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PATHWAY TO EXCELLENCE: ENVISIONING THE FUTURE OF TOTAL QUALITY MANAGEMENT THROUGH A BIBLIOMETRIC LENS

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A B S T R A C T

This study presents a comprehensive bibliometric analysis and systematic literature review of Total Quality Management (TQM). The research aims to address the existing gap in the literature, which has largely focused on conceptual frameworks and industry applications rather than mapping the evolution of research trends, influential authors, and key publication sources over time. Using the Scopus database, the study analyzed 915 articles published in the field of quality management between 2020 and 2025. The findings reveal that Asia accounts for the highest percentage of published articles at 46.7%, followed by Europe at 26.9%, and Oceania with the lowest percentage at 3.9%. India emerged as the top-publishing country in Asia with 114 articles, followed by Malaysia and China. Within Europe, the United Kingdom led with 25.1% of published articles. In the Americas, the United States was the leading country with 61.8% of articles, while Australia dominated Oceania with 86%. The analysis of subject areas indicates that TQM has received significant attention in Business and Management, with a high implementation rate of 38%. This reflects the recognition of quality as a critical factor for improving performance and enhancing competitiveness across various sectors, including business, healthcare, and engineering. This research provides valuable insights into the intellectual structure and research frontiers of TQM studies, which can help scholars and practitioners identify key developments and future research directions.

1. INTRODUCTION

Total Quality Management (TQM) is a strategic management approach that focuses on embedding quality principles across all organizational processes, with the aim of achieving long-term success through customer satisfaction and continuous improvement. Initially emerging as a response to challenges in manufacturing quality, TQM has since evolved into a comprehensive framework applicable across a wide range of industries—including manufacturing, healthcare, education, finance, and telecommunications (Anttonen, 2025; Jasti et al., 2022a). TQM is widely recognized for its emphasis on customer-centricity, employee involvement, data-driven

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decision-making, and a culture of continuous learning (Aichouni et al., 2024). In higher education, for example, TQM practices have been associated with the integration of quality into leadership structures, administrative procedures, and academic service delivery (Jasti et al., 2022b). Similarly, in the banking sector, TQM has been linked to various managerial practices such as information and analysis, human resource development, quality assurance, benchmarking, and service design (Ahinful et al., 2025).

The literature demonstrates that TQM is not a static or isolated practice but rather an evolving philosophy that helps organizations design and implement competitive strategies. According to Arhin and Cobblah (2024), TQM enhances service quality by minimizing errors, fostering teamwork, encouraging long-term thinking, and building strong supplier relationships. These practices are particularly crucial in dynamic industries where agility and innovation are critical for success. For instance, Koomson (2025) highlighted that in the telecommunications sector of Ghana, agile firms that adopt TQM practices show improved innovation performance and responsiveness to market changes. In addition, empirical studies across diverse cultural and organizational contexts support the notion that TQM contributes positively to organizational outcomes such as job satisfaction and performance. Alsaad et al. (2025) found a significant positive impact of TQM implementation on academic staff satisfaction in Saudi public universities. Mahmood et al. (2024) similarly reported that TQM and job satisfaction positively influenced school performance in Pakistan, leading the government to invest in leadership and management training programs focused on quality improvement.

Despite the extensive body of literature, a comprehensive bibliometric analysis of TQM research remains limited. While previous reviews have examined TQM's conceptual frameworks and industry applications, there is a growing need to map the evolution of TQM research trends, influential authors, key publication sources, and thematic clusters over time. This study aims to fill that gap by conducting a systematic literature review and bibliometric analysis, offering insights into the intellectual structure and research frontiers of TQM studies. The findings are expected to support scholars and practitioners in identifying key developments and future research directions in the field of Total Quality Management.

2. LITERATURE REVIEW

Total Quality Management (TQM) represents a holistic, organization-wide commitment to fostering a sustainable environment in which employees continuously enhance their ability to deliver products and services valued by customers (Ahire et al., 1995). It constitutes a comprehensive management approach that prioritizes the relentless pursuit of quality and operational excellence (Hackman & Wageman, 1995). Fundamentally, TQM is a quality-centered philosophy that relies on collective participation across all organizational levels, striving for long-term success by ensuring customer satisfaction and generating value for all stakeholders (Talha, 2004). The core philosophy of TQM emphasizes that the responsibility for continuous improvement extends across all departments—including sales, marketing, accounting, finance, engineering, and design (Ross, 2017). Within this framework, management holds a crucial responsibility to actively support quality initiatives through appropriate funding, training, staffing, and clear goal setting (Oakland, 2003).

A fundamental element of TQM lies in the term "Total," which signifies universal responsibility and systemic integration. This denotes accountability for quality improvement among all employees and departments, transitioning from traditional siloed practices to a systemic, organization-wide quality culture (Charantimath, 2017; Ho et al., 2001). This transformation demands breaking down internal barriers, fostering a shared commitment to quality, and reengineering roles to embrace organization-wide quality assurance. Additionally, TQM advances a proactive and preventative paradigm shift. Unlike traditional reactive quality control that inspects products post-production, TQM focuses on preventing defects through robust process design, employee engagement, and continuous feedback mechanisms (Martínez-Lorente et al., 1998; Zbaracki, 1994; Kiran, 2016).

TQM extends beyond internal processes to encompass relationships with external stakeholders, especially suppliers and customers. This holistic view transforms the entire value chain into an integrated quality ecosystem. Suppliers are engaged in process improvement efforts, while customer feedback loops shape quality standards and expectations (Sayah et al., 2025; Albloushi et al., 2023). As such, TQM requires robust supply chain collaboration and customer relationship management to optimize quality outcomes and enhance overall performance (Yusuf, 2023; Wassan et al., 2022).

The historical roots of quality management trace back to medieval European guilds, where craftsmanship and peer inspection governed product quality (Hassan & Jaaron, 2022). The Industrial Revolution introduced mass production, requiring structured inspection systems to manage increased output (Jasti et al., 2022a; Egwunatum et al., 2022). In the early 20th century, pioneers like Walter Shewhart introduced statistical quality control (SQC), while Frederick Taylor emphasized standardization and task inspection (Haroun et al., 2022; Huang et al., 2013). These developments laid the groundwork for the emergence of modern quality practices.

Following World War II, American experts W. Edwards Deming and Joseph M. Juran profoundly influenced Japan's industrial resurgence. Deming's contributions, including the Plan-Do-Check-Act (PDCA) cycle, Statistical Process Control (SPC), and the System of Profound Knowledge, emphasized management's role in

fostering quality (Harolds, 2015; Watson, 2015). Juran introduced the Juran Trilogy (planning, control, and improvement) and popularized the Pareto Principle, advocating for leadership and education in quality management (Maguad, 2006; Ibidapo, 2022). Crosby further reinforced prevention through his "zero defects" philosophy, while Ishikawa advanced practical tools like the fishbone diagram and introduced the internal customer concept (Dahlgaard-Park, 2011; Aydemir & Türkel, 2022). Feigenbaum's concept of Total Quality Control positioned quality as a strategic, enterprise-wide imperative (Levis et al., 2007).

These pioneers collectively shaped TQM into a synthesized body of knowledge that integrates philosophical foundations, systematic planning, practical tools, and a prevention-oriented mindset (Cullotta & Gonzales, 1997). Japan's post-war economic success, driven by the application of these principles, inspired Western firms to adopt TQM in response to global competition, particularly in the automotive and electronics sectors (Maguad, 2024; Tsutsui, 1996).

In the 1970s and 1980s, quality practices evolved further through methodologies like Just-in-Time (JIT) and Six Sigma, the latter pioneered by Motorola (Jasti et al., 2022b). While TQM offered a broad managerial philosophy, its lack of operational specificity led to the adoption of standardized systems such as ISO 9000. Introduced in 1987 and based on British standards, ISO 9000 offered structured guidelines and certification for quality management systems (Jafari, 2010; Mathur et al., 2023; Sun, 2000). Six Sigma, in contrast, provided a data-driven approach to defect reduction and performance improvement through structured methodologies like DMAIC, distinguishing itself from TQM by focusing on measurable results and financial returns (Klefsjö et al., 2001).

In conclusion, TQM represents a foundational philosophy in quality management, integrating contributions from diverse pioneers and adapting over time to include specialized methodologies like ISO 9000 and Six Sigma. Its evolution reflects the dynamic nature of quality management, responding to changing organizational needs and global competitiveness through a combination of cultural, structural, and technical innovations.

3. BIOMETRIC ANALYSIS OF THE QUALITY MANAGEMENT

The Scopus container was relied upon to identify the published articles in the field of quality management, which numbered (915) articles in the field of quality management Figure 1. The analysis process was conducted according to the following pillars:

- **Year of Publication**: Articles published in the field of quality management were identified between 2020 and April 2025. Table 1 of the published articles reveals that the highest number of articles published in the field of quality management was in 2020. The number of articles published in the Scopus database in 2025 can be predicted using a linear regression equation ($Y = b + a.x$) based on the data in Table (1), which amounts to (162) articles.

Table 1. Number of articles published according years (2020 -2025)

Year	Number of Articles
2020	187
2021	160
2022	170
2023	158
2024	175
2025	65
2025 (forecast)	162

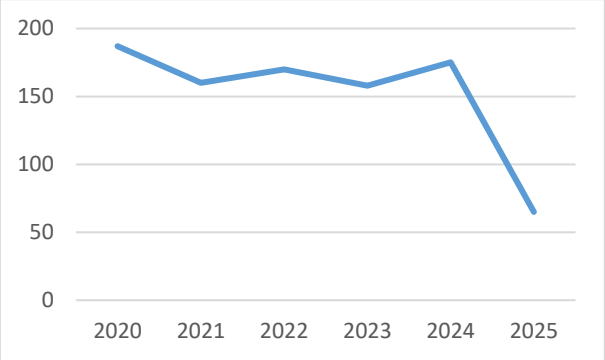

Figure 1. Number of articles published according to the years (2020-2025)

- **Publishing region (continent):** The results of Table 2, Figure 2, reveal that the continent of Asia has the highest percentage of publishing articles in the field of quality management, with a percentage of 46.7%, while Oceania had the lowest percentage of publishing articles in the field of quality management, with a percentage of 3.9%.

Table 2. Articles by author's region

Continent (area)	Number of articles	Percentage
Asia	594	46.7%
Europe	342	26.9%
Africa	88	6.9%
The Americas	199	15.6%
Oceania	50	3.9%
Total	1273	100%

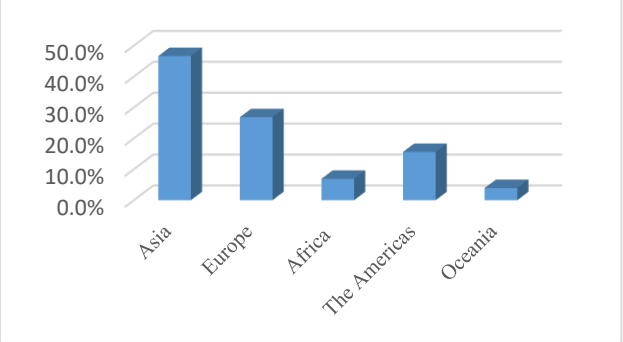

Figure 2. Articles by author's region

Table 3 and Figure 3 indicate that the Asian continent obtained (594) published scientific researches in the field of

quality management. While India obtained the highest number of published articles, amounting to 114 articles, with a percentage of 19.2%. While each of the countries (Kazakhstan, Azerbaijan, Bahrain, Sri Lanka, Uzbekistan) obtained the least number of published articles, with a percentage of 0.2%.

Table 3. Articles according to the authors' country (Asia)

Country	No	%	Country	No	%
India	114	19.2%	Iraq	9	1.5%
Malaysia	68	11.4%	Singapore	5	0.8%
China	65	10.9%	Yemen	5	0.8%
Jordan	39	6.6%	Nepal	3	0.5%
United Arab Emirates	36	6.1%	Philippines	3	0.5%
			Georgia	2	0.3%
Indonesia	33	5.6%	Lebanon	2	0.3%
Iran	25	4.2%	Kazakhstan	1	0.2%
Pakistan	25	4.2%	Azerbaijan	1	0.2%
Taiwan	23	3.9%	Bahrain	1	0.2%
Saudi Arabia	21	3.5%	Sri Lanka	1	0.2%
Turkey	18	3.0%	Uzbekistan	1	0.2%
Viet Nam	17	2.9%	Palestine	8	1.3%
South Korea	16	2.7%	Hong Kong	6	1.0%
Bangladesh	11	1.9%	Kuwait	5	0.8%
Japan	10	1.7%	Oman	5	0.8%
Thailand	10	1.7%	Qatar	5	0.8%

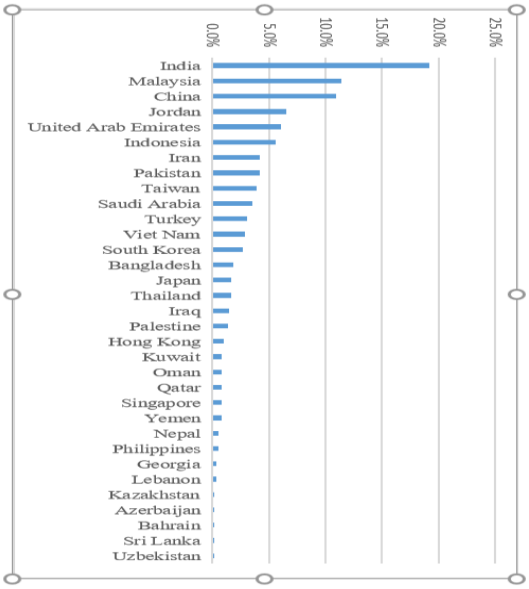

Figure 3. Articles according to the authors' country (Asia)

Table 4 and Figure 4 indicate that the European continent obtained (342) published articles in the field of Quality Management. While the United Kingdom obtained the highest number of published articles, amounting to 86 articles, with a percentage of 25.1%. While the countries of (Slovenia) obtained the least number of published articles, with a percentage of 0.3%.

The results of Table 5 and Figure 5 indicate that Africa has obtained (88) published scientific researches in the field of Total Quality Management.

While South Africa obtained the highest number of published articles, amounting to 16 articles, at a rate of 18.2%, while (Zimbabwe) obtained the least number of published articles, at a rate of 1.1%.

Table 4. Articles according to the authors' country (Europe)

Country	No	%	Country	No	%
United Kingdom	86	25.1%	Bosnia and Herzegovina	4	1.2%
Italy	36	10.5%			
Greece	22	6.4%	Slovakia	4	1.2%
Spain	22	6.4%	Russian Federation	4	1.2%
France	18	5.3%			
Germany	18	5.3%	Czech Republic	3	0.9%
Sweden	15	4.4%			
Netherlands	14	4.1%	Hungary	3	0.9%
Ireland	13	3.8%	Romania	3	0.9%
Portugal	12	3.5%	Serbia	3	0.9%
Norway	10	2.9%	Croatia	2	0.6%
Cyprus	9	2.6%	Lithuania	2	0.6%
Denmark	7	2.0%	North Macedonia	2	0.6%
Finland	7	2.0%			
Poland	6	1.8%			
Belgium	5	1.5%	Ukraine	2	0.6%
Switzerland	5	1.5%			
Austria	4	1.2%	Slovenia	1	0.3%

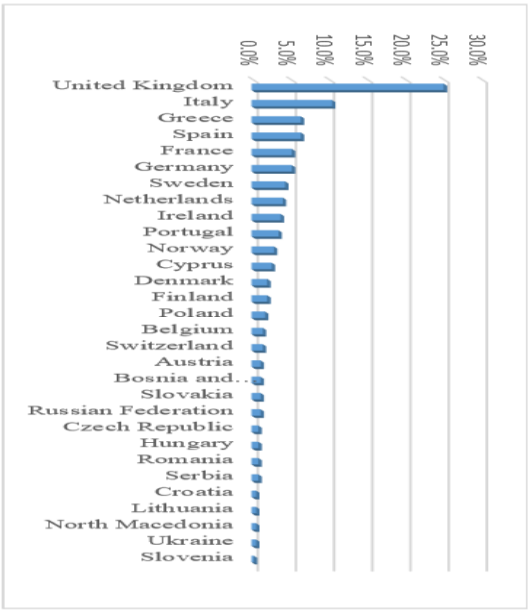

Figure 4. Articles according to the authors' country (Europe)

Table 5. Articles according to the authors' country (Africa)

Country	No	%	Country	No	%
South Africa	16	18.2%	Kenya	2	2.3%
Nigeria	12	13.6%	Uganda	2	2.3%
Ghana	11	12.5%	Angola	1	1.1%
Tunisia	11	12.5%	Cameroon	1	1.1%
Ethiopia	7	8.0%	Lesotho	1	1.1%
Morocco	6	6.8%	Mauritius	1	1.1%
Egypt	5	5.7%	Sudan	1	1.1%
Algeria	3	3.4%	Zambia	1	1.1%
Namibia	3	3.4%	Zimbabwe	1	1.1%
Tanzania	3	3.4%			

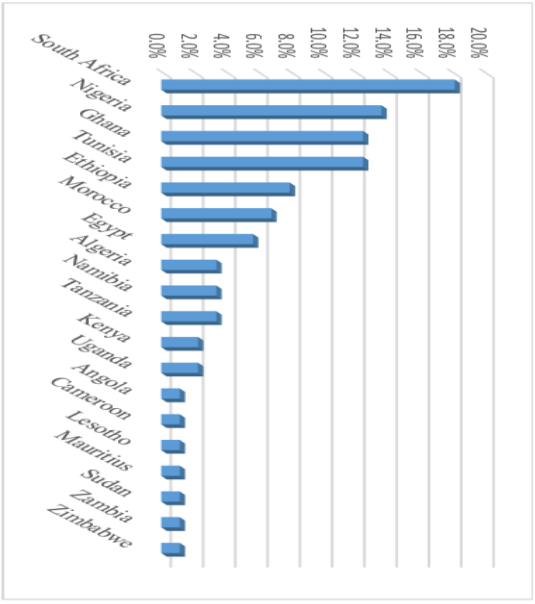

Figure 5. Articles according to the authors' country (Africa)

Table 6. Articles according to the authors' country (Americas).

Country	No	%	Country	No	%
United States	123	61.8%	Colombia	3	1.5%
Canada	34	17.1%	Ecuador	2	1.0%
Brazil	21	10.6%	Argentina	1	0.5%
Mexico	9	4.5%	Haiti	1	0.5%
Peru	5	2.5%			

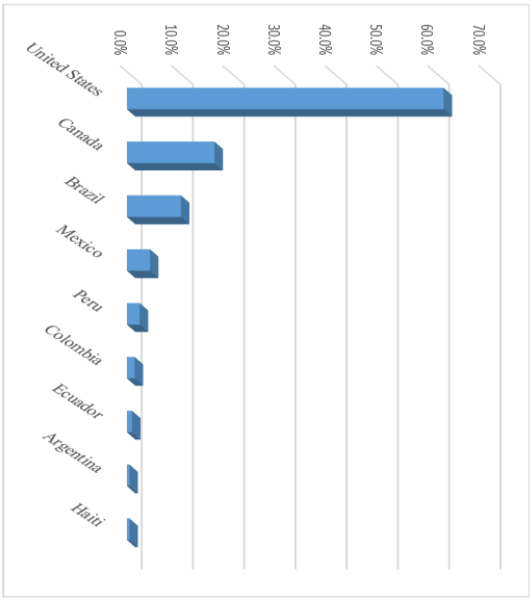

Figure 6. Articles according to the authors' country (Americas)

The results of Table 6 and Figure 6 indicate that the Americas have obtained (199) published scientific research in the field of quality management. While the United States has obtained the highest number of published articles, amounting to 123 articles, with a percentage of 61.8%. The United States is the country with the highest number of published articles in the field of quality management. While (Haiti) has obtained the least number of published articles, with a percentage of 0.5%.

The results of Table 7 and Figure 7 indicate that Oceania has obtained (50) scientific researches published in the field of quality management. While Australia obtained the highest number of published articles, amounting to 43 articles, with a percentage of 86%, while Fiji obtained the least number of published articles, with a percentage of 4%.

Table 7. Articles according to the authors' country (Oceania)

Country	No	%
Australia	43	86.0%
New Zealand	5	10.0%
Fiji	2	4.0%

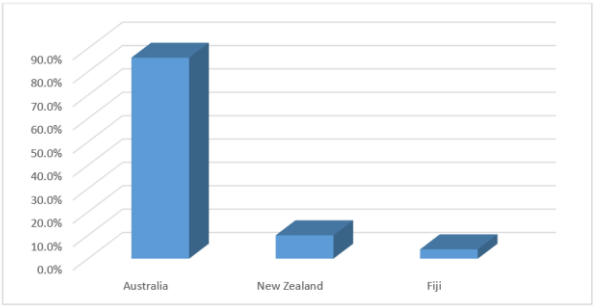

Figure 7. Articles according to the authors' country (Oceania)

Subject area: Figure 8 reveals that quality management has received widespread attention in business and management, with a high rate of implementation reaching 38%, a rate higher than that in other fields such as the environment, health, and medicine.

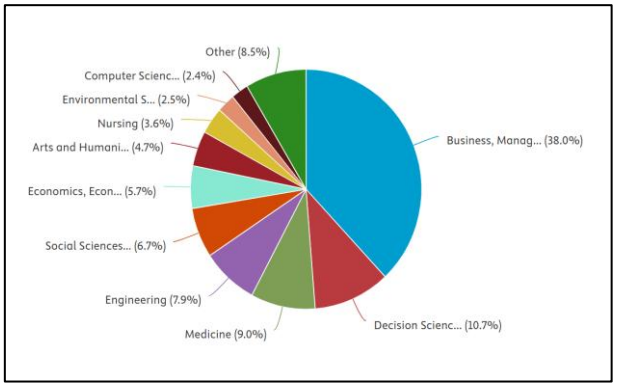

Figure 8. Articles according to subject area**.**

This reflects organizations' recognition of the importance of quality as a critical factor in improving performance and increasing competitiveness. The results demonstrate

that the application of quality management is not limited to improving products or services alone, but rather extends to being a comprehensive strategy that can be adapted to suit various sectors, whether commercial, medical, environmental, or even engineering.

For example, in the healthcare sector, quality principles are used to solve health problems and improve patient care, while in engineering, they are employed to achieve precise and effective products. From this, it can be concluded that quality has become a primary focus for all types of organizations, regardless of their size or specialization. Quality does not simply mean compliance with standards; it represents a strategic means of building and maintaining a strong reputation over the long term, which enhances customer confidence and ensures continued success.

4. CONCLUSION

The findings of this bibliometric analysis confirm that Total Quality Management (TQM) has evolved into a comprehensive, organization-wide philosophy that extends beyond product and service improvement. The study reveals a global research interest in TQM, with a notable concentration of scientific output in Asia, particularly in India, Europe (United Kingdom), and the Americas (United States). This geographical distribution of research suggests that the adoption of TQM principles is seen as a global competitive necessity. Furthermore, the analysis of subject areas highlights that the business and management sectors are the primary focus of TQM research. This underscores organizations' recognition of quality as a strategic factor for achieving long-term success.

Based on these conclusions, future research in TQM should continue to explore its applications in new and diverse fields. It is also essential to investigate the challenges and cultural barriers associated with TQM implementation in different geographic regions and to develop innovative solutions for its effective integration into various organizational cultures. This will allow TQM to maintain its relevance as a fundamental driver of competitive advantage and sustained success.

References:

Ahinful, A. A., Opoku Mensah, A., Koomson, S., Cobblah, C., Takyi, G., & Kwarteng, A. H. (2025). Achieving banking industry innovation performance using total quality management: an empirical study. *The TQM Journal*, *37*(5), 1292-1319.

Ahire, S. L., Landeros, R., & Golhar, D. Y. (1995). Total quality management: a literature review and an agenda for future research. *Production and Operations Management*, *4*(3), 277-306.

Aichouni, A. B. E., Silva, C., & Ferreira, L. M. D. (2024). A systematic literature review of the integration of total quality management and industry 4.0: Enhancing sustainability performance through dynamic capabilities. *Sustainability*, *16*(20), 9108.

Albloushi, B., Alharmoodi, A., Jabeen, F., Mehmood, K., & Farouk, S. (2023). Total quality management practices and corporate sustainable development in manufacturing companies: the mediating role of green innovation. *Management Research Review*, *46*(1), 20-45.

Alsaad, A. A., Dato Mansor, Z. B., & Ghazali, H. B. (2025). Effect of service innovation and service recovery in the relationship between total quality management and job satisfaction for university staff in Saudi Arabia. *foresight*.

Anttonen, M. (2025). *Quality management as a driver of customer retention and business profitability* (Master's thesis). University name, (Finland).

Arhin, E. P., & Cobblah, C. (2024). Total quality management implementation practices and customer satisfaction: the role of innovative employee behavior and employee empowerment. *Management Research Quarterly*, *1*(1), 26-41.

Aydemir, H., & Türkel, R. (2022). Evaluation of Quality Principles from the Islamic Perspective. *Hitit İlahiyat Dergisi*, *21*(2), 1193-1238.

Charantimath, P. M. (2017). *Total quality management*. Pearson Education India.

Cullotta, P., & Gonzales, H. (1997). Quality pioneers in education provide immeasurable value to students. *Quality Progress*, *30*(9), 67.

Dahlgaard-Park, S. M. (2011). The quality movement: where are you going?. *Total Quality Management & Business Excellence*, *22*(5), 493-516.

Egwunatum, S. I., Anumudu, A. C., Eze, E. C., & Awodele, I. A. (2022). Total quality management (TQM) implementation in the Nigerian construction industry. *Engineering, Construction and Architectural Management*, *29*(1), 354-382.

Hackman, J. R., & Wageman, R. (1995). Total quality management: Empirical, conceptual, and practical issues. *Administrative science quarterly*, 309-342.

Harolds, J. (2015). Quality and safety in health care, part I: five pioneers in quality. *Clinical nuclear medicine*, *40*(8), 660-662.

Haroun, A., Ayaad, O., Al-Ruzzieh, M. A., & Ayyad, M. (2022). The role of total quality management in improving patient experiences and outcomes. *British Journal of Healthcare Management*, *28*(10), 1-8.

Hassan, A. S., & Jaaron, A. A. (2021). Total quality management for enhancing organizational performance: The mediating role of green manufacturing practices. *Journal of Cleaner Production*, *308*, 127366.

Ho, D. C. K., Duffy, V. G., & Shih, H. M. (2001). Total quality management: an empirical test for mediation effect. *International Journal of Production Research*, *39*(3), 529-548.

Huang, K. P., Tung, J., Lo, S. C., & Chou, M. J. (2013). A review and critical analysis of the principles of scientific management. *International Journal of Organizational Innovation (Online)*, *5*(4), 78.

Ibidapo, T. A. (2022). Introduction to quality. In *From Industry 4.0 to Quality 4.0: An Innovative TQM Guide for Sustainable Digital Age Businesses* (pp. 1-27). Cham: Springer International Publishing.

Jafari, S. M., & Setak, M. (2010, December). Total quality management tools and techniques: the quest for an implementation roadmap. In *Proceedings of the AGBA 7th World Congress* (Vol. 1, No. 3, pp. 1-12).

Jasti, N. V. K., Venkateswaran, V., & Kota, S. (2022). Total Quality Management in higher education: a literature review on barriers, customers and accreditation. *The TQM Journal*, *34*(5), 1250-1272.

Jasti, N. V. K., Venkateswaran, V., Kota, S., & Sangwan, K. S. (2022). A literature review on total quality management (models, frameworks, and tools and techniques) in higher education. *The tqm journal*, *34*(5), 1298-1319.

Kiran, D. R. (2016). *Total quality management: Key concepts and case studies*. Butterworth-Heinemann.

Klefsjö, B., Wiklund, H., & Edgeman, R. L. (2001). Six sigma seen as a methodology for total quality management. *Measuring business excellence*, *5*(1), 31-35.

Koomson, S. (2025). Leveraging strategic agility for innovation performance in Ghana's telecommunication industry: roles of total quality management and industry pressures. *International Journal of Quality & Reliability Management*.

Levis, M., Helfert, M., & Brady, M. (2007). Information quality management: review of an evolving research area. *ICIQ'07*.

Maguad, B. A. (2006). The modern quality movement: Origins, development and trends. *Total Quality Management & Business Excellence*, *17*(2), 179-203.

Maguad, B. A. (2024). A brief history of managing for quality: the journey continues. *Journal of Business and Behavioral Sciences*, *36*(2), 60-70.

Mahmood, W., Ismail, S. N., & Omar, M. N. (2024). Mediating role of school climate and job satisfaction in total quality management and school performance. *Malaysian Journal of Learning and Instruction*, *21*(2), 117-146.

Martínez-Lorente, A. R., Dewhurst, F., & Dale, B. G. (1998). Total quality management: origins and evolution of the term. *The TQM magazine*, *10*(5), 378-386.

Mathur, S., Antony, J., Olivia, M., Fabiane Letícia, L., Shreeranga, B., Raja, J., & Ayon, C. (2023). An empirical study into the use of 7 quality control tools in higher education institutions (HEIs). *The TQM Journal*, *35*(7), 1777-1798.

Oakland, J. S. (2003). *Total quality management: text with cases*. Routledge.

Ross, J. E. (2017). *Total quality management: Text, cases, and readings*. Routledge.

Sayah, H. R., Balkat, F. S., & Jweer, F. J. (2025). Improving the quality of banking services using the marketing innovation strategy: A study in a number of Iraqi Islamic banks. *Journal of Engineering, Management and Information Technology*, 3(4), 257–264. DOI:10.61552/JEMIT.2025.04.003

Sun, H. (2000). Total quality management, ISO 9000 certification and performance improvement. *International Journal of Quality & Reliability Management*, *17*(2), 168-179.

Talha, M. (2004). Total quality management (TQM): an overview. *The bottom line*, *17*(1), 15-19.

Tsutsui, W. M. (1996). W. Edwards Deming and the origins of quality control in Japan. *The Journal of Japanese Studies*, *22*(2), 295-325.

Wassan, A. N., Memon, M. S., Mari, S. I., & Kalwar, M. A. (2022). Impact of total quality management (TQM) practices on sustainability and organisational performance. *Journal of Applied Research in Technology & Engineering*, *3*(2), 93-102.

Watson, G. (2015). Total quality's leader. *Quality Progress*, *48*(1), 16-22.

Yusuf, F. A. (2023). Total quality management (TQM) and quality of higher education: A meta-analysis study. *International journal of instruction*, *16*(2), 161-178.

Zbaracki, M. J. (1994). *The rhetoric and reality of total quality management*. Stanford University.

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