality of Carpiano warehouse. Firstly they set the overall vision of Carpiano warehouse for the Toyota Kata implementation project. "*If you do not define some clear milestones that after maybe you will review, the risk is to not have the right focus*". [48] It was hence established that the long-term target state (2016) of Toyota Kata deployment at Carpiano warehouse was to have two Kata coachees - out of the four warehouse team leaders - in place. Secondly it was discussed whether to follow a top-down approach with the involvement of the local management team, or to opt for a bottom-up approach by involving people from lower hierarchical level such as warehouse team leaders and team members.

The decision to opt for a top-down approach was supported by the following reasons:

- ✓ The application of Kata on real shop floor processes requires the involvement of people who are experienced in operations and problem solving. At Carpiano warehouse this skillset complies with that of middle management. "*First the middle management was more ready to work with this approach than the other departments. Also the maturity level, because they have more experience with Lean*". [48]
- ✓ The cultural change of daily-lived improvement is only feasible with the involvement of top management. "We implemented Kata first by convincing the top leaders". [51] Moreover, as the training was held in English, knowledge of the language was another important selection criteria to consider.

Thirdly, they determined the scope of the Toyota Kata implementation project. In this case, the choice was between involving one person from each of the three Logistics functions; (Material Management, Transport Management and Warehouse Management) or focusing on only one department by involving more members of it. The selection of the latter was guided principally by historical reasons. "Also when we started with Lean we had a similar decision to take. We decided to start with the Warehouse function mainly because you have some practical activities that can be visibly enhanced with the implementation of some tools". [48]

Lastly they outlined the implementation roadmap (Figure 15) that was structured into three major phases. The first step was aimed at promoting awareness of the topic, assuring a mutual understanding of it and preparing the Warehouse top and middle management for the dry runs training. The second phase was about practicing the 4-step Improvement Kata pattern in a safe environment in order to internalize it and thus being able to teach and apply it on real shop floor topics. Lastly the third phase was about the Kata rollout at middle management level with a real shop floor topic and within a designated warehouse area.



Figure 15 - Toyota Kata Implementation Timeline

4.2.2 Toyota Kata Kickoff Workshop

The Kata Kickoff Workshop lasted four days and was organized into two parts. The intention of the first part was to create awareness of the topic on-site and to train the participants in the essential theory. During the first two days Cemil Polat explained "*What is Kata*?" while the third day he clarified "*How does Kata work*?". In total 11 persons from the three functions of the Logistics department participated in the first part of the Kickoff workshop. The aim of the second part of the workshop was to plan the conceptual preparatory steps and to create the elements of Kata room and Kata storyboards. During this second part it was also narrowed down the scope of the pilot for the Dry Run Training by selecting the core team, consisting of Andrea Ferrero, Fabio Milani, Matteo Pozzoli and the author of this master thesis.

I. Kata Room

The creation of the Kata room was supported by the need to have a separate location with the right atmosphere for being creative and where to discuss non-business related topics without disturbing the normal course of business. "*The first advice is to have some high level of commitment … Then also to create the right environment like in the Kata room with the storyboard for discussing about the topics.*" [48] The Kata room was composed by the following elements:

- ✓ <u>Mood barometer</u>: On one wall of the room it was posted a mood barometer chart. Every day the core team together with Cemil Polat used to meet in front of it to discuss about the morale of the group with regards to the Kata coaching sessions completed during the day.
- ✓ <u>Chart for overall learnings</u>: Next to the mood barometer chart there was also the chart for overall learnings. Indeed just right after the talk on the level of morale and confidence, the group also discussed about the learnings and difficulties faced during the various Kata coaching sessions completed during the day.
- \checkmark <u>Kata storyboard</u>: discussed in the next section.

II. Kata Storyboard

The creation of Kata storyboards was based on Rother's storyboard idea. "*Kata board that is something similar to the literature but adapted to our needs and activities*". [48] In total four Kata storyboards were implemented, one for each member of the core team or better one for each Coachee. They were indeed considered the owners of the boards and as a consequence the ones responsible for keeping these updated and ready for each coaching session. In Figure 16 it is represented the final structure and layout of the Kata storyboard that was designed, adapted and developed for the specific needs of Carpiano warehouse. It consists of the following components:



Figure 16 - Kata Storyboard at Carpiano

- ✓ Headline: the headline contains information about the focus process under analysis, the name of the Coachee and Coach and a stopwatch that is used as a guideline for the duration of each coaching session (15 minutes approximately). It was also added the space for two magnetic smileys. These are indeed used by Coach and Coachee during the feedback session that takes place after each coaching cycle in order to express their mood based on the performance of his/her counterpart.
- ✓ Target State: this template is used to visualize the target state of the focus process. The headline of this template perfectly resembles that of the storyboard as it identifies the focus process and the Coach and Coachee name. While the central part is divided into two sections, one dedicated to the description of the focus process target condition. The other section dedicated to capture the target numerical parameters.
- ✓ *Current State*: this template describes the current state of the focus process. The headline contains the same information reported on the target state template. Below it is defined the AS-IS condition both in terms of current condition that in terms of parameters.
- ✓ Obstacle Pool: this template is used to visualize all the various obstacles that are preventing the Coachee from reaching the target state of the focus process.
- ✓ PDCA Cycle Record: this template documents all the step of the PDCA Cycle and it is the only template that changes its position on the board. Before the coaching session begins, the Coachee has already filled the next step idea on how to overcome the current obstacle, his/her expectations and

the way to conduct the experiment. After the experiments, the Coachee documents his/her observations, namely what actually happened compared to the expectations set in the previous step and the learnings. After reviewing the results of the test, the Coachee, together with the Coach, defines whether the obstacle is solved or not and whether the learnings have to be standardized or not.

- ✓ PDCA Loop: the PDCA loop action field is located in the middle of the board. At Carpiano the current obstacle that the Coachee is trying to overcome is placed in the middle of the action field. Lastly a vertical red line separates the planning phase (right side) before the experiment from the checking phase (left side) after the experiment.
- ✓ Standard Overview and Knowledge Pool: this template on the one side documents all the lessons learned out of an experiment which are worth sharing with the Coach. On the other side it shows all those ideas and actions that finally resulted in innovation and were hence standardized as "Best Practices".
- ✓ *Archive*: this space is dedicated to the storage of filled PDCA Cycle Record templates.
- ✓ PDCA in Progress: this space is used when two PDCA Cycle Records are opened at the same time..

4.2.3 Toyota Kata Dry Run training

The Kata Dry Run training lasted exactly 20 days, 4 entire working weeks. During this period the core team practiced the Toyota Kata patterns on non-business related topics and on a daily basis. "We had to get familiar with the structure of the board. How to go through all of the steps of the coaching Kata... So we made more or less one month of dry runs." [52] All the Kata coaching sessions were held within the Kata room by a single couple at the time. "The four of us started to make some dry runs to make use of the methodology. These were real Kata session in the Kata room while developing our Kata boar". [48] The aim was that of having at least two coaching cycles per day in order to arrive at 50 by the end of the Kata Dry Run training. (Figure 17) Members of each Kata couple changed from week to week exactly like roles performed by each of them. Lastly the core team, in order to internalize all the teachings gained during these four weeks of pure practice on the Toyota Kata, created a one-pager template with clear examples on how to avoid bad Kata coaching sessions. (Figure 34 in the appendix)

Nie	Name of Coach /	Number of		(CW 1	6			(CW 1	7			C	CW 1	8			(CW 1	9	
Nr.	Coachee	coachings	L	Μ	W	Т	F	L	М	W	Т	F	L	М	w	Т	F	L	М	w	Т	F
1	Andrea Ferrero	47	5	2	2	2	2	4	1	2	2	3	5	0	2	2	1	1	3	5	3	0
2	Fabio Milani	56	5	2	3	2	2	4	2	2	3	2	2	5	1	3	2	2	5	2	2	5
3	Matteo Pozzoli	80	5	3	3	3	2	5	5	4	5	4	3	5	3	5	3	5	3	5	5	4
4	Alberto Pogliaghi	69	5	3	2	3	3	0	6	6	4	2	5	3	4	3	5	3	5	2	3	2

Figure 17 - Kata Coaching Sessions (Dry-run training)

I. Selection of topics

The reason underlying the decision to select non-business related topics stemmed from the intention of Cemil Polat to have the core team focusing firstly on the structure and only then on the content. "The dry runs were on subjects not only related to business in order really to gain experience and to learn the sequence of Kata and its difficulties." [48] During the first two weeks, each Kata couple chose private topics that could be easily impacted by simple and daily experiments. "For example we started for the first two weeks to focus a lot on the structure. Not a lot on the content. It was just an exercise based on internalizing the structure..." [52] At the beginning of the third week, Cemil Polat decided to start focusing also on the content and not only on the structure. For this reason, also thanks to the support of Kostas Kefalakis, Global Lean Manager and Coach Coach during the third week of Dry-Run training, the core team begun to place a greater attention on how to write a realistic and measurable Target State, how to write down obstacles that does not include the solution, how to assure that obstacles are linked with the current state and how to prepare a PDCA cycle. The outcomes of this change of perspective are depicted in Figure 18. Even though the topics discussed during the last two weeks were always non-business related, this shift represented a shock for the core team, as clearly shown by the mood barometer graph. "At the third week... we started to focus more on the content. This was quite stressful...we realized that we were missing the most important part". [52] Nonetheless at the end of the fourth week the core team positively judged the dry-run training with three out of four weeks ranked above the threshold of acceptance.

			Focus	Learnings & Results	Deviation & Adaption	Mood Barometer
	CW 15	Kickoff Workshop	Theory & Preparation	Kata Room & Kata Storyboard	Not applicable	•
	CW 16	Dry Run Week 1	Internalization of IK/CK pattern	High organizational effort Limited number of daily sessions	Reinforce link between target state and vision	
	CW 17	Dry Run Week 2	Internalization of IK/CK pattern	Limited PDCA thinking Go-live framework setting	PDCA board structure	
	CW 18	Dry Run Week 3	Internalization of IK/CK pattern	Critical project phase Focus on content	Do not rely on pattern only Ask the right questions	
	CW 19	Dry Run Week 4	Internalization of IK/CK pattern	Critical project phase More rigid in following the pattern	Not applicable	
V						
Project	Timeline					

Figure 18 - Mood Barometer (Dry-run training)

II. Role of Coach Coach

During the first three weeks a Coach Coach participated to each Kata coaching session. His role was that of observing the coaching cycle to then, after its completion, give an external feedback to the couple. He was not allowed to interrupt the session. Furthermore, in case of absence of one of the Coaches, the Coach Coach was the person responsible for assuming that role and assuring the continuity of dry runs. Lastly the Coach Coach changed from week to week. During the first week Cemil Polat supported the core team as Coach Coach, while Ferdinand Fingerhut assumed the Coach Coach role during the second week and finally Kostas Kefalakis during the third one. "During this month we changed three times the Coach-Coach. For the first three weeks we had a Coach-Coach while the last week we went by our own. What was really helpful was that the change of the Coach-Coach allowed us to change perspective." [52]

4.3 Kata Go-Live Workshop

After one month of practice on the structure of Toyota Kata, the local management group decided to work on a real customer-influencing shop floor topic. Therefore the 10th of May, Cemil Polat met with the core team in Kata room to define the final rollout plan. During this discussion it was decided which pair would begin work with this new methodology and which shop floor focus process would be addressed. "*Live was the selection of a couple, Coach and Coachee, with a very operative subject*". [48] At Carpiano the choice was between having two couples that practice Toyota Kata in parallel on two different topics or focusing only on one couple at a time. "One important additional factor is the dimension. … It is better maybe to select and focus on one area. So it is very important to me defining the right number of people involved. And after of course assuring scalability of the pilot is fundamental". [48] With regards to the choice of the first Kata couple, this was based on the following two criteria:

- i. *Leadership skills*: The Dry-Run phase had revealed to the core team that the longer was the experience gained by a person in management roles, the slower was the learning process of the logics of Toyota Kata. "*The older leadership experience you have, more difficulties you face in not being directive or manipulative in a session. This was really a nice learning from the dry runs*". [48]
- ii. Shop floor presence: Also this condition stems from another learning assimilated by the core team during the Dry-Run phase. Toyota Kata required regular practice and hence a great investment of time. "It is time consuming so you have to invest time. Different from other activities in Lean where you usually invest time in training and after you can start. Here you have to invest time in training and also in practice". [48] This requirement was contrasting with the less frequent physical presence of Andrea Ferrero and Fabio Milani at Carpiano warehouse. (Figure 35 in the Appendix)

After the assessment of these two criteria the core team chose the first couple for the Kata Go-Live phase. This was composed by Matteo Pozzoli and Alberto Pogliaghi. Furthermore, it was decided that Matteo Pozzoli would take over the Kata coach role and Alberto Pogliaghi the Kata coachee role. This decision was explained with the leadership experience and technical skills Matteo Pozzoli could refer to.

With regards to the selection of the focus process, the core team had already made a pre-selection based on the following 2 criteria:

- i. Shop floor topic: In order to increase the level of awareness of shop floor people on Toyota Kata, Cemil Polat recommended to choose a shop floor customer-impacting focus process. The aim was that of selecting a process in which the coachee needed to work closely together with warehouse team leaders. "What we needed was a good successful example, very related to the shop floor, to buy in people for the second roll-out in operation". [52]
- ii. *Visible and direct impacts*: Secondly, it was paramount to choose a focus process that could be easily and visibly impacted by the Toyota Kata methodology. It needed "*to be something that if changed would have had visible impacts for everyone within the warehouse*". [51] In this way, the impression of the new Toyota Kata mindset by the operational team would be positive because they will perceive it as a good instrument to manage process changes.

At the end it was chosen the focus process: "trolley flow". This process, also called "manual picking process" touches three out of the four warehouse teams present at Carpiano warehouse, namely Fast Picking team, High Bay team and Manual Packing team. Between January of 2015 and May of 2015 this process delivered on average almost 30% of the outbound volumes processed each day and employed 11 out of the 15 team members responsible for the outbound process. Overall, the "trolley flow" can be described as follows:

In order to pick items at several warehouse storage areas, mainly on shelves and on five cranes, the High Bay team uses in total 36 trolleys that are moved between the storage areas during the picking process. The picking is performed with the use of paper lists where it is visualized the ID number of each item to be picked, the quantity to be picked and its specific bin location. These picking lists are extracted and printed throughout the afternoon until 4:30 p.m. (cut-off time) at the control desk by Mauro Bianchessi (Fast Picking team leader). Then picking lists are withdrawn in random batches from Antonio Cafeo (High Bay team leader) who then places these on a trolley. He subsequently assigns the trolley to one of his team members who will pick the items listed on the picking lists. Once the trolley is full or once all the picking lists are completed, it is brought in front of the packing lines so that the picked items can be processed at the packaging station. And from here, the trolley resumes its "tour" again.

With the selection of the first Kata couple and the definition of the first focus process, two thirds of the Kata Go-Live Workshop was completed. Therefore Cemil Polat invited the entire core team in Kata room for the last conceptual exercise. He wanted to define in unison with them a focus process vision. They hence analyzed Carpiano 2020 Corporate Strategy and selected from each of the three pillars (Processes, Skills and Culture) only those elements that were aligned with the warehouse structure and reality. (Figure 36 in the Appendix) Then, from each of these elements, they derived some desirable scenarios. By re-shaping and combining these they finally obtained the vision state for the entire warehouse. (Figure 37 in the Appendix) At the end they fine-tuned and adapted this newly created vision to the "manual picking process" and wrote down a draft of the focus process vision for the next three years. (Figure 19)

Vision	Parameters
"Create a trolley flow without	Flow Degree: 1%
interruption completely driven	Degree of pull: 100%
Define a picking logic and	Number of trolleys used: 6
sequence that minimize the movements between pick areas and the distance	High Bay efficiency: 80 lines man-hour
traveled".	Packing efficiency: 55 lines man-hour

Figure 19 - Focus Process Vision

4.4 Kata Go-Live Phase

4.4.1 Definition of Current and Target States

After the selection of the first Kata couple and of the focus process it was time to set up the necessary framework and get started with daily coaching sessions on a real shop floor process. During the first month the couple decided to leave the Kata board in Kata room and to focus on grasping the current state. Together with Cemil Polat, Matteo Pozzoli and the author of this thesis invested five consecutive afternoons in gemba walks within the first floor of the warehouse. Armed with a pen and a piece of paper, they followed the flow of trolleys from the end, packing stations, to the beginning, fast picking control desk, and vice versa. They listed one by one all the activities that made up the process and observed their sequence and linkages. They also discussed and questioned team members on the functioning of the "manual picking process", measured the average distance traveled by one single flow of trolleys and performed several real picking missions with the trolleys.

At the end the Kata couple decided to summarize all the findings on a value stream map to make these more visual. (Figure 38 in the Appendix) "We started ... with a Value Stream Mapping analysis to avoid to make "Happy Kata". We defined "Happy Kata" as those Kata that are not related to our vision". [52] This was firstly drawn on brown paper in order to correct and adjust it along the way. Only when the team felt ready and satisfied with the final result, they re-elaborated and fine-tuned it on Microsoft Visio in order to print and post it on the Kata board. After having defined the vision and created a value stream map of the "manual picking process", the Kata couple decided to fill the template of the current state with the description and the parameters of the AS-IS condition. (Figure 20)

Current State	Parameters			
"We have a chaotic flow of overfilled trolleys due to an assumption based	Distance Traveled: 1500 meters			
	Buffer of trolleys in front of packing: 18			
a huge workload buffer in front of the	Number of trolleys used: 36			
manual packing area".	High Bay efficiency: 40,85 lines man hour			
	Packing Efficiency: 41.1 lines man hour			

Figure 20 - Focus Process Current State

Once the current state was defined, the Kata couple decided to invest one other entire afternoon in gemba walks to look for interruptions or impediments to the "trolley flow". All the findings and evidence collected by the Kata couple can be summarized as follows:

i. Trolley layout

The trolleys' capacity is limited through an unfavorable layout and there is no standardized pattern on how to load them, often resulting in overloaded trolleys. In addition, it happens that there are not enough trolleys to process all orders;

ii. Unstructured trolley route

The flow of the trolley between the different storage locations is strongly depending on the unique experience of the picker and follows an undefined and unstructured logic. This causes a high differentiation in the picking process;

iii. Huge buffer of trolleys in front of the packing area

There is a great number of "finished" trolleys (18 out of 36) that are ready to be processed at the packaging station and are parked in front of the area without any defined parking lot logic, lot size or lot limitation.

Since the three obstacles defined were too vague, the Kata couple decided to narrow these down. "*The definition of the Obstacle is another key point. Especially the drill down of the obstacle*". [52] To overcome this roadblock Matteo Pozzoli and the author of this thesis decided to apply the 5-why methodology in order to drill each obstacle down to a sufficient level of detail. "*One tool that can be easily used during this phase is a 5 Why analysis of the obstacle*". [52] As a consequence for three consecutive afternoons the couple met in front of the board for 20 minutes per day. They discussed only one obstacle at the time until the seventh "why" was reached. This was chosen by the couple as the signal that they had reached enough profundity in the discussion. The final result of these three coaching sessions is represented in Figure 21.

Huge buffer at packing	Unstructured trolley flow	Trolley Layout		
Big parking lot in packaging	Lack of control of trolley flow	Trolley capacity & storage- overfilled trolleys		
Not clarity of lot size in	Travel distance of trolley	No transparency in picking		
packaging	High flexible trolley flow	Pattern to load trolley		

Figure 21 - Focus Process Obstacles

After almost three weeks the target state was the last template that remained to be filled. Therefore the Kata couple met with Andrea Ferrero and Fabio Milani in Kata room to analyze the obstacles and evaluate their relative potentials and efforts. The couple left the room with a description of the first target state. (Figure 22) This challenge was aligned with the vision and it had to be achieved within a maximum timeframe of three months. Target state parameters were the same of those used in the current state. Lastly, to calculate the numerical targets to be reached, the Kata couple has not used any economic formula or mathematical model, but it mainly relied on the technical knowledge and managerial experience of Andrea Ferrero, Fabio Milani and Matteo Pozzoli.

Target State	Parameters
"A continuous trolley flow	Distance Traveled: 850mt.
with a balanced trolley capacity for the 2 processes	Buffer of trolleys in front of packing: 8
workload buffer".	Number of trolleys used: 20
	High Bay efficiency: 43 lines man-hour
	Packing efficiency: 46 lines man-hour

Figure 22 - Focus Process Target State

4.4.2 Iterate towards the Target State

Once all the templates of the Kata storyboard were filled, the first Kata couple brought this in the warehouse. They located the board close to the Fast Picking control desk in a place that could guarantee adequate visibility of the process and where this was easily accessible by everyone. Moreover, the Kata couple decided to dedicate a fixed time frame for the Kata coaching sessions: one in the morning between 9:30 and 10:00 and one in the afternoon between 17:00 and 17:30. "*Daily coaching sessions even twice a day. It was always driven by the kind of test that we were making*". [52] The session in the morning was indeed aimed at the planning of the experiment, while the one in the afternoon to the analysis and discussion of the final results. Lastly, they decided to schedule a weekly call with Cemil Polat in order to align him on the overall progress of the focus process, of the coaching sessions and of Toyota Kata. The weekly alignment calls lasted one month at the end of which Cemil Polat, in accordance with the couple, decided to decrease the frequency to one call per month.

Hereafter are briefly described, in sequential order, the various steps that led to the resolution of the obstacles defined by the Kata couple up to the first deadline set for the focus process; namely the 14th of September.

i. Trolley Layout

The resolution of the first cluster of obstacles took almost one month, six PDCA cycles and two coaching sessions per day with an average duration of 25 minutes each. During this first period, since Matteo Pozzoli considered the level of the couple not yet enough mature, it was decided to limit the presence of warehouse team leaders to the coaching sessions that were hence still held in English language. As a matter of fact, it was the coachee's responsibility to participate to each shop floor meeting of level 0 and to inform team leaders and team members of the experiment to be performed during the day or eventually about its outcomes. However it was not rare that the coachee had to join more than once the same shop floor meeting since the information explained had been misunderstood.

Lastly this cluster of obstacles has been solved by analyzing data gathered both from the database of Carpiano warehouse management system (WHMS) and from questionnaires filled by warehouse employees.

✓ No Transparency in Picking

At first the Kata couple decided to study the typology of picking lists in order to then cluster these ones with the aim of maximizing the efficiency of each single picking mission. Therefore they extracted from WHMS all the sales orders processed at Carpiano warehouse for the last three months in order to understand the percentage of picking volumes of each area. From this analysis they discovered that: (Figure 39 in the Appendix)

- 73% of the picking lists are single lists of which 38% is made up only by two cranes (7/8 and 9/10) out of five.
- 48% of the multiple picking lists are composed by the combination of two cranes mentioned above with the shelf area.

Then the Kata couple created specific trays made of carton boxes for placing and hence differentiating the various clusters of picking lists defined and located these trays at the control desk area where picking lists

are extracted. (Figure 40 in the Appendix) Furthermore they asked the High Bay team leader to withdraw picking lists from only one tray at the time. Lastly the Kata couple also created plastic labels and glued these to the trolleys in order to identify whether these were used for the picking of single lists or of multiple ones. (Figure 41 in the Appendix)

✓ Patter to Load the Trolley / Overfilled Trolleys

With this newly acquired knowledge the couple began to focus on the identification of a common pattern to load the trolleys that could balance the efficiency of the picking mission with the order on the trolley. To evaluate a qualitative parameter such as the quality of the picking missions, the Kata couple decided to create a questionnaire to give to the packers. This was a table composed by three columns and 25 lines in which it was asked whether the trolley was of single or of multiple lists, how many picking lists were present on the trolley and what was their perception of quality of the trolley. Finally since the questionnaire was already pre-compiled, the respondent had only to tick the answer. With the information gathered from the questionnaire the Kata Couple defined three rules aimed at standardizing the pattern to load the trolleys, based on the typology of lists handled and focused on balancing the picking process with the packing process:

- Maximum 15 single lists were allowed per picking mission.
- In case of multiple lists composed by less than three areas maximum 8 lists were allowed per picking mission.
- In case of multiple lists composed by more than three areas maximum 6 lists were allowed per picking mission.

ii. Unstructured Trolley Flow

For the resolution of the second cluster of obstacles the Kata couple invested more than one month, closed in total 10 PDCA cycles and held two coaching sessions per day with an average duration of almost 25 minutes. Since warehouse team leaders directly supported the Kata couple in the definition of a clear trolley layout by giving advices and recommendations, Matteo Pozzoli decided to involve them as observers during some coaching sessions. *"We are always changing daily and this let us involve more people and also receive and exchange with them feedbacks and expectations"*. [52] The couple also believed that by involving team leaders to the Kata sessions the time invested for the communication of the experiments would have decreased. As a consequence, little by little throughout the resolution of the second cluster of obstacles the Kata couple begun to have coaching sessions in Italian. During a discussion with Matteo Pozzoli he commented this change by stating that on the one side it brought to a greater inclusion of team leaders' perspectives and ideas in the resolution of the obstacles. However on the other side it also brought to a visible lengthening of the coaching sessions. Lastly, the Kata couple solved this cluster of obstacles mostly by analyzing data gathered from the internal warehouse management systems (WHMS) used at Carpiano warehouse.

✓ Travel Distance of Trolleys / High Flexible Trolley Flow

After having separated picking lists based on their typology and after having created a set of standard rules for creating picking missions, the Kata couple wanted to revise or re-define the logics underlying the flow of trolleys, which they considered as the mechanism that controls the entire manual picking process. At the beginning, the Kata couple focused on the search of a flow that could actually decrease the distance traveled by each trolley. Nonetheless, after the completion of the first PDCA cycle, they decided to reject this parameter to focus on time. The major reasons that brought to this change are the following:

- Distance as a parameter was misleading as the shortest path was not necessarily the fastest one.
- The distance traveled by each trolley of the warehouse was a difficult parameter to measure.

As a consequence the couple begun to search for an alternative parameter to measure instead of the distance traveled. They hence decided to extract from WHMS both the time of extraction of all the picking lists managed during a day and their time of confirmation that was the last time a list was touched by the packer at the packing station. The Kata couple named this parameter as the average throughput time of picking lists and decided to use it instead of the distance traveled by the trolleys. (Figures 42 and 43 in the Appendix) From the analysis and the comparisons of the various throughput times it resulted that the picking of a single list was 11% faster than the picking of multiple list which was lasting on average 4,73 hours. Moreover they discovered that 13% of the single lists was confirmed in less than 1 hour and a half; while for multiple lists this percentage was much lower as it was around 6%. As a matter of fact, since the shift of the High Bay team was starting two hours earlier than that of the packing team, the Kata couple asked them to pick at first the multiple lists in order to not overload the packing process during the first hours of the day.

Once demarcated the priority among picking lists, the couple decided to introduce also a clear sequence among the picking areas; namely between the shelf area and that of the cranes. Since the latter processed on a daily basis 65% more of the outbound volumes compared to the former, they named the area of the cranes as the central one and the shelf area as the peripheral one. Based on this distinction, the Kata couple decided to establish the following sequence among picking areas:

- Always start the picking mission of multiple lists from the peripheral areas.
- Once all the picks in these areas are performed, bring the trolley in front of the cranes.
- Combine and consolidate the various lists on the trolley with single lists picking missions.
- Once all the picks in the central area are performed, bring the trolley in front of packing stations.

The Kata couple was indeed convinced that this sequence would reduce the number of picking missions in the peripheral areas and also the risk of missed picks of items located in these areas.

At last, the couple demarcated a consolidation zone in front of the area of the cranes that was composed by two parking lots of which one was painted in yellow and one in red. The logic underlying the color code was the following: it is possible to park the trolley in the red parking lot only when the yellow one is already occupied. This consolidation zone had to be utilized only for those trolleys of multiple lists coming from the shelf area that had also one or more picks on the cranes. When both of the parking lots were full, High Bay team leader had to combine the lists present on the two trolleys with the picking mission of the correct crane.

✓ Lack of Control of Trolley Flow

Once the trolley flow was tested and structured, the couple decided to standardize it. Therefore they created a template for process standards because in their opinion having a clear, detailed and also visual description of an activity was fundamental in order to easily track deviations from this. They hence looked at the internal documentation and also on the Internet for examples, combined their characteristics and adapted these to the needs of Carpiano employees. The final outcome of this process is shown in figure 44 in the Appendix. This template was then used to describe all the various tasks that were composing the process of sorting of the picking lists and of moving the trolley among the packing areas, their relative timings, responsibility and purpose. Lastly, these were explained to each team working in the outbound process during their shop floor meeting and also posted on every team leader's shop floor board.

F					н	ilti. Outperfor	n. Oı	ıtlast.	
Process & Activity Team Lead			der	C	reated By	Date		Rev. Date	
	High Bay_Sort Picking List	Cafeo Anto	nio	Cafeo,Pogli	aghi,Pozzoli,Mariani,Milani	ni,Milani 03/08/2015			6
#	Task		Time	Who	1	Why		V.A I	HSE
1	Separate Single lists from Multiple lists into the trays			FP TL	Enhances the man	agement of picking list	s	0	
2	2 Single lists and Multiple lists cannot be placed on the same trolley			HB TL	Improves the ord	nproves the order and flow of trolleys			
3	3 Always start the manual picking process from Multiple lists			HB TL	Improves th	Improves the flow of trolleys			
4	Separate Multiple lists into the trays for the number and type of picking areas			HB TL	Enhances the management of Multiple picking lists				
5	In case of a Multiple lists composed by more than three areas, maximum 6 lists are allowed			HB TL	Improves order o				
6	In case of a Multiple lists composed by two areas, maxi	mum 8 lists are allowed	1 m	HB TL	Increases the co				
7	7 Separate Single lists for the number of lines into the trays			HB TL	Enhances the mar	;	0		
8	8 If the Single lists is composed by one line, maximum 15 lists are allowed			HB TL	Increases the co				
9	9 If the Single lists is composed by more than one line, maximum 10 lists are allowed			HB TL	Improves order o				
10	Turn the label glued on the trolley accordingly to the typ	e of lists placed on it	5 s	HB TL	Enhances the visualiz m	ation of the type of pick ission	king		

Figure 23 - Process standard for sorting picking lists

iii. Huge Buffer at Packing

For the resolution of the last and third cluster of obstacles the Kata couple closed 4 PDCA Cycles and held almost 1,5 coaching sessions per day for an average of 15 minutes each. Indeed the Kata couple worked on the focus process only during the first two weeks of September; namely until they reached the planned deadline that was the 14th of September. Furthermore, during the first week of September, the Kata couple was busy in the organization of a yearly event that was taking place at Carpiano warehouse and they hence held only one session per day. Lastly, for the resolution of the third cluster of obstacles the Kata couple continued to involve warehouse team leaders into the daily coaching sessions. As a matter of fact these were held in Italian, even though the templates were still written in English.

✓ Big parking lot in packing / Lack of clarity of lot size in packing

The Kata couple noticed that the introduction of a well-defined trolley flow did not completely eliminate the confusion and disorder present in front of packing lines. They hence decided to apply the same logic used for the consolidation zone also in front of the packing area. The couple marked on the floor four parking lots in front of each packing station Indeed, together with the team leader of the packing process they assessed that having more than four trolleys per packing line was causing difficulties in their movement. The logic underlying the color code utilized was the following: it was mandatory to firstly fill the three yellow parking lots and to use the red one only if all the three were occupied. Moreover, the act of parking a trolley in the red parking lot was a pull signal for the packer who had to move to that packing station to complete all the trolleys waiting in line.Lastly to supervise if High Bay team leader was respecting this rule, the Kata couple created a questionnaire that needed to be filled every hour by each packer with the number of trolleys in front of his packing line. The results of this monitoring process that lasted three exact weeks are depicted in figure 45 located in the Appendix.

4.4.3 Outcomes of the first Focus Process

The 28th of September the Kata couple met together with Andrea Ferrero, Fabio Milani and also Cemil Polat in order to discuss about the progress of the first focus process. Even though the first deadline of three months set for the achievement of the first target state was already expired, the core team opted to wait for the presence on-site of the Global Lean manager. Finally, instead of having the meeting in Kata room, the first couple decided to present the results of the first focus process in front of the Kata board.

#	Parametres	May	June	July	September	TARGET
1	Warehouse Efficiency	24,01	24,3	24,15	23,61	24 YTD
2	Packing Efficiency	41,1	41,4	41,2	41,1	46 MTD
3	High Bay Efficiency	40,85	39,52	40,42	43,35	43 MTD
4	Number of trolleys	36	36	33	30	20
5	Avg. TPT of Picking Lists	-	-	4,66	4,29	> 4hrs
6	Range A %	-		10%	8%	< 15%
7	Range A + B %	-	-	53%	57%	-
8	Buffer in front of Packing lines	-	-		10	8
9	PDCA cycles closed	3	7	9	4	
10	Avg. Duration of coaching sessions	-	25 min	25 min	15 min	15 min

Figure	24 -	First	Kata	Focus	Process	Parameters
					11000000	- aranecers

In Figure 24 are summarized the numerical outcomes achieved by the Kata couple within a period of three months. Moreover, since the monitoring and evaluation of certain parameters started only after two months from the first coaching sessions, their dimensions are not always shown in the table. For instance parameters 5, 6, 7 and 8 were introduced out of two PDCA cycles for the measurement of specific experiments. However, because the couple had considered them significant parameters for monitoring the focus process, they then decided to include these in the list of key performance indicators. Hereafter it follows a brief description on the overall trend of the parameters listed in Figure 24:

- ✓ Between May and September the efficiency of the packing process remained stable at 41.1 lines man hour with minor fluctuations in the months of June and July. Nonetheless, on the other side the average number of trolleys parked in front of the packing stations for each hour of the afternoon passed from 14,4 of the first week of September to 9,6 of the third week of the same month.
- ✓ Between May and September the efficiency of the High Bay process (manual picking process) improved by 6% as it passed from 40,85 lines man hour to 43,35 lines man hour, reaching in this way the target set. Furthermore, between July and September the stability of the process improved by 27% as it passed from 11 days outside the upper and lower threshold to only 4 days. (Figure 46 in the Appendix)
- ✓ Between May and September the number of trolleys utilized to pick goods during the manual picking process was reduced by 16%. Furthermore, during this period the manual picking process did not suffer shortages of trolleys.
- ✓ Last of all, between May and September the average throughput time of picking lists slightly decreased by 7,9% as it passed from an average of 4,66 hours to an average of 4,29 hours. This improvement is mostly due to the increase by 4% of the percentage of lists processed in less than four hours and a half (Range A + B) and in a decrease by 3% of the lists closed in more than 8 hours and a half (Range D).

5 Discussion

5.1 Answer to the First Research Question

To provide a comprehensive response to the overall research problem investigated in this master thesis, three research questions were cascaded down from it. These are meant to be answered sequentially. Indeed, in order to assess the effects of Toyota Kata on lean at Carpiano it is firstly necessary to comprehend how lean was introduced at the Italian central warehouse and how this was perceived and lived by the local management team and by all the employees. Secondly it is essential to investigate the major motivations that brought to the introduction of Toyota Kata and to the implementation approach selected at Carpiano WH. Lastly, by analyzing the impacts of this methodology on the Italian central warehouse and, most of all on the "manual picking process", it is possible to confirm if Toyota Kata is matching the expectations; if the application of this methodology is producing positive impacts; if these impacts are changing the way lean is perceived and lived; and finally, in case of a positive answer, what key factors are supporting the change. This first part of the discussion is aimed at giving an answer to the following research question:

RQ 1) "What are the factors that brought to a stagnation of Lean at Carpiano warehouse?"

Overall the first research question is intended at discussing the invisible symbols associated to the period of stagnation and at deriving the major root causes underlying the lack of sustainability of lean. A careful analysis of these elements would support the local management team to understand exactly where they are along the lean journey. Furthermore, a comprehensive answer to the first research question would also assist them to eventually adjust or fine-tune the process of change undertook with the Toyota Kata implementation.

The answer to this research question is grounded both on quantitative and qualitative data. The first kind of data has been extracted from two warehouse management systems (SAP and WHMS). The two major key performance indicators analyzed for the first part of the discussion are: efficiency (lines man-hour) and inventory accuracy (number of counted bins with mistakes / total number of bins counted).

While, qualitative data has been collected mostly through interviews and direct observations. The analysis of this type of data assisted in the identification and confirmation of examples of lean stagnation and supported the author of this thesis in the study of the root causes. The three major qualitative elements examined in the first part of the discussion are: vision and deployment strategy, employees' engagement and leadership approach.

5.1.1 Visible elements of lean at Carpiano warehouse

Nowadays at Hilti Italian distribution center the presence of lean tools is perceptible. An external guest who visits Carpiano warehouse can easily notice that each warehouse team leader has his own shop floor board where he meets his group every day for 15/20 minutes. Each area is delimited by floor markings, each stocking bin is properly labeled and process standards are posted in almost each work area. It is indeed undeniable that, also due to the "*sense of urgency*" associated with the period of harsh recession, from its implementation in 2012 lean quickly spread within Carpiano warehouse. (Rubrich, 2004)

This evidence on the one side is confirmed by the qualitative data gathered directly on-site by the author of this thesis during a period of six months. On the one side from the interviews with warehouse team leaders and Aurelio Mariani, it emerged that everyone experienced in a positive way the change brought by lean, mostly in terms of:

- i. Order and Cleanliness
- ii. Structured processes
- iii. Improved performance

These comments exactly mirrors the findings cited by the academic literature. For instance, in a study of two Swedish manufacturing companies, the authors state that from the interviews with blue collar workers emerged that "there were many positive comments about the tools...better housekeeping and better order...the use of more structured processes...". (Eklund & Berglund, 2007) Moreover, form the comments of Carpiano warehouse team leaders it seems that 5S was the most successful tool implemented, as "it requires minimal resources" and it is "relatively simple" to implement. (Kovach et al., 2011)

On the other side, also the local management team enjoyed the effects brought by lean. Indeed, from the interviews it emerged a common sense of satisfaction with the improvements achieved in the last three years. However they especially perceived the impacts of lean in terms of:

- i. Efficiency
- ii. Inventory accuracy

As a matter of fact from 2013, the efficiency of the Carpiano warehouse increased by almost 30% and passed from 18,1 lines / man / hour to 23,4 lines / man / hour year to date 2015. Furthermore inventory accuracy passed from 87% of 2013 to 92% of 2015. (Figures 33 and 47 in the Appendix) Essentially it improved by almost 5% in only three years. "*It is quite possible to use a variety of TPS tools…The result will be short-term jumps on performance*". (Liker, 2004)

5.1.2 Invisible elements of the stagnation of lean at Carpiano warehouse

To the eyes of an external visitor, Carpiano warehouse may seem to have reached an advanced level in lean. However a superficial look is not sufficient to be able to make a considered judgment on the current situation. "It's not what you see, it's generally what you don't see that is more important". (Hines et al., 2008) Indeed the symbols of the stagnation are not as visible and noticeable as the positive effects described above. These symptoms are only perceptible by those who are in contact and work with lean every day in the shop floor. "Lean thinking based on the Toyota Way involves a far deeper and more pervasive cultural transformation". (Liker, 2004)

a) Lack of utilization of lean tools

A detectable aspect of the stagnation of lean at Carpiano warehouse is the widespread lack of utilization of lean tools among team leaders and members. Most of these have indeed slowly fallen into disuse. "*Over time, the lean production line… declines rather than improves*". (Liker, 2004) For instance, an external visitor entered at Carpiano in March 2015 could have noticed that the last 5S audits were held in September 2014, in the warehouse there were still process standards posted in 2013 or that on the shop floor boards, which were tidy, clean and white, the last quality circle posted was closed in June 2014.

The same evidence emerges from the interviews with warehouse team leaders who all stated that they still not perceive lean as part of their daily job. "*This is...due to entropy which says that any organized process naturally tends to decline to a chaotic state if we leave it alone*". (Rother, 2010) The major driver of entropy at Hilti's Italian distribution center is the fact that the local management team placed an excessive focus on reorganizing and improving single operational processes with the implementation of lean tools. "*Management adopts a few of these technical tools and even struggle to go beyond the amateurish application of them*". (Liker, 2004) As a matter of fact, all the four team leaders claimed that there is not always time to apply lean since the priority is to process all the orders that have to be delivered within the day in an efficient manner. Moreover this strong emphasis at single process level ended up jeopardizing the organization's capacity to learn and innovate. (Wang, 2011) For instance all warehouse team leaders claimed that the great majority of team members still do not know or understand what is lean. (Same evidence from direct observations)

b) Firefighting Approach

Carpiano management team decided to implement lean to face a difficult period of recession and hence with a strong short-term orientation. The mission was to reorganize operational processes with the help of lean tools in order to raise efficiency and hence profitability. To accomplish this objective Carpiano management team adopted an implementation strategy grounded primarily on a "*firefighting*" mentality; namely "*reacting to problems*". (Rother, 2014) At the beginning this attitude, also thanks to the high level of tension associated to that period and to the efforts devoted by the local management team, guaranteed a quick acceptance of lean among the majority of the employees. However "although this approach frequently leads to quick wins and fosters confidence among the employees, sustaining these improvements in the long-term can be problematic". (Liker, 2004) Indeed, soon after the end of the period of recession, the "sense of urgency" and pressure associated with the implementation of lean weakened. The same happened with the relevance of the mission. (Rubrich, 2004) At Hilti Italian distribution center the harsh period of recession slowly fell in the oblivion and with it, unfortunately, also the various tools and changes introduced. It is hence no coincidence that all warehouse team leaders are convinced that lean has nothing more to offer to Carpiano, a part from some small and secondary improvements.

c) Employees engagement

"Getting all the employees on board from the outset is crucial to sustaining lean change". (Hines et al., 2008) However, this was not the case of Carpiano warehouse. For instance Aurelio Mariani confessed that during the implementation of lean team leaders were barely considered; while the situation was even worst for team members as they were completely excluded. The same evidence emerges from the interviews with all four team leaders who confirmed that they were not directly involved except that for hands-on activities such as 5S audits or stock transfers between bin locations. Instead of being the drivers of the change and empowered to make the decisions, (Hines et al., 2008) their roles have been confined to that of "components in the production system". (Pettersen, 2009) Moreover, all of the four warehouse team leaders also complained about the low level of transparency and training received during the period of the lean workshop. "Communication and training...effective mechanisms that affect an employee's willingness to adopt lean behaviors". (Hines et al., 2008) Lastly all of them also revealed that in their opinion team members do not propose ideas because these are not taken into consideration or are often rejected by the management group. "Encouragement contributes to the success of achieving lasting change. People who are not encouraged tend

to lose motivation and give up". (Hines et al., 2008) All these are clear examples of the lack of engagement and contribution of warehouse employees to the lean change.

d) Directive Leadership

The local management team guided the implementation of lean at Carpiano warehouse mainly by their desks in the office. "Management, or leadership, is not sitting in an office". (Liker, 2004) A clear demonstration of this is the 6-Step Implementation plan used to introduce lean tools. Five out of six of the phases were executed by the taskforce in their offices without involving team members and often even team leaders. This evidence clearly emerges from the interviews with them as they all confessed to have perceived the implementation of lean as something pushed from the top. In addition, they also claimed that the presence of the local management team on the shop floor was not always positively perceived because sometimes they felt judged. As an example of this they mentioned the period in which the management, together with the taskforce, was posting red dots on the focus areas to be improved. These opinions are associated to the "task manager" role played by the local management team at Carpiano warehouse. (Hines et al., 2008) Indeed, as confessed by Matteo Pozzoli they directed the change, and still drive improvements initiatives, by using a traditional type of leadership characterized by a vertical focus and top down directives. (Hines et al., 2008) Essentially the local management team guided the change by selecting and pushing tools and tasks from the top with a "do it my way" approach and with a clear focus on optimizing a single process or activity. (Hines et al., 2008) However, lean tools should be "pulled not pushed". (Liker, 2004) Otherwise these will be perceived by employees as an imposition and thus as something on top to their daily activities.

All the dimensions described above clearly indicate that, at the beginning of 2015, Carpiano warehouse was still stagnating at the Process level of the 4P Pyramid model described by Liker. (Liker, 2004) Fundamentally lean was not yet embedded in the way of thinking and acting of warehouse employees and it was also not always applied as a guiding principle by the management group. "Why do not Lean programmes sustain? Well, there may be many reasons, but nearly all will be something to do with people, their leadership and their engagement". (Hines et al., 2008) Top management, during the process of change initiated by the implementation of lean, focused too much on the tool side and failed to adequately address all of the elements that make up the invisible part of the Sustainable Lean Iceberg. (Hines et al., 2008) These components are all liked together. (Hines et al., 2008) For instance at Carpiano warehouse lean tools have fallen in disuse because the employees are not enough trained and truly engaged. Indeed the local management team, also due to the period of crisis that demanded for quick-wins, failed to adequately involve them in the transformation process and preferred to drive it from the office. As a consequence, after the end of the period of crisis, team leaders and team members aborted the change as this was considered as something pushed from the top and as also not part of the daily job. Lastly, since the soft-skills part of the iceberg is composed of enabling elements, these three key areas are fundamental in order to deliver an effective and sustainable lean transformation. (Moyano-Fuentes, 2012) However, at Carpiano the invisible elements of lean have not been entirely embraced, understood and accepted by everyone. Actually, those who were to guide the change have only been superficially trained and marginally involved.

To conclude, Carpiano management team saw in lean mostly the possibility to "leverage existing resources as much as possible and achieve "operational excellence"...by emphasizing control and performance measurement and drawing the attention of organizational members towards quality and efficiency". (Wang, 2011) However, it is due to this approach that at the beginning of 2015 Carpiano warehouse could still be defined as a "Knowing organization"; namely as a company, "in the first lean awareness stage", that is

solely focused on the prescriptive application of tools at single process level and that "believes that there is a best way of doing things that is well established". (Hines et al., 2004) This is mainly due to the fact that the local management team during the implementation of lean mainly concentrated on its operational level as it considered this to be the major driver for performance improvements. They hence introduced, or better "copied and pasted" lean tools without considering their interconnections, their purpose and underlying culture and philosophy. (Liker, 2004) This silos mentality together with a short-term orientation and a "copy with pride" implementation approach, prevented the local management team to tap human potential and thus unlock the strategic level of lean.

5.1.3 Root causes of the lean stagnation at Carpiano warehouse

The management team of Hilti Italian central warehouse during the lean workshop placed too much attention on "doing lean" and hence on applying its operational tools, instead of trying to understand what does it means "being lean" and hence embracing this concept at a more strategic level. As a matter of fact the trajectory followed until today by the lean journey of Carpiano resembles the dotted line represented at the beginning of this master thesis, in Figure 2. During the initial years this journey has made leaps forward thanks to the introduction of tools that boosted the performance of warehouse processes. However, since most of the tools fell into disuse, the improvements have not been sustained in the long-term. The final outcome of this decay process is that lean at Carpiano is now in a period of stagnation. There are multiple reasons that can explain why Carpiano warehouse have not experienced a comprehensive and systematic lean implementation change. More specifically, there are several elements that triggered a "doing lean" approach solely focused on improving single operational processes through the application of tools. All these elements are linked with the implementation mode selected and followed by Carpiano management team and represent mistakes commonly cited in the academic literature. The various failure factors specific to the lean implementation at the Italian central warehouse can be clustered into three categories:

a) Lack of a Shared Vision

At Hilti Italian central warehouse not only "Champion 2020" vision is still mostly unknown to warehouse employees, but also, as a direct consequence, the linkage between this one and lean. Indeed during the five weeks workshop the local management team only stressed the importance of applying lean tools to overcome the period of decline generated by the financial crisis that was hitting the Italian economy. They failed to invest enough time in the development of a holistic, desirable and shared "visual picture and verbal description of what the company must look like at some point in the future". (Rubrich, 2004) As a consequence, warehouse employees connected the implementation of lean with the search of a method that could guarantee immediate survival. Essentially they perceived it as another necessary "cost reduction" initiative. (Rubrich, 2004) Moreover since the risk of closure of Carpiano warehouse was real, warehouse employees saw in "doing lean" the only way to save their own job. On the one side, the threat represented by the recession and the sense of urgency tied to this, at the beginning stimulated and aligned everyone towards the desired short-term direction. "Change does not occur without a sense of urgency to do so". (Rubrich, 2004) However, on the other side, once the situation was restored and survival assured, everyone entered in a relaxation and satisfaction mode. After the crisis that they perceived as major trigger of the implementation of lean eased and vanished they lost a reason and motivation to invest time in applying lean tools.

Lastly the lack of a long-term and commonly shared vision for lean at Carpiano warehouse triggered a "*fire-fighting*" approach focused on the application of simple fixes for the resolution of short-term problems.

(Rother, 2014) This reactive attitude fostered within the Italian distribution center a strong reliance on push directives from the top and a "silos mentality" based on the improvement of those processes that could have a greater influence on total warehouse efficiency. This way of working in the short-term brought several changes and enhancements scattered among the entire warehouse and not always linked to each other. However, in the long-term it tapped human potential and Carpiano warehouse ability to improve and innovate by failing to provide a common long-term direction and to establish a widespread sense of "creative tension" in desiring to achieve the goal. (Rother, 2010)

b) Lack of adequate training

Lack of training is one of the most commonly cited causes of change implementation failures in the academic literature. (Rubrich, 2004) It can indeed "affect an employees' willigness to adopt Lean behaviors" and this in turns can doom the initiative to unsustainability. (Hines et al., 2008) During the lean workshop held at Carpiano warehouse only the management team participated to the sessions of in-class training while team leaders received at maximum only a superficial explanation on how to practically deploy lean methods. "Organizations achieve long-term growth through achieving these higher levels of learning". (Wang, 2011) The situation is even worst for team members that have not been involved at all in the training process as they have only been informed of the implementation of lean. Essentially the local management team failed to patiently teach the logics underlying lean tools to warehouse employees and grow lean leaders among them able to spread the way of thinking and behaving promoted by this concept. Furthermore Carpiano top management not only permitted the adoption of a "not invented here" mindset", but it also promoted this by limiting the content of warehouse employees' teachings to the mere utilization of lean tools. (Kovach et al., 2011) As a result, all of the four team leaders during the interviews associated lean to the visible impacts of 5S at Carpiano WH; namely order and cleanliness. It is indeed evident that the local management team failed to adequately train and also coach the end users on the problem-solving culture and continuous improvement philosophy underlying lean methods. (Liker, 2004) By doing so they have tapped the potential of warehouse employees and limited their contributions to the process of creation and development of context-specific and hence unique "lean solutions". (Wang, 2011)

As clearly depicted in Figure 25, understanding and commitment are linked to one another. At Carpiano WH the low amount and wrong content of lean trainings brought to a widespread lack of awareness and understanding of this concept among warehouse employees. They hence misperceived the real essence and the final purpose of lean and mainly connected it to a series of tools to order and clean work areas. In the long run, also due to the periodic push from the top, they associated these tools as something not strictly related to their job and hence on top of their daily activities. Team leaders, and above all team members, were indeed confident that lean methods were not necessarily aligned to the process of "picking, packing and shipping packages". Overall, the implementation path followed by lean at Carpiano WH started from the lack of training received by warehouse people at Carpiano and resulted in an almost complete lack of engagement and involvement of them into lean initiatives. This is one of the reasons why little by little the benefits gained with lean vanished and its tools have fallen into disuse; namely lean change has been aborted after its initial utilization.



Figure 25 - Implementation path (Hines et al., 2008)

c) Weak deployment strategy

During the lean workshop held at Carpiano warehouse the management team mostly focused on the practical implementation process. Fundamentally they placed careful attention only to the first five steps of the 6-Steps Implementation plan and under-evaluated the importance of the last one: Sustain. Indeed they failed to define a clear deployment strategy and a comprehensive escalation plan that considered the future involvement of warehouse employees and above all team leaders. This is mainly due to the fact that the top management viewed in lean a possible medicine to cure the ills of the crisis. As a consequence they considered the lean workshop as a "one off event" to reorganize and improve the performance of a specific process or work area. (Rubrich, 2004) "If events are used as the sole improvement strategy, backsliding will occur as soon as the event is over". (Rubrich, 2004) The local management team failed to outline a strong and structured deployment strategy where roles and responsibilities were clearly assigned, timelines defined and scalability assured. They also failed to schedule follow-up meetings and group discussions to evaluate the trend of the change process and to clarify any related skepticism and doubt. (Rubrich, 2004)

Last but not least, the top Carpiano management group relied only on few local lean experts and left them alone to manage the process of implementation and diffusion of lean tools. "*Expertise obviously is necessary*. *So is critical mass*". (Keller, 2006) They failed to adequately involve and consider warehouse team leaders and by doing so they limited the process of diffusion and internalization of lean. It is hence not a case that, when Barbara Sorrentino left Carpiano warehouse at the end of 2014, lean suffered a severe setback. This is exactly what happened at Bredbury warehouse when the warehouse manager, at that time also local lean expert, left the organization.

5.1.4 Conclusion

To conclude, the first part of the discussion is mostly focused on the investigation of the overall trend of the lean journey at Carpiano warehouse from its implementation in November 2011 to the first months of 2015. The careful analysis of this period of time is what makes possible to give a comprehensive answer to the first research question addressed by this master thesis. Indeed, although the symptoms of the stagnation of lean at Carpiano warehouse have begun to be recognizable and worrisome only in the second half of 2014, the root causes underlying the unsustainability of this concept reside in the way in which it was implemented.

The local management team failed to address some of the most frequently cited causes of implementation failure factors; namely:

- i. Due to the urgency associated with the implementation of lean at Carpiano warehouse, the local management team failed to create a **strong and commonly shared vision**. As a consequence, within the distribution center the concept started to be associated with that of taking a medicine to treat a disease. Moreover, since middle management and team leaders were lacking a north star to follow, their improvement efforts were often directed towards different directions and implemented in a rather reactive mode. This absence in the long term supported the adoption of a firefighting approach strictly focused on the resolution of actual and specific problems.
- ii. Due to the excessive focus on quick-wins and easy gains, the local management team failed to invest enough **time and resources in the training** of the final users and hence drivers of the change; namely warehouse team leaders and team members. The lack of consideration received and of involvement in the process of change ended up by deteriorating the level of empowerment and engagement of warehouse people. This is the reason why, little by little, they all begun to associate lean as an additional task imposed by the top and hence to complain about the increased work pace and about the constant lack of time.
- iii. Lastly the local management team also failed to define a long term oriented and holistic deployment strategy for cascading down the concept at warehouse level. The complete absence of a proper escalation plan finally resulted in an inflexible organizational structure still standing also thanks to the knowledge, expertise and efforts of only two persons. This in turn fostered the use of a directive leadership approach characterized by the imposition of top-down directives since there was not enough time to invest in coaching team leaders on how to develop their own solutions.

All these three elements are among the major root causes of the fall into disuse of lean tools and hence of the unsustainability of this concept at Carpiano warehouse. Indeed the implementation approach selected for the introduction of lean at the Italian distribution center triggered an operational perspective on lean focused on the mere application of instruments with the sole aim of improving the efficiency of single processes. This in turns brought sporadic improvements scattered and dissipated within the warehouse. As a matter of fact, it can be claimed that lean at Carpiano was far from being a strategic direction giver, since those who were supposed to pull and use it at shop floor level did not yet understood it. As a consequence, after almost four years, Carpiano warehouse was still classifiable as a "Knowing Organization" at the beginning of its lean journey.

5.2 Answer to the Second Research Question

The second part of the discussion is aimed at giving an answer to the second research question addressed by this master thesis:

RQ2) "What are the essential elements to take into consideration during the implementation of Toyota Kata?

Overall the second research question is intended to examine the implementation mode selected at Carpiano warehouse for the introduction of Toyota Kata within the entire Hilti Group and the reasons underlying this particular choice. A careful analysis of the elements adopted at the Italian central warehouse could support the implementation of this method into other warehouses or plants of the multinational company by providing it with already tested guidelines and advices. Moreover, the second research question is also aimed at understanding if the implementation approach followed during the introduction of Toyota Kata is different

by the one followed during the introduction of lean. This assessment is necessary in order to comprehensively answer to the research problem addressed by this thesis: "*How is Toyota Kata influencing the trajectory of the lean journey of Carpiano warehouse?*" Indeed as mentioned in the first part of the discussion, the stagnation of lean at Carpiano is highly linked to the decisions taken by the local management group during its introduction. This essentially means that if they followed the same approach also during the pilot project of Toyota Kata, any possible influence of this method on the lean journey of Carpiano warehouse will be temporary since little by little also Toyota Kata will vanish into oblivion.

To conclude, to answer to the second research question it was analyzed mainly qualitative data gathered through interviews with the core team (Andrea Ferrero, Fabio Milani, Cemil Polat and Matteo Pozzoli) and through direct observation. This kind of data was used in order to reveal the reasons underlying the decision to implement Toyota Kata at Carpiano, to evaluate which critical factors and essentials elements were taken into consideration and also to unearth the overall expectations set by the participants. Lastly, since the author of this master thesis played an active role in the implementation of Toyota Kata at Carpiano warehouse, in the second part of the discussion direct observation played a key role. (Tables 10, 11, 12 and 14)

5.2.1 Toyota Kata Implementation Approach

Toyota Kata arrived at Carpiano warehouse the 7th of April of 2015, even though the decision to consider the Italian distribution center as pilot location for this new methodology was taken in November 2014, almost 5 months before. The long period of time in between the selection of Carpiano and the beginning of the actual implementation is due to the fact that the concept of Toyota Kata was new to almost everyone within the Hilti Group. For instance, Andrea Ferrero and Fabio Milani, who always stressed the willingness to have the Italian central warehouse as pilot location, revealed that at the beginning they were partially unaware of the topic. During the interview with Cemil Polat he argued that the lack of knowledge on Toyota Kata that surrounded the Hilti Group acted as a barrier to its implementation. This is why the Global Lean manager and Carpiano warehouse top management invested almost three months in the study of this subject through field visits, discussions with veterans and various readings. Hereafter are hence described those elements, resulting from this demanding investigation process, that were recognized essential during the implementation of Toyota Kata by the core team.

a) Develop a Vision

The decision to implement Toyota Kata was taken in a different period compared to the situation caused by the recession that, in part, triggered the choice to introduce lean at Carpiano. In November of 2014 was not already time to discuss about growth and investments, but on the other side the peak of the crisis was now far away. In addition, different were also the needs that pushed Carpiano management team to take these two decisions. On the one side, the risk of closure demanded for a quick way to stabilize profitability by decreasing costs and raising the overall efficiency of the warehouse. On the other side, Toyota Kata was perfectly reflecting the willingness of the management group to confirm the centrality of lean and invest on people at all organizational levels. The final result was the definition of a vision focused on the development of team leaders' leadership skills as these were seen as the major driver for future improvements in efficiency. More precisely, by the end of 2016 Andrea Ferrero wanted to have two Kata Coaches at team leader level. As claimed by Rother this shift of attention is much more aligned with Toyota philosophy that does not "concentrate on outcome targets", but it "puts considerable emphasis on how people tackle" and continuously improve a process, "which is what generates the outcomes". (Rother, 2010) Moreover, the same author states that "a vision...is a broad description of a condition we would like to have achieved in the

future". (Rother, 2010) This applies to the vision developed at Carpiano that was aimed at arriving to a situation in which at least two team leaders were able to apply the Toyota Kata patterns to guide their own team members in the improvement of processes. Nonetheless, from the interviews with team leaders and several discussions with team members it clearly emerged that for most of them was not clear what was Toyota Kata and why it was introduced. Essentially, the local management team failed to appropriately consider and involve also warehouse people in the development and discussion of the vision. (Rubrich, 2004)

b) Create the Right Environment – The Kata Room

The decision to set up the Kata room was taken by Carpiano top management and above all by Andrea Ferrero. He indeed wanted to dedicate a separate area, detached from daily routines and activities, for learning and practicing the Toyota Kata patterns. The intention of the local management team was aligned with the importance associated by Mike Rother to the creation of an environment where trial and error experimentation is perceived as a mean for creating new knowledge and hence for learning. (Rother, 2010) "In a lean organization, learning is critical, and is line management's direct responsibility". (Flinchbaugh & Carlino, 2008) Even though the academic literature on Toyota Kata does not mention the element of the Kata room, every member of the core team judged it in a positive manner. They perceived this newly created room as a safe environment where hierarchies were not anymore valid and committing a mistake was seen as an opportunity to learn. Creating the correct environment is indeed considered a crucial element for a successful change implementation also by the academic literature. For instance, Chad argues that a quiet environment, far away from the intrusive eyes of people, facilitates the process of active listening, improves the quality of the discussion and builds the necessary basis for a trustful relationship between Coach and Coachee. (Chad, 2014) Nonetheless since only one session at the time was allowed within the Kata room, scalability and increase in the number of couples could, on the other side, limit its availability. This in turn, as also claimed by Cemil Polat, could act as a barrier against the continuity and constancy demanded by the practice of Toyota Kata.

✓ Kata Storyboard

The idea to create these boards was principally promoted by Cemil Polat and Ferdinand Fingerhut who were already conscious of the role played by this element. They indeed took inspiration from the "*Kata Handbooks*" written by Mike Rother to draw the overall structure of the four boards. However the final layout, design and content of Carpiano Kata Storyboards is the result of various months of practice and of coaching sessions conducted in front of these. "*After you have practiced with this storyboard format and gained some experience, your organization's storyboard design can evolve to suit your environment and culture*". (Rother, 2014)

As a matter of fact, even though the design of the Kata storyboards implemented at the Italian distribution center follows the sequence of the five Coaching Kata questions as prescribed by M. Rother, the core team made some changes to the structure by introducing new elements. (Rother, 2014) For instance the *"Knowledge pool"* is not mentioned by the literature review. Nonetheless, during the interviews each member of the core team cited the importance of having a template whose aim is that of making transparent to anyone the knowledge generated from an experiment. However, since the teachings on the *"Knowledge pool"* were written in English, very often these were not definitely easy to understand for warehouse team leaders. This choice limited the potential of this template as it acted as a barrier against those who at the end have to implement the change.

Lastly, during the interviews each member of the core team revealed that, mostly at the beginning, the presence of the Kata Storyboard is needed to internalize the Improvement and Coaching Kata patterns in a correct and effective manner. Indeed as argued by M. Rother the Kata Storyboard is an essential element since it helps to structure the coaching sessions. "*The board itself does nothing. It's used to support the interaction between Learner and Coach in the Improvement Kata process*" (Rother, 2014)

c) In-class Training

During the first week of April 2016, Cemil Polat and Ferdinand Fingerhut held a three days in-class training on Toyota Kata only for the management level of the Italian Logistics department. This was in English language and composed both by a theoretical part, explained by slides, and by a practical part with games connected to the theory explained. On the other side, the in-class training for Aurelio Mariani and the four warehouse team leaders was held by Matteo Pozzoli and it lasted two half days as it covered only selected concepts of the theoretical part discussed with the management level. The decision to receive two different levels of preparations is supported also by Rubrich as he claims that training has to be adequate for the organizational level and function in which is held. (Rubrich, 2004)

During the interviews all the members of the core team judged awareness of the Toyota Kata as essential in order to understand this intangible and cultural topic. "Launching even a modest lean initiative without having the required skills is not realistic". (Keller, 2006) Training is also an important mechanism for engagement as it "affects an employees' willigness to adopt Lean behaviors". (Hines et al., 2008) This can be clearly evicted by the interviews with warehouse team leaders who all claimed to be curious about the topic and to be willing to get involved directly. Nonetheless, the local management group failed to organize follow-up meetings and discussions about the topic and this, little by little, resulted in a vague understanding of it by team leaders. (Rubrich, 2004) The four of them indeed when asked what was Toyota Kata in their opinion, revealed that this concept was not yet clear to them as the training, although interesting was not sufficient.

d) Dry run Training and the Core Team

Out of forty-four persons employed in the Italian Logistics department only four participated to the dry run training; namely Andrea Ferrero, Fabio Milani, Matteo Pozzoli and the author of this master thesis. During the interview with the Head of Region Logistics E4 he indeed explained that choosing the right dimension of the first focus group is fundamental in order to increase the possibility of success. This reflects what M. Rother claims; namely that to develop the first Kata Coaches the best approach is to create a learning group within which the future Coaches practice daily the Kata patterns and alternately take over both the Kata Coach and Coachee roles. (Rother, 2014) "A more promising approach is to begin with some already-established practice routines... and then evolve those routines to suit your organization once a critical mass of competency and knowledge is developed". (Rother, 2014)

From the interviews with the members of the core team it clearly emerged that practice played a central role in the learning process of the Toyota Kata methodology. They all indeed claimed that theory alone was not sufficient in order to comprehensively understand this complex topic. These comments reflects the centrality of the principle "*learning by doing*" highly emphasized by the lean philosophy. (Spear, 1999) Moreover, as claimed by M. Rother since the Kata coaching function is often missing in a company, at the beginning of each Kata initiative the focus should be on creating the right structure and set up for practice. "*Practice with corrective feedback is an important part of effective skills training*". (Rother, 2014)

Lastly, at Carpiano warehouse it was defined that 100 coaching sessions was the minimum threshold to achieve before the roll out of Toyota Kata. Even though in the academic literature it is not mentioned any minimum required number of practice sessions, 100 reflects the necessary continuity and constancy required for the internalization of the Toyota Kata methodology. (Rother, 2010) This in turns, as emphasized by the members of the core team, demanded for a high level of commitment and for a great investment of time that were considered by Cemil Polat as two essential elements during the implementation of Toyota Kata at Carpiano.

✓ Selection of appropriate topics for practice

At Carpiano the idea of practicing the Kata pattern on non-customer influencing topics before increasing the complexity originated from Cemil Polat who, at the beginning of the dry run training, stressed the need of learning how to use the structure of the board. "*It is important to use an easy-to-understand work process for their initial practicing, so they can concentrate on the pattern*". (Rother, 2014) During the interviews each member of the core team supported this decision. They all indeed confirmed that at least two weeks of experience on how to use the board are essential to then face the difficulties associated with the focus on the content and digest the relative shock. For this reason, the first week of dry run training Cemil Polat supported the two couples in the selection of adequate focus processes. These had to be rather simple and easy to work on topics, not customer influencing and not related to warehouse activities. "*Select an appropriate focus process for a beginner learner*". (Rother, 2014)

Lastly, during the training period the topics selected should be of high relevance both for the coach and the coachee in order to not consider the training as an additional task. (Rother, 2014) However, this was not always the case at Carpiano. For instance during the first week of practice Fabio Milani chose as focus process his diet. The relevance of the focus process to the couple, especially during the training period, has to be carefully taken into consideration by the local management team during the roll out at operative level. Indeed, as also claimed by Matteo Pozzoli, the risk is to lose the attention and commitment of people as they will perceive this exercise as something not related to their daily job.

✓ Lean experts – The role of the Coach Coach

During the dry run training period the core team performed daily coaching sessions in front of three different Coach Coach. "As in sports and music, practicing a skill should be done under periodic observation and guidance of an experienced coach". (Rother, 2014) Each one of them is employed in the Global Lean department located in Schaan, Liechtenstein. Moreover, also before joining the Hilti Group, Cemil Polat and Kostas Kefalakis already had extensive experience with lean and the Toyota Kata methodology. Indeed the former worked for seven years in a lean consultancy firm, while the latter worked for five years in a management role at Toyota. "The 2nd Coach is typically ...a specialist, such as a Lean staff person. Like the Coach, the 2nd Coach must have personal experience with applying the Improvement Kata". (Rother, 2014) During the interviews, Andrea Ferrero, Fabio Milani and especially Matteo Pozzoli, appreciated the

attendance of lean experts during the dry run training period. They hence confirmed the importance given also by the academic literature to the role played by the Coach Coach who is indeed held *"responsible for the effectiveness of the Coach's teaching"*. (Rother, 2014)

Lastly, although there is nothing mentioned in the academic literature on Toyota Kata, the three members of the core team also judged in a positive manner the presence of three different external lean experts as each one of them brought a singular perspective.

In their opinion this helped them to widen their understanding on the Toyota Kata methodology and on its fundamental aspects. However, on the other side it is also important that the different perspectives brought by the three Coach Coach are all aligned and linked together; otherwise the risk is to create confusion. This is exactly the case of the third week of the dry run training period when to restore the calm among the members of the core team Kostas Kefalakis asked for the support of Cemil Polat. Indeed since the former was not aware of the current level of the two couples, he had brought a radical change of perspective that discouraged the Italian team.

e) Deployment strategy

If on the one side the overall vision of Toyota Kata had been widely communicated and shared among the Logistics management group, the same does not apply for the deployment strategy. Essentially it was clear what was the mission, but how to achieve it was still vague to everyone. The local management group and also Cemil Polat mostly focused on the first roll out at middle management level and thus invested several time in considering all the elements for an effective preparation of the first Kata couple. They failed to consider the importance of scalability and to assign clear responsibilities, provide defined timelines and indicate what resources are to be committed for achieving the vision. (Rubrich, 2004) This process of policy deployment in the Japanese culture is called Hoshin Kanri and at Toyota it plays a central role as it is one of the elements that composes the top of the 4P Pyramid Model. (Liker, 2004) Indeed as stated by Peter Hines, Hoshin Kanri is a policy that ensures the right alignment of the entire company towards a common goal so that progress can be measured and organizational learning can take place. (Hines et al., 2008) On the other side, without a well-defined and long-term oriented deployment strategy the lean implementation can result in a series of jeopardized and hence misaligned improvement initiatives. (Rubrich, 2004) Therefore Carpiano management team needs to carefully consider this point, especially for organizing the second roll out at operational level, otherwise the risk is that it "*can fail by attempting too much*". (Keller, 2006)

5.2.2 Conclusion

To conclude, the second part of the discussion is mostly focused on the investigation of the elements that accompanied the implementation of Toyota Kata at Carpiano warehouse. These are the outcomes of a long period of research on the topic, mainly driven by a complete absence of awareness of it within the Hilti world. Therefore a careful assessment of these elements is of high importance as it can guide and facilitate future Toyota Kata implementation projects by providing them with already tested knowledge, documentation and with practical examples. Furthermore, since the implementation approach selected impacts on the sustainability of the change, its analysis is also important because it can reveal some threats to the long-term diffusion and survival of Toyota Kata at the Italian distribution center. Overall, from the evidence gathered both through direct observations and interviews with the core team composed by Andrea Ferrero, Fabio Milani, Cemil Polat and Matteo Pozzoli, it emerged that at Carpiano warehouse the essential elements during the introduction of the Toyota Kata methodology were:

i. A **clear vision** for Toyota Kata focused on the willingness to achieve a desirable and future target condition rather than on the need to escape from a current threat to survival, such as a period of the recession. However, still this vision was defined and discussed only among the management level, instead of being properly shared and communicated also to warehouse people.

- ii. A **separated and dedicated environment** for the daily practice of the Toyota Kata methodology. The Kata room was a place in which all that had not to do with Toyota Kata was excluded and this also applies to hierarchical roles and work relations. Moreover within the Kata room it was located another essential element for the implementation of this methodology; namely the Kata storyboards which were defined as fundamental for an effective internalization of the Kata patterns.
- iii. The **in-class training**, though refereed necessary and interesting, was not considered as sufficient for gaining an adequate level of understanding on Toyota Kata. **Practice** was indeed judged even more significant for the internalization of this intangible and cultural topic. With regards to the practical coaching session, the choice of the topics and the presence of a Coach Coach were regarded as two fundamental factors to take into careful consideration. However, on the other side, daily practice requires a huge investment of time and a high level of commitment that is not always easy to estimate in advance and hence guarantee in the moment of need.

Lastly, there is one critical element that the local management team failed to adequately consider and that could therefore threaten the success of the Toyota Kata implementation project. This is a **well-defined and long-term oriented deployment strategy** that includes a comprehensive escalation plan where role and responsibilities are assigned, milestone and timelines are set and resources are adequately allocated. Above all, this deployment strategy will have to include all the teachings and guidelines assimilated by the core team during the first roll out at middle management level. This could help Carpiano management team to fine tune and adjust the process of transmission of Toyota Kata and steer it towards the correct direction, even though, as claimed by M. Rother " there is a need to go beyond just planning to continually experimenting, observing and adjusting at the organizational (deployment) level". (Rother, 2014)

5.3 Answer to the Third Research Question

The third part of the discussion is aimed at answering to the last research question addressed by this master thesis; namely:

RQ3) What are the major changes introduced by Toyota Kata at Carpiano during the first roll out?

This research question, also due to its relevance with regards to the overall problem treated by this master thesis, deserves particular and careful attention. Indeed in the third part of the discussion it is evaluated the application of the Toyota Kata methodology at Carpiano warehouse on a real shop floor and customerimpacting topic. Moreover in this section are also highlighted the major changes introduced by Toyota Kata at the Italian distribution center. The assessment of these elements is of high importance on the one side because it guides the reader towards the solution of the research problem. On the other side because it can provide useful guidelines and advices to those who in the future will eventually implement and hence diffuse Toyota Kata within the Hilti Group.

Lastly the answer to the third research question is founded on the analysis of the data gathered by the author of this master thesis, who also acted in the role of Coachee during the first Toyota Kata roll out. On the one side the quantitative data was mostly extracted from the internal warehouse management system (WHMS) used at Carpiano warehouse with the precious support of Matteo Pozzoli. Moreover, quantitative data was also collected through questionnaires filled by warehouse team members. The three major quantitative parameters analyzed for the third part of the discussion are: throughput time, buffer areas and efficiency.

On the other side qualitative data was collected from the interviews with warehouse team leaders and with the members of the core team, from direct observations and from questionnaires filled by warehouse team members. The four principal aspects deepened in this third part of the discussion are: transparency & quality of communication, level of involvement, leadership approach and problem solving method.

5.3.1 The impacts of Toyota Kata at Carpiano Warehouse

After six months from the arrival of Toyota Kata at Carpiano warehouse, its impacts were already perceptible. Not only at visual level in terms of different flow of goods, process standards, floor markings or even labels glued on trolleys. But also at commitment level with regards to the time invested by the middle management for the preparation and execution of Kata coaching sessions and by the team leaders for the implementation of the experiments proposed by the couple.

From the interviews with the latter it emerged that all of them are aware of the Toyota Kata methodology. On top of that, three out of four of them claimed that they have participated, if only as observers, to the Kata coaching sessions and that they have already noticed its impacts mostly at:

- a) Process level
- b) Involvement level
- c) Quality of communication

On the other side also the local management team agreed with team leaders when they claimed that Toyota Kata already brought some changes at Carpiano warehouse. However, they perceived the impact of this new methodology mostly at:

- a) Process level
- d) Leadership approach
- e) Problem solving method

The only lone voice is that of Cemil Polat who warned the local management team of the fact that the road ahead is still long and the major challenges and difficulties are yet to come. Nonetheless, he also confirmed that some little changes are already in place and that, due to the high level of commitment and attention showed by the Italian management team, he is confident about the future of Toyota Kata at Carpiano warehouse. In the next pages each of the characteristics mentioned by the local management team and by warehouse team leaders is deepened and analyzed at the light of the literature review discussed in chapter 3.

a) Process Level

The major result achieved by the Kata couple during the first roll out is a structured and streamlined flow of trolleys, which finally resulted in a decrease of throughput time for the manual picking process.

As the couple started to monitor throughput time at the beginning of July, its reduction of almost 8% is related only to the last month and a half. Strictly connected to this point, in July the operators working in the manual picking process picked and packed the 53% of all lists in less than 4:30 hours compared to the 57% of September. Lastly, as a collateral effect, these improvements brought also some effects on the efficiency of the processes involved. As a matter of fact, during the first three months of application of Toyota Kata the efficiency of the High Bay process increased by 6%, while its stability improved by 27%. On the other side the Packing process remained stable throughout the period, with minor fluctuations in the months of June and July.

✓ Parameters Measured

One evidence that emerges from the majority of the interviews is the selection of parameters used to measure the first Kata focus process. Indeed, the emphases placed on efficiency shifted to make way to the throughput time and to the measurement of the buffer areas. And as claimed by Mads Harck, Head of Lean Management, during the Lean Summit, it was the first time that the throughput time was introduced within a Hilti warehouse. The criteria upon which the Kata couple decided what parameters to measure are the following: linkage with the target condition, ease of collection and ease of understanding. This is in line with what Toyota does. Indeed, as stated by Hines et al., "we believe that there must always be a link between, *KPI, the strategy and the Lean improvement project*". (Hines et al., 2008) Moreover, by focusing only on the choice of few, critical and "simple metrics" that are applied "at the company or plant level" it is possible to assure the correct alignment of people towards the desired direction. (Liker, 2004) On the contrary the risk is that of creating confusion as to what parameter is more important. (Rother, 2014) Lastly, since "you get what you measure", the change of focus in the selection of parameters can drive improvement initiatives in areas not yet considered by the local management team of Carpiano warehouse. (Liker, 2004) This is exactly the case of the throughput time as it fostered a standardization of the trolley flow that until that moment was considered an out of scope topic because of its complexity.

✓ Pull versus Push

From the interview with Matteo Pozzoli it emerged that during the first Kata roll out the couple adopted a different approach towards the introduction of lean tools. In fact these were not anymore pushed from the top to boost improvements in one area, but were pulled by the couple in order to resolve a specific problem. "Tools should be driven by the needs of the customer, the business and people within the business; they should be pulled, not pushed". (Hines et at., 2008) Moreover, the approach followed by the couple during the introduction of lean tools is fostered also by Shah and Ward, as they claimed that when embarking on a lean journey a company should not accept and "pre-chewed solution" of the concept, but it should develop and deploy its own. (Shah & Ward, 2007) This is the case of Carpiano warehouse where the "lean solutions" implemented by the Kata couple were strictly connected to an issue that was impacting the shop floor and hence "tailor made" for the uniqueness of the circumstance that pulled them. (Wang, 2011)

b) Involvement Level

During the first roll out of Toyota Kata at Carpiano warehouse not only "*extra training*" was provided so that "*team leaders were given skills that emphasized the change*". (Hines et at., 2008) But they were also invited to participate to the coaching sessions as observers, with the aim of having them aligned on the experiments ongoing in the shop floor and hence being faster during the implementation phase. As a matter of fact, during the coaching sessions the Kata couple discussed about the expectations on the experiment and the way to execute it. While at the end of the dialogue, team leaders gave their feedbacks and suggestions which were then used to adjust the test before its implementation. The reasons that led to the decision of involving team leaders perfectly follows the philosophy promoted by Toyota which "gets all the parties on board and supporting the decision so any resistance is worked out before implementing anything". (Liker, 2004) Moreover, after having achieved a great level of detail, the Kata couple understood that in order to set up and execute in an effective manner an experiment it was necessary to rely on the experience and knowledge of warehouse team leaders.

Not only they possessed a greater understanding of shop floor activities, but they also had a different perspective and hence might have seen something that the couple missed. (Liker, 2004) Lastly, by having participated to the coaching sessions they also begun to take part into the decision making process. However their participation was still indirect and limited to observe and give feedbacks. As a consequence they cannot still be defined as the "*improvers*" of the process since the decisions are still taken and cascaded from the top of the hierarchy. (Rother, 2014)

c) Quality of communication

One aspect that emerges from the interviews with warehouse team leaders is the increased quality of communication and level of transparency associated with the introduction of Toyota Kata. They all indeed appreciated the fact that during the daily shop floor meetings the Kata couple used to invest some time for the explanation of the new parameters introduced or for the analysis of their progress.

The importance given by the Kata couple to an open communication resides in the fact that during the first month they failed several tests solely because these were misinterpreted by the executers. The lack of an "*effective two-way communication*" was slowing the progress of the focus process and inhibiting the inclusion of team leaders and members into the change process. (Hines et al., 2008) This is the reason why the couple decided to actively participate to each shop floor meeting of level 0 and dedicate one part of the shop floor meeting of level 1 for the discussion of the first Kata focus process. The decision immediately paid off as team leaders started to better understand the overall direction, to be aligned towards the final goal and as a consequence also to give improvement suggestions. (Figure 13) This evidence confirms the power of communication as an instrument that "*can boost productivity by promoting teamwork, engagement and employees empowerment*". (Rubrich, 2004) At Carpiano communication served to include workers in the change programme as they were finally made aware of the reasons for introducing it. (Hines et al., 2008) Essentially, with Toyota Kata not only changed the frequency and time devoted by the middle management for promoting an open and constant communication, but also the content of the communication that shifted from a pure focus on "*what*" to a focus on "*why*". (Rother, 2014)

d) Leadership Approach

Toyota Kata challenged the traditional leadership style followed at Carpiano warehouse already during the dry run training. The practice indeed revealed that the longer was the management experience, the more difficult was to apply the lean leadership principles promoted by this methodology. This is due to the fact that managers are used to "*spoon feed*" their subordinates with answers, instead of developing "*problem-solvers*" that can find the solution by their own. (Rother, 2014)

This was in part the case of the first Kata roll out. Since the couple was working on a customer-impacting focus process by using a new methodology and the coach was already aware of the solution, the latter adopted a manipulative leadership style. [52] Matteo Pozzoli stated that this attitude at the beginning prevented the development of mutual trust and this in turn acted as a barrier to the creation of a no blame relationship. As a matter of fact "*at the start, coaching cycles often take too much time*" because the coach instead of following the five questions manipulates with closed questions the coachee, who, on the other side, is trying to guess "*what solution the mentor has in mind*". (Rother, 2010) The fear to fail associated with the lack of trust within the couple is noticeable by the low number of experiments conducted during the months of May and June. Essentially Matteo Pozzoli instead of encouraging the coachee to abandon his own comfort zone preferred that the latter did not commit any mistake. (Rother, 2010) As a result during the first period the Kata couple mostly focused on the analysis of data extracted from WHMS.

This behavior is in contrast with what a leader should do; namely "*elimante the comfort zone and direct people to the learning zone*". (Flinchbaugh & Carlino, 2008) Lastly, Coaching Kata promotes a different management approach where the leader is expected to create the right learning environment and the employees are held responsible for problem solving and continuous improvement. (Liker, 2004) This coaching method is founded on the belief that "*if the learner hasn't learned, the teacher hasn't taught*" (Rother, 2010) However at Carpiano the feeling was that if the learner has not learned it was because he had not effectively followed the directives of his teacher. Therefore it can be concluded that, even if in a less explicit manner compared to the period before the introduction of Toyota Kata, the role played by the coach was still characterized by the features of the "*task manager*". (Hines et al., 2008)

e) Problem-solving level

One element upon which all warehouse team leaders agreed is the fact that during the first Kata roll out the couple was very often in the shop floor to make experiments. The same evidence is confirmed by Matteo Pozzoli even though he specified that the presence of the couple in the warehouse has been slowly increasing. Indeed during the first period they mostly focused on extracting and analyzing data from the internal warehouse management system. However, when they reached a good level of detail the only way to assess the outcomes of an experiment was through measurements done in the shop floor. It was hence not rare that the coachee was in first line to practically execute the experiment together with warehouse team leaders. This behavior is aligned with Toyota motto "*Go and confirm the facts yourself*". (Liker, 2004) Indeed, as claimed by Rother, "*Go Gemba*" is an important characteristic for a lean leader who needs to spend sufficient time on the shop floor in order to get to the bottom of problems. (Rother, 2010) Indeed the 4-steps of the IK pattern are all based on thoroughly observation and reflection about the situation (Rother, 2010). The author also affirms that shop floor presence generates two effects: (Rother, 2014)

- ✓ Appreciation through direct on-site contact
- ✓ Mental closeness

The same evidence emerged from the interviews with warehouse team leaders who all appreciated the presence and "*active engagement*" of the couple. They indeed claimed that the Kata couple was always available in explaining and clarifying to everyone why and how an experiment had to be executed and what changes it was supposed to bring. (Kallage, 2006)

Lastly, Matteo Pozzoli also stated that Toyota Kata brought a change in the size of problems solved. [52] For instance an experiment often consisted in testing only a specific part of a processes rather than changing the entire process at once. Indeed for the warehouse controlling team leader the key with Toyota Kata lies in the level of detail achieved by drilling down obstacles so that it is then easier to make single factor experiments and hence understand whether these are aligned with the expectations or not. [52] This systematic and sequential problem solving approach is consistent with that used at Toyota. (Rother, 2010) As claimed by Liker, "underlying the entire process of planning, problem solving and decision making is careful attention to every detail". (Liker, 2004) Indeed only by doing small, incremental and daily steps it is possible to learn along the way and transform improvement activities into a daily routine. (Rother, 2010)

5.3.2 Conclusion

To conclude, the third part of the discussion is aimed at analyzing the changes brought by Toyota Kata after six months from its implementation at Hilti Italian central warehouse. This investigation is of high importance as it will guide the reader to the resolution of the research problem addressed by this master thesis. Moreover it will also help the local management team to assess whether the impacts of this newly implemented methodology are aligned with their expectations or not.

From the analysis of the evidence and data gathered it can be claimed that in a limited period of time Toyota Kata brought several changes at Carpiano warehouse. And indeed among the local management team the level of enthusiasm and excitement was high. Furthermore little by little within the Hilti Group the level of curiosity was rising. As a matter of fact, after only three months from the roll out this topic had already done so much noise that it had been chosen as a focus process for the prestigious Lean Summit held in Schaan. Overall, Toyota Kata brought changes at:

- ✓ People Level: During the first roll out the involvement of team leaders into the change process was not anymore relegated to the physical and practical implementation of a specific tool. Thanks to a renovated level of transparency, warehouse people begun to understand why an experiment had to be executed and hence they also started to propose suggestions to make that experiment more effective. Lastly, by participating to the coaching sessions as observers they also started, at least indirectly, to deal with the decision making process underlying the taking of a solution.
- ✓ Problem Solving Level: Toyota Kata brought at Carpiano warehouse a new problem solving approach based on small and sequential experiments conducted and measured on the shop floor. This method, based on a detailed drill down of the obstacles, helped the couple to be fast and focused during the implementation phase. However to achieve a good level of speed and quality the Kata couple invested several coaching sessions. Indeed at the beginning the tendency was still that of making slow and painstaking statistical analysis to then take a decision on what solution to implement. Only after having achieved a level of detail such that it was not anymore possible to extract data from WHMS the Kata couple started to rely more on a trial and error problem solving approach.
- ✓ Process Level: Toyota Kata not only brought to a structured and streamlined flow of trolleys, but it mostly brought to a shift of mentality. For instance tools were not anymore pushed from the top in order to improve the performance of a single process, but were pulled by the needs of the couple and hence tailored to the unique circumstance. Furthermore the use of this tools was not anymore solely aimed at increasing the efficiency of an activity, but it was often aimed at achieving a higher target condition.
6 Answer to the Research Problem

This master thesis investigates the introduction of Toyota Kata within the Italian central warehouse of the Hilti Group. The primary objective of this master thesis has been to provide the reader an answer to the research problem "*can Toyota Kata revitalize the lean journey of Carpiano warehouse*?" In order to assure a comprehensive and structured answer to the problem three research questions were cascaded down from it. These were answered in the previous chapter and are the point of departure for the resolution of the research problem addressed by this master thesis.

Answering the primary research problem, Toyota Kata definitely had an impact on the lean journey of Carpiano warehouse which was in a period of stagnation characterized by a lack of understanding of lean and of utilization of the tools. Under this point of view the outcomes of the first roll out at shop floor level are promising, even though there are still some areas of concern that the local management team will have to seriously take under control. Nonetheless in the overall it can be claimed that Toyota Kata revitalized the lean journey of Carpiano warehouse mostly at:

✓ Strategy and Alignment Level: The decision to implement Toyota Kata at Carpiano warehouse was anchored in the willingness to increase the level of quality of lean and improve the competencies and skills of warehouse people. To achieve this objective the local management team developed a clear and strong vision and a detailed escalation plan up to the first Kata roll out. Moreover they also invested time and resources in order to drive, in first line, the change and to communicate by person the expectations and the progress of the implementation. However under this point of view the local management team has to take into serious consideration the creation of a clear and comprehensive escalation plan so that it can be provided the right structure for deploying Toyota Kata throughout the organization.

In the overall this shift revitalized the lean journey of Carpiano warehouse by assisting employees to look at lean more as a long term journey rather than as a short term cost reduction initiative.

✓ Behavior and Engagement Level: The implementation of Toyota Kata impacted in a direct manner all warehouse team leaders. Not only they were involved in a two days in-class training on this newly introduced methodology, but they also participated to the coaching sessions as observers and supported the couple in the execution and measurement of the experiments. Thanks to a renovated level of transparency and to the creation of an open communication channel, the Kata couple begun to involve team leaders in the decision making process. For the first time the latter were explained why an experiment or an improvement action had to be implemented and what were the outcomes and changes expected.

In the overall this shift revitalized the lean journey of Carpiano warehouse by increasing the level of engagement and involvement of team leaders into the change and continuous improvement process.

✓ Process Management Level: During the first roll out of Toyota Kata the couple applied several lean tools that in most cases brought visible impacts in the warehouse. However, under this point of view the great difference with regards to the implementation of lean, was that these methods were pulled by the needs of the situation and thus tailored to the specific needs of Carpiano warehouse. Furthermore, the implementation of the tools was not anymore driven by a sole focus on improving the efficiency of a process, but it was often aimed at achieving a higher level target condition. This shift of mentality was accompanied by a change of key performance indicators analyzed, to the point

that the Italian distribution center is the first one that introduced throughput time measurements within a warehouse at the Hilti Group.

In the overall this shift revitalized the lean journey of Carpiano warehouse by fostering a mentality in which solutions are developed for a specific need and not anymore copied and pasted.

To conclude, Toyota Kata revitalized the lean journey of Carpiano warehouse by impacting most of the invisible elements of the Lean Sustainable Iceberg model. (Hines et al., 2008) These enabling and strategic elements, that are all people related, are the key to sustainability and hence long-term survival of lean within an organization. (Hines et al., 2008) Since the complete internalization of the soft skills embedded in Toyota Kata is part of a "*dynamic learning process*", it is now too early to judge whether this methodology was a success or not. (Holweg, 2007) On the one side the first outcomes are promising and as a matter of fact the enthusiasm and curiosity within the Hilti world are evident and palpable. However on the other side there are areas of concern that need to be carefully investigated by the local management team of Carpiano warehouse.

6.1 Further Steps for Carpiano Warehouse

This master thesis is focused on a limited timeframe. However, by comparing the first outcomes of the introduction of Toyota Kata at Carpiano warehouse with the theoretical frameworks proposed in the literature review it is possible to draw some necessary further steps that the Italian Logistics department will have to take to assure a successful deployment of this methodology. This last section is of high importance for the local management team as it can provide them with useful advices and guidelines on how to adjust and fine tune their approach towards Toyota Kata.

✓ Deployment Strategy

Until now the local management team have not yet defined and communicated a clear and detailed escalation plan. They focused most of their attention and efforts solely towards the implementation phase and hence towards the first roll out. It is indeed not yet clear who is going to be involved for the second roll out, when it is supposed to start and how long it will take. As a matter of fact, in order to guarantee scalability and guide the diffusion of Toyota Kata the local management team has to carefully clarify and communicate a clear and detailed deployment strategy. This must take into consideration defined deadlines, roles, responsibilities and resources. Otherwise the risk is that of having only few individuals that are held accountable and responsible for pushing and maintaining Toyota Kata. However this structure is very risky and inflexible because if these people leave the company then also the initiative vanishes into nothing.

✓ Policy Deployment

Until now the direction to take has always been defined by the management who very often failed to then cascade it down to warehouse people. This in the long term brought to have team leaders that are dependent on the directives of the management team since they do not know how their actions are impacting on the achievement of the overall mission. Toyota Kata has partially mitigated this factor by making more transparent why an action / experiment has to be executed. Now to make a step further the local management team has to cascade the mission, drill it down into a series of smaller targets and translate these into a series of actions. Policy deployment will indeed assure that everyone within the warehouse is following the same direction and it will also inhibit the application of Toyota Kata for the improvement of single processes. Lastly this step is fundamental in order to empower team leaders to be the real "*improvers*" otherwise they will always depend on the input given by the management team. (Rother, 2014)

6.2 Limitations of the Master Thesis

The answer to the research problem addressed by this master thesis is grounded on the theoretical frameworks highlighted in the literature review. Nonetheless there are some limitations that have to be discussed as, if not acknowledged by the reader, could eventually limit the generalizability of the final results. Overall four major limits were identified:

✓ Single case base study

This master thesis discusses the introduction of Toyota Kata at Hilti Italian central warehouse. As a consequence the answer to the research problem is grounded on the data and evidence gathered within a single and unique reality. This essentially means that not all the impacts of Toyota Kata on the lean journey of Carpiano warehouse can be generalizable to other organizations of the Hilti Group. It is indeed possible that the introduction of this methodology within a different environment could eventually generate different changes in terms of magnitude and typology. Nonetheless the generalizability of the outcomes discussed by this master thesis is assured by the adherence to the theoretical frameworks provided in the literature review. And even if each lean implementation is different, still there are some points of contact between each one of them. (Rubrich, 2004)

✓ Limited timeframe

This master thesis discusses only a limited timeframe, especially for a behavioral and cultural element such as Toyota Kata. Six months are indeed not adequate to comprehensively answer to the research problem addressed by this master thesis. For instance the second roll out at team leader level could potentially provide contrasting results and force the local management team to adjust their approach. However, since lean initiatives can be set up to fail, from the evidence and data gathered it is possible to predict whether Toyota Kata is going to be a success or not. (Rubrich, 2004) Based on this assessment is then possible to understand whether the impacts described by the author are buds waiting to bloom or only short term and unexpected changes doomed to unsustainability.

✓ *Role of the researcher*

The author of this master thesis actively participated to the implementation of Toyota Kata in the role of intern in the Italian Logistics department of the Hilti group between March 2015 and September 2015. However this master thesis deepens strategic and cultural elements that cannot be directly influenced in a six months internships. Therefore the decisions that led to the introduction of Toyota Kata at Carpiano warehouse and to the selection of the implementation approach have not been influenced since these were taken at a higher organizational level. Nonetheless with regards to the first Kata roll-out the author, who acted in the role of Coachee, with its actions had a direct impact on the experiments and progress of this methodology. It is indeed possible that if another person was chosen for the role of Coachee the final outcomes would have been different.

✓ Toyota Kata

Lastly the topic itself can represent a possible limitation of this master thesis. Indeed Toyota Kata is a methodology anchored in the organizational culture of a company and hence the impacts of its introduction can vary among different firms. The choices taken by the local management team were tailored to the unique needs and reality of Carpiano warehouse and thus these could eventually not be replicable into other organizations of the Hilti Group. Moreover the commitment and ability that the Italian Logistics department will demonstrate in deploying this approach and the capacity of team leaders to internalize this method can inhibit or boost the success of Toyota Kata at Carpiano warehouse.

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8 APPENDIX

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This master thesis is the outcome of a 6 months internship at the Logistics department of Hilti Italia s.p.a. The accomplishment of this master thesis concludes my Master of Science in Supply Chain Management at the Copenhagen Business School (CBS).

The internship at Hilti has been for me a precious opportunity to apply my knowledge on lean management on a concrete and real business case and develop myself both academically and professionally. I would hence like to thank the whole warehouse organization of Carpiano in Italy. Andrea Ferrero, Fabio Milani and Matteo Pozzoli your commitment, devotion and engagement made this master thesis possible. You guided and supported me throughout the entire internship program with your technical experience and precious knowledge. I would also like to thank you for all the opportunities you gave me, the comfortable and unique working atmosphere and also for the fun we had together.

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Last but not least I would also like to thank my family and my friends that always supported and bore me during this intense, demanding and long period. You have proven me that important people do not abandon you in the moment of need instead they share it with you. You gave me all the energies, confidence and motivation I needed to be able to finalize this master thesis. Finally I want to particularly thank you also for the sensitive physical presence with which you sustained this important step in my life.

LIST OF ABBREVIATIONS

Abbreviation	Explanation
BIC	Best in Class
BPPM	Best Practice Process Management
CEO	Chief Executive Officer
СК	Coaching Kata
CW	Central Warehouse
GLOMEX	Global Logistics Management Exchange
HQ	Headquarter
IK	Improvement Kata
KPI	Key Performance Indicator
MM	Materials Management
МО	Market Organization
OE	Operational Excellence
PDCA	Plan Do Check Act
SFM	Shop Floor Management
QC	Quality Cost
ТК	Toyota Kata
TL	Team Leader
ТМ	Transport Management
ТМ	Team Member
TPS	Toyota Production System
TPT	Throughput Time
WH	Warehouse
WLD	Work-load balance
WM	Warehouse Management



Figure 26 - Global Best in Class Distribution Center Award, 2014

Hilti Italy S.p.A

The first international subsidiary of Hilti was settled down in Italy, where Artec, an Italian firm acquired by the Group in 1952, was charged of distributing Hilti's products. In 70 years Hilti has grown up very quickly and it has soon spread across the country up to the nearby nations. As a result of its long and successful history in the country, Italy was recently chosen to lead the so-called "Region E4" which comprehends all of the various Balkans countries together with Greece and Israel. (Figure 27) The Italian HQ in Milan controls a network of 82 HC scattered along the peninsula, 1000 independent sellers, one distribution center (CW) located in Carpiano together with the repair center and finally two small warehouses in Sicily and Sardinia. The recent financial crisis of 2007 had critical impacts on the sales of the Group in the Region and consequently on its financial stability. After a complete reorganization of the company, the closure of almost 10 HC and the intervention of several Global Task-forces, Hilti Italy can now celebrate the return to growth. Indeed in the first half of 2015, also driven by the Expo in Milan, sales have increased by 4% compared to the previous year.

Carpiano Warehouse

Hilti's CW in Italy is located almost 25km South-East of Milan, in the small town of Carpiano. Overall the warehouse of Carpiano employs 38 persons, of which 22 are operative and 16 work in the Logistics Department. The operational part, headed by Aurelio Mariani, is divided into four major processes: Inbound & Returns, led by Pietro Corvi, Fast Picking, led by Mauro Bianchessi, High Bay, led by Antonio Cafeo, and Packing & Quality, led by Daniele Bricchi. (Figure 28 and 30) On average Carpiano warehouse receives 2,5 trucks per day which equals to almost 350 Inbound lines and 30 of Customer Returns. While it delivers to the final clients, to the Hilti Centers and to all the various Account Managers more than 4000 Outbound lines per day.

On the other side, the Logistics Department, headed by Andrea Ferrero, is divided into three different areas: Material Management, supervised by Fabrizio Martini, Transport Management, controlled by Marco Battista and Warehouse Controlling, managed by Fabio Milani. (Figures 29 and 31)

CW was the first one that forced by the financial crisis to choose between lay off about half of its work force or pursue a comprehensive restructuring of its operational processes, opted for a widespread implementation of Lean practices. The results of this choice have supported its growth up to the point of becoming "Best in Class" warehouse of the Hilti Group with an overall efficiency of 24 lines per man / hour against a worldwide target of 22 lines per man / hour.



Figure 27- Logistic Region E4, Hilti Group



Figure 28 - Carpiano Warehouse Structure & Processes



Figure 29 - Organizational Chart Operation Warehouse, Carpiano Warehouse



Figure 30 - Organization Chart Logistic Region E4

	LOg			
	Milani Fa	bio		
	HELT	Head of WH E4		
		Logistic Operations		
	1 3	Hiti Italia S.p.A.		
		the second se		
Baldini Lorenzo Bruno	Pogliaghi Alberto	Pozzoli Natteo		Mariani Aurelio
Baldini Lorenze Bruno WH Maintenance	Pogliaghi Alberto Stage	Pozzoli Mattee Wi	Controlling TL	Mariani Aurolio Operation WH TL
Baldini Lorenzo Bruno WH Maintenance Logistic Operations	Pogliaghi Alborto Stage Logistic Operations	Pozzoli Mattee Wi	I Controlling TL	Mariani Aurolio Operation WH TL Operation WH

Figure 31 - Organizational Chart Logistic Operations, Carpiano Warehouse



Figure 32 – Hilti Italy s.p.a. Revenues and Engaged Customers (2011 – 2015)



Figure 33 - Carpiano Warehouse Performance (2013 – 2015)

Bad KATA	WHY (Explanation)	Good KATA	
	(Business) Vision		
"Be the best in the world"	 → Defines guiding principle and business philosophy → Should be understood as a corporate constitution → Is not primarily a financial KPI, but a vague explanation of how to operate 	"See Champion 2020 Tower – e.g. purpose: We passionately create enthusiastic customers and build a better future"	
	Challenge (VSM Vision state)		
"Flow without interruptions except in high bay area" "Lead time from 16 to 15 days" "Efficiency from 24 to 25 LPH"	 → Challenge should not consider restrictions of the current state → Challenge should be progressive and long-term (5-7 years & factor 4) → Effectiveness before efficiency 	"Flow without interruptions in the total WH" "Lead time from 16 days to 4 days"	
	Target State		
"Minimize", "Maximize", "Reduce", "Improve", "Increase"	 → Avoid terms, which anticipate actions → Describe the required target state/ working pattern to reach the challenge 	"Direct connection between shelves picking and packaging with buffer of 3 trolleys."	
Obstacles			
"Lack of 5S" "No barcode system in place" "Improvable setting"	 → Solutions embedded into obstacles → No clear description of what is preventing you to reach the target state. → Too vague description of the obstacle 	"Unorganized and dirty work station" "Keying in data takes time and causes mistakes" "Layout causes long walking distances"	

Figure 34 - "Bad Versus Good Kata", Carpiano Warehouse



Figure 35 - Shop floor Presence among Members of the Kata Core Team



CARPIANO WAREHOUSE

Main attributes of the VISION state

- 1. Get rid of cranes
- 2. [Cut-off time at 17:30 by reducing takt time] No Cut-off
- 3. Less mixed area
- 4. No walking
- 5. Picking in the box
- 6. Consolidation (if customer needs that)
- 7. Packing includes sorting
- 8. Total (100%) Pull logic
- 9. No customer related mistakes

Figure 37 – Carpiano Warehouse Vision 2020



Figure 38 - AS - IS Value Stream Map of the Trolley Flow

	Description	Month to Date - June, 2015
8	Lines per Multiple List	8459
	Lines per Single List	8428
	Multiple Lists	2623
, j	Single Lists	7179
<u>č</u>	% of Multiple Lists	73%
<u>.</u>	% of Single Lists	27%
<u> </u>	% of 9/10 and 7/8 Sigle lists	38%
11X	Lines per List (Multiple)	3,22
	Lines per List (Single)	1,17

Figure 39 – Mix of Picking Lists

Trays for	r Single Lists	Trays for	Multiple Lists
1 / 2	41 A	7/8	8 + 9 / 10
7 / 8	41 B	7 / 8 +	9 / 10 + 41
9 / 10	41 C	7 /	/ 8 + 41
11 / 12	41 D	9/	10 + 41
13 / 14		2 Areas	+ 3 Areas

Figure 40 – Sorting Trays for Picking Lists



Figure 41 – Labels for Visualizing Picking Missions

		Description	Month to Date - July, 2015
e	sts	Range A (0 - 1,5 hours)	6%
0	È	Range B (1.5 - 4,5 hours)	50%
me ts	iple	Range C (4,5 - 8,5 hours)	40%
tii Jist	fult	Range D (> 8,5 hours)	5%
	Avg. TPT Multiple Lists	4,73 Hours	
ghg tin	ß	Range A (0 - 1,5 hours)	13%
ou g ick	List	Range B (1.5 - 4,5 hours)	45%
P	ele	Range C (4,5 - 8,5 hours)	36%
T	Sing	Range D (> 8,5 hours)	6%
	•1	Avg. TPT Single Lists	4,26 H ours

Figure 42 – Throughput Time of Picking Lists



Figure 43 - "Manual Picking Process" Throughput Time, July 2015 - September 2015

l				Hilti. Outperf	form. Outlast.
	Process & Activity	Team Leader	Create	d By Date	Rev. Date
#	Task	Time	Who	Why	V.A HSE
1					
2					
4					
5					
6					
7					
8					
9					
10					

Figure 44 – Process Standard Template



Figure 45 - Number of Trolleys at the Buffer Area in front of the Packing Line



Figure 46 – High Bay Process Efficiency (July 2015 - September 2015)



Figure 47 - Carpiano Warehouse Inventory Accuracy (2013 - 2015)

INTERVIEWS

Reference Number	44
Date of Interview	29/09/2015
Interviewee	Bianchessi Mauro, Fast Picking Team Leader
Language	Italian (translated in English)
Question 1	When was Lean introduced at Carpiano and why was it introduced?
Amouron 1	"Il Lean è stato implementato durante i primi mesi del 2012. Me lo ricordo perchè Andrea Ferrero e Fabio Milani avevano fatto una comunicazione a tutto il magazzino. Avevano detto che per via della crisi era necessario introdurre dei cambiamenti. Ed in effetti era un periodo difficile in cui si lavorava poco per via dei volumi bassi. Nel magazzino si mormorava addirittura la possibilità di chiusura".
Answer I	"Lean was implemented during the first months of 2012. I remember it because Andrea Ferrero and Fabio Milani made a communication to all the employees of the warehouse. They said that because of the crisis it was necessary to introduce some changes. And in fact it was a difficult period in which we worked little because of the low outbound volumes. Within the warehouse it was even whispered the possibility of closure".
Question 2	of Lean?
Answer 2	"Durante l'implementazione del lean sono stato coinvolto soprattutto per quello che riguarda l'aspetto pratico ed operativo. Siccome uno dei progetti era sul Fast Picking e io al tempo ero team leader del Fast Picking venivo coinvolto per ogni cambio che c'era da fare. A volte solo per effettuare il trasferimento della merce, altre per consigliare quale articolo spostare e dove. Quindi tutto sommato direi un 6 anche perché di contro noi team leader siamo stati completamente esclusi dal processo decisionale. Le decisione e le scelte su quale processo migliorare e come sono sempre state prese dall'ufficio". "During the implementation of Lean I have been involved especially for what concerns the practical and operational aspects. As one of the projects was on Fast Picking and I, at the time, was the Fast Picking team leader I was involved for every change there was to do. Sometimes just to make the transfer of goods, others to advise which product to move and where to move it. So all in all I would say a 6. Also because team leaders against were completely excluded from the decision-making process. The decision and the choices of what process to improve and how to improve it have always been taken by the office neonle".
Question 3	Do you think you have received adequate training on Lean?
Answer 3	"Durante l'introduzione del lean sono stati organizzati dei corsi anche per i team leader. Se non ricordo male i team members non sono stati coinvolti nella parte di corsi, o alcuni lo sono stati, ma solo più avanti. Sta di fatto che se chiedi a 5 persone che co'è il lean ti daranno 10 risposte diverse. La formazione l'ho trovata abbastanza generale ed organizzata in modo veloce. Nel senso che non c'era un vero e proprio filo logico. Siamo stati bombardati di nozioni di cui non sapevamo nulla. Quindi se oggi mi

Br-f-Mun

	chiedi cosa ti ricordi: molto poco! La teoria in generale mi è chiara, ma ho alcune lacune dovute al poco tempo dedicatovi".
	"During the introduction of lean there were some courses organized also for team leaders. If I remember correctly the team members were not involved in the courses, or some people were, but only later. As a matter of fact, if you ask what is lean to 5 persons in the warehouse, you will get 10 different answers. I found the training quite general and organized quickly. In the sense that there was not a real logical thread. We were bombarded with notions of which we knew nothing. So if today you ask me what you remember: very little! The theory in general is clear to me, but I have some shortcomings due to the little time devoted to it".
Question 4	During the implementation of Lean Carpiano top management was often in shop floor or directed from its offices?
Answer 4	"Andrea Ferrero, Fabio Milani e Barbara Sorrentino, ma adesso anche Matteo Pozzoli, hanno sempre affrontato i cambiamenti in prima linea. Questo vale anche per l'introduzione del lean. Erano sempre in magazzino con la task force a mettere dei pallani rossi alle aree che andavano migliorate. Poi analizzavano il processo, lo strutturavano e a volte ordinavano e pulivano anche. (risata) Comunque sono stati presenti e questo ci ha motivato. Sapevamo che stavano lavorando per migliorare la situazione, anche se noi di contro non siamo mai stati coinvolti direttamente. Eravamo utilizzati per fare il lavoro sporco". "Andrea Ferrero, Fabio Milani and Barbara Sorrentino, but now also Matteo Pozzoli, have always faced changes in the forefront. This also applies to the introduction of lean. They were always in the warehouse with the task force to put red dots to areas that needed to be improved. Then they analyzed the process, they standardized it and sometimes ordered and even cleaned. (Laughing) But they were present and this has motivated us. We knew that they were working to improve the situation, even though we were never directly involved. We were used to do the dirty work".
Question 5	Do you think that Lean was something pushed from above or something required by team members?
Answer 5	 "Non so se la decisione sia stata presa da Andrea Ferrero e gli sia stata imposta da Schaan, ma è venuta dall'alto. Infatti non siamo nemmeno l'unico magazzino Hilti che ha introdotto il lean. Per esempio il magazzino di Bredbury qualche anno fa ha vinto il premio sul Lean. Poi parlo per me, all'epoca il lean era solo un grosso punto di domanda. Mentre per alcuni team members lo è ancora un grosso punto di domanda. Ma se avessimo saputo che ci avrebbe portato a diventare il miglior magazzino del mondo Hilti penso che avremmo tutti spinto per avere il lean". "I do not know if the decision was made by Andrea Ferrero or if it was imposed by Schaan, but it came from the top. In fact we are not even the

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	only Hilti warshouse which introduced lean For example Prodhum
	warehouse a few years and year the Lean award. They Level few warehouse if
	warehouse a few years ago won the Lean award. Then I speak for myself,
	at the time the lean was just a big question mark. while for some team
	members it is still a big question mark. But if we had known it would lead
	us to become the best warehouse of the Hilti world I think we all pushed
	to have the lean."
Question 6	How would you describe Lean in only few words?
	"Il lean lo definirei come ordine, pulizia e continua ricerca nell'eliminare
	lo spreco di materiali e tempo".
Answer 6	
	"I would define lean as order, cleanliness and continuous research in
	eliminating the waste of materials and time".
Question 7	Do you consider Lean as part of your job or as something on top?
	"Se dovessi rispondere per far felice Fabio Milani e Andrea Ferrero direi
	di si, ma se devo rispondere onestamente direi di no. Purtroppo non
	sempre c'è tempo per applicare il lean soprattutto se si deve spedire tutto
	ed essere efficienti. Per gli attuali volumi siamo contati e quindi si corre
	tutto il giorno. In questo caso il lean diventa una fonte di stress e
	confusione perché ti distoglie dalle tue attività. Per esempio quando venite
	per fare l'audit 5S. Anche se è solo una mezz'ora in quel momento può
	fermarsi l'impianto, bloccarsi la nastratrice, la reggiatrice e così via
	Ouindi da una parte mi viene chiesto di fare i 5S e i Quaity Circles ma
	dall'altra parte il giorno dono mi viene chiesto perchè non ho fatto 24
	righe ora"
	inghe ora .
Answer 7	""If I had to respond to make happy Milani Fahio and Andrea Ferrero I
	would say yes, but if I have to answer honestly I would say no
	Unfortunately there is not always time to apply lean especially if you have
	to ship everything and be efficient. For current outbound volumes we are
	counted and thus we run all day. In this case, lean becomes a cause of
	stress and confusion because it distracts you from your work. For
	example when you come to make the 55 sudit. Although it is early a half
	hour during that paried the conversion can atom on the taring
	and stranning machine conveyor can stop of the taping,
	they tall maximulament 58. Quality Circles and so on the one side
	the day often they call me why the officiency is not 24 li
	hour?"
Question 8	How many times per day do you use I can toole? Which toole?
Question o	"Quante volte al giorno dinende dalla giornata. Di siguro agni giorno
	come tu ben sai, abbiamo lo shon floor, incontro che travo molto utilo
	Dovrebbe service per pianificare le risorra par la signate a diastant de
	problemi del giorno prima, ma molto grazza si diluvali anti alla discuttere del
Answer 8	public Coreo poi di applicare il 55 elle mis matterio di la
r inswer o	una. Cerco poi di applicare il 55 ana mia postazione di lavoro al meno
	Lavorara nalla settimana attrimenti mi ritrovo a nuotare nella polvere.
×.	Lavolare neno sporco mi da fastidio quindi il 58 e un'attività che cerco di
	svoigere ogni settimana anche se non sempre è possibile se devi
	consegnare 4000 righe al giono".

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	"How many times a day depends on the day. For sure every day, as you well know, we have shop floor management, a meeting that I find very useful. It should be used to plan resources for the day and discuss the problems of the day before, but very often we dwell to talk about anything. Then I try to apply the 5S to my workstation at least once a week otherwise I find myself swimming in the dust. Working in the dirt bothers me so the 5S is an activity that I try to play every week although it is not always possible if you have to deliver 4000 lines per day".
Question 9	Can you give me three advantages and three disadvantages of Lean?
Answer 9	"Svantaggi direi che si lavora di corsa, i ritmi sono aumentati con l'implementazione del lean. Vuoi anche che negli ultimi anni i volumi stanno aumentando, ma io arrivo ogni giorno alla sera che sono morto. Poi il fatto che si guarda sempre più all'efficienza, mentre prima quasi non si calcolava nemmeno. A volte quindi lavoriamo di fretta e lavoriamo male, c'è disordine e facciamo errori. Il terzo svantaggio è che c'è poco tempo per gestire tutle le attività. Purtroppo io ho solo due mani e i giorni hanno solo 24 ore. Quindi o faccio il 5S, o lancio gli ordini o gestisco il mio team. Tutto non si può fare!.". "Come vantaggi invece direi l'organizzazione del lavoro. Il lean a portato degli standard. Per il Fast Picking c'è lo standard su come lanciare gli ordini, quanti lanciarne e ogni quanto. C'è poi una procedura su come prelevare per essere più veloci, prima metti nella scatola la merce voluminosa e poi quella più piccola. Poi ovviamente sta alla persona applicarli, ma al meno ha una linea guida. Poi come vantaggio includo anche le performance migliorate. Carpiano è cresciuto molto sotto questo punto di vista. Oggi siamo il miglior magazzino del mondo Hilti e questo in parte lo dobbiamo anche all'ordine e all'organizzazione che ha portato il lean". "Disadvantages I would say that you work in a hurry, the work pace increased with the implementation of lean. Even if in recent years the outbound volumes are increasing, I come every day to night that I am really tired. Then the fact that they look more and more to efficiency, whereas before almost they did not even calculated. Sometimes we work in a hurry and hence we work badly, there is confusion and we make mistakes. The third disadvantage is that there is little time to manage all the activities. Unfortunately I have only two hands and the days have only 24 hours. So either I do the 5S, or launch orders or manage my team. I cannot do all!" "As benefits instead I would say the organization of work. Lean led to the implementation of standards. For Fast Pickin

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	world and this in part due to the order and to the organization brought by lean".
Question 10	Do you think that the ideas for improvement proposed by team members / team leaders are properly considered by top management?
Answer 10	"Le idee se vengono proposte sono sempre prese in considerazione. Però i team members più che proporre idee di solito presentano problemi. Molto spesso durante shop floor ti trovi di fronte persone che quando hanno un problema lo accantonano e sperano che qualcuno lo risolva. Sinceramente con questa mentalità non si va lontano. L'altro grosso problema è che delle poco idee proposte, molte non vengono poi praticamente portate a termine. Se dici di fare una cosa, fai quella e la finisci. Poi fai altro. Qui invece c'è la tendenza a incominciare mille cose, e on finirne nesssuna. Anche per questo motivo a volte ti senti demotivato a proporre idee. Perché poi alla fine sai che molto probabilmene saranno solo aria fritta".
Answer 10	"If the ideas are proposed, these are always taken into account. But usually team members instead of proposing ideas, present problems. Very often during shop floor you face people who have a problem, set it aside and hope that someone solves it. Honestly with this mentality you will not go far. The other big problem is that of the recently few proposed ideas, many are not then practically completed. If you say you do one thing, do that and finish it. Then do another thing. But here there is a tendency to start many things and to not finish any of them. This is also why at times you feel discouraged to propose ideas. Because in the end you know that it probably will only be hot air".
Question 11	In general do you believe that Lean had a positive or negative impact at Carpiano? Why?
Answer 11	"Tutto sommato direi positivo. Grazie al lean ho visto Schaan quando siamo andati a ritirare il premio per miglior magazzino del mondo Hilti. A parte gli scherzi, il lean ha decisamente cambiato il modo di lavorare e anche di pensare delle persone. Non parlo solo del magazzino, ma anche dell'ufficio. Ora si guardano i dettagli; per esempio con il Kata si dividono le liste singole da quelle multiple. Di quelle singole ne posso dare massimo 15, mentre di quelle multiple se sono a due aree massimo 8 se sono a 3 aree massimo 6. Prima non distinguavamo nemmeno tra liste singole e liste multiple, ne prendevi un certo numero e cercavi di farcele stare tutte su un carrello. Sicuramente è stato complicato introdurlo e ancora non tutti lo hanno assimilato. Però c'è molto più ordine, i carrelli non finiscono più e soprattutto non si finisce più di lavorare alle 21:00": "All in all I would say positive. Thanks to lean I saw Schaan when we went to collect the prize for best warehouse of Hilti world. Joking aside, lean has definitely changed the way we work and also the way we think. I speak not only of the warehouse, but also office. Now they look more at details; for example with Kata we divide single lists from multiple ones. Of single lists I can give up to 15, while those multiple if they are up to two areas 8 if they are up to 4 areas 6. Before we did not even distinguish

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	between single and multiple lists, you took a certain number of these and
	tried to make them fit within a trolley. Surely it was difficult to introduce
	the change and yet not all of them have assimilated. But there is much
	more order, there are no shortages of trolleys and above all we do not end
	up working until 21:00":
Question 12	How would you describe Kata in only few words?
Answer 12	"Lo descriverei come un metodo di risoluzione dei problemi. Sicuramente è un'attività molto positiva che coinvolge esattamente chi fa il lavoro e lo supporta nell'affrontare i problemi. È un metodo utile per affrontare qualsiasi tipo di sfida anche nella vita privata. Come approccio è decisamente impegnativo e complesso da applicare, soprattutto durante l'attività operativa. Lo trovo però un ottimo modo di rivisitazione delle nostre routines giornaliere".
	"I would describe it as a method of problem resolution. Definitely it is very positive as it involves exactly who does the work and supports him in dealing with problems. It is a useful method to tackle any challenges even in private life. As approach is very challenging and complex to apply, especially during the operational activities. But I find it a great way of revisiting of our daily routines".
Question 13	The Kata brought about changes:
Answer 13	A livello di processo? "Premetto che ho partecipato al Kata solo indirettamente quindi posso risponderti su quello che ho visto". "A livello di processo sicuramente si. La gestione delle liste ora è molto più impegnativa, ma è molto importante. Infatti c'è ordine sui carrelli e c'è ordine di fronte alle linee di stampa. E semplifica anche il lavoro del team leader di high bay. Ci sono anche delle strisce per terra che indicano quanti carrelli possono essere parcheggiati di fronte alle linee di stampa. E anche se pensavo non sarebbe stato possibile, ora Antonio Cafeo e Daniele Bricchi comunciano e si aiutano di più. In questo modo posso concentrarmi solo sul mio processo". Nel tipo di leadership utilizzata? "Non lo so. Dal mio punto di vista non è cambiato molto". Livello di coinvolgimento lato operativo in progetti/cambi? "Questo dovresti dirmelo tu. Sei sempre in giro con Antonio Cafeo, quasi sembra che abbiate una relazione. A parte gli scherzi, si c'è stato un cambio. Noi team leaders e anche Aurelio Mariani abbiamo partecipato ad alcune sessioni di Kata ed è stato utile. Per quel poco che ho capito mi ha fatto capire il perché di alcuni cambi. E in questo modo ho anche potuto dere dei menerati de la cuni cambi. E in questo modo ho anche potuto

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funziona Carpiano".
Comunicazione dei target di processo?
"Sicuramente si. Adesso viene misurato il tempo di gestione di una lista. Questo parametro è una novità, siamo sempre stati abituati a discutere solo l'efficienza. Invece adesso durante shop floor discutiamo del numero di carrelli di fronte all'area del confezionamento, del tempo di gestione delle liste. Di sicuro questo dimostra un aumento delle aspettative, ma anche ci aiuta a guardare al processo con occhi diversi. Non devo lavorare più solo per fare efficienza, ma lavorare anche in modo ordinato e strutturato".
At process level?
"As I have participated in Kata only indirectly, I can answer you only on what I saw." "At the process level certainly. The management of the picking lists is now much more difficult, but it is very important. In fact there is order on the trolleys and there is order in the front of packing lines. It also simplifies the work of the High Bay team leader. There are also floor markings on the ground that indicate how many trolleys may be parked in front of the packing lines. And also if I thought it would not be possible, now Cafeo Antonio and Daniele Bricchi communicate and help each other
more than ever. In this way I can just focus on my job."
In the kind of leadership used?
"I do not know. From my viewpoint I would say that nothing has changed".
Level of involvement of the operational side into projects / changes?
"You should tell me this. You're always walking around with Antonio Cafeo almost seems that you have a relationship. Seriously, there was a change. We team leaders and even Aurelio Mariani have participated in some of Kata sessions and it has been useful. From the little I have understood I realized why of some changes. And in this way I could also give some suggestions. Also because I work here for 15 years and I worked almost in all processes so I definitely understand how Carpiano works ".
Communication of process targets?
"Surely. Now it is measured the time of handling of a picking list. This parameter is new, we have always been accustomed to only discuss the efficiency. But now during shop floor management we discuss the number of trolleys parked in front of the packaging, the time of handling of

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	picking lists. Surely this shows an increase of expectations, but also helps
	us to look at the process through different eyes. I must not work more just
	to make efficiency, but also work in an orderly and structured manner. "
Question 14	What do you expect from Kata in the future? What are the changes that
	Kata will bring in your opinion?
	"Cosa mi aspetto dal Kata ancora non lo so. Avendo partecipato al
	training penso che prima o poi tocchi anche a noi. E direi che questo è
	positivo perché molti di noi non sono abituati a lavorare in modo
	strutturato ed ad affrontare i problemi. Ci sono alcuni che invece li
	nascondono o si lamentano e basta. I tempi cambiano e dal nostro ruolo ci
	si aspetta di più, non basta più fare i pacchi e basta. Però dall'altra parte
	bisogna organizzare adeguatamente la struttura. Bisogna trovare il tempo
	per poter fare anche il Kata altrimenti diventerà un di più rispetto alle
	nostre attività. Sono comunque curioso di capire che cosa ci aspetta e di
	partecipare in prima persona al Kata".
Answer 14	
	"What do I expect from Kata still I do not know. Having participated in
	the training I think that sooner or later it will come our turn as well. And I
	would say this is good because many of us are not used to working in a
	structured manner and to face problems. There are some who instead hide
	them or just complain. As times change management from our role would
	expect more, it is not enough to make just packages. But on the other
	hand, they must organize the change properly. You have to find the time
	to do also Kata otherwise it will become a plus in respect to your daily
	activities. However I'm curious to see what awaits us and to participate in
	first person at Kata".

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Reference Number	45
Date of Interview	17/09/2015
Interviewee	Bricchi Daniele, Handling & Quality Team Leader
Language	Italian (translated in English)
Question 1	When was Lean introduced at Carpiano and why was it introduced?
	"Non mi ricordo il giorno esatto. Però se non mi sbaglio hanno introdotto il Lean circa 3 / 4 anni fa. Era intorno al 2012. Perché? E' una bella domanda. Ad oggi ti direi per migliorare i processi di magazzino. E ridurre i costi. Alla fine era un periodo di crisi e il business era a rischio."
Answer I	"I do not remember the exact day. But if I'm not mistaken they introduced Lean more or less 3 / 4 years ago; around 2012. Why? It 'a good question. Today I would say to you in order to improve warehouse processes. And reduce costs. In the end it was a period of crisis and the business was at risk".
Question 2	On a scale from 1 to 10, how did you get involved in the implementation of Lean?
	"All'inizio per nulla. E' venuta una taskforce da Schaan e hanno fatto tutto loro. Andavano in giro a mettere pallini rossi e verdi. Verdi era ok, rosso no. Però col tempo sono stato più coinvolto, anche per via del mio ruolo. La lezione sul Kata è un esempio. Quindi direi un 6 politico!"
Answer 2	"At the very beginning not at all. It came a task force from Schaan and they did everything by themselves. They were going around putting red and green dots. Green was ok, red was not ok. But over time I have been always more involved, also because of my role. The training on Kata is an example. So I would say a political 6!"
Question 3	Do you think you have received adequate training on Lean?
	"Durante l'introduzione del Lean, come ti ho detto prima, non siamo stati coinvolti. Quindi non abbiamo nemmeno ricevuto una vera e propria formazione. La taskforce è venuta in magazzino e ci hanno detto che da oggi si faceva così. Però col tempo siamo stati più coinvolti e Matteo Pozzoli ci ha fatto dei corsi sul 5S e lo SFM. E' stato duro entrare nelle logiche del Lean, ma ad oggi direi che il concetto mi è chiaro."
Answer 3	"During the introduction of Lean, like I told you before, we were not involved. So we have not even received a proper education. The taskforce came in the warehouse and they told us that from today we have to work in a different manner. But over time we have been more involved and Matteo Pozzoli gave us trainings on 5S and the SFM. It 'was hard to understand the logics of Lean, but today I would say that the concept is clear to me. "
Question 4	During the implementation of Lean Carpiano top management was often in shop floor or directed from its offices?
Answer 4	"A quel tempo c'era Barbara Sorrentino al posto di Matteo Pozzoli. Loro due erano molto spesso in magazzino con la task force. Inizialmente anche solo per mettere pallini rossi e verdi. Questo personalmente lo trovavo un

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	po' fastidioso perche ci sentivamo giudicati indirettamente e per di più
	non sapevamo di che cosa si trattasse. Però poi sono arrivati i
	cambiamenti, molti in meglio, e quindi ci siamo ricreduti. Però per tornare
	alla tua domanda, Barbara Sorrentino, Matteo Pozzoli e anche Fabio
	Milani erano molto spesso in magazzino, non come adesso con il Kata che
	siete sempre in magazzino. Forse fin troppo! (risata) "
	"At that time there was Barbara Sorrentino instead of Matteo Pozzoli and
	the two of them were very often in the warehouse with the task force.
	Initially just to put red and green dots. This personally I found it a bit
	annoying because we felt judged indirectly, and most importantly we did
	not know what it was exactly going on. But then they implemented the
	changes, many for the better, and hence we changed our minds. But to
	return to your question. Barbara Sorrentino, Matteo Pozzoli and even
	Fabio Milani were very often in warehouse, maybe not like now with Kata
	that you are always in the warehouse. Perhans too much! (Laughing) "
	Do you think that I can was something pushed from above or something
Question 5	required by team members?
	"Di sicuro non qualcosa di richiesto dai team members! Penso che molti
	di loro non sanno nemmeno cosa sia il Lean La decisione di introdurre il
	Lean è stata presa dai cani. Poi noi abbiamo ricevuto notizia da Fabio
	Milani che ha fatto un annuncio a tutto il magazzino. Ci ha detto che
	sarabhero venuti da Schaan ner sistemare alcuni processi e quindi di stare
	propti al cambiamento"
Answer 5	pronti al cambiamento.
MISWEI 5	"Certainly not something requested by team members! I think many of
	them do not even know what is the Lean However, the decision to
	introduce the Leen was taken by the management group. Then we
	received information from Echie Milani who made an announcement to
	the entire werehouse. He said they would some from Scheen to represented
	the entire warehouse. He said they would come from Schaan to reorganize
Oursetion 6	Some processes of the waterouse and to be ready for changes:.
Question o	How would you describe Lean in only lew words?
	Per me il Lean e un metodo per snellire e migliorare i processi. E' un
Answer 6	metodo per tenere in ordine e pulita la propria area di lavoro e quindi
	essere più efficaci. Direi che è un metodo di lavoro ordinato, strutturato ed
	efficiente."
	"For me Lean is a method to streamline and improve processes. It 'a way
	to keep tidy and clean your working area and thus be more effective. I
	would say that it is an ordered, structured and efficient working method".
Question 7	Do you consider Lean as part of your job or as something on top?
Answer 7	"Domanda difficile a cui risponderei di no. Il mio lavoro è consegnare
	tutti i pacchi al corriere prima delle 20:00. Il Lean invece è un di più che
	però a volte mi dà flessibilità. Se ci sono pochi ordini faccio pulire la 41
	ad un team member per esempio. Se c'è tempo applichiamo il Lean, se no
	ci concentriamo su spedire i pacchi ai clienti. Anche perché ci pagano per
	questo".

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	"Difficult question to which I will answer no. My job is to deliver all the parcels to the courier before 20:00. Lean instead is a plus that sometimes can give me flexibility. If there are few orders I ask one of my team members to clean the shelf area (41) for example. If there is time we try to apply Lean, if not we focus on ship packages to customers. Also because we are paid for it ".
Question 8	How many times per day do you use Lean tools? Which tools?
A	"Dipende. Come ti dicevo, se ho tempo applico il Lean se no mi concentro sul mio lavoro. Cerco di fare un 5S alla settimana, ma non sempre è possibile. Dipende anche dalla disponibilità che ti danno le persone. Di contro ogni giorno abbiamo lo shop floor management, anche se onestamente lo trovo troppo ripetitivo. Si parla sempre degli stessi problemi e molte idee per migliorare non vengono mai applicate. Quindi a volte mi chiedo che senso abbia partecipare. Soprattutto se di fronte hai alcuni team members che vengono a lavorare giusto per lo stipendio!".
Answer 8	"It depends Like I said if I have time I apply I can otherwise I feare on
	my work. I try to make 5S once per week, but it is not always possible. It also depends on the availability that give people. Conversely every day we have the shop floor management, though honestly I find it too repetitive. We always speak of the same problems and many ideas to improve are never applied. So sometimes I wonder what sense to participate. Especially when you have in front some team members who
	are working only for salary".
Question 9	Can you give me three advantages and three disadvantages of Lean?
Answer 9	"Svantaggi direi che è un metodo complicato da comprendere e all'inizio richiede molto, anche troppo tempo. Questo spesso va in conflitto con il nostro lavoro, o fai il lean o fai i pacchi. Però poi se non fai i pacchi il giorno dopo durante shop floor ti chiedono perché non hai consegnato tutto al corriere. Mentre come vantaggi direi la facilità di applicazione del Lean. Per fare il 5S non devi avere una laurea (risata). Poi anche il fatto che il Lean ti permette di lavorare in un modo strutturato ed ordinato. Questo di contro ti permette di essere più efficiente. Quando facciamo il 5S alla 41 il giorno dopo l'efficienza di prelievo è sempre più alta. Non è un caso che Carpiano è diventato miglior magazzino di Hilti da quando ha incominciato ad applicare il Lean. Purtroppo però non tutti seguono questo metodo di lavoro e si vede!".
	"Disadvantages I would say that it is a complicated method to understand and, at th,e beginning it requires a lot, even too much time. This often conflicts with our work, or you do lean or you do packages. But then if you do not do packages the next day during shop floor management they ask you why you have not delivered everything to the carrier. While advantages I would say the ease of application of Lean. To make the 5S you do not need a degree (laughing). Then also the fact that the Lean allows you to work in a structured and orderly manner. In turn this allows

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	you to be more efficient. When we do the 5S at the shelf area (41) the day after picking efficiency it is always higher. It is no coincidence that
	Carpiano became best Hilti warehouse since it began to apply Lean.
	Unfortunately, not everyone follows this way of working and it is
	visible!".
Question 10	Do you think that the ideas for improvement proposed by team members /
Question 10	team leaders are properly considered by top management?
Answer 10	"Dipende dalle idee. Se sono valide si cerca sempre di implementarle. Se non lo sono vengono scartate. E dipende anche dalle persone perché come ti dicevo c'è chi viene a Carpiano giusto per timbrare il cartellino. Qui a Carpiano secondo me il problema principale sono le tempistiche. Le idee ci sono anche. Però se per ogni idea devi aprire un quality circle e per chiudere il quality circle ci si impiega 4 mesi, alla fine non ti senti incentivato. E' come se oggi mi compro l'iphone 6, ci impiegano 4 mesi a consegnarmelo e nel mentre è già uscito l'iphone 7!".
Answer 10	
	"It depends on the ideas. If these are valid you always try to implement them. If not, these are discarded. It also depends on people because as I said there are those who are in Carpiano just to punch the clock. Here in Carpiano I think the main problem is the timing. The ideas are there. But if for every idea you have to open a quality circle and to close the quality circle it takes four months, at the end you do not feel encouraged. It is like if today I buy the iPhone 6, it takes me 4 months to deliver it and meanwhile the iPhone 7 is already out!".
Ouestion 11	In general do you believe that Lean had a positive or negative impact at
	Carpiano? Why?
Answer 11	"Il Lean ha portato a Carpiano un cambio decisamente positivo. Tu non lavoravi ancora qui, ma ti assicuro che c'era molta confusione. Io prelevavo al fast picking e questo faceva circa 70 righe ora. Adesso ne fa 120! Arrivare a questo livello di ordine, organizzazione ed efficienza è stato però molto faticoso. Ci sono voluti molti cambiamenti che spesso portavano più confusione che performance. Capitava che un giorno ci dicevano di confezionare un pacco alla volta, mentre il giorno dopo ti dicevano di confezionarli tutti in una unica volta. Quindi la strada è stata lunga e difficile, ma alla fine ha ripagato gli sforzi. Ora che però il lean ha dato quello che poteva dare a Carpiano è ora di fare il prossimo cambio. E penso che Kata possa essere la strada giusta perché lavora con le persone. Anche se proprio per il fatto che lavora con le persone penso che il cambiamento sarà duro e lungo (risata)!". "Lean at Carpiano brought a very positive change. You were not yet working here, but I assure you that there was a lot of confusion. I was a picker in the fast picking area and this was about 70 lines man hour. Now it makes 120 lines man hour! Getting to this level of order, organization and efficiency, however, was very difficult and tiring. It took a lot of changes that often brought more confusion than performance. It happened

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anone se non partecipavo un cuantente al Kata perche polevo sempre		anche se non partecinavo direttamente al Kata parahá potavo service
		anone se non partecipavo un cuamente al Kata perche potevo sempre
esprimere la mia opinione. Ora sappiamo anche qual è il target finale		esprimere la mia opinione. Ura sappiamo anche qual è il target finale
quindi abbiamo una meta da raggiungere. Di conseguenza le idee proposte		quindi abbiamo una meta da raggiungere. Di conseguenza le idee proposte
sono più coerenti di prima. Se so che devo fare i 100 metri a nuoto di		sono più coerenti di prima. Se so che devo fare i 100 metri a nuoto di
sicuro non mi alleno sul salto in alto. Prima mancava trasparenza!"		sicuro non mi alleno sul salto in alto. Prima mancava trasparenza!"

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Comunicazione dei target di processo? "Assolutamente si. Come ti dicevo ora sappiamo tutti qual è il target del processo perché questo è scritto sulla lavagna. Chiunque può andare alla lavagna e leggere qual è l'obbiettivo finale. C'è molta più trasparenza e questo di sicuro ci fa sentire più coinvolti e anche più utili. A volte mi capita di sentirmi come un robot che deve solo chiudere e spedire pacchi. Adesso invece mi sento parte del processo di cambio. A volte sapere il perché devi fare qualcosa cambia poi il modo in cui svolgi quell'attività". At process level? "Definitely yes. Many small and simple changes have been introduced, such as the sorting of lists or labels on trolleys, which when added together produce a big impact. Now you have to work with people to make sure they follow the changes introduced otherwise in the end it was all for nothing! This I think is a very difficult challenge especially if you work with some people who are not willing to change." In the kind of leadership used? "I could not tell. What I noticed is that you and Matteo Pozzoli are very often in the warehouse to make new changes. I think this is good because everyone can see what you are doing and feel motivated to give support " Level of involvement of the operational side into projects / changes? "Absolutely yes. With Kata now the decisions are made in the warehouse with us team leaders. I always felt involved even if I was not attending directly Kata because I was always free to express my opinion. Now we also know what is the final target so we have a goal to reach. As a result the ideas proposed are more consistent than before. If I know I have to swim the 100 meters at the Olympic Games I will not train on the high jump. Before we were lacking transparency!". Communication of process targets? "Absolutely yes. As I said, now we all know what is the target of the focus process because this is written on the storyboard. Anyone can go to the storyboard and read what is the ultimate goal. There is much greater transparency and this certainly makes us feel more involved and even more useful. Sometimes I feel like a robot that only has to close and send packages. But now I feel part of the process of change. Sometimes indeed knowing why you have to do something at the end changes the way you perform that activity. "

Question 14	What do you expect from Kata in the future? What are the changes that Kata will bring in your opinion?
Answer 14	 "Sono rimasto positivamente impressionato dal Kata. La giornata di training e assistere alle vostre sessioni di Kata mi hanno aiutato a capire meglio di che cosa si trattasse. Basta poi guardare ai cambiamenti che ha portato in così pochi mesi per capirne le potenzialità. Quindi dal futuro mi aspetto un coinvolgimento maggiore dei team leader. Non so come e quando riuscirò a trovare del tempo per fare il Kata, ma vorrei essere direttamente coinvolto. Avere la mia lavagna per lavorare sul mio processo". "I was positively impressed by Kata. The day of training and all yours Kata sessions to which I participated have helped me to better understand what it is. Then you just have to look at the changes that resulted in so few months to understand its potential. So from the future I expect a greater involvement of team leaders. I do not know how and when I can find the time to do Kata, but I would like to be directly involved. Have my storyboard to work on my process".
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Reference Number	46
Date of Interview	19/10/2015
Interviewee	Cafeo Antonio, High Bay Team Leader
Language	Italian (translated in English)
Question 1	When was Lean introduced at Carpiano and why was it introduced?
	"Il Lean è stato implementato a Carpiano circa due, tre anni fa. Era un periodo in cui l'azienda aveva bisogno di cambiamenti per poter andare avanti."
Answer 1	"Lean was implemented at Carpiano more or less two, three years ago. It was a period in which the company needed to change in order to move forward. "
Question 2	On a scale from 1 to 10, how did you get involved in the implementation of Lean?
Answer 2	"Poco, direi 4. Il Lean è stato sponsorizzato da Schaan, da casa madre. Sono venuti loro da Schaan con una task force per implementarlo. Quindi io personalmente non sono stato coinvolto nel progetto".
	"Only a little, I would say 4. Lean was sponsored by Schaan, from the headquarter. They came directly from Schaan with a taskforce force to implement it. So I have not personally been involved in the project. "
Question 3	Do you think you have received adequate training on Lean?
Answer 3	 "Abbiamo ricevuto formazione, c'è stato un corso. a non la ritengo adeguata. Ancora infatti non mi è tutto chiaro. Non mi sento sufficientemente preparato." "We received some sort of training, there was a course. But I do not consider my knowledge adequate. Indeed Lean is still not entirely clear to
Question 4	When the Lean was sponsored by senior management? How it was sponsored?
Answer 4	"Da un giorno all'altro si è introdotto il Lean. La taskforce è arrivata da casa madre con già le idee chiare su come implementarlo. Sono state dedicate tante risorse e tempo al Lean e sono stati introdotti tantissimi cambi. Il che è buono perché prima si lavorava nella confusione e nel casino. Adesso con il Lean le aree di lavoro sono più pulite ed ordinate, ci sono degli standard per i processi che rendono più chiaro il metodo di lavoro da utilizzare."
	"Lean was introduced from one day to another. The task force came from the headquarter with a clear idea of how to implement it. They dedicated many resources and time to Lean and they also introduced many changes. Which it is good because before we worked in the confusion and mess. Now with Lean work areas are clean and tidy, there are standards for processes that make clearer the working method to use. " During the implementation of Lean's top management Carpiano was often
Question 5	in shop floor or directed from its offices?

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	"Durante l'introduzione del Lean il management non ci ha supportato
	adeguatamente. Non erano in shop floor con noi per guidarci nell'utilizzo
	di questi nuovi strumenti. Siamo però stati guidati ed aiutati da Aurelio
	Mariani".
	"Ultimamente però vedo spesso Andrea Ferrero e Fabio Milani
	partecipare alle sessioni Kata in shop floor. Quindi adesso sono molto più
	visibili e partecipi. Questo personalmente ritengo sia una cosa favorevole
	perché si interessano su come vanno i processi. Non vengono in shop
	floor per coinvolgerci in progetti, ma più per controllare come stiamo
	lavorando e farci sapere se non stiamo seguendo gli standard."
Answer 5	
	"During the introduction of Lean management did not adequately
	supported us. They were not in the shop floor with us to guide us in the
	use of these new tools. However, we have been guided and helped by
	Aurelio Mariani ".
	"Lately, however, I often see Andrea Ferrero and Fabio Milani attend
	sessions of Kata in the shop floor. So now they are much more visible and
	involved. I personally think this is a positive thing because you care about
	the way in which the process works. They do not come to the shop floor
	to involve us in projects, but more to control how we are working and let
	us know if we are not following the standards. "
Question 6	Do you think that Lean was something pushed from above or something
Question o	required by team members?
	"Il Lean è stato spinto e introdotto da casa madre. Quindi è qualcosa che è
	venuto dall'alto. Sono venuti con una taskforce, dove la situazione era ok
	mettevano dei pallini verdi, dove le cose andavano male mettavano pallini
	rossi. Lo scopo della taskforce era portare dei miglioramenti e questi ci
	sono stati. Quindi anche se non siamo stati coinvolti direttamente però
	siamo stati positivamente impattati dal Lean".
Answer 6	
	" Lean was pushed and introduced by the headquarter. So it's something
	that came from above. They came with a taskforce, where the situation
	was ok they put green dots where things went wrong they put red dots.
	The purpose of the taskforce was to bring these improvements and those
	were evident. So even though we were not directly involved, we have
	been positively impacted by Lean. "
Question 7	How would you describe Lean in only few words?
	"Miglioramento, pulizia ed ambito di lavoro più ordinato."
Answer 7	
	"Improvement, cleaning and area of work more orderly."
Question 8	Do you consider Lean as part of your job or as something on top?
	"Il Lean fa parte del mio lavoro quotidiano. Se voglio lavorare bene devo
	seguire le logiche del Lean. Se non seguo il Lean rischio di finire tardi e
Answer 8	soprattutto fare errori."
	"Lean is part of my daily work. If I want to work well I have to follow the
	logic of Lean. If you do not follow Lean the risk of being late and above

	all make mistakes is high. "
Question 9	How many times per day do you use Lean tools? Which tools?
Answer 9	"Non uso spesso gli strumenti del Lean. I QC non vengono aperti e le proposte dai miei team member sono spesso assenti. Il 5S invece dipende dal management. Quando stabiliscono un audit allora si fa il 5S. A volte anche se c'è una spinta dall'alto nell'utilizzare i tool Lean noi non sempre li utilizziamo". "Siamo comunque arrivati ad un livello di miglioramento oltre il quale è difficile andare. Non so come lavorano le altre MO e Schaan, quindi mi
	baso su Carpiano. Si può ancora fare qualche miglioramento, ma se guardo indietro e ai cambi fatti fino ad ora, difficilmente riesco a pensare a qualcosa di simile ora."
	"I do not often use the tools of Lean. The QC are not opened and the proposals by my team members are often absent. The 5S instead depends on the management. When they set an audit then we do the 5S. Sometimes even if there is a push from above to use Lean tools we do not always use them. "
	"However, we have reached a level of improvement beyond which it is difficult to go. I do not know how the other Market Organizations and Schaan work, so I rely on Carpiano. You can still make some improvements, but as I look back to the changes made so far, I can hardly think of anything like that now. "
Question 10	Can you give me three advantages and three disadvantages of Lean?
Answer 10	"Svantaggi penso nessuno. Vantaggi direi pulizia, si lavora nell'ordine. Aree ben definite e processi chiari che hanno portato miglioramenti in efficienza. Anche se il Kata di per sé ha portato più impatti sui processi e sull'efficienza"
	"Disadvantages I think none. Benefits I would say cleanliness, and working areas more ordered. Areas well defined and clear processes that have brought improvements in efficiency. Although Kata itself brought more impacts on processes and efficiency. "
Question 11	Do you think that the ideas for improvement proposed by team members team leaders are properly considered by top management?
Answer 11	"Io penso che alcuni team member non propongano idee perché nel passato non sono mai stati presi in co nsiderazione. Quindi ritengono inutile esporsi. Prima non venivano sempre seguite le idee di CIP spinte dai TM. Adesso però sta cambiando la situazione, vengono considerate di più. Fabio Milani adesso ci lascia più spazio per proporre idee di miglioramento e nel dirci se possono nzionare o no."
	"I think that some team members do not propose ideas because in the past they have never been taken into account. So they believe it is pointless to expose themselves. Before the ideas for continuous improvement pushed by team members were not always followed. Now, however, the situation is changing, they are considered a bit more. Fabio Milani now leaves us

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	more room to propose ideas for improvement and to tell us whether they can work or not. "
Question 12	In general do you believe that Lean had a positive or negative impact at Carpiano? Why?
Answer 12	"Il Lean ha sicuramente avuto impatti positivi. Non è molto in linea con il mio modo di essere perché io non sono una persona molto ordinata. Ma anche per questo è stato molto utile. Quindi cerco sempre di applicarlo anche se mi richiede a volte molto lavoro e molti sforzi". "Penso che comunque il Lean ormai abbia poco da dare a Carpiano. Nel senso già molti cambi e miglioramenti sono stati fatti, e ci ne sono ancora altri piccoli cambi che si possono fare. Ma nulla che possa stravolgere la realtà presente a Carpiano".
	"Lean has definitely had a positive impact. It is not very much in line with my way of being because I'm not a very tidy person. But also because of this reason it was very useful. So I always try to apply it even if though sometimes it requires a lot of work and effort. "
	"However I think Lean now has little to give to Carpiano. Indeed already many changes and improvements have been made, and there are only other small changes that you can do. But nothing that would upset the present reality in Carpiano. "
Question 13	How would you describe Kata in only few words?
Answer 13	"Il training è stato interessante. Avere un gioco con cui poter far pratica è stato utile per capire meglio il concetto. Mi è piaciuto il concetto degli ostacoli. Noi spesso ragioniamo sempre con la soluzione in testa al posto che analizzare meglio gli ostacoli. In generale comunque è un buono strumento per poter migliorare i processi." "Il Kata per me è essenzialmente un metodo di comunicazione. Questo richiede rispetto reciproco con la persona con cui ti stai confrontando. Perché se non ha rispetto per l'altra persona e per le sue idee, è inutile farlo."
	"The training was interesting. Having a game with which to make practice was useful to better understand the concept. I liked the concept of obstacles. We often reflect with the solution already in our mind instead of better analyzing the obstacles. In general, however, it is a good tool to improve processes. " "The Kata for me is essentially a method of communication. This requires mutual respect with the person with whom you are confronted. Because if he has no respect for the other person and for his ideas, it is useless to do it. "
Question 14	The Kata brought about changes:
	A livello di processo?
Answer 14	"Il Kata ha portato dei cambiamenti a livello di processo. Cambi in meglio e visibili. Però bisogna far capire meglio ai Team Members qual è l'ulteriore cambiamento a cui stiamo andando incontro. Infatti alcuni di

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	loro sono rimasti ancora a 15 anni fa e non hanno quindi ancora ben capito cosa si sta facendo. Questo perché non sono stati coinvolti nel corso come invece è successo per noi TL."
	Nel tipo di leadership utilizzata?
	"Il tipo di leader a Carpiano è decisamente cambiato. Non sono più direttivi, ma cercano di aiutarti e di supportati. Ascoltano le idee e cercano di adattarle per metterle in pratica. Sono molto spesso in shop floor quindi sono più visibili e per esempio Andrea Ferrero quando è a Carpiano è sempre in shop floor. Partecipa direttamente, da idee e controlla anche."
	Livello di coinvolgimento lato operativo in progetti/cambi?
	"In partenza il cambio è stato imposto. Quando viene imposto si fa fatica ad implementare il cambio perché non lo si capisce e va contro quello che si pensa essere il miglior modo di lavorare. Quindi alla fine il cambio viene implementato male e appena si può tornare a lavorare come prima lo si fa. Però adesso per il processo di HB si sta incominciando a confrontarsi e discutere su quali cambi fare. Questo mi motiva personalmente perché mi sento coinvolto direttamente e mi sento di poter influenzare le decisioni che mirano a migliorare il processo di cui sono TL."
	Comunicazione dei target di processo?
	"Inizialmente il Kata ha portato alla misurazioni di parametri di cui non ne ero a conoscenza e di cui non ne sapevo nulla. Quando sono stato coinvolto ho iniziato a capire che il focus non era più solo sull'efficienza, ma che c'erano anche altri parametri. Adesso che conosco anche io i parametri li ho comunicati ai miei TM, gli ho detto che siamo migliorati tantissimo e gli ho fatto i complimenti. Ritengo infatti che sia giusto che li sappiano cosi che sanno perché si stanno facendo i cambi e che miglioramenti stanno portando".
	At process level?
	"Kata brought some changes at the process level. Changes for the better and visible changes. However we have to help Team Members to understand better what is the further change towards which we are going. In fact some of them worked at Carpiano for 15 years and hence have not yet understand what we are doing. This is because they have not been involved in the training as it has happened for us Team Leaders."
	In the kind of leadership used?
	"The kind of leader in Carpiano has definitely changed. No more directive, but they try to help and support us. They listen to the ideas and

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	try to adapt them to then put them into practice. Management is very often in shop floor so they are more visible and for example when Andrea Ferrero is at Carpiano he is always in the shop floor. He participates directly, gives ideas and also controls. "
	Level of involvement of the operational side into projects changes?
	"At the beginning the change was imposed. When it is imposed it is hard to implement the change because we do not understand it and we think it goes against what is thought to be the best way of working. So in the end the change is implemented badly and soon you can return to work as before. But now in the process of High Bay you are beginning to meet and discuss what changes to make. This motivates me personally because I feel directly involved and I feel I can influence decisions that aim to improve the process of which I am Team Leader. "
	Communication of process targets?
	"Initially the Kata led to measurements of parameters of which I was not aware of and which I knew nothing. When I got involved I began to understand that the focus was not only on efficiency, but that there were also other parameters. Now that I know also the parameters I have communicated them to my Team embers, I told them that we have improved a lot and I complimented with them. I believe it is right that they understand what we are doing so that they know why you are making the change and what improvements are expected from it. "
Question 15	What do you expect from Kata in the future? What are the changes that Kata will bring in your opinion?
Answer 15	"Vorrei essere coinvolto di più nel Kata di sicuro per poter portare altri miglioramenti e dare il mio contributo nel processo di cambiamento. Il Kata porterà altri cambiamenti importanti, forse grandi come quando c'è stata l'introduzione del Lean. Il Kata dal mio punto di vista ha un potenziale notevole e quindi sono molto positivo nei suoi confronti."
	"For sure I would like to be more involved in Kata to bring other improvements and give my contribution in the process of change. Kata will bring other important changes, perhaps as large as when there was the introduction of Lean. Kata from my point of view has considerable potential and therefore we are all very positive towards it."

 20/10/2015 Pietro Corvi, Inbound Team Leader Italian (translated in English) When was Lean introduced at Carpiano and why was it introduced? "Se non erro nel 2012. Sicuramente il lean è stato introdotto per migliorare I processi e la loro gestione in un periodo di declino. L'obbiettivo era quello di ottimizzare l'efficienza e la performance di una azienda che era sempre stata solida e competitiva". "If I am not wrong in 2012. Surely the lean has been introduced to improve the processes and their management in a period of decline. The goal was to optimize the efficiency and performance of a company that had always been
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Solid and competitive". On a scale from 1 to 10, how did you get involved in the implementation of Lean?
"Parlando da team leader direi molto poco, rispetto a quello che mi sarei aspettato. Direi un 50%. Mi sarebbe piaciuto essere coinvolto molto di più perché il lean è un metodo che mi affascina. Ogni giorno ti rendi conto che applichi metodologie che sono in linea con la filosofia lean". "Speaking from a team leader perspective I would say very little, compared to what I would have expected. I would say 50%. I would have liked to be involved much more because Lean is a method that fascinates me. Every day you realize that you are applying methodologies which are in line with the lean philosophy ".
Do you think you have received adequate training on Lean?
"Anche in questo caso devo dire di no. Dal mio punto di vista la formazione ricevuta dai team leader non è sufficiente. Alla fine se non hai una buona formazione e delle buone basi su quello che è il lean non vai da nessuna parte. Non so se il lean si è fermato ad Aurelio Mariani o è stata una scelta volontaria quella di non includerci a pieno, però sicuramente ad oggi ancora in molti non sanno cosa sia il lean". "Again I have to say no. From my point of view the training received by the team leaders was not adequate. In the end if you do not have a good education and a good foundation on what is lean you are not going anywhere. I do not know if the lean stopped at Aurelio Mariani or it was a deliberate choice to not fully include us, but certainly many today still do not know what is lean".
When the Lean was sponsored by senior management? How it was sponsored?
"Il lean è stato sponsorizzato a sufficienza. Anche se però per via della mancata formazione di team leaders e team members, molto spesso c'era confusione su cosa fosse il lean". "Lean was sponsored enough. Even if however because of the lack of

	training of team leaders and team members were often there was confusion
	as to what was lean "
Question 5	During the implementation of Lean's top management Carpiano was often in shop floor or directed from its offices?
Answer 5	"L'implementazione del lean è stata fatta sul campo, con tante ore spese per cambiare I processi o a sistemare e ordinare le aree di lavoro. Sicuramente sono state spese anche tante ore in sala per valutare e avere una maggiore analisi su cosa fare. Ma una volta deciso, il resto veniva fatto interamente in magazzino. E questo secondo me è stato molto positivo perché è servito ad abbattere alcune barriere che avevamo all'interno dell'azienda. Per esempio il fatturato ad Hilti era sempre andato molto bene, ma con la crisi nel mercato dell'edilizia c'è stato un periodo di declino. Questo ha obbligato Hilti a stare molto attenta sui costi e gli sprechi. Si lavorava per portare a casa ottimi risultati. Questo indica che c'era stato un cambio di mentalità". "Lean was implemented in the shop floor, with many hours spent to change warehouse processes or to clean and order the work areas. Surely the taskforce spent also many hours in the meeting-room to evaluate and to have more analysis on what to do. But once decided, the rest was done entirely in the warehouse. And I think this is very positive because it served to break down some barriers that we had within the company. For example, revenue for Hilti was always gone very well, but with the crisis in the housing market there was a period of decline. This has forced Hilti to be very careful about
	costs and waste. Everyone hence worked to bring home good results. This
	indicates that there had been a change of mentality".
Question 6	Do you think that Lean was something pushed from above or something required by team members?
Answer 6	 "Beh come dicevo prima il lean è stato sponsorizzato da Schaan. Loro hanno deciso di introdurlo per ottimizzare l'efficienza e farci tornare un'azienda solida. Però potrei fare tantissimi esempi, di molte richieste dei team members e soprattutto dei team leaders che erano in linea con il metodo lean. Però queste non erano,diciamo espresse in modo strutturato". "Well as I said before lean was sponsored by Schaan. They have decided to introduce it to maximize efficiency and help us to return to be a solid company. But I could cite so many examples, many requests from team members and especially the team leaders that were in line with the Lean method. But these were not let's say expressed in a structured way"
Ouestion 7	How would you describe Lean in only few words?
Answer 7	"Efficienza, filosofia, produttività e ordine". "Efficiency, philosophy, performance and order"
Question 8	Do you consider Lean as part of your job or as something on top?
Answer 8	"Facendo un passo indietro, se ci fosse stata una formazione e struttura più solida sul progetto lean ora non ti accorgeresti nemmeno di usarlo. Quindi adesso non è sicuramente parte integrante delle attività che noi team leaders e team members facciamo".

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	"By taking a step back, if there was better training and a more solid structure for the lean project, now no one would even realize to use it. So now it is definitely not an integral part of the activities that we team leaders and team
	members do".
Question 9	How many times per day do you use Lean tools? Which tools?
Answer 9	"Direi che più o meno ogni giorno usiamo gli strumenti lean. Per esempio lo shop floor meeting. Prima non esisteva, mentre automaticamente oggi dedichiamo 10 minuti prima dell'inizio dell'attività lavorativa parlando di pianificazione, di risorse, di pericoli e lo facciamo di fianco ad una lavagna che il lean ci ha permesso di avere".
	"I would say that we use lean tools more or less every day. For example, the shop floor meetings. It did not exist before, while today we dedicate automatically 10 minutes before the start of work to talk about planning, resources, risks, and we do it next to a board that lean has enabled us to have".
Question 10	Can you give me three advantages and three disadvantages of Lean?
Answer 10	"I tre vantaggi, è come ho anticipato prima, sul rendere alcune attività molto più piacevoli eseguirle. Anche le piccole cose però, per esempio adesso sappiamo dove buttare il cartone e dove buttare la plastica, c'è una struttura e un layout ben definito. E questo per noi è un vantaggio. Parlando di minuscole cose, che per noi sono grandi perché ogni giorno ti rendono ordine nel posto di lavoro, efficiente quello che uno fa. Invece le cose negative è che forse non tutti prendono ancora a cuore e sul serio le potenzialità di questo modo che si usa privatamente e quotidianamente. Per esempio a casa il cucchiaino del caffè lo metto di fianco alla macchina del caffè e non a due kilometri da questa! Solo che molti non sapendo il metodo non lo hanno ancora compreso e accettato. Quindi molti non sono in linea o fanno finta di non essere allineati con il lean".
	"One of the three advantages, as I said earlier, was making some activities much more pleasant to execute. Even the little things though, for example, we now know where to throw the carton and where to throw the plastic, there is a structure and a well-defined layout. And this is an advantage for us. Speaking of tiny things, which for us are great because every day these make order in the workplace and efficient what one does. Instead the negative things is that perhaps not all of us still take to heart and seriously the potential of lean Since many still do not know the method, they have not yet understood and accepted it. So many of us are disconnected or pretend not to be aligned with lean ".
Question 11	Do you think that the ideas for improvement proposed by team members / team leaders are properly considered by top management?
Answer 11	"Direi di no. Noi team leader non abbiamo ancora abbastanza potere per decidere come migliorare dei processi. Ci sono molte conversazioni e ancora alcune barriere di mezzo. Spero che nel futuro molte decisioni semplici, ma molto vengano lasciate in mano a noi e prese quindi nel minor tempo

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	possibile. Questa secondo me e stata una lacuna. Avremmo perso un po' più di tempo, ma secondo me saremmo comunque arrivati a dove voleva Hilti. Molte mie idee e considerazioni per migliorare il processo Inbound non sono mai state prese in considerazione, per esempio ottimizzare i viaggi con il muletto per evitare di andare avanti e indietro. Anche molte idee di altri team leaders erano buone però non avevamo quella giusta leva per cercare di metterle in pratica".
	"I would say no. We team leaders have not enough power to decide how to improve the processes. There are many conversations and even some barriers along the way. I hope that in the future many simple decisions are going to be left in our hands and hence re going to be taken as quickly as possible. This in my opinion was a gap. We would have invested a bit more time, but we would still got to where Hilti wanted. Many of my ideas and considerations to improve the Inbound process have never been taken into account, for example to optimize the trips of the forklift to avoid going back and forth. Even many ideas of other team leaders were good but we did not have the right lever to try to put them into practice".
Question 12	In general do you believe that Lean had a positive or negative impact at Carpiano? Why?
Answer 12	"Come accennavo prima, penso che il lean abbia avuto un impatto positivo anche perchè penso di avere una predisposizione nei confronti di questo metodo. L'impatto positivo lo si è visto sicuramente più a livello operativo, meno a livello di persone. Non è un caso che grazie al lean abbiamo vinto il trofeo di miglior magazzino al mondo". "As I mentioned earlier, I think lean had a positive impact also because I think I have a predisposition towards this method. We have seen the positive impact certainly more at operational level, not at the level of people. It is no coincidence that thanks to lean we won the trophy for best warehouse in the Hilti world ".
Ouestion 13	How would you describe Kata in only few words?
Answer 13	"Dal mio punto di vista il Kata è focalizzato sulla formazione delle persone perchè il progetto Kata è focalizzato soprattutto sulle persone e nel rapporto tra Coach e Coachee. Però a sua volta include anche una parte di operatività per esempio sviluppare e misurare nuovi parametri o fare dei test". "From my point of view the Kata project is mainly focused on people and on the relationship between coach and coachee. But in turn it also includes a part of operation; for example to develop and measure new parameters or do
	tests in the warehouse.
Question 14	The Kata brought some changes?
Answer 14	A livello di processo? "Ti direi di si. Anche se non sono stato ancora coinvolto direttamente ne ho sentito parlare molto dai team members del processo su cui state lavorando. Però non mi chiedere quali miglioramenti perché non ti saprei rispondere".

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Nel tipo di leadership utilizzata?
"Per me l'approccio è molto diverso. Ho notato dei cambiamenti nella parte management che mi hanno piacevolmente colpito. Cambi in termini di gentilezza, morbidezza quando devono riprendere una persona che ha sbagliato. O per esempio anche nel loro approccio alla comunicazione, più diretto e completo. Poi ho notato che te e Matteo siete molto spesso in magazzino a fare test. Questo è positivo perché secondo me motiva i team members, si sento coinvolti."
Livello di coinvolgimento lato operativo in progetti/cambi?
"Decisamente si. Direi che in questo specifico caso c'è area di cambiamento. Per esempio prima le lavagne erano solo in ufficio, adesso invece sono in magazzino visibili a tutti quanti. Però direi che il Kata non è stato applicato al processo outbound su richiesta dei team members del processo. La scelta di applicare Kata al processo outbound è venuta dall'alto."
Comunicazione dei target di processo?
"Decisamente si. Questo cambiamento è visibile anche durante i nostri shop floor meetings dove non si parla più solo di efficienza. Adesso si iniziano a discutere anche altri parametri, quindi si entra più nel dettaglio del processo con la spiegazione della descrizione. Io per esempio non avevo mai sentito parlare del tempo chiusura di una lista e quindi non capivo cosa cambiasse tra farlo in due ore o farlo in quattro. Durante shop floor meeting se ne è discusso e adesso ogni giorno riceviamo il dettaglio della giornata precedente. Questo penso sia un'ottima cosa perché adesso il responsabile di processo ha più dati per valutare l'andamento della giornata precedente".
At process level?
"I would say yes. Although I am not yet directly involved, I've heard a lot from the team members of the process you are working on. But do not ask me what improvements because I do not know how to answer".
In the kind of leadership used?
"For me, the approach is very different. I have noticed changes in the management who have pleasantly surprised me. Changes in terms of kindness, softness when they have to reprove a person who has made a mistake. Or for example also in their communication approach that is now more direct and complete. Then I noticed that you and Matteo are very often in the warehouse to make tests. This is positive because I think it motivates team members, they feel involved"
 Level of involvement of the operational side into projects / changes?

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	"Definitely yes. I would say that in this specific case it is easy to feel the air of change. For example, before the boards were only in the office, but now these and their data are visible to everyone in the warehouse. But I would say that the Kata has not been applied to the outbound process at the request of members of the outbound team. The option to apply to outbound process Kata came from above, from the top".
	Communication of process targets?
	"Definitely yes. This change is also visible during our shop floor meetings where we no longer speak only about efficiency. Now we begin to discuss other parameters, so that you can enter into more detail of the process with a clear explanation and description of each parameter discussed. For example, I had never heard of the closing time of a list and so did not understand what changed between doing it in two hours or do it in four. During shop floor meeting it was discussed, and now every day we receive the details of the previous day. I think this is a good thing because now the person in charge of the process has more data to assess the trend of the previous day "
Question 15	What do you expect from Kata in the future? What are the changes that Kata will bring in your opinion?
Answer 15	"Io mi auguro nel futuro di venire coinvolto di più in questo progetto. Non solo per l'importanza del progetto come dimostrato da casa madre. Ricoprendo un ruolo da team leader ritengo questo metodo molto utile per incominciare a fare le cose in una maniera diversa, seguendo una prospettiva e filosofia diversa. Kata potrebbe aiutarmi a trovare metodi di lavoro e gestione dei miei team members più efficaci ed efficienti. Quindi direi che nel futuro mi piacerebbe sviluppare la mia conoscenza sul Kata anche a livello pratico".
Allswer 15	"I hope that in the future I will be more involved in this project. Not only because of the importance of the project as demonstrated by the headquarter. By playing the team leader role, I consider this method very useful to begin to do things in a different way, following a different philosophy and also perspective. Kata could help me to find different working and coaching methods that are more effective and efficient. So I would say that in the future I would like to develop my knowledge on Kata also through practical experience".

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Reference Number	48
Date of Interview	07/09/2015
Interviewee	Andrea Ferrero, Head of Region Logistics E4
Language	English
Question 1	When and why was Lean introduced at Carpiano? How was it introduced?
Answer 1	"Let's start from whenoverall the Lean journey at Carpiano started at the end of 2011, beginning of 2012 with the implementation of some tools. In the second half of last year, after July 2014, we started to think how to increase level of commitment and involvement of people. The Global Lean department presented us the application of Kata and we immediately started to think whether this method was fitting with our status and culture in Carpiano or not. At the end we decided, I guess it was around November 2014, to make Carpiano as a pilot of Kata. On the other side, why, which is the second part of the question, mainly because we were looking for something to support us not only on the tool part of Lean, but also on the people and leadership part of Lean. We were already using some typical tools and also with good success; shop floor management was at the beginning a challenge, because we were thinking that our people would have some difficulties in make it, but after two years, at the end of 2014, SFM was working quite well from a result point of view. However we were discussing how to improve the quality. To improve the quality you need leadership skills of people and the involvement of people at different levels".
Question 2	What were the expectations?
Answer 2	"At the beginning I have to admit that I was not knowing the topic. It was new to me so I started to make the usual literature reading. We also decided to go and see one company where Kata was implemented. This was for me an eye-opener. Indeed rom this visit I started to have some expectations. First, it was clear to me that Kata is not something fast, it requires some time because it is not just a mechanical tool to learn. So the first expectations was to be capable of managing time. We were aiming at having a comprehensive and complete roll-out in a two years range. So we were expectating was to invest a couple of years to make it. The expectations in terms of results was and are quite high; first in terms of people. I see a great opportunity to develop the skills of people from the instrumental part of Kata. Difficult to measure, but at the end this will have to bring economical results. Intermediate expectations are an increase in the involvement of people, such number of spontaneous improvement suggestions and potential new tests in Carpiano to improve the economic performance and operative efficiency". "It was also clear to me that when you start a journey like this the typical directive leadership style that usually you have in a warehouse was not adequate anymore, especially when you think between team leader and team member relationships,. These will be challenged because at the end we aim to have a situation where the hierarchical leadership will not be any more directive, but much more bottom up. The bottom up honestly requires a different leadership style. I think that this will be one of the major challenges during the roll-out. So the expectation is to make a really big change and of course we know that some people will have some difficulties in adapting to it".
Question 3	How was Kata introduced? Was it an effective mode? What would you have changed if you could?
Answer 3	"We did a training together with our headquarter colleagues that already had competence in Kata. We decided to have one day and a half of training at the broad level of the logistics structure. At Carpiano we have mainly three functions Warehouse, Material Management and Transport. We selected some people from

	the three functions to make the training. And this was also an exercise to gain the first knowledge about the topic. Then at the end of the training, around end of March, we decided to focus the implementation, at least in the first stage, within the Warehouse function"
Ouestion 4	Was Carpiano mid management ready for it?
Answer 4	"Here we can also go back to the Len journey that we did in Carpiano. Also when we started with Lean we had a similar decision to take. We decided to start with the Warehouse function mainly because you have some practical activities that can be visibly enhanced with the implementation of some tools. Only after we came back to the other departments and perhaps we implemented SFM within the other two functions. Now thinking to Kata this is a consequence. First the middle management was more ready to work with this approach than the other departments. Also the maturity level, because they have more experience with Lean. They did more projects and roll-outs in Warehouse. However they have still a very practical approach to Lean, and I think the basis are broader and bigger. And we have also more need of it in the Warehouse".
Question 5	What about the Kata room, Kata storyboard and Dry runs?
Answer 5	"When we decided to focus on the warehouse we decided to have four persons involved: myself, the responsible of the warehouse and the responsible of processes in the warehouse (and myself). The four of us started to make some dry runs to make use of the methodology. These were real Kata session in the Kata room while developing our Kata board which is something similar to the literature but adapted to our needs and activities. The dry runs were on subjects not only related to business in order really to gain experience and to learn the sequence of Kata and its difficulties. We were also rotating among the four of us within the various Coach-Coachee sessions. It was clear that based on the different leadership experience, based on different age and position in the organization, the approach to leadership was different. The older leadership experience you have, more difficulties you face in not being directive or manipulative in a session. This was really a nice learning from the dry runs. After the dry runs of course we went live. Live was the selection of a couple, Coach and Coachee, with a very operative subject. We had a beautiful discussion when selecting the subject. At the beginning we have been naïve in the approach. Then we thought about our business, we did a Value Stream Mapping of processes and we considered some of the most appropriate topics with which to start. Then we went live in June with the first board which remained in the Kata room for the first days. And after finally the board went outside in the shop floor and we started to naive almost daily Coach Coachee sessions."
Question 6	If you have to give an advice about the implementation mode to another Hilti's warehouse, what will you suggest as best practice and what will you tell them to avoid?
Answer 6	"The first advice is to have some high level of commitment because at the end is not a quick and easy implementation. It requires time and present some challenges in terms of investment of time. It requires a lot of resources and thus a high level of commitment within the organization. If you want to implement it into a warehouse and the warehouse responsible is not fully committed forget it. Then also to create the right environment like in the Kata room with the storyboard for discussing about the topics. It helps you to learn the structure. So also to have a proper location is something that I will suggest. And then when you feel ready you can go in the shop floor with real life topics. What I will suggest to avoid is, a part from implementing it without full commitment, to implement it if there is not at least a good maturity level in the Lean

	understanding with the organization. I will also avoid to place too much pressure on time because this is something that you cannot push too much. But on the other hand I will also avoid to not place any pressure on time. Because the other risk that I can see is to have Happy Kata. If you do not define some clear milestones that after maybe you will review, the risk is to not have the right focus. So avoid to have too ambitious implementation objectives at the beginning but also to not have any objective because the risk is that the motivation will go done and it will become a second priority. This will kill the exercise".
Question 7	On a scale from 1 to 10, for a successful implementation of Kata how much is it important:
Answer 7	 Time devoted to it? At least 8. It is time consuming so you have to invest time. Different from other activities in Lean where you usually invest time in training and after you can start. Here you have to invest time in training and also in practice. Hence it requires an additional investment of time compared to other roll-out of activities". Management commitment? Working with existing mental models? I think this is not mission critical. I will put 5 or 6. Of course it is depending on what is the maturity level in the organization and middle management. Adopting and sharing a common vision? Very important. This is the clear example of Value Stream Mapping we discussed before. So I would say 9. Practice? 8 at least. Awareness of the topic? In my experience honestly till last year I was not an expert on the topic. Of course you need a little bit of awareness at least to make the evaluation if it fits or not with my organization. You cannot make this fit analysis if you do not have awareness of the topic. So I will put 7. Right culture and mindset in place? Fundamental. 10
Question 8	What do you consider as major key success factor for its successful introduction?
Answer 8	"One important additional factor is the dimension. On the one side it is important to evaluate how big is your organization and on the other side the size of the team chosen for the roll-out. From what I saw, if you have a medium/big organization it is very hard for me to think to have a parallel roll-out everywhere. It is better maybe to select and focus on one area. So it is very important to me defining the right number of people involved. And after of course assuring scalability of the pilot is fundamental".
Question 9	What are the major changes brought by Kata?
Answer 9	"From our roll-out, with the topic chosen in June, I think we already have many changes. First we chose a very specific topic that was untouched in the past. We were aware that it was a critical one, but we always considered it to be quite complex and we did not have a clear idea on how to approach it. And this is also

	another learning. If there is something that you already know how to do it maybe you do not need Kata because it is an implementation part. But when you explore something that is outside your threshold of knowledge I think that Kata fits. And I can confirm this from our experience. So changes started and we had some experimentation. This was dependent on a change in leadership style because of course if you are very directive it is very hard that you are given the possibility to make experiments. So this is very positive. There are also many visible changes and differences in the area impacted by Kata. For instance a different flow of goods, different approach to
	the topic. Of course there are also the first measurement tools for the first experiments. And I think that we had the first common experiences: some
Ouestion 10	experiments went well, others went less well. This is part of the journey".
Answer 10	"The answer is yes. For the visibility of the impact maybe it is too early to see. I think we will start to have a more visible impact when also the second wave of roll-out will be live on practical activities. In this way we will reach a critical mass which will have a bigger impact on te organization. Now It is not still visible. The nice thing is that we started to question the things we do and the changes we implement. Several times we do not know the answer, but this part of the game. So it very hard to assess the visible impact, but between lines we can already say that this will defintely change our approach to Lean".
Question 11	What were the major challenges during Kata introduction?
Answer 11	"First as I said before the leadership approach. So the typical leading by question is something that you learn and try to apply. It is also consistent with many seminars we did at Hilti in general. But when you are really in a Kata session, leading by question by keeping in control the activities while leaving the space for experimentation and not to go in a manipulative mode, for me was one of the first challenges. The second one was that, it took me a while to understand that Kata works well when you have a solid vision, but also when you drill down topics and reach the right level of detail. It is very hard to have meaningful experiments on big topic. You have to slice them into smaller parts. And at the beginning this is very difficult. And the last challenge, always at the beginning, was understanding how much time devote to it. Because as I said before, it is not only the training, but also the practice. And practice requires time".
Question 12	How do you see the future of Carpiano with Kata? What are the next steps? Do you think Carpiano is ready for it?
Answer 12	"I really think that we are arrived at middle of the journey. A very important aspect for us is to go ahead in the roll-out. So to keep the same commitment that we had during the first go live also with this second roll-out. Of course we are now touching a different level of the organization. We will face different challenges such as leadership and knowledge understanding of the topic, the theoretical part will be more difficult. But on the other side they have a better understanding of the practical part. So they will have to combine a lower level in leadership skills, with a higher level in operational attitude. What I expect if I look medium term, so more than two years, I think that this will be a model that we will use in the whole warehouse. I do not see major barriers to have a full roll-out. I can even foresee that this will influence the organization that we will have. I cannot already figure it out all the possible changes. But for sure I can figure it out that this will bring to a change in the job description profile of team leaders of the future. I will need a different type of leaders. This does not mean that we will have to fire and hire, but that we have to develop people and spread Kata understanding. But the job profile will be a little bit different I particular in

the leadership approach. Lastly I think it will not only be in the warehouse. I can
imagine that we will come back to the other departments when we will have a
couple of years of experience in the warehouse. Of course it will be different. For
instance the Kata board in the office could be different from the one we have in
the warehouse. But I foresee not only warehouse topics, but also whole
organization ones".

Reference Number	49
Date of Interview	22/09/2015
Interviewee	Mariani Aurelio,
Language	Italian (translated in English)
Question 1	When was Lean introduced at Carpiano and why in your opinion?
Answer 1	"Il Lean quest'anno compie esattamente 5 anni. Quindi è stato introdotto nel Settembre a cavallo con Ottobre del 2010. Credo che il Lean, o almeno per quanto mi è stato riportato, sia stato introdotto per una decisione aziendale. Sicuramente un'azienda come Hilti ha bisogno di allinearsi a quello che è il panorama mondiale. Per questo si è deciso di introdurre il Lean, con un focus più attento sui magazzini più grandi". "Per di più eravamo in un periodo di crisi e il Lean riesce a dare un buon controllo sui costi. Quindi se il profitto cala, allora bisogna andare di pari passo con i costi e il Lean ci ha aiutato a bilanciare i due".
	"Lean this year celebrates exactly 4 years. So it was introduced in October on horseback with Novemberr of 2011. I think Lean, or at least to me it was reported, was introduced for a business decision. Surely a company like Hilti needs to align to what is the world scene. Therefore it was decided to introduce Lean, with a closer focus on larger warehouses. " "On top of that we were in a period of crisis and Lean can give good control over costs. So if profit falls, then you have to go hand in hand with the costs
	and Lean has helped to balance the two. "
Question 2	On a scale from 1 to 10, how did you get involved in the implementation of Lean?
Answer 2	"11! Anche perché il mio ruolo, il responsabile operativo per il magazzino per Hilti Italia, è stato introdotto in concomitanza con l'introduzione del Lean. All'inizio dell' esperienza Lean io ero uno dei primi attori, proprio perché questo è stato introdotto in magazzino".
	"11! Also because my role, the Operations Manager for the warehouse of Hilti Italy, was introduced in conjunction with the introduction of Lean. At the beginning of the Lean experience I was one of the first actors, because this was introduced in the warehouse. "
Question 3	Do you think you have received adequate training on the Lean?
Answer 3	"La formazione sul Lean e sugli strumenti Lean che utilizziamo in magazzino mi è stata spiegata nel dettaglio. Essendo poi stato coinvolto direttamente, tutto ciò che c'era da sapere mi è stato spiegato. Anche i team leader sono stati formati, ma non cos' nel dettaglio come me. Anche perché di alcune logiche Lean ne sono responsabile, come per esempio il SFM. Quindi necessitavo di una formazione adeguata per essere in grado di adempire alla mie responsabilità in ambito Lean. Mentre i team member più che formati sono stati informati perché loro non sono i principali attori. Nel senso partecipano a SFM, ma in questo specifico caso gli è stato detto devi dire questo o devi dire quello. Anche perché loro non sono stati coinvolti direttamente nel Lean."

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	"I received detailed training on Lean and on the various Lean tools that we use in the warehouse. Since I was directly involved. I have been told
	everything that there was to know. Also the team leaders were trained but
	not so in detail as me. Also because I am the responsible for some I can
	tools such as the CEM. So I readed means their is to be able to falfill me
	tools, such as the SFIM. So I heeded proper training to be able to fulfill my
	responsibilities in the field of Lean. While team members have only been
	informed instead of being trained because they are not the main actors. Of
	course they participate to SFM, but in this particular case they were told
	what to say. Because they were not directly involved in Lean. "
Question 4	How much was Lean sponsored by senior management? How it was
-	sponsored?
Answer 4	"Il Lean è stato sponsorizzato in maniera abhastanza incisiva All'inizio
	Andrea Ferrero e Fabio Milani insieme alle persone della taskforce, ci
	Andrea Perioro e Pablo Minani, insieme ane persone dena taskibice, er
	namo informato sul motivo della presenza della taskforce. Dopo di che e
	iniziato il periodo di formazione con incontri in classe, slides esplicative e
	varie riunioni".
1	"Anche il senso di urgenza dovuto al periodo di crisi ha fatto si che si
	sponsorizzasse molto il Lean quale strumento per alleviare o meglio gestire
	le difficoltà. Il management di Carpiano era pienamente convinto della
	scelta e ha guindi promosso l'iniziativa Lean direttamente e anche
	intensamente"
	"Lean has been sponsored in a fairly effective way. At the beginning
8	Andrea Formers and Fabia Milani, along with the neepla of the tealsformer
	Andrea Ferrero and Fabio Milani, along with the people of the taskforce,
	informed us about the reason of the presence of the taskforce. After that it
	has begun a period of training with classroom meetings, explanatory slides
	and various meetings. "
	"The sense of urgency due to the crisis has meant that Lean was also
	sponsored as a means to relieve or better manage the difficulties. The
	management of Carpiano was fully convinced of the choice and has
	therefore promoted the initiative Lean directly and also intensely ".
Question 5	During the implementation of Lean was Carpiano ton management often in
Question 5	shop floor or they directed it from the office?
A	Shop hoor of they directed it from the office?
Answer 5	Tutto quello che e stato il percorso Lean, la formazione e la
	sponsorizzazione del Lean, è avvenuta direttamente sul campo. Il
	management a volte discuteva nei loro uffici, ma poi veniva in shop floor
	per informare sulle decisioni prese. Quando abbiamo fatto le
	comunicazione a tutti gli operatori dell'introduzione del Lean ricordo che
	eravamo in magazzino con Milani, Ferrero e tutta la taskforce, abbiamo
	fatto spegnere la radio e loro ci hanno dato tutte le informazioni step by
	step. Durante questi incontri venivano spiegati i vari passi
	dell'introduzione prima è stato spiegato SFM poi il 58 e così via Alla fine
	invece hanno voluto da noi un feedback sull'asperienza e i primi
	ambiamonti"
	Campianiciti .
	Anche durante il Kata sono sempre presenti. Ferrero, Milani e anche
	Pozzoli sono sempre presenti in shop floor per monitorare, aiutare e
	studiare i processi. Non vedo alcuna differenza rispetto a prima."

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Question 6	 "Everything from Lean trainings and sponsorship of Lean, took place in the warehouse. Management sometimes discussed in their offices, but then came to the shop floor to inform on the decisions taken. When we made the communication to all operators of the introduction of Lean I remember that we were in the warehouse with Milani, Ferrero and the entire taskforce, we turned off the radio and they gave us all the information step by step. During these meetings theyexplained the various steps of the introduction, before it was explained SFM, then the 5S and so on. At the end however they wanted from us feedback on the experience and the first changes. " "Even during the Kata they are always present. Ferrero, Milani and also Pozzoli are always present in the shop floor to monitor, assist and study the processes. I do not see any difference from before. "
	required by team members?
Answer 6	 "Assolutamente qualcosa di spinto dall'alto. Anche perché dei team member qualcuno si è adattato al Lean senza condividerlo a pieno. Altri ancora non lo hanno condiviso a pieno. Quindi pensare a loro come promotori è difficile". "Absolutely something pushed from above. Also because among team members someone has adapted to Lean without sharing it in full. Others have not yet shared it in full. So it is very difficult think of them as promoters."
Ouestion 7	How would you describe Lean in only few words?
Answer 7	"Lo definirei come uno stile di vita. Quando spiego il Lean ai clienti li
	vedo spesso confusi. Loro pensano sia un grosso impegno, uno stravolgimento dell'azienda e a volte che sia quasi una costrizione. Sicuramente un impegno lo è, ma solo a mantenere alcune logiche in essere. Per esempio c'è chi in garage tiene le chiavi inglesi tutte in ordine dalla più grande alla più piccola e chi le getta nel cassetto casualmente. Sicuramente la prima logica è più impegnativa da mantenere, ma nel lungo ti permette di risparmiare tempo. In questo senso dico che è uno stile di vita, nemmeno una regola o un'imposizione. C'è chi è più Lean nella vita e chi lo è di meno e quindi dovrà sforzarsi di più".
	"I would define it as a lifestyle. When I explain Lean to customers, I see them often confused. They think it's a big commitment, a setback of the company and sometimes it's almost a coercion. Surely it is a commitment, but only to keep some logic in place. For example, someone in the garage holds wrenches all in order from largest to smallest while someone else casually throws them in the drawer. Surely the first logic is more difficult to maintain, but in the long it allows you to save time. In this sense, I say it's a lifestyle, not a rule or an imposition. Some persons are more "Lean in life" than others that therefore will strive more. "
Question 8	Do you consider Lean as part of your job or as something on top?
Answer 8	"Assolutamente si. Facendo parte del mio stile di vita, Al Lean fa
	Anon derle

	sicuramente parte anche del mio lavoro".
	"Absolutely yes. Since it is part of my lifestyle, Lean is certainly also part of my job. "
Question 9	How many times per day do you use Lean tools? Which tools?
Answer 9	"Il Lean lo uso direi quotidianamente. Lo SFM viene fatto ogni giorno alle 12:40 e gestendolo ci sono sempre. Il 5S cerco di applicarlo il più possibile. Le stesse logiche di magazzino a volte di portano ad applicare il Lean. Il semplice fatto di avere il carrello che deve stare parcheggiato all'interno delle linee è Lean e questo ci è stato quasi inculcato!".
	"I use Lean tools daily. The SFM is done every day at 12:40 and it is always running there on time. I try to apply 5S as much as possible. The same logic of a warehouse sometimes leads to apply Lean. The simple fact of having the trolley to be parked within the lines is Lean and this was almost inculcated. "
Question 10	Can you give me three advantages and three disadvantages of Lean?
Answer 10	"Svantaggi onestamente non ne vedo nessuno. Certo il Lean nel breve periodo richiede un investimento di tempo, ma poi nel lungo invece ti fa guadagnare tempo. Essendo poi questo parte del mio stile di vita non lo ho mai percepito come qualcosa di negativo. Mentre di vantaggi ho individuato tre dimensioni che possono presentare anche vari altri sotto vantaggi. Prima di tutto la condivisione che ho con i miei riporti o colleghi per poi poter pianificare la giornata o addirittura la settimana. Secondo punto che è qualcosa di molto importante per cui mi sono sempre battuto sia nei miei 13 anni di lavoro alla Hilti che nei miei 30 anni di esperienza in generale nei magazzini, è il coinvolgimento dei team member. I Team Memebers devono sempre sapere tutto, anche quelle che sono le decisioni del direttore. Spesso invece accade che per via del livello gerarchico o dell'autorità della persona, questa non condivide più di tanto le informazioni importati. Ovviamente fino ad un certo punto si deve comunicare e condividere con i team member; le decisioni finanziarie magari no, ma se c'è qualche impedimento alla operatività come un TIR fermo o qualche problema o cambio di programma devono essere informati. Però spesso il fatto di sapere perché stai fcendo qualcosa ti motiva moltissimo. A volte vedo che viene solo detto fai questo e alla domanda perché? Viene risposto perché devi farlo. In questo modo demotivi una persona e in tal caso questo non performerà al top. Questo te lo dico per esperienza; essendo cresciuto nell'operatività mi sono sempre chiesto perché devo fare questo? A chi porta beneficio? Quali sono gli impatti di questa mia azione? E sapere le risposte a queste domande mi motivava a fare bene il mio lavoro. Per di più ho visto anche l'effetto del condividere informazioni con i TM; per esempio a SFM tra TL e TM vedo che quando il TL spiega la situazione che ha portato a dove compiere tali azioni c'è interesse anche se hai davanti una persona che viene al lavoro giusto per timbrare il cartellino. Terzo ed ultimo
	5S adesso sappiamo subito dov'è allocato un prodotto, quindi uno non deve
	dell'autorità della persona, questa non condivide più di tanto le informazioni importati. Ovviamente fino ad un certo punto si deve comunicare e condividere con i team member; le decisioni finanziarie magari no, ma se c'è qualche impedimento alla operatività come un TIR fermo o qualche problema o cambio di programma devono essere informati. Però spesso il fatto di sapere perché stai fcendo qualcosa ti motiva moltissimo. A volte vedo che viene solo detto fai questo e alla domanda perché? Viene risposto perché devi farlo. In questo modo demotivi una persona e in tal caso questo non performerà al top. Questo te lo dico per esperienza; essendo cresciuto nell'operatività mi sono sempre chiesto perché devo fare questo? A chi porta beneficio? Quali sono gli impatti di questa mia azione? E sapere le risposte a queste domande mi motivava a fare bene il mio lavoro. Per di più ho visto anche l'effetto del condividere informazioni con i TM; per esempio a SFM tra TL e TM vedo che quando il TL spiega la situazione che ha portato a dove compiere tali azioni c'è interesse anche se hai davanti una persona che viene al lavoro giusto per timbrare il cartellino. Terzo ed ultimo punto e l'ordine e la pulizia. Con il 5S adesso sappiamo subito dov'è allocato un prodotto, quindi uno non deve

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	più andare a cercare in giro la merce sprecando un sacco di tempo".
	"Honestly I do not see any disadvantage. Sure Lean in the short term requires an investment of time, but then in the long run it helps you to gain time. Since Lean is part of my lifestyle I have never perceived it as something negative. While among the different benefits I have identified three dimensions which include many other smaller advantages. First of all the possibility to easily share with my colleagues or others to then be able to plan your day or even the week. Second point that I consider something very important for which I have always fought in my 13 years of working at Hilti and in my 30 years of experience in general in the warehouses, is the involvement of team members. Team members must always know everything, even what are the decisions of the Director. Often it happens that because of the level of the hierarchy or authority of the person, he or she does not share important information. Obviously to a certain point you have to communicate and share with team members; financial decisions maybe not, but if there is any impediment to the operation as a truck stop or a problem or change in plans they should be informed. Very often the fact of knowing why you're doing something motivates you a lot. Sometimes I see that it is just said do this and to the question "why?" is answered because you have to. In this way you discourage a person and he will not perform 100%. I tell you this from experience; I grew up in the operation and I've always wondered why do I do this? What is the benefit? What are the impacts of my actions? And knowing the answers to these questions motivated me to do my job well. Moreover I have seen the effect of sharing information with team members; for example in SFM between team leaders and team members I see that when the team leader explains the situation and the major issues there is interest among the team members even if you are in front of a person who is working just to punch the clock. The third
	immediately where a product is allocated, so one does not have to go
	searching around the goods wasting a lot of time."
Question 11	Do you think that the ideas for improvement proposed by team members / team leaders are properly considered by top management?
Answer 11	 "Secondo me vengono ascoltate spesso le idee dei team leader o team member. Fabio Milani per esempio questo fatto è qualcosa che cura molto. Quando c'è una comunicazione o dei richiami da dare ad un team leader si interfaccia sempre con me per dirmi come dovrei approcciarla. Quindi si direi che il management ci tiene a sapere cosa pensano gli operatori di magazzino e a dare un feedback alle loro proposte". "Faccio l'esempio dei quality circle. Ho nel mio ufficio tutti i postit dei quality circle proposti dai team members. Se l'idea era buona facevamo di tutto per implementarla. Se invece l'idea non era ritenuta valida spiegavo poi al team member perché non era stata presa in considerazione"
	into consideration. Fabio Milani for is very careful about this. When there is a communication or lures to give to a team leader he always interfaces

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	with me to tell me how I should approach it. So I would say that the management is keen to know what the warehouse operators think and give feedback to their proposals. For instance this happen with the quality circles. I have in my office all the cards of quality circles proposed by team members. If the idea was good we did everything to implement it. If the idea was not valid then I explained to team members the reasons why it was
Question 12	In general do you believe that Lean had a positive or negative impact at Carpiano?
Answer 12	"L'impatto del Lean è sicuramente positivo. In questi 5 anni abbiamo avuto una crescita impressionante. Una crescita nei processi, nel perfezionamento dei processi, nell'ordine e pulizia dell'area di lavoro e in fine miglioramento dell'efficienza. In questo il Lean ha avuto un ruolo fondamentale. Ad ora però nel Lean, per quello che è l'ambito operativo, direi che c'è poco che resta da essere migliorato. Direi che a pulizia, ordine siamo ad un buon livello. Vedo invece molto miglioramento da fare nell'ambito della formazione. Vedo il Lean applicato dagli operatori e anche da alcuni team leader ancora una sfida. Lavorare con le persone significa anche poi andare a mantenere quello che si è fatto fino ad ora e magari anche migliorarlo. Vedi il 5S, molte azioni spesso non vengono portate a termine e per esempio le pulizie nell'area non vengono mantenute. Quindi direi che c'è ancora molto spazio per lavorare con le persone e nel sostenere i traguardi raggiunti, mentre per il resto direi che c'è quasi tutto."
	"The impact of Lean is definitely positive. In these five years we have had an impressive growth. We improved processes, order and cleanliness of the work area and at the end all of these brought an improvement in efficiency. At Carpiano Lean has played a key role. However currently with regards to the operational side of Lean, I would say that there is little left to be improved. I would say that we are at a good level of cleanliness and order. I do see a lot of improvement in training. I see the Lean applied by the operators and also by some team leaders still a challenge. Working with people also means then going to maintain what has been done so far and maybe even improve it. For instance in 5S many actions are often not completed and for example cleanliness in the area is not maintained. So I would say that there is still much room to work with people and in sustaining the achievements, while overall I would say that we are already at a good level."
Question 13	How would you describe Kata in only few words?
Answer 13	"Premetto che è da poco che sono entrato a conoscenza di questa nuova logica del Kata, quindi alcuni meccanismi non mi sono ancora molto chiari. Ti rispondo quindi per quello che ho percepito fino ad adesso. Io il Kata lo descriverei come il metodo del metodo, ossia il metodo del processo che è applicato alle persone. Il processo del Kata mi sta aiutando ad affinare un metodo di risoluzioni problemi, vedi ad esempio la riorganizzazione del mio ufficio, che è strutturato quindi passo dopo passo e visibile. Per

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	esempio per il mio ufficio non avevo mille idee che cambiavano di giorno
	in giorno. Sapevo che volevo la radio, il computer, una sedia e la scrivania
	cosa c'era da poter rimuovere dall'ufficio perché inutile. E quindi non
	sapevo quanto spazio avrei avuto a disposizione. Adesso con il Kata al
	posto di basarmi su possibili idee, agisco. Sto mettendo dei postit su tutto
	quello che non uso così posso fare la cernita e poi vedere se buttarli o
	riutilizzarli in altre aree del magazzino. Una specie di 5S nel mio ufficio.
	Con il Kata ho anche imparato a definire il punto di inizio e il punto di
	arrivo così so se sto prendendo la direzione giusta o no. E' un po' come ti
	dicevo prima. Con il Kata capisco perché faccio certe azioni, come mettere
	i postit, e in questo modo mi motiva a continuare.".
	"I just got acquainted with this new logic of Kata, so some mechanisms of
	it are not yet very clear to me. Then I answer for what I perceived until
	now. I would describe Kata as the method of the method, namely the
	helping mo to refine a method of problem colving and for exemple the
	reorganization of my office, which is structured, iterative, step by step and
	visible. For example, for my office I had a thousand ideas that changed
	from day to day. I knew I wanted the radio, the computer, a chair and a
	desk and maybe even a plant. But I did not know how and where, because I
	did not know what was there to be removed from my office because
	unnecessary. So I did not know how much space I had available. Now with
	Kata instead of basing my plans on possible ideas, I act. I'm putting colored
	cards on everything that I do not use so I can do the sorting and then see
	whether to throw them or reuse them in other areas of the warehouse. A
	kind of 5S in my office. With Kata I also learned how to determine the
	starting point and the finishing point so I know if I'm taking the right
	understake certain actions, such as putting a colored cord, and thus it
	motivates me to continue."
Question 14	Kata brought changes:
Answer 14	A livello di processo?
	"Si direi di si. Ha portato dei cambiamenti anche se adesso è ancora in via
	di sviluppo e in fase di test. I cambiamenti comunque ci sono stati perché
	abbiamo valutato alcune idee, messo in pratica molte di loro e analizzato i
	nsultali. Addiamo alla fine scartato alcune idee basandoci non solo sui
	importante perché loro sono esperti nel processo e lavorandoci posso capire
	se funziona o no. Adesso con il Kata abbiamo dato ai TL un metodo ossia
	uno standard, su come lavorare in moto ordinato ed efficiente. La gestione
	delle liste di prelievo ha una sua logica strutturata e il flusso dei carrelli è
	molto più fluido e continuo. Tutto questo è frutto di prove e anche di errori.
	Però i risultati ci sono quindi secondo me è la strada giusta. Anche
	l'efficienza dei due processi è migliorata, sono molto più bilanciati ora e
	comunicano anche di più".

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Nel tipo di leadership utilizzata?

"Bhe all'inizio delle sessioni di Kata il Coach, in questo caso Matteo Pozzoli, era molto manipolativo quindi si direi direttivo. Cercava di farmi prendere la strada giusta. Poi piano piano quando ho iniziato a capire come funzionava mi ha lasciato sempre più libero e anche a volte mi ha lasciato sbagliare. Quindi direi che si alla fine è diventato più supportvo."

Livello di coinvolgimento lato operativo in progetti/cambi?

"Il cambiamento da questo punto di vista c'è, è reale e lo hanno anche notato tutti. Voi adesso siete qua circa 8 ore al giorno con i team leader e i team member a fare test. Tutto quello che state implementando lo condividete con il magazzino. Anche prima c'eravate in magazzino ma era più per capire come andavano le cose, per controllare. Invece adesso fate test con i TL, condividete con loro le informazioni e fate anche monitoraggio in magazzino coinvolgendo i team member. Quindi il cambio da questo punto di vista è visibile da tutti".

Comunicazione dei target di processo?

"Tutti sappiamo per cosa stiamo lavorando e ora molto meglio. Ci sono stati spiegati i parametri che misurate nel Kata dei carrelli. In questo modo capiamo se i test funzionano o no. Basta vedere se i risultati di questi test portano dei benefici sui parametri target misurati. Poi adesso il focus non è più sull'efficienza anche perché abbiamo già raggiunto un buon livello sotto questo punto di vista. Ma ci stiamo concentrando su altri parametri come il tempo di chiusura lista, il numero di carrelli di fronte alla linea di stampa, il numero di errori di prelievo, e altri. Quindi anche da questo punto di vista c'è stato un cambio, non però visibile come quello di prima".

At process level?

"I would say yes. Kata brought some changes even though now it is still under development and being tested. However there were some changes because we evaluated some ideas, put into practice many of them and analyzed the results. We eventually discarded some ideas relying not only on defined parameters, but also on feedbacks from the team leaders of the process. This is important because they are experts in the process, they work on it and hence they can see if it works or not. Now with Kata we gave the team leader a method, or a standard, about how to work in an orderly and efficient manner. The management of the picking lists has its own logic and by structuring the flow of trolleys this is now much more fluid and continuous. All this is the result of tests and also of errors. But the results are there so I think it's the right way. The efficiency of the two processes has improved, they are much more balanced now and communicate even more."

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In the type of leadership used?
"Well at the beginning of the sessions of Kata, in this case Metteo Pozzoli, was very manipulative, I would say directive. He tried to make me take the right path. Then slowly I started to understand how it worked so he left me more freedom and even sometimes the opportunity to make mistakes. So I would say that it eventually became more supportive. "
In the level of involvement of the operational side in projects / changes?
"The change from this point of view is there, is real and also visible. Now management is here about 8 hours a day with the team leaders and team members to do the tests. All they are implementing is shared with warehouse people. Even before management was there in the warehouse but it was more to understand how things were going, to control. But now they do tests with team leaders, share with them the information and also make monitoring in the warehouse involving team members. So the change from this point of view is absolutely visible".
Communication of the process target?
"We all know what we are working for and now it is much better. They explained us all the parameters measured in Kata. In this way we understand if the tests work or not. Just see if the results of these tests bring benefits on target parameters measured. Then now the focus is no longer on the efficiency also because we have already achieved a good level under this point of view. But we are concentrating on other parameters such as the time of closing the list, the number of trolleys in front of the packing line, the number of picking errors, and others. So from this point of view there was a change, but not visible as the one before. "
What is the impact that Kata had at Carpiano? What do you expect from Kata in the future?
"Per adesso un impatto negativo e stressante. Nel senso che i risultati e sviluppi per adesso ci sono, però è ancora in fase di test e non siamo ancora arrivati a capirlo fino in fondo. Per adesso è davvero un impegno, prima di tutto in termini di tempo. Non solo i dieci minuti di sessione, ma anche la preparazione che ci st dietro. Per me è come fare un compito a casa diciamo. A volte sono molto focalizzato sul mio lavoro e dovermi concentrare sul Kata quasi mi distoglie e distrae da quello che sto facendo. Devo ancora trovare il giusto equilibrio e anche capire meglio come funziona. Ma ci vuole molta pratica e quindi molto tempo da dedicare. E per ora non ne vediamo ancora il fine. Quindi si rischia di veder il Kata come un qualcosa in più. Esattamente come all'inizio del Lean. Noi eravamo molto contrari, tutti quanti noi del magazzino non lo abbiamo accettato a braccia aperte. Ma poi abbiamo visto i risultati e abbiamo

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come un impegno, è inevitabile. Ho però deciso io personalmente di approcciare Kata e ho chiesto a Fabio e Andrea di fare parte non solo per la mia vita lavorativa, ma anche per quella privata. Nonostante non sia una cosa che mi appartiene il mettermi seduto a ragionare, scrivere le aspettative e fare test strutturati, penso che i benefici che possa darmi siano enormi. Il Kata può aiutare a migliorarmi sempre di più, soddisfa la mia voglia di crescere e continuare farlo. Sono salito per tre anni di fila sul palco del Kick-off e voglio continuare a farlo. Il Kata mi può aiutare a raggiungere questo traguardo". Il Kata nel futuro andrà sicuramente a migliorare, affinare quello che già utilizziamo. Ci aiuterà anche a farne uno stile di vita, dandoci un metodo da seguire. Poi i benefici nel dettaglio potrò dirteli nel futuro quando incomincerò a vedere quelli che ho vissuto nel mio stesso processo di riorganizzare l'ufficio".
"For the moment Kata had a negative and stressful impact. In the sense that the results and developments are there, but it is still in the testing phase and we have not yet came to understand it in depth. For now it's really a commitment, first of all in terms of time. Not only the ten-minute session, but also the preparation that there is behind. For me it is like a homework, an assignment. Sometimes I am very focused on my work and having to concentrate on Kata almost distracts me from what I'm doing. I have yet to find the right balance and also to better understand how it works. But it takes a lot of practice and so much time. And for now we do not see yet the end. So it is difficult to see the Kata as something more. Just like at the beginning of Lean. We were very contrary, all of us in the warehouse we have not accepted it with open arms. But then we saw the results and we changed approach. Surely with Kata soon we will see the benefits and thus we will be more motivated, but it will take time. So now it is seen as a commitment, it is inevitable. I personally decided to approach Kata and I asked Fabio Milani and Andrea Ferrero to join. Although it is not something that belongs to me the reason to sit down, write the expectations and do structured tests, I think that the benefits that can it give me is huge. Kata can help me to improve myself more and more, it satisfies my desire to grow and continue to do so. I have
doing it. Kata can help me to achieve this goal. " The Kata in the future will certainly improve, refine what you already use. It will also help shape our habits, giving us a method to follow. I will tell you the benefits in detail in the future when I'll start to see them. "

Jeron Joula

Reference Number	50
Date of Interview	18/09/2015
Interviewee	Fabio Milani, Head of Warehouse E4 (Warehouse Manager Carpiano)
Language	English
Question 1	When and why was Lean introduced in Carpiano? How was it introduced?
Answer 1	"So When exactly three years ago at Carpiano in 2012. There are several reasons, but the main reason or input for approaching Lean at Carpiano is because: first, after the crisis we decided that the organization needed to find different solutions and approaches in order to achieve productivity and efficiency in different processes. Second because three years ago was the right moment to change the point of view of people here in the warehouse. Those are the two main reasons". "Lean was introduced together with the Global Lean department located in Schaan. We decided to work together in order for us to learn the concept of Lean and give them the opportunity to enter in our community and in our warehouse. And from this collaboration later came the success. We had a pilot for everything: SFM, OC and other things like that. But always together with the
	Global Lean team. We worked hand in hand to reach this important result".
Question 2	Were TM and TL involved at the beginning?
Answer 2	"At the beginning only the first level of the warehouse so until the supervisors (middle management) approached Lean and tried to understand its logics and its massage in order to introduce it in the organization in the right way. So before introducing every lean tool or approach we received the right training. Only after we decided to introduce the tool in different processes and mainly in those processes where we could receive the biggest impacts in terms of efficiency and productivity" "The first process involved was the workload balance in picking. In fast picking because this is the main area of efficiency and can hence give an higher impact on efficiency in the warehouse".
Ouestion 3	What were the major impacts of Lean in Carpiano? Were them expected?
Answer 3	"We started with only one expectation that was to increase the efficiency during the situation of the crisis without any change in the structure. In this case the main KPI that we took into consideration when discussing about Lean is achieve and increase efficiency. In this case we achieved the result and hence step by step we continued to introduce or use different approaches in different processes. These gave us also unexpected results. For example we improved different KPI in different processes. For example helped and supported us to re-organize the organization instead of re-structuring it. So we created a role which is really clear for each person and a unique flow from the inbound to the outbound".
Question 4	What do you think of Lean in Carpiano? Do you perceive it more as an operative tools or as a strategic direction giver?
Answer 4	"My perception of Lean. So now when a person wants to change something or proposes an idea to change something, he takes into consideration whether this idea or new change of the process, will create an impact in other areas of the warehouse. In this case it is clear that when someone wants to change something he takes into consideration every area of the warehouse and not only little pieces of the process. For instance as if we gain efficiency in inbound than we lose everything in outbound. So now they try to think not only in terms of pieces but more in terms of whole process". "From my side both. Because in shop floor it is possible to see, it is visible the impact of Lean. However at the same time Lean is also something strategic. We can use it to increase the motivation of people and also touch the part related with

	leadership in the organization".
	Do you think that the operative side of the warehouse has the same perception of
Question 5	Lean?
	"Little bit different. So there are two levels of managing this topic, this approach.
	In the operative part they perceive it as a possible support to their daily job. It is
	very difficult for them to look at Lean also with a strategic point of view. In the
Answer 5	operative part it is necessary that people live Lean like an help, a support, like a
	different point of view to manage the daily job probably in a different way or
	also as a different way to achieve a better result".
Question 6	How much time was devoted by management during Lean introduction?
	"Of course at the beginning the support of the management was very high
	because it was also necessary to understand the approach. But step by step we
Anoma	introduced this concept also in the operation and hence with the other persons
Allswer o	involved in the organization. Therefore we reduced the time devoted at working
	with Lean. But at the beginning more or less, because it was necessary, 50% of
	the daily job was dedicated to think in the Lean approach"
Question 7	Overall are you satisfied by the changes brought by Lean implementation?
	"Yes. I trust the Lean approach even if some results achieved, some inputs and
	some changes along the journey are not aligned with the initial expectations. I
	think that this is normal. At the end from the macro point of view of Lean in the
	organization I think that it is a good approach and that we achieved good results.
Answer 7	I think that the approach of Lean helped the organization to improve, to develop
	also people and processes and so this is for me a good result. Positive results I
	have to say. Also because in 2014, last year, we received the award of best
	warehouse in the organization. And this is a result achieved also thanks to the
	help of Lean approach".
Question 8	Why have you decided to implement Kata in Carpiano?
	"Kata is another part of the Lean approach. It is a very difficult topic but at the
	same time it is also a very important topic. We decided to approach this tool
	because it is the right moment to change the habits of people. So in the last three
	years we managed lean tools such as 55, SFM, QC and also we tried to involve
	the people. But now it is time to make another step, to reach another level,
Answer 8	arrive by their self to the solution. Not to receive always the solution, but to he
	arrive by their sen to the solution. Not to receive always the solution, but to be
	overall direction to the people. For instance, this is the tool for quality circles and
	it has to be managed in this way. Kata is another approach in which I try to coach
	people to find the solution to understand what is the right obstacle, and step by
	step to arrive to the solution"
	Do you already see some changes after the first 6 months of Kata? Do you think
Question 9	that Kata already had an impact on Lean at Carpiano?
	"Yes of course. I see some changes at first level where we started the Kata
	approach. We spent six months with daily Kata sessions. Now that we started to
	implement Kata also at operational level I can already see the difference. In shop
	floor we have a bigger possibility to develop people with Kata. I see this as the
	next step for the organization".
Answer 9	"Yes of course this is the main reason why we introduced Kata. We need to have
	an open mind because Kata will also show us who is not yet aligned and ready to
	start with this method and receive this opportunity, namely to develop his
	leadership skills. This because there are different skills in the organization and
	some people can have more difficulties in accept this method. So also in this case
	Kata is a good way to have a clear picture of the organization. And I think that

	we will achieve good results also from the structural point of view of the organization".
Ouestion 10	What were your expectations about Kata?
Answer 10	"At the beginning my expectation was that the implementation of Kata would have been fast. But now that I saw the efforts required to understand Kata, its structure and its content, I think that we will need more time to transmit it, to teach it in the right way to people who will have to use it. So now the major issue is the time required to push this approach to the other people".
Question 11	What were the major challenges during Kata introduction?
Answer 11	"So everyone can have the opportunity to participate and can find the solution to the problem and overcome the obstacles on the path, instead of using the old approach of asking to the team leader for a solution to the problem. They have to understand that are different pieces that form the problem and they with their skills and this method can find by their self the solution to the problem". "So the main difficulty is to address the right obstacle. So every day we encounter obstacles and we always claim that THIS is the obstacle. But as soon as we go into detail and we try to understand the obstacle we then realize that THIS is not an obstacle. The right approach Kata is to be open in order to understand what is the real obstacle that you are facing. So if you trust and follow a structured way when solving a problem, probably you can receive an help from Kata. Instead of reacting casually each time that you face a problem. But if you have a structured manner to solve the problem this can represent a big help in arriving to a good solution. So instead of starting without any idea, any information and any point of view, follow one structured process to solve the problem".
Question 12	What do you consider as a key success factor for Kata implementation? Do you consider lean maturity as a prerequisite for Kata?
Answer 12	"So with Kata there is the possibility to manage and also live your daily job and your life in a different way. So go out from you habits, and accept Kata. Because if you manage every day one thing in the same way, even though it produces good results, you also have to accept that there is another way to do it and that will produce also different results. So it is very important to keep your mind open. Of course it is also important to involve people. But mostly be open to other solutions. There are always other ways to manage something that will give you also different results and sometimes also better results" "I think that before starting with Kata is necessary to have a common base, a common understanding within the organization about what is lean and how does it work. Every person and every part of the organization, and in this case of the warehouse, have clear in mind what is the lean approach. If you start without any input, any information of lean, I don't think it is the right approach. Before starting with Kata you need a clear understanding of lean. You cannot drive a Ferrari if you do not have experience in driving a car, a Fiat 500 for example. So it is not possible to start without any experience".
Question 13	How do you see the future of Carpiano with Kata? What are the next steps? Where do you see the major difficulties?
Answer 13	"So the future of Kata at Carpiano for me is to have also the operational people involved and practicing Kata. This in order to give to people the opportunity to work alone and use all the tools available to manage the daily job and solve the problems and hence in the long run guarantee the stability of the organization. So now it is very old the approach where there is one director, one team leader who manages everything. And this is not possible anymore". "I see the major difficulties in those people who worked in the organization for a

long time. They have a strong habit in their mind that it is difficult to fight.
Whilst for people who arrived here only three years ago, it is easier to manage
this new approach. So for me the issue is now is to convince the people who
worked at Hilti for a long time that this is the right method to follow. So people
and the habits of people. Also because to me Kata is 80% people issues and not
process issues"

Reference Number	51
Date of Interview	14/09/2015
Interviewee	Polat Cemil, Global Lean Manager (Supply Chain)
Language	English
Question 1	Why have you chosen Carpiano as a pilot for Kata implementation? How have you assessed Carpiano's readiness for Kata? After 6 months would you take the same decision?
Answer 1	We knew that the best pilot would be a site which has already a high maturity level on lean. Talking about both a high level on the tool site of lean and on the mindset side. A solid tool side because this leads to the fact that people have a general understanding of lean referring to successful examples on site and the question why is less in focus than the question how. A solid mindset and culture because otherwise the scope for the introduction would have been to big leading to intensive work with top management first. Andrea is in terms of lean leadership one of the role models we have in Logistics. He represents the values of lean and finds the right approach to give his people direction without overwhelming them with too much dominance. Carpiano has within Hilti Logistics the best presetting for the topic. We preassessed this through various expert chats within the lean team and by checking our internal benchmarking tools like BPPM and Balanced scorecard in which Carpiano takes a leading position and finally through visits on side in which we observed the environment and culture. After 6 months seeing the development of the topic we are convinced of having taken the right decision.
Question 2	How did you implemented Kata in Carpiano? Why? Was it an effective mode? If you could, what would you have changed to make it even more effective?
Answer 2	We implemented KATA first by convincing the top leaders (Andrea/ Fabio and the local leadership team). We did an external lighthouse visit on KATA pioneers company Ihlemann who has a lot of experience with the topic and shared insights on their journey. This helped Andrea and Fabio to picture what effect this, on the first sight, intangible and elusive topic really has. This helped to understand what we are heading to and clarified much better the question WHY. In a next step we did a 3 days training on site explaining in detail first the WHAT 2 days and then the HOW 1 day in the how we left enough space to tailor the approach and make it a Carpiano solution, which helped to increase identification. In the following dry run session, we struggled a little with two factors. First with time, as the dry runs take a lot of efforts and time and daily business forces and tempts to look for short cuts and compromises. Instead of the whole 100 sessions we stopped at around 60, which was a little too short. The other factor was building routines. Lastly after the dry runs we chose the first Kata couple and the focus process. This had to be to be something that if changed would have had visible impacts for everyone within the warehouse. And it also Looking back I would have put more focus on making the daily KATA a strong habit, having in the dry runs fixed time frames, focusing the first 50 sessions only on the structure not on the content and the drill down of topics.
Ouestion 3	How did Kata impacted Lean in Carpiano in vour opinion?
Answer 3	KATA is still in the very beginning stages in Carpiano. It boosted the attention of the whole lean community towards Italy, the local team is aware of that and takes the topic carefully to the next stage. The biggest challenge we have so far is still that we don't have the right structure to drive KATA in a solid way especially after the roll out to the shop floor staff, having a Hancho or Lean coach which is partially free from his daily business duties to cover the coaching and daily

	experimenting. I'm convinced that in one of the next steps within the roll-out we have to take care on the current infrastructure otherwise results will always be more important than learning as we don't have enough capacity and time. This is a challenge which Andrea is aware of, he is already working on a new set up therefore we just need some patience and a lenger breath
	ultererore we just need some patience and a longer bream.
Question 4	After 6 months, where do you see Carpiano along the Lean journey? How do you consider the first roll-out of Kata? What the success factors? What the challenges? What about the learnings?
Answer 4	Carpiano is on a good way, but as stressed still in the very beginning of the journey. They are facing now some of the real challenges trying to roll it out on the shop floor staff and also trying to make it part of their daily business which obviously is not working yet as they don't have an extra budget of time for it. Generally I consider the Carpiano pilot a very promising test, which still needs to prove that it is a real sustainable success. For this reason I also reject any requests to roll it out somewhere else, first we need to prove our concept in Carpiano. If it doesn't work here it won't work anywhere, as we had the best prerequesites clearly in Carpiano. The success factors in the beginning where the mindset and the leadership approach, today the crucial success factor, as the project is getting bigger and bigger is having the right setup and enough resources dedicated to it.
Question 5	What do you think are the next mandatory steps for Carpiano?
Answer 5	As mentioned now we need to think about a modified set up with Hancho structures and also a well working Hoshin Kanri cascade to ensure that we are all aligned although improvements are taking place very decentralized in a bottom up approach.
Question 6	How do you see the future of Carpiano with Kata?
Answer 6	KATA in Carpiano, the topic has it to make the future look extremely bright. Internally KATA will not only ensure a sustainable lean journey keeping up competitiveness and innovation, developing and sharing standards and becoming the best in class WH over and over again. On top KATA will further change how we work together, increasing the involvement of the people, enhancing the level of trust and respect and finally boosting the diversity to daily business which allows creativity and trying new things. This will further foster the play drive and the instinct of people to strive for self fulfillment and purpose, which has a direct impact on motivation. And also identification will further increase making people act like entrepreneurs. Finally KATA will help to find a better balance between learning and performing and hence will be a very important instrument on our VISION to became a so called learning organization.

Reference Number	52
Date of Interview	07/09/2015
Interviewee	Matteo Pozzoli, Warehouse controlling team leader
Language	English
Question 1	When was Lean implemented at Carpiano?
Answer 1	"So the implementation of Lean started more or less at the end of 2011. I was not already within the company, but from what I know they started at the end of 2011, beginning of 2012. It was with a taskforce. So some of our colleagues from the headquarter came to Carpiano and started to review some processes. They firstly started from the inbound process. They developed the new Inbound global standard for all warehouses in Hilti which is called "Three step Putaway" process. Then the journey continued until today and it will continue also in the next years".
Question 2	Why was Lean introduced at Carpiano?
Answer 2	"Sincerely, Carpiano warehouse, when I started, had a big structure, particularly under the people point of view. A lot of people compared to the volumes. We had decreasing volumes because of the crisis that we had in those years. Now we are more or less out. So Lean was mainly implemented because of the possibility and ability to adapt to the changes in volumes. We were in a year of decreasing volumes in terms of lines and also in terms of turnover for the whole Company, and the structure was very heavy. We had many Hilti employees, warehouse employees and temporary employees and the efficiency was very low. We then realized that this warehouse could have performed way better. This was one of the main driver of the implementation of Lean. So the crisis, decreasing volumes and lack of agility in adapting to the business change"
Question 3	What were the major risk for Carniano warehouse during that period?
Answer 3	"The possible risk was the decision of the Hilti Group to close Carpiano warehouse. This was one of the major risks. Here there was a big structure and obviously high costs. With the crisis also a big decrease in volumes. So this was one of the major risks I would say. To close Carpiano and attach its volumes to another distribution center like France. This is in my opinion of course."
Ouestion 4	Which tools were implemented at Carpiano and why?
Answer 4	"A part from the reorganization of the Inbound process, the first tool that was implemented is 5S. One of the most common tools in Lean. Why? Sincerely I would say because it is simple. Very simple tools that can be applied to every area of the warehouse. It also gave to chance to operational people to get familiar with the new methodology, or culture let's say, that we were trying to implement. Then we started to implement also shop floor management. And then, more or less in parallel with shop floor management, we introduced also the quality circle concept".
Question 5	After almost three years, how did Lean impacted Carpiano at process level?
Answer 5	"Lean had a huge impact at Carpiano, mostly at process level. All of our processes have been changed during these years. Sometimes these were changed even more than once per year. Lean brought a lot of changes and a lot of improvements under this point of view. We highly reduced our waste and one of the major proofs is the increase of the efficiency of the warehouse. From 2013 until today, the efficiency of the warehouse increased by almost 30%. From 18 lines / man / hour to 23,4 lines / man / hour year to date 2015. So this was for sure one of the main success factors of Lean implementation. Then I would say that a part from process improvements I do not see other big impacts of Lean implementation. No big impacts at cultural level. We started a little bit to empower people, but then the learning curve stabilized, flattened. So no more improvement suggestions are proposed. Overall it can be said that Lean it is not sustained".
Question 6	Why do you think that Lean is not sustained at Carpiano warehouse?
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	"In my opinion it was not because a bad training. In my opinion indeed people had
	been very well trained on the concept. The major point that we missed was to really
	give them the time to really learn and internalize the culture and to practice on this
	new approach. We wanted fast results. So we usually drove all of the initiatives and
	improvements, such as 5S for example, as top down. So there was always me, in the
Answer 6	case of 5S, to lead 5S audits and activities. While we did not give them the chance
	to start practicing it by their own, to work with that as part of their responsibilities.
	So we were very top down and not bottom up. And we did not give them enough
	time because we wanted fast results. We wanted to get back to a good performance
	levels and to adapt as fast as possible to the volumes that were decreasing very
	fast".
Question 7	Do you consider the Lean concept as well understood by the operational people in
Question /	the warehouse?
	"This is a nice question. Obviously it depends on the people. There are some of
	them that have quite a good understanding of what is really Lean. And some that do
Answer 7	not yet understand it. But in general I would say that in operation Lean right now is
	still only seen as a tool. As something that will let you improve somehow in some
	processes somewhere. It is not seen as a cultural change. So it is just a tool".
Question 8	What is your opinion on Lean at Carpiano?
	"Well, another nice question. I would say that at Carpiano Lean, or the tools side
	point of view of Lean, is at a quite good level. We have implemented quite a lot of
	tools such as 5S, shop floor management, quality circles, kanbans, heijunka. So a lot
	of tools were implemented. But what I see that Carpiano is missing and ,what now it
Answer 8	is trying to close the gap, is really the cultural side of Lean. We are really missing
	that perspective. Quite mature, but not enough to say that we can be completely
	defined as a Lean warehouse. I would not describe Carpiano as a Lean warehouse.
	From the tools side of Lean yes. But from the cultural side, the approach and the
	leadership style no".
Question 9	Among the various Lean tools what are the most successful?
	"I would say that shop floor management was a great success when we
	implemented it. It was one of the main drivers of the improvements that we had in
	those years. Also 5S sincerely. We have implemented 5S in almost all the areas of
Answer 9	the warehouse. 5S is implemented in almost 80% of the warehouse. Sincerely they
	were also successful, but again there is a lack os sustainability that is clear. Right
	now for example the level of discussion during shop floor management is quite
	stable. So yes they were successful, but then they stopped. So they did not grow up
0 10	rrom a content point of view.
Question 10	What is your role in Lean and now much time to you devote to Lean per day?
	well, my role within Lean at Carpiano is, as a Lean expert, is to drive and to train
	people at Carpiano under this point of view. And to drive all of the initiatives that
	we have. How much time do I spend? I would say that daily I spend almost 30 /
	40% of my time, mainly because it is not my only responsibility. I also have the
Answer 10	the workbauge side is involved. So in the ideal world Labould dedicate much
	the warehouse side is involved. So in the ideal world I should dedicate much more
	dedicated to Lean. Of course Lean is always inside every process ravious that we
	make even if we do not emply a Lean tools for evenue. But of course you are not
	and a course you are not apply a Lean tools for example. But of course you are not only focused on Lean"
	Uny locused on Lean . Bafore we discuss on Kata can you briefly avalain me what was your loadership
Question 11	approach?
Answer 11	"I would say very directive. So if we think about situational leadership we can say
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	that my approach was always D1 and S1. So always giving directions to the people, tell them what to do instead of for example coaching them and try to teach them how to arrive to the solution alone. Why? There is not a main why. It was mainly driven by the fact that we have very few time to make the changes so the approach was: we have to change this process so we got for a step change improvement. We apply it, so you have to trust us and do what we say. Sincerely we did not had time to develop the problem solving skills of the operational people".
Ouestion 12	Do you usually explain to operational people why they have to complete an action?
Answer 12	"No usually it is just a Do this. Obviously an overall understanding of why we are going to improve a process or an activity is given. But we did not gave them the direction that the company was going to follow. And so try to make them understand why we are moving towards that direction. So let's say that the drill down of Carpiano vision, which is related to the corporate vision, was never drilled down to the operational level. We just went in the warehouse to say we have to do this because we want to improve. So please help us to do it like this".
Question 13	What do you think are the major issues of being so directive with operational people?
Answer 13	"A challenge could be that obviously people are not happy when someone come out and say you have to do that instead of what you have done for the last ten years. This is one of the major challenges that we had. Especially if it is a young guy that is going out to say to older people that you are doing it in the wrong way, so please change. This is te main challenge. Then,we had a high speed of change, but if I have to consider the mood of people when we were making the change it was always low. They were committed to implement the change, but their humor about the change was low. Then after that the change is being understood and applied correctly the humor grow up again. But during the period of change it was always very low".
Question 14	Do you think that operational people understood that Lean was a solution, a recovery for the crisis?
Answer 14	"Sincerely ves. They understood the benefits that Lean brought during that period".
Question 15	Why was Kata implemented at Carpiano?
Answer 15	"Top management decided to be pilot of Kata for the Hilti Group mainly because Carpiano is one of the most mature warehouses in the tools side of Lean. And also because we realized that the improvement curve was becoming very stable. This was mainly driven by a not structured change inside the warehouse. So we were also a little bit losing the control of what was going on in the warehouse. Our process stability for example was very poor, low. A lot of deviations even if the final outcomes were good. From day to day and week to week there were a lot of deviations".
Question 16	How was introduced Kata at Carpiano?
Answer 16	"We made a week, three days, of training on the topic very focused on the theory of Kata which was of our major obstacles. We were not so aware of the topic. So we made a three days training on the theoretical part of Kata and then we started to make some dry runs. So to apply the tools in a safe environment, regarding simple topics for example my diet, or whatever, just to get familiar with the structure. With the Global Lean team of Hilti we have developed our own Hilti Kata board. And we had to get familiar with the structure of the board. How to go through all of the steps of the coaching Kata. So Target State, Current State, Obstacles, PDCA and of course Knowledge Pool. So we made more or less one month of dry runs. During this month we changed three times the Coach-Coach. For the first three weeks we had a Coach-Coach while the last week we went by our own. What was really helpful was that the change of the Coach-Coach allowed us to change perspective.

	For example we started for the first two weeks to focus a lot on the structure. Not a lot on the content. It was just an exercise based on internalizing the structure. At the third week we changed again our Coach-Coach and after this change we started to focus more on the content. This was quite stressful because we were quite sure that we were at a quite good level in the Kata approach. But then we realized that we were missing the most important part. I think it was the right moment to start working on the content because the structure as very well internalized by the team. After the dry runs we went live with the first couple and with a real shop floor topic. The couple was me and you (Alberto Pogliaghi, author of this master thesis) with you as a Coachee and me as a Coach. The journey is still on going, we are still in the learning phase. We are always improving our skills on the topic. Overall the implementation approach for Kata at Carpiano was very good and successful?
Question 17	Why have you decided to have a Kata room at Carpiano?
Answer 17	"Mainly because we needed a place where everything that was not concerning with Kata was out. We needed our safe, in brackets, our safe space where to practice and have all of our reminders of what is the right Kata and Lean culture".
Question 18	How do you consider the selection of simple topics for practicing during the dry run phase?
Answer 18	"I would say that it depends. If we think about mid management team that is trying to implement Kata I would say that I is good, it is helpful. If I think about operational people I am not so sure anymore. Because operational people want to do practice with something that they can touch. This risk of doing dry runs like that with operational people is that you lose their attention and focus on the topic. This is a possible risk, but at least at the beginning I would always suggest, for one or two weeks, to make some dry runs on easy topics, also not business related, just to focus on the structure".
Question 19	Why do you think that mid management had been highly involved in the implementation of Kata rather than top management?
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	we tried to overcome obstacles that were too huge, too big to be solved with only one PDCA. So we drilling down Obstacles is another success factor for having meaningful Kata coaching sessions. One tool that can be easily used during this phase is a 5 Why analysis of the obstacle. Then also another aspect of Kata that has to be always in focus is the detail of description of a PDCA cycle. We must to be very detailed in explaining what we want to learn, or better expect to learn from an experiment and how we want to conduct the test. Be always sure that the PDCA cycle is single factor. In the sense that involves an experiment which will impact only one factor, one parameter".
Question 22	During Kata you used other Lean tools such as Value Stream Maps and 5 Why. Were these tools pushed by top management or "pulled by Toyota Kata"?
Answer 22	"I would say that these were pulled by Kata. After the Dry Runs phase we realized that without a tool that could help us to link together the Current State and the Vision and that could support us in the definition of the Target State, the risk to have Kata sessions on nothing or on topics where Kata is not needed. Also the 5 why analysis was pulled. I never had the opportunity or need to use it before the introduction of Kata even though I knew what was it. During Kata and for those obstacles that were more out from our comfort zone than others, we started to understand that we needed to drill down them in order to have them manageable. So we used these tools by our own, without having top management to ask us to use them".
Question 23	Where should be placed the focus during the implementation of Kata?
Answer 23	"I would say that a good way to implement Kata, even though its aim is a bottom up culture, is with a top down approach. Why? Mainly because it is a cultural topic. Therefore if the management do not have the right culture in place, how can you think that people will change their way of thinking and working. So I will suggest to always start in an operational environment, such as a warehouse or also a repair center, and to start with middle management and then make a roll-out in the operations. This approach will make things easier".
Question 24	Do you think that Lean Maturity is needed and why?
Answer 24	"Yes a certain Lean Maturity is needed. Why? Because you already started to touch and understand what is the Lean culture. Maybe you are not completely aware of it, but at least you have already started to talk about continuous improvement, order, cleanliness and waste reduction. These concepts are already present, even though sometimes are hidden. So if you already have introduced some Lean tools in my opinion you are a little bit more prepared to the change. Even if I would not exclude that you can apply Kata without knowing and applying the tools. With already a good Maturity level it is just easier. There are indeed some companies that implemented Kata without having ever had introduced any Lean tool. It is a choice. In my opinion it is better to have at least a little bit of Lean experience and then go for Kata".
Question 25 / Answer 25	Does Kata brought some changes at: People level? "Here we had some nice changes. Before we had only directive and step-changes. Right now with this coaching and single factor experiments approach we are always changing daily and this let us involve more people and also receive and exchange with them feedbacks and expectations. So even if at the moment the changes are driven by "office people", they can at least influence and try to adapt to their needs what we are going to do". Problem Solving level? "It brought some changes under this point of view, but not so big mainly because

	Kata is applied by a team who was already having good problem solving skills. So there was a change, but not so huge as we can expect it will happen with operational people. Kata gave us the right structure to make problem solving possible also at the operational level".
	Leadership approach? "It changed a lot. For sure with Kata you have to change your leadership approach. Because with Kata it is not anymore me solving the problem by implementing something that I know it would work. Now we were going completely out f the comfort zone. So I needed to change the approach and I needed the support of the people. So I needed to coach them and let them understand why we were implementing something. I needed to make transparent also to them our target parameters to show them where we were heading and to buy their trust. This was a very nice change. Not so easy, from both sides. From my side to change leadership approach and from their side to start answering to questions and not just make questions or ask for solutions. Now they have to find the solutions by their own".
	Process level? "There have been a lot of impacts. We improved a lot the focus process that we chose for the roll-out. What was nice is that we started to measure other KPIs that until now we were excluding, actually for no reason. At Carpiano one of the major KPIs have always been efficiency, lines/man/hour. Obviously inventory accuracy and whatever, but from the operational point of view it was only the efficiency. Now we started to measure and improve the throughput time and also for example the buffer areas. So under this point of view we started to measure also other KPIs, not only quantitative such as efficiency, but also qualitative such as buffer areas. Indeed the number of buffer areas can well represent the quality of our processes. So I would say good improvements".
	Philosophy and cultural level? "I think that also in this topic we had a good improvement. We started to work with Value Stream Mapping. We tried to make understand people what is Carpiano 2020 vision. By doing so we started to work more in a strategic way. Not anymore in a reactive way. Such as during the crisis. I would not say that it was a bad approach, it was the right one for the situation. Now that the circumstances are way better we can now re-start to work in a structured way".
Question 26	Does Kata impacted Lean at Carpiano ?
Answer 26	"Yes. Definitely yes. Kata was able to show the real aim of a lot of Lean tools. For example, the aim of having Kanban is that of trying to eliminate Kanban and arrive to a one-piece flow. So it was an eye-opener, it helped us on setting the long term target, or vision, and work on it and try to develop our own Lean tools. Obviously, if you can stole and copy-paste, copy with pride, no problem with that. But it will always be an adapted tools. So the idea is to have Kata as a driver for the development of our own and unique Lean tools in Hilti instead of copying from Toyota. This could be really a nice target to achieve".
Question 27	What were the major challenges during the implementation of Kata?
Answer 27	"As I told you before there are some points that have to be always on focus when having a coaching session and those point were our major challenges. So one of our major challenge was that of properly defining an obstacle with an adequate level of detail. So not a huge obstacle, but a single and small obstacle that if worked on will have an impact only on a single parameter or factor. This was one of the main obstacles and it took us more than one month to be able to overcome this challenge

	and to start working in a proper way. Another challenge was the ability to be very detailed and structured on describing all the elements of the Kata storyboard during a coaching session. So properly describe the Current Condition, the Target Condition and the PDCA cycle. This was another big challenge. Maybe the biggest one because if I think about if I think about the Obstacle you can drill down it an then it will get easier to solve. But being able to properly describe what you have in your mind for me it is much more difficult. Another challenge that we had during the Go-Live was a matter of trust. In my opinion we started with a not balanced couple. You (the author of this thesis) were not expert on the topic and hence at the beginning it was very difficult to avoid to manipulate you. Because you (the author of this thesis) were always working on topics that you did not know so it was very difficult to at beginning with this set up. But after a couple of weeks we started to balance a little bit more the expertise on the process with that on the topic. So instead of manipulating you I started to support you in going and see how the process was working. So also this was a nice challenge even though at the end we were able to solve it".
Question 28	Can you tell me three success factors of Kata?
Answer 28	"Firstly the commitment. Our team was highly committed during the implementation of Kata, even if it was not mandatory. Kata was a pilot, we were a test. We had another big project this year that was overlapping with Kata. However, we were able to show a high level of commitment on the topic. So this for sure is one key success factor. Then also I would say the support from the Lean team of Schaan was very helpful. They indeed supported us a lot. So as prerequisite I would also recommend to have some experts on the topic present on site as much as possible. And finally I would say that the choice of the Go-Live couple was another key success factor. Within the first couple the level of commitment was really high and this allowed them to have a quick developmental process. For example your (the author of the thesis) skills and knowledge on the process improved. This was one of the first results that we were able to continuously see, while struggling against this complex topic. (Kata) We were always able to see improvements, for example on your (the author of the thesis) skills. This way very helpful as it signaled us that we were going in the right direction. So even if during the first month Kata did not brought any result in terms of focus process improvements, what helped us to understand that we were going in the right direction, was to see you (the author of the thesis) developing. So also the choice of the right couple is one of key factors to consider in order to have a successful Kata implementation".
Question 29	You just discussed about skills development. What about leadership skills? Do you
Answer 29	think that Kata brought any change under this point of view? "Yes for sure. But I see it more as a result than as a prerequisite. I started to be a team leader at the beginning of this year. It is almost 10 months that I am a team leader. So I cannot say that I was having leadership skills or at least I was having only few basic ones. As a result of Kata I see many improvements on my own leadership skills. At least I think as I am talking about myself. But I am convinced that this is for sure another big result of Kata".
Question 30	Do you think that your low level of leadership expertise acted as a barrier or as a
X	facilitator during the implementation of Kata?
Answer 30	"As a facilitator for sure and it is also obvious I would say. If you have always been a leader in a certain way and you have to change your approach it is much more difficult than to create a new approach from the scrap. This is obvious and I would say it is also normal. I have never been a leader, I never lead a team. So I never had to think about how I am leading. I started to be a leader by using Kata and by applying the concept of coaching Kata. So this quickly became part of my

	leadership style. As this is also the only one that I have ever experienced. Before Kata I have been trained a little bit on Situational Leadership, so I know a little bit the basics of it and I see those highly reflected on Kata. Quite similar the final approach".
Question 31	What do you see as the next future mandatory step for Carpiano warehouse along the Kata journey? And do you think that Carpiano warehouse is ready for it?
Answer 31	"Obviously the roll-out in operation. There is no other next mandatory step than this. So we must roll-out the Kata concept also in operation, we must have our team leaders trained on Kata and applying Kata on a daily basis. So I see this as the only possible next step, at the moment, for Carpiano warehouse. Maybe we can also start to apply Kata within another function, such as Material Management. But for sure the next mandatory step will be to roll-out Kata at warehouse team leader level. Carpiano warehouse is, I would say, almost ready. Warehouse people is now quite aware of the change and of the high level of commitment showed by top management level on the topic. I see also them highly motivated to change. What we need now is to re-define the balance of their activities in order to give them enough time to practice on Kata. This is the same mistake we did in the past when implementing other Lean tools. So I think that they are ready for Kata and that they have understood why we would like ad need to implement Kata".
Question 32	What are you expectation about Kata for Carpiano warehouse?
Answer 32	"Eh for instance I would like to finally see process improvements proposed and implemented by team leaders. I would like to have my team only as support in guiding them during the implementation. And not to go there and impose the change. So what I would like to start to see is a little bit of bottom up under this point of view. I would also like to see a change in the approach that we are having now, in the way in which the management team is deploying and cascading process targets and decisions and also in the way in which every team member of the process works to reach those targets. I think that we should try to consider also this factors when going with the roll-out at warehouse level. So I think that we have to focus a lot on the people point of view that Kata has embedded. So to sum up I would really like to see an increase in the bottom up approach and also in the way in which continuous improvement is approached. I would like to see it as part of the daily business of warehouse people and not only of office people. So I would like to see them leading the process of continuous improvement and we only support them instead of always giving them the solution".

CODING OF THE INTERVIEWS

To assess and evaluate as objectively and accurately as possible the data collected from the 9 interviews conducted by the author of this master thesis, these were coded in terms of themes discussed and hierarchical level of the interviewees. This latter criteria was selected due to the different levels of knowledge, expertise and experience that distinguish warehouse team leaders and the management team. The purpose of this distinction was, from a certain point of view, to note if within the same group there was a similar understanding of the topics addressed by this master thesis. On the other side, thanks to this division it was also possible to identify the different beliefs, ideas and opinions proposed by the members of the two group. To each theme discussed during the interviews it was devoted a table where all the relevant data was collected with regards to the hierarchical level of the interviewee.

On the one side, with warehouse team leaders were discussed the following topics:

- 1) Understanding of lean
- 2) Implementation of lean at Carpiano warehouse
- 3) Impacts of lean at Carpiano warehouse
- 4) Level of involvement into lean initiatives
- 5) Toyota Kata at Carpiano warehouse

On the other side, the interviews with the local management team touched the following themes:

- 1) Implementation of lean at Carpiano warehouse
- 2) Current situation of lean at Carpiano warehouse
- 3) Why Toyota Kata at Carpiano warehouse
- 4) Toyota Kata at Carpiano warehouse
- 5) The future of Toyota Kata at Carpiano warehouse

With the differently coded data it was possible to create a small "database" that was used as mean to easily access qualitative data for the analytical part. Within this "database" it is stored all the relevant information on the themes addressed by this master thesis. Lastly, to test the reliability of the data coded from the interviews, it was used the "*test-retest method*" in which "*a person codes the material once and without looking at the results re-codes the same material to see whether the first and second ding agree*". (Gorden, 1992) To further improve the consistency of this approach, it was decided to retest the data coded a week after the first coding.

Questions	Bianchessi	Bricchi	Cafeo	Corvi	Mariani
How would you describe lean?	Order, cleanliness and continuous research of waste.	A method to streamline processes and keep clean the work area.	Improvement, cleanliness, order.	Efficiency, philosophy and order.	Lifestyle, Commitment .
How do you consider lean?	Not part of the job due to the time pressure.	"Lean instead is a plus that sometimes can give me flexibility".	It is not part of my daily job.	"Now it is definitely not an integral part of the activities".	Part of my job, I use it daily.
How much have you been involved during lean implementation?	More at practical level, than at decision-making level. Overall 6.	A political 6! The taskforce did almost everything.	Only a little, 4. The taskforce did everything.	"Little compared to what I would have expected".	11 out of 10! I was one of the main actors.
How do you consider your level on lean training?	"The theory in general is clear to me, but I have some shortcomings due to the little time devoted to it".	"Today I would say that the concept is clear to me".	Not adequate. It is still unclear to me.	Not adequate. Still many today do not know what is lean.	Adequate. However, team leaders and members have only been informed!

Table 2 - Lean Understanding (Warehouse Team Leaders)

Questions	Bianchessi	Bricchi	Cafeo	Corvi	Mariani
When was lean implemented?	At the beginning of 2012	3 / 4 years ago, around 2012	2 / 3 years ago	In 2012	October 2011
How do you perceived lean?	Push from the top.	Push from the top.	Push from Schaan.	Push from Schaan.	Pushed from the top.
How much have lean been promoted by management?	"Andrea Ferrero and Fabio Milani made a communicationsai d that because of the crisis it was necessary to introduce some changes".	-	"Lean was introduced from one day to another".	Enough, even though there was confusion as we did not understood what lean exactly was.	"In a fairly effective way", "also due to the period of crisis".

Table 3 - Implementation of Lean (Warehouse Team Leaders)

Questions	Bianchessi	Bricchi	Cafeo	Corvi	Mariani
How much have you been involved during lean implementation?	More at practical level, than at decision-making level. Overall 6.	A political 6! The taskforce did almost everything.	Only a little, 4. The taskforce did everything.	"Little compared to what I would have expected".	11 out of 10! I was one of the main actors.
Suggestions for improvement are properly considered by management?	If ideas are proposed they are taken into consideration. However very few are implemented.	"It depends on the ideasI think the main problem is the timing".	"Some team members do not propose ideas because in the past they have not been taken into account".	"Many of my ideas and considerations to improve the inbound process have never been taken into account".	"In my opinion the ideas of the team leader or team member are taken into consideration".

 Table 4 - Level of Involvement & Engagement (Warehouse Team Leaders)

Questions	Bianchessi	Bricchi	Cafeo	Corvi	Mariani
How would you define the impact of lean at Carpiano WH ?	Positive impact as it changed the way of working and thinking of people.	Positive impact mainly at process level.	Positive impacts even though it is not aligned with my way of being.	Positive impact, more at process level than at people level.	Definitely positive. Though there is still to work on people! 5S cleanings are not done!
3 Pros of lean:	Organization of work such as standards and improved performance.	Ease of application, structured and clear processes and efficiency.	Cleanliness, clear process and efficiency.	There is a structure, well- defined layout and order that make activities more pleasant to execute and efficient.	Ability to plan; Communication; Order and cleanliness
3 Cons of lean:	Time pressure, too much focus on efficiency and increased work pace.	Difficult to comprehend and requires a lot of time.	No disadvantage.	"Not all of us still take to heart and seriously the potential of lean".	Honestly none, it requires time.

Table5 - Perception of Lean (Warehouse Team Leaders)

Questions	Bianchessi	Bricchi	Cafeo	Corvi	Mariani
What do you know about Toyota Kata?	"A method of problem resolutionI find it a great way of revisiting our daily routines".	"A mental approach to face problems".	A method of communication, training was really interesting.	A method to train and grow people. It includes also an operational level.	I know little. "I would define it as the method of the method".
Does Toyota Kata bought any change at Carpiano WH?	Overall yes. In the way of managing picking lists (process level), in the level of engagement and communication of parameters.	Small and simple changes at process level that produced a big impact and greater transparency.	Absolutely yes. At process level, less directive leadership and more involvement of people.	Yes, mostly on the level of involvement of people and on the communication of process targets.	Yes. Mainly on the involvement of people and communication of targets.
What are your expectations on Toyota Kata?	"Still I do not knowsooner or later it will come our turn as wellorganize the change properly. You have to find the time".	"I was positively impressed by KataI would like to be directly involved".	"I would like to be more involved and give my contribution in the process of change".	"I hope that in the future I will be more involved in this project".	"Even though it is not something that belongs to meI think that the benefits that it can give me are huge".

Table 6 - Perceptions about Toyota Kata (Warehouse Team Leaders)

Questions	Pozzoli	Milani	Ferrero
When was lean introduced at Carpiano WH ?	"End of 2011, beginning of 2012".	Three years ago in 2012.	"End of 2011, beginning of 2012".
Why was lean introduced at Carpiano WH ?	It was a period of crisis, decreasing volumes. "The possible risk was the decision of the Hilti Group to close Carpiano warehouse".	"We decided that the organization needed different to find different solutions and approaches in order to achieve productivity and efficiency".	-
What were the expectations?	"We then realized that this warehouse could have performed way better. This was one of the main driver"	"We started with only one expectation that was to increase the efficiency during the situation of the crisis".	-
How much time was devoted by mid management for the implementation of lean ?	"I would say that daily I spend almost 30 / 40% of my timebut if I consider currently only 20%".	"At the beginning more or less, because it was necessary, 50% of the daily job was dedicated to think in the Lean approach"	-

Table 7 - Implementation of Lean (Local Management Team)

Questions	Pozzoli	Milani
Is lean understood by warehouse people?	"There are some of them that have quite a good understanding of what is really Lean. And some that do not yet understand it".	"In the operative part they perceive it as a possible support to their daily job. It is very difficult for them to look at Lean also with a strategic point of view".
What were the major impacts of lean at Carpiano WH?	"Lean had a huge impact at Carpiano, mostly at process level. All of our processes have been changed during these years Then I would say that a part from process improvements I do not see other big impacts of Lean implementation".	"The main KPI that we took into consideration when discussing about Lean is achieve and increase efficiency. In this case we achieved the result".
What is your opinion of lean at Carpiano WH ?	It has reached a good level on the tools side of lean, but it is lacking the cultural side of it. <i>"I would not describe Carpiano as a Lean warehouse"</i> .	"I think that the approach of Lean helped the organization to improve, to develop also people and processes and so this is for me a good result".

Table 8 - Perception of Lean (Local Management Team)

Questions	Pozzoli	Milani	Ferrero
Why was Toyota Kata introduced at Carpiano WH ?	"We realized that the improvement curve was becoming very stable. This was mainly driven by a not structured change within the warehouse".	"We decided to approach this tool because it is the right moment to change the habits of people". "Now it is time to make another step, to reach another level".	"Because we were looking for something to support us not only on the tool part of Lean, but also on the people and leadership part".
What were the major expectations ?	-	"At the beginning my expectation was that the implementation of Kata would have been fast".	"The expectations in terms of results were and are quite high; first in terms of people". "At the end it will have to bring economical results".

Table 9 - Expectations about Toyota Kata (Local Management Team)

Questions	Pozzoli	Milani	Polat	Ferrero
How was Toyota Kata implemented at Carpiano WH ?	"We made three days, of training very focused on the theory then we started to make some dry runswe have developed our own Hilti Kata board".	-	"Firstly by convincing the top leaderswe did an external lighthouse visitIn the next step we did a 3 days trainingIn the following dry run session, we struggled a little".	"We did a trainingto gain the first knowledge about the topicaround end of March, we decided to focus on the implementation".
What are the key success factors for the correct implementation of Toyota Kata at Carpiano WH ?	High level of commitment, support from Global Lean department and selection of the first Kata couple.	There was the right mindset in place and adequate understanding of lean for the people involved in Kata.	At the beginning the right mindset and leadership approach is fundamental. During the roll-out the right setup and enough resources dedicated to it.	High level of commitment, right environment and good understanding of lean.
What were the major challenges during the implementation of Toyota Kata at Carpiano WH ?	Properly define an obstacle, ability to be detailed and structured and develop trust.	Identify the right obstacle and do not react randomly when you face one.	The major challenges were time, building routines and having the right structure.	Develop the right leadership approach and reach the adequate level of detail when making experiments.

Table 10 - Implementation of Toyota Kata (Local Management Team)

Questions	Pozzoli	Milani	Polat	Ferrero
Do you already see some changes after the implementation of Toyota Kata ?	"I never had to think about how I am leading. I started to be a leader by using Kata".	Yes I see some changes mainly at middle management level.	No. "Kata is still in the very beginning stages in Carpiano"	"There are also many visible changes For instance a different flow of goods".
Do you think that Toyota Kata impacted Lean at Carpiano WH ?	"Yes. Definitely yes. Kata was able to show the real aim of a lot of Lean tools".	Yes, in the way problem are faced.	"I consider the Carpiano pilot a very promising test, which still needs to prove that it is a real sustainable success".	"The nice thing is that we started to question the things we do and the changes we implement".
What are the next mandatory steps for Carpiano WH ?	Roll-out Kata at operational level and «re-define the balance of their activities".	"People and the habits of people. Also because to me Kata is 80% people issues".	"We need to think about a modified set up with Hancho structures and also a well working Hoshin Kanri cascade".	Prepare operative people with an adequate understaning of the thoery and leadership approach.
What are your expectations about Toyota Kata at Carpiano WH ?	"For instance I would like to finally see process improvements proposed and implemented by team leaders".	Kata will allow Carpiano to reach a higher level in lean, but it will require more time than expected.	Kata will ensure sustainability, competitiveness and innovation by increasing the level of involvement of people.	Reach a bottom-up culture where improvements are driven by operative people.

Table 11 - Impacts of Toyota Kata (Local Management Team)

DIRECT OBSERVATIONS

Date	Situation	Who	Observation
07/04/2015	Toyota Kata Training	Andrea Ferrero, Head of Region Logistics E4	Andrea Ferrero opened the training of Toyota Kata by welcoming Cemil Polat and by stating that he expects this methodology to be a driver to improving even further warehouse processes and achieve 26 lines man hour.
15/04/2015	Dry Run Training Period	Andrea Ferrero, Head of Region Logistics E4	During a brief wrap up meeting on the feelings about the first week of practice, Andrea Ferrero stated that in his opinion the the board is essential as it gives a flow and structure to the coaching session. He will thus never have a coaching session via Skye again.
25/04/2015	Dry Run Training Period	Cemil Polat	After a coaching session between Matteo Pozzoli and the author, he congratulates the couple for the maturity level. He then claims that in his opinion the lower is the experience in management roles, the higher is the tendency to follow the Five Questions and hence not manipulate.
27/04/2015	Dry Run Training Period	Fabio Milani, Head of Warehouse E4	During the discussion of the morale together with the core team, he confessed his doubts with regards to the possibility of having team members applying the Toyota Kata approach. It will be even a bigger challenge than the implementation of shop floor management.

Table 11 - Direct Observation (April 2015)

Date	Situation	Who	Observation
09/05/2015	Dry Run Training Period	Fabio Milani, Head of Warehouse E4	After a coaching session, Fabio Milani claimed that in his opinion when the mood of the coach or of the coachee is negative it is better to skip the meeting. Otherwise the risk of manipulation is high and the exercise fails.
18/05/2015	Shop Floor Meeting	Andrea Ferrero, Head of Region Logistics E4	After the daily shop floor meeting, Andrea Ferrero complained about the session as he found it repetitive and not effective. As an example he claimed that team leaders when asked to comment the previous day they answered "good" regardless of the low performance.
9/06/2015	Gamba Walk	Antonio Cafeo, High Bay TL	During a discussion, Antonio Cafeo confessed that in his opinion there is little to improve in the High Bay process. He suggested to look more at the packing process since it is slow, discontinuous and hence the cause of trolley shortages during the afternoon.
24/06/2015	Shop Floor Meeting	Mauro Bianchessi, Fast Picking TL	When asked why the internal good transfers were not executed, Mauro Bianchessi replied that since he has to prepare and deliver all the customers' orders on time and in an efficient manner, the time to invest for other activities is limited.

Table 12 - Direct Observations (May - June 2015)

Date	Situation	Who	Observation
07/07/2015	High Bay SFM	High Bay team member	During the shop floor meeting of the High Bay team, one of the team members complained about the increased work pace and about the fact that often he has to work bad in order to be efficient. He claimed the need of one extra team member.
18/07/2015	Coaching Session	Antonio Cafeo, High Bay TL	After a having participated as an observer to a Kata coaching session, Antonio Cafeo complained about the fact that his ideas and suggestions are never taken into considerations even though he has much more experience on the field.
20/07/2015	Coaching Session	Matteo Pozzoli, Warehouse controlling TL	During the feedback session Matteo Pozzoli confess that in his opinion the coaching sessions in Italian are longer because there is a tendency to divagate. Whilst English is more synthetic.
23/07/2015	5S Audit at the Inbound area	Pietro Corvi, Inbound TL	After the 5S audit the team leader of the Inbound process complained about it since he considers this tool as a waste of time. Indeed most of the actions proposed are never implemented and hence are always the same.
24/07/2015	Coaching Session	Matteo Pozzoli, Warehouse controlling TL	During a coaching session, Matteo Pozzoli directly manipulates the coachee by convincing him to think about the experiment and in case postpone it. He then decides to invest the coaching session to drill the obstacle down.

Table 13 - Direct Observations (July 2015)

Date	Situation	Who	Observation
26/08/2015	Coaching Session	Matteo Pozzoli, Warehouse controlling TL	At the first Kata coaching session after the period of stop due to the summer holidays, Matteo Pozzoli claimed that the level of quality was decreased because of a lack of continuity. He raised the importance of having Kata coaching sessions as a daily routine in the calendar.
14/09/2015	Lean Summit	Mads Harck, Head of Lean Management	During the opening speech of the Lean Summit, Mads Harck claimed that in his opinion Kata is a powerful instrument to bring improvements in an innovtive way. As an example he cited the introduction of the throughput time measurement at Carpiano WH that is the first warehouse to measure this parameter
22/09/2015	Gemba Walk	Cafeo Antonio, High Bay TL	During a discussion with Antonio Cafeo, he revealed to be proud of the improvements brought at the High Bay process. In his opinion, also thanks to his advices and support to the Kata coaching sessions it was possible to reduce the disorder in front of the area of the cranes and finish to work exactly at the end of the shift.
28/09/2015	Follow up Meeting	Cemil Polat,	During the follow up meeting aimed at discussing the first three months of roll out, Cemil Polat warned the local core team to define as soon as possible a clear deployment plan in order to cascade Toyota Kata at warehouse team leader level .in a structured manner.

Table 14 - Direct Observations (August - September 2015)