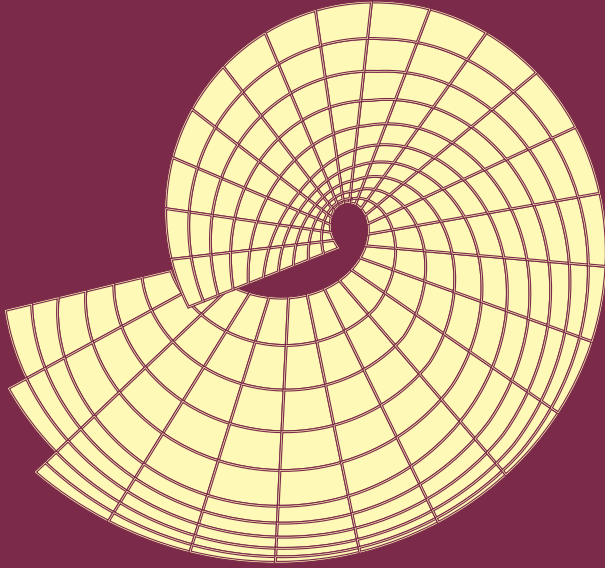


KAIZEN PHILOSOPHY IN A MODERN-DAY BUSINESS

Dilek Demirbas, Rhys Blackburn, David Bennett



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Although this book is prepared with utmost care, there may be some errors and is subjected to further enhancements.

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ABBREVIATION

QCCs	Quality Control Circles
PDCA	Plan-Do-Check-Act Cycle
TPS	Toyota Production system
VMUK	VMUK LIMITED Business Supplies and Equipment, UK

INTRODUCTION

Many scholars have mentioned about the importance of Kaizen philosophy in Japanese management, and the concept is often shown as an underlying principle of Toyota Production System, Lean Production, and TQM. However, there is a great deal of inconsistency within literature of what Kaizen actually represents in a modern-day business and most importantly in the perception of the average worker. This research looks to explore how Kaizen is understood and perceived by the Supply Chain workforce of a UK Vehicle Manufacturer (VMUK) which is a British based tier 1 automotive manufacturer that produces over 507,000 cars per year. Open since 1986 the site covers 2 square kilometres and employs over 7000 people.

With increasingly high levels of productivity, the plant produces more cars per worker than any other factory in Europe. Working to a strict yet efficient no-defect policy, the plant has become one of the largest manufacturers in the UK car industry. As stated by Childerhouse et al. (2003) this a significantly large, competitive and pressurised industry which often acts as a barometer for today's environment and economy. As a result, VMUK are constantly focused on improvement and innovation to secure their position in the market. VMUK excels through a variety of Japanese manufacturing management techniques that have transformed the face of European car manufacturing. Implementing a Just-in-Time delivery process, VMUK rely on a network of in-house suppliers to create an efficient and cost-effective supply chain. VMUK utilise electronic linkages to make orders with their suppliers, with deliveries being made from sites that are located strictly within a 3-4 Mile radius. Using this process requires a combination of flexibility and predictability (Kumar and Midha, 2001), but allows for a highly efficient synchronous supply of materials as and when they are required for production.

Important to this study, VMUK pride themselves on their use of continuous improvement throughout the company, but particularly within their in-house supply network. Using the knowledge and experience of direct line workers, both internal and supplier, VMUK benefit from the creation of incremental and applicable improvements. The success of such improvements is to be discussed further in this study.

VMUK would be a great case study example of an Automotive industry organisation with existing, consistent, and efficient supply chain processes and strategies. The company not only utilise Kaizen strategies but pride themselves in the efficiency of doing so, providing an excellent area of research for this paper. Furthermore, there is a widely accepted belief that often non-Japanese companies struggle establishing long-term and effective Kaizen. Using a case study, we are interested to see how these techniques have been developed, translated, and implemented to an English majority workforce.

The study will look firstly to explore relevant areas of literature regarding Kaizen and its efficient implementation in part one. After defining what Kaizen is and its origins, advantages and requirements of Kaizen, as well as the key principles set out in literature. We also review strategies involved in creating continuous improvement such as Quality Circles and Teians and will give an expanded view on Lean Production techniques such as 5S, SOP, and Value Stream Mapping.

Then in part two, the chosen methods to analyse the primary data will be explored. This part will describe and justify the processes used and discuss the ethical consideration and limitations of the research.

Next, in part three literature will be compared to primary research undertaken within VMUK, consisting of 12 Semi-structured, qualitative, interviews with members of staff from a variety of roles, ages and experiences within the VMUK supply chain. After that, this part will discuss and analyse the key findings from the primary research conducted. Theories discussed in the literature review section will be compared to the primary data to identify contrasts and correlations.

The final part within this study bring together the research to formulate conclusions relating back to the initial objective set out at the start of the research. This part shows that, with exceptions, there is a lack of in depth understanding of Kaizen in the workforce likely as a result of poor training and education. A bell curve is identified with those most knowledgeable and experienced with Kaizen being members of staff with 5-10 years of experience within VMUK.

Workers perceptions on the implementation, principles, advantages, and requirements of Kaizen seem to be the most important aspects of the study. The effectiveness of Kaizen is mainly depends on the company implementation of Kaizen even though the participants might believe Kaizen in concept is effective.

PART 1

1. Literature Review

1.1. Origins of Kaizen

Kaizen is a philosophy that suggests a human life and lifecycle can be consistently bettered, translating according to Colenso (2000), to “change and good”. The Japanese word is often linked to the term ‘continuous improvement’ which it is frequently referred to in western organisations and literature as a replacement for the Japanese terminology. Agmoni (2016) finds that, as a philosophy, Kaizen not only prompts positive developments but places a focus on identifying and rectifying issues before they develop and take effect.

The foundation of Kaizen was laid in Japan after the Second World War, when the country was attempting to rebuild factories and rethink many systems. The concept of Kaizen began to be formed and it took off in the 1950s. According to Masaaki Imai, the father of Kaizen strategy, it is the most important concept of Japanese management – the key of Japanese business success (Prošić, 2011).

The concept of Kaizen encompasses a wide range of ideas. It involves making the work environment more efficient and effective by creating a team atmosphere, improving everyday procedures, ensuring employee satisfaction, and making a job more fulfilling, less tiring, and safer (Kenton, 2018).

The origins of Kaizen in supply chain management can be traced back to the Japanese automotive industry, with Shingo’s (1981) paper on the ‘Toyota Production system’ - developed and implemented in the early 1950s by Taiichi Ohno, former Executive Vice President of Toyota Motor Company (as can be seen from Sako, 2004).

Forming the building block for Kaizen, the concept of lean manufacturing focused on ways to remove ‘muda’ waste from production processes. Hines and Taylor (2000) defines such waste as non-value adding activities that, in the eyes of the final customer, do not make a product or service more valuable. Keeping with Inman’s (1993) description of high inventories as the “flower of all evil”, Lean looked to minimise inventory to ‘zero’ in addition to defects, breakdown, handling, set up and lead time (Shingo, 1981).

Over time, Lean production has become increasingly popularised with western organisations, stimulated by Womack, Jones, and Roos’ (1990) study of the Toyota Production System. Comparing the Japanese strategy to other manufacturing organisations around the world, this acted as quantification for earlier manufacturing studies (Shingo, 1981; Schonenberg, 1982; Monden, 1983).

A key step in the TPS house, (see Figure 1.1) Kaizen serves as a key mechanism used to fully incorporate Lean production processes into an existing supply chain (Davis, 2011). Providing arguably the first well known and most frequently cited paper on Kaizen itself, Imai (1986) documents the core principles and values of Kaizen in relation to the improvement process. As a result of these works, concepts of Kaizen in supply chain management are being increasingly embraced by organisations worldwide. The difference between this literature however, and modern western literature varies greatly, this is discussed further in the study.

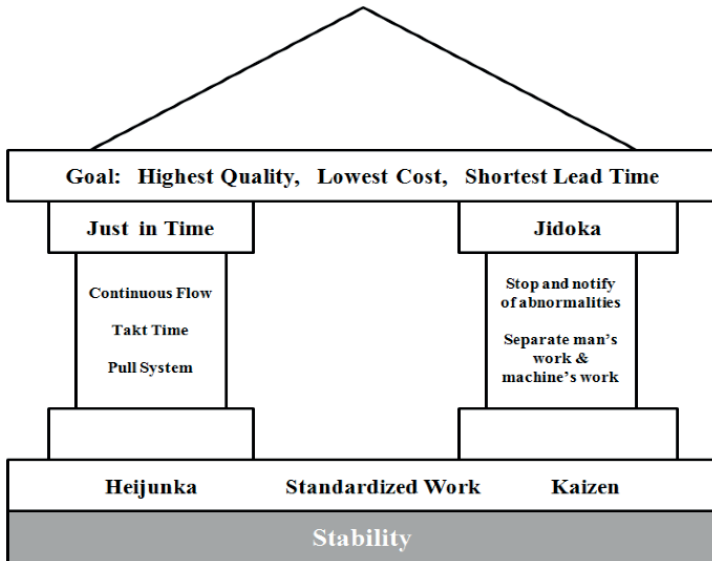


Figure 1.1. Forming the building block for Kaizen (Lean Enterprise Institute, 2015)

It is important to note, that although the term ‘Kaizen’ originated in Japan, many principles of continuous improvement can be seen in western organisations pre- dating the boom of the Japanese car industry. A significant example of this is put forward by Graban and Swartz (2012) who outline the employee suggestion program used within the British Navy as long ago as 1770.

1.2. Modern Definitions

The definitions of Kaizen in modern literature often follow a similar pattern of key words and phrases, however, they often struggle to pinpoint a definite meaning for the term. Although the nature of Kaizen stems from Japanese philosophies, modern western literature focuses heavily on Kaizen as a process, strategy, or even a productivity tool. This is likely

due to an over-reliance of western organisations on utilising Kaizen strictly as a management tool to reduce the costs of a manufacturing process. Some of the key objectives of the Kaizen philosophy include quality control, just-in-time delivery, standardized work, the use of efficient equipment, and the elimination of waste. The overall goal of Kaizen is to make small changes over a period of time to create improvements within a company (Kenton, 2018)

Davis (2011) defines Kaizen as “a process aimed at making continuous improvement, by focusing on and eliminating wastes inherent to the manufacturing processes being employed”.

Coimbra (2013) defines Kaizen as “a long-term strategy that systematically seeks to achieve small, incremental changes in processes in order to improve efficiency and quality”.

Abdulmouti (2015) defines Kaizen as a “Productivity tool that emphasizes continuous improvement through regular, incremental improvement”.

These definitions are well suited from a strategy perspective but are not fully representative of Kaizen. Looking back at early Japanese literature, Imai (1986) defines Kaizen as “a culture of ongoing improvement involving everyone—top management, managers and workers”.

This is far from an easy-applicable strategy, as in modern literature, and instead focuses on Kaizen first as a culture amongst staff. Imai (1986) pushes this further stating that the concept is often “so deeply ingrained in the minds of both managers and workers that they often do not even realise that they are thinking Kaizen”. Ishikawa (2013) points out “*Kaizen is not a panacea for cost-reduction or productivity improvements. It is not a problem-solving tool; it only creates a mindset of improvement that equips people to address the larger issues better*”.

Kaizen philosophy goes beyond simple productivity improvement into a process that, when done correctly, humanizes the workplace, eliminates waste (Muda) and overly hard work (Muri), and teaches people how to identify and eliminate wastes in a scientific method (Davis, 2011). Kaizen strives to empower the workers, increase worker satisfaction, and facilitate a sense of accomplishment, thereby creating a pride in their work. If the culture of Kaizen is not being properly represented in many papers, it is clear to see why Kaizen is often found difficult to successfully implement, especially in non-Japanese organisations (Laraia et al., 1999).

This, however, is not to say that all authors misrepresent the ideals of Kaizen. For example, Brunet and New (2003) excellently define Kaizen to “consist of pervasive and continual activities, outside the contributor’s explicit contractual roles, to identify and achieve improvement outcomes that are believed to contribute to the organisational goals”.

1.3. Principles of Kaizen

In previous literature, many authors provide a number of key principles in order to provide further clarification for Kaizen. These can range from company requirements to ordered steps in the implementation process, but ultimately they allow for greater understanding rather than providing a simple definition. Though this varies, there are four key points which can be identified throughout literature which encompass Kaizen implementation (see Figure 1.2).

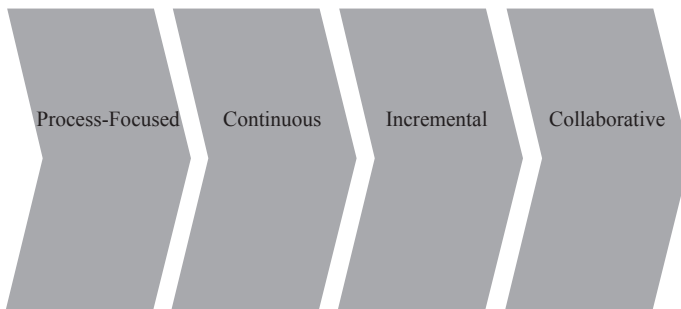


Figure 1.2. Principles of Kaizen Philosophy

Firstly, Kaizen must be **process orientated**. Process orientation states that before results can be improved, processes must be improved, opposing a result-orientation where outcomes are most important (Martichenko, 2004). This doesn't state that the results aren't of importance, but instead places focus on high quality processes which will result in positive results with the aim to achieve 'zero defects' (Hammer et al., 1993). Berger (1997) furthers this by identifying two practical consequences: Management's responsibility to stimulate process improvement and the implementation of evaluating criteria e.g. employee efforts, supervisor and first line manager support. Where Kaizen is most effectively used, a culture of pull-flow thinking is implemented where supply is based on demand, allowing for optimal information and material flow (Coimbra, 2013).

Secondly literature shows that Kaizen must be **continuous**. Many studies highlight the importance of Kaizen as a long-term continuous strategy and that it should not be used as a term for short term 'Kaizen blitz' or events (Cheser, 1998; Manos, 2007).

Handyside (1997) supports this, arguing Kaizen should not be used for instantaneous benefit, but instead become "a habitual way of life in the organisation". Creating a culture of continuous improvement is vital and a key part of the original Japanese Kaizen philosophy.

Thirdly, Kaizen should be made up of **incremental** changes. Agmoni (2016) agrees with this, characterizing Kaizen as “daily incremental actions that entail improvements to all aspects of an organization”. This supports the work of Bessant and Caffyn, (1997) who state that changes should not be major management-initiated reorganisations or technological innovations, but instead small and incremental in nature. These changes should be close to the ‘gemba’ (The real workplace) and be focused on waste elimination. This principle also outlines that in order to be successful with incremental changes a focus must be placed on maintaining supply chain standards, with Imai (1986) stating “There can be no improvement where there are no standards”. This argues that Kaizen’s incremental improvements are inseparable from strict maintenance of standards and highlights the use of 5S, Poka-yoke, Standard operating procedures and PDCA.

Finally, literature shows that Kaizen must be a **collaborative** effort throughout the company. Kaizen needs to include the involvement and intelligence of the work force as well as generate intrinsic psychological and quality of work-life benefits for employees (Brunet & New, 2003). Imai (1986) states that Kaizen is based on a belief in people’s inherent desire for quality and worth, and management has to believe that it is going to “pay” in the long run. Kaizen must be fully represented and sponsored throughout the supply chain from management to the average line worker in order to be successful.

1.4. Implementing Kaizen

In order to successfully implement Kaizen, many authors highlight the need for companies to set up support activities and strategies that work to achieve workplace standardisation and therefore highlight issues affecting the workplace (Imai,1986; Berger, 1997; Martichenko, 2004). Previous literature has identified the following as key activities. Figure 1.3 shows the implementing Kaizen.

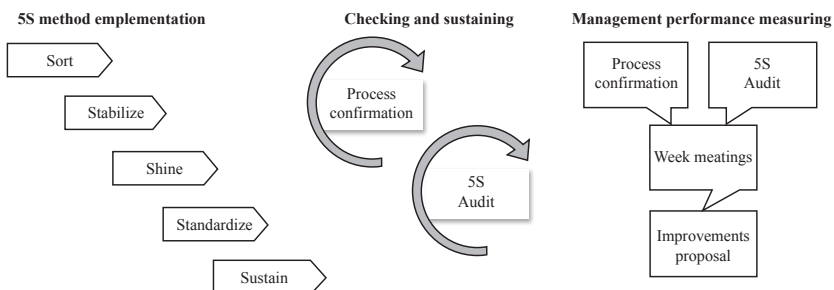


Figure 1.3. Implementing Kaizen (Gupta and Jain, 2014)

5S

5S is a workplace organisation method that uses a set of tools for housekeeping and maximising performance. Gupta and Jain (2014) analyse the use of 5S in implementing Kaizen finding that the integration of the two concepts leads to increased process efficiency, improved visibility, improved morale and safety of the employees, and reduced delays and searching time. Flilip (2015) further praises 5S in this partnership stating that together they make a powerful tool that can be implemented in any industry, whether it be micro, small, medium or large.

Standard Operating Procedures

A standard operating procedure is a set of step-by-step instructions compiled by an organization to help workers carry out complex routine operations. SOPs aim to achieve efficiency, quality output and uniformity of performance, while reducing miscommunication and failure to comply with industry regulations (Nakagawa, 1997). Imai (1986) places a focus on maintaining standards when implementing Kaizen stating that “There can be no improvement where there are no standards”. Berger’s (1997) paper furthers this stating the two are inseparable, and highlights three key purposes of SOPs in Kaizen – individual authorisation and responsibility, enhanced learning, and discipline.

Plan-Do-Check-Act Cycle

The PDCA cycle is a critical model and a major practice of improvement, established within the manufacturing industry by William Deming. Figure 1.4 shows the PDCA cycle. It has been frequently adopted and promoted as a functional tool for continuous improvement (Handyside, 1997). Watson et al. (2013) explains PDCA stating “*it is an iterative, four-stage approach for continually improving processes, products or services, and for resolving problems. It involves systematically testing possible solutions, assessing the results, and implementing the ones that have shown to work*”. Using this in-line with Kaizen is key for the efficient improvement of processes.

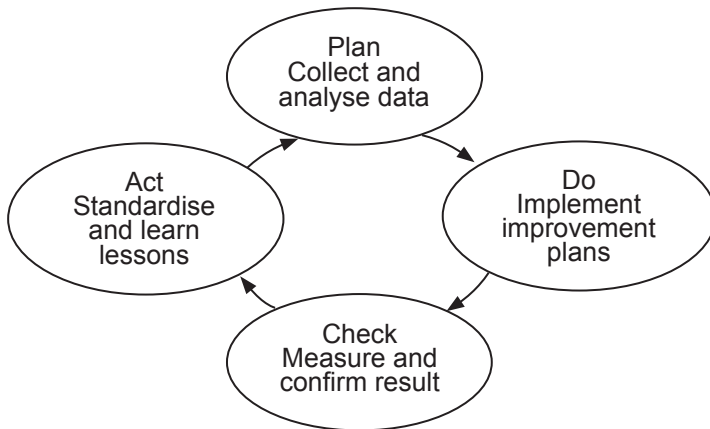


Figure 1.4. The PDCA cycle (Deming, 1986)

Value Stream Mapping

Value Stream Mapping is an improvement method used in implementing ‘lean thinking’ and is identified by previous literature as a leading formula for continuous improvement activities (Filip, 2015; Brunet and New, 2013). A Value Stream Map is a collection of all the actions, value adding and non-value adding, which are necessary for a full process of a product through the technological flow, from the raw material to the client. The final aim of the Value Stream Map is to provide clarity and visibility in order to identify waste nodes in the value flow and identify solutions for their elimination (Banu and Epureanu, 2009). Figure 1.5 illustrates the value and identify solutions.

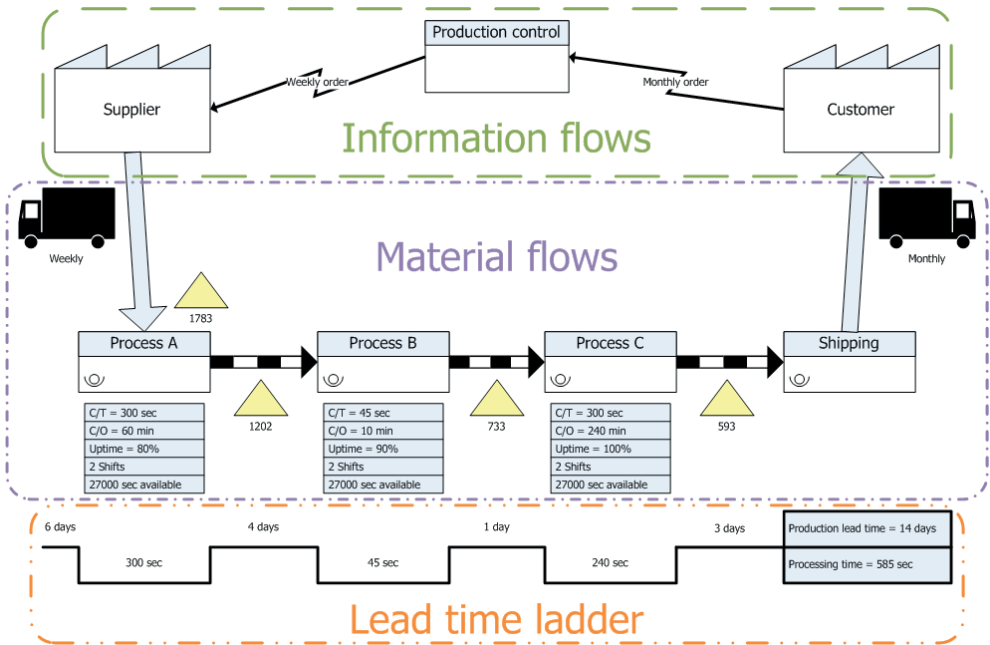


Figure 1.5. The value flow and identify solutions (Banu and Epureanu, 2009)

Suggestion Boxes

Reviewing Graban and Swartz ‘s (2012) paper, a key method of implementing Kaizen is a basic suggestion program. Their study finds the use of this within the British Navy, dating back to 1770. This technique uses little resources for the company, yet allows workers to voice their ideas, making functional improvements whilst boosting worker morale and providing economic benefit (Kii, 2013). This frequently utilises the PDCA cycle identified earlier.

Teians

As continuous improvement has developed, literature shows employee suggestions have developed to form ‘Teians’, a Japanese term meaning ‘improvement’ and ‘proposal’ (Kii, 2013). Teians are utilised to resolve small scale problems, within the proposer’s immediate working area and are commonly based on hands-on knowledge (Marin-Garcia et al., 2008). They are reliant on an employee’s willingness to make implementable improvement ideas (Van Dijk & Van den Ende, 2002) and involve the completion of electronic or paper-based Teian sheets (Schuring & Luijten, 2001). In an efficient Teian system, most suggestions are considered and evaluated, and are rewarded with recognition and involvement, over the economic benefits offered in traditional systems (Ma, 2013).

Quality Control Circles

In addition, the use of quality control circles (QCCs) has become popular within Kaizen implementation. A QCC consists of a group of workers usually 5-15, either from the same department/ function or as part of a cross-functional team.

The groups meet voluntarily under the leadership of their supervisor on a regular basis, usually for around an hour per week (Bacdayan, 2001). During these meetings the circle shares ideas and expertise for improvement, analyses the causes and recommends a solution to the management (Zailani, 1998).

The focus is based on specific and measurable goals and are often linked to long term quality control activities (Wang et al., 2013). Where the reward of teian suggestions are often individualistic, and are based on recognition and involvement,

QCCS differ through their group nature. Ma (2013) explores this theme stating that *“rewards are not directly offered to the meetings but are based on the utility of the end results, as a result, rewards for QCCs are given to the group rather than to individuals”*. Therefore, it can be stated that through a QCC, employees are more focused on the improvement of the company as a whole, instead of personal gain, whether this be conscious or sub-conscious.

In comparison, the teian and the QCC perform varying tasks within Kaizen and many authors argue which is more efficient to utilise as can be seen from Table 1.1. However, to achieve an effective culture of Kaizen both should be used combined to succeed in establishing short-term and long-term focused change. The important point to recognize, however, is that in order for these actions to be successful, they must be continuously applied and not on a one-off basis as found by studies such as (Cheser, 1998) and (Manos, 2007).

Table 1.1. specific and measurable goals

	Japanese Teian	QCC
Purpose	incremental changes	Larger changes
Scale	Local	Company-wide
Form	Individual	Group
Motivation	Recognition / employee involvement	Improving place of work Reward based on outcome
Organisation	Informal	Formal

1.5. Advantages of Kaizen Implementation

The positive effects of successful Kaizen implementation are discussed throughout previous literature:

Waste Removal - Linking back to its roots in lean production, Kaizen's primary goal is to identify potential areas of waste removal (Womack, Roos & Jones, 1990). Manos (2007) praises Kaizen for this, stating that it is "the ultimate and only way of improvement, to truly achieve lean production". Within this removal of waste comes a wide number of resulting benefits affecting a supply chain network, including productivity and efficiency improvements, quality control, flexibility and reduced cost (Bessant et al., 2001).

Customer Satisfaction - Chen and Tjosvold (2006) identify that this has enabled Japanese companies to "improve customer satisfaction, improve productivity index, achieve world-class standard, increase employee job satisfaction and improve company revenue". Agmoni (2016) cites Kaizen for its ability to achieve such results through collaboration highlighting the importance of Teians and QCCs (Davis, 1990).

Employee Morale/Involvement - As an additional result of this, the emphasis on employee participation can encourage employees to think differently about their work and boost the morale and the sense of responsibilities among the employees regarding their workplace (Maarof & Mahmud, 2015). "Intrinsic needs for skill development, quality and worth combined with management acknowledgement for efforts and reward systems for results", are proposed by Berger (1997) as the sources of motivation for workers to participate in improvement activities. However, it should be noted that Pandey (2012) argues that manager seniority and discipline often force the majority of workers to participate in improvement activities.

Low Risk - In contrast to Kaizen, most other forms of improvement are reliant on innovation or major changes. Inman (1993) states "Innovation is dramatic, a real attention getter. Kaizen, on the other hand, is often undramatic and subtle". Imai (1986) states that Kaizen "is not about retooling, redeveloping, or investing heavily in the latest technologies. Kaizen is an overall business concept that entails a number of quality concepts developed steadily". Kaizen allows companies to make slow, subtle changes at very low cost, which translates to low risk. Graban and Swartz (2012) points out that "Managers can always go back to the old way without incurring large costs"

Immediacy - Pandey (2012) identifies that a major effect of Kaizen, is the benefit of immediate results. Instead of focusing on large scale, often capital-intensive improvements

(Terziovski,2002), Kaizen instead focuses on creative investments that continually solve a larger number of smaller problems.

Long-term Focus - And finally, a major effect of Kaizen is the long-term process it creates for continuous improvement, set out at a level that spans the entire supply chain. With a strategic objective aimed at lowering total costs and achieving greater efficiency (Recht & Wilderom. 1998), Kaizen is a powerful tool to achieve long-term operational excellence as long as it is fully implemented and sponsored by management (Kii, 2013).

1.6. Requirements for Successful Kaizen

Much of Kaizen literature supports the potential benefits of implementing a Kaizen philosophy in a supply chain, however there are a number of key areas of difficulty identifiable in previous literature. Without carefully considering these aspects, a failure in implementation will likely result in negative implications to the company (Tanner & Roncarti, 1994).

Involvement & Training - Despite being praised by Agmoni (2016) for its involvement of the entire workforce, workforce participation is a key difficulty in implementation often faced by supply chain management. Ghalayini et al. (1997) describe Kaizen as “characterized by operatives on the shop floor, identifying problems and proposing solutions”. However, without effective communication and knowledge management (Nonaka & Takeuchi, 1995; Pagell, 2004) employees will not be willing to become involved with the process. Robinson & Schroeder (2009) support this stating the absence of compensation or reward, lack of proper training for the employees and long delays in getting the suggestions processed are the main causes of failure. In addition, Garcia-Sabater et al. (2011) have identified further challenges in worker involvement including resistance to change among mature workers, and confusion of the concept of continuous improvement.

Management support & Sponsorship - In addition to including the workforce, it is also vital that management fully support and sponsor the implementation of Kaizen. As stated by Imai (1986), top management’s commitment to having a clear corporate strategy, policies and goals stimulate Kaizen culture in the organization. Evans and Lindsay (2008) and Bessant et al. (1994) support this, listing management’s effort and commitment as a pre-requisite to Kaizen.

Garcia-Sabater et al. (2011) identify key requirements such as manager involvement and leadership, clear objective setting and measurement, availability of resources,

existence of cross-functional teams, and a clear and fixed organization structure. However, Watanabe (2011) argues against the requirement for a fixed organisational structure, finding that an organisation that uses ad-hoc relationship and collective membership with a high degree of autonomy, self-discipline and openness tends to be more successful as compared to a static organization. Looking closer at the style of management, Bateman (2003) identifies that a management approach which has an “open minded culture” and “enthusiasm” towards change tends to develop a positive Kaizen culture in the organization (Doolen et al., 2008).

Selection of ideas - Even when implementing effective Kaizen events, it is vital that the ideas taken from employees are well evaluated, selected and implemented. Aoki (2008) shows difficulties of selecting the right idea and supporting methods to enable, adopt, and sustain the selected ideas for change. In order to effectively select and implement ideas Mauborgne (1999) refer to the ‘value innovation strategy’ where the emphasis is placed on value and the customer instead of competition. This focus on value innovation pushes managers to go beyond standard changes to effective, continuous, and incremental improvements of existing products, service, and processes.

Cultural and literal translation - Since it’s humble beginnings in Japan, the concept of Kaizen has spread worldwide due to huge successes in the automotive industry. However, previous literature shows that the transferal of concepts from one cultural and organisational context to another can often lead to misinterpretation and failure (Berger, 1997; Oliver et al., 2002; Herron and Hicks, 2008).

Oliver et al. (2002) evidences this difficulty in his extensive study, finding that non-Japanese organisations implementing Kaizen perform comparatively poorly according to a number of indicators including: productivity, quality, changeover time, problem solving, and buyer-supplier relations.

Where the Japanese culture values small-step incremental innovation, Choi and Liker (2007) explain that traditional Western values tend to emphasize the role of science and technology in major innovative leaps forward. Davis (2011) explains that whereas the American style stresses the suggestion’s economic benefits and provides financial incentives, the Japanese style focuses on the morale-boosting benefits of positive employee participation.

Brunet & New (2003) offer a prime example of this mis-translation found in the fact that “quality control circles” became “quality circles” (QC) in the Western concept. This implies

that the management role and responsibility for controlling QC activities were perhaps underestimated and left out. Hackman and Wageman (1995) provide similar arguments regarding the changing of core concepts, such as the transformation of the Japanese TQC to the Western total quality management (TQM).

Sustainability - Finally, in order to be successful, a difficulty posed to many companies is to build a long-term and sustainable culture of Kaizen. Martichenko (2004) explains that although focused improvement initiatives are important, and should be completed, they need to flow through an organization “like a river” rather than as isolated, sporadic bursts of improvements. Davis (2011) states the need for a full 18-month outline of planning, with targets, purposes, and budgets to be reviewed and evaluated regularly.

In summary, this section has reviewed the existing literature on Kaizen, looking at key aspects such as its origins, modern definitions, and principles. Within the literature a theme of variation between traditional and modern western implementation has been developed, which will be analysed further within the findings. In addition, practical aspects such as activities, advantages and requirements of implementation are discussed and will be applied to a case study within the findings.

PART 2

2. Methodology

2.1. Introduction

Focusing on VMUK, representatives of the company, and their supply chain partners, provided the author with first-hand knowledge, experiences, perceptions and opinions to create a wealth of primary data. This combined with secondary data from previous literature, worked to achieve the proposed research objectives outlined in the introduction.

This section will expand upon how this research was formulated, implemented and actioned throughout the study, to obtain accurate and reliable data through systematic and methodical approaches.

2.2. Research Philosophy

For this study, an inductive approach to research is being. This used seen from Figure 2.1. This method involves the search for information from observation, and the development of explanations and theories for such information through a series of hypotheses (Bernard, 2011). No theories or hypotheses are applied in the beginning of the research, allowing the inductive reasoning to be built purely from patterns, resemblances and regularities in experience (Saunders, Lewis and Thornhill, 2012).

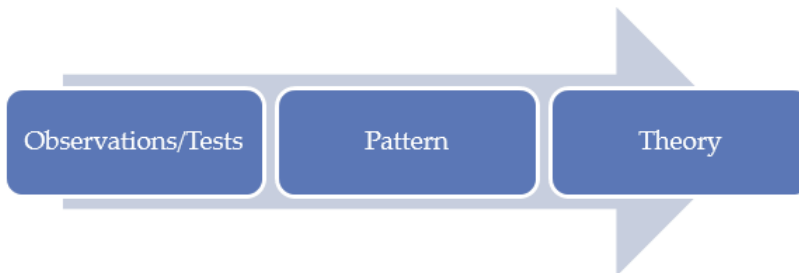


Figure 2.1. Inductive Approach to Research

The process of the inductive approach involves observing specific interactions, formulating general patterns that occur from the observations, creating theories from the work and then backing these up in the study, to draw informed and evidenced conclusions (Tracy, 2012).

Lodico, Spaulding and Voegtle (2010) describe inductive reasoning as a “bottom-up” approach to knowing, in which the researcher uses observations to build a clear picture of the subject that is being studied. This approach was selected as it allows for a greater definition

and understanding than a deductive approach, aligning well with the objectives of the research. In addition, the inductive approach offers greater freedom and flexibility in terms of direction than the deductive approach, which focuses on firm conclusions as a result of previous theories and hypothesis (Cameron and Price, 2009).

2.3. Secondary Data

The research completed in this book is also supported by secondary data compiled, discussed and evaluated in the literature review section. Secondary data is information that has previously been gathered and published and can be accessed for use by other researchers. The data may have been collected for different purposes than intended for the current study but can be effectively applied without manipulation. This can include data, internal or external, qualitative or quantitative, and can range from journal articles, to interviews, to national surveys (Smith & Smith, 2008).

It is important to consider however, that using secondary data does warrant potential issues to effective research, such information that is inaccurate, outdated, or inapplicable. In order to remedy this, all sources were evaluated based on the four key criteria set out by Scott (2014), which are: Authenticity, Credibility, Representativeness, and Meaning. This ensures all secondary data gathered in this study is reliable and fit for purpose.

As a result, a large number of benefits are provided to the author when conducting research, including time, resource and cost savings. In addition, with the significant expansion of available data, the research benefits from greater reliability, better understanding, and provision of a basis for comparison.

2.4. Case Study

Yin (1984) describes the case study approach as “an empirical inquiry that investigates a contemporary phenomenon within its real-life context through multiple sources of evidence”. This method of research excels at bringing understanding of a complex issue or object and can extend experience or add strength to what is already known through previous research (Bryman, 2012).

Defining the broad research topic of Kaizen, the case study focusses on VMUK’s in-house supply network and allows a wide range of data to be consolidated for analysis and discussion. The advantages of the case study method are its applicability to real-life, contemporary, human situations and its public accessibility through written reports (Spring, 1997). Case study results relate directly to the reader’s everyday experience and facilitate an understanding of complex real-life situations.

2.5. Research Strategy

Within this case study, a qualitative research approach was taken in terms of collecting data. Denzin and Lincoln (2018) define Qualitative research as “a multimethod focus, involving an interpretive, naturalistic approach to its subject matter”.

The aim of qualitative research is to understand the social reality of individuals, groups and cultures as closely as possible as its participants feel it or live it. Therefore, people and groups, are studied in or as close to their natural setting. Research following a qualitative approach is exploratory and seeks to explain ‘how’ and ‘why’ a particular phenomenon, or behaviour, operates as it does in a particular context (McLeod, 2017).

Unlike quantitative research, where data is gathered in a numerical form, qualitative research can be gained from a variety of sources including observations, interviews, diary accounts and ethnography. Table 2.1 shows further differences between the two strategies.

Table 2.1. Differences Between Qualitative and Quantitative Research

	Qualitative	Quantitative
Conceptual	<p>Concerned with understanding human behaviour from the informant’s perspective</p> <p>Assumes a dynamic and negotiated reality</p>	<p>Concerned with discovering facts about social phenomena</p> <p>Assumes a fixed and measurable reality</p>
Methodological	<p>Data are collected through participant observation and interviews</p> <p>Data are analysed by themes from descriptions by informants</p> <p>Data are reported in the language of the informant</p>	<p>Data are collected through measuring things</p> <p>Data are analysed through numerical comparisons and statistical inferences</p> <p>Data are reported through statistical analyses</p>
<p><i>Source:</i> Adapted from Minichiello <i>et al.</i> (1990, p. 5)</p>		

As a result of using qualitative research, the focus of the study is not on numbers but words, allowing the use of interviews with semi-structured open-ended questions.

This allowed respondents in the study to provide greater detail, using their own choice of words, providing more rounded results and a greater understanding.

2.6. Participants & Sampling

Table 2.2 Participants and Sampling shows a table of the interviewees within this study. To undertake an in- depth primary study, a case study approach was taken with a sample of 12 information-rich cases. The interviewees came from a variety of areas, with varying levels of experience, knowledge, and levels of authority. We found it to be important to receive information from all areas of the supply chain network with the sample containing managers, supervisors, line workers, and representatives from third party suppliers. This allowed for a broad perspective to be taken and as a result, gave a fair representation and understanding of the supply network as a whole. Names of the participants are removed for ethical purposes.

Table 2.2. Participants and Sampling

Participant	Job Role	Experience
A	Controller - Warehousing	5 Years
B	Placement Student – Cost Reporting	12 Months
C	Technician - Material Handling	4 Years
D	Graduate Controller – Inbound Logistics	3 Years
E	General Manager – Operations Management	20 Years +
F	Section Manager – Parts Control	7 Years
G	Manager - In-House Supplier	9 Years
H	Admin Assistant – Inbound Logistics	2 Years
I	Senior Controller – Parts Control	20 Years +
J	In-House Supplier – Outbound Logistics	4 Years
K	Senior Line Supervisor	15 Years
L	Section Manager – Kaizen Team	6 Years

In terms of sampling a purposive approach was taken, a non-probability method, whereby the author relies on their own judgement in order to select the population of the study (Black, 2010).

The main objective of a purposive approach is to produce a sample that can be logically assumed to be representative of the population. This is often accomplished by applying expert knowledge to select a sample of elements that represents a cross-section of the population (Lavrakas, 2008). Although Cooper and Schindler (2008) highlight the potential bias of using such method, it was decided that it provided the greatest understanding whilst reducing cost and time expenditure.

Key requirements for inclusion in the study were: a role within the area of the study, a reasonable length of experience, and willingness to participate in a potentially lengthy interview process. It was also vital that the participants were not all selected as 'experts' of Kaizen to get a full representation of the supply network's views and perceptions.

It should also be noted that elements of snowball sampling were utilised to acquire additional participants for the study. This method provided further participants through initial interviewees' recommendations on who should be included in the sample population (Wilson, 2014).

2.7. Interviews

In order to collect high quality, qualitative data, interviews were conducted Individually with 12 participants from the VMUK supply network. These interviews were informal and took place in quiet areas such as canteens and break areas, in order to ensure the participants were comfortable and responsive. The responses were recorded by Dictaphone and key notes were made throughout the interview. Open ended questions were used allowing participants to answer with a spontaneous response in their own words (Popping, 2015).

For the purpose of this study, a semi-structured approach was used within the interview. This gave the opportunity to seek insights and expansion of key points whilst allowing a variation in both questions and format addressed at each interviewee. Although a structured approach may have provided quicker, and easier to analyse data, this method allowed for a greater understanding to be built of the subject area. With no structure at all however, the information gained would be too distant and sporadic therefore elements of structure were introduced. When conducting the research, a list of themes, areas, and key questions were noted to cover the varying interviews, to ensure useful and applicable data was acquired (Saunders, 2011). Figure 2.2 shows questions within the interview were kept semi structured but the areas of discussion often followed the flow.

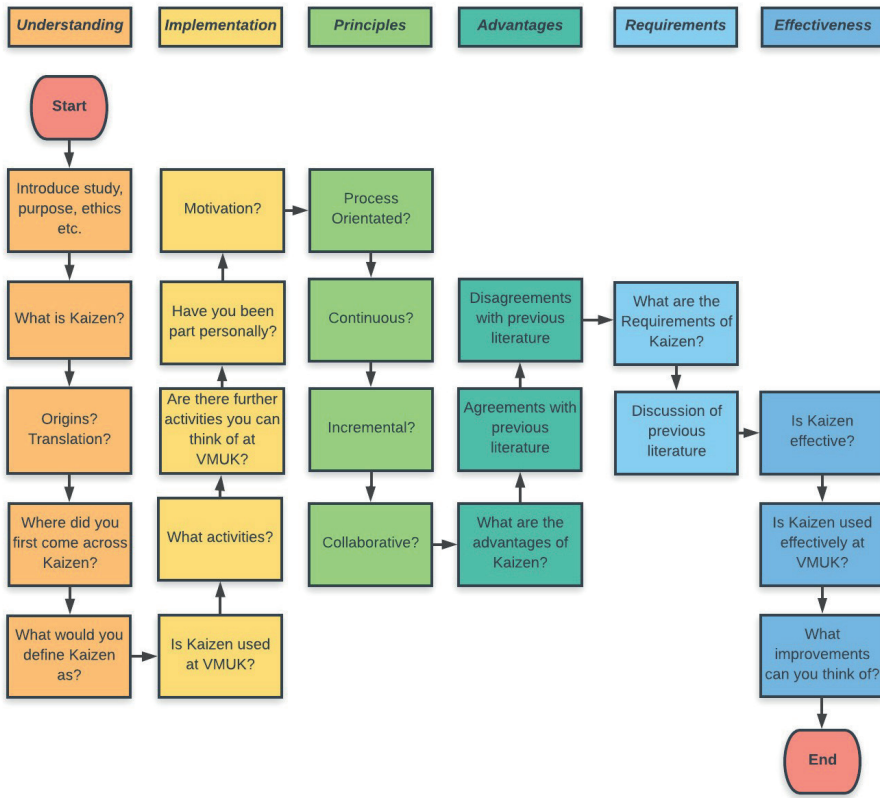


Figure 2.2. Interview Flows

Although most interviews took place in person, there were a number of interviewees that were instead sent an online questionnaire due to time and scheduling constraints. Although this may not have been an as effective method, the layout of the questionnaire was well-designed to provide the most accurate, and informational results. Despite these interviews often not providing as much of a deep insight as face to face interviews, they were very much useful in gaining a wider sample of data.

2.8. Ethics

“Within research, the author must adhere to sound ethical values in order to promote the aims of the research, imparting authentic knowledge, truth and prevention of error” (Sudeshna and Datt, 2016)

Table 2.3 lists the four key considerations of a social science researcher and the actions taken in this study to meet them.

Table 2.3. The Four Key Considerations of a Social Science Researcher

Key Considerations	Actions taken
Avoiding harm	<ul style="list-style-type: none"> ▪ Research Process was explained and discussed before proceeding. ▪ Opportunity to decline/ leave was available at all times ▪ Interviews took place in social areas (Canteens/Meeting areas) to avoid safety risks
Ensuring anonymity	<ul style="list-style-type: none"> ▪ Names of employees were not used on record ▪ Roles within company were kept general
Assuring Consent	<ul style="list-style-type: none"> ▪ Individual consent forms were signed by each participant before the interview ▪ Participants could remove their answers from the record at any point during or after the interview
Avoiding deception	<ul style="list-style-type: none"> ▪ Research Process was explained and discussed before proceeding. ▪ Start and end of interview process was clearly signalled. Any information before or after could not be used. ▪ A copy of the transcript and notes could be sent to the Participant if asked for.

Face to Face interviews were recorded by dictaphone and key notes were made throughout the interview. Online interviews were sent and returned via email, with additional notes being made. All data was stored electronically on password protected platforms and was deleted promptly after the completion of the research.

2.9. Limitations

In terms of limitations for this research, the primary limitation that can be identified is scale. Restricting the sample size to 12 participants allowed an understanding to be built from qualitative responses, whilst keeping cost and time consumption relatively low. However, in order to gain a greater representation of the supply chain, or the company as a whole, a much larger sample size would have to be studied.

It should also be noted that generalizations may occur in such research, having focused on one specific area within one specific company. In order to gain a full picture multiple areas and companies could be studied for greater benchmarking.

Finally, Saunders, Lewis and Thornhill (2012) argue that close exposure to one particular organization can lead to biased data. Being a former employee and local to the site this again highlights a need for further organizations to be studied before any universal hypotheses can be made.

2.10. Data Analysis

Within this study, a thematic approach was used for the analysis of data. This is commonly used within qualitative research and is defined by Braun and Clark (2006) as “a method for identifying, analysing, and reporting themes and patterns within data”. These patterns are

identified through a rigorous process of data familiarisation, data coding, and theme development and revision (Tuckett, 2005).

Wilson (2014) encourages the use of this approach stating that by breaking the raw data into manageable sections, it can “easily allow the facilitation of comparisons amongst the participants and their transcripts, allowing for rational conclusions to be made”.

The main reason for which this process was chosen is that thematic analysis is often more flexible than other forms of analysis, applicable to a variety of different theoretical frameworks. Allowing rich, detailed and complex description of data it is well suited to questions of experiences, perception, and understanding, making it a perfect fit for this case study.

PART 3

3. Findings and Discussion

3.1. Understanding of Kaizen

Table 3.1 shows the participants basic understandings of Kaizen, including an attempted definition, its origin and where they first came across it. The answers vary in knowledge level, but all provide a basis to assess the understanding and perception of Kaizen within VMUK's supply chain workforce.

Looking at how the members of the supply chain define Kaizen, it is interesting to see that out of the 12 interviewed, 3 members did not know exactly what Kaizen was. Those not understanding were: a placement student with 12 months experience, a materials handling technician, and a member of staff from an in-house supplier. Furthering this participant C explains it as "*one of those things you hear about, but don't really need to know*". This shows a lack of education and inclusion specifically towards the lower levels of the workforce, a defining failure identified by Brunet & New (2013) for fully effective Kaizen. It should be noted however, that despite not knowing how to define Kaizen, when it was explained or put into context there was often realisation and understanding, this supports Imai's (1986) findings that Kaizen is engrained into the culture, whether they know it or not (Imai, 1986).

Reviewing the definitions provided one key term stands out – '*Continuous improvement*'. This term was present in 7 of 9 answers given, with even a third of the sample believing this was in fact the direct translation of Kaizen. Although continuous improvement is frequently referred to in literature, there appears to be a lack of knowledge within the workforce, past this term with many offering it up as there only real answer. Looking at the best definitions, Participant E defines Kaizen as "*a process of continuous improvement made up of daily, small changes to the way we work*" whereas Participant L defines it as "*a philosophy of continuous improvement, aiming to better the way we work across the entire company*". These align with the definitions found in literature by Davis (2011) and Abdulmouti (2015).

When asked about the origin of Kaizen, 100% of the sample can identify its origins in Japan. This is likely due to the company's Japanese heritage and upper management being largely Japanese, in addition to the use of other Japanese terms such as 5S and Monozukuri. However, only 25% of the sample can identify it as coming from Toyota, proving that very few know of its origins within the Toyota Production System. This brings about the question of whether full understanding can be achieved without the knowledge of its original purpose and the benefits of literature.

Table 3.1. Participants Basic Understanding of Kaizen

Participant	Definition	Thoughts	Origin	Translation	Where first learned of	Type
A	"Process of Continuous improvement, making changes to the way we work"	"Helps the company move forward, if used the right way"	Japan Manufacturing Industry	Change	Nissan induction	Process
B	"No idea"	"Don't know, don't really need to know"	Japan	Don't Know	Nissan	Philosophy
C	"Don't Know"	"Unsure of what it is, one of those things you hear about but don't really need to know"	Asia	Don't Know	Nissan	Strategy
D	"Philosophy to achieve continuous improvement in all areas of working"	"Idea is positive; however, it is not always implemented properly and often used as a buzzword"	Japan Toyota	Continuous improvement	University	Philosophy
E	"A process of continuous improvement made up of daily, small changes to the way we work"	"Effective strategy for improvement, and moving forward in the industry"	Japan Motor Industry	Change	Nissan	Process/ Philosophy
F	"A philosophy of continuous improvement looking at processes and systems to look how to improve them"	"Much different to Uni, something you don't really have time to consider daily"	Japan Toyota	Continuous Improvement	University	Philosophy/ Strategy
G	"A process used by Nissan to improve their production"	"Good that they look to always improve, often makes life easier for us"	Japan Nissan	Don't Know	Nissan	Process
H	"Improvement"	"Not sure"	Japan	Improvement	Nissan	Process
I	"Continuous Improvement"	"Talked about a lot but not sure if its implemented properly"	Japan Motor Industry	Change and "Something else"	Nissan	Philosophy
J	"Not sure, something Nissan use"	"Think it's a department at Nissan that look to make improvements"	Japan	Don't Know	Nissan	Strategy
K	"Process used for continuous improvement"	"Don't really have much to do with it, something management deal with"	Japan	Continuous Improvement	Nissan	Process
L	"A philosophy of continuous improvement, aiming to better the way we work across the entire company"	"Efficient way to improve buy utilising the knowledge and experience of the workforce"	Japan Toyota	Change Good/Better	University	Philosophy
Literature	"A culture of ongoing improvement involving everyone—top management, managers and workers" (Imai, 1986)	N/A	Japan, Toyota Production System	Change Good/Better	N/A	Philosophy

Looking to provide further definition the participants were asked whether they believed Kaizen to be a philosophy, strategy, tool or process. Table 3.2 Frequency Used Kaizen as a philosophy gained the most responses, as fitting with many authors (Imai, 1986; Shingo, 1981; Davis, 2011), closely followed by those believing it to be a process. Those who answered philosophy tend to have more knowledge on Kaizen whereas those answering process have either less knowledge or less interaction with Kaizen activities. Interestingly 2 participants identified Kaizen as both a philosophy and a strategy or process, identifying that it was often multi-faceted. With the combination of process and strategy gaining more answers than philosophy a clear western management perspective can be identified as supported by Choi and Liker (2007).

Table 3.2. Frequency Used

Type	Frequency Used
Philosophy	6
Strategy	3
Tool	0
Process	5

Looking to explain the differences in knowledge of Kaizen within the Supply Chain a number of trends can be identified. Firstly, a hierarchical trend can be noticed within the results with those higher up in the management ladder having much more knowledge, and in fact a much more positive perspective. This can be exemplified by Participant E, a General Manager, and therefore the highest-ranking member of staff, who has a particularly in-depth and optimistic view of Kaizen within the interview. Comparing this to participant B or C a significant difference can be seen in understanding and outlook. Participant K defines Kaizen as “*something management deal with*” showing a cultural split, thereby representing poor collaboration within the company. This split can also be seen in the differences in answers between more hands-on practical roles, and office-based roles. Collaborating poorly is a key issue for implementation as identified in literature by Brunet and New (2013).

Secondly a trend can be identified within the length of service within the supply chain workforce. A bell curve trend is shown in Figure 3.1 with members of staff within the 5-10-year experience range having the most understanding. Those above and below this, clearly have less education from the company or less direct experience with Kaizen activities. It can also be identified that Participant E is an outlier to this trend.

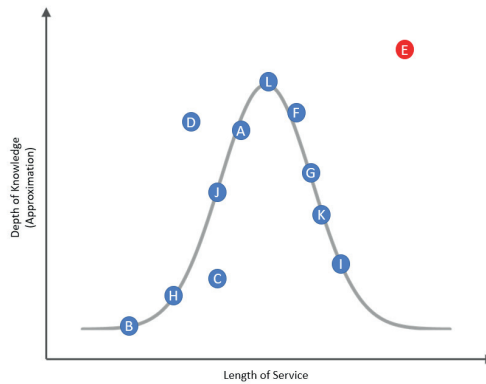


Figure 3.1. A bell curve trend

Finally, a trend can be seen in that those participants who first encountered Kaizen in University have a much greater depth of knowledge. Despite participant F stating that it is “Much different to what is taught in Uni”, answers from participants A, D, F, and L are much more detailed and often have much more in common with previous literature.

3.2. Principles of Kaizen

The 12 participants were asked whether the four key principles of Kaizen identified by literature were present in VMUK’s Kaizen implementation. Table 3.3 and Table 3.4 show the results.

The principle of process-orientation was found to be true by all participants. This shows VMUK focuses on high quality processes, in order to gain positive results. This is supported throughout literature as a key component of Kaizen (Berger, 1997).

Literature also shows that Kaizen should be continuous. However, a third of the sample states that this is not the case at VMUK. Participant I explains this saying that “*Kaizen activities are only now and again, when people have enough time to make changes, instead of putting out fires every day*”. This suggests Kaizen is not implemented on a fully continuous basis, which will likely result in ineffective processes.

Agmoni (2016) states that Kaizen should be made up of “*daily incremental actions that entail improvements to all aspects of an organization*”. Of those who gave answers, this is agreed upon by 90%. This suggests that VMUK do indeed implement incremental improvements to processes. Participant K disagrees with this stating that “*often smaller changes aren’t implemented as they aren’t worth the risk of stopping production*”. A fair point, however, it should be considered that this response is firmly in the minority.

Table 3.3. Interview Results For Principles

Participant	Process-Orientated	Continuous	Incremental	Collaborative
A	“Yeah, I’d say so, the primary focus anyway”	“Generally, it comes into place when management identify an area they need to improve”	“Yes, it’s usually pretty minor”	“I’d say it is, anyone is free to make a suggestion at the very least”
B	“Don’t Know”	“Don’t Know”	“Don’t Know”	“Don’t Know”
C	“I think so”	“Yeah there’s constantly things changing on the line”	“Yeah”	“Probably not, I know I’m not included”
D	“Yes, it’s definitely focused on how we can improve how we work”	“People are continuously looking to make things better, whether it’s officially Kaizen or not”	“There’s rarely huge changes because that would cost so much”	“Kaizen includes some areas and levels but not all, for every 5 you include, you basically exclude another 100”
E	“Yes, improving our work efficiency is the number one priority”	“Yes, it’s engrained in the way we work”	“Yes, we focus on making small, daily changes to the way we work”	“We all are involved in making improvements, it’s always been that way”
F	“It’s often focused at where operations are slow and how we can improve them”	“Yes, sometimes it can be difficult to keep up with the change in fact”	“Yes, rarely ever a big change but they do add up”	“No not really, I think there’s a limit to how many you can include really. Often people don’t want to be involved”
G	“In terms of suppliers, Kaizen is focused on improving our processes and efficiency to meet their standards”	“Yeah, it’s a constant process”	“It’s just little changes or steps in our processes”	“If they include their suppliers then yeah I’d say yes”
H	“Yeah I agree”	“I’d say sometimes more than others but it’s definitely still continuous”	“The vast majority of changes are small, but there’s is a huge amount per day”	“Yes, I’d say so”
I	“Yes, usually it’s to improve machinery or change SOPs”	“Kaizen activities are only now and again, when people have enough time to make changes, instead of putting out fires every day”	“Yeah, high risk bigger changes are often much more difficult to get approved”	“I wouldn’t say everyone. There’s definitely people that are more involved than others”
J	“Don’t Know”	“Don’t Know”	“Don’t Know”	“Don’t Know”
K	“Yeah I’d say it’s pretty process focused”	“No, I’d say its once in a while”	“Often smaller changes aren’t implemented as they aren’t worth the risk of stopping production”	“Usually only involves the people at the top”
L	“Yes, definitely, the main focus of Kaizen is to improve our internal processes”	“Yes, the cycle never stops”	“Yes, it usually comes in the form of small changes, but them small changes can have a huge impact”	“Yes absolutely, everyone is involved with the Kaizen processes”
Literature	“Process orientation states that before results can be improved, processes must be improved” (Martichenko, 2004)	“Kaizen should become a habitual way of life in the organisation” (Handyside, 1997)	“Daily incremental actions that entail improvements to all aspects of an organization” (Agmon, 2016)	“Kaizen needs to include the involvement and intelligence of the work force as well as generate intrinsic psychological and quality of work-life benefits for employees” (Brunet & New, 2003)

Table 3.4. Table Data excludes two participants who responded ‘unsure’

Principal	Yes	No
Process Orientated	100%	-
Continuous	60%	40%
Incremental	90%	10%
Collaborative	50%	50%

Finally, literature shows Kaizen must be fully collaborative, represented and sponsored throughout the supply chain from management to the average line worker in order to be successful. With 50% of respondents answering no, this principle is the least represented within VMUK. Participant D furthers this stating that “*Kaizen includes some areas and levels but not all, for every 5 you include, you basically exclude another 100*”. Participant K, I, and F similarly conclude that Kaizen processes seem to pick out those in the middle, but not those at the bottom. This links with the bell curve of knowledge identified in section 3.1. It is important to note that without full collaboration of the workforce, VMUK cannot achieve the most efficient levels of Kaizen.

3.3. Implementation of Kaizen

Table 3.5 shows the responses of participants when asked about the implementation of Kaizen activities at VMUK.

When asked whether Kaizen was implemented at VMUK, 100% participants responded yes. However, these answers were often not fully positive prompting responses such as “In parts” or “in certain areas more than others”. Furthering this, when the participants were asked whether they had personally been involved in Kaizen, only 58% responded yes. This supports the earlier finding that VMUK’s workforce believe Kaizen may not be fully collaborative across all levels of the business. This goes against the findings of literature for successful Kaizen implementation.

Motivation for taking part in Kaizen activities seems to be based around worker involvement and job rotation, Participant J best sums this up stating Kaizen gives the “*Opportunity to make a change that might not have happened otherwise*”. It is clear there is very little financial incentive in current Kaizen activities, linking processes to the traditional Japanese standard, found by (Davis, 2011), which focuses on the morale-boosting benefits of positive employee participation. The importance of cultural translation is discussed by Aoki (2008) as a key requirement for success and has been achieved well here. Given a list of Kaizen activities,

Table 3.5 the responses of participants when asked about the implementation of Kaizen activities at VMUK.

Participant	Is Kaizen used at Nissan?	Which Processes are used at Nissan?	Have you been part of them personally?	Are these effective?	What makes you want to take part?
A	"Yeah, In certain areas more than others"	PDCA, Suggestion boxes, CFT's, SOP, 5S	"Yes, I've taken part in most of these activities"	"Working in a group is often more effective than solo ideas"	"Involvement and motivation. There's certainly not any financial reward"
B	"Yeah, I think so"	QCC, SOP, 5S	"Not really, everybody has to follow SOP and 5S though"	"I'm not sure"	"Make improvements to the way we work"
C	"Yes, it's definitely talked about anyway"	Suggestion boxes, QCCs, SOP, 5S	"No"	"I guess so, things are always changing about, not always for the better though"	"Money"
D	"Yes, but more in the manufacturing areas"	PDCA, QCCs, SOP, 5S	"A little"	"Not sure, not really in my area"	"If given time to do it away from usual role, acknowledgement too"
E	"Of course, It's implemented throughout the business"	PDCA, Suggestion boxes, QCCs, SOP, 5S	"Yes, in all processes"	"Yes, almost all the changes made in the company comes from Kaizen activities"	"A chance to change the company for the better"
F	"Yes, plus there's a specialist team whose role it is to make continuous improvements in processes"	PDCA, Suggestion boxes, SOP, 5S	"Yeah from time to time"	"Can be, but relies on budgeting whether changes can actually be made a lot of the time"	"Improving the workplace, it's often the little changes that make a big difference"
G	"Yeah, there's a team especially for it"	PDCA, SOP, 5S	"briefly"	"Yeah id say so, keeps us on track"	"Improving the processes helps us to be much more efficient"
H	"Yeah definitely"	PDCA, QCC, SOP, 5S	"I've done admin work, prepared figures and presentations"	"I'd imagine so"	"Something different to do"
I	"Yes, in parts"	PDCA, CFT, SOP, 5S	"Yeah I've taken part quite a few times"	"Can be, but often comes down to money, also the changes tend to take a while"	"Job rotation, wouldn't like to be put in charge though"
J	"Yes, there's a team we deal with who are designed to find improvements"	SOP, 5S	"No, not directly"	"I guess so, we're constantly making changes to processes"	"Opportunity to make a change that might not have happened otherwise"
K	"Yes, well at least they say so"	Online suggestions, SOP, 5S	"Not particularly"	"Not sure, things often take a while to put in place and when they do they're not always helpful"	"I'm busy enough with my own role, only financial incentives would interest me"
L	"Absolutely, its engrained in the culture of the company from top to bottom"	PDCA, Suggestion boxes, QCC, 5S, SOP	"Yes of course, everyone does"	"yes, some changes have more resistance than others but in the end there's always improvement to be made"	"Ability to make a difference, not only in your own working but on the company itself"

Participants were asked to identify which Kaizen activities they had witnessed being used within VMUK. Firstly, it can be identified that 100% of participants have witnessed the use of Standard operating procedures and 5S, as well as 83% witnessing the use of PDCA's. These activities allow a baseline of standardisation to allow change to be made. Of the 12 interviewed, only 1 participant identified the use of VSM within VMUK, being Participant L, the member of the Kaizen team. This suggests it is used within that area but not across the whole company.

When asked about Teians, participants often did not recognise the term, but when explained 50% responded this or a similar suggestion box style approach was in place. Participants agreed the Teian sheet layout discussed by (Schuring & Luijten, 2001) was not used, but agreed with the motivational aspects identified by Ma (2013). Similarly, many participants didn't recognise the use of the term QCC within VMUK, but 66% responded that group-based Kaizen activities were in place, fulfilling similar functions as identified by literature, but referred to as Cross-Functional Team Meetings or CFTs.

When asked which processes were most effective in implementing Kaizen the majority concluded that the use of PDCA's and group-based meetings made the best improvements. A number of participants agreed that 5S and SOPs supported Kaizen in terms of standardisation, but participants were often frustrated in how it limited their ability to work as they would like. When asked about suggestion boxes and Teians, participants often felt like their ideas weren't been taken seriously, with little feedback given, or changes made as a result. Management support and the selection of ideas is frequently identified in literature as a key requirement for Kaizen by authors including Ma (2013) and Aoki (2008).

3.4. Advantages of Kaizen

Table 3.6 shows the perceived advantages of Kaizen implementation within the VMUK supply workforce. Of the advantages identified individually by the participants the most frequent answer is the improvement of efficiency and productivity, being referred to as the first point by almost all the participants. Another major theme is the use of the knowledge and experience of the entire workforce, rather than just the top level of management, this point is specifically mentioned by those at the lower end of the hierarchy. Other advantages identified include gaining competitive advantage and improving quality. Interestingly only three of the participants identify the advantage of waste reduction, a key benefit identified in literature (Womack, Jones and Roos, 1990).

Noticing participants were struggling to name more than two or three advantages, they were shown advantages identified in previous literature, and asked whether they agreed or disagreed, this resulted in some interesting findings. Firstly, 25% disagreed with Kaizen reducing cost, Participant K explains this saying “*that by the time the change is thought of, discussed, planned, tested, and implemented, you’ve often spent more than what you would have saved in the first place*”. This could be true if VMUK are not flexible enough to change and do not have the processes and budget set up specifically for continuous improvement. Another 25% disagree with Kaizen improving morale and worker involvement again citing a lack of collaboration throughout all levels of the workforce as discussed earlier.

In terms of major disagreements, 50% of participants say that Kaizen changes are never low risk, and that despite often being incremental, there is always risk involved. This is true in a workplace where any minor change could cause an expensive production-line stoppage. Furthering this, 58% disagree that Kaizen is immediate, stating that changes often take time to implement due to planning, testing, and approvals, processes undertaken to reduce and mediate risk. As a result, it could be questioned whether Kaizen is suitable for a high-risk workplace such as VMUK. If a necessary change cannot be made for the fear of incurring larger mistakes, advantages identified in literature such as the removal of waste and increased productivity are thoroughly limited. This suggests that Kaizen is better implemented in environments of low risk.

3.5. Requirements

Table 3.7 shows the perceived requirements for successful Kaizen. The workforce agrees with previous literature on a number of key requirements including training and knowledge, management support, and idea selection. Efficient translation and adjustment from the Japanese style is not included in any of the responses. This is likely due to many of the participants not knowing the differences between traditional and commonly western Kaizen implementation, witnessing Kaizen first in VMUK. In addition, the participants do not identify the requirement of sustainability within their answers. It is therefore suggested that there is a lack of education of the key requirements underpinning Kaizen.

However, the participants do identify more practical requirements not commonly discussed within previous literature. Time away from their existing role seems to be a major requirement for most staff, with many concerned that they do not have enough time in their own schedule for Kaizen. Setting up a team for Kaizen will be helpful but without full collaboration of the workforce a fully efficient culture cannot be built (as mentioned in Magnier-Watanabe, 2011).

Identified as the most important requirement by participant I, financial availability needs to be present for the conducting of Kaizen activities and implementation of improvements. This is a feature that according to participants A, H, I, K, and L is not frequently available at VMUK. Participant K suggests that this should be set aside from departments' standard budgets and be used solely to conduct Kaizen activities. This therefore reduces pressure to utilise the money elsewhere. This furthers the literature found within the review and adds more practical, real-life applications to the theory.

3.6. Perceived effectiveness of Kaizen

Overall, the perceived effectiveness of Kaizen amongst VMUK workers is fairly mixed, but with some major recurring themes. When asked whether Kaizen is effective 100% of the sample answered yes. Many participants stated previously identified advantages and were positive about Kaizen in concept (see Table 3.8).

Table 3.8. Perceived Effectiveness of Kaizen

Question	Yes	No	Unsure / Mixed
Is Kaizen effective?	100%	-	-
Is Kaizen used effectively at VMUK?	33%	25%	42%

However, when asked their opinion on Kaizen at VMUK a variety of answers were given. Firstly, 33% of the sample responded that VMUK use Kaizen effectively. Participant J identifies that processes are constantly changing in their area of working and Participant A highlights the effectiveness arising from group-based activities. Participant L concludes VMUK's long history of using Kaizen, and its strong company performance is evidence enough of its efficiency.

Disagreeing with this, 25% of the sample outright stated that Kaizen was not being used effectively at VMUK, citing failures in key principles and requirements identified in literature. However, gaining the largest percentage, 42% of respondents gave mixed responses perceiving that Kaizen was only sometimes effective, or effective in certain areas but not others. This mixed response shows that they are positives to be found within their Kaizen, however in the eyes of the employees, there are a number of improvements to be made.

Trends in perceived effectiveness align well with earlier identified trends in understanding. It can be seen that respondents that perceived Kaizen to be effective were

often in management positions, and or, had been with the company for 5-10 years. At the opposite end of the scale, respondents with less knowledge of Kaizen, and in lower levels, or more practical roles, had a much more negative perception of Kaizen. Therefore, it can be concluded that the greater the understanding of Kaizen the better the perceived effectiveness of Kaizen.

Workers perception of issues in the implementation of Kaizen, can be evidenced throughout the findings, however, can be narrowed down to three major factors:

Timing – Respondents frequently answered that Kaizen was not used in a continuous format, instead Kaizen activities were put in place when management decided changes needed to be made, often based off poor results in key performance indicators. When potential improvements, were identified the changes often take a long time to implement due to managerial planning and approval to avoid risk.

Budget – Many participants perceive a lack of financial availability for Kaizen to be a major factor in its ineffective implementation. Participant K states that money for change just often isn't available within their strict budgets.

Collaboration – As a key point throughout the findings, many participants conclude that Kaizen implementation at VMUK is not fully collaborative and does not work to use the entire knowledge and experience of the workforce. The implementation of Kaizen activities and changes are not reflected equally throughout areas of working and many members of staff feel left out from the process. Failing a key principle of Kaizen identified in literature suggests it is very unlikely to be successful.

In order to improve implementation at VMUK the participants were asked what they would do to make Kaizen better. The most common answer to this, was greater knowledge and training. Many felt like the concept of Kaizen is not explained well enough and suggested further teaching in induction and training sessions. In addition, improving the general awareness and involvement in Kaizen was suggested.

Finally, a number of participants suggested that further time and money should be spent on Kaizen. Participant L identifies that to be more successful the company need to input more manpower, more budget, and more freedom to make changes. He states that only then can VMUK truly achieve the principles set out in previous literature for effective Kaizen.

PART 4

4. Conclusion

This section will revisit the six initial aims and objectives, that were stated at the beginning of the study, in order to deliver a relevant conclusion to the study. It will also look at the limitations that had to be addressed during the research and provide suggestions for future research.

4.1. Objectives

Analyse the understanding of Kaizen amongst VMUK supply chain workers

The primary research shows that the understanding of the concept of Kaizen amongst workers is relatively poor. A quarter of the sample couldn't give a definition of Kaizen and participant C explains it as “*one of those things you hear about, but don't really need to know*”. However, it should be considered that once explained or put into context there was a consistent realisation and level of understanding amongst the sample. This proves Imai's (1986) theory that Kaizen is often engrained into culture without the workers even knowing. Many did understand the concept of Kaizen but all too often defined it simply as continuous improvement, another term which in itself needs further definition to fully explain. This suggests a lack of depth in knowledge and education of Kaizen throughout the workforce.

Almost all participants did not know of Kaizen's origins in the Toyota Production System as identified in the literature review, and a focus was often placed on a western management style strategy approach as found by Choi and Liker (2007).

The research identified key trends in understanding, primarily a bell curve effect in understanding vs the length of experience, with those in the 5-10-year range much more experienced and knowledgeable than others.

Analyse how VMUK workers perceive Kaizen to align with key principles set out in literature

Firstly, participants all agreed that VMUK's Kaizen was process orientated. This is highlighted by Berger (1997) and Martichenko (2004) as a key aspect to ensure change is based on high quality processes and a zero-defect mentality. Similarly, 90% of the study agreed that changes made based off Kaizen were incremental in format and based off a level of standardisation, supporting the findings of Bessant and Caffyn (1997).

However, the study shows that the participants do not perceive VMUK to be fulfilling all of these principles efficiently. 40% of the sample do not believe VMUK's Kaizen to be

continuous. Participants feel Kaizen is implemented on occasion, when management deem changes need to be made. This goes against the principle set out by Imai (1986) and discussed by Agmon (2016), to ensure Kaizen is implemented in a continuous and long-term manner. Additionally, 50% of the sample identified that Kaizen was not collaborative across the whole company. Participants K, I, and F conclude that Kaizen processes seem to pick out those in the middle, but not those at the bottom. This links with the bell curve of knowledge identified in section 3.1. This principle is highlighted as being vitally important for success by Imai (1986) and Brunet and New (2013).

Analyse the implementation of Kaizen activities at VMUK

From the primary research, 100% of the sample agree that Kaizen is implemented in VMUK, however only 58% think they have personally taken part in a Kaizen activity. This supports the earlier finding that VMUK's workforce believe Kaizen may not be fully collaborative across all levels of the business. Motivation for Kaizen is based upon job rotation and worker involvement and has very little financial incentive, linking it to the traditional Japanese methods identified by Davis (2011). The use of support activities found in literature including PDCA's, 5S, and SOP are well represented by the research, however Teians and QCCs are often unheard of in that specific terminology. When simplified, participants agree that they can be found within VMUK, but this conclusion is not unanimous across all levels. Participants agree that these activities do provide benefit, but complaints can be found regarding limiting their workflow and productivity.

Identify the perceived benefits of Kaizen

From the research, the benefit identified most frequently is the improvement of efficiency and productivity. Many discuss the importance of including the experience and knowledge from the entire workforce, a benefit which is highlighted often by those lower in the hierarchy. Interestingly only three of the participants identify the advantage of waste reduction, a key benefit identified in literature (Womack, Jones and Roos, 1990). When shown the benefits listed in previous literature a number of justified disagreements were made for its application in VMUK including reducing cost, improving worker morale, low risk, and immediacy. These factors are all considered when evaluating the effectiveness of Kaizen implementation.

Identify the perceived company requirements of Kaizen

From the research, the workforce agrees with previous literature on a number of key requirements including training and knowledge, management support, and idea selection.

Efficient adjustment and translation from the Japanese style is not included in any responses likely due to a lack of depth in training and education on the matter. Participants do identify further, more practical, requirements not frequently identified in literature such as time away from their current role and financial availability. This furthers the literature found within the review and adds more practical, real-life applications to the theory.

Evaluate VMUK workers perceived effectiveness of Kaizen implementation and their suggestions for improvement

The final goal of the study was to assess worker perception on the effectiveness of Kaizen. The study finds that 100% of participants find Kaizen to be effective in concept, but only 33% believe it to be implemented efficiently at VMUK. Making up the largest percentage 42% gave mixed responses, perceiving that Kaizen was only sometimes effective, or effective in certain areas but not others. This shows an issue in the lack of continuity and companywide collaboration that is evidenced throughout the findings. Trends on perceived effectiveness align well with earlier identified trends in understanding especially with the bell curve of understanding found in section 3.1. Therefore, it can be concluded from this study that the greater the understanding of Kaizen the better the perceived effectiveness of Kaizen.

When discussing the issues of Kaizen implementation, the sample discuss three main factors – Timing, in terms of continuity and immediacy, budget, and collaboration. These issues link with the findings of the literature review for successful Kaizen and highlight areas for improvement for VMUK. When asked how the participants would go about improving it themselves the main responses included further education and training, increased budgets and freedom to change.

4.2. Summary

In summary, we believe that the research goals set out at the beginning of the study have been met, providing an in-depth analysis of the understanding and perceptions of Kaizen from the perspective of a VMUK supply chain worker.

Based on the findings of this study, there is concern regarding the effectiveness and suitability of Kaizen for VMUK. Based on the perception of the workers, there is a clear lack of education and training, resources, buy-in, and culture needed to fulfil its requirements. The nature of the company causes issues in suitability due to its sheer scale and high level of risk in production. In our opinion, in order to gain full competitive advantage VMUK need to have a major re-assessment and re-engineering of their Kaizen processes, resolving the

issues found in this study, starting first with the true meaning of Kaizen and the inclusion of the average worker. In more Macro Level, as Lemma (2018) mentioned that Kaizen focuses on one key aspect of economic transformation: improving firm-level productivity. What it does not do, which could be improved in the future, is look at the effects on individual workers within Kaizen-implementing firms, i.e. how it affects turnover rates, trained labour productivity, etc.

4.3. Limitations of Study

Although we find the results of this study to be accurate and representative of VMUK's supply chain department, being based on one department alone may not reflect the full extent of the company. Furthering this, being based solely on VMUK may not reflect the entire automobile industry. Using a larger and wider sample, although more time consuming, would provide a greater representation of the subject, and potentially allow for greater findings.

Another limitation of this study would be a lack of comparative practical data to compare perceptions against. Although comparing against a review of literature did result in interesting findings, a comparison against productivity figures surrounding Kaizen activities would provide an interesting topic of discussion.

Finally, this research acts as a wide overview of Kaizen in VMUK, each point discussed could be analysed further in independent studies to create a more detailed discussion.

4.4. Suggestions for Future Research

- For future studies, it can be suggested that research of Kaizen perceptions within a wider sample of VMUK or the vehicle manufacturing industry as a whole
 - A comparison of perceptions of Kaizen effectiveness against company data
 - An in-depth study of VMUK's use of 5S and SOPs to support Kaizen
 - A study into whether Kaizen is suitable for high risk production environments

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