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The Path to Operational Excellence: Implementing Kaizen Principles for Competitive Advantage. A Multiple Case Study

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Abstract:

Purpose: This study aims to identify and analyze the key organizational factors that influence the practical implementation of Kaizen principles in Colombian agri-food companies. Using the Kaizen Maturity Model (KMM) as an analytical framework, the research examines how different managerial, operational, and cultural conditions shape the maturity of continuous improvement practices in an emerging economy context.

Design/methodology/approach: The research adopts a multiple case study approach to evaluate the maturity level of Kaizen principle (creating customer value, flow optimization, Gemba orientation, people empowerment, and scientific transparency) using the Kaizen Maturity Model (KMM). Real data were collected through interviews with managers, document analysis, and on-site observations conducted during plant visits, enabling a comparative analysis across four Colombian agri-food companies.

Findings: The findings reveal different levels of Kaizen maturity among the analyzed companies and highlight several factors that influence the practical implementation of continuous improvement practices according to Kaizen principles. In particular, limitations related to process flow management, Gemba-based leadership practices, and the use of data for problem solving were identified as key challenges. The results provide a detailed diagnosis of current practices and highlight opportunities to strengthen the integration of Kaizen principles within organizational routines.

Research limitations/implications: This study focuses on Colombian agri-food companies, which may limit the generalizability of the findings to other industrial contexts or regions. Future research could expand the analysis to other sectors and countries in order to compare implementation factors and further refine the understanding of Kaizen maturity in different organizational environments.

Practical implications: The study provides a road map with a structured benchmarking perspective based on the Kaizen Maturity Model (KMM), enabling managers to identify critical gaps in the implementation of continuous improvement practices and to design targeted actions for strengthening operational excellence.

Social implications: By promoting a culture of continuous improvement, the adoption of Kaizen principles can contribute to improving organizational efficiency, greater employee involvement in problem-solving activities, and stronger alignment with broader societal expectations related to responsible and sustainable business practices.

Originality/value: This research contributes to the Kaizen and continuous improvement literature by providing empirical evidence on the factors influencing the practical implementation of Kaizen in an emerging economy context. The study extends the use of the Kaizen Maturity Model (KMM) as an analytical tool to assess implementation challenges and offers insights that may guide organizations seeking to strengthen their operational excellence capabilities.

Keywords: kaizen, operational excellence, competitive advantage, continuous improvement

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1. Introduction

In today's business environment, characterized by fierce competition and rapidly changing customer expectations, organizations face a continuous need to adapt and improve their processes to remain competitive. Globalization and digitalization have increased the pressure on companies to not only optimize their operations but also continuously innovate in products and services to meet the changing demands of the market (Omol, 2024; Bacca-Acosta et al., 2023; Kraus et al., 2021; Sánchez-Ruiz et al., 2019). In this context, a focus on continuous improvement has become a strategic imperative (Rožman et al., 2023).

Continuous improvement, a central concept in many quality management models, has been shown to be a key factor in maintaining organizational competitiveness. In particular, the Kaizen philosophy (Suárez-Barraza et al., 2018), which focuses on continuous incremental improvements in processes, products, and services, has been globally adopted as a strategy to foster operational efficiency and organizational excellence (Carnerud et al., 2018). Kaizen relies on the active involvement of all levels of the organization, from senior management to frontline employees, to identify and eliminate waste, optimize processes, and enhance quality over time (Imai, 2012).

The Kaizen philosophy has proven to be effective not only in Japan, where it originated, but also globally, with companies from different sectors adopting its principles to improve operational efficiency and foster a culture of continuous improvement (Janjić et al., 2019). Recent studies have shown that adopting Kaizen in manufacturing and service companies has led to significant improvements in product quality, process efficiency, and customer satisfaction (Dieste & Panizzolo, 2019; Narayanamurthy et al., 2016). Additionally, Kaizen promotes a collaborative work environment where employees are empowered to make decisions and actively participate in problem-solving activities (Chiarini et al., 2018).

Given the widespread adoption of Kaizen philosophy, several maturity models have been developed to assess the effectiveness of continuous improvement practices within organizations. Some of the most well-known maturity models include the Capability Maturity Model Integration (CMMI) (Chrissis et al., 2011), the Lean Enterprise Self-Assessment Tool (LESAT) (Nightengale & Mize, 2002), the Business Process Maturity Model (BPMM) developed by Fisher (2004), the Continuous Improvement Maturity Model (CIMM) (Jørgensen et al., 2006), and the EFQM Excellence Model developed by the European Foundation for Quality Management (EFQM, 2020), among others.

Among these approaches, the Kaizen Maturity Model (KMM) has gained relevance as a practical tool to evaluate the extent to which organizations have successfully embedded Kaizen principles into their operational and managerial practices. The KMM assesses organizations across several key dimensions, including creating customer value, enabling process flow, promoting Gemba-based leadership, empowering employees, and fostering scientific

and transparent decision-making (Fonseca & Domingues, 2018). Despite the growing interest in maturity models for continuous improvement, empirical research examining the organizational factors that influence the practical implementation of Kaizen principles remains limited, particularly in emerging economy contexts and in specific industrial sectors such as the agri-food industry.

This gap is particularly relevant in emerging economies, where organizations often face structural, cultural, and managerial challenges that may affect the adoption of continuous improvement practices. Understanding these contextual factors is essential for explaining differences in Kaizen maturity levels and identifying the conditions that enable or hinder the successful implementation of continuous improvement initiatives.

Taking into account this background, this study aims to identify and analyze the organizational factors that influence the practical implementation of Kaizen principles in Colombian agri-food companies. Using the Kaizen Maturity Model (KMM) as an analytical framework and adopting a multiple case study approach, this research evaluates the maturity level of Kaizen practices in four Colombian firms and examines the managerial and operational conditions that shape their implementation.

Accordingly, the study addresses the following research question: Which organizational enablers and barriers shape the practical implementation and maturity of Kaizen principles in Colombian agri-food companies?

By answering this question, the study contributes to the literature on continuous improvement and operational excellence by providing empirical evidence from an emerging economy context. Furthermore, the research offers practical insights for managers seeking to strengthen the adoption of Kaizen principles and advance their organizations toward higher levels of operational excellence.

The remainder of this paper is structured as follows. Section 2 presents the theoretical framework, focusing on continuous improvement, organizational factors influencing Kaizen implementation, and maturity models, including the Kaizen Maturity Model (KMM). Section 3 describes the research methodology, including the research design, data collection procedures, and analytical approach. Section 4 presents the results of the empirical analysis structured around the five principles of the KMM. Section 5 discusses the findings in relation to the existing literature. Finally, Section 6 presents the main conclusions, managerial implications, and directions for future research.

2. Theoretical Framework

2.1. Continuous Improvement and Kaizen Implementation

Continuous improvement (CI) has long been recognized as a fundamental capability for organizations seeking to maintain competitiveness in dynamic and globalized markets. Rather than being limited to isolated improvement initiatives, CI refers to a systematic organizational capability that enables firms to constantly refine processes, products, and managerial practices through incremental learning and structured problem-solving activities (Bessant & Caffyn, 1997).

Within this context, Kaizen philosophy has emerged as one of the most influential approaches to operational improvement. Originating from Japanese management practices, Kaizen promotes the continuous and incremental enhancement of processes through the active participation of employees at all organizational levels (Imai, 2012). The philosophy emphasizes the elimination of waste, the improvement of process flows, and the development of organizational learning capabilities that support long-term operational excellence.

Over the past decades, the global diffusion of Kaizen has generated a growing body of empirical research examining how organizations implement continuous improvement practices and the conditions that determine their success. Several studies report that Kaizen initiatives contribute to improvements in operational performance, product quality, and employee engagement when effectively embedded within organizational routines (Carnerud et al., 2018; Dieste & Panizzolo, 2019). However, the implementation of Kaizen outside its original Japanese context often faces organizational and cultural challenges that affect the sustainability of improvement initiatives (Fryer et al., 2013). Consequently, recent research has increasingly focused on identifying the organizational factors that influence the successful deployment of continuous improvement practices.

2.2. Organizational Factors Influencing Kaizen Implementation

The effective implementation of Kaizen requires more than the adoption of improvement tools; it involves the development of organizational capabilities that sustain continuous learning and structured problem solving. According to Bessant and Caffyn (1997), continuous improvement should be understood as a dynamic capability that evolves progressively as organizations develop routines and cultural practices supporting systematic improvement.

One of the most frequently cited factors influencing Kaizen implementation is leadership commitment. Previous research in operations management has consistently identified leadership support as a critical success factor for the effective adoption of continuous improvement practices (Sánchez-Ruiz et al., 2019; Netland, 2016). Leadership plays a key role in establishing a strategic orientation toward improvement and ensuring the allocation of organizational resources required to sustain improvement initiatives (Bortolotti et al., 2015). Moreover, organizations in which senior managers actively promote improvement practices tend to develop stronger continuous improvement capabilities and achieve higher levels of maturity in their improvement systems (Netland & Ferdows, 2016).

Another key factor influencing Kaizen implementation is employee involvement and empowerment. Previous research in operations management highlights that continuous improvement systems rely heavily on the active participation of employees in identifying problems and proposing improvement solutions (Galeazzo et al., 2021; Marín-García & Bonavía, 2015). Empirical studies indicate that organizations with high levels of employee engagement tend to achieve superior operational outcomes from improvement initiatives, as employee participation enhances problem-solving capabilities and facilitates knowledge sharing across the organization (De-Medeiros et al., 2025; Al-Rjoub, 2023). Furthermore, organizational mechanisms such as suggestion systems, improvement teams, and structured problem-solving activities provide formal channels through which employees can actively contribute to organizational learning and the development of continuous improvement capabilities (Lameijer et al., 2023).

Organizational culture also plays a decisive role in sustaining continuous improvement practices. Previous research has shown that the successful implementation of continuous improvement systems depends not only on technical tools but also on the development of supportive organizational cultures that promote learning, collaboration, and employee participation (Bortolotti et al., 2015). Continuous improvement requires an environment that encourages experimentation, learning from errors, and cross-functional collaboration across hierarchical levels, enabling organizations to develop collective problem-solving capabilities and organizational learning mechanisms (Fryer et al., 2013; Anand et al., 2009; Bessant et al., 2001). In contrast, organizations characterized by rigid structures or blame-oriented cultures often struggle to sustain improvement initiatives over time because such environments discourage experimentation and limit employee engagement in improvement activities (Netland, 2016; Tortorella & Fogliatto, 2017).

Additionally, the literature highlights the importance of structured problem-solving and data-driven decision-making in continuous improvement initiatives. Organizations are able to enhance improvement outcomes when systematic approaches are adopted to analyse process data, identify root causes, and evaluate corrective actions through structured methodologies (Khan et al., 2023; Naughton, 2024). Within this context, iterative improvement frameworks such as the Plan–Do–Check–Act (PDCA) cycle provide a structured mechanism for testing solutions, monitoring performance outcomes, and institutionalizing successful practices across organizational processes (Peças et al., 2021; Endalamaw et al., 2024).

Finally, process orientation and flow management are essential elements in the implementation of Kaizen. Lean management literature highlights that improving process flow and eliminating operational waste are central mechanisms for achieving operational excellence (Womack & Jones, 1996; Liker, 2004). Empirical research in operations management further demonstrates that flow efficiency and waste reduction are fundamental drivers of operational performance within Lean production systems (Shah & Ward, 2007). Together, these organizational factors constitute the foundation upon which Kaizen practices can be successfully implemented and sustained (Netland, 2016). However, because these capabilities do not emerge simultaneously, organizations typically develop them progressively over time through processes of organizational learning and capability accumulation (Anand et al., 2009). For this reason, several scholars have proposed maturity models that conceptualize continuous

improvement as an evolutionary capability that develops through successive stages of organizational learning and institutionalization (Bessant & Caffyn, 1997; Bessant et al., 2001).

2.3. Maturity Models for Continuous Improvement

Because continuous improvement capabilities evolve progressively over time, several maturity models have been proposed to assess the level of development of improvement practices within organizations. These models are grounded in the view that improvement capability emerges gradually through organizational learning and the institutionalization of routines that support systematic problem solving and process improvement (Anand et al., 2009). Maturity models therefore provide structured frameworks that enable organizations to evaluate their current capabilities and identify opportunities for further development (De-Bruin et al., 2005; Tarhan et al., 2016). Examples include the Capability Maturity Model Integration (CMMI) (Chrissis et al., 2011), the Lean Enterprise Self-Assessment Tool (LESAT) (Nightingale & Mize, 2002), and the Continuous Improvement Maturity Model (CIMM) (Jørgensen et al., 2006). These models conceptualize improvement capability as an evolutionary process in which organizations gradually develop routines, managerial practices, and learning mechanisms that support continuous improvement (Bessant et al., 2001; Netland, 2016). Within this perspective, maturity models allow researchers and practitioners to understand not only the level of implementation of improvement practices but also the organizational conditions that influence their development, including leadership, organizational culture, and employee involvement (Bortolotti et al., 2015; Hardcopf et al., 2021).

2.4. The Kaizen Maturity Model (KMM)

Within the context of Kaizen implementation, the Kaizen Maturity Model (KMM) has been developed as a practical framework to assess how deeply Kaizen principles are embedded in organizational practices. The model, developed and promoted by the Kaizen Institute, has been widely used in industrial environments and within the context of the Kaizen Awards to evaluate the maturity of organizational continuous improvement systems.

The KMM evaluates organizations across five key principles derived from the Kaizen philosophy:

- **Create Customer Value (CCV)** – alignment of organizational activities with customer needs and expectations.
- **Let It Flow (LIF)** – optimization of process flow through the elimination of waste, variability, and overburden.
- **Be Gemba Oriented (BGO**) – leadership practices focused on direct observation and problem solving at the workplace.
- **Empower People (EP)** – active involvement of employees in continuous improvement initiatives.
- **Be Scientific and Transparent (BST)** – data-driven decision-making supported by structured improvement methodologies.

Each principle is operationalized through several categories of analysis that evaluate how Kaizen practices are embedded in managerial routines, operational processes, and organizational culture. The detailed assessment rubric used in the evaluation process is presented in Appendix A.

The evaluation process follows a five-level maturity scale, ranging from an initial stage where improvement practices are informal (score = 1, the lowest), to advanced stages where continuous improvement is fully integrated into the organization (score = 5, the highest):

- **Level 1 – Local:** improvement initiatives are isolated and informal.
- **Level 2 – Emerging:** continuous improvement practices are defined but inconsistently applied.
- **Level 3 – Managed:** improvement processes are formally implemented and coordinated.
- **Level 4 – Integrated:** continuous improvement practices are systematically embedded across the organization.
- **Level 5 – Extended:** continuous improvement becomes a strategic capability that supports innovation and operational excellence.

The overall maturity level, referred to as the Kaizen Maturity Level (KML), is calculated by aggregating the scores assigned to each evaluation category. Higher KML values indicate stronger integration of Kaizen principles into organizational practices.

By linking the evaluation of Kaizen maturity with the organizational factors discussed in the previous sections, the KMM provides a structured analytical framework to explore how managerial practices, organizational culture, and employee engagement influence the practical implementation of Kaizen practices. In this sense, the model allows not only the assessment of the maturity of continuous improvement systems but also the identification of the organizational conditions that facilitate or hinder their development.

Building on this perspective, the present study uses the Kaizen Maturity Model as the central analytical framework to assess the maturity of Kaizen practices in four Colombian agri-food companies and to identify the organizational factors that shape their implementation.

3. Methodology

3.1. Research Design

This study adopts an empirical exploratory research design aimed at assessing the maturity of Kaizen practices and identifying the organizational factors that influence their implementation in Colombian agri-food companies. Given the limited empirical evidence regarding the application of structured continuous improvement models in emerging economies, an exploratory approach was considered appropriate to better understand how Kaizen principles are implemented in this context.

The study evaluates the level of maturity of Kaizen practices within participating organizations by applying the Kaizen Maturity Model (KMM), previously described in Section 2.4. This model provides a structured analytical framework to assess how deeply Kaizen principles are embedded in managerial practices, operational processes, and organizational culture.

By applying this framework, the study aims to analyze the maturity level of Kaizen implementation and explore the organizational conditions that facilitate or hinder the development of continuous improvement systems.

3.2. Research Context and Sample

The empirical study focuses on companies operating in the Colombian agri-food sector. This sector represents an important component of the national economy and faces increasing pressure to improve productivity, operational efficiency, and fosters competitiveness in international markets.

The participating companies were selected through purposive sampling. Organizations were invited to participate based on their interest in continuous improvement initiatives and their willingness to undergo an assessment of their Kaizen practices. The respondents included managers and operational leaders directly involved in improvement activities, who were considered key informants because of their direct experience in the implementation of Kaizen-related practices.

Table 1 shows some of the relevant socio-demographic characteristics of the selected companies. The company names have been changed to C1, C2, C3, and C4 for obvious reasons.

Company	Sector	Years in operation	Number of employees	Continuous improvement experience
C1	Food production	>30 years	2000	Kaizen initiatives implemented
C2	Food processing	>20 years	8000	Lean/CI programs
C3	Agri-food manufacturing	>25 years	887	Continuous improvement projects
C4	Food processing	>30 years	3800	Structured improvement system

Table 1. Characteristics of the companies participating in the study

3.3. Measurement Instrument

Kaizen Maturity Model (KMM), which evaluates the maturity of Kaizen implementation through five core principles: Create Customer Value (CCV), Let It Flow (LIF), Be Gemba Oriented (BGO), Empower People (EP), and Be Scientific and Transparent (BST).

Each principle is evaluated through a set of categories that assess how Kaizen practices are embedded in organizational routines, operational processes, and managerial behaviors. Respondents evaluated each criterion using a five-level maturity scale ranging from Level 1 (Local) to Level 5 (Extended).

The detailed assessment rubric used in the evaluation process is presented in Appendix A.

3.4. Measurement of KM Level

Data collection was based on semi-structured interviews supported by a standardized assessment instrument derived from the KMM evaluation criteria. The instrument included qualitative and quantitative items aligned with the five principles of the model. Interviews were complemented with document analysis and on-site observations. Real data were systematically recorded and analyzed using spreadsheet-based tools to compute maturity scores and identify patterns across cases.

The overall maturity of Kaizen implementation is expressed through the Kaizen Maturity Level (KML). For each organization, individual scores assigned to the evaluation criteria are first averaged within each principle. Subsequently, an overall maturity score is calculated by aggregating the results across the five principles.

Based on the resulting score, organizations are classified according to the five maturity levels defined by the KMM, ranging from early stages where improvement initiatives are informal to advanced stages where continuous improvement becomes a strategic organizational capability.

3.5. Data Analysis

The collected data were analyzed using descriptive statistical techniques in order to evaluate the maturity level of Kaizen implementation across the participating companies.

The analysis focused on two main aspects. First, the maturity scores obtained for each of the five Kaizen principles were analyzed to identify patterns in the development of continuous improvement practices. Second, the maturity results were examined in relation to the organizational factors discussed in the theoretical framework, including leadership commitment, employee involvement, organizational culture, structured problem-solving practices, and process orientation.

This analytical approach allows the study to explore how different organizational conditions influence the maturity of Kaizen implementation and to identify common challenges faced by organizations in developing sustainable continuous improvement systems.

4. Results and Analysis

4.1. Overall Kaizen Maturity Level

The assessment of Kaizen practices across the participating companies reveals heterogeneous levels of maturity in the implementation of continuous improvement systems. The overall Kaizen Maturity Level (KML), calculated by aggregating the scores obtained across the five principles of the KMM, indicates that most organizations are currently positioned in intermediate stages of Kaizen implementation.

While continuous improvement initiatives are present in all participating companies, the results suggest that the integration of Kaizen principles into managerial routines and operational processes remains uneven. In several cases, improvement practices are implemented through specific projects or initiatives rather than as fully institutionalized organizational capabilities.

These findings suggest that the participating organizations have begun to adopt structured improvement practices but still face challenges in embedding Kaizen principles systematically across the organization.

The following Table 2 illustrates the comprehensive results achieved by each company in evaluating the five Kaizen principles along with their corresponding maturity levels.

COMP	CCV	LIF	BGO	EP	BST	SUM	AVG	Observed KML
C1	68	44	56	52	60	280	56	Managed
C2	76	40	68	60	64	308	61,6	Integrated
C3	72	52	76	76	76	352	70,4	Integrated
C4	76	56	68	80	76	356	71,2	Integrated
SUM	292	192	268	268	276			
AVG	73	48	67	67	69			

Table 2. General aggregate results by principle and company. Row and column labels refer to the four companies studied and the five Kaizen principles (as presented in Table 1), respectively

4.2. Create Customer Value (CCV)

The principle of Create Customer Value evaluates the extent to which organizational activities are aligned with customer needs and expectations. The results indicate that most participating companies demonstrate a moderate level of maturity in this dimension.

Several organizations have implemented mechanisms to monitor customer satisfaction and collect feedback regarding product quality and service performance. These mechanisms include customer complaint systems, quality audits, and periodic evaluations of product performance.

However, the results also reveal that customer-oriented improvement initiatives are often limited to quality control activities rather than being fully integrated into strategic decision-making processes. In some companies, the link between customer value creation and continuous improvement initiatives remains weak, suggesting that improvement activities are still primarily focused on operational efficiency rather than on customer-driven innovation.

4.3. Let It Flow (LIF)

The Let It Flow principle evaluates how organizations manage process flow and eliminate operational inefficiencies. The results show significant variability among companies in this dimension.

Some organizations have implemented basic Lean management practices aimed at reducing waste and improving process efficiency. These practices include standardization of work procedures, basic process mapping activities, and efforts to reduce bottlenecks in production flows.

Nevertheless, the findings indicate that flow optimization practices are still at relatively early stages of development in several companies. In particular, the systematic identification and elimination of variability and operational waste remain limited, suggesting that process improvement initiatives are often reactive rather than proactive.

4.4. Be Gemba Oriented (BGO)

The principle of Be Gemba Oriented focuses on leadership practices that encourage direct observation of operational processes and problem-solving at the workplace. The results indicate that this principle represents one of the strongest dimensions across the participating companies.

Managers and supervisors frequently interact with operational teams and participate in improvement discussions related to daily production challenges. In several organizations, management practices encourage direct observation of processes and promote problem-solving discussions at the operational level.

However, the results also reveal that these practices are often informal and depend largely on individual leadership styles rather than on structured managerial routines. Consequently, the systematic institutionalization of Gemba-oriented leadership practices remains an area for further development.

4.5. Empower People (EP)

The Empower People principle evaluates the extent to which employees are actively involved in continuous improvement initiatives. The results indicate moderate levels of employee participation across the participating companies.

Several organizations have implemented mechanisms that allow employees to contribute improvement ideas, including suggestion systems and improvement meetings. In addition, employees in operational areas frequently participate in problem-solving discussions aimed at addressing production challenges.

Despite these positive practices, the results suggest that employee empowerment remains limited in scope. In some organizations, improvement activities are still primarily driven by managerial initiatives rather than emerging from bottom-up employee participation. This finding indicates that organizations are still developing the cultural and structural conditions necessary to fully leverage employee engagement in continuous improvement.

4.6. Be Scientific and Transparent (BST)

The principle of Be Scientific and Transparent evaluates the use of data-driven decision-making and structured improvement methodologies. The results reveal that this dimension represents one of the main challenges for the participating companies.

Although basic performance indicators are widely used to monitor production performance, the application of structured problem-solving methodologies remains inconsistent. In several cases, improvement decisions are based on managerial experience rather than on systematic data analysis.

The limited use of structured improvement methodologies such as PDCA cycles or root cause analysis suggests that organizations still face difficulties in adopting scientific approaches to problem solving. Strengthening analytical capabilities and data-driven decision-making therefore appears to be a critical area for the further development of Kaizen practices.

5. Discussion

The results of this study provide important insights into the maturity of Kaizen implementation in Colombian agri-food companies and highlight the organizational factors that influence the development of continuous improvement systems.

First, the overall maturity levels observed across the participating companies suggest that Kaizen practices are still in intermediate stages of development. Although continuous improvement initiatives are present in all organizations, they are often implemented through isolated projects rather than as fully institutionalized systems. This finding is consistent with prior studies indicating that organizations outside the original Japanese context frequently face difficulties in embedding Kaizen principles into daily managerial routines and organizational culture (Fryer et al., 2013; McLean et al., 2017).

From a maturity perspective, these results align with the evolutionary view of continuous improvement proposed by Bessant et al. (2001), which suggests that organizations gradually develop improvement capabilities as they adopt structured routines and learning mechanisms. The intermediate maturity levels identified in this study indicate that the participating companies have moved beyond initial stages of improvement but have not yet fully institutionalized continuous improvement as a strategic capability.

Second, the analysis of the five principles of the Kaizen Maturity Model reveals uneven development across different dimensions of Kaizen implementation. In particular, the results show relatively stronger performance in the principles related to Gemba-oriented leadership and employee involvement. This finding supports previous research emphasizing the critical role of leadership and employee participation in sustaining continuous improvement initiatives (Rich & Bateman, 2003; García-Sabater & Marín-García, 2009).

The prominence of Gemba-oriented practices suggests that managers in the participating companies actively engage with operational processes and support problem-solving activities at the workplace. This behaviour is

consistent with Lean management principles, which highlight the importance of direct observation and on-site decision-making for effective process improvement (Liker, 2004). However, the results also indicate that these practices are often informal and not fully institutionalized, which limits their long-term impact on organizational learning.

Similarly, the moderate levels of employee involvement observed in the study confirm that participation is a key enabler of continuous improvement, as widely documented in the literature (Jaca et al., 2012; Glover et al., 2014). Employee engagement facilitates the identification of improvement opportunities and supports the development of problem-solving capabilities at the operational level. Nevertheless, the findings suggest that employee empowerment remains constrained in some organizations, where improvement initiatives are still driven primarily by management rather than emerging organically from the workforce.

In contrast, the results reveal weaker performance in the principles related to process flow optimization and scientific problem-solving. This finding is consistent with previous studies indicating that organizations often struggle to implement structured methodologies for data-driven decision-making and systematic problem solving (Chiarini et al., 2018; Antony & Sony, 2020). The limited use of analytical tools and standardized improvement cycles such as PDCA suggests that many companies have not yet developed the technical capabilities required to support advanced stages of continuous improvement.

The relatively low maturity observed in the "Be Scientific and Transparent" principle also highlights a critical gap in the development of continuous improvement systems. As suggested by Bessant and Francis (1999), the ability to systematically analyse data and learn from improvement outcomes is essential for progressing toward higher levels of maturity. Without these capabilities, improvement efforts tend to remain reactive and lack the consistency required for long-term sustainability.

Furthermore, the findings reinforce the importance of aligning continuous improvement initiatives with organizational strategy. As highlighted in prior research, the lack of alignment between improvement activities and strategic objectives represents a major barrier to the sustainability of continuous improvement systems (Caffyn, 1999; Prajogo & Sohal, 2004). In the present study, the limited integration of customer value considerations into improvement initiatives suggests that organizations still face challenges in linking operational improvements to strategic outcomes.

Overall, the results demonstrate that the Kaizen Maturity Model provides a robust analytical framework for understanding the development of continuous improvement systems. By assessing multiple dimensions of Kaizen implementation, the model enables the identification of both strengths and weaknesses in organizational practices, supporting a more comprehensive understanding of how improvement capabilities evolve over time.

6. Conclusions and General Recommendations

This study aimed to assess the maturity of Kaizen implementation in Colombian agri-food companies and to analyse the organizational factors that influence the development of continuous improvement systems. By applying the Kaizen Maturity Model (KMM) as the central analytical framework, the research provides empirical evidence on how Kaizen principles are embedded within managerial practices, operational processes, and organizational culture in an emerging economy context.

The results indicate that, although all participating companies have adopted continuous improvement initiatives, most of them remain at intermediate levels of Kaizen maturity. Improvement practices are present but are often implemented as isolated initiatives rather than as fully institutionalized organizational capabilities. This finding suggests that the transition from project-based improvement to system-wide continuous improvement remains a critical challenge for organizations in the agri-food sector.

The analysis of the five principles of the KMM reveals an uneven development of Kaizen practices. Stronger performance was observed in dimensions related to Gemba-oriented leadership and employee involvement, highlighting the importance of managerial engagement and workforce participation in sustaining improvement initiatives. In contrast, weaker performance was identified in principles related to process flow optimization and

scientific, data-driven problem solving, indicating that many organizations still lack the technical and analytical capabilities required to support advanced stages of continuous improvement.

From a theoretical perspective, the findings support the view of continuous improvement as an evolutionary organizational capability, reinforcing the relevance of maturity models as analytical frameworks to understand the development of improvement systems over time. By linking organizational factors with maturity levels, the study also extends existing research by offering a more integrated perspective on how managerial practices, organizational culture, and employee engagement interact to shape Kaizen implementation.

From a managerial perspective, the results highlight the need for organizations to move beyond isolated improvement initiatives and focus on the systematic development of continuous improvement capabilities. In particular, organizations should strengthen their use of structured problem-solving methodologies, enhance data-driven decision-making, and ensure stronger alignment between improvement initiatives and strategic objectives. Additionally, fostering a culture that supports employee empowerment and cross-functional collaboration remains essential for achieving higher levels of Kaizen maturity.

This study is subject to some limitations. First, the research focuses on a specific sector and geographical context, which may limit the generalizability of the findings. Second, the cross-sectional design does not allow for the analysis of the evolution of Kaizen maturity over time.

Future research could address many of these limitations by conducting longitudinal studies to analyse the evolution of Kaizen maturity over time, expanding the analysis to other sectors and countries, and incorporating quantitative approaches to validate relationships between organizational factors and maturity levels. Additionally, further research could explore the integration of Kaizen with other improvement methodologies such as Lean and Six Sigma, as well as its relationship with broader organizational capabilities such as innovation and sustainability.

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Declaration of Conflicting Interests

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Authors' contributions

Luis Paipa (Author A): Conceptualization, methodology, investigation, data collection, formal analysis, writing – original draft preparation, visualization, and supervision.

Arturo T. De Zan (Author B): Conceptualization, methodology, validation, formal analysis, writing – review and editing, and supervision.

Both authors read and approved the final manuscript.

Data availability

The data that support the findings of this study are available from the corresponding author upon reasonable request. Due to confidentiality agreements with the participating companies, the raw data are not publicly available.

Use of Artificial Intelligence

Artificial Intelligence (AI)-based tools were used exclusively to support language editing, grammar refinement, and text organization during manuscript preparation. All scientific content, study design, data collection, data analysis, interpretation of results, and final decisions regarding the manuscript were performed and validated by the authors. The authors take full responsibility for the content of this article.

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Appendix A

Principles	Categories of analysis	Definition
1. Create Customer Value (CCV)	1.1 Capture the voice of the customer	To know the customer needs by market segment is the starting point of the company strategy.
	1.2 Quality first	Dedicated to quality (stop the process to immediately fix issues). Committed to fulfilling customer expectations.
	1.3 Market in	Scan the market for profitable growth opportunities, dive deep into these segments to find real customer needs & develop differentiated offerings that satisfy the customer experience.
	1.4 Next Operation as Customer	Commitment to Quality means Don't Accept, Don't Generate, Don't Pass poor Quality. Root causes are solved upstream.
	1.5 Improve Customer Experience	Quality is more than quantitative fulfillment of needs. Quality is the overall positive emotional experience including Design and Excellent Touchpoints.
2. Let It Flow (LIF)	2.1 Total Systems Optimization	Leaders know how to design, create, manage, and improve processes. Partial/ point/ functional optimization is avoided. Overall Systems Optimization and results reaching the customer is the focus.
	2.2 Make Process Flow End-to-End	The seven Flow Wastes are identified and a Vision to implement Flow across the full supply chain and preference to Customer Proximity is implemented.
	2.3 Stable Processes	Everyone understands the importance of reliability and repeatability of all process steps and consistent performance is the first concern of every Team.
	2.4 Pull at Customer Demand	Delivery and Production of products and services is done upon customer demand.
	2.5 Reduce 3 Mu's	Everyone understands waste (muda), variability (mura) and difficulty (muri) and takes an active role in eliminating these from all processes.
3. Be Gemba Oriented (BGO)	3.1 Organized & Visual Gemba	The workplace is organized for efficiency, visual management (VM) is used to make waste, standards, and behaviors visible. VM is used to avoid errors.
	3.2 Leaders go to Gemba	Leaders go to the place of work to understand problems firsthand and to observe the anomalies and ask people on the spot.
	3.3 Identifying Problems as deviation from standards:	Everyone can identify if the output was correctly developed, to guarantee if the process was correctly executed & to send only the outputs in conformance with standards to the next customer.
	3.4 Solve the problem by eliminating root causes	Throughout the organization, problem solving is based on root cause analysis, e.g. by deploying 5 WHY or Fishbone Diagram or more advanced techniques.
	3.5 Standardize processes	Provide transparency and allow anomalies to be quickly detected. Standards for all processes are available, used and improved.
4. Empower People (EP)	4.1 Set aligned goals for teams	Business objectives are deployed/ cascaded in the organization so that every team and individual know how to contribute and succeed.
	4.2 Lead by Example	All leaders share KAIZEN skills; and role model a KAIZEN mindset as they develop their teams.
	4.3 Leaders as coaches	Leaders play an essential role in teaching and coaching down the line. They actively drive this role down the line of their direct reports.

Principles	Categories of analysis	Definition
	4.4 No blaming	Leaders create a blame free environment, where focus is on accountability. Errors, deviations, or abnormalities are viewed as opportunities for learning and growth.
	4.5 Team development	Leaders and team take specific actions to support the team's success in accomplishing its mission.
5. Be Scientific and Transparent (BST)	5.1 Long term thinking	Management decisions are based on the long-term vision, even at the expense of short-term financial goals. True North Vision sets strategic direction.
	5.2 Focus on processes & results	Right lagging & leading indicators are used as KPIs at all levels. These KPIs are frequently monitored to find problems & drive improvements.
	5.3 Speak with data	Decision making and problem solving is based on real data from Gemba (Gemba Gembutsu). Visual Performance Management is used at all levels.
	5.4 PDCA/SDCA	PDCA cycle is deployed to improve towards target performance. SDCA cycles ensure that the improvements sustain and do not slide back.
	5.5 Reflect, learn and improve	Leaders ensure that an organization learns from both successes and failures. Knowledge management is the foundation for KAIZEN and Yokoten (Horizontal Deployment) is fully working.

Structure of the KML assessment process. Source: Kaizen Institute