

Application of Six Sigma in the Quality Management Process

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Abstract- *This study scrutinized 134 administrative personnel members' perceptions of how effectively the Center for Innovation and Quality Management uses Six Sigma Define-Measure-Analyze-Improve-Control strategies to improve its administrative procedures and service delivery. Respondents' assessments of process implementation and significant elements of service quality were evaluated using a structured survey and a descriptive quantitative research design. The results show that Six Sigma is applied to a modest degree, with strengths noted in project objective definition, role and responsibility clarification, documentation system maintenance, and process control mechanisms. Nevertheless, shortcomings were found in the Measure and Analyze stages, specifically in the development of performance indicators, the regularity of data collecting, and the breadth of analytical methods. While inefficiency identification and ongoing staff development had relatively lower evaluations, documentation procedures, process clarity, communication, and coordination were all generally scored well in terms of service delivery. The study leads to the conclusion that even though the organization has a working quality management system, more development of data-driven analysis, feedback systems, and ongoing training initiatives is required to increase consistency and accomplish sustainable service improvement.*

Index Terms- *Innovation, Process Implementation, Management System, Quality Management, Six Sigma*

I. INTRODUCTION

While uncontrolled variability compromises efficiency, consistency, and cost-effectiveness, process variation remains to be an intrinsic constraint on the performance of an organization. The challenge is even more difficult in innovation-driven settings, such quality management centers, where dependable procedures are necessary for methodically creating and executing novel concepts (Helmold, 2025). In this regard, Six Sigma has developed into a strict, data-driven technique that institutionalizes process discipline through statistical control and continuous improvement cycles in addition to focusing on defect reduction (Dehan, et al., 2026; Morgado, et al., 2024; Taraza, et al., 2023). Six Sigma's strength lies in its capacity to convert data into actionable process insights, allowing organizations to achieve

quantifiable gains in productivity, error reduction, and resource optimization, according to recent empirical studies conducted across the manufacturing, healthcare, and service industries (Ilyina and Sanovich, 2021; MB Moraes and Trianni, 2026; Yadav, et al., 2020).

Furthermore, the study by Moskvichenko, et al. shows that Six Sigma's benefits go beyond improving operations to include developing a culture of data-driven decision-making and continuous improvement, which is essential in knowledge-based organizations (2024). According to Sampaio, et al. (2026), when properly contextualized, formal quality frameworks in educational settings may improve stakeholder satisfaction, decrease process delays, and increase administrative efficiency. Nevertheless, these applications continue to be dispersed and inadequately institutionalized, especially in poor nations. This emphasizes how important it is to methodically analyze Six Sigma within CIQM with the goal to produce context-specific evidence that synchronizes quality management techniques with the ever-changing needs of higher education institutions.

Additionally, when used methodically, Six Sigma has the ability reduce defects by up to 50% and increase process cycle times by 30% to 60%, according to the study of Da Silva Gomes, et al. (2022) that measures its wider organizational impact (Junio, 2025). Added by Junio, lean Six Sigma-based process improvement projects in education resulted in quantifiable increases in stakeholder satisfaction and up to 40% decreases in administrative delays (2025). The requirement for an organized, data-driven application within CIQM to provide context-specific, evidence-based improvements is highlighted by the fact that adoption in higher education is still restricted and dispersed despite these results, especially in developing contexts.

These results are further supported by research conducted in the Philippines, demonstrating its importance in enhancing operational dependability in developing nations. Nevertheless, its use in higher education, especially in institutional units responsible for innovation and quality management, remains understudied despite its shown cross-sector flexibility (Junio, 2025; Mongaya and Santos, 2025). Given the growing need for evidence-based process optimization in educational systems, this disparity is substantial. Therefore, implementing Six Sigma at Urdaneta City University's Center for Innovation and Quality Management presents a tactical chance to resolve process irregularities and bolster quality-driven innovation.

II. METHODOLOGY

In for the purpose of rigorously assess and analyze process performance indicators at Urdaneta City University's Center for Innovation and Quality Management, this study used a descriptive-analytic quantitative research approach. Important individuals in the university's process improvement activities, including directors, program heads, deans, heads of offices, and some employees involved in operations and service delivery, were among the responders. The sample size, which consists of 134 respondents overall, was determined by taking complete enumeration into account. The weighted mean was used to assess how much the Center for Innovation and Quality Management applied the Six Sigma DMAIC process to achieve administrative efficiency and quality of service delivery in terms of process clarity, documentation workflow, communication and coordination, and continuous improvement.

III. RESULTS AND DISCUSSIONS

The agreement of the Center for Innovation and Quality Management in applying the Six Sigma-DMAIC process to attain administrative efficiency.

Table I: Extent of agreement regarding the Define phase of the Six Sigma-DMAIC process as implemented by the Center for Innovation and Quality Management (CIQM) to enhance administrative efficiency

Define	Weighted Mean	Descriptive Equivalent
CIQM clearly identifies problems affecting administrative processes.	2.99	Agree
Objectives of each project or initiative are well-defined.	3.09	Agree
The roles and responsibilities of staff are clearly stated.	3.10	Agree
Relevant Stakeholders are consulted in defining administrative goals.	2.95	Agree
The purpose of process improvements is communicated effectively.	3.01	Agree

The results show that, despite there are some areas that need improvement, the Center for Innovation and Quality Management (CIQM) exhibits a generally structured use of the Define and Measure phases of the Six Sigma DMAIC methodology. High levels of agreement on well-defined project objectives (WM = 3.09) and clearly stated roles and responsibilities (WM = 3.10) show a solid foundational alignment with accepted quality management principles, where accountability and scope clarity improve process stability and lessen execution ambiguity (Ilyina and Sanovich, 2021). The study of Dehan, et al. (2026) also confirms that organizations with well-defined

project charters and job definitions see gains in project efficiency of up to 35% as a result of fewer coordination mistakes and decision delays (Antony et al., 2022). However, given that modern quality frameworks stress that inclusive stakeholder interaction greatly enhances problem definition accuracy and project acceptance, frequently boosting

The overall mean of CIQM in the Measure phase is 2.90, indicating moderate efficacy. The perceived accuracy and dependability of measuring tools are particularly strong (WM = 2.94). This is important because identifying process variation and facilitating evidence-based decision-making depends on reliable measurement methods. Abualsauod (2025) indicates that organizations with verified measuring methods can improve the accuracy of subsequent analysis by reducing data variability by up to 40%. However, the overall moderate assessment suggests that although technical measurement capabilities exist, there is still room for improvement in terms of their methodical integration into a fully optimized data-driven cycle.

Table II: Extent of agreement regarding the Measure phase of the Six Sigma-DMAIC process as implemented by the Center for Innovation and Quality Management (CIQM) to enhance administrative efficiency

Measure	Weighted Mean	Descriptive Equivalent
CIQM regularly collects data to evaluate administrative performance.	2.93	Agree
Performance indicators are clearly defined and monitored.	2.85	Agree
Quantitative measures (e.g., time, cost, output) are used in evaluating efficiency	2.89	Agree
Measurement tools used by CIQM are accurate and reliable.	2.94	Agree

Data collection procedures are consistent across different administrative processes	2.87	Agree
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The findings also point to a crucial flaw in CIQM's Measure phase implementation, specifically in the development and tracking of performance indicators, which had the lowest agreement (WM = 2.85). This implies that although there may be measurement tools available, the conversion of these measurements into well-defined and regularly monitored performance indicators is still in its infancy. Inadequately defined indicators might compromise the reliability of baseline data in sophisticated quality management systems, which will ultimately limit the efficacy of later phases of analysis and improvement. Organizations with well-structured key performance indicators (KPIs) can achieve up to 45% higher accuracy in performance diagnostics and more focused interventions, according to empirical research (Zouagha, et al., 2026)). Because real-time, data-driven monitoring is crucial for continuous improvement, the limited implementation of the Measure phase at CIQM suggests a partial alignment with TQM 4.0 concepts (Ahmed, et al., 2024).

The overall weighted mean of 2.87 in the Analyze phase indicates a similarly moderate degree of implementation. The comparatively higher agreement on the comprehensive analysis of administrative issues before making decisions (WM = 2.90) highlights CIQM's ability to conduct systematic analysis, which is essential for identifying the underlying causes of process variation (Ioppolo, et al., 2024). However, the study of Escobar, et al. (2024) highlights those sophisticated analytical techniques, such statistical modeling and root cause validation, can increase the efficacy of issue solving by as much as 50% (Ahmed, et al., 2024). This implies that even while CIQM exhibits good evaluative standards, there is still needed to improve analytical rigor using more advanced, data-intensive techniques.

Table III: Extent of agreement regarding the Analyze phase of the Six Sigma-DMAIC process as implemented by the Center for Innovation and Quality Management (CIQM) to enhance administrative efficiency

Analyze	Weighted Mean	Descriptive Equivalent
CIQM identifies the root causes of	2.87	Agree
Data analysis is used to understand	2.88	Agree
Analytical methods are applied to	2.85	Agree
Administrative problems are	2.90	Agree
Staff are involved in analyzing	2.87	Agree

The results of the Analyze phase show that although CIQM has a fundamental ability to analyze administrative problems, the breadth of its analytical procedures is still limited. The employment of analytical techniques to assess service delivery had the lowest agreement (WM = 2.85), indicating a restricted use of advanced data analytics to identify process inefficiencies. This is a serious issue because modern quality management frameworks stress that the Analyze phase's strength is in its thorough use of statistical and data-driven methods to identify underlying causes rather than depending on surface-level or descriptive evaluations.

According to Yang, et al. (2020), businesses can increase decision accuracy and problem resolution rates by up to 50% by incorporating advanced analytics techniques like regression modeling and root cause validation. Therefore, the Analyze phase's moderate overall implementation suggests that, despite being structured, CIQM's current practices may not yet fully utilize the diagnostic power required under TQM 4.0, where real-time data interpretation and predictive insights are essential to continuous improvement.

The Improve phase, on the other hand, produced a somewhat higher overall mean of 2.92, indicating a

reasonable degree of effectiveness in carrying out improvement measures. This implies that although CIQM can convert recognized problems into practical solutions, the quality of these enhancements is intrinsically reliant on the breadth and accuracy of earlier investigation. The plans for improvement based on solid analytical insights are up to 40% more successful in attaining long-term process improvements (Judijanto and Ummah, 2025). Therefore, enhancing analytical skills is crucial to optimizing the results of CIQM's improvement initiatives.

Table IV: Extent of agreement regarding the Improve phase of the Six Sigma-DMAIC process as implemented by the Center for Innovation and Quality Management (CIQM) to enhance administrative efficiency

Improve	Weighted Mean	Descriptive Equivalent
Improvement strategies are developed based on analysis results.	2.96	Agree
CIQM applies innovative solutions to address inefficiencies.	2.92	Agree
Improvement initiatives are tested before full implementation.	2.87	Agree
Improvement solutions are designed to prevent recurrence of identified issues.	2.92	Agree
Staff are encouraged to suggest improvement and innovative ideas.	2.93	Agree

The results pertaining to the Improve phase indicate that CIQM exhibits a methodical, if incomplete, approach to converting analytical insights into operational improvements. The Center can match interventions with identified process issues, which is consistent with evidence-based quality management, where solutions derived from validated data tend to produce more dependable and targeted outcomes (Dehan, et al., 2026). This is indicated by the highest agreement on the development of improvement strategies based on analysis results (WM = 2.96).

However, the comparatively lower rating (WM = 2.87) for testing improvement initiatives before full implementation highlights a serious flaw in the process improvement validation step. Pilot testing and controlled experimentation are crucial mechanisms for lowering implementation risk, improving interventions, and guaranteeing scalability, according to recent Six Sigma and TQM 4.0 literature. Without such validation, organizations are more vulnerable to rework, variability recurrence, and subpar outcomes (MB Moraes, et al., 2026; Yadav, et al., 2020; Yang, et al., 2020). This discrepancy implies that CIQM's improvement initiatives might rely less on empirical verification and more on logical alignment, which would limit the results' robustness.

Ultimately, the moderate level of adoption shows that although CIQM can create suitable improvement strategies, the treatments' dependability and sustainability are limited by the lack of thorough pilot testing. Therefore, to increase the efficacy of the Improve phase and guarantee that improvements are not only well-designed but also empirically validated prior to full-scale adoption, pre-implementation validation procedures must be strengthened.

Table V: Extent of agreement regarding the Control phase of the Six Sigma-DMAIC process as implemented by the Center for Innovation and Quality Management (CIQM) to enhance administrative efficiency

Control	Weighted Mean	Descriptive Equivalent
CIQM monitors processes to ensure improvements are sustained.	2.96	Agree
Standard operating procedures in CIQM are regularly reviewed and updated to maintain effectiveness.	2.91	Agree
Control measures are in place to track performance.	2.93	Agree
Documentation ensures consistency in administrative tasks	3.05	Agree
CIQM regularly collects feedback to maintain efficiency gains and support decision-making.	2.77	Agree

The results of the Control phase reveal that, notwithstanding their uneven institutionalization, CIQM has built fundamental mechanisms for maintaining process improvements. Documentation guaranteeing consistency in administrative chores

showed the highest degree of agreement (WM = 3.05), indicating a significant preference for uniformity and procedural stability. This implies that CIQM makes good use of written procedures as control tools, which is essential for avoiding process drift and preserving improvements made during previous DMAIC stages. Organizations with strong documentation systems have been demonstrated to reduce process deviations by up to 30%. Standardized documentation serves as a type of institutional memory in quality management literature, lowering variability and enabling replicable performance across units (Ioppolo, et al., 2024). CIQM is well-positioned to sustain baseline operational consistency thanks to this strength.

However, a major constraint in dynamic process control is revealed by the lowest agreement on the regular collection of feedback to sustain efficiency increases (WM = 2.77). Even though documentation promotes stability, it is insufficient for ongoing development in intricate administrative settings. Modern TQM 4.0 frameworks highlight the need for closed-loop feedback systems, where stakeholder input and real-time data guide continuous process modifications. Organizations run the danger of depending on static controls that might not be able to identify new inefficiencies or contextual changes if they do not collect input in a systematic manner. According to empirical research, organizations with integrated feedback mechanisms increase decision accuracy and responsiveness by more than 25% because they provide prompt remedial action and adaptive learning (Abualsauod, 2025).

When considered collectively, the Control phase's moderate overall implementation indicates that CIQM's methodology is more compliance-focused than adaptable. The Center's insufficient use of feedback systems limits its capacity to maintain and improve efficiency gains over time, even while documentation guarantees consistency. In conclusion, moving from static control to continuous, evidence-based process optimization in line with TQM 4.0 principles will need bolstering structured feedback systems, such as regular performance reviews, stakeholder input channels, and data-driven monitoring.

Extent of agreement of the current quality of service delivery in CIQM

Table VI: Extent of agreement regarding Process Clarity as a dimension of quality service delivery at the Center for Innovation and Quality Management (CIQM).

Process Clarity	Weighted Mean	Descriptive Equivalent
CIQM processes are simple and easy to follow	3.00	Agree
Service procedures are clearly communicated to clients.	3.02	Agree
Staff understand the sequence of steps in service delivery.	2.98	Agree
Process guidelines reduce confusion among employees.	2.99	Agree
Clients receive services in a timely manner without delays caused by unclear procedures.	2.96	Agree

According to the results on Process Clarity, CIQM exhibits a generally moderate degree of procedural transparency in service delivery, with both observable gaps and strengths impacting overall effectiveness. Clients receive services in a timely manner without delays caused by unclear procedures (WM = 2.96), the indicator with the lowest rating, indicates that procedural ambiguity still occasionally affects service timeliness. This suggests that although operational procedures are in place, they cannot be sufficiently standardized or understood consistently

throughout administrative divisions. According to Helmold (2025) and Ilyina and Sanovich (2021), inconsistent activity frequently results in bottlenecks, rework, and preventable delays in organizational systems. This kind of inconsistency is crucial since process flow clarity is a fundamental driver of service efficiency. Even minimal workflow design inconsistencies can add up to quantifiable inefficiencies in the context of quality management, especially in service-oriented organizations where timeliness is a critical performance metric.

The requirement for more robust procedural harmonization lends additional credence to the overall interpretation of moderate process clarity. Modern TQM 4.0 frameworks emphasize that streamlined and clearly defined procedures minimize decision delays, improve service predictability, and lessen cognitive load on staff (Mongaya and Santos, 2025). In the instance of CIQM, the results indicate that although processes are well understood, they might not yet be sufficiently streamlined or codified to remove execution variability.

Simultaneously, results from Documentation Workflows (overall mean = 3.11) support CIQM's strength in organized record-keeping, especially the strong consensus that accurate documentation lowers service delivery failures (WM = 3.28). This is consistent with the literature on quality management, which highlights how well-designed documentation systems function as preventive control mechanisms that lower service failures and improve consistency (Sampaio, et al., 2026). The significantly lower workflow accessibility grade (WM = 3.02), however, suggests that although documentation is available, its applicability may vary depending on the level of staff. Because accessibility is crucial to ensure that recorded procedures convert into actual operational behavior, this constraint diminishes the practical usefulness of otherwise robust documentation systems.

CIQM demonstrates a rather solid foundation in documentation-driven control and process clarity. However, limitations in workflow accessibility and procedural uniformity indicate that adjustments should concentrate on improving operational guidelines' system-wide accessibility and

streamlining process definitions. By strengthening these areas, CIQM's delivery service would be more timely, less variable, and more in line with TQM 4.0's efficiency-driven goals.

Table VII: Extent of agreement regarding Documentation Workflows as a dimension of quality service delivery at the Center for Innovation and Quality Management (CIQM).

Documentation Workflows	Weighted Mean	Descriptive Equivalent
CIQM maintains updated and complete documentation of its processes.	3.05	Agree
Maintains well-documented workflows that are accessible to staff	3.02	Agree
CIQM ensures that records are regularly updated to maintain accuracy.	3.05	Agree
Documentation helps in tracking administrative performance	3.15	Agree
Proper documentation reduces errors in service delivery	3.28	Strongly Agree

The findings on Documentation Workflows indicate that CIQM demonstrates a relatively strong institutional capacity in maintaining structured documentation systems that support quality service delivery. Overall results suggest a high extent of implementation, implying that documentation practices are generally well-established and contribute to consistency, accuracy, and error reduction in administrative processes. This aligns with quality management principles which emphasize that standardized documentation serves as a

stabilizing mechanism in service organizations by reducing variability and reinforcing procedural compliance (Yadav, et al., 2020). In practice, well-developed documentation workflows function as operational safeguards, ensuring that institutional knowledge is preserved and that service processes remain replicable across personnel and time.

Nevertheless, the results also suggest that there is still room for development in terms of accessibility. To optimize their usefulness in real-time decision-making, documentation systems must not only be accurate and comprehensive but also easily accessible and user-friendly, according to modern quality standards under TQM 4.0 (Junio, 2025). The efficiency benefits of documentation are lessened when accessibility is restricted because operational agility and responsiveness may be impacted by information retrieval delays.

The overall mean of 2.94 for Identification of Efficiencies indicates a moderate level of implementation, indicating that CIQM is able to identify and encourage operational improvements but has not yet fully institutionalized systematic efficiency detection techniques. When considered collectively, the findings show that although CIQM has built a solid foundation for documentation, additional improvements in accessibility and efficiency identification systems are required to completely optimize service delivery and conform to data-driven continuous improvement principles.

Table VIII: Extent of agreement regarding Identification of Efficiencies as a dimension of quality service delivery at the Center for Innovation and Quality Management (CIQM).

Identification of Efficiencies	Weighted Mean	Descriptive Equivalent
CIQM monitors activities to eliminate redundant steps.	2.88	Agree
Resources (time, money, manpower) are utilized	2.94	Agree

effectively.

Inefficient processes are quickly identified and addressed. 2.86 Agree

Best practices are adopted to maximize efficiency. 2.98 Agree

Efficiency measures contribute to better client satisfaction. 3.04 Agree

The results of the Identification of Efficiencies study show that CIQM has a fairly developed ability to identify and use operational efficiencies to improve service quality. Efficiency measures that boost client satisfaction received the highest rating (WM = 3.04), indicating a strong conceptual connection between improvements in internal processes and external service results. According to TQM 4.0 principles, which stress that operational optimization should directly improve stakeholder satisfaction through streamlined and value-oriented service delivery, this implies that CIQM can convert efficiency initiatives into perceived value for clients (Liu et al., 2023). This alignment is important from the standpoint of quality management because it shows that efficiency is a method for increasing service effectiveness rather than just lowering internal costs.

The lowest rating (WM = 2.86) for quickly identifying and resolving wasteful processes, however, suggests that CIQM's real-time monitoring and remedial response are limited. This suggests that although efficiencies are conceptually acknowledged, the system for identifying inefficiencies as they appear may not yet be sufficiently sensitive or properly institutionalized. According to Abualsauod (2025), maintaining steady performance and avoiding the build-up of systemic mistakes depend on the prompt detection of process inefficiencies. Efficiency benefits could be delayed or used inconsistently in the absence of such responsiveness.

The moderate degree of efficiency identification indicates that CIQM has developed a fundamental understanding of efficiency-driven service improvement; however, to fully operationalize continuous improvement and conform to the proactive, data-driven orientation of TQM 4.0, it needs more robust monitoring systems and quicker feedback mechanisms.

Table IX: Extent of agreement regarding Communication and Coordination as a dimension of quality service delivery at the Center for Innovation and Quality Management (CIQM)

Communication and Coordination	Weighted Mean	Descriptive Equivalent
Information flows smoothly among staff members.	2.95	Agree
Communication channels are effective in supporting service delivery.	2.92	Agree
Staff coordinate well to ensure efficient processes.	3.00	Agree
Updates on processes are regularly shared with employees.	2.94	Agree
Communication reduces misunderstandings in service delivery	3.08	Agree

CIQM exhibits a moderate but functional level of effectiveness in controlling internal information flow inside its service delivery system, according to the Communication and Coordination findings. CIQM's ability to guarantee clarity and reduce errors in

administrative procedures is demonstrated by the highest grade (WM = 3.08) for communication eliminating misunderstandings. This is consistent with TQM 4.0 concepts, which highlight accurate and seamless information interchange as a key factor in organizational success and process efficiency (Dehan, et al., 2026; Junio, 2025; Ilyina and Sanovich, 2021; Mongaya and Santos, 2025; Morgado, et al., 2024). It implies that CIQM's interpersonal and procedural communication is adequate to maintain fundamental operational coherence.

However, the lower rating (WM = 2.92) for the effectiveness of communication channels in supporting service delivery reveals structural limitations in the systems used to facilitate coordination. This implies that while communication content may be clear, the platforms or mechanisms through which information is transmitted may not be fully optimized or consistently reliable. Ilyina and Sanovich (2021) emphasize that weaknesses in coordination systems can introduce inefficiencies and variability in service operations, particularly when communication channels are fragmented or not fully integrated.

In all, CIQM demonstrates a modest degree of coordination and communication, with clear advantages in lowering misunderstandings but disadvantages in channel efficacy. Enhancing responsiveness and alignment with the integrated, technology-driven goals of TQM 4.0 would involve fortifying digital communication platforms and incorporating more organized coordination systems.

Table X: Extent of agreement regarding Continuous Improvement as a dimension of quality service delivery at the Center for Innovation and Quality Management (CIQM)

Continuous Improvement	Weighted Mean	Descriptive Equivalent
1. CIQM regularly evaluates the quality of its service.	2.90	Agree
2. Client feedback is effectively utilized	2.98	Agree

by CIQM to improve its services.		
3. Staff at CIQM receive regular training to support continuous process improvement	2.89	Agree
4. CIQM demonstrates the quality to adapt to changes in order to maintain quality service.	3.01	Agree
5. A culture of continuous improvement is promoted within the organization.	3.01	Agree

The results show that, although its implementation is still uneven in important supporting mechanisms, CIQM exhibits a moderate degree of continual improvement within its framework for providing quality services. Regular staff training received a comparatively lower rating (WM = 2.89), indicating that workforce development is still not fully institutionalized as a methodical driver of process improvement. This is crucial because, according to the Six Sigma and TQM 4.0 paradigms, ongoing human capital development that gives staff members the skills to recognize, evaluate, and address inefficiencies is just as important to continuous improvement as process monitoring (Da Silva, Gomes, et al., 2022; Morgado, et al., 2024; Taraza, et al., 2023) emphasizes that organized training is essential to quality sustainability because it improves organizational capacity to sustain improvements and lower process variability over time.

This is further supported by empirical quality management studies, which demonstrate that companies with regular training programs have up to 30–50% higher improvement retention rates and considerably lower recurrence of process errors because of improved employee proficiency and

standard adherence (MB Moraes, et a., 2026; Sampaio, et al., 2026; Taraza, et al., 2023). On the other hand, inconsistent or disjointed training programs frequently lead to limited institutionalization of best practices and partial adoption of improvement projects. This implies that although mechanisms for improvement may exist at the procedural level inside CIQM, their long-term efficacy is limited by inadequate reinforcement at the human capability level.

All things considered, CIQM shows a moderate yet encouraging approach to continuous development. However, to effectively integrate a culture of iterative enhancement and connect institutional practices with the persistent learning and adaptive improvement concepts of TQM 4.0, it is imperative to reinforce structured, recurrent, and competency-based training programs.

V. CONCLUSION

Following the study's findings, CIQM uses the Six Sigma DMAIC framework to a moderate degree, demonstrating both the existence of well-established quality management systems and areas that still need improvement. The Define and Control stages are strong, especially when it comes to standardized control mechanisms that promote process stability and consistency, unambiguous goal setting, role demarcation, and documentation procedures. However, the Measure and Analyze phases show significant limits that hinder deeper diagnostic capability and evidence-based decision-making, especially in the formulation of performance indicators, data-driven monitoring, and the use of sophisticated analytical tools.

CIQM generally performs well in terms of service quality, with documentation workflows showing up as the strongest dimension, supporting dependable and consistent service delivery. Additional indicators of functioning service systems are moderate to high scores in process clarity, efficiency identification, communication, coordination, and continual improvement. However, the report identifies important areas for improvement, such as more systematic staff training, stronger feedback systems, better communication infrastructure, and quicker

identification of inefficiencies. To fully institutionalize continuous improvement and better match with TQM 4.0 concepts, CIQM must strengthen these areas.

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