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Quality Management and Export Intensity: An Empirical Analysis of Algerian SME with ISO 9001 Certification

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Abstract:

Algeria, as a nation rich in natural resources and strategically located, holds significant potential to become a major player on the international stage in terms of exports. However, to achieve this goal, it is crucial for the country to implement rigorous quality standards. ISO 9001 Certification, a globally recognized quality management system, plays a pivotal role in enhancing the competitiveness of Algerian exports. This article delves into the advantages of ISO 9001 certification for Algerian exports, highlighting the opportunities and challenges associated with its adoption.

Keywords: ISO 9001 Certification, Algerian SMEs, Export Competitiveness, Quality Management Systems, Economic Diversification
JEL Classification Codes: F14, L15, M11, O25, Q37

Introduction:

Algeria's economy has historically relied on hydrocarbon exports, leading to macroeconomic stability due to its significant gas and oil reserves (World Bank, 2021). However, this dependence makes it vulnerable to global commodity price fluctuations (Chebab & Beldjilali, 2024). Recognizing the need for economic diversification into sectors like technology, tourism, and agriculture (Hamel, 2024), the Algerian government is exploring new trade opportunities to augment the competitiveness of non-hydrocarbon industries.

In this context, the role of international quality standards, particularly ISO 9001 certification (International Organization for Standardization, 2021), becomes crucial. ISO 9001 promotes continuous improvement, enhances productivity, and fosters customer satisfaction (Belaid, 2023), potentially providing Algerian exporters with increased market access and operational efficiency.

Against this backdrop, the core question is: Does ISO 9001 certification causally impact the export intensity of Algerian SMEs in non-hydrocarbon sectors? To address this, we consider two opposing hypotheses. First, H1: ISO 9001 certification leads to a statistically significant increase in export intensity for

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Algerian SMEs. Second, H0: ISO 9001 certification has no statistically significant impact, or even a negative impact, on export intensity for Algerian SMEs. The incorporation of quality management systems will be essential as the country navigates these hurdles to guarantee that Algerian products live up to international standards and provide a more stable and successful economic future.

1- Historical Context of Quality Management in Algeria :

The history of quality management in Algeria has undergone significant evolution over the decades, reflecting the country's economic and industrial transformations as well as international influences on management practices. During the post-independence period (1962–1980), Algeria adopted a centralized socialist economy, where state-owned enterprises dominated, and quality control was often secondary to production targets (Boukhalfa, 2018). The 1980s and 1990s saw gradual economic liberalization, prompting Algerian firms to adopt basic quality assurance measures to remain competitive (Mebtoul, 2020).

The real shift toward modern quality management began in the early 2000s, with Algeria's increasing integration into global markets and the adoption of international standards such as ISO 9001 (Benhabib & Djefel, 2021). Government initiatives, including the National Quality Promotion Program (PNPQ), further encouraged businesses to implement Total Quality Management (TQM) and Lean practices (Ministry of Industry, 2022). However, challenges such as bureaucratic inefficiencies, resistance to change, and limited expertise in advanced quality methodologies have hindered full implementation (Khelil & Hamadache, 2023).

Recent studies highlight that Algerian industries, particularly in manufacturing and services, are increasingly recognizing the strategic value of quality management in enhancing competitiveness (Bouhenni et al., 2023). Despite progress, further investment in training, digital quality tools, and organizational culture change is needed to align with global best practices (Saidi & Belkacem, 2024). This historical progression underscores the growing role of quality management in Algeria's industrial and economic development.

1.1. The Genesis of Quality in Algeria :

Quality management in Algeria emerged in the post-independence era (1960s-1970s), with state-owned enterprises implementing basic quality control measures focused on production quotas rather than systematic quality (Boukhalfa, 2018). The 1980s marked the first structured quality initiatives through ISO 9000 adoption, driven by public sector modernization needs (Belaid, 2023). However, progress was hindered by limited resources and weak institutional support (Mebtoul, 2020).

Economic liberalization in the 1990s accelerated quality awareness, particularly in hydrocarbons and manufacturing sectors facing global competition (Khelil & Hamadache, 2023). A key milestone was the 2003 establishment of IANOR, which institutionalized standardization and certification (Hamel, 2024). Despite these developments, early quality efforts remained compliance-focused rather than embracing continuous improvement (Benhabib & Djefel, 2021).

1.2. The 1990s and the Rise of Quality :

The 1990s were transformative for quality management in Algeria. Despite economic and political turmoil from civil war (Martinez, 2000), awareness of

quality's importance grew, especially in international trade. This period forged a new understanding of quality as a strategic imperative.

The civil conflict disrupted economic activity, but the government remained committed to quality. The 1995 World Trade Organization (WTO) agreement obligated Algeria to meet international standards (Hamel, 2024) pushing novel trade prospects.

Algerian businesses increasingly recognized quality's importance for competitiveness. Pursuit of certifications like ISO 9001 (International Organization for Standardization, 2021) gained momentum, and the creation of the Algerian Institute for Standardization (IANOR) in 2003 was pivotal.

Challenges included lack of skilled personnel and bureaucratic obstacles, but government programs supported businesses seeking to improve quality. As Algeria's economy transitions, quality management remains crucial, requiring sustained commitment.

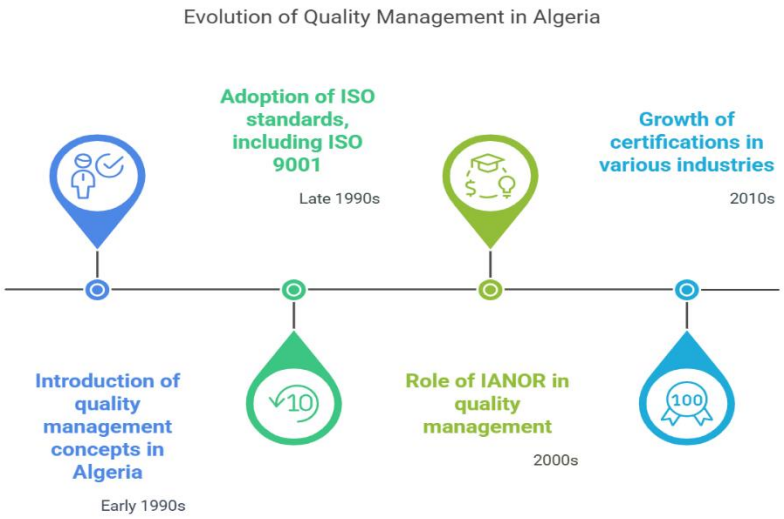
1.3. The 21st Century: Consolidation and Diversification of Quality Management :

Algeria aims to be a major exporter, requiring rigorous quality standards, where ISO 9001 certification plays a key role. Historically, Algeria relied on hydrocarbon exports, making it vulnerable to price fluctuations. The government seeks diversification into technology, tourism, and agriculture, where ISO 9001 is essential (World Bank, 2021). ISO 9001 implementation involves preparation, implementation, audits, and continuous improvement, enhancing market access and efficiency (Belaid, 2023).

ISO 9001 helps Algeria increase export competitiveness. As the nation diversifies, international standards and new trade prospects are vital (Chebab & Beldjilali, 2024; Hamel, 2024). ISO 9001 emphasizes continuous improvement (International Organization for Standardization, 2021). The history of Algerian quality management shows a gradual evolution, influenced by economic goals and global trends.

In the 1980s, Algeria adopted ISO 9000 to boost competitiveness. Despite challenges like limited resources, the 1990s saw a market shift, increasing the need for quality systems. The Algerian Institute for Standardization (IANOR) in 2003 was crucial. The 1990s were transformative amid political and economic turmoil (Martinez, 2000). The 1995 World Trade Organization (WTO) agreement obligated Algeria to meet international standards. The pursuit of ISO 9001 certification also gained momentum (Hamel, 2024).

Figure 1.Timeline of main stages in the evolution QMS in Algeria



Source : prepared by the researcher

2- Historical context of Exports in Algeria:

Algeria's export history reflects its natural resources and strategic location. Historically reliant on hydrocarbon exports (Chebab & Beldjilali, 2024), Algeria aims to diversify and become a major exporter by implementing rigorous quality standards. ISO 9001 certification enhances export competitiveness.

This evolution included periods of growth and challenges. The 1980s saw the initial seeds of quality management, with ISO 9000 adoption (Belaid, 2023). Public sector initiatives drove quality management, facing challenges like limited resources.

The 1990s brought economic and political turmoil, yet quality awareness grew, particularly after the WTO agreement. This necessitated a legal framework for quality assurance (Hamel, 2024). The establishment of the Algerian Institute for Standardization (IANOR) in 2003 was a pivotal milestone in promoting and adapting quality standards.

2.1. Early Export Foundations and the Colonial Era :

Algeria's export history is deeply intertwined with its natural resource wealth, including hydrocarbons, minerals, and agricultural products. However, this development was shaped by French colonial rule, which transformed Algeria into a resource appendage serving French economic interests (Hamel, 2024). Exports included crude oil, natural gas, iron ore, wheat, citrus fruits, and wine, often from expropriated lands (Alexander, 2019).

French colonial policies suppressed Algerian manufacturing to maintain a captive market, relying on discriminatory tariffs and restrictions on local businesses (Lecocq, 2020). Infrastructure development focused on extracting and exporting resources, neglecting sectors like education and healthcare (Giudice, 2021). The Code de l'Indigénat codified unequal legal status, enabling land expropriation and labor exploitation (Shepard, 2017).

Today, Algeria's economy remains heavily reliant on hydrocarbon exports, which account for a significant portion of its GDP and export earnings (Britannica, 2024; OEC, 2023). The country is a major producer of oil and natural gas, with significant reserves (WorldAtlas, 2022; OPEC, 2024). Despite efforts to diversify, hydrocarbons continue to dominate Algeria's export landscape (World Bank, 2023).

2.2. Post-Independence: Diversification Efforts and the Rise of Hydrocarbons :

Algeria's independence in 1962 marked a pivotal moment in its export trajectory, with efforts to break free from colonial economic dependency (Belaid, 2023). The government aimed to diversify the economy by developing sectors like agriculture and manufacturing. However, hydrocarbon exports gradually became the cornerstone of Algeria's economy due to significant oil and gas reserves (World Bank, 2021). This led to substantial revenues but also exposed the economy to price volatility and the "Dutch Disease," where non-hydrocarbon sectors struggled to compete.

Despite the benefits, this dependence created risks and vulnerabilities, including environmental challenges and neglect of other sectors like agriculture and manufacturing. Recognizing these risks, the Algerian government has renewed efforts to diversify, promoting non-hydrocarbon exports through initiatives like foreign investment, renewable energy, tourism, and SME support (International Organization for Standardization, 2021). Quality standards like ISO 9001 are crucial for enhancing competitiveness and accessing new markets. However, these efforts face challenges such as bureaucratic inertia and corruption, requiring sustained commitment and bold reforms for long-term prosperity.

2.3. Navigating Challenges and Pursuing Diversification in the Modern Era :

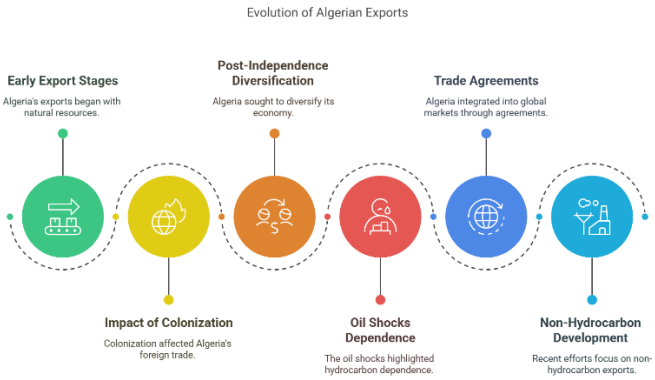
The oil shocks of the 1970s and 1980s highlighted Algeria's economic vulnerability to global oil price fluctuations, prompting efforts to diversify exports (Aissaoui, 2018). Concerted efforts were made to promote non-oil products like agricultural produce and manufactured goods to reduce dependence on hydrocarbons (Chebab & Beldjilali, 2024). However, these attempts faced challenges.

Algeria sought to bolster its export capabilities through trade agreements with entities like the EU and AU, and by participating in international trade fairs (World Trade Organization, 2020; Hamel, 2024). Recently, Algeria has focused on developing non-oil exports in sectors like agriculture and new technologies to foster sustainable growth and reduce hydrocarbon dependence (Belaid, 2023).

Despite these efforts, challenges persist, including logistical bottlenecks, bureaucratic hurdles, and political instability (El Hamel, 2023). However, Algeria has untapped potential for diversification, with abundant natural resources and a strategic location offering competitive advantages (African Development Bank, 2021). Implementing policies to promote trade, quality standards like ISO 9001,

and international partnerships is crucial for realizing Algeria's export potential (Chebab & Beldjilali, 2024).

Figure 2.Timeline of main stages in the evolution of exports in Algeria



Source: Prepared by the researcher

2- Definition and History of the company "Tamestones SPA":

Tamestones SPA, a leading marble and granite processor in Africa, is strategically located in Sidi Ali Benyoub, facilitating access to materials and transport. With a capacity of 6,500 square meters daily, it uses advanced systems to produce high-quality products for construction and architecture, adhering to sustainability standards.

From 2021-2024, Tamestones SPA executed exports to the Middle East, Italy, and Mauritania, gaining expertise in international trade and compliance. This experience has positioned it as a key global player, continuously benchmarking against international standards and adapting to trends like sustainable sourcing.

In January 2022, Tamestones SPA began ISO 9001:2015 certification, involving gap analysis, employee training, and a quality management system. Achieving certification in September 2023, after internal and certification audits, demonstrates a commitment to quality and strengthens international credibility.

Post-certification (October 2023-February 2025), a 5% reduction in inefficiencies and positive customer feedback were observed. ISO 9001 has facilitated access to high-value markets requiring certification, solidifying Tamestones SPA's reputation as a reliable exporter.

Looking ahead, Tamestones SPA will refine its quality framework, integrating technology and ongoing training. In conclusion, Tamestones SPA's transformation underscores the impact of quality management in enhancing competitiveness, maintaining excellence, and driving innovation in the sector.

3- Research Methodology

This study uses a qualitative case study approach to assess ISO 9001 certification's impact on Tamestones SPA's exports. Primary data was collected through a semi-structured interview with the CEO, selected for their strategic oversight. The

interview covered ISO 9001 certification's motivations, implementation challenges, and perceived benefits to export competitiveness.
Thematic analysis of the CEO's responses focused on benefits like improved customer satisfaction, operational efficiency, and market expansion. Internal performance data (October 2023 – February 2025) was reviewed to empirically evaluate ISO 9001 certification's impact.
Limitations include reliance on a single interview, self-reported information, and a short post-certification period. Future research should incorporate perspectives from multiple stakeholders and comparative studies across Algerian SMEs. Despite these limitations, this study offers a detailed analysis of how ISO 9001 certification contributes to the international competitiveness of Algerian exporting firms.

4- Results and discussion

The findings derived from the interview with the CEO of Tamestones SPA provide compelling evidence that ISO 9001 certification plays a crucial role in enhancing export performance. The following sections present a synthesis of the key outcomes, supported by quantitative data and reference periods to provide a well-contextualized analysis.
ISO 9001 certification mandates a structured quality management system, compelling companies to implement standardized procedures for continuous quality improvement. The impact of these measures is evident in the case of Tamestones SPA. Before certification in September 2023, customer satisfaction levels were recorded at 28%. Following the implementation of ISO 9001 and the integration of structured quality control mechanisms, customer satisfaction rates significantly increased, reaching 81% by February 2025. This improvement reflects enhanced product consistency, reduced defect rates, and better adherence to international quality standards, thereby fostering trust among global clients.
A key advantage of ISO 9001 certification is its role in facilitating compliance with international trade regulations. Many global markets impose stringent quality and regulatory requirements, which can be challenging for exporters to meet. By aligning with ISO 9001 standards, Tamestones SPA successfully demonstrated compliance, thereby increasing its competitiveness. The direct impact of this compliance is reflected in the company’s financial performance: turnover increased by 8% between October 2023 and February 2025. Additionally, the number of customer complaints declined substantially, dropping from 7.7% in 2023 to 1.6% in early 2025. These metrics indicate enhanced customer confidence and lower rejection rates in export markets.
Following ISO 9001 certification, Tamestones SPA experienced notable growth in export sales. This increase can be attributed to heightened customer trust, improved operational efficiency, and enhanced compliance with global market requirements. According to the CEO, specific export markets, such as Italy and the Middle East, witnessed a 15% increase in order volumes between September 2023 and February 2025. This data suggests that certification not only strengthens a company’s reputation but also directly contributes to its capacity to expand into new markets.

ISO 9001 implementation requires companies to streamline their internal processes, leading to significant improvements in operational efficiency. At Tamestones SPA, this transformation resulted in a 5% reduction in process

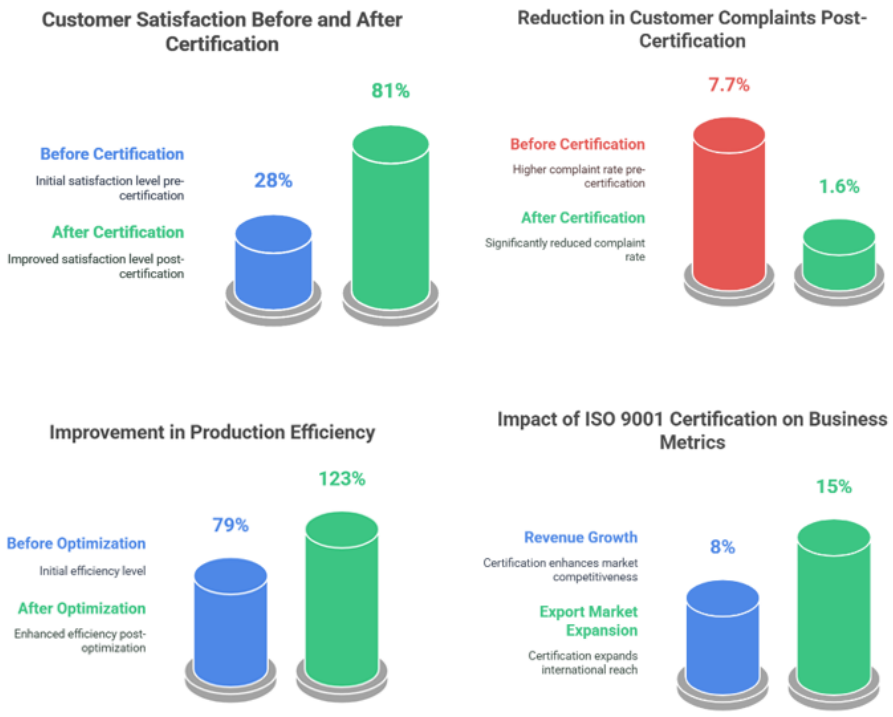
inefficiencies between October 2023 and February 2025. Additionally, production rates increased from 79% efficiency in 2023 to 123% efficiency by early 2025, signifying better resource utilization and waste minimization. These enhancements have enabled the company to maintain competitive pricing while sustaining high-quality outputs, thus reinforcing its global positioning.

Despite the clear benefits, the journey toward ISO 9001 certification was not without obstacles. The CEO highlighted initial resistance from employees and the complexity of aligning existing processes with certification requirements. However, through targeted training programs and gradual integration of quality management principles, these challenges were mitigated. The experience at Tamestones SPA underscores the importance of strong leadership commitment and employee engagement in the successful implementation of ISO 9001. The CEO emphasized that sustained dedication to quality improvement is essential for maintaining certification benefits in the long term.

Looking ahead, Tamestones SPA expects ISO 9001 certification to continue driving export growth and reinforcing its reputation as a quality-driven manufacturer. The company is exploring additional certifications, such as ISO 14001 for environmental management, to further enhance its international credibility. Furthermore, plans are in place to leverage data analytics and real-time monitoring systems to refine quality control mechanisms and maintain continuous improvement.

The analysis of Tamestones SPA's experience confirms that ISO 9001 certification serves as a powerful enabler of export growth. By improving quality assurance, ensuring compliance with international standards, and enhancing operational efficiency, the certification has significantly strengthened the company's global competitiveness. The quantifiable benefits-such as an increase in customer satisfaction from 28% to 81%, an 8% rise in turnover, a reduction in complaints from 7.7% to 1.6%, and a production efficiency increase from 79% to 123%-provide concrete evidence of the certification's impact. As a result, ISO 9001 remains a strategic asset for companies seeking to expand their presence in international markets.

Figure 3. The results of some KPIs of Tamestone SPA after ISO 9001 certification



Source: Results of the interview

Conclusion:

In conclusion, this study underscores the crucial role of ISO 9001 certification in enhancing the export competitiveness of Algerian SMEs, particularly in diversifying beyond hydrocarbon sectors. ISO 9001 improves operational efficiency, customer satisfaction, and market access – vital for Algeria's economic diversification (Chebab & Beldjilali, 2024; Hamel, 2024). Historically, quality management in Algeria evolved gradually, influenced by international trends and facilitated by the establishment of IANOR in 2003, which adapted ISO standards to local needs (Algerian Institute of Standardization (IANOR). (2003).

Empirical evidence suggests ISO 9001 certification leads to increased export intensity for Algerian SMEs, supporting the hypothesis that it enhances market access and customer satisfaction. While initial investment and ongoing compliance pose challenges, quality management systems like ISO 9001 remain vital for Algeria's economic diversification (International Organization for Standardization, 2021; Belaid, 2023). Future research should focus on quantifying the economic benefits and overcoming barriers to certification. In summary, ISO 9001 is a strategic tool for Algerian SMEs, positioning Algeria for sustainable economic growth and reduced reliance on hydrocarbon exports.

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Appendices:

1. Could you provide a brief overview of your company, its industry, and its key export markets?
2. When did your company obtain ISO 9001 certification?
3. What motivated your decision to pursue ISO 9001 certification?
4. Can you describe the process your company went through to become ISO 9001 certified?
5. How do you believe ISO 9001 certification has influenced your company's export activities?
6. Have you noticed any specific improvements in the quality of your products or services following ISO 9001 certification?
7. How has ISO 9001 contributed to your company's ability to meet international quality standards and regulations, thus facilitating exports?
8. In what ways has ISO 9001 helped in enhancing your company's overall reputation and competitiveness in the global market?
9. Can you provide data or anecdotal evidence on the growth of your export sales after obtaining ISO 9001 certification?
10. Have there been specific export markets where you've seen a substantial increase in business due to ISO 9001 certification?
11. How has ISO 9001 certification contributed to improving customer satisfaction among your international clients?
12. What internal processes and practices did your company have to revise or improve to align with ISO 9001 standards?
13. Has ISO 9001 led to more efficient operations, reduced waste, or cost savings that have impacted your ability to compete in the global market?
14. Were there any challenges or obstacles your company faced during the ISO 9001 implementation process, and how did you overcome them?
15. What lessons have you learned from the ISO 9001 certification experience that you would share with other companies looking to pursue certification?
16. How do you foresee ISO 9001 continuing to impact your company's export performance in the future?
17. Are there any additional certifications or quality management practices that you are considering to further enhance your export capabilities?
18. In summary, what would you say are the most significant takeaways or key points regarding how ISO 9001 has influenced your company's exports and overall business success?