www.ijecs.in
International Journal of Engineering and Computer Science
Volume 14 Issue 02 February 2025, Page No. 26871-26883
ISSN: 2319-7242 DOI: 10.18535/ijecs/v14i02.4992

Implementation of A Quality Management System Based on Iso 9001 Requirements in Gaming Industry Companies

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Abstract

This review article examines the potential benefits of implementing a Quality Management System (QMS) based on the requirements of the international ISO 9001 standard within gaming industry companies. The article explores the core principles and structure of an ISO 9001 QMS in the context of game development. It describes the main stages of QMS implementation in gaming companies and highlights the role of the ISO/IEC/IEEE 90003 standard in this process. Particular attention is paid to analyzing the feasibility of applying the ISO 9001 standard in the gaming industry, supported by research on the standard's compatibility with popular development methodologies used in high-tech and creative companies, as well as real-world examples of successful implementation and certification of gaming companies under the ISO 9001 standard.

Keywords: gaming industry, QMS, TQM, ISO 9001, quality assurance, testing, user satisfaction, systems approach.

1. Introduction

The dynamic growth of the gaming industry is accompanied by steady expansion and increasing competition. According to Statista, the global gaming market is projected to reach $522.5 billion by 2025, with an expected compound annual growth rate of 7.25% through 2029 [1]. This growth highlights the industry's significant potential but also introduces new challenges: stricter product quality requirements intensified regulatory measures, and the rapid evolution of technologies, including generative artificial intelligence (AI), demand adaptation to rapidly changing conditions [2].

Modern players expect not only impressive visual and gameplay features but also flawless stability, user-friendly interfaces, and minimal errors. However, the loosely formalized management methods prevalent in the industry often fail to meet these expectations. An illustrative example is the launch of Cyberpunk 2077 by CD Projekt RED. Despite an extensive marketing campaign and high anticipation, the release was marred by critical technical issues on older console generations, leading to widespread refunds and the game's removal from the PlayStation Store, causing significant reputational damage to the company [3]. This example underscores the necessity of a systematic approach to quality that not only improves product stability and internal efficiency but also helps companies remain competitive in increasingly complex market conditions. One strategically important solution for improving quality and development efficiency is the implementation of a Quality Management System (QMS). A QMS is a set of interrelated processes, principles, and methods used within an organization to ensure and enhance the quality of products, services, and processes, making them transparent, efficient, and reproducible. These

advantages are particularly critical given the market characteristics outlined above.

Among the various approaches to establishing a QMS, the most widely adopted is the international ISO 9001 standard, which provides a universal quality management model applicable across industries. Its use supports process optimization, risk reduction, and alignment of products with user expectations. Additionally, for companies involved in software development, including the gaming industry, the ISO/IEC/IEEE 90003:2018 standard offers tailored guidance on applying ISO 9001 to the creation, delivery, and maintenance of software products. This makes it especially relevant for high-tech and creative sectors such as game development. The purpose of this study is to analyze the potential benefits and prospects of implementing a QMS in gaming industry companies.

Objectives of the study:

To examine the ISO 9001 standard and its implementation process in conjunction with ISO/IEC/IEEE 90003 within the context of the gaming industry.

To analyze the feasibility of applying ISO 9001 in the gaming industry.

The theoretical significance of the study lies in the systematization of the experience of applying ISO 9001 in video game development and the analysis of specific requirements and challenges associated with its implementation. This work clarifies theoretical aspects of adapting the standard to the gaming industry's unique characteristics, providing a foundation for further research in quality management for creative products.

The practical significance of the study lies in the development of recommendations for implementing and maintaining a QMS based on ISO 9001:2015 and ISO/IEC/IEEE 90003:2018 standards in gaming companies. It is expected that applying these recommendations will enhance development efficiency, risk management, and the global market launch of games while strengthening competitiveness, increasing player satisfaction, and improving key performance indicators. Additionally, the results of this study provide gaming company executives with a scientifically grounded basis for making informed decisions about the feasibility of implementing the standard.

Overview of the ISO 9001 standard in the context of the gaming industry

The ISO 9001 standard is among the most widely adopted frameworks for quality management. Initially developed in 1987, it serves as a tool for systematically improving organizational operations, ensuring consistent quality in products and services while meeting client requirements and legal regulations. Over time, ISO 9001 has become synonymous with certification and associated marketing advantages, yet its core philosophy remains rooted in continuous improvement and a focus on achieving high-quality standards in both products and services [4]. ISO 9001 not only establishes a comprehensive framework for quality management but also fosters a culture of quality within organizations. This approach transitions companies from reactive problem-solving to proactive defect prevention and continuous enhancement, enabling them to adapt to emerging technologies and the growing expectations of users. The standard is part of the ISO 9000 family, which is grounded in the principles of Total Quality Management (TQM). These principles emphasize meeting customer needs, employee engagement, a process-oriented approach, and ongoing improvement. Among the documents in this family, ISO 9001 provides the most detailed quality requirements, encompassing all stages of organizational activities and serving as a universal foundation for QMS. Other documents within the ISO 9000 family complement ISO 9001 by offering theoretical insights, standardized terminology, and additional guidance for quality enhancement.

Together, these documents create a cohesive platform that enables organizations to streamline internal processes and maintain high standards of quality, even when developing creative and dynamic products. This is particularly relevant to the gaming industry, where the complexities of

innovation and user expectations demand robust and adaptable quality management frameworks [5].

1.1 Key principles and structure of the ISO 9001 standard

The application of ISO 9001 is based on several universal principles that form the foundation of QMS. These principles guide the development of processes and define the approach to all stages of a product's lifecycle, from concept and design to testing and post-release support. In the gaming industry, the practical implementation of these principles can become a critical factor for success [6]:

Customer focus. The standard emphasizes the importance of regularly gathering feedback and analyzing the needs of end users. In the gaming industry, this principle is reflected in active engagement with the player community, studying audience preferences, and continuously monitoring market trends. These actions enable prompt adjustments to game mechanics, balance, and functionality, which can enhance a product's competitiveness and player retention.

Leadership. According to the standard, organizational leadership is responsible for defining strategic priorities and creating conditions that ensure effective quality management. In the context of the gaming industry, this includes supporting innovation, allocating necessary resources for development and testing, and fostering a motivational and inspiring environment for creative teams. This approach can encourage seamless collaboration among specialists, stimulate the generation of new ideas, and ensure high-quality final products. Employee engagement. The standard calls for the development of competencies, encouragement of initiative, and reinforcement of accountability for results. In the gaming industry, this principle can be applied by promoting collaboration among programmers, designers, testers, and marketers. Engaged employees can work in coordination to propose and implement ideas aimed at improving the quality of gaming products, contributing to the successful achievement of development goals and meeting user expectations. Process approach. The standard views organizational activities as a series of interconnected processes, each influencing the final quality. In game development, this principle can help structure stages such as game design, coding, testing, and ongoing support. This reduces the likelihood of management gaps and simplifies the identification of potential problem sources, ultimately resulting in higher-quality gaming products. Continuous improvement. The standard encourages organizations to continuously analyze and refine their processes. In the gaming industry, where improvement can significantly affect commercial success, this approach provides a foundation for greater flexibility in adapting to market demands and enhances the ability to respond promptly to emerging technological opportunities. Fact-based decision-making. The standard underscores the importance of using objective data for management decisions, reducing the risk of errors and increasing process efficiency. In the gaming industry, this principle is realized through the analysis of test results, defect statistics, community feedback, and player retention metrics. Such an approach allows resources to be focused on the most critical aspects of development, minimizing subjective errors.

Relationship management. The standard emphasizes the importance of effective collaboration with all stakeholders. In the gaming industry, this includes partners, contractors, platform holders, and external studios, ensuring their interests are considered and facilitating more cohesive project work. This approach minimizes conflicts and strengthens the overall quality of product development and release. The core element of the ISO 9001 structure is the "Plan-Do-Check-Act" (PDCA) cycle, an iterative management process aimed at continuous improvement and achieving high-quality products and services. This cycle is based on four key stages [6]: Plan. This stage involves setting goals and objectives related to improving the quality of products or services. It includes analyzing the current state of the process, identifying potential risks, and determining the resources required to

achieve the objectives. An action plan, evaluation criteria, and methods for monitoring results are developed.

Do. At this stage, the developed plans are implemented, and changes are introduced into the process. Data on the results of implementation are collected, and their compliance with the set criteria is monitored. Adjustments are made to the process as necessary to ensure the achievement of the defined objectives. Check. This stage focuses on analyzing the collected data to assess results against the set criteria. Nonconformities and errors are identified, and the effectiveness and efficiency of the measures taken are evaluated. Decisions regarding further actions are made based on the findings.

Act. Based on the analysis of results, decisions are made to adjust the action plan and implement necessary changes in the process. This may include revising objectives, improving methods of plan execution, or introducing new tools or procedures. The combination of the seven principles of quality management and the iterative PDCA cycle provides a reliable methodological foundation, enabling the implementation of innovations while maintaining predictability and control at all stages of development. A QMS based on the ISO 9001 standard represents a structured approach to organizational process management, ensuring consistency and adaptability to changes. Figure 1 illustrates how the key elements of a QMS interact with each other and align with the previously described PDCA cycle.

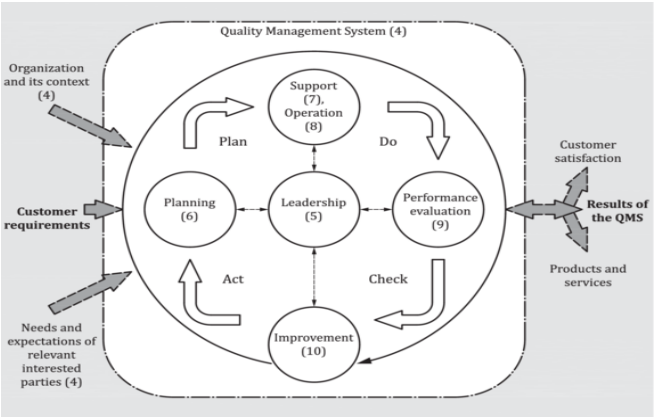

Figure 1 — QMS structure in accordance with the PDCA cycle [6]

The structure of the system is oriented toward continuous improvement and is closely linked to a process approach, where every operation impacts the final product quality. The QMS connects internal company processes with external requirements and expectations.

The input data for the system include:

- Customer needs, which form the foundation of product requirements, encompassing aspects such as operational stability, ease of use, and functionality;
- Expectations of stakeholders, including partners, platform holders, and regulators.
- The system delivers the following outputs:
- Products and services that meet the stated requirements;
- Increased customer satisfaction, a key indicator of the system's effectiveness;
- Process evaluation results, enable strategic adjustments and enhance competitiveness.

The main structural elements, such as Support, Operation, and Performance Evaluation, are designed to work cohesively within a unified system. These processes are based on the seven principles of quality management described earlier. A QMS based on ISO 9001 is built on a holistic approach to quality management and comprises a range of components that interact to ensure the system's effective operation [6]:

1. Quality policy and objectives. A QMS begins with defining the organization's strategic vision and management commitments to quality, reflected in the quality policy. The quality policy outlines the principles and directions of the organization’s activities regarding the quality of products and services. Specific quality objectives are established based on this policy, which must be measurable and assessed using key performance indicators (KPIs).
2. Processes and procedures. To achieve the defined quality objectives, processes, and procedures are developed and documented to specify how tasks are performed and

establish responsibilities. The process approach involves identifying and managing key processes that influence product or service quality, ensuring consistency and efficiency in their execution.

3. Resources. A QMS requires the provision of necessary resources to implement processes and achieve quality objectives. Resources include human resources (qualified personnel, training, and development), material resources (equipment, tools, materials), financial resources (funding for QMS activities), and infrastructure (workspaces, information systems, communication channels).
4. Document management. A QMS involves the creation, maintenance, and updating of documentation that governs the processes and procedures ensuring product and service quality. Documentation includes standards, instructions, forms, records, and other materials that describe quality requirements, quality management processes, and evaluation methods.
5. Monitoring and measurement. To evaluate process effectiveness and the achievement of quality objectives, the monitoring and measurement of QMS performance are essential. Methods include internal audits, control charts, statistical data analysis, and other quality assessment techniques.
6. Data analysis. Collecting and analyzing data on product or service quality is a crucial QMS element, enabling the identification of trends, analysis of root causes for deviations from established requirements, and informed decision-making to improve quality.
7. Corrective and preventive actions. When nonconformities in product or service quality are identified, corrective actions are taken to eliminate the root causes and prevent recurrence. This involves root cause analysis and the implementation of measures to address them. Preventive actions focus on avoiding future issues through proactive measures, process improvement, and the adoption of new technologies.
8. Continuous improvement. A QMS emphasizes continuous improvement across all organizational activities related to quality. This is achieved through innovation, process optimization, the use of new technologies, and advanced quality management methods.

Thus, to ensure the consistency and effectiveness of a QMS, it is necessary to establish a regulatory framework comprising a set of interconnected and complementary normative documents that govern processes, requirements, and responsibilities. The regulatory framework must be clear, comprehensible, and consistent, ensuring its effective practical application.

A QMS must have a clearly articulated policy that defines the strategic vision and management's commitments to the quality of products and services. This includes specific objectives, tasks, and principles for achieving them. Additionally, the QMS must be supported by an interconnected and complementary system of processes that ensures effective quality management at all stages of the organization’s activities. To implement the requirements set forth in the regulatory framework, an effective mechanism must be established to ensure the consistency and efficiency of process execution and the achievement of QMS objectives. It is also crucial that organizational personnel possess sufficient knowledge of the policy, regulatory framework, and the mechanisms for implementing its requirements, as well as the ability to apply this knowledge in practice.

The requirements outlined in the QMS policy and regulatory framework must be strictly adhered to and respected by all employees of the organization.

1.2 Implementation process of a QMS based on ISO 9001 requirements in the gaming industry

The organization of the QMS implementation process in gaming industry companies involves adapting the general requirements of the ISO 9001

standard to the specific characteristics of the sector. To achieve this, the ISO/IEC/IEEE 90003:2018 standard has been developed, providing detailed guidance on applying ISO 9001 to the processes of creating, delivering, and maintaining software products. This standard is applicable to the gaming industry as it considers the specifics of software development, an integral part of video game creation. It offers approaches to enhance quality management at all stages of a product's lifecycle, from design to post-release support [7].

The implementation of a QMS requires a phased approach that considers the specifics of this field. Each phase plays a critical role in system implementation and the achievement of its objectives. Figure 2 illustrates the sequence of QMS implementation phases.

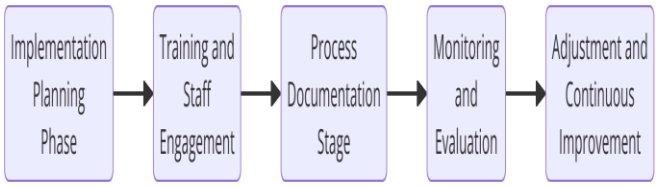

Figure 2 — Phases of QMS Implementation

At the first stage, a detailed QMS implementation plan is developed, including diagnostics of current processes, defining system objectives, and creating a roadmap for implementation. An audit of the existing management system identifies weaknesses and prioritizes areas for improvement. In the gaming industry, the planning phase must account for the high pace of changes, the need to adapt to new technologies, and the balance between strict regulations and creative freedom. The ISO/IEC/IEEE 90003:2018 standard describes methods for addressing the unique aspects of software development, such as the iterative nature of processes, frequent changes in requirements, and the necessity of maintaining high quality throughout the product lifecycle. During the planning phase, the standard aids in defining strategic quality objectives and effectively identifying key processes, contributing to the creation of a realistic and result-oriented action plan.

The next stage may involve training employees on quality management principles, the process approach, and the requirements of ISO 9001:2015 and ISO/IEC/IEEE 90003:2018. In the gaming industry, it is essential for all team members to understand the objectives and principles of the QMS. This stage may include organizing training sessions and workshops to familiarize the team with the standard's approaches and their application in daily work. It may also require forming a working group to coordinate implementation efforts and providing employees with access to training materials to help adapt ISO/IEC/IEEE 90003:2018 recommendations to the company's current processes.

The documentation stage forms the foundation of the QMS, ensuring process transparency and consistency. In the gaming industry, this stage may involve developing regulations that describe game mechanics design, code creation and testing, and product release. The ISO/IEC/IEEE 90003:2018 standard provides approaches for documenting processes that influence software product quality. For example, it helps create documentation that records key project stages, defines interaction standards between teams, and establishes a structure for change management. This approach can contribute to building a transparent and repeatable quality management system tailored to the specifics of the gaming industry. Following the documentation phase, pilot implementation of the QMS begins. During this stage, monitoring and internal audits are conducted to identify and eliminate nonconformities. This allows for process adjustments and error minimization. Key activities include developing a system of KPIs, conducting internal audits, analyzing results, and using monitoring tools such as Defect Detection Efficiency (DDE).

The final stage involves data analysis, identifying areas for improvement, and implementing corrective actions. In the gaming industry, this can include optimizing testing processes, improving interdepartmental collaboration, and adopting new technologies such as generative AI. Regular

retrospectives, process adaptations, and the integration of innovations can enhance product quality and player satisfaction. The process of implementing a QMS in the gaming industry represents an approach that accounts for the sector's specifics, market dynamics, and user expectations. Consistent execution of the described stages can help companies structure their processes and improve overall efficiency.

2. Analysis of the feasibility of applying the ISO 9001 standard in gaming industry companies

This section provides an analysis of the feasibility of applying the ISO 9001 standard in the gaming industry. The analysis includes the following steps:

- Identification of potential benefits from implementing the standard in gaming industry companies;
- Review of the author's practical case study;
- Assessment of the standard's applicability to game developers, considering available resources and capabilities.

The analysis will utilize the following sources of information:

- The article by Bill McMichael and Marc Lombardi, " ISO 9001 and Agile Development" [8];
- The article by Tor Stålhane and Geir Kjetil Hanssen, "The Application of ISO 9001 to Agile Software Development" [9];
- The article by Anuradha Mathrani, Shanuka Wickramasinghe, and Nihal Palitha Jayamaha, " An Evaluation of Documentation Requirements for ISO 9001 Compliance in Scrum Projects" [10];
- The article by Wolfgang Molnar and Joe Nandhakumar, " Managing a New Computer Device Development in a Creative ISO 9001 Certified Company: A Case Study" [11];
- Data collected by the author on the implementation of a quality assurance (QA) process based on ISO 9001 in the Zero City project by MY. GAMES;
- Known examples of IT companies specializing in game development that have successfully achieved official ISO 9001 certification.

The relevance of these sources to the gaming industry is tied to the frequent use of Agile and Scrum methodologies by game developers, and the inherently creative nature of such organizations. These characteristics enable the analysis results to substantiate the feasibility of ISO 9001 implementation in gaming companies.

2.1 Potential benefits of implementing ISO 9001

Based on the analysis of data from the aforementioned publications, the key potential benefits that gaming companies can gain from implementing the ISO 9001 standard have been identified. These findings are presented in Table 1 for clarity:

Table 1. Identified Benefits of Implementing ISO 9001

Benefit	Description
Improved quality	Implementation of the standard promotes process standardization, ensuring consistent product and service quality. This eliminates deviations and meets customer expectations [8, 9].
Reduction in defects	Standardization and strict adherence to procedures reduce the likelihood of defects, minimizing costs associated with corrections. This is particularly significant in industries with high-quality demands [9].
Increased customer trust	Certification enhances customer and partner trust by demonstrating a commitment to international quality standards. This strengthens market reputation [8, 11].

Improved collaboration	The standard improves communication between company departments by unifying approaches and procedures. This is critical for organizations where coordination plays a key role [9, 10].
Support for innovation	The standard provides a framework that allows companies to maintain creativity and adapt to innovative approaches while retaining process control. This is especially important for creative companies [11].
Creation of a quality culture	The standard fosters a focus on continuous improvement and meeting customer needs. Organizations begin to view quality as a strategic priority, influencing all levels of the company [11].
Cost optimization	Implementing the standard simplifies processes, reducing time and material costs. Optimization is achieved by eliminating redundancies and enhancing efficiency [9].
Strengthened market position	International certification enables companies to compete successfully in global markets, gain access to new segments, and strengthen trust from investors and partners [11].

Strengthened market position International certification enables companies to compete successfully in global markets, gain access to new segments, and strengthen trust from investors and partners [11]. Thus, implementing ISO 9001 in gaming industry companies can potentially drive systematic improvements in quality management, operational efficiency, and customer engagement. These anticipated benefits validate the importance of further exploration and adoption of this standard as a tool for enhancing competitiveness and business sustainability in the gaming market.

2.2 Practical case review

As an example of the successful application of ISO 9001 in the gaming industry, the experience of the Zero City project, a popular mobile game from the MY. GAMES portfolio, will be examined. Although ISO 9001 is traditionally implemented at the company-wide level, in this case, it served as the foundation for introducing specific tools, procedures, and practices at the project and team level.

The author of this article developed and implemented a QA process (Figure 3) based on the seven principles of quality management. The goal of this implementation was to establish a systematic approach to ensuring the quality of the gaming product under constrained resources.

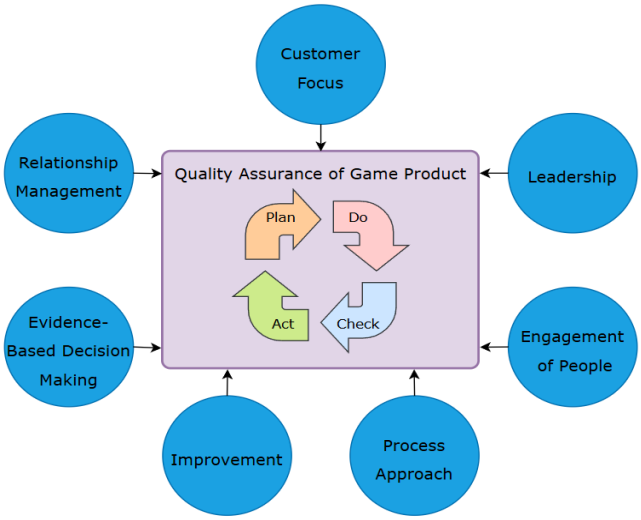

Figure 3 — QA process based on ISO 9001 principles

Activities within this process were organized in accordance with the PDCA cycle, enabling continuous improvement and prompt resolution of emerging issues:

- At the "Plan" stage, the scope of development is assessed, including requirements analysis and prioritization. Test plans are created, specifying the required resources, methodologies, and key metrics for evaluating product quality. Test cases are also prepared, detailing

scenarios for verifying new functionality or other aspects of the product.

- At the "Do" stage, planned activities are carried out. Builds are created and prepared for testing on each target platform, and functional, regression, and UX/UI testing are conducted, along with additional testing types as needed, such as performance or network functionality testing. The testing environment and CI/CD tools are configured to automate routine processes. Additionally, data on testing progress is systematically collected and analyzed, including key metrics for compliance with established requirements.
- At the "Check" stage, all results are thoroughly analyzed and compared against established quality metrics. Detailed bug reports or issue summaries are generated, root causes of problems are analyzed, and specific recommendations and proposals for improving the product or processes are developed.
- At the "Act" stage, adjustments are made to both the game product (defects are fixed, and functional requirements are refined and enhanced) and the testing and development processes. Test cases are revised and optimized, quality evaluation criteria are updated, and new tools and automation methods are introduced. Procedures and approaches are modified as needed to increase process efficiency and adaptability to current and future tasks.

Each of the seven principles of quality management was adapted as follows:

1. Customer focus: Processes were aimed at prioritizing player needs. The QA team's interaction system with the technical support department was organized to ensure timely responses to user complaints and feedback, contributing to increased user satisfaction.
2. Leadership: Measurable and achievable goals, such as reducing the number of defects and shortening content production time, were established. These goals ensured alignment and coordination among all project participants.
3. Employee engagement: The QA team actively participated in improving processes, including the development of new testing approaches and the adoption of more efficient practices. This enhanced employee involvement and accountability.
4. Process approach: Standardized testing procedures were implemented and documented, covering aspects such as functionality, performance, network functionality, and UX/UI. This ensured process transparency and consistency in actions.
5. Continuous improvement: Regular incident analysis and retrospectives following sprint results contributed to ongoing process enhancements. The application of the PDCA cycle enabled rapid adaptation to new challenges and effective risk mitigation.
6. Evidence-based decision-making: Analysis of player feedback, analytics data, and testing results provided an objective approach to quality management. By analyzing Git commits and development scope, test coverage was determined, and tasks were prioritized based on user-critical and business-critical functionality of the game.
7. Relationship management: Effective collaboration between the QA team and all development stakeholders—including game designers, programmers, artists, marketers, and external outsourced testers—facilitated the achievement of a high-quality game product. Coordination among all stakeholders helped minimize risks and improve release stability.

The application of this approach in the Zero City project yielded the following results:

- The release cycle was reduced from 5 weeks to 3 – 3.5 weeks, enabling the

delivery of more content and attracting new users;

- The DDE metric reached 90%, minimizing the risk of critical errors in the game product at the release stage;
- A high level of user satisfaction was confirmed by average ratings of 4.7 in the App Store and 4.5 in Google Play.

The practical case of the Zero City project clearly demonstrates that even partial implementation of ISO 9001 at the project level can positively impact product quality and process efficiency. This suggests that applying the standard at the company-wide level could lead to even more significant and systematic improvements.

2.3 Assessment of ISO 9001 applicability based on capabilities and resources

To evaluate the applicability of ISO 9001 considering the capabilities and available resources of gaming industry companies, the following classification is introduced based on company size:

- Small studios (~up to 25 employees/limited resources);
- Medium-sized companies (~up to 100 employees/moderate resources);
- Large companies (~100+ employees/significant resources).

Table 2 presents examples of IT companies officially certified under ISO 9001 that specialize in game development:

Table 2. Gaming Companies Certified to ISO 9001

Company	Description	Number of Employees	Company Category	Certification
GameCloud Technologies [12]	A company specializing in video game testing and quality assurance, providing high-quality services across a wide range of gaming platforms.	50+	Medium	ISO 9001:2008
Riseup Labs [13]	An international company offering high-quality IT services and technological solutions, specializing in web systems, mobile applications, games, and interactive entertainment.	100+	Large	ISO 9001:2015
Juego Studio [14]	A company engaged in game development and interactive applications, providing high-quality services in creating games, augmented and virtual reality applications, and other digital solutions.	300+	Large	ISO 9001:2015

Gameskraft [15]	A leading Indian online gaming company focused on delivering high-quality gaming experiences and implementing innovative solutions.	700+	Large	ISO 9001:2015

The data presented in the table indicate that certification under the current version of ISO 9001:2015 is more commonly found among large companies in the gaming industry. For such organizations, certification not only ensures process efficiency but also serves as a vital tool for enhancing market reputation, building trust with clients and partners, and gaining international brand recognition.

The example of Game Cloud Technologies, certified under ISO 9001:2008, highlights that for medium-sized companies, the outcomes of implementing the standard are more important than the currency of the certification. Even an older version allowed the company to structure its processes and improve service quality, underscoring the standard's value for medium-sized organizations.

No examples of ISO 9001 certification were identified among small studios. This may be attributed to the fact that full implementation and certification require resources more commonly available to medium-sized and large companies. However, small studios or individual teams can use the standard as a guideline for improving key processes. An example of such an approach is the previously discussed Zero City project, where ISO 9001 principles were successfully adapted for a team with limited resources. Although certification was not pursued, significant process improvements and enhanced product quality were achieved. Thus, ISO 9001 demonstrates its versatility, adapting to the capabilities and needs of different company categories. Medium-sized and large companies can also gain reputational benefits from certification, while for small companies, the standard's requirements can serve as a foundation for implementing a basic QMS.

4. Conclusion

The findings of this study confirm the effectiveness and potential of implementing a QMS based on ISO 9001 in gaming companies. The author outlined how the implementation process can be organized, considering industry specifics and utilizing ISO/IEC/IEEE 90003.

The analysis of industry-relevant articles emphasized that implementing ISO 9001 contributes to improved product quality, defect reduction, increased customer trust, cost optimization, enhanced interdepartmental collaboration, the creation of a culture of continuous improvement, support for innovation, and strengthened market positions for companies.

The author's practical example within the Zero City gaming project demonstrated that even partial application of the standard can yield significant results, such as defect reduction, faster release cycles, and high levels of user satisfaction. These outcomes highlight the considerable potential of a comprehensive QMS implementation: if the application of this standard at the project level can achieve such noticeable improvements, scaling it to the company-wide level offers prospects for even more substantial benefits.

The assessment of applicability based on capabilities and resources showed that ISO 9001 is suitable for gaming companies of various sizes. Small studios can focus on key aspects of the standard to achieve tangible results. Medium-sized and large companies can gain both operational benefits from improved cross-functional collaboration and overall efficiency and reputational benefits through successful certification.

In the context of a rapidly growing market with increasing competition for player engagement, implementing a QMS based on ISO 9001

represents a strategically important step. The standard enables companies to optimize processes while enhancing their adaptability to frequent changes and user expectations. This creates conditions for long-term sustainable development and competitive advantages. The results underscore the importance of a systematic approach to quality and open opportunities for further research and practical application of ISO 9001 in the gaming industry.

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