

## **Systematic Literature review: Approach, Challenges and Further of Continuous Improvement in private sector**

Aini Indrijawati<sup>1</sup>, Mediaty<sup>2</sup>, Aswar Anas Assaggaf<sup>3</sup>, Hastuti<sup>4</sup>, Suryarahma Rosali<sup>5</sup>, Sriwahyuni<sup>6</sup>

[ainindri@fe.unhas.ac.id](mailto:ainindri@fe.unhas.ac.id), [mediaty@unhas.ac.id](mailto:mediaty@unhas.ac.id), [aswar.anas87@gmail.com](mailto:aswar.anas87@gmail.com),  
[uyharosali@gmail.com](mailto:uyharosali@gmail.com), [hastuty812@gmail.com](mailto:hastuty812@gmail.com), [sri.wahyuni.kudo@gmail.com](mailto:sri.wahyuni.kudo@gmail.com) <sup>1,2,3,4,5,6\*</sup>

Universitas Hasanuddin, Indonesia <sup>1,2,3,4,5,6\*</sup>

### **Abstract**

This research aims to analyse the approaches, challenges, and prospects of implementing Continuous Improvement (CI) in the private sector through the Systematic Literature Review (SLR) method. By collecting and evaluating 42 relevant articles, the study found that CI approaches involve methods such as Lean Manufacturing, Six Sigma, Total Quality Management (TQM), and Kaizen. The main challenges identified include resistance to change, limited resources, and lack of top management support. The future outlook for CI is expected to focus more on the integration of advanced technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), and environmental sustainability. The results of this study provide an in-depth understanding of CI implementation in improving the efficiency and competitiveness of companies in the private sector.

**Keywords:** Continuous Improvement, Lean Manufacturing, Six Sigma, Total Quality Management, Sistematis, *Implementation Challenges, Future Prospects.*

 This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).

### **Introduction**

Continuous improvement (CI) has become one of the most important management approaches in the private sector. Continuous improvement is a management approach that leads to the systematic improvement of processes within an organisation. In an increasingly competitive and dynamic business environment, companies are required to continuously improve the efficiency, quality, and innovation of their products and services. According to Imai (2012), CI aims to reduce waste, improve quality, and create more value for customers.

CI implementation focuses not only on improving internal processes, but also on developing an organisational culture that supports innovation and adaptation to market changes. CI emphasises not only major innovations but also consistent small improvements in various aspects of a company's operations. The concept of CI is widely known through the Kaizen philosophy, which emphasises small but significant incremental improvements (Imai, 2012). In this literature review, we will discuss the approaches, challenges, and directions of continuous improvement in the private sector based on recent studies.

The CI approach involves various methods and tools designed to improve organisational performance in a sustainable manner. According to Bessant and Caffyn (2017), CI focuses on improving performance by minimising variability and eliminating waste in business operations. The basic principles of CI include quality improvement, cost reduction, improved customer satisfaction, and increased productivity.

Lean Manufacturing is an approach that focuses on reducing waste and increasing efficiency in the production process. Liker (2004) explains that CI is the essence of Lean Manufacturing, a management approach that aims to create maximum value by minimising waste. In this context, waste can be time, material, or labour that does not add

value. An automotive company applying Lean principles can identify stages in the production process that are inefficient, such as the waiting time between the painting and assembly processes. By reducing this waiting time, the company can not only reduce production costs, but also improve the quality of the final product by reducing the possibility of damage during the process. Lean is not just about reducing costs, but also about creating value for customers (Womack & Jones, 1996).

Six Sigma is a method that helps organisations to reduce variability in processes and improve product quality (Harry & Schroeder, 2000). This method aims to improve the quality of products and services by identifying and eliminating defects in the process. Six Sigma uses a statistical approach to analyse data and make fact-based decisions. Pyzdek and Keller (2014) explain that Six Sigma is a data-driven approach to reducing variation in processes and improving product quality. This approach is often used in the private sector to achieve higher levels of efficiency. For example, an electronics company may use Six Sigma to analyse frequent product defects, such as damage to certain components. By collecting data and analysing defect patterns, the company can identify root causes and take appropriate corrective measures, thereby reducing defect rates significantly.

Total Quality Management (TQM) is a managerial approach that involves the entire organisation in quality improvement efforts. TQM includes employee training, development of a quality management system, and customer involvement in the improvement process. To illustrate, a food company can implement TQM by involving employees from all levels to provide input on the production process. By providing training on quality standards and involving customers in product testing, the company can ensure that the products produced meet customer expectations and adapt to the feedback received. According to Oakland (2014) TQM is a customer-focused management approach that involves all employees in an effort to improve quality.

Kaizen, which originated in Japan and means 'continuous improvement', involves all employees in the improvement process. Kaizen is a philosophy that emphasises the importance of continuous small improvements and involves every individual in the organisation (Imai, 1986). This approach promotes a culture where each individual feels responsible for improving their work processes. For example, a manufacturing company may hold regular brainstorming sessions where employees from different departments can propose ideas to improve efficiency. By rewarding employees who propose innovative ideas, the company can create an environment that supports continuous improvement.

While there are many benefits to be gained from CI implementation, there are a number of challenges that companies in the private sector often face. One of the biggest challenges in CI implementation is resistance to change. Many individuals are comfortable with existing ways of working and may be reluctant to adopt new methods. Organisations face cultural barriers, where employees or management are comfortable with existing ways of working and are not ready to accept change (Hammer & Champy, 2009). Employees in a company that has long used traditional methods in production may feel concerned that new methods will disrupt their routine. Therefore, it is important for management to communicate the benefits of the change and involve employees in the transition process. As stated by Kotter (1996), Successful change requires involvement and support from all levels of the organisation.

According to Deming (1986), if management is not committed to improvement, then all employee efforts will be in vain. This is also a challenge in CI implementation. The success of CI is highly dependent on the support and commitment of top management. Without strong support, CI initiatives are likely to fail. For example, if management does not provide adequate resources or is not actively involved in CI initiatives, employees may feel that improvement efforts are not taken seriously. Therefore, it is important for management to demonstrate their commitment by participating in training and providing the necessary support.

Limited resources are also an obstacle in CI implementation. Companies often face

constraints in terms of time, manpower, and budget. This can hinder their ability to effectively implement CI initiatives. For example, a small company may not have the budget to conduct the employee training required to implement CI methods. But the company needs to find creative solutions, such as utilising internal resources or working with educational institutions to get the necessary training. In this case, limited resources are not an excuse for not making improvements; rather, it is a challenge that must be overcome (Juran, 1999).

Measuring the success of CI initiatives can be challenging. Effective measurement is key to understanding the impact of improvement initiatives (Parry & Turner, 2006). Companies need to develop appropriate metrics to evaluate the impact of the changes made. A company implementing Lean methods needs to define clear performance indicators to measure waste reduction and efficiency improvement. Without clear metrics, companies may struggle to assess whether their CI initiatives are successful or not. Effective measurement is key to understanding the impact of improvement initiatives.

In recent years, there have been several key trends in CI approaches in the private sector. Digital technologies offer unprecedented opportunities to improve productivity and efficiency (Brynjolfsson & McAfee 2017). Digitalisation and automation is one of the most significant trends. Companies are increasingly adopting digital technologies and automation to improve efficiency and reduce human error. The use of data analytics and artificial intelligence (AI) is becoming increasingly common in support of data-driven decisions.

Data-driven approaches are also growing in popularity among companies. Today, companies rely more on data to analyse performance and identify areas of improvement. The use of advanced analytics tools helps companies make more informed decisions. A retail company can use data analytics to understand customer behaviour and tailor their product offerings according to customer preferences. According to research by Davenport & Harris (2007), companies that use data analytics effectively can achieve a significant competitive advantage.

A positive customer experience is key to retaining customers and creating loyalty (Lemon & Verhoef, 2016). The focus on customer experience is becoming increasingly important in CI approaches. Companies are not only focusing on internal processes, but also on the customer experience. Companies endeavour to understand customer needs and expectations in order to provide better products and services. For example, a technology company may conduct regular customer surveys to gather feedback on their products, and then use the information to make improvements.

Collaboration and employee engagement are also a major focus in CI. There is an increased focus on collaboration between teams and employee involvement in the improvement process. Companies realise that innovative ideas often come from frontline employees. Knowledge gained from practical experience is a valuable resource for innovation (Nonaka & Takeuchi, 1995). Healthcare companies can involve doctors and nurses in the service improvement process, so they can provide valuable input based on their direct experience.

According to Schein (2010), organisational culture is key to successful change and innovation. Organisational culture change is also an important aspect in the future direction of CI. The company will continue to strive to create a culture that supports innovation and continuous improvement, where each individual feels they have a role in the process. Companies can conduct training programmes to upskill employees in innovation and process improvement, thus creating a more inclusive and collaborative environment.

Going forward, continuous improvement in the private sector is expected to continue to evolve in line with changing technology and market needs. The integration of advanced technologies such as the Internet of Things (IoT) and predictive analytics will

increasingly become part of companies' CI strategies. By collecting data from various sources, companies can identify patterns and trends that can help them improve efficiency and product quality. According to Porter and Heppelmann (2014), IoT will change the way companies operate, allowing them to collect and analyse data in real-time.

According to George et al. (2004), the future of CI will be greatly influenced by the increasing integration of AI and machine learning technologies in automation and decision-making. AI-powered systems will be able to automatically identify areas that require improvement and provide faster and more efficient solutions. However, the role of humans in CI will not be completely replaced by technology. According to Imai (2012), the involvement of all members of the organisation remains a key factor in ensuring the success of CI. A culture of continuous improvement, involving all levels of the organisation, will be increasingly important in an era where technological change is happening at a rapid pace.

Broader stakeholder involvement is also a direction that companies may take in CI implementation. According to Freeman (1984), good management involves all stakeholders in the decision-making process. Companies are expected to involve more stakeholders, including suppliers and customers, in the improvement process to create greater value. For example, a manufacturing company may work with suppliers to identify ways to reduce costs and improve the quality of raw materials.

Sustainable approaches are becoming increasingly important in the context of continuous improvement. With increasing awareness of environmental issues, companies will focus more on sustainable and environmentally friendly business practices in their CI initiatives. Companies should invest in sustainability to create long-term value for stakeholders (Elkington, 2013). Companies can implement recycling practices in their production processes or develop products that are more efficient in energy use.

Continuous improvement is a key element in management strategies in the private sector. Although there are challenges in its implementation, the CI approach offers great opportunities to improve a company's performance and competitiveness. By adopting the right methods and overcoming the challenges, companies can create a culture of continuous improvement and adapt quickly to market changes. In the ever-changing business world, the ability to adapt and innovate is critical to a company's survival and success.

## **Analysis Method**

This research applied the systematic literature review (SLR) method as the main approach. SLR is a systematic and comprehensive method for identifying, evaluating, and synthesising knowledge in a research field. With this method, researchers can understand the latest developments, trends, important findings, and gaps in the scientific literature (FEB Unair, 2024). This approach involves collecting, assessing, and compiling relevant information on a particular topic or issue from various literature sources. Systematic literature review/SLR is conducted through five stages or phases outlined by Denyer and Tranfield (2009).

### **Phase 1 : Pilot search and research question**

The initial phase in the SLR research method involves establishing the pilot and formulating the research question. A literature search was conducted through the Wase Uake database, a platform for finding Scopus indexed journals, using pre-defined keywords as shown in Figures 2 and 3. This process used specific strings to identify contributions relevant to the research topic. The articles obtained from the title and keyword search were designed to answer the main research questions regarding the approaches, implementation challenges and prospects of continuous improvement in the private

sector. To obtain more in-depth results, the main research topic was broken down into three subtopics: analysing continuous improvement approaches in the private sector, evaluating implementation challenges, and exploring the future prospects of continuous improvement in the private sector. The research on these subtopics provided in-depth insights into the approaches, challenges and prospects of continuous improvement in the private sector.

**KEYWORD IDENTIFICATION**

| No | Keyword                                                | Raw |
|----|--------------------------------------------------------|-----|
| 1  | continuous improvement in private sector               | 494 |
| 2  | challenges of continuous improvement in private sector | 46  |
| 3  | further of continuous improvement in private sector    | 326 |

**RECORD LIMITATION**

| Criteria           | Limitation  |
|--------------------|-------------|
| Year From          | 2014        |
| Year To            | 2024        |
| Tier (Q1,Q2,Q3,Q4) | Q1,Q2,Q3,Q4 |

**Figure 2 & 3. Article identification process on Watase Uake Web**

**Phase 2: Identifying Studies**

The research site search stage aims to identify relevant articles using appropriate databases. This study uses a primary database, Watase Uake, which provides extensive access to literature related to the research topic. Pre-determined keywords are used in the search process, with a consistent protocol applied to each database. For instance, the search on Watase Uake focuses on article titles.

Watase.web.id is an online platform designed to support collaboration among researchers. Developed in 2018, the platform began involving researchers from various universities in 2020. Watase aims to facilitate research collaboration by offering features such as systematic literature reviews using the PRISMA method, simple meta-analysis, article classification, and data visualization (Wahyudi, 2024).

**Phase 3: Selection and Evaluation of Studies**

The selection and evaluation of literature is a crucial step in the research process, focusing on choosing and assessing the identified literature. The main goal is to ensure that the selected literature is highly relevant and of high quality. Literature obtained from the previous search is read, thoroughly analyzed, and evaluated based on the defined research topic.

From the search, 866 articles were identified as relevant. These articles were then filtered using inclusion and exclusion criteria, including a publication period limited to 2014 to 2024.

- The elimination process was conducted in three main stages:
1. Stage 1: 278 articles were removed due to duplicates caused by using two keywords.

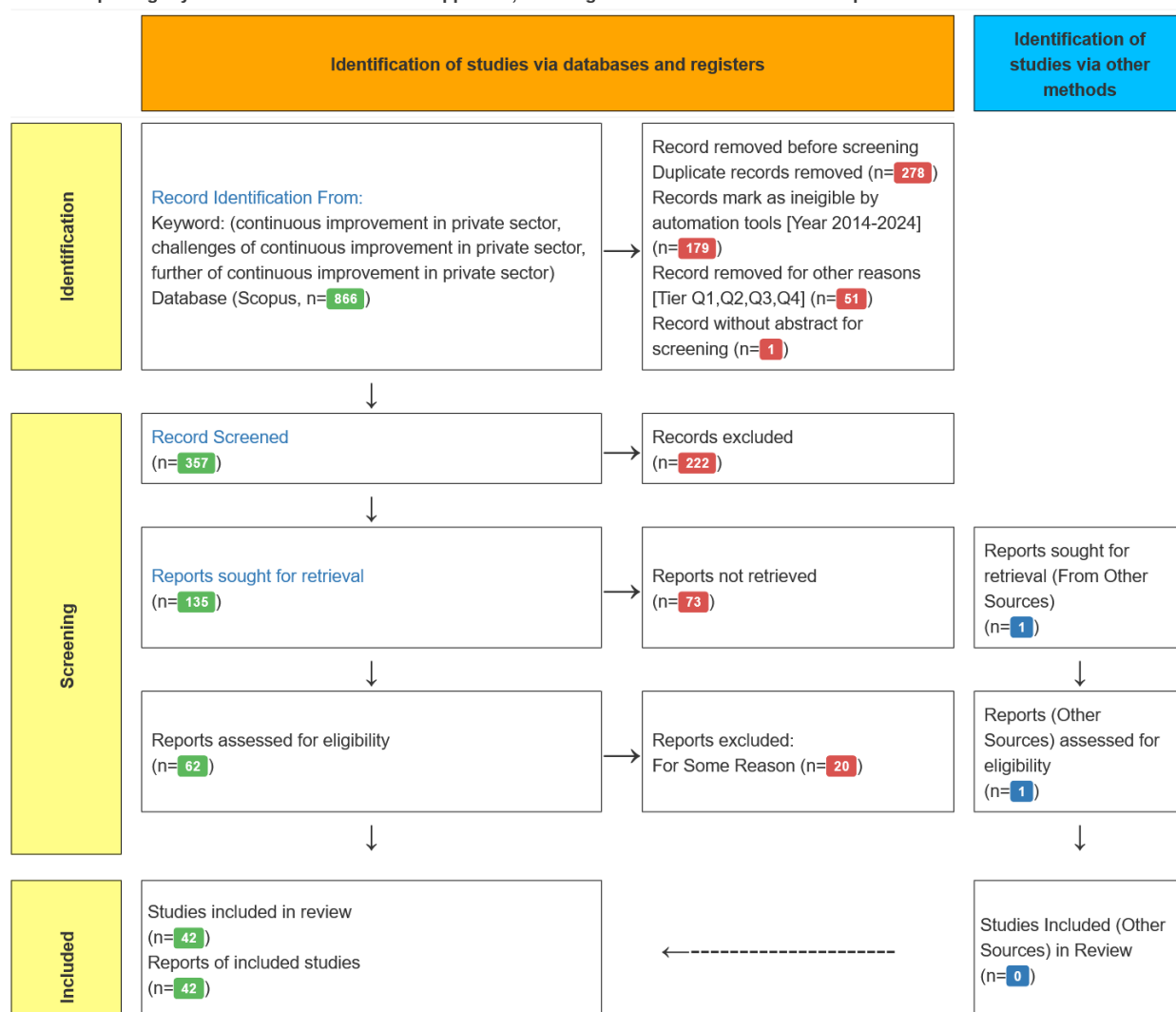
2. Stage 2: 178 articles were eliminated because they were published outside the specified time period.
3. Stage 3: 56 articles were excluded as they were not classified under Q1, Q2, Q3, or Q4 categories based on the Scopus database.

Afterward, two additional filtering stages were conducted:

1. Manual review of titles and abstracts to ensure keyword relevance, which eliminated 222 articles that did not meet the criteria.
2. Screening articles that lacked available data, resulting in the elimination of 73 more articles.

At the final analysis stage, 62 articles met the criteria and passed the elimination process. However, 20 articles could not be included due to specific reasons. Thus, a total of 42 articles were selected for use in this research.

Prisma Reporting: Systematic Literature Review : Approach, Challenges An Further Of Continuous Improvement In Private Sector



Generate From Watase Uake Tools, based on Prisma 2020 Reporting

**Figure 4. Reporting Prism: Digital Transformation In Public Sector**

Source: Data processed from watase uake website, 2024

#### Phase 4: Analysis and Synthesis

In this phase, an in-depth analysis was conducted on the 42 selected articles. The data obtained was synthesized to identify factors and patterns related to approaches, challenges, and future prospects of continuous improvement in the private sector. The

objective of this analysis is to gain a more comprehensive insight into the development of approaches, challenges, and future prospects of continuous improvement within the sector.

Additionally, bibliometric analysis was carried out to uncover the evolutionary patterns related to this topic by considering several key aspects:

- 1. Number of articles published in the last ten years,
- 2. Distribution of articles based on journal databases, and
- 3. Distribution of articles based on countries of origin.

Phase 5 : Reporting Results

The research findings are presented in the form of tables, statistics, and discussions, using an approach aligned with the methodology developed by Pontoh et al. (2024). This approach includes a detailed explanation of the following components: Search strategies, Inclusion and exclusion criteria, Selection process for relevant studies, Quality evaluation, Data extraction, and Synthesis of findings.

The results of the analysis are systematically and comprehensively organized, both as a scientific article and a detailed report. This comprehensive presentation provides in-depth insights into the approaches, challenges, and future prospects of continuous improvement in the private sector

Result and Discussion

Classification of Articles Based on Keywords

Descriptive testing is a crucial first step in data analysis, as it ensures that the data is of good quality and well-understood before pro-ceeding to more in-depth analysis (Sugiyono, 2017).

Tabel 1. Article Classification

| No. | Topics / Keywords                                      | Researcher Name (Year)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.  | Continuous Improvement in Private Sector               | Rousso et al. (2024), Pang et al. (2024), Wu et al. (2024), Jacob et al. (2024), Alkhurayyif et al (2024), Ghasemi et al. (2023), Zhou et al. (2022), Tiganescu et al. (2022), Zhao et al. (2022), Tafuro et al. (2022), Park et al. (2022), Choi et al. (2022), Sullivan et al.(2022), Saul Janet et al. (2022), O'mahony et al (2021), Bepalov et al. (2021), Kattak el al. (2021), Hartini et al. (2020), Kawanishi et al (2020), Ongena et al. (2019), Ahmed et al. (2019), Maarif et al (2018), Ahmed et al. (2018), Gravestejin et al (2018), Vairagde et al (2018), Xu et al. (2017), Dastranj et al. (2017), Peng et al. (2017), William & Debby (2017), Milner et al. (2016), Aoun et al. (2015), Botin & Vergara (2015), Myerson et al. (2015), Al-Shdaifat (2015), Susilawati et al (2015), Putri Nilda et al (2014) |
| 2.  | Challenges of Continuous Improvement in Private Sector | Rousso et al. (2024), Dastranj et al. (2017), Peng et al. (2017), William & Debby (2017), Milner et al. (2016)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

|                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3. <i>Further of Continuous Improvement in Private sector</i> | Rousso et al. (2024), Nawawi et al. (2024), Jacob et al. (2024), Hartomuljono et al. (2023), Maulana et al. (2023), Ardi et al. (2022), Tiganescu et al. (2022), Zhao et al. (2022), Tafuro et al (2022), Saul Janet et al. (2022), O'mahony et al (2021), Bespalov et al. (2021), Kattak el al. (2021), Kawanishi et al (2020), Ongena et al. (2019), Parsetyo et al. (2019), Ahmed et al. (2019), Maarif et al (2018), Ahmed et al. (2018), Gravestejin et al (2018), Vairagde et al (2018), Dastranj et al. (2017), Peng et al. (2017), de Almeida et al (2017), William & Debby (2017), Milner et al. (2016), Aoun et al. (2015), |
|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

As presented in Table 1, the articles have been categorized according to the keywords established during the sample search phase and the research questions, which were further refined through the analysis and synthesis phases.

From the total articles:

- 36 articles discuss continuous improvement in the private sector,
- 5 articles address challenges in implementing continuous improvement in the private sector, and
- 28 articles explore the future prospects of continuous improvement in the private sector.

Some articles discuss two or even all three topics. This demonstrates a strong correlation between these topics, highlighting their interconnected nature in the context of the private sector.

### **Bibliometric Analysis**

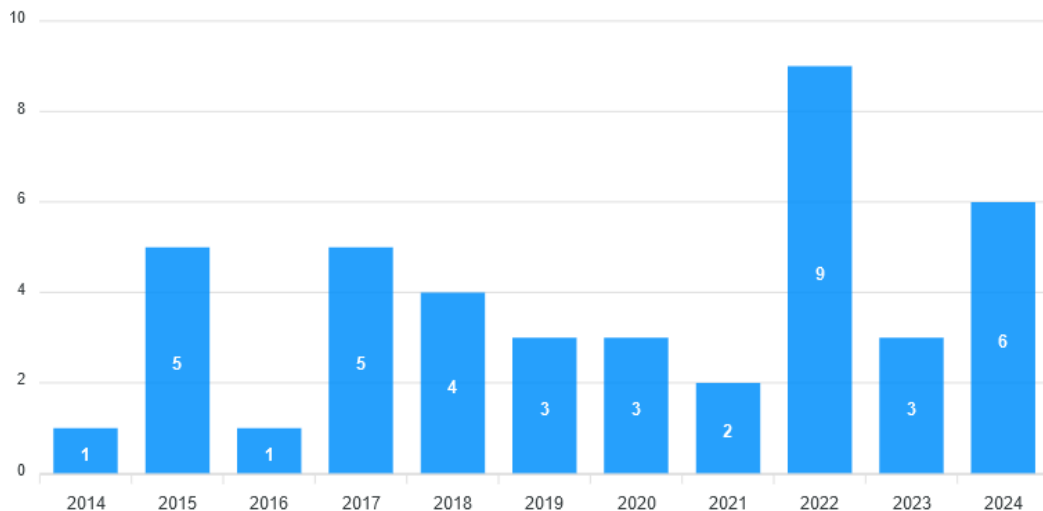
The results of the bibliometric analysis will be presented to examine the trends and developments of research on this topic. Graphical visualizations will illustrate the distribution of published articles based on:

1. Year of Publication,
2. Country of Origin, and
3. Journal Database over the last 10 years (2014–2024).

The scientific publications related to approaches, challenges, and future prospects of continuous improvement in the private sector during this period exhibit fluctuations. Certain years show an increase in the number of publications, while others experience a decline.

Research productivity reflects the extent to which institutions or individuals contribute to research activities, which is measured through research outputs, one of which is publications.

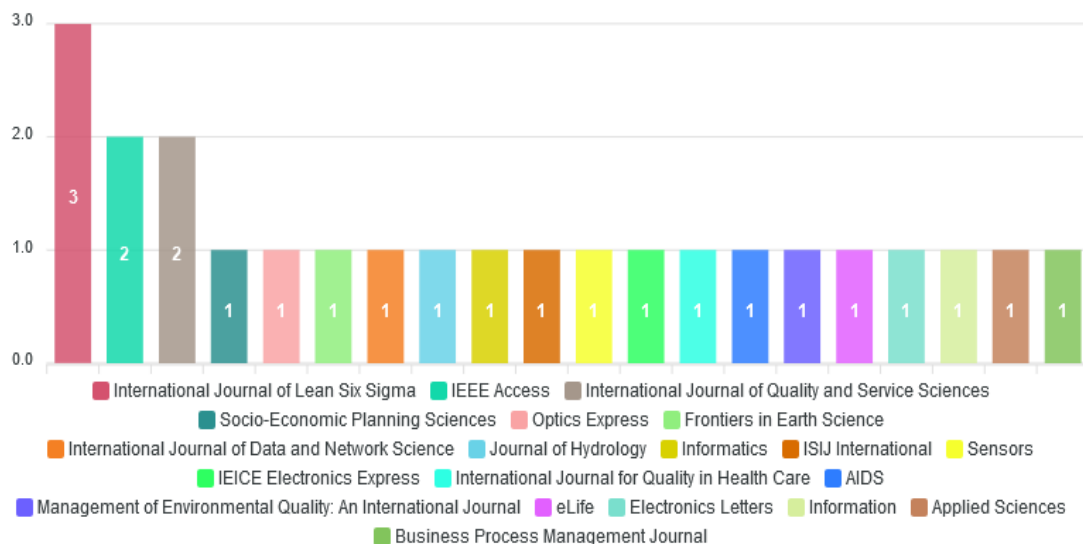
### Yearly Article



**Graph 5.** Graph of Distribution by Year of Publication  
Source: Data processed in 2024

The analysis of 42 articles shows that the number of publications experienced fluctuations starting from 2014. As shown in Figure 5, the peak of research productivity and publication occurred in 2022, reaching a total of 9 articles. However, a decline followed in subsequent years. It is important to note that data for 2024 still has the potential to increase as the year progresses. It is hoped that the publication of articles discussing approaches, challenges, and future prospects of continuous improvement in the private sector will continue to grow in 2024 and beyond, considering that this topic remains highly relevant to the advancements in technology and changing times.

### Journal Classification



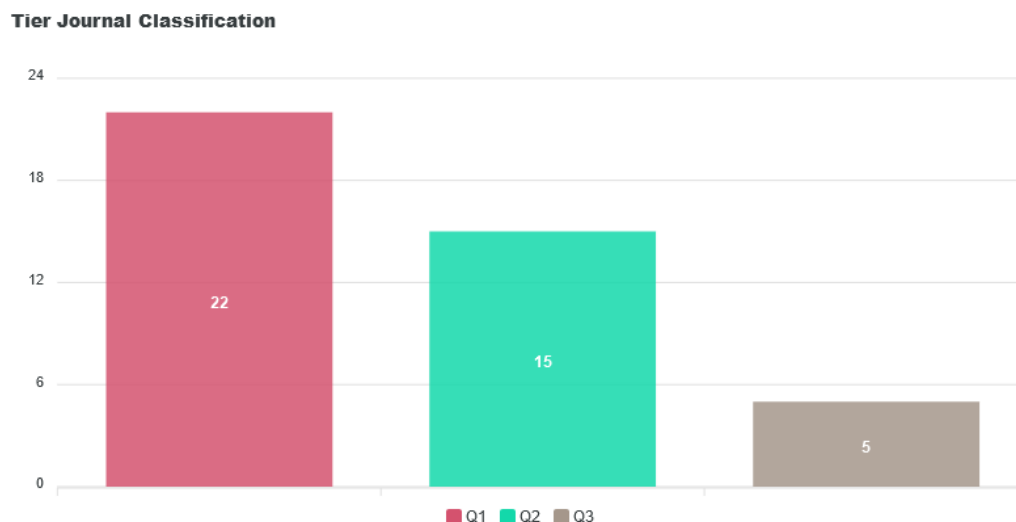
**Graph 6.** Graph of Article Distribution Based on Article Classification  
Source: Data processed in 2024

Publications on approaches, challenges in implementation, and future prospects of continuous improvement in the private sector, as shown in Figure 6, indicate the presence of 42 articles discussing this topic.

- The International Journal of Lean Six Sigma is the main contributor with 3 articles.

- IEEE Access and the International Journal of Data and Network Sciences follow with 2 articles each.
- Most of the other journals have only one relevant article on this topic.

These findings reflect the high interest and ongoing research on continuous improvement in the private sector. They also highlight the diverse sources of information available for researchers and practitioners in this field.

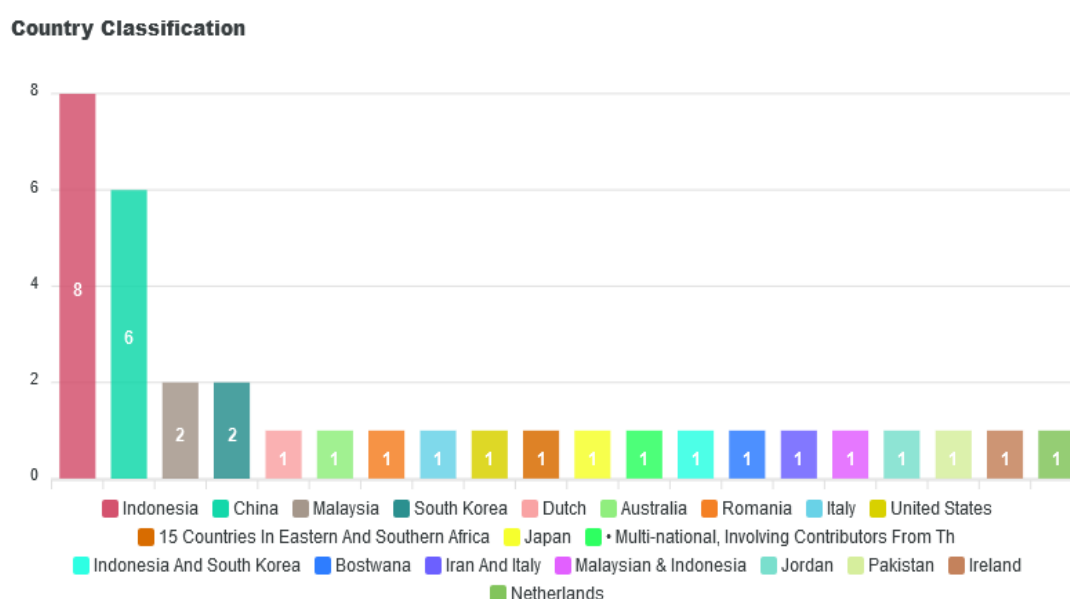


**Picture 7. Distribution by Article Tier Classification (Tier Article)**

Source: Data processed in 2024

As shown in Figure 7, regarding the Scopus-indexed article tier distribution, it can be observed that: 22 articles are classified as Q1, 15 articles fall under Q2, and 5 articles are classified as Q3.

This indicates that the majority of research in this domain is published in Q1 and Q2 tier journals. This fact demonstrates a strong interest and focus on research and the dissemination of knowledge related to the approaches, implementation challenges, and future prospects of continuous improvement in the private sector.



**Gambar 8. Graph of Article Distribution by Country**

Source: Data processed in 2024

The development of publications on the topic of approaches, challenges, and future prospects of continuous improvement in the private sector, as presented in Figure 8, highlights contributions from a total of 20 countries. Some articles also involved collaborative research between countries or within the same continent.

Based on the collected data, the findings indicate that:

- Indonesia ranks first with 8 articles discussing this topic.
- China follows with 6 articles.
- Malaysia and South Korea each contributed 2 articles.
- Additionally, 5 articles were the result of international collaborations involving multiple countries.

These findings conclude that research on this topic is globally distributed and not concentrated in a single continent. Over the last 10 years, contributions have emerged from countries across Asia, America, Europe, and Africa, demonstrating the global relevance and interest in continuous improvement within the private sector.

### **Continuous Improvement Approach in Private Sector**

The Continuous Improvement (CI) approach plays a crucial role in enhancing operational efficiency, productivity, and organizational competitiveness, particularly in the private sector. Various methods and approaches have been extensively studied to understand their impact on creating more effective and efficient work processes. Based on a literature review, this research provides a comprehensive analysis and review of the role and implementation of Continuous Improvement in the private sector.

Khattak et al. (2020) emphasized that transformational leadership is a critical foundation for the successful implementation of Continuous Improvement. Transformational leaders not only provide clear direction but also motivate employees to innovate and improve performance. This research highlights how change-oriented leadership can foster an organizational culture that supports sustainable improvement. This is particularly significant in the private sector, which faces intense competition and demands rapid adaptation to market changes (Khattak et al., 2020).

In the manufacturing industry, the Lean Manufacturing approach serves as a primary tool for assessing and improving sustainability. Hartini et al. (2020) demonstrated that implementing Lean Manufacturing helps organizations identify waste and enhance productivity. This provides a significant competitive advantage in industries that focus heavily on efficiency and cost reduction (Hartini et al., 2020).

Vairagde and Hans (2018) also asserted that Lean Management can improve workforce productivity in machine manufacturing facilities. Their case study revealed how the systematic implementation of Lean methods effectively addressed inefficiencies in kitting areas and improved productivity.

The study by Ahmed et al. (2019) illustrated the effectiveness of Six Sigma in addressing process variation issues in private hospitals in Malaysia. The research highlighted that variation in medical services often causes inconsistencies in patient care and resource wastage. Six Sigma, through its data-driven approach like DMAIC (Define, Measure, Analyze, Improve, Control), allows organizations to identify the root causes of variation and apply systematic solutions. The results of the study showed significant improvements in healthcare service quality, reduced patient waiting times, and efficient use of medical resources.

Meanwhile, the Lean Six Sigma approach has become one of the most effective alternative strategies to drive Continuous Improvement in the private sector. This is because it combines the efficiency principles of Lean Manufacturing with the quality control focus of Six Sigma. This combination enables companies to focus on two key aspects: eliminating waste and reducing process variation, resulting in significant improvements in quality and efficiency.

O'Mahony et al. (2021) presented a practical implementation of Lean Six Sigma in the private healthcare sector, specifically in hospital operating rooms. Their study outlined how medical equipment and operational supply chains can be optimized by identifying non-value-added activities. By redesigning supply flows and removing bottlenecks, hospitals successfully reduced operational costs, accelerated service delivery, and enhanced patient experience. This implementation of Lean Six Sigma demonstrated its direct impact on cost savings and improved service quality in the private healthcare sector, where efficiency is closely tied to operational sustainability.

In the service industry, Milner and Savage (2016) developed a model for the evolution of Continuous Improvement. This model provides a framework for understanding the stages of process improvement in the service sector, ultimately contributing to customer satisfaction and operational efficiency. This approach is particularly important for private service sectors that focus on customer service.

In the context of Continuous Improvement programs, Sullivan et al. (2022) highlighted the importance of data utilization to identify areas for improvement and measure performance. Their study on the DREAMS program demonstrated that a data-driven approach enables organizations to achieve sustainable improvements in a more targeted and objective manner.

### **Challenge of Continuous Improvement in Private Sector**

Continuous Improvement (CI) continues to play a significant role in modern industries, particularly in companies' efforts to enhance efficiency and competitiveness. However, the literature review in this study identifies several challenges in implementing CI in the private sector. Top management support is a critical element for CI success, yet it is often inadequate. Frequent shifts in business strategies and changing priorities hinder sustainable implementation. Khattak et al. (2020) found that low management involvement reduces employee motivation, while Ahmed et al. (2019) revealed that weak leadership can lead to the failure of Six Sigma projects in Malaysian private hospitals.

Organizational culture and employee resistance also serve as significant obstacles. Employees are often reluctant to embrace change, preferring existing systems, which is worsened by a lack of clear communication about CI benefits. Ahmed et al. (2018) emphasized that resistance stems from insufficient training or a lack of awareness about Lean Six Sigma methods, particularly among less experienced staff. Sullivan et al. (2022) noted that an unsupportive culture for innovation stagnates CI processes, while Vairagde & Hans (2018) observed resistance in manufacturing industries when Lean Management was introduced without active employee involvement.

The implementation of CI requires skilled human resources, supporting infrastructure, and technology. A lack of workforce competence in methodologies like Lean, Six Sigma, or Total Quality Management (TQM) remains a major challenge. Additionally, inadequate technological infrastructure limits the adoption of data-driven approaches. Hartini et al. (2020) highlighted that limited time and labor often hinder CI implementation, and Putri et al. (2014) identified insufficient technical training and supply chain management as major barriers in Indonesia's automotive industry.

Many organizations approach CI primarily for marketing purposes or external demands, such as ISO certification, rather than long-term improvement. Jacob et al. (2024) reported a 55% certification discontinuation rate in Botswana due to an inability to maintain improvement commitments. Organizations often abandon CI initiatives when immediate benefits are not apparent. Furthermore, the absence of clear evaluation systems makes it difficult to monitor CI effectiveness. A lack of Key Performance Indicators (KPIs) and accurate data complicates identifying areas needing improvement (Willar, 2017), while Ongena & Ravesteyn (2020) found that service industries are slower to adopt formal performance measurement compared to manufacturing sectors.

In complex organizations, inter-departmental coordination becomes a challenge due to differing priorities and poor communication. O'Mahony et al. (2021) highlighted these complexities in supply chains and multi-functional services like hospitals. Similarly, Sullivan et al. (2022) noted that non-standardized communication in orthopedic clinics caused delays in patient wait times.

On a smaller scale, financial constraints pose a major challenge for small and medium enterprises (SMEs). Jacob et al. (2024) found that SMEs struggle to fund audits, employee training, technology procurement, and documentation, leading to difficulties in sustaining ISO 9001 certification. In Indonesia's manufacturing industry, limited budgets have forced many small businesses to discontinue CI processes after initial certification (Hartini et al., 2020).

In conclusion, challenges such as insufficient management support, employee resistance, resource constraints, financial limitations, and coordination issues significantly impact the implementation of CI in the private sector. Addressing these obstacles is essential for achieving sustainable improvements, increasing efficiency, and enhancing competitiveness in modern industries.

### **Further of Continuous Improvement in Private Sector**

In the future, Continuous Improvement (CI) is predicted to evolve further with the utilization of advanced technologies while maintaining the critical role of human involvement in the process. Sectors such as manufacturing, healthcare, and even education are expected to increasingly adopt technology-based CI approaches. However, the greatest challenge will be ensuring that organizations not only adopt new technologies but also build a culture that supports CI, with a strong focus on training, employee engagement, and continuous adaptation to change.

Nisar et al. (2020) emphasized the role of transformational leadership in driving CI through employee trust. Effective leadership strengthens an organization's commitment to continuous improvement and reinforces organizational identity. Through this approach, transformational leaders create an environment conducive to implementing CI, where every individual feels responsible for contributing to organizational performance improvements (Khattak et al., 2020).

Furthermore, in the future, CI will no longer be limited to process improvements but will involve dynamic knowledge-sharing mechanisms between leaders, employees, and teams. Ardi et al. (2022) highlighted the importance of Empowering Knowledge-Based Interaction (EKI) in digital startup environments. By fostering goal-oriented participative engagement and knowledge exchange across teams, organizations can build a culture of sustainable innovation. Leadership styles focused on digital transformation will play a crucial role in advancing CI.

The future of CI also relies on specific strategies. Ongena and Ravesteyn (2019) emphasized the role of Business Process Management (BPM) Maturity in achieving process performance. Continuous Improvement, as a core dimension of BPM, is influenced by contextual factors. Successful CI in BPM requires a focus on process awareness, performance measurement, and resource alignment, especially through the use of information technology to enhance process agility and outcomes.

Sustainability issues will also be a significant future prospect for CI implementation. CI approaches can form the foundation for developing sustainability programs. Hartini et al. (2020) explored the integration of sustainability with Lean Manufacturing using an expanded Value Stream Mapping (VSM) tool to assess sustainability performance in the manufacturing industry. This study incorporated sustainability aspects into traditional VSM by combining environmental, economic, and social dimensions into the process flow map. This approach is referred to as Sustainable Value Stream Mapping (Sustainable-VSM).

From a technological perspective, the future of CI will be dominated by the

development of applications and tools derived from CI theories and approaches. Examples of new methods include Lean Six Sigma (LSS) for redesigning inventory management in hospital operating departments through the Define, Measure, Analyze, Improve, Control (DMAIC) methodology (O'Mahony et al., 2021), as well as the application of Soft Systems Methodology (SSM) to improve product quality in the Gayo coffee agroindustry in Aceh (Fadhil et al., 2018). These advancements showcase the ongoing development and implementation of CI methods to address specific challenges in various industries.

## **Conclusions and Suggestions**

This study comprehensively analyzes the approaches, challenges, and prospects of Continuous Improvement (CI) in the private sector through a Systematic Literature Review (SLR) of 42 relevant articles. The findings reveal several significant insights. Continuous Improvement plays a crucial role in enhancing operational efficiency and organizational competitiveness. The most frequently implemented CI methods include Lean Manufacturing, which focuses on reducing waste in production processes and improving efficiency by eliminating non-value-added activities, proving particularly effective in optimizing workflows and reducing production costs in the manufacturing sector. Six Sigma adopts a data-driven approach through the DMAIC phases (Define, Measure, Analyze, Improve, Control) to reduce process variation and enhance product or service quality. This method has achieved success across various industries, including healthcare, with significant improvements in service quality and resource optimization. Total Quality Management (TQM) emphasizes the involvement of all organizational members in holistic quality improvement, focusing on customer satisfaction and fostering a quality-oriented culture as an inclusive managerial approach. Meanwhile, Kaizen, a philosophy of continuous improvement, involves all levels of the organization, emphasizing consistent small changes to achieve long-term significant impacts.

However, the implementation of Continuous Improvement in the private sector faces several challenges. Resistance to change remains a major obstacle as employees are often hesitant to adopt new methods or processes due to uncertainty and a lack of understanding regarding CI benefits, exacerbated by poor communication from management. Additionally, insufficient top management support poses a challenge, as successful CI requires full commitment, adequate resource allocation, and continuous monitoring, which is often lacking. Resource limitations are particularly pronounced in small and medium enterprises (SMEs), where budget constraints, a lack of skilled professionals, and insufficient technological infrastructure hinder the implementation of methods like Lean and Six Sigma. Ineffective performance measurement, characterized by the absence of key performance indicators (KPIs) and measurable evaluation systems, makes it difficult for organizations to assess the success or impact of CI initiatives. Lastly, organizational complexity in companies with intricate structures often creates coordination challenges between departments, slowing the integration of CI processes.

The future of Continuous Improvement in the private sector is projected to advance alongside technological progress and increasing awareness of sustainability. Technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), and Big Data Analytics are expected to serve as the backbone of CI implementation. These technologies enable companies to analyze real-time data, identify opportunities for improvement, and automate decision-making processes. The CI concept will increasingly align with environmental sustainability efforts, with approaches like Sustainable Value Stream Mapping (VSM) integrating operational efficiency with environmental impact reduction, supporting eco-friendly business practices.

Organizations must foster a supportive organizational culture that encourages active employee involvement at all levels in CI processes. Collaboration across teams and the

exchange of knowledge will be key to driving sustainable innovation. Methods like Lean Six Sigma, which combine Lean's efficiency with Six Sigma's quality control, are expected to evolve further alongside innovations. Additionally, technologies such as machine learning and predictive analytics will help organizations identify improvement patterns more accurately and efficiently.

By addressing existing challenges and leveraging opportunities provided by advanced technologies and sustainable practices, private sector companies have the potential to establish a strong foundation for Continuous Improvement. This will enable organizations to become more adaptive to market changes, enhance their competitiveness, and ensure long-term sustainable growth.

## Referensi

- Ahmed, S., Abd Manaf, N. H., & Islam, R. (2018). Measuring Lean Six Sigma and Quality Performance for Healthcare Organizations. *International Journal of Quality and Service Sciences*, 10(3), 267–278. <https://doi.org/10.1108/IJQSS-09-2017-0076>
- Ahmed, S., Abd Manaf, N. H., & Islam, R. (2019). Effects of Six Sigma Initiatives in Malaysian Private Hospitals. *International Journal of Lean Six Sigma*, 10(1), 44–57. <https://doi.org/10.1108/IJLSS-08-2017-0099>
- Al-Shdaifat, E. A. (2015). Implementation of Total Quality Management in Hospitals. *Journal of Taibah University Medical Sciences*, 10(4), 461–466. <https://doi.org/10.1016/j.jtumed.2015.05.004>
- Alkhurayyif, Y., & Sait, A. R. W. (2024). Multi-Modal Dyslexia Detection Model via SWIN Transformer with Closed-Form Continuous Time Networks. *IEEE Access*, 12(August), 127580–127591. <https://doi.org/10.1109/ACCESS.2024.3454795>
- Aoun, M., & Hasnan, N. (2015). Health-Care Technology Management: Developing the Innovation Skills Through Implementing Soft TQM Among Lebanese Hospitals. *Total Quality Management and Business Excellence*, 28(1–2), 1–11. <https://doi.org/10.1080/14783363.2015.1043881>
- Ardi, Bernarto, I., Berlianto, M. P., & Nanda, K. A. (2022). Empowering Knowledge-Based Interaction in Digital Startup. *International Journal of Data and Network Science*, 6(4), 1273–1286. <https://doi.org/10.5267/j.ijdns.2022.6.007>
- Bespalov, A., Bernard, R., Gilis, A., Gerlach, B., Guillén, J., Castagné, V., Lefevre, I. A., Ducrey, F., Monk, L., Bongiovanni, S., Altevogt, B., Arroyo-Araujo, M., Bikovski, L., de Bruin, N., Castaños-Vélez, E., Dityatev, A., Emmerich, C. H., Fares, R., Ferland-Beckham, C., ... Steckler, T. (2021). Introduction To the EQIPD Quality System. *ELife*, 10, 1–26. <https://doi.org/10.7554/eLife.63294>
- Bessant, J., & Caffyn, S. (2017). Managing Continuous Improvement in Manufacturing and Service Industries. *International Journal of Operations & Production Management*.
- Botín, J. A., & Vergara, M. A. (2015). A Cost Management Model for Economic Sustainability and Continuous Improvement of Mining Operations. *Resources Policy*, 46, 212–218. <https://doi.org/10.1016/j.resourpol.2015.10.004>
- Brynjolfsson, E., & McAfee, A. (2017). *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. W.W. Norton & Company.
- Choi, H. G., Lee, S. H., & Cho, S. H. (2022). Technique for Fast Triangular Chirp Modulation in FMCW PLL. *IEICE Electronics Express*, 19(14), 1–4. <https://doi.org/10.1587/elex.19.20220214>
- Dastranj, N., Ghazinoory, S., & Gholami, A. A. (2017). Technology Roadmap for Social Banking. *Journal of Science and Technology Policy Management*, 9(1), 102–122. <https://doi.org/10.1108/JSTPM-07-2017-0029>
- de Almeida, J. P. L., Galina, S. V. R., Grande, M. M., & Brum, D. G. (2017). Lean Thinking: Planning and Implementation in the Public Sector. *International Journal of Lean Six*

- Sigma, 8(4), 390–410. <https://doi.org/10.1108/IJLSS-06-2016-0027>
- Deming, W.E. (1986). *Out of the Crisis*. MIT Center for Advanced Educational Services.
- Denyer, D., & Tranfield, D. (2009). *Producing a systematic review*.
- Davenport, T. H., & Harris, J. G. (2017). *Competing on Analytics: The New Science of Winning*. Harvard Business Review Press.
- Elkington, J. (2013). *The Triple Bottom Line: Does It All Add Up?*. Earthscan.
- Fadhil, R., Qanytah, Q., Hastati, D. Y., & Maarif, M. S. (2018). Development Strategy for a Quality Management System of Gayo Coffee Agro-Industry Using Soft Systems Methodology. *Periodica Polytechnica Social and Management Sciences*, 26(2), 168–178. <https://doi.org/10.3311/PPso.11341>
- FEB Unair. (2024, May 29). "SYSTEMATIC LITERATURE REVIEW MELALUI WATASE UAKE UNTUK PENGEMBANGAN PENELITIAN" HIMA S3 ILMU EKONOMI UNIVERSITAS AIRLANGGA. <https://feb.unair.ac.id/news-download/news-mahasiswa/hima-s3-ie/8761-systematic-literature-review-melalui-watase-uake-untuk-pengembangan-penelitian-hima-s3-ilmu-ekonomi-universitas-airlangga.html>
- Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. In *Strategic Management: A Stakeholder Approach*. <https://doi.org/10.1017/CBO9781139192675>
- George, M.L. (2003). *Lean Six Sigma: Combining Six Sigma Quality with Lean Production Speed*. McGraw-Hill.
- George, M. L., Rowlands, D., Price, M., & Maxey, J. (2004). *The Lean Six Sigma Pocket Toolbook: A Quick Reference Guide to 100 Tools for Improving Quality and Speed*. McGraw-Hill.
- Ghasemi, A. R., Aminzadeh, H., & Ballo, A. (2023). Ladder-Type Gm-C Filters with Improved Linearity. *IEEE Access*, 11(May), 41503–41513. <https://doi.org/10.1109/ACCESS.2023.3270372>
- Gravesteijn, M., & Wilderom, C. P. M. (2018). Participative Change Toward Digitalized, Customer-Oriented Continuous Improvements Within a Municipality. *Journal of Organizational Change Management*, 31(3), 728–748. <https://doi.org/10.1108/JOCM-05-2016-0100>
- Hammer, M., & Champy, J. (2009). *Reengineering the Corporation: A Manifesto for Business Revolution*. HarperBusiness.
- Harry, M. and Schroeder, R. (2000). *Six Sigma The Breakthrough Management Strategy Revolutionizing the World's Top Corporations*. Doubleday, New York.
- Hartini, S., Ciptomulyono, U., Anityasari, M., & Sriyanto, M. (2020). Manufacturing Sustainability Assessment Using a Lean Manufacturing Tool: A Case Study in the Indonesian Wooden Furniture Industry. *International Journal of Lean Six Sigma*, 11(5), 957–985. <https://doi.org/10.1108/IJLSS-12-2017-0150>
- Hartomuljono, A., Sugiarto, A., & Jennefer. (2023). Hemoperfusion Techniques Using Jafron HA330 Cartridge Combined With BBraun Dialog+ Dialysis Machine in Patient With Coronavirus Disease 2019 Pneumonia and Septic Shock: a Case Report. *Journal of Medical Case Reports*, 17(1), 1–6. <https://doi.org/10.1186/s13256-023-03851-y>
- Imai, M. (1986). *Kaizen: The Key to Japan's Competitive Success*. Random House.
- Imai, M. (2012). *Gemba Kaizen: A Commonsense Approach to a Continuous Improvement Strategy*, Second Edition. McGraw-Hill.
- Jacob, L. A., Gandure, J., & Kommula, V. P. (2024). Investigation of Sustainability Failures of ISO 9001 Quality Management System - A Case of Botswana. *International Journal of Quality and Reliability Management*. <https://doi.org/10.1108/IJQRM-07-2023-0223>
- Juran, J. M. (1999). *Juran's quality handbook*.
- Kawanishi, M., & Fujikura, R. (2020). Assessment for the Implementation of a National Greenhouse Gas Inventory: the Case of Japan. *Management of Environmental Quality: An International Journal*, 32(2), 359–375. <https://doi.org/10.1108/MEQ-06-2020-0116>
- Khattak, M. N., Zolin, R., & Muhammad, N. (2020). Linking Transformational Leadership and Continuous Improvement: The Mediating Role of Trust. *Management Research Review*, 43(8), 931–950. <https://doi.org/10.1108/MRR-06-2019-0268>

- Kotter, J. P. (1996). *Leading Change*. Harvard Business Review Press.
- Lemon, K. N., & Verhoef, P. C. (2016). Understanding Customer Experience Throughout the Customer Journey. *Journal of Marketing*, 80(6), 69-96.  
<https://doi.org/10.1509/jm.15.0420>
- Liker, J. K. (2004). *The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer*. McGraw-Hill.
- Maulana, M. M., Suroso, A. I., Nurhadryani, Y., & Seminar, K. B. (2023). The Smart Governance Framework and Enterprise System's Capability for Improving Bio-Business Licensing Services. *Informatics*, 10(2). <https://doi.org/10.3390/informatics10020053>
- Milner, C. D., & Savage, B. M. (2016). Modeling Continuous Improvement Evolution in the Service Sector: A Comparative Case Study. *International Journal of Quality and Service Sciences*, 8(3), 438–460. <https://doi.org/10.1108/IJQSS-07-2016-0052>
- Myerson, A. S., Krumme, M., Nasr, M., Thomas, H., & Braatz, R. D. (2015). Control Systems Engineering in Continuous Pharmaceutical Manufacturing May 20-21, 2014 Continuous Manufacturing Symposium. *Journal of Pharmaceutical Sciences*, 104(3), 832–839. <https://doi.org/10.1002/jps.24311>
- Nawawi, I., Ilmawan, K. F., Maarif, M. R., & Syafrudin, M. (2024). Exploring Tourist Experience through Online Reviews Using Aspect-Based Sentiment Analysis with Zero-Shot Learning for Hospitality Service Enhancement. *Information (Switzerland)*, 15(8). <https://doi.org/10.3390/info15080499>
- Nonaka, L., Takeuchi, H., & Umemoto, K. (1996). A theory of organizational knowledge creation. *International journal of technology Management*, 11(7-8), 833-845.
- Oakland, J. S. (2014). *Total Quality Management and Operational Excellence*. Routledge.
- Pande, P.S., Neuman, R.P., & Cavanagh, R.R. (2000). *The Six Sigma Way: How to Maximize the Impact of Your Change and Improvement Efforts*. McGraw-Hill.
- O'mahony, L., McCarthy, K., O'donoghue, J., Teeling, S. P., Ward, M., & McNamara, M. (2021). Using Lean Six Sigma to Redesign the Supply Chain to the Operating Room Department of a Private Hospital to Reduce Associated Costs and Release Nursing Time to Care. *International Journal of Environmental Research and Public Health*, 18(21). <https://doi.org/10.3390/ijerph182111011>
- Ongena, G., & Ravesteyn, P. (2019). Business Process Management Maturity and Performance: A Multi Group Analysis of Sectors and Organization Sizes. *Business Process Management Journal*, 26(1), 132–149. <https://doi.org/10.1108/BPMJ-08-2018-0224>
- Pang, J., Ou, X., & Li, Q. (2024). A digital Prediction Compensation for DR Improvement in CT DSM With Digital Noise Coupling. *Electronics Letters*, 60(5), 2–4. <https://doi.org/10.1049/ell2.13124>
- Park, H., Kim, M., Jung, Y., & Lee, S. (2022). Method for Improving Range Resolution of Indoor FMCW Radar Systems Using DNN. *Sensors*, 22(21). <https://doi.org/10.3390/s22218461>
- Parry, G. C., & Turner, C. E. (2006). Application of lean visual process management tools. *Production planning & control*, 17(1), 77-86.
- Peng, G. C., & Nunes, M. (2017). Establishing an Evidence-Based 9D Evaluation Approach for ERP Post-Implementation. *Industrial Management and Data Systems*, 117(2), 398–424. <https://doi.org/10.1108/IMDS-03-2016-0087>
- Pontoh, G. T., Indrijawati, A., Selvi, F., Ningsih, L., & Putri, D. R. (2024). A Systematic Literature Review of ERP and RFID Implementation in Supply Chain Management. *WSB Journal of Business and Finance*, 58(1), 80–96.
- Porter, M.E. and Heppelmann, J.E. (2014) How Smart, Connected Products Are Transforming Competition. *Harvard Business Review*, 92, 64-88.
- Prasetyo, V. E., Belleville, B., Ozarska, B., & Mo, J. P. T. (2019). A Wood Recovery Assessment Method Comparison Between Batch and Cellular Production Systems in the Furniture Industry. *Smart and Sustainable Manufacturing Systems*, 3(1), 1–17. <https://doi.org/10.1520/SSMS20190001>
- Pyzdek, T., & Keller, P. A. (2010). *The Six Sigma Handbook: A Complete Guide for Green Belts, Black Belts, and Managers at All Levels*. McGraw-Hill.

- Putri, N. T., Mohd. Yusof, S., & Irianto, D. (2014). The Delphi Hierarchy Process-Based Study of Quality Engineering in Malaysia and Indonesia Automotive Companies. *TQM Journal*, 26(6), 566–576. <https://doi.org/10.1108/TQM-09-2012-0068>
- Rousso, B. Z., Do, N. C., Gao, L., Monks, I., Wu, W., Stewart, R. A., Lambert, M. F., & Gong, J. (2024). Transitioning Practices of Water Utilities From Reactive to Proactive: Leveraging Australian Best Practices in Digital Technologies and Data Analytics. *Journal of Hydrology*, 641(August), 131808. <https://doi.org/10.1016/j.jhydrol.2024.131808>
- Saul, J., Toiv, N., Cooney, C., Beamon, T. A., Borgman, M., Bachman, G., Akom, E., Benevides, R., Limb, A., Sato, K., Achrekar, A., & Bix, D. (2022). The Evolution of DREAMS: Using Data for Continuous Program Improvement. *Aids*, 36(October 2021), S5–S14. <https://doi.org/10.1097/QAD.00000000000003158>
- Schein, E. H. (2010). *Organizational Culture and Leadership* (4th ed.). San Francisco, CA: Jossey-Bass.
- Sullivan, K., Topper, L., & Rajwani, A. (2022). Redesigning Patient Flow in Orthopedics and Radiology Clinics Via a Three-Phase “Kaizen” Improvement Approach and Interrupted Time Series Analysis. *International Journal for Quality in Health Care*, 34(3), 1–7. <https://doi.org/10.1093/intqhc/mzac061>
- Susilawati, A., Tan, J., Bell, D., & Sarwar, M. (2015). Fuzzy Logic Based Method to Measure Degree of Lean Activity in Manufacturing Industry. *Journal of Manufacturing Systems*, 34(C), 1–11. <https://doi.org/10.1016/j.jmsy.2014.09.007>
- Tafuro, A., Dammacco, G., Esposito, P., & Mastroleo, G. (2022). Rethinking Performance Measurement Models Using a Fuzzy Logic System Approach: A Performative Exploration on Ownership in Waste Management. *Socio-Economic Planning Sciences*, 79, 101092. <https://doi.org/10.1016/j.seps.2021.101092>
- Tiganescu, A., Craifaleanu, I. G., Aldea, A., Grecu, B., Vacareanu, R., Toma-Danila, D., Balan, S. F., & Dragomir, C. S. (2022). Evolution, Recent Progress and Perspectives of the Seismic Monitoring of Building Structures in Romania. *Frontiers in Earth Science*, 10(April), 1–10. <https://doi.org/10.3389/feart.2022.819153>
- Vairagde, H. R., & Hans, N. (2018). Utilization of Man Power, Increment in Productivity by Using Lean Management in Kitting Area of Engine Manufacturing Facility - A Case Study. *SAE International Journal of Materials and Manufacturing*, 11(3), 205–212. <https://doi.org/10.4271/05-11-03-0020>
- Wahyudi, L. (2024). Watase Uake: Research Collaboration Tools. <https://www.watase.web.id/>
- Willar, D. (2017). Developing Attributes for Evaluating Construction Project Based Performance. *TQM Journal*, 29(2), 369–384. <https://doi.org/10.1108/TQM-04-2016-0036>
- Womack, J.P., & Jones, D.T. (1996). *Lean Thinking: Banish Waste and Create Wealth in Your Corporation*. Simon & Schuster.
- Wu, Z., Song, Y., Liu, J., Chen, Y., Sha, H., Shi, M., Zhang, H., Qin, L., Liang, L., Jia, P., Qiu, C., Lei, Y., Wang, Y., Ning, Y., Zhang, J., & Wang, L. (2024). Advancements in Key Parameters of Frequency-Modulated Continuous-Wave Light Detection and Ranging: A Research Review. *Applied Sciences* (Switzerland), 14(17). <https://doi.org/10.3390/app14177810>
- Xu, M., Yang, W. E. I., Pang, L., & Kong, D. (2018). R & D, Financial Constraints and Productivity: Evidence From the Chinese Industrial Enterprises. *Singapore Economic Review*, 63(1), 1–21. <https://doi.org/10.1142/S0217590817500126>
- Zhao, H., Yuan, G., Zhou, X., & Wang, Z. (2022). Frequency Modulated Continuous WAVE Linearization of LiDAR Using Reinforcement Learning. *Asia Communications and Photonics Conference, ACP*, 2022-November(12), 902–906. <https://doi.org/10.1109/ACP55869.2022.10088969>
- Zhou, Y., Xu, K., He, F., & Zhang, Z. (2022). Application of Time Series Data Anomaly Detection Based on Deep Learning in Continuous Casting Process. *ISIJ International*, 62(4), 689–698. <https://doi.org/10.2355/isijinternational.ISIJINT-2021-372>