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**PHÂN TÍCH QUẢN LÝ CHẤT LƯỢNG TOÀN DIỆN (TQM) TẠI TOYOTA VÀ
ĐỀ XUẤT BÀI HỌC CHO NGÀNH CÔNG NGHIỆP Ô TÔ VIỆT NAM**

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Tóm tắt

Bài nghiên cứu này phân tích việc triển khai hệ thống Quản lý chất lượng toàn diện (TQM) của tập đoàn Toyota, vốn được xem là một chuẩn mực toàn cầu về quản lý chất lượng trong ngành công nghiệp ô tô. Bài viết nghiên cứu các ứng dụng TQM cốt lõi của Toyota nhằm đánh giá hiệu quả hoạt động và chất lượng sản phẩm đồng đều. Nghiên cứu cũng chỉ ra những hạn chế hiện nay trong ngành công nghiệp ô tô ở Việt Nam như ứng dụng hệ thống quản lý chất lượng chưa đồng đều, năng lực nhà cung cấp còn phân tán và cơ sở hạ tầng chưa hoàn thiện. Thông qua phương pháp phân tích định tính, nghiên

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cứu đưa ra các đề xuất chiến lược TQM mà Việt Nam có thể áp dụng để nâng cao hiệu quả quản lý chuỗi cung ứng trong ngành ô tô.

Từ khóa: quản lý chất lượng toàn diện, TQM, Toyota, ngành ô tô, ngành công nghiệp ô tô Việt Nam

ANALYSIS OF TOTAL QUALITY MANAGEMENT (TQM) IN TOYOTA AND LESSONS FOR VIETNAM'S AUTOMOBILE INDUSTRY

Abstract

This research paper analyzes Toyota's implementation of the Total Quality Management (TQM) system, a global benchmark for quality excellence in the automobile industry. It examines Toyota's core TQM practices to evaluate how they contribute to the operational effectiveness and consistent product quality. The paper then looks into the current limitations in Vietnam's automotive industry, including uneven adoption of quality management systems, fragmented supplier capabilities, and insufficient infrastructure. Through qualitative analysis, the study proposes TQM strategies that Vietnam can adopt to strengthen its supply chain management in the automotive sector.

Keywords: Total Quality Management, TQM, Toyota, automotive sector, Vietnam's automobile industry

1. Introduction

In the current competitive global automotive market, quality has become one of the key factors that define a company's success or relative competitiveness. Total Quality Management (TQM) provides a comprehensive approach that integrates quality considerations at every stage of production and supply chain operations. One of the most successful examples of TQM implementation is Toyota, a pioneer in the use of TQM in the automobile industry. Studying Toyota's TQM model provides valuable insights into how quality can be integrated across procurement, manufacturing, logistics, and workforce management to achieve sustainable competitive advantage.

The objective of this research is to understand the core components of Toyota's Total Quality Management system and its application across the supply chain. By evaluating TQM achievements of Toyota and the current limitations in Vietnam's automotive industry, practical insights can be derived to improve supply chain resilience and efficiency of Vietnam's TQM adoption.

The paper begins with a literature review of prior research on TQM in the automotive industry, emphasizing gaps in the Vietnamese automotive context. It then describes the theoretical framework underlying TQM concepts and their significance in automotive supply chains. The methodology section outlines qualitative approaches used for data collection and analysis. The core of the study presents an in-depth analysis of Toyota's TQM practices, followed by recommendations tailored for the Vietnamese automobile industry.

2. Literature review

2.1. Prior research on TQM in the automotive industry

2.1.1. Categorised by brands

The study on Total Quality Management (TQM) in the automotive industry has evolved, with two main analytical approaches. The first one is focusing on specific automakers and another examining TQM in a national/regional context, especially in emerging economies such as the ASEAN region.

Among various cases, Toyota is recognized as the most comprehensively studied case. It is justified that its success comes from strict integration of the Toyota Production System (TPS) and the philosophy of “The Toyota Way”. According to Liker (2004a), this system is operated through 14 management principles, pointing out that TQM in Toyota is not simply a set of tools but an organisational culture, based on two fundamental pillars: “Continuous Improvement” (Kaizen) and “Respect for People”. Spear & Bowen’s (1999) research decoded the DNA of TPS, showing that simple but strict operating rules pushed employees to self-discover and solve problems, while embedding quality into every stage of production.

Besides Toyota, other Japanese manufacturers such as Honda and Nissan have also driven a lot of academic attention. Research on Honda emphasized more on its quality philosophy in engineering, innovation, and work culture towards perfection. On the other hand, Nissan's revival under Carlson is a classic case study of strategic restructuring, cost-cutting, and strategic reorientation towards quality and efficiency.

For European manufacturers such as Volkswagen and BMW, research shows that TQM is implemented in conjunction with strict engineering standards, focusing on superior quality and safety. The German spirit of “Technik” (technical excellence) appears as a consistent strategy. Studies often emphasize the challenge of these firms in maintaining consistent quality in the context of increasingly complex global supply chains.

In contrast, U.S. automakers such as Ford and General Motors (GM) illustrate a notable shift in quality management. After experiencing serious quality and competitiveness challenges, both companies initiated large-scale restructuring and gradually adopted TTQM and Lean practice - approaches that they adapted after studying Japanese methods such as Toyota Production System. Research on initiatives like the Ford Production System and GM’s global production efforts emphasizes the considerable difficulty of transforming corporate cultures to support employee empowerment and continuous improvement.

Finally, the rapid rise of Korean companies such as Hyundai and Kia has also been widely documented. Studies describe their transformation from low-cost carmakers to global leaders, thanks to the

aggressive application of TQM, large investments in R&D, and the implementation of disciplined, centralized quality control systems from the top.

2.1.2. Categorized by nations

Within the ASEAN region, Thailand has emerged as a typical successful case. The development of Thailand as the “automotive cradle” of the region is explained as the result of an effective combination of three factors: first, consistent and investment-attracting government policies, supported by organizations such as the Automotive Industry Institute of Thailand; second, the development of a strong supporting industry with a network of local suppliers capable of absorbing and effectively practicing TQM and Lean Manufacturing; and third, the formation of concentrated industrial clusters, such as the Eastern Seaboard area, which facilitate knowledge spillovers and effective collaboration. The study by Techakanont & Terdudomtham (2011) is a typical example showing that automotive companies in Thailand have applied TQM very effectively.

In Indonesia, studies, such as Siwage & Hidayat (2022), often emphasize the role of national car programs and the challenges in developing localization rates and upgrading the technical capabilities of domestic suppliers.

In Malaysia, the literature focuses more on the case of Proton, analyzing the journey of technology transfer and quality management from Mitsubishi, and pointing out the difficulties in building an autonomous and sustainable quality ecosystem after the joint venture relationship ends.

For Vietnam, the first application of new TQM mainly remains with basic tools such as 5S and ISO 9001 quality assurance system. Second, the main barriers identified include limited capacity of local suppliers, a management culture that is heavily centralized and command-driven from the top, short-term thinking in investing in quality, and the implementation of TQM in a fragmented manner, which has not really become a philosophy throughout the entire organization.

2.2. Research gap

2.2.1. Limited Integration of TQM and Supply Chain Management

Existing research has focused mainly on analyzing TQM within the scope of each enterprise, without systematically examining the application of TQM throughout the entire supply chain. This is a significant gap, especially in the automotive industry, where there is a close dependence on the network of suppliers. The mechanisms for transferring TQM practices from assembly companies to local suppliers have not been fully studied, despite their important role in the overall competitiveness of the industry.

2.2.2. Lack of contextualized implementation framework

Although Toyota's TQM system is considered a global gold standard, most of the existing literature has not yet provided a specific guiding framework to adapt these principles to the industrial conditions of Vietnam. There is still a lack of research that can translate Toyota's complex practices into feasible strategies for Vietnamese enterprises, especially when considering the practical constraints of management culture, labour capacity, and the readiness of local suppliers.

3. Theoretical framework

3.1. Definition of Total Quality Management (TQM)

3.1.1. Concepts

In 1994, the International Organization for Standardization ISO introduced the concept of TQM as follows: "TQM is a way of managing an organization, focused on quality, based on the participation of all members, aiming at long-term success through customer satisfaction and benefits to all members of the organization and to society.

3.1.2. Eight principles of TQM

Customer focus

The core principle of TQM is customer focus. All activities in the organization must be oriented towards meeting the current and future needs of customers. When the business clearly understands customer expectations and continuously improves quality, customer satisfaction and loyalty will increase (Evans, 2013).

Leadership

Leadership plays an important role in orienting quality goals and creating a positive working environment. Leaders need to commit, inspire, and facilitate employees to perform well to achieve common goals (Evans, 2013).

Involvement of people

Employees must be well-trained, committed, and enthusiastic in their work to work towards interdependent goals. The working environment needs to promote employee initiative, motivation and engagement, as their active participation will contribute to creating an effective team spirit. Evans (2013) identifies three important forms of collaboration: vertical, horizontal, and inter-organizational collaboration.

Process approach

TQM emphasizes process management, in which processes need to be continuously controlled and improved to produce high-quality outputs. Good results from a process approach will improve customer satisfaction (Evans, 2013).

System approach to management

TQM requires an organization to manage related processes as a unified system. According to ISO, “Identifying, understanding, and managing interrelated processes as a system contributes to increased efficiency and effectiveness in achieving the organization’s objectives.” This helps businesses develop clear strategies, collect and use relevant data during implementation.

Continuous improvement

Continuous improvement is a core principle of TQM, helping organizations maintain a competitive advantage. Continuous improvement of processes, services and products allows businesses to better meet customer needs and improve operational efficiency (Evans, 2013).

PDCA is considered the ultimate tool for continuous improvement because of its ability to simplify complex problems into manageable action steps. It helps build a sustainable improvement culture where every individual from production, QC, maintenance to management is mobilized to optimize the process. More importantly, PDCA not only standardizes effective solutions and enhances collaboration between departments, but also has a direct and measurable impact on key KPIs such as OEE, defect rate, delivery time and cost efficiency. (Orca Lean, 2024)

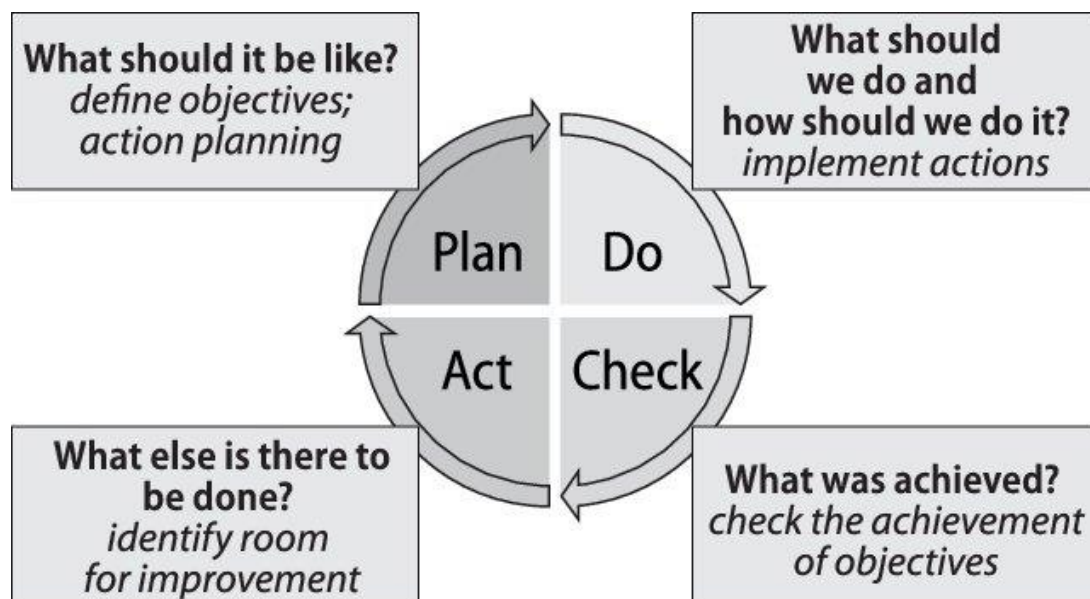


Figure i. PDCA cycle of continual improvement of processes

Source: Luburić, 2015

Factual approach to decision-making

Decisions should be based on real data rather than emotions. Data analysis allows organizations to make accurate decisions, contributing to improving processes and enhancing the quality of products or services. This is the optimal way to achieve customer satisfaction (Evans, 2013).

Mutual beneficial supplier relationship

Mutually beneficial relationships with suppliers (reciprocity) are an important principle of TQM. Since businesses operate based on many interconnected parts, building effective cooperation with suppliers helps optimize processes, reduce risks, and improve overall quality. Businesses often use process diagrams, charts or visual tools to clearly understand the connection between parts. However, implementing TQM is not easy and requires a change in organizational culture, so it needs to be done slowly and accurately (Evans, 2013).

3.2. Significance of TQM in the automotive supply chain

3.2.1. Ensuring cost effectiveness and End-to-End quality

TQM prevents costly defects and recalls by synchronizing quality standards from the smallest supplier to the final assembly plant. By incorporating principles like "quality at the source," it enhances customer satisfaction and protects the brand's reputation (Liker, 2004a). Additionally, TQM drives out waste (*muda*) through practices like Just-in-Time (JIT) production, which relies on and fosters perfect quality to minimize inventory and associated costs across the supply network (Ohno, 1988).

3.2.2. Building a resilient and innovative network

TQM turns transactional supplier relationships into cooperative, long-term alliances. This is essential for resilience because open communication and trust allow partners to proactively manage risks and work together to solve issues during disruptions (Sheffi, Y., 2013).. Moreover, this collaborative environment, supported by supplier development and a culture of continuous improvement (*kaizen*), becomes a powerful driver of innovation, enhancing the entire chain's technical capabilities and performance (Marksberry, P.,2013).

3.2.3. Empowering a unified, problem-solving culture

People are the primary factor for the success of the automotive supply chain. TQM's principle of "total participation" empowers every employee, from the OEM to the Tier-n supplier, to act as a quality inspector and problem-solver. This human-centric approach, exemplified by practices like *Jidoka* (where any worker can stop the line), ensures that quality is a shared responsibility, leading to faster issue resolution and sustained operational excellence.

4. Methodology

This study employs a qualitative research approach, utilizing document analysis and case study analysis as the primary research methods. These methods are selected to provide an in-depth understanding of Toyota's Total Quality Management system and its potential applications in Vietnam's automotive industry.

An extensive document analysis was conducted using multiple credible sources. Academic publications, peer-reviewed journals on TQM and automotive quality management, along with Toyota's official publications, including annual reports, sustainability reports, and TPS guidebooks, were analyzed to understand the company's quality management philosophy. Additionally, industry reports from Vietnam Automobile Manufacturers' Association (VAMA) and government publications provided context for Vietnam's automotive industry. For case study analysis, Toyota was selected as the primary case study due to its globally recognized excellence in TQM implementation. The case study analysis focused on examining Toyota's quality management system through multiple dimensions. The analysis also considered both achievements and limitations in Toyota's TQM implementation to provide balanced insights.

5. Analysis of Toyota's Total Quality Management

5.1. Company overview

Toyota Motor Corporation (TMC) was founded in 1937 by Kiichiro Toyoda. With a diverse product portfolio encompassing passenger cars, hybrid and electric vehicles, and luxury models (Lexus), the company has grown to become one of the biggest automakers in the world, operating in more than 170 countries and territories.

Toyota is a global leader in manufacturing and management systems due to its reputation for excellence. Its reputation in quality control was strengthened when it received the Deming Application Prize in 1965 and the Japan Quality Control Award in 1975 (Toyota Motor Corporation, 2025). The company's brand equity also consistently ranks among the world's top automakers every year. In 2025, it returned to the Top 1 brand value position of 64.7 billion dollars, ranked by Brand Finance, surpassing its competitor, Tesla (Brand Finance, 2025). Importantly, Toyota's operational excellence has its roots in an established and integrated quality management philosophy that has influenced global industrial practice.

5.2. Total Quality Management in Toyota's supply chain

Total Quality Management (TQM) is integrated in Toyota's corporate culture and manufacturing systems, technically based on the timeless principles of "customer first", "kaizen" (continuous improvement), and "total participation" (Toyota Motor Corporation, 2025).

Toyota's quality philosophy is grounded in The Toyota Way, a management framework rooted in decades of continuous learning. According to Gary L. Convis (Former Managing Officer of Toyota Motor Corporation), the original Toyota Way outlines two core pillars:

- ***Continuous Improvement (Kaizen)*** - an organizational culture of constant, incremental enhancement of processes and systems.

- **Respect for People** - a belief that quality improvement depends on engaging, developing, and trusting people at all levels of the organization.

The Toyota Way 4Ps is Toyota Motor Corporation’s codified set of management and production principles, encapsulated in four interrelated dimensions, commonly known as the 4Ps. This 4Ps model was first articulated by Jeffrey K. Liker in his seminal work *The Toyota Way* (2004), based on more than two decades of academic research within Toyota facilities.

These four categories of “P” are not arbitrary; rather, they provide a structured framework that underlies Toyota’s entire organizational structure. Liker (2004a) organized Toyota’s 14 management principles into these four mutually reinforcing categories, forming a pyramid in which long-term philosophy undergirds process, people and problem-solving practices.

- **Philosophy** emphasizes long-term thinking and purpose beyond short-term financial goals.
- **Process** centers on building the right systems and workflows (i.e. continuous flow, pull systems, standardization) to produce quality and expose problems.
- **People and Partners** highlights the development, engagement, and respect of employees and supply-chain partners.
- **Problem Solving** focuses on root-cause analysis, continuous improvement (kaizen), and learning by “going and seeing for yourself” (genchi genbutsu) and using consensus-based decision-making.

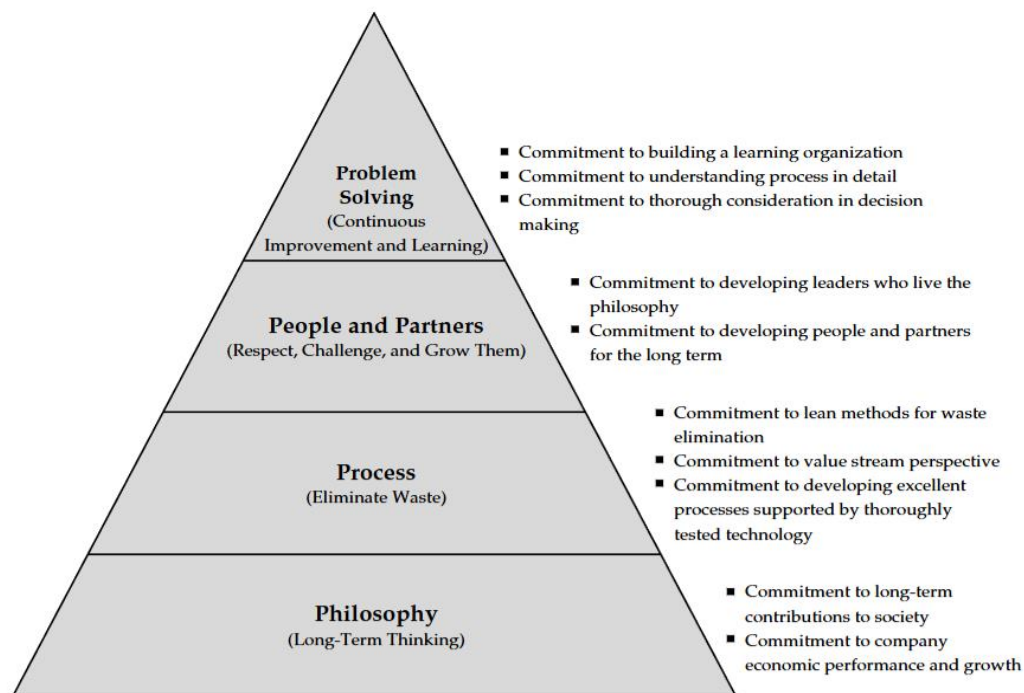


Figure ii. The Toyota Way 4Ps Model

Source: Liker and Meier, 2006

This 4Ps model explains not only what Toyota does under Toyota Production System (TPS), but also why those practices work - because they are grounded in philosophy, sustained by people, and driven by a culture of learning and improvement.

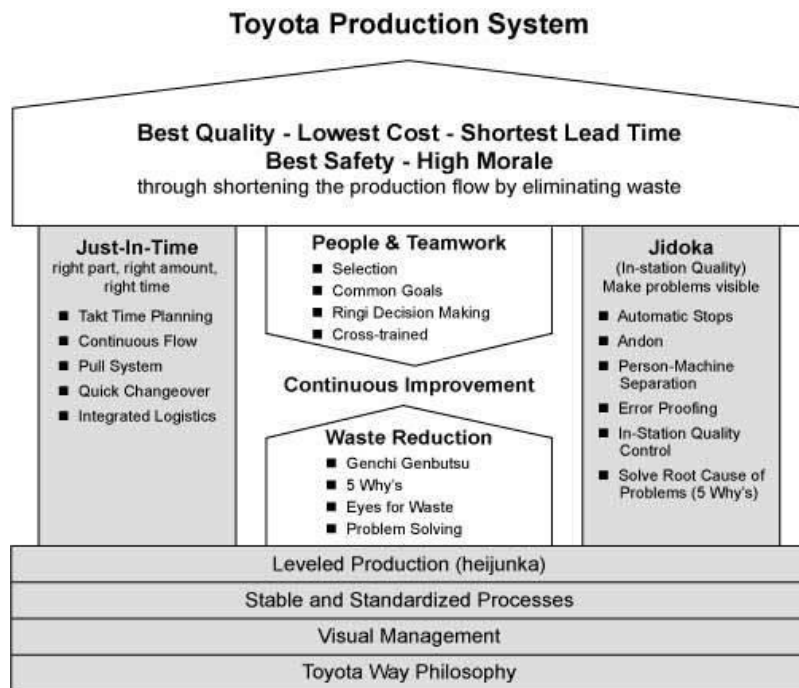
5.2.1. Philosophy

Toyota's guiding philosophy stresses long-term vision with "customer first" and "quality first values (Toyota Motor Corporation, 2025). This means every strategy or investment is justified by its long-term impact on quality and customer satisfaction. This focus creates what W. Edwards Deming called "Constancy of purpose", an unwavering commitment that aligns the entire organization toward a common goal far greater than quarterly profits.

A case reflecting the strong power of the "long-term thinking" philosophy of Toyota is the TABC Truck Bed Plant. When Toyota decided to move its truck bed business to a new factory in Mexico, instead of closing the plant for economic benefits, the company chose to find new work for the facility that had performed exceptionally well for 30 years (Liker, 2004b). This sent a powerful message to every Toyota employee: the company values a committed, high-performing workforce far more than the fleeting economic benefits of chasing low-wage labor.

5.2.2. Process

The Process layer of the Toyota Way emphasizes building high-quality into every operation. Toyota Production System, resting on two pillars - "Jidoka" and "Just-in-time", is the practical manifestation of Toyota's Total Quality Management (TQM) philosophy and provides the specific tools and processes to facilitate that philosophy in reality.



Source: J. Liker (2004). *The Toyota Way*. McGraw-Hill. pg. 33.

Figure iii. Toyota Production System house model

Source: Liker, 2004b

Jidoka

Jidoka, often referred to as “autonomation”, means building quality into the production process by adding human intelligence to the automated machinery (Liker, 2004b; Toyota, 2025). It empowers either the machine or the worker to stop the entire production line the moment a defect or abnormality is detected. In modern Toyota plants, the andon (signal board) and stop-line cord embody Jidoka: problems are made visible immediately, so they can be solved before harm is done.

Due to this adoption of Jidoka, there is a mere difference in how the management board of Toyota and other automakers, for example, Ford, react to the underproduction of a shift. According to Gary Convis, you have to explain to the Division if not running production for 100% of the shift (Liker, 2004b). Meanwhile, at Toyota, ensuring safety and quality takes precedence over hitting production targets, as long as root cause analysis and problem-solving are implemented. Paradoxically, the tolerance for underproduction does not hinge on productivity; rather, Toyota is still regularly ranked among the most productive plants in the auto industry. This is the result of the continual learning process through the empowerment to integrate wisdom into automated processes when each stop is an opportunity for workers to eliminate unwanted errors and improve the process. Thus, Jidoka not only prevents defects but also drives the never-ending quality improvement central to TQM.

However, there are also some criticisms. A prominent one is that to ensure Jidoka is implemented properly, the sense of responsibility to ensure quality at each station is of great importance (Liker, 2004b). This means it requires that workers feel empowered and safe to pull the andon cord, fostered

by the promise that team members would not face repercussions. This also means that leaders, in turn, have to ensure their teams use the system judiciously, avoiding unnecessary production halts.

Just-in-Time (JIT)

Just-in-Time is defined as making exactly what the customer needs, when it is needed, and only in the amount needed. Heijunka, or production leveling, is the foundation of JIT, which employs pull signals, takt time, and flow to reduce waiting and overproduction (Soliman, 2022). The main goal is waste elimination: JIT reduces expenses and defects related to large stocks by reducing inventory buffers and excess parts.

Toyota's adoption of JIT principles, demonstrated through customer-centric navigation and continuous improvement, closely resembles the TQM mindset. In fact, JIT is a “pull system” that is initiated by actual customer demand rather than forecasts. In order to avoid the waste of overproduction, the plants stock just enough parts for the following cycle and replenish only what is needed to produce only marketable items. The limit in work-in-process inventory leads JIT to expose inefficiencies and quality issues, forcing problems to surface and raising an urge to resolve them quickly, thereby embracing continuous improvement.

JIT necessitates strict coordination and discipline; otherwise, there may be a trade-off: businesses are more vulnerable to unforeseen shocks (Ortiz, 2022). To address this problem, Toyota uses strict quality control, a variety of suppliers, and ongoing kaizen. In reality, Toyota usually locates its suppliers and plants nearby and pulls parts in small lots using kanban, which is effective for consistent volumes (Sodhi and Choi, 2022).

5.2.3. People and Partners

The People and Partners pillar embodies TQM's idea of total participation. In fact, “Respect for People” is one of two original pillars of The Toyota Way (Basu, 2011). Toyota's core belief is that its systems are animated by exceptional people, and sustainable quality is only possible by systematically developing individuals, teams, and external partners (Liker, 2004b). The involvement of people in Toyota notably encompasses three elements: leadership, teamwork, and supplier participation.

Leadership

Toyota grows its leaders from within, a stark contrast to the common Western practice of hiring high-profile external CEOs to enact radical change. Leaders like Fujio Cho, who learned TPS at the feet of Taiichi Ohno, rose through the ranks over decades. The leadership function at Toyota requires leaders to possess both an in-depth, hands-on understanding of the work (*genchi genbutsu*) and a commitment to being bottom-up people developers. They are expected to be mentors and teachers of the philosophy, not just managers who give orders (Bouttell, 2025). This is also reflected in Principle 9 of The Toyota

Way compiled by Liker (2004b): “grow leaders who thoroughly understand the work, live the philosophy, and teach it to others”.

Teamwork

The very design of the Toyota Production System fosters teamwork. A one-piece flow cell, for example, makes team members highly interdependent; if one person falls behind, the entire cell is affected (Liker, 2004b). This technical system must be supported by a robust social structure. The andon system is no exception; rather, it fosters this principle even more. As andon cords allow any team member to stop the line, the team has to gather and fix the problem together to reach kaizen. The leader must also shoulder the responsibility to ensure that no halt in production is unnecessary.

Supplier participation

Toyota treats its suppliers as an extension of its own business, fostering long-term partnerships rather than purely transactional relationships. Rooted in principle 11 of The Toyota Way - “Respect your extended network of partners and suppliers by challenging them and helping them to improve” - Toyota engages suppliers as extensions of its team (Liker, 2004a). In practice, Toyota systematically collaborates with its suppliers to implement lean strategies, and is even attributable to the development of supplier development through supporting and teaching them lean practices (Marksberry, 2012). For example, the Toyota Supplier Support Center (TSSC) dispatches Toyota experts to struggling suppliers to conduct lean workshops, reflecting Toyota’s effort to help partners improve. Beyond that, it is claimed by Akio Toyoda, Toyota’s current Chairman of the Board of Directors, that Toyota and its suppliers share a family-like bond (Toyota, 2023).

5.2.4. Problem-solving

The Problem-solving layer is the mechanism for continual learning and improvement, directly supporting the TQM principles of Kaizen and Factual approach of decision-making.

Kaizen

Kaizen at Toyota means “change for the better” - a relentless, incremental improvement process. It humanizes the workplace by empowering team members to improve their own processes (Toyota, 2013). Standardized work ensures problems become visible, so that workers can promptly raise and resolve them. Integral to Toyota’s culture is Hansei, or self-reflection. Teams must identify what went wrong and plan how to prevent recurrence. Failing to find problems indicates a lack of critical review (Toyota, 2016). This mindset of Hansei is important in the TPS as it reinforces learning and continuous improvement at all levels.

Another representative of kaizen is the automaker’s long-standing suggestion system - launched in 1951 - encouraged employees to submit improvement ideas; by 1980, this had generated over 5 million

suggestions (Toyota Motor Corporation, 2025). Quality Circles - which are small teams established for problem-solving - were also introduced in the 1960s to bring workers together to resolve production issues. By the 1970s, self-directed Quality Circles were widespread, with regular meetings and company awards to recognize achievements. By embracing innovative ideas and quality resolution, Toyota exemplifies TQM's learning nature and involvement of people.

Factual approach of decision-making

Toyota insists on *genchi genbutsu* ("go and see for yourself") and rigorous root-cause analysis for every problem. Managers and workers must observe the actual process and gather facts rather than rely on secondhand reports. This drives a fact-based culture: decisions, from minor fixes to major investments, require validation on the shop floor.

To ensure fact-based decisions, employees of Toyota are entitled to adopt root cause analysis methods. A prime example is the 5 Whys technique, which comprises repeating a sequence of questions, starting with "why", with an aim to involve the human mind in a process of searching ideas and in this way, stimulating problem-oriented thinking (Myszewski, 2013). After identifying the cause through answering a series of inquiries, teams develop countermeasures and standardize the improved process, continuing the PDCA cycle.

The latter part of Toyota's decision-making process appears to be slow and cumbersome to outsiders, but important to achieve flawless implementation, because it follows "*nemawashi*" (making decisions slowly by consensus; implementing rapidly). To deliver "*nemawashi*", thorough, upfront consideration must be ensured and discussed with everyone affected in the search for the best solution. For example, during the development of the first Lexus engine, the chief engineer built consensus across departments by first having them build a single high-precision prototype. The A3 reporting process, which condenses all relevant information for a decision onto a single sheet of paper, is another tool that facilitates this deep consensus-building. Once a decision is made, the stage is set for rapid and smooth implementation, as all parties are already aligned (Liker, 2004b).

5.3. Limitations of Toyota's TQM

While being one of the most quality names in manufacturing, Toyota's philosophy and execution of quality control still shows noticeable limitations, especially as a benchmark for outsiders' application.

Strong context dependence and Limited transferability across cultures

Toyota's way to implement TQM is highly context-dependent, because it evolves within Toyota's specific historical, cultural, and organizational environment. Scholars widely note that few organizations outside Toyota have successfully replicated TPS in its entirety, as it operates a complex, self-organizing system rather than a fixed blueprint (Caulkin, 2007). While individual principles are transferable, their synchronized interaction within a living system remains difficult to reproduce

elsewhere. The key limitation lies in the system's reliance on high discipline, standardization, and long-term human development, which other corporations may fail to build from scratch (Bruce, 2025).

Vulnerability from extreme lean optimization

Toyota's extreme lean optimization, which lies in the idea of JIT to minimize inventory and buffers, can increase system fragility under volatile conditions. Without careful balancing, organizations adopting TPS in unstable environments may face supply disruptions or even quality risks.

Challenges under rapid expansion

Toyota's own experience during rapid global expansion further illustrates these constraints. Analysts argue that growth pressures in the 2000s diluted core TPS mechanisms and created misalignment between internal coherence and external demands, contributing to quality failures during its 2009-2010 recall crisis (Camuffo and Wilhelm, 2016).

6. Recommendations for Vietnamese automobile industry

6.1. Overview of Vietnam's automotive industry

Vietnam's automotive industry has expanded steadily over the past decade, thanks to a strong domestic market driven by higher income and urbanization, as well as large investments from both domestic and foreign car manufacturers. Vietnam was able to reduce tariffs on cars, and the result was over 494,000 vehicles sold in Vietnam in 2024, rising by 22% (Pham, 2025).

Despite these developments, the supplier foundation is still being fragmented. Many of the domestic suppliers are small and medium-sized enterprises (SMEs) with little or no technological capability. Consequently, just a few of them accept adopting international quality management systems. This restricts their role in the higher-level segment of the automobile supply chain.

The market is characterized by a combination of domestic manufacturers and foreign joint ventures, including VinFast, Thaco (assembling Kia, Mazda, Peugeot, BMW), Hyundai Thanh Cong, Toyota Motor Vietnam, Mitsubishi, and Ford (Nguyen, 2025). The emergence of VinFast as a major domestic EV producer has further reshaped industry structure. So as the transition to electric energy accelerates, demand is increasing for better parts and more sophisticated quality control.

Typically, local manufacturers in the Vietnamese automobile market will have standard quality-control measures for a production line, as well as inspections and audits for suppliers that are carried out from time to time. Meanwhile, large Original Equipment Manufacturers and joint ventures increasingly require their suppliers to implement lean operations and maintain a certification that complies with quality standards like IATF 16949, which is based on ISO 9001 principles (BENHADOU, 2025).

However, several systemic limitations continue to constrain quality performance:

Uneven adoption of formal automotive quality management systems

IATF 16949 requires very strict “supplier management”, including risk and process control (TÜV SÜD, 2021). That is why the implementation of this certificate is still a challenge for local suppliers, especially tier-2 and tier-3 firms. Consequently, process variations, poor documentation, and unstandardized control plans remain widely present.

Fragmented supplier capability

Many domestic suppliers do not have advanced testing equipment, metrology capability, and standardized work processes (Schröder, 2017). These shortcomings limit their ability to meet OEM requirements for defect prevention, traceability, and statistical process control.

Insufficient testing and certification infrastructure

The development of national testing systems, including EV-specific technical regulations (QCVN), is still at an early stage. There are currently only 5 QCVNs specifically for electric vehicles and no QCVN specifically for electric cars, thus causing difficulties in compliance and elongating the product validation lead times (Tin, 2024)

Human resource constraints

There is a shortage of highly qualified human resources in the Vietnamese automotive industry, which constrains productivity (Nguyễn, 2022).

6.2. Rationale for Vietnamese automakers adopting total quality management

Implementing Total Quality Management (TQM) is essential for strengthening the competitiveness of the Vietnamese automotive sector. By emphasizing defect prevention, root-cause analysis, and quality control from the source, TQM facilitates significant improvements in product reliability and consistency, as demonstrated by Toyota’s Production System (TPS) (Toyota, n.d.)

Beyond improving quality, TQM also boosts operational efficiency by integrating lean principles and continuous improvement efforts. These strategies help reduce waste, lower production costs, and stabilize manufacturing processes (Alshammari, 2025).

Moreover, the adoption of TQM promotes stronger collaboration and skill development among suppliers (Zubair, 2025). This helps local manufacturers meet strict original equipment manufacturer (OEM) standards and participate more effectively in complex supply chains.

Importantly, aligning local automotive practices with recognized quality standards like IATF 16949 helps strengthen the ability of Vietnamese automakers to participate in global supply chains and respond effectively to the shift toward electric vehicles, where technical compliance and reliable processes are vital.

Overall, TQM is not just a set of quality-control procedures. It is a strategic framework that supports sustainable growth, operational excellence, and long-term competitiveness in the industry.

6.3. Challenges in adopting TQM for Vietnamese automotive industry

Cultural and organizational barriers: Successful TQM requires frontline empowerment, management commitment, and a continuous improvement mindset. However, these elements may be missing in the hierarchical structures prevalent in some Vietnamese companies.

Financial limitations: Certification, tooling upgrades, and digital quality systems require significant investment, which can be challenging for small and medium-sized suppliers.

Supplier ecosystem immaturity: Limited process control and inconsistent quality documentation among suppliers make it hard to fully adopt TQM.

Regulatory uncertainty: Ongoing changes to EV-related standards may slow down adoption and compliance.

Skills shortage: A lack of trained quality engineers and auditors limits the ability to implement structured continuous improvement programs.

6.4. Recommendations for the Vietnamese automotive industry

6.4.1. Lessons learned from Toyota's TQM system

The experience of Toyota demonstrates that effective TQM implementation relies on several interrelated principles. Standardized work provides the foundation for consistent operations, including process stability and incremental improvements. Jidoka, or built-in quality, makes sure that problems are detected and fixed right away. This prevents defects from spreading through the production line. Continuous improvement, or kaizen, encourages all employees to contribute small, ongoing changes that add up to significant performance boosts. Lean principles focus on cutting out activities that do not add value, which enhances efficiency and lowers operational costs. Finally, long-term partnerships with suppliers improve overall supply chain quality, highlighting the importance of collaborative capability development. Overall, a successful TQM system goes beyond shop-floor tasks; it includes organizational culture, supplier collaboration, and ongoing learning.

6.4.2. Recommendations for Vietnamese automotive industry

In Vietnam, manufacturing companies face major challenges in applying TQM. These challenges include limited employee training, low commitment, and inconsistent process control (Đào, 2024). Experts suggest that Vietnamese automotive firms should pilot TQM in selected production lines or product families before expanding to create standardized work processes, visual management, and organized problem-solving routines (DM Anh, 2024; Intech Group, 2024). At the same time, companies should focus on adopting IATF 16949 quality management standards. They need to perform

detailed gap analyses and create step-by-step implementation plans that cover main production lines and important suppliers.

Drawing from Toyota's experience, Vietnamese automakers should also strengthen structured problem-solving capabilities as a core element of TQM. Kaizen should be institutionalized through regular improvement activities, while root cause analysis tools such as PDCA and the 5 Whys should be systematically applied to prevent recurring defects rather than merely correcting symptoms. This approach helps transform quality management from periodic inspection into continuous organizational learning.

To ensure effective supplier integration, Vietnamese automakers should enhance supplier development programs. This can be done through teamwork initiatives such as kaizen workshops, technical coaching, and shared quality roadmaps. In addition, greater attention should be given to meeting requirements for process control, PPAP, SPC, and traceability. Investing in digital quality systems, like real-time statistical process control and traceability dashboards, is also recommended, as this investment will help improve defect detection, process transparency, and decision-making efficiency. Especially, companies should develop human resource capabilities by creating structured training programs or building partnerships with universities, vocational schools, and industry associations to address the current shortage of skilled workforce.

6.4.3. Recommendations for policymakers

Policymakers and industry associations play a critical role in supporting TQM adoption across the domestic automotive sector. The government should establish programs to co-finance supplier development, including financial support for IATF 16949 certification, technical consulting, and workforce training, particularly targeting small and medium-sized enterprises. It is recommended to invest in accredited testing laboratories for both conventional and electric vehicles to reduce certification lead times and align national technical regulations (QCVN) with international standards. Incentives such as tax reductions or preferential credit schemes should be provided to encourage manufacturers and suppliers to invest in automated inspection systems, metrology equipment, and digital quality management tools.

Additionally, collaboration between industry and academia should be promoted to ensure a steady supply of skilled quality engineers, auditors, and continuous improvement specialists, thereby addressing the current workforce gap. Collectively, these measures will create a supportive environment for widespread TQM implementation.

CONCLUSION

This research paper has examined the Total Quality Management (TQM) system of Toyota as the benchmark for the automotive industry in Vietnam. This successful application majorly depends on the Toyota Way 4Ps model. By prioritizing long-term quality over short-term profits, Toyota has embedded quality into every operational step through practices like Jidoka and Just-in-time production, while fostering continuous improvement through employee empowerment and supplier partnerships.

In terms of Vietnam's automotive sector, it faces significant challenges, including uneven adoption of quality management systems, fragmented supplier capabilities, and insufficient testing infrastructure. However, those problems can be solved by leveraging proven TQM principles aligned with local conditions through a phased implementation approach. Manufacturing firms should prioritize the IATF 16949 standard, enhance supplier capability, and invest more in quality expertise. Besides, the policymakers and automotive industry associations should support these efforts by organizing co-financing programs, investing in infrastructure, and expanding educational partnerships.

Consequently, with the integration of the TQM experience of Toyota with Vietnamese contextual adaptations, the domestic automobile industry can achieve substantial improvements in product quality, operational efficiency, and competitive positioning in the global market.

Even so, the research gap is that it has not delved into the specific data-driven outcomes of proposed frameworks. Future studies could use quantitative analysis to thoroughly analyze the evolving challenges and opportunities in this manufacturing industry.

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