



A Systematic Review of Kaizen Approach in Industries

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Today industries are currently entering the best possibility to action on rapidly changing customer needs, desires and experiences. In the environment of industries, as well as cultural competitiveness and improving market share in the global narrowing market saturation is a big concern, the concept of continuous improvement of manufacturing processes strive to the best experiences to customers has become necessary. Market competition and continuously increasing levels of service and needs for customer satisfaction have proven to be the ultimate driver of an organization's key performance continuous improvement. Adaptable Kaizen refers to sustainable continuous improvement in performance delivery, cost, and quality to a satisfied customer. This paper contribution to define research variable domination in various tools used in Kaizen concept and research variable of Kaizen dominated by VSM and Continuous Improvement with the same percentage number 21%, then Lean 18%, TPM 10%, 5S 8%, PDCA 4%, in this calculation one research paper can use more than one tools of Kaizen.

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1. INTRODUCTION

If done properly, Kaizen humanizes the work environment by teaching workers to identify and remove waste in production processes and planning. While Kaizen typically yields modest gains, a continuous improvement mindset yields big gains in total productivity (Matusova, 2016). A value stream map may be used now using lean techniques like Kaizen, Go-see, and 5S may improve material and information flow across the manufacturing system, reducing total value-added time. Making more goods everyday and meeting

consumer demand sufficiently (Chowdhury, Shahriar, Hossen, & Mahmud, 2016). The top ranked improvement technique is Kaizen, followed by Kaikaku and Kaizen Blitz (Ma, Lin, & Lau, 2017). For each issue (potential waste), one Kaizen event was suggested. Less inventory, less process time, less non-additional-value time, and better performance also for quality of result were noted following Lean Kaizen adoption (Kumar, Dhingra, & Singh, 2018). The technique of process improvement via Kaizen events allows quick action on key value chain activities with

minimal runtime and cheap cost, allowing the establishment of an organizational culture that prioritizes and facilitates work will aid in the consolidation of continuous improvement processes (Campos, Cotrim, Galdamez, & Leal, 2016). An institutional mentoring (twinning) strategy also demonstrates the possibility for expand future partnerships with accredited also non-accredited companies, and it may be utilized to expedite the adoption of a strong quality management system (QMS) and continuous improvement initiatives (Gumba et al., 2019).

2. LITERATURE REVIEW

Successful benchmarking is associated with successful Kaizen, and people attitude and formalization are associated with success in centralization and integration, as well as success in benchmarking, among other things. Successful benchmarking can be achieved by a company through the implementation of successful kaizen, people mentality, formalization, centralization, and integration processes (Goni, Tharia, & Suryo, 2018). Also improved customer-supplier relationships, greater process improvement and management are intangible TQM-TPM performance metrics. Enhanced communication, improved tool management, visible material inventory, pride in showing off the plant to visitors, clean and green plant (Singh & Ahuja, 2015). After successfully implementing 5S approach at the factory, it led to considerable improvement in the working environment of manufacturing organization. The 5S approach has been used for about a year and has greatly improved the industry's quantitative and qualitative advantages (Randhawa & Ahuja, 2018).

Increased market competition fosters continuous system and process improvement. The goal is to decrease manufacturing costs and waste to the bare minimum, increasing product competitiveness. Action research was used to examine the entire manufacturing process from receiving components to the end of the assembly line, emphasizing the analysis time of shipping and handling (Xavier & Gonzalez, 2016). The Lean concept has management and societal implications: project team selection switched from "availability status" to competence-based selection. A new bidding

method was also set up to optimize this phase's productivity. Few studies address contractor bidding and improvement using lean thinking. It is mostly owing to the actors' engagement in the building process. However, the popularity of this style of procurement in France should be seen as a chance to improve efficiency for all parties. Setting up Lean frameworks for contractor bids should be prioritized. Finally, the bidding and construction phases should be linked to detect waste incidence (Dakhli, Lafhaj, & Bernard, 2017).

The suggested strategy works by identifying non-value-added manufacturing expenses early in the design process, setting realistic cost reduction objectives, and establishing and methodically developing improvement initiatives with all stakeholders (Posteucă & Zapciu, 2015). To overcome engine damage, use the PDCA cycle to the procedures DELTA carefully done. From the assessment outcomes of observable success and beneficial effect (Ihsan, Hasanah, & Purba, 2019). Studies have revealed that kaizen is not just used in manufacturing but also in service industries. Few studies have addressed the use of several lean technologies to improve kaizen outcomes. This research adds to the lean literature by demonstrating that lean technologies may be utilized in circumstances comparable to the printing industry (Chan & Tay, 2018). The research examines the role of CI strategy implementation in improving manufacturing performance via quality initiatives, a value stream analysis may be used to improve customer satisfaction by reducing small stoppages and redesigning processes (Sraun & Singh, 2017).

3. RESEARCH METHOD

Some individuals may be acquainted with the term "Kaizen," which means "continuous improvement" (read: kai-zinc). Change is represented by the letter Kai, whereas better is represented by the Japanese word Zen. In addition to being a basic improvement effort, Kaizen is a continual improvement attempt to be better than the current circumstances. Some have coined the phrase Kaizen Teian, which translates as follows: "Kaizen" refers to "continuous improvement," and "teian" refers to "system." Kaizen Teian is a complete idea of

an enterprise system that is used in order to create better circumstances than they are now experiencing, thus infusing fresh life into every business or organization that implements it (Ihsan et al., 2019).

Since TQM is the foundation of TPM, TQM encourages its use. It is essential to focus on their fundamental principles to distinguish TQM from TPM since they are comprehensive improvement programs. Fundamental practices of TQM and TPM are first understood (TQM- or TPM-specific techniques). As well as HR-related procedures that are similar to TQM and TPM. To reduce costs while improving quality are the primary goals of TQM and TPM. Goals of TPM are to increase machine efficiency and create a maintenance system to meet the primary goals of TQM (Singh & Ahuja, 2015). From figure 1 it is important to remember that, while these processes are given in a sequential sequence, the review process from 92 papers, and that many actions can be launched during the review process and subsequently improved throughout successive phases of the process to get 50 selective papers, this process continued with overall depth review of Kaizen variable research attributes and summarized in to five domains which is Kaizen in practical, Kaizen as a plan, Kaizen as a tools, Kaizen model, and Kaizen solution, Prior works that have been vital or crucial to a given subject are the focus of this section. Examples include empirical research or conceptual articles that sparked a path of study, altered the way issues or questions were framed, presented new techniques or ideas, or sparked significant discussion.

For the previous five years, every journal-collected literature review was searched using the phrases Kaizen and PDCA as search criteria in a variety of various industries, and the findings were then examined and summarized. This was made possible via the usage of databases such as Proquest, Emerald, and Science Direct, among other sources. It was revealed that the phrase "Kaizen" appears practically everywhere in literature, which was surprising to me.

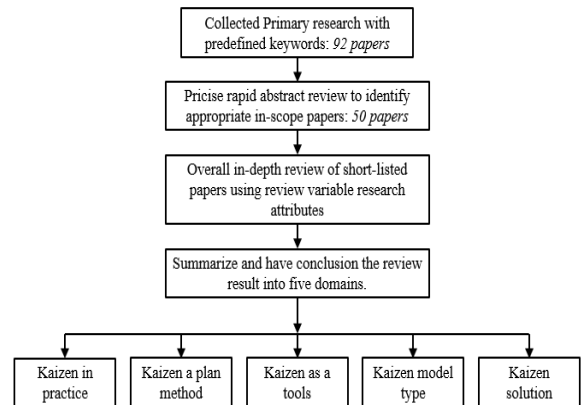


Fig 1. Study framework.

4. RESULT AND DISCUSSION

All journal-collected literature review was searched using the terms Kaizen and PDCA as search terms in many different sectors during the last five years, and the results were analyzed. This was accomplished via the use of databases such as Proquest, Emerald, and Science Direct. It was discovered that the term "Kaizen" occurs nearly everywhere in literature.

A special emphasis is placed on the Kaizen for improvement team, which also includes quality circles and the solving of everyday issues. Continuous improvement is a fundamental technique that was developed in the early days of the industrial revolution in addition to being widely utilized for the industrial sector. Specifically, the purposes of this research is to discover the concept of Kaizen, as well as the success factor that has a direct result on the output and productivity of the sector in question. The technique used is a study of a magazine that advocates the implementation of Kaizen in every continuous improvement process, as well as the outcomes achieved after implementing the method in question.

As can be seen in Table 1, all of the papers selected indicated that Kaizen steps relevant in industry to improve productivity and achieve the company's goals resulted in good output and adaptation to each step of the organization's maturity stages, as evidenced by the good output and adaptation to each step of the organization's maturity stages.

Table 1. Existing literature review of Kaizen.

Paper Identity	Research Object	Result
(Randhawa & Ahuja, 2017a)	For the targeted sustainable performance of companies, the outcome of this study paper provides the look of 5S tool application and emphasizes the accomplishments.	5S adoption yields amazing benefits for companies. This method's simplicity and recognition make it readily adaptable to any business. Thus, 5S is a universal instrument that offers enormous advantages with no drawbacks.
(Prawira, Rahayu, Hamsal, & Purba, 2018)	How 5S Improves Heavy Equipment Productivity in Mining	5S saves 400m ² of space in the plant department, reduces manpower and material transportation.
(Jasti, Kota, & Sangwan, 2020)	In the auto-ancillary sector, VSM improves efficiency and quality.	Total process time for line 1008.0 min to 600 min, result time for line 12.0 min to 11.0 min, line proportion increase 15 percent to 25 percent.
(Goni et al., 2018)	Indonesian firms and services. It looks at how Kaizen, people attitude, and organizational factors affect benchmarking success.	Correlation with Kaizen performance at the 0.05 significant level. Success in Kaizen improves the organization's capacity to benchmark.
(Singh & Ahuja, 2015)	A synergetic approach to TQM and TPM deployment was investigated.	Overall Plant Effectiveness (OPE) increased from 50.1 percent in FY01 to 86.4 percent in FY06.
(Xavier & Gonzalez, 2016)	Examine the overall outcomes of adopting Kaizen in a Brazilian construction equipment manufacturer.	Encouraging 30% more efficient shipment and handling
(Randhawa & Ahuja, 2018)	An Indian automobile components industry's quantitative and qualitative advantages are evaluated in a research study.	Significant reduction in monthly machine breakdown hours from 800 to 95.
(Dakhli et al., 2017)	Lessons learned from a French contractor using lean in the building bidding phase.	Solicitations for public equipment, rehabilitation, and private real estate development were all lowered by 1.5% before the technical assessment.
(Posteucă & Zapciu, 2015)	To determine the proportion of future production costs, the manufacturing cost policy is deployed for new goods.	Waste of waste result 6 changeover occurrences each month 0,0460 pcs scrap multiplied by 0,355 € per product result 0,0163 € per one month
(Elsheikh, Emam, & AlShareef, 2017)	A balanced framework of current practice and corresponding documentation is shown in this study report.	The average time per prescription was reduced by 16.7% in inpatient pharmacy and by 20.0 % in emergency department pharmacy.
(Chan & Tay, 2018)	Using planned kaizen activities to increase efficiency in the printing sector.	Using a combination of lean tools improved assembly productivity by 10-30%.

(Sánchez-Ruiz, Blanco, & Gómez-López, 2019)	To discover and better understand the elements that allow executing a continuous improvement	Find 29 enablers. A team of specialists chose 11 enablers to offer a new conceptual framework.
(Sraun & Singh, 2017)	Developing and implementing continuous improvement methods in Northern Indian SMEs.	TQM and quality had the greatest positive correlation ($r / 0.2, 161$).
(Gunduz & Naser, 2017)	Subsurface Pipeline Construction Projects: VSM as a sustainable tool for construction.	To enhance cycle time, the overall VAT was lowered by 43.3 percent, while the NVAT was decreased by 27.8 percent.
(Zarbo, Varney, Copeland, D'Angelo, & Sharma, 2015)	A graphic daily management board consisting of quality, time, inventory, productivity and safety metrics as a baseline and idea (QTIPS).	8 lab sections at Henry Ford Hospital used 64 daily measurements throughout a year (June 2013– July 2014), improved 42 processes.
(Thomas, 2018)	Using an integrated system of methods to achieve operational best performance.	Create an optimal state value stream map to monitor time efficiency, process effectiveness, HR and customer relations KPIs.
(Jayakrishna, Srikrishna, Senthilkumar, Vinoth Louie, & Kamalakannan, 2017)	Stakeholders may use the approach to connect organizational practices with waste reduction goals.	The present state mapping detected 9.21Kg of material waste, which includes packing materials and liquid waste.
(Vinodh, Selvaraj, Chintha, & Vimal, 2015)	Value Stream Mapping (VSM) for Lean Manufacturing in India	A 10% increase in overall equipment effectiveness from current level of 56% to 66%.
(Wickramasinghe & Wickramasinghe, 2016)	To provide empirical data on the impact of CI on factory floor workers.	The interaction impact on work performance is 95% significant.
(Saravanan, Nallusamy, & George, 2018)	Diverse Lean tools to get significant Efficiency in a Medium-Sized Gearbox Manufacturing Company.	A 24 percent reduction in processing time and a 7 piece improvement in total output.
(Randhawa & Ahuja, 2017b)	Result evaluation and 5S tool use.	Problems like breakdowns, delays, decreasing profitability, disillusioned workers, and unhappy customers are eliminated.
(Al-Aomar & Hussain, 2019)	Finding, categorizing, and ranking lean tools.	In the inventory criteria, hotels prioritized forecasting (56%) and inventory cost (37%).
(Ihsan et al., 2019)	A PDCA and Kaizen study of Fanuc CNC machine damage	Once the root cause is identified, the PDCA cycle may be used to solve the problem.
(Crema, Verbano, & Chiozza, 2015)	examine the main elements of effective implementation in Italian hospitals.	The findings indicate that HLM may help CRM overcome local optimizations and adopt a systemic approach to healthcare.

(Naidoo & Mahomed, 2016)	Lean tool effect on patient cycle and waiting times.	Cycle durations were reduced by 27%, waiting times were reduced from 80.95 to 74.43 minutes, and average efficiency improved from 16.35 to 20.13 percent.
(Gumba et al., 2019)	As a consequence of GCLP deployment at the Kenya Medical Research Institute-Center	Performance increased from 10.7% at baseline to 76.37% at departure.
(Musa, Kasim, Razali, Mahadzir, & Wan Saidin, 2015)	Autonomous maintenance in the crankcase line improves OEE.	Autonomous maintenance in the crankcase line improves OEE.
(Campos et al., 2016)	Metalmechanical Industry Case Study - Introduction to Lean Manufacturing Philosophy	Eliminating the requirement for an operator for component cleaning reduces manufacturing lead time (99%) and costs (5%).
(Dadashnejad & Valmohammadi, 2018)	Using VSM to decrease operational losses in a single manufacturing firm	VSM impacts six operational losses, including substantial decreased speed, after work scrap and rework, and starting losses.
(Kim, 2015)	Learn from Toyota for uses LM and the TPS for its suppliers.	There were 54 concrete and intangible improvements made.
(Rodrigues, de Sá, Ferreira, Silva, & Santos, 2019)	Results of implementation restricted to a metalworking SME in Portugal.	Reduction in faulty product expenses per hour by 27.9% and an increase in machine occupancy rate of 8.5 percent
(Shah & Naghi Ganji, 2017)	Improved performance via lean manufacturing and supply chain innovation.	The lack of commitment from upper management was highlighted as one of the main difficulties faced by the baked goods business while implementing lean methods.
(de Almeida, Galina, Grande, & Brum, 2017)	Planning and implementing lean office at a Brazilian regulatory body.	1,000-1,220 work processes mapped, 5,000 levels, 800 competences, and 80 business flows.
(Kumar et al., 2018)	propose a value stream mapping approach to implementing Lean-Kaizen (VSM).	The value-addition-time a total C/T was decreased by 75.0 percent (from 345.0 s to 102.0 second).
(Suhardi, Anisa, & Laksono, 2019)	Minimize waste in the Indonesian furniture sector utilizing lean manufacturing and ECRS.	Lead time reduced by 4.79 percent, allowing the operator to manage their workload.
(Ma et al., 2017)	Prioritizing the enablers for Kaizen in China.	Incentives, job training, and shop floor management and get the greatest scores.
(Satolo, Leite, Calado, Goes, & Salgado, 2018)	Using the idea of grey systems, the lean production system results show how they assist companies attain WCM.	Among the instruments assessed based on the WCM pillars, the VSM with the highest index 0.6816.

(Chowdhury et al., 2016)	Distinguish between value add and non-value add stages in the supply and manufacturing flows.	Kaizen is a modest and constant improvement technique. Lengthens lead times and improves capacity by 8.8%. In the present scenario, a value stream map is viable.
(Tan, Otto, & Wood, 2017)	Analysis of early vs late design choices in systems development management.	After implementation, approximately 50% of idea phase choices were revised.
(Dave & Sohani, 2015)	Resolve the problem of the hobbing machine's unexpected disappearance.	Electronic failures reduce breakdown frequency from 5 to 2.
(Nguyen, 2019)	SME Performance and Kaizen in Vietnam.	The positive impact of Kaizen process as well as the long-term performance of SMEs in Vietnam are discussed in this paper.
(Gonzalez Aleu & Van Aken, 2016)	Review and evaluate the available literature on key success criteria in order to provide recommendations.	A thorough list of 53 variables was culled from the many papers that were discovered.
(Omotayo, Boateng, Osobajo, Oke, & Obi, 2020)	The capacity maturity model, which was created to facilitate the implementation of continuous improvement.	It is estimated that it will take between six and seven and a half years to fully implement continuous improvement.
(Matusova, 2016)	The Application of Kaizen and Six Sigma to the positive impact of Logistics flows.	Our company's average annual output of 20,000 units on this family of products will save up to 66,000 Euros compared to the industry average.
(Agmoni, 2015)	Organization providing logistics services has used the Kaizen idea and techniques in order to achieve dramatic improvements in their performance.	Significant gains have occurred in both businesses, including 30 percent financial growth and an 81 percent increase in productivity.
(Bortolotti et al., 2018)	Problem-solving skills and attitudes toward kaizen efforts in the healthcare setting are determined by a variety of factors.	Significant relationships exist between IP and AO and the ability to cope with stress are 0.6330 and 0.4730, correspondingly, and statistically significant at the 0.0010 level.
(Awad & Shanshal, 2017)	Developing a new framework and methodology for the early design stage that takes use of the advantages of Kaizen events.	A 29 percent increase in oil consumption was observed while using the improved power cylinder at high-speed and heavy load.
(Zeferino, Sarantopoulos, Spagnol, Min, & Freitas, 2019)	In the disinfection center, this is the result of removing processes that do not add value to the client experience.	Implementing disinfection took 2h37 less time overall, and the financial resources needed were lowered by R\$ 809.08 a month, saving a total of 2h37 in time and money.
(Stelson, Hille, Eseonu, & Doolen, 2017)	Today results from a research on variables affecting hospital continuous improvement project performance.	The mean participant answers to attitude were 4.8, KSA ranging from 3.33 to 6, 4.89, area effect ranging from 3.71 to 6, and 4.7.
(Džubáková & Kopták, 2017)	A Case Study on Elementary Logistics Operations Processes.	The average time has been reduced from 2.85 minutes to 2.64 minutes.

Prominent research of the Kaizen concept will cerated a summary of the successful implementation of any process.

From figure 2 summarized in percentage we can see India 22% is the excessively country find in this literature review of Kaizen followed by Brazil 10%, Indonesia 8%, and UK 6%.

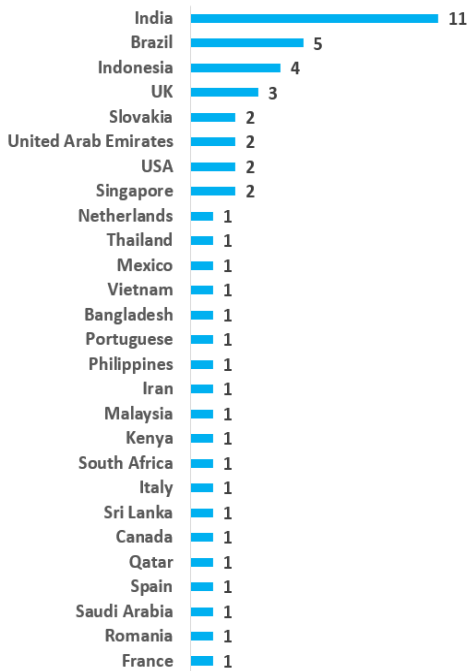


Fig 2. Country of Authors.

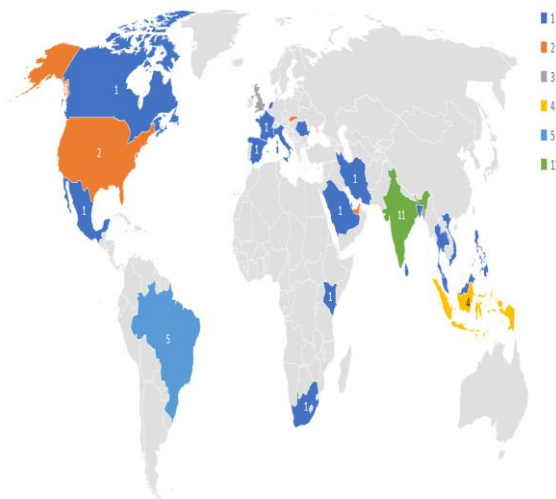


Fig 3. Country of Authors in maps.

Years of publications at figure 4 are selected by five years range and not longer than 2015, and

distribution of the year lead by the year 2017-27%, 2018-23%, 2019-18%, 2015-18%, 2016-14%.

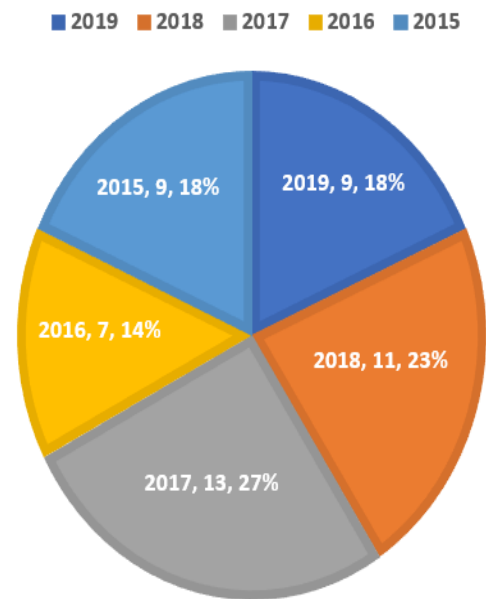


Fig 4. Years of publications.

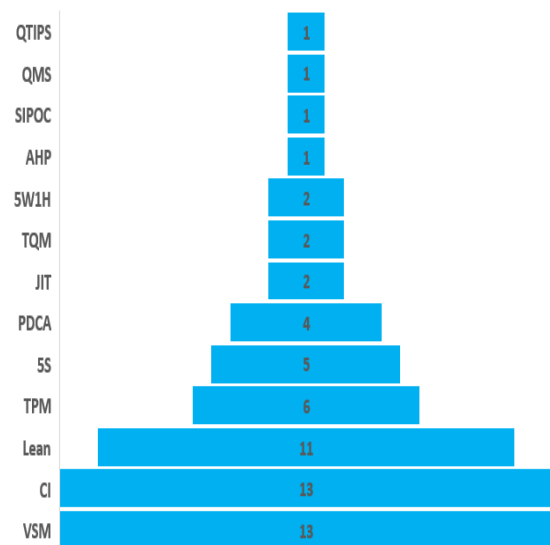


Fig 5. Research Variable.

From figure 5 concluded research variable of Kaizen dominated by VSM and Continuous Improvement that we can see at figure 5 with the same number 21%, then Lean 18%, TPM 10%, 5S 8%, PDCA 4%, in this calculation one research paper can use more than one tools of Kaizen.

Table 2. Novel Significant detail article for Kaizen Gaps.

Paper Identity	Detail article for Kaizen Gaps
(Randhawa & Ahuja, 2017a)	Organizations must devise a method for assessing the progress of 5S implementation across different teams, departments, businesses, etc., groupings in order to achieve long-term organizational sustainability and success.
(Prawira et al., 2018)	5S is the strategic foundation for management choices needed to create an integrated maintenance system.
(Jasti et al., 2020)	Long-term Lean manufacturing assistance is required. Get the findings may require additional time and money from the business.
(Goni et al., 2018)	The research concluded that senior leader commitment and team engagement are required to achieve effective Kaizen implementation in industrial firms.
(Randhawa & Ahuja, 2018)	A comparable research will be performed in the service sector as well.
(Dakhli et al., 2017)	The contractor procedures should be evaluated for waste, information loss, and rework.
(Elsheikh et al., 2017)	Insufficient measurement and statistical analysis precluded solid proof of progress. A paucity of prior studies has also been an issue. For example, the authors intend to assess flow time, customer and staff satisfaction, flow error rates, and so on.
(Chan & Tay, 2018)	These studies are being conducted to determine which sectors may benefit from using these technologies in kaizen applications, as well as how frontline employees can contribute to a continuous improvement culture.
(Sánchez-Ruiz et al., 2019)	Increasing the sample size will help our research. Similarly, because the questioned businesses are already committed to CI, it would be fascinating to include organizations who have not yet adopted CI or have failed.

5. CONCLUSION AND INDUSTRIAL IMPLICATIONS.

Industrial implication covered the ability of management to commit to Kaizen is essential for its effective implementation. There was a direct and beneficial influence on the professional development of human resources as well as their benefits and economic gains for the organization. As a result, it can be claimed that managers play an important role in the organization. During the planning stage of Kaizen, it is important to ensure that it is implemented effectively.

However, when businesses fail to adapt to or fight these changes, managers may place more emphasis on other parts of the business than the personnel. They may be concerned with the

company's profile, its management, its aims and objectives, as well as other internal and external aspects that might be considered to be important in determining the success or failure of a business venture. Because of this, factors relating to human resources may not be seen as equally important areas of concern, despite the fact that personnel are essential to the effective execution of continuous projects.

Kaizen always pushes any conditions to empower the worker's performance, ability to increase worker satisfaction, creates a sense of accomplishment at the end of the process, thereby creating a pride of result. And not only ensures that industrial phases become leaner and fitter, as well as eliminate waste where every value is added at any step of the process,

the fact that a gap exists in the chosen paper, as shown in Table 2, demonstrates that Kaizen should be implemented with care and should touch on the most important sectors as well as the targeted sectors. Kaizen by now is a continuously discussed to an adaptable today industrial environment, then applied manufacturing culture to success, in any variety of industries across the world. This research of literature discusses different articles that have been published and presents a review of the literature. Kaizen is the most applicable tool to help an organization such as industrial and others who have a phase of the process and always wants to improve their process continuously by applying Kaizen of integral tools form Kaizen.

In the future Kaizen is applicable as Organizations may use this tactical tool to assist them in their pursuit of continuous improvement. Kaizen is the elimination of waste and inefficiency, as well as the promotion of excellent housekeeping and the use of standard operating procedures. An Overview of the Situation Kaizen is a Japanese term that meaning "positive transformation" (kai) (zen). More specifically, quality, effort, desire to change, and communication are the main components of kaizen when examined in more depth. A second point to mention is that the Gemba home, which serves as the foundation for Kaizen, has five essential elements: great teamwork; employee discipline; significant increase morale; and quality circles. Recommendations for enhancements Kaizen, which is based on this basis, is concerned with the reduction of waste and inefficiency in an organization (Muda). The conclusion is designed to provide a response to the research questions or objectives. Following the conclusion of the report, it aids the readers in understanding why your study should be of interest to them in the future. Instead of just summarizing the primary themes addressed or re-stating your research challenge, it should be a synthesis of important aspects, including recommendations for additional areas of investigation if necessary.

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