



28 EISIC – 2025

Quality Management Evolution and Trends in Mexico (1990-2025)

Rafael Gerardo Espinosa Villalón

Independent Consultant

re@ppim.com.mx

Abstract:

a. Purpose of the paper: This article analyzes the evolution of Quality Management in Mexico from the early 1990s to the present year, as well as the current challenges in a dynamic and changing global environment. It was prepared by analyzing documentary information and conducting discussions to gather the views of those responsible for Quality Management and related areas, from various industries and professional associations.

b. Main findings: Five stages are identified: 1) the paradigm shift of Quality in Mexico, that focused in align it with trading partners. There were significant training and coaching efforts for managers and operational levels in companies that carried out binational projects. 2) Quality systems implementation in line with TQM models. 3) The shift from TQM to international quality standards as ISO 9001, which had a slower evolutionary process and focused primarily on production tools that led to a decrease in the comprehensive approach. 4) The strengthening of automotive industry and ISO 9001 standards in last ten years, which helped management systems scope and promoted their application in diverse sectors. 5) The actual situation, with process automation, certifications, tools and specialized standards that focus on strengthening specific organizational processes and the challenge is the quality management vision to combine them successfully, from a holistic perspective.

c. Type of paper: literature review

1. Introduction:

Reflecting on comments made during the closing session of EISIC 27 regarding the challenges faced by Total Quality Management (TQM) has prompted an evaluation of its evolution, current state, and future challenges in Mexico. This introspection is crucial for maintaining and advancing excellence within Mexican organizations.

In my professional journey, I have witnessed a profound paradigm shift in Quality Management (QM) at a national level, particularly within the automotive and appliance manufacturing sectors. This article outlines the major stages in the evolution of TQM in Mexico, detailing the changes implemented, objectives achieved, and the challenges that lie ahead to continue promoting a vision of excellence across domestic organizations.

A documentary review of the significant events shaping TQM's development in Mexico was conducted. Additionally, I sought insights from several esteemed colleagues with whom I have shared this journey, to provide a comprehensive account of accomplishments and present challenges. I express my gratitude to Víctor Cavazos, Sergio Baldit, and Jorge Parada for their invaluable contributions.

2. - Paradigm Shift in QM (Before 1990):

Before 1990, Quality Management in Mexico primarily focused on inspection tasks aimed at separating good products from defective ones on production lines. Quality departments were typically small and often subordinated to the Production department, consisting of a supervisor and a group of inspectors. The emphasis was on manufacturing, with quality assurance achieved through inspection.

During this period, Mexico's market was relatively closed, offering consumers limited product variety and innovation. Supply chains prioritized costs over compliance with quality requirements and specifications. Consequently, products made in Mexico were often pricier, less efficient, and technologically outdated compared to those produced in countries like the United States. Consumers also lacked effective channels to address product malfunctions, as customer satisfaction was not a priority for manufacturers.

The severe economic crisis of the 1980s prompted Mexico to seek new economic avenues, leading to trade liberalization and the signing of the North American Free Trade Agreement (NAFTA) on January 1, 1994.

Between 1988 and 1994, there was a notable evolution in production systems, particularly in Quality Management in Mexico. Inspired by Japan's Deming Prizes and the U.S.'s Malcolm Baldrige National Quality Award, a group of over twenty business leaders, organized under the Mexican Foundation for Total Quality A.C., proposed the establishment of a National Quality Award to the Mexican government.

On November 29, 1989, the President of Mexico approved this proposal, creating the National Quality Award (PNC). This initiative aimed to guide continuous improvement within organizations' total quality systems. The PNC was groundbreaking as the third of its kind worldwide and the first to incorporate Social Responsibility, emphasizing sustainable development, community well-being, and addressing societal priorities. It became a strategic element of the Ministry of Economy's programs for industrial and sectoral development.

The award's purpose was to encourage the adoption of comprehensive Total Quality Management (TQM) processes based on the National Model for Total Quality, and to recognize companies, educational institutions, and government agencies in Mexico with exemplary practices.

During this period, numerous co-investments between Mexican companies and international partners emerged to capitalize on NAFTA opportunities. Notable collaborations included Whirlpool Corporation with Grupo Vitro and General Electric with Mabe in the appliance sector, among others across various industries.

The advent of binational projects and NAFTA fundamentally shifted Quality Management paradigms in Mexico, as it implied an opening of borders to products manufactured abroad, which would compete frontally with those made locally and Mexican products destined for international markets required adherence to rigorous requirements and specifications.

In response, Mexican companies significantly increased training efforts across all organizational levels to develop business skills related to Quality Management. The PNC Model and preventive Quality Assurance systems played an influential role in shaping the conceptualization and objectives of the quality systems developed during this transformative period.

The necessity for higher-performing, cost-effective products to meet domestic market demands compelled many Mexican manufacturers to establish robust Quality and New Product Development systems. With the opening of borders, these companies recognized that prevention-focused approaches were crucial to remain competitive against global manufacturers.

Simultaneously, export initiatives necessitated adopting international work standards aligned with the specific requirements and specifications of new markets. This transition presented significant learning opportunities for many companies capable of manufacturing export-quality products. They took proactive steps to meet these international standards, fostering growth and development.

The conceptualization of quality systems in Mexico evolved from a primary focus on inspection to comprehensive quality management emphasizing defect prevention. Manufacturing plants predominantly drove this shift in the automotive sector and their supplier networks, utilizing statistical tools to support quality improvement initiatives. During this period, Mexico closely followed Japan's successful quality initiatives, incorporating tools such as the seven basic quality tools and quality circles. While some companies considered adopting these practices, many faced challenges due to cultural difference and the considerable cultural change required. As a result, successful implementations were rare and often temporary.

Furthermore, the National Quality Model served as a valuable guide for implementing Total Quality Management in larger industrial groups and companies with advanced quality systems. The National Quality Award played a significant motivational role—delivered annually in a ceremonious event presided over by the Mexican president—serving as both recognition and incentive for continuous improvement in quality practices across organizations.

3. - Implementation of TQM (1990 – 2010)

Between 1990 and 2010, the implementation of Total Quality Management (TQM) in Mexico experienced a significant surge, largely driven by the recognition and influence of the National Quality Award (PNC) established in 1989. During this period, numerous quality recognition initiatives emerged across different levels of government and industry. Several states created their own awards, while the federal government introduced the “Intragob” award to evaluate and honor its dependencies. Prominent private companies such as Vitro, Gruma, Femsa, and Cydsa, along with government entities like the Federal Electricity Commission (CFE) and the Mexican Institute of Social Security (IMSS), established internal awards to motivate quality improvement among their units.

This national momentum fostered a culture of continuous improvement as organizations participated in internal, state, and eventually national evaluations, culminating in recognition at the Iberoamerica level, creating a positive and synergistic environment for TQM development.

The era also saw the organization of major conferences dedicated to Total Quality. The most prominent, held annually in Mexico City and Monterrey N.L., attracted both national and international speakers. For example, the XI International Congress of Total Quality in Monterrey, themed “Response to Current and New Millennium Challenges,” drew wide participation and underscored Mexico’s commitment to evolving quality practices.

Organizations adopting TQM encountered valuable lessons, especially at the outset. A key realization was regarding how TQM was applied organizationally. Initially, large companies believed quality management should be confined to production units or operational areas. However, this approach proved inadequate. The more effective strategy was to recognize the functional roles of each corporate area and involve the designated process owners in the implementation process. This approach encouraged comprehensive interaction across the entire organization, facilitating coordination and system improvement. It often led to the involvement of corporate leadership, including CEOs and executive teams, fostering a culture of quality leadership from the top down. This insight was transformative emphasizing that successful TQM deployment requires systemic engagement across all levels and departments of an organization.

The second significant learning during this period was the recognition of the need for dedicated roles responsible for translating the implications of the TQM model across various functional areas. These roles involved analyzing existing practices within each area, developing integrated work systems, and identifying gaps where current practices did not align with TQM principles. The primary goal was to elevate the maturity level of the overall quality system, which was periodically evaluated. However, the underlying aim extended beyond mere assessment; it focused on improving performance through enhanced coordination and communication among departments.

Employees occupying these roles acted as both coordinators of TQM implementation and agents of change, engaging across all organizational levels and departments. They proposed better ways to foster coordination and communication, using the TQM model as a guiding reference. This approach helped diminish functional silos, promoting greater openness and interaction between departments, and fostering a more integrated organizational culture.

This phase was characterized by a dual approach: operational quality systems primarily tailored to manufacturing companies, and broader TQM initiatives applied within industrial groups. In many cases, both systems coexisted, with operational quality systems focusing on day-to-day production control, and TQM covering the entire organization to promote systemic improvements.

Operational quality systems evolved towards a more preventive stance. Key practices included acceptance sampling of first parts to ensure specifications, Statistical Process Control (SPC) programs on the shop floor, and statistical evaluations of process capacity to guide equipment and tooling procurement decisions. These initiatives involved extensive training at all levels, emphasizing the need for a mindset shift driven by the implications of free trade agreements. Employees learned to apply statistical tools and adopt procedures aimed at reducing variability and ensuring product quality.

Additionally, the organizational structure of Quality departments was redefined. They were elevated to be on equal footing with other core functions, reporting directly to company leadership. New roles specializing in prevention and process planning, such as Quality and

Process Engineers, were introduced alongside existing inspection personnel. This restructuring reinforced the shift towards a preventive, systemic approach—integrating quality seamlessly into operational processes and organizational strategy.

4. - Quality Systems and the ISO 9001 standard (2000 – 2015)

Between 2000 and 2015, quality management in Mexico saw the coexistence of TQM and Quality Assurance systems, with TQM reaching its peak in the early 2000s before gradually declining. Several factors contributed to this trend. The discontinuity of public policies, such as the irregular awarding of the National Quality Award by the presidency and the cessation of evaluation guidelines for federal dependencies after 2006, weakened the momentum. Moreover, the frequent leadership changes in private companies disrupted the continuity of quality initiatives.

Additionally, TQM's nature as a cultural philosophy focused on long-term, organization-wide improvement meant that it lacked the formalized structure of management standards. It was perceived more as a management philosophy encouraging continuous improvement rather than a certifiable standard. This led to challenges such as inconsistent implementation, focus shifting to evaluation results rather than ongoing improvement, and a lack of standardized documentation, making daily practice and formalization difficult.

In contrast, the introduction of ISO 9001:2000 brought a new, more structured approach based on a process-oriented framework and the eight principles of quality management. Awareness grew quickly among those involved in TQM, but several hurdles had to be addressed, including management's full engagement, comprehensive training in the standard's requirements (especially the process approach), and overcoming resistance to changes in work practices. Initial extensive focus on documentation sometimes overshadowed the core goal of process improvement.

Despite these challenges, ISO 9001:2000 significantly contributed to improving customer focus, fostering process orientation, and embedding a culture of continuous improvement. Certification numbers increased sharply—from approximately 1,000 companies in Mexico in 2000 to around 4,500 by 2010—spurred partly by large companies requiring their suppliers to obtain certification.

The 2008 revision of ISO 9001 clarified and refined the standards, helping organizations better grasp and implement the process approach. From 2008 to 2015, progress was notable across various sectors such as manufacturing, education, health care, and government. Governments adopted reforms and aligned their regulations with international standards, emphasizing accreditation and compliance.

In sectors like automotive and electronics, many companies adopted ISO 9001 and sector-specific certifications to meet international requirements. Educational institutions sought accreditation through bodies like COPAES to improve higher education quality, while health services implemented accreditation programs aligned with international standards to enhance patient safety and service quality.

However, obstacles persisted. Variability in standards implementation across regions, limited resources for accreditation bodies, resistance from some organizations, and lack of access to quality assurance mechanisms for informal and small businesses hampered uniform progress. Despite these challenges, this period marked a significant step toward integrating international quality standards into Mexico's organizational fabric.

5. - The evolution of quality systems in Mexico (2010-2024) and current challenges

The ISO 9001:2015 standard remains a central framework for quality systems in Mexico, introducing key enhancements aimed at improving organizational robustness. Its adoption has supported organizations in integrating risk-based thinking to proactively identify and mitigate potential issues, thereby increasing system effectiveness. The standard emphasizes understanding and managing process interactions, considering both external and internal contexts that influence strategic objectives, and ensuring top management's active participation to align quality management with overall organizational strategy. Additionally, the replacement of "documents" and "records" with "documented information" offers greater flexibility in documentation management, while new requirements around organizational knowledge ensure critical information is maintained and accessible for ongoing quality operation.

Over the past fifteen years, Mexico's approach to quality management has transformed significantly, driven by globalization, technological innovation, and regulatory reforms. From aligning standards internationally to deploying digital tools, Mexican enterprises have adapted to meet the demands of a highly competitive global economy. However, notable challenges persist, such as disparities in implementation and sustainability requirements continue to shape the quality landscape in Mexico.

5.1. - Main aspects and challenges that have evolved around quality systems in Mexico.

5.1.1. - Regulatory Modernization and International Integration (2010–2015)

Mexico prioritized harmonizing its quality infrastructure with international benchmarks, especially under NAFTA, the key actions were:

- Strengthening accreditation through the expansion of the Mexican Accreditation Entity (EMA).
- Widespread adoption of ISO 9001, ISO 14001, and sector-specific standards like IATF 16949 in automotive and aerospace industries.
- Initiatives such as the National Quality Infrastructure Program aimed at regulatory harmonization. These efforts cemented Mexico's role as a major manufacturing hub, attracting foreign investment and fostering high-tech sector growth.

These efforts consolidated Mexico as a competitive manufacturing center, attracting foreign investment in sectors of high technical demand.

5.1.2. - Technological Advances and Industry 4.0 (2016–2020)

The rise of Industry 4.0 ushered in innovations like:

- IoT-based monitoring systems for real-time defect detection.
- Predictive maintenance to enhance operational efficiency.
- Big data analytics to optimize supply chain quality.

Large corporations, especially in automotive, advanced swiftly by adopting standards such as IATF 16949, yet many SMEs lag due to resource limitations, hindering their competitiveness.

5.1.3. - USMCA and Post-Pandemic Adaptation (2021–2024)

The ratification of USMCA the Treaty between Mexico, the United States, and Canada (USMCA) in 2020, introduced stricter quality and labor standards, forcing Mexican exporters to improve traceability and compliance. After the COVID-19 pandemic, the focus was on:

- The development of resilient, remote auditing practices.

- Nearshoring strategies that elevated local quality expectations.
- Integration of ESG (Environmental, Social, Governance) principles into quality management, demanding greener processes and social responsibility.

5.1.4. - Ongoing Challenges

Despite progress, several critical issues remain:

- **SME Constraints:** Many small and medium-sized enterprises lack the resources and expertise needed to implement advanced quality systems, risking their competitiveness.
- **Regional Disparities:** Industrial strength in northern states like Nuevo León and Coahuila outpaces southern regions, deepening economic divides.
- **Sustainability Pressures:** Growing demand for eco-friendly practices requires costly transformations to reduce environmental impact without compromising quality.
- **Cybersecurity Risks:** As digitization deepens, vulnerabilities rise, especially in sectors requiring data integrity such as aerospace and automotive.
- **Global Competition:** Constant advancement by Asian and South American manufacturers compels continuous innovation; complacency could erode Mexico's sectoral leadership in electronics, textiles, and other industries.

Mexico's quality systems have advanced markedly since 2010, shifting from reactive, compliance-focused frameworks to proactive, technology-driven ecosystems. Moving forward, addressing disparities among SMEs, regional imbalances, and sustainability challenges will be vital. Strengthening collaboration among government, academia, and private enterprise—with investments in education and digital infrastructure—is essential. In the post-USMCA landscape, Mexico must balance quality, innovation, and inclusion to sustain its competitiveness and relevance in the evolving global economy.

6. - Is there future for (T)QM in 2025?

A concern that is present in practically all organizations has to do with the execution of the strategy. (T)QM allows addressing various challenges in this topic, by promoting a culture of continuous improvement, focus on the client, and interfunctional collaboration, transforming strategic execution into a systematic, inclusive and adaptable process, closing the gap between planning and the results.

- Misalignment between departments

(T)QM seeks to eliminate organizational silos by promoting teamwork interfunctional, ensuring that all departments align with the objectives organizational and contribute in a cohesive manner to the priorities strategic.

- Inconsistent processes

By standardizing workflows and reducing variability through tools such as statistical process control, reliable execution is ensured, minimizing errors that affect strategic outcomes.

- Low employee participation

Empowering employees at all levels to identify and solve problems, fostering a sense of responsibility towards initiatives strategic and improving commitment to its execution.

- Deficient communication

Structured feedback circuits are established (e.g.: customer insights, employee suggestions) to ensure that strategic objectives are communicate clearly and adjust according to data in real time.

- Resistance to change

By integrating continuous improvement into daily operations, adaptability, reducing resistance when strategies require changes in processes or behaviors.

- Inefficient allocation of resources

The databased approach (e.g.: Pareto analysis) identifies areas of high impact, directing resources to critical processes that drive strategic success.

- Disconnection between strategy and client

The client-centered approach ensures that strategies prioritize their needs, aligning execution with market demands to improve satisfaction and competitiveness.

- Lack of responsibility

Clear quality standards and performance metrics create responsibility at an individual and group level, guaranteeing constant progress towards strategic objectives.

- Short-term mentality

The orientation to a preventive approach (e.g.: Kaizen, PHVA cycles) combats the making of reactive decisions, maintaining alignment with strategic objectives before operational pressures.

Having the reference of potential contribution of TQM to strategy execution, the characteristics of the “Rocket Fuel” methodology were analyzed, (Gino Wickman & Mark C. Winters) where the main point is the synergy between a Visionary role and an Integrator role in a company. The Visionary is the generator of the global vision, while the Integrator is responsible for execution. The dynamics obtained by the interaction of these roles foster innovation, accountability of accounts, and sustained growth, what is sought is a balance between the innovation and the execution.

6.1. - Alignment, potential synergies, and challenges analysis for TQM and Rocket Fuel methodology combination.

6.1.1. - Alignment between TQM and the Rocket Fuel methodology Shared focus on leadership and accountability:

TQM: Emphasizes among other aspects, the commitment of leadership to the culture of quality, customer satisfaction, employee empowerment and inter functional collaboration.

Rocket Fuel: It is based on the collaboration between the Visionary and the Integrator to make the vision a reality and boost execution and accountability. The Integrator can act as the "quality system leader" to design the work systems and ensure their correct execution.

Expected Synergy: The Integrator's operational approach aligns with the TQM need for a systematic process management.

6.1.2. - Process Optimization:

TQM: Uses tools such as PDCA cycles (Plan-Do-Check-Act), Six Sigma and continuous improvement to eliminate waste and defects.

Rocket Fuel: Is based on EOS (Entrepreneur Operation System) tools (e.g., Scorecards, Rocks) to optimize processes and align teams.

Synergy: The Rocket Fuel execution framework can operationalize the quality objectives of TQM, through work systems (e.g., establishing "Quality Rocks" as quarterly priorities).

6.1.3. - Client-centered approach

TQM: Prioritizes customer satisfaction through quality standards and feedback cycles.

Rocket Fuel: The visionary tends to embody the customer-centered vision, while the integrator ensures that the delivery meets the same expectations.

Synergy: Combine customer knowledge based on information and TQM data, with Rocket Fuel's strategic alignment to refine products and services.

6.1.2. - Potential Synergies

6.1.2.1.- Leadership Roles:

Visionary: Drives innovation (e.g., customer experience initiatives or new quality standards).

Integrator: Implements TQM systems throughout the company (e.g., process certifications, reduction of errors and or failures in processes) and oversees KPIs.

6.1.2.2.- Cultural Integration:

Rocket Fuel's emphasis on trust and clarity in leadership perfectly complements TQM's need for a culture that prioritizes quality. EOS meetings can be useful to review TQM metrics and address quality improvement opportunities.

6.1.2.3.- Continuous Improvement:

Combine TQM's PDCA cycles with Rocket Fuel's quarterly "Rocks" to iteratively improve organizational outcomes. The feedback cycles act as the "nervous system" connecting customer opinions, process performance, and leadership decisions.

Allow organizations to adapt dynamically while maintaining quality standards and discipline in execution.

6.1.3. - Challenges to Address

6.1.3.1. - Distinct Priorities:

TQM focuses on a long-term quality culture, while Rocket Fuel emphasizes short-term execution. It would be necessary to balance both aspects through strategic planning.

6.1.3.2. - Role Ambiguity:

Ensure that the integrator is not overloaded with implementing TQM and ensure that the visionary's strategy is executed.

6.1.3.3. - Integration of measurements at different organizational levels:

TQM requires data of different degrees of integration and Rocket Fuel tracks high-level KPIs. Ensure the integration of dashboards that help monitor the strategy and organizational processes.

As could be observed, there are indications, that focusing in the knowledge obtained when implementing TQM systems, it is possible to establishing the dynamic "vision-execution" of the strategy", through the integration and harmonization of organizational processes from a complete perspective.

The Integrator role shares several characteristics of TQM implementer, designing systems and work processes throughout the organization, with the difference that previously the Quality model was the reference and in contrast the design, monitoring and improvement of the processes should be delineated to support the strategy for business objectives.

6.2. - Essential characteristics of TQM to be useful in 2025

- Personalized customer-centered approach Use data analytics to anticipate needs and offer solutions personalized, ensuring loyalty in competitive markets.
- Data-driven decisions Integrate AI, IoT and predictive analytics to optimize processes and control quality in real time.
- Agility and adaptability combine agile methodologies to respond quickly to changes in the market, technological disruptions or crises.
- Empowerment of talent Foster autonomy, continuous training and collaboration in hybrid or remote.
- Integrated sustainability Prioritize circular practices, ethics in the supply chain and compliance with ESG standards (environmental, social and governance).
- Digital transformation Implement Industry 4.0 tools (block chain, automation) for traceability and error reduction.
- Collaboration without silos Use digital platforms for interdepartmental teamwork and with partners external.
- Constant innovation Align continuous improvement with R&D and disruptive business models.
- Resilience and risk management Prevent threats (cybernetic, geopolitical) and ensure operational continuity before crisis.
- Quality culture led from management promote individual responsibility and inclusion at all levels organizational.
- Global and ethical standards align with the best global quality practices, while addressing and take into account ethical concerns about biases in AI algorithms or data privacy.
- Efficient and flexible processes eliminate waste with "lean" principles, maintaining flexibility despite the adaptation to different customer needs.

If TQM has these characteristics, it could continue to be a powerful tool for driving quality, innovation and confidence in a globalized and constantly changing world.

7. – Conclusion

TQM's decline from perception gaps and operational challenges rather than irrelevance. By integrating technology, aligning with contemporary priorities (as for example sustainability, digitization), and simplifying implementation, organizations can reinvent TQM as a holistic strategy for resilience and customer-centric growth. The key is to adapt its timeless principles—continuous improvement, employee empowerment, and systemic thinking.

REFERENCES:

Wickman & Winters, 2016, *Rocket Fuel, the one essential combination that will get you more of what you want from your business*, Benbella books, USA.