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Business process automation: A case study on quality management systems implementation

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A B S T R A C T

Business Process Automation (BPA) is widely recognized for its potential in enhancing process efficiency, reducing costs, and boosting customer satisfaction, ultimately driving organizational success. This study makes a significant contribution to the existing knowledge on implementing Quality Management Systems (QMS) through BPA by offering a detailed analysis of their integration. By examining the motivations, strategies, and impacts, this research provides valuable insights for practitioners, academics, and decision-makers who aim to optimize quality management practices through automation. The findings demonstrate remarkable improvements in performance efficiency, error reduction, and flexibility in upgrading enterprise management systems. However, challenges related to technology integration and change management require careful planning and strategic alignment. This study offers critical insights for service-oriented organizations, highlighting the transformative potential of BPA in revolutionizing quality management practices and providing a comprehensive roadmap for organizations seeking operational excellence. Future research should focus on cross-industry comparisons and longitudinal studies to assess the sustainable impact of BPA. This research significantly enhances the literature on BPA and QMS, presenting both practical and theoretical implications.

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1. Introduction

In today's rapidly evolving business environment, organizations are increasingly adopting Business Process Automation (BPA) to enhance operational efficiency, boost customer satisfaction, and secure a competitive edge. BPA is a strategic technology-driven approach that streamlines and optimizes business processes, leading to increased efficiency, reduced errors, and improved productivity (Arantes et al., 2023). A Quality Management System (QMS) is an essential framework that organizations implement to ensure that their products and services consistently meet customer requirements and enhance satisfaction. The significance of QMS is underscored by its role in continuous improvement, which is vital for organizations aiming to maintain competitiveness in today's dynamic market environment. When combined with a Quality Management System (QMS), BPA can ensure consistency, reliability, and strict adherence to quality standards, offering a transformative impact on processes. This integration has the potential to drive operational excellence, providing significant benefits to organizations that implement it effectively (Kowalkowski, 2023; Meyer et al., 2020).

A Quality Management System (QMS) is a structured framework within an organization that includes policies, processes, and procedures to ensure that an organization's products or services consistently meet customer requirements and enhance customer satisfaction ((Pirmanta et al., 2021; Gremyr et al., 2021). The essence of a QMS lies in its ability to integrate quality demands into daily management practices, coordinate quality-related activities, and align strategy with critical success factors such as business vision, market understanding, and core processes (Gunawan, 2024; Gremyr et al., 2021; Naldos & Alfredo, 2020). This aligns with the findings of Benzaquen (2024), who emphasizes that Total Quality Management (TQM) is a management philosophy that maximizes the use of organizational resources to achieve quality objectives. Quality

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management practices have evolved over time to include Total Quality Management (TQM), which integrates various technical and behavioral approaches to improve organizational performance (Pimentel & Major, 2015; Wiśniewska & Szczepańska, 2013). In the practice of implementing a quality management system, process management plays an important role in designing, controlling, and improving processes effectively to enhance product quality, customer satisfaction, and overall organizational performance (Lenning, 2018).

The ISO 9001 standard, an international standard regarding quality management system requirements recognized worldwide, serves as a fundamental tool for building a QMS, emphasizing continuous improvement and customer satisfaction (Yadav & Heriyati, 2023). Organizations that adopt the ISO 9001 standard or similar standards aim for continuous development by managing the quality of their business processes (Bondarenko, 2024). The ISO 9001 standard explicitly states that "The standard has promoted the adoption of a process approach when developing, implementing, and improving the effectiveness of a quality management system to enhance customer satisfaction by meeting customer requirements" (Standardization, 2015). This standard is crucial as it enables organizations to align their processes with strategic objectives, thereby ensuring continuous improvement and maintaining competitiveness (Irhirane et al., 2023). The implementation of ISO 9001 standards has been associated with improved organizational performance, emphasizing the positive impact of implementing a quality management system (Irhirane et al., 2022). However, research suggests that ISO certification alone may not be sufficient to ensure a positive relationship with improved organizational performance; other components beyond ISO standards are needed(Castelló et al., 2017).

Business process automation has emerged as a critical component for modern organizations seeking to improve operational efficiency and drive continuous improvement. By automating business processes, organizations can achieve a high level of customization while ensuring alignment with business objectives (Arantes et al., 2023). BPA within a QMS plays a critical role in driving continuous improvement and ensuring compliance with quality standards (Garza-Reyes, 2018). Through automation, organizations can achieve higher levels of efficiency, cost reduction, and increased customer satisfaction, ultimately contributing to organizational success (Blasco-Torregrosa et al., 2019; Bolton et al., 2018). Automation is a key factor in enhancing organizational efficiency, reducing costs, and improving customer satisfaction, thereby contributing to overall organizational success (Santos et al., 2019; Schlegel, 2024). Process Automation is a technology that utilizes software to automate business processes, leading to enhanced efficiency and cost savings (Osvaldo Braz dos Santos, 2023). Process digitization, a core component of automation, aims to quickly integrate processes with new technologies to drive operational improvements (Schlegel, 2024). Automation should be considered a comprehensive process improvement initiative, emphasizing the importance of streamlining processes holistically (Oberle, 2023).

The integration of BPA into QMS offers significant potential to improve process efficiency and effectiveness, boosting overall organizational performance (Nataly Inêz Fernandes dos & Renan Felinto de Farias, 2023). This integration can lead to the creation of an organizational improvement context, involving specific business and software teams committed to development initiatives and a systematic approach to drive improvement efforts (Maldonado et al., 2020). By utilizing technology, organizations can automate routine tasks, optimize business processes, and drive process standardization, leading to increased operational efficiency and improved process quality (Schlegel, 2024). Business Process Automation (BPA) involves various actions aimed at enhancing organizational processes, including business transformation, process analysis, modeling, process improvement, and redesign (Ghosh & Lever, 2020)\. Process automation has emerged as a technology focusing on automating repetitive, rule-based tasks, contributing to process efficiency and effectiveness (Ylä-Kujala et al., 2023). The impact of Information Technology (IT) on process innovations is crucial, with modern tools for automation becoming more advanced with digital transformation (Arantes et al., 2023).

In the service industry, the adoption of digital technologies can significantly increase efficiency, improve service quality, and reduce response times, thus benefiting stakeholders (Laurenza et al., 2018; Meyer et al., 2020). Increasing productivity through automation, standardization, integrated architecture, and effectively utilizing existing IT resources is essential in today's service industry (Hussain et al., 2023; Heckmann, 2018). Process Automation projects play a significant role in cost savings and service improvement (Bruccoleri et al., 2023) (Schlegel, 2024). Understanding that the role of BPA is a significant factor in the implementation of QMS, especially in the context of increasing customer satisfaction and achieving sustainable development (Bondarenko, 2024; Gremyr et al., 2021). Therefore, there are three research questions raised in this study:

RQ1: Why does the implementation of a quality management system require business process automation?
RQ2: What are the best practices, methodologies, and frameworks that enable the successful integration of BPA into a QMS?
RQ3: How does the implementation of a quality management system with business process automation impact the performance and efficiency of the organization?

2. Theoretical background

Theories related to Business Process Management (BPM), Quality Management System (QMS), and Business Process Automation (BPA) are extensions of the grand theory of Total Quality Management (TQM). Reviewing TQM within this study aims to provide insight into its relationship with operational excellence, competitiveness, and customer satisfaction.

2.1. Total Quality Management (TQM)

The concept of Total Quality Management (TQM) emphasizes organizational resilience, sustainability, and excellence (Lagrosen et al., 2012). Implementing TQM as a business strategy has been shown to significantly advance organizations in quality, productivity, space utilization, safety, and employee morale (Bowen, 2024). TQM is recognized as a source of competitive advantage globally, enabling organizations to drive continuous improvement and achieve sustainable success across all functions and levels (Nadali et al., 2017; Benzaquen & Charles, 2020; Herzallah et al., 2013). This approach integrates quality values and management practices to achieve excellence in products and services (Prashar, 2018; Solnet et al., 2019). TQM requires the involvement of all employees, from top management to frontline workers, ensuring that every staff member takes responsibility for the quality of their work (Bowen, 2024; Ramesh & Ravi, 2013). This inclusive approach aligns with the concept of internal customers in TQM, where employees are viewed as customers, highlighting the importance of internal service quality in driving employee satisfaction, commitment, and performance (Andrade et al., 2015; Sharma et al., 2016; Vogus et al., 2021).

The implementation of a QMS is critical for instilling a quality culture within an organization, developing a quality-oriented human resource management system, and aligning with standard models such as ISO 9001 or the European Foundation for Quality Management (Para-González et al., 2016). Effective QMS implementation demands commitment from top and middle management to successfully drive improvement initiatives (Alhaqbani et al., 2016). As organizations face the complexities of today's dynamic environment, the future of quality management may increasingly involve the innovation and integration of quality management practices (Lilja et al., 2017). Therefore, business process automation is closely related to concepts such as Total Quality Management (TQM), operational excellence, and process automation, which emphasize the importance of efficiency and efficacy in business processes. This approach aligns with the goal of achieving continuous improvement and operational excellence as emphasized by the principles of Total Quality Management (Dahlgaard & Anninos, 2022; Nataly Inêz Fernandes dos & Renan Felinto de Farias, 2023).

2.2. Quality Management System

A Quality Management System (QMS) is a formal system that documents the processes, procedures, and responsibilities for achieving an organization's policies and objectives through quality products and services (Benzaquen, 2024). It helps coordinate and direct an organization's activities to meet customer and regulatory requirements and continually improve its effectiveness and efficiency. The implementation of a QMS is essential for embedding quality into an organization's culture and operational practices, ensuring that products and services consistently meet customer expectations (Gremyr et al., 2021; Shahid et al., 2021)**.**

The ISO 9001:2015 standard is one of the most widely recognized tools for building an organization's quality management system. It focuses on several core principles, including customer focus, leadership, people involvement, process approach, improvement, evidence-based decision making, and relationship management (Jabnoun, 2019; Yadav & Heriyati, 2023). These principles guide organizations in structuring their QMS to meet quality objectives while fostering a culture of continuous improvement and sustainability (Al-Jarrah et al., 2023; Bondarenko, 2024; Otheitis & Kunc, 2015). This approach is particularly relevant in today's global economy, where quality and sustainability are key differentiators for competitive advantage. Adopting the ISO 9001:2015 standard into an organization's management system assists organizations in improving their processes and aligning with global quality management practices (Comas, 2023; Yang et al., 2022). ISO 9001:2015 is a widely recognized quality management standard that plays a critical role in driving organizational excellence and performance (Lim, 2024; Santhose et al., 2019). This standard emphasizes continuous improvement, customer focus, and evidence-based decision-making, providing a structured framework for improving organizational performance and aligning with world-class business strategies (Castelló et al., 2017; Irhirane et al., 2023).

Successful QMS implementation requires a strong commitment from top and middle management to effectively drive improvement initiatives (Cheung & To, 2015; Alhaqbani et al., 2016). Leadership plays a critical role in fostering a culture of quality within an organization, ensuring that quality objectives are aligned with the organization's vision and strategic goals (Thao & Tu, 2021). This alignment is critical to embedding quality into all aspects of operations and achieving long-term success (Irhirane et al., 2023; Lycke & Tano, 2017). Leaders must ensure that quality management principles are integrated into the organization's culture, fostering a commitment to continuous improvement and aligning quality objectives with strategic goals (Krajcsák, 2018; Lycke & Tano, 2017). Across industries, the implementation of QMS principles has resulted in improved customer experience, enhanced service delivery, and increased profitability (Álvarez et al., 2012). These findings underscore the importance of a robust QMS framework in driving organizational success across sectors.

2.3. Business Process Automation (BPA)

Business process management (BPM) is a fundamental aspect of quality management systems in organizations. BPM involves monitoring how work is done to ensure consistent results and exploit opportunities for improvement (Arias et al., 2018). BPM is highlighted as an important theme that helps structure management practices to translate organizational strategies into

operational processes aimed at achieving set goals and objectives. This underscores the importance of aligning management practices with strategic objectives to drive organizational success (Lameijer et al., 2017; Comas, 2023). The ISO 9001 standard itself explicitly states that "The implementation of a quality management system is a strategic decision for an organization that can help improve its overall performance and provide a strong foundation for sustainable development initiatives" (Standardization, 2015).

Business process mapping is an important aspect of process management that involves the visual representation of the steps and interactions in a process to enhance understanding, identify inefficiencies, and drive improvements (Kuhlang et al., 2013; Li & Mukherjee, 2021). This technique is essential for organizations to streamline operations, improve quality, and drive continuous improvement initiatives (Lanke et al., 2016; Martí-Ballester & Simon, 2017). Business process mapping serves as a foundational step before automation. It provides a detailed understanding of existing processes, which is essential for identifying which tasks can be automated. Business process mapping is a fundamental aspect that involves the visual representation of steps and interactions in a process to enhance understanding, identify inefficiencies, and drive continuous improvement (Kuhlang et al., 2013; Lanke et al., 2016; Nabhani et al., 2018). It is a systematic routine integrated into an organizational framework to drive value stream improvements at varying levels of detail (Cosenz, 2017; Soltani et al., 2019).

Business process mapping is a critical step in preparing for business process automation. By providing a clear understanding of existing processes, business process mapping enables organizations to identify opportunities for automation and design efficient workflows. By visualizing and analyzing processes, organizations can identify inefficiencies and implement targeted improvements, as well as monitor performance (Ahmad, 2023; Azad & Ahmadi, 2015; Majanoja et al., 2017). In addition, process management enables efficient information flow across functional areas and supply chain partners, improving business information monitoring and decision making (Basana, 2024; Yiu et al., 2020). Automation, in turn, increases the effectiveness of these processes, leading to increased efficiency, cost savings, and improved organizational performance (Lestari et al., 2020). Together, business process mapping and business process automation form a powerful combination for achieving operational excellence. According to Bruccoleri et al., technology can optimize business processes and overcome information overload, leading to more informed decision-making and increased operational efficiency (Bruccoleri et al., 2023).

Business Process Automation (BPA) refers to the use of technology to perform repetitive tasks or processes in a business where manual efforts can be replaced. It is a strategic approach aimed at optimizing business operations, increasing efficiency, reducing human error, and improving overall productivity (Arantes et al., 2023; Zebec, 2024). BPA encompasses a range of actions, including process analysis, modeling, improvement, and redesign, to streamline operations and achieve higher efficiency and effectiveness (Klun & Trkman, 2018; Nataly Inêz Fernandes dos & Renan Felinto de Farias, 2023). BPA involves the use of technology to perform repetitive tasks or processes where manual efforts can be replaced, resulting in increased efficiency and productivity (Kurdi et al., 2023)). This integration can lead to the creation of an organizational improvement context involving specific business and software teams committed to development initiatives and a systematic approach to drive improvement efforts (Guerreiro, 2020).

Studies have shown that BPA can lead to significant improvements in organizational performance across industries. In the healthcare industry, BPA has been shown to improve patient care by automating administrative tasks and streamlining clinical workflows (Schlegel, 2024). In the manufacturing sector, BPA has played a significant role in optimizing production processes, reducing waste, and increasing efficiency (Heckmann & Maedche, 2018). These findings highlight the transformative potential of BPA in driving operational excellence and improving service quality.

2.4. Quality Service

Quality management in the service industry is essential to ensure customer satisfaction and operational efficiency. Implementing quality management practices in service organizations involves various aspects that contribute to delivering high-quality services. For example, employee empowerment plays a vital role in the service industry, where frontline employees are required to provide fast and flexible service to customers (Kim et al., 2017). In addition, service innovation is critical to business performance in the service industry, as organizations that fail to innovate in service are likely to underperform (Kitsios & Grigoroudis, 2020; Rejikumar et al., 2019). In the service industry, monitoring service levels and adjusting staffing are essential to maintain service quality, eliminate losses due to service failures, and increase post-recovery satisfaction (Zhang & Geng, 2019). Controlling and reducing process variability is essential to ensure consistent service quality in the service industry (Li & Mukherjee, 2021). In addition, the concept of service quality in the service industry is defined as the extent to which a service meets the expectations, requirements, and satisfaction of users (Álvarez et al., 2012; Nguyen & Malik, 2021). The concept of quality service is deeply rooted in the principles of TQM, which emphasize continuous improvement, customer focus, and a commitment to excellence across all organizational processes (Dahlgaard & Anninos, 2022). In the service industry, quality service is achieved by aligning organizational strategy with customer needs, utilizing quality management tools, and cultivating a culture of excellence (Lycke & Tano, 2017). Quality service is an essential aspect of modern business practices, reflecting an organization's ability to consistently meet or exceed customer expectations. This involves the systematic application of quality management principles to ensure that services are delivered with excellence, reliability, and customer satisfaction at the forefront. In the service industry, quality service is achieved by

aligning organizational strategy with customer needs, utilizing quality management tools, and cultivating a culture of excellence (Kao & Chen, 2016; Lycke & Tano, 2017).

Quality service is achieved through the integration of digital technologies to improve service delivery, reduce response times, and increase patient satisfaction (Laurenza et al., 2018; Meyer et al., 2020). The application of BPA technology in the service delivery process can result in significant improvements in service quality, efficiency, and customer satisfaction (Al-Diabat, 2022; Bruccoleri et al., 2023). Quality service is essential to creating memorable customer experiences and building brand loyalty. The service industry must consistently deliver high-quality service that meets or exceeds customer expectations to remain competitive in a highly dynamic market (Álvarez et al., 2012). Quality management systems in the service industry focus on improving service delivery through continuous improvement and customer feedback. By leveraging BPA technology, service businesses can streamline operations, improve service quality, and enhance customer satisfaction (Ghosh & Lever, 2020). The literature on Quality Management Systems, Business Process Automation, and Quality Service highlights the interrelated nature of these concepts in driving organizational success. Quality Management Systems provide a structured framework for ensuring product and service quality, while Business Process Automation offers a strategic approach to optimizing efficiency and effectiveness. Together, these elements contribute to delivering quality service, enhancing customer satisfaction, and driving continuous improvement.

By understanding the definition and scope of QMS and BPA, organizations can effectively implement these strategies to achieve operational excellence and sustain competitive advantage in today's dynamic business environment. This literature review underscores the importance of integrating quality management principles with automation technologies to improve service quality and achieve sustainable development. By adopting QMS and BPA, organizations can enhance their competitiveness, improve service delivery, and foster a culture of continuous improvement. This integration is essential to meeting customer expectations, achieving operational excellence, and ensuring long-term success in a rapidly evolving global marketplace.

3. Material and methods

This study employs a case study research design to thoroughly explore the adoption and impact of BPA on QMS implementation within the service industry. As a valuable qualitative research method, the case study approach is widely utilized across various fields, including information systems and business research. This method enables researchers to comprehensively investigate phenomena from multiple perspectives within a specific context, providing a complete and detailed description (Cope, 2015; Rashid et al., 2019; Taylor & Thomas-Gregory, 2015). This study provides an in-depth exploration of the adoption and impact of BPA on QMS implementation in a management consulting firm. This design is particularly effective for capturing the complexities and nuances of real-world BPA integration, allowing for a detailed examination of the processes, challenges, and outcomes associated with this integration. The qualitative case study approach allows for an in-depth understanding of the specific technologies and strategies used by the consulting firm, providing insight into how BPA enhances quality management practices and contributes to operational improvements.

3.1. The Case Company

The company that is the subject of the case is Cognoscenti Consulting Group, which has an established BPA framework integrated into its QMS named Progresia. The company provides a range of management consulting services, allowing for extensive analysis of the impact of BPA on various service processes. The Jakarta-based management consulting company was founded in 2008 and has been actively involved in the development and implementation of good management practices for government organizations, private companies, and state-owned enterprises to achieve better processes and outcomes for the organization, society, and the country. CCG is a Consulting services company that provides Management Consulting Services to organizations that want to improve organizational performance and achieve their desired goals. The company has also implemented a management system based on ISO 9001:2015 and ISO 37001:2016. The company's products include management consulting in the fields of strategic management, operational management, human resources development, and organizational development.

3.2. Data Collection and Analysis

Data collection for this study was carried out using qualitative methods, focusing on gathering rich and detailed insights from various stakeholders within the organization. This approach often involves multiple data collection methods to thoroughly explore and understand a case, contributing to scientific development by providing valuable insights and generating research results (Flyvbjerg, 2006; Luck et al., 2006; Sandelowski, 2010). Data were collected through in-depth interviews with key stakeholders, including senior management, IT specialists, quality assurance personnel, and consultants involved in the BPA initiative. These interviews were designed to gain insights into implementation strategies, technology challenges, and the perceived benefits of BPA in QMS. In addition to interviews, direct observation was conducted in this study, where the researcher was an instrument to obtain qualitative data directly. Direct observations of automated processes within the firm

were conducted to assess real-time changes in service delivery efficiency and quality outcomes. Observations focused on processes automated by BPA, evaluating their impact on service quality and operational efficiency.

Data analysis was conducted concurrently with data collection to refine emerging understanding by iterating recursively between theoretical concepts and data (Suddaby, 2006; Walsham, 2006). Quality management system documents, including process maps, quality manuals, BPA implementation plans, and performance reports, were analyzed to understand the specific processes that were automated and the resulting impact on quality management. Documents reviewed included strategic plans, quality audits, BPA project reports, and client feedback related to automated processes. Thematic analysis was used to identify patterns and themes from interview transcripts, document reviews, and observations. This approach allowed for an in-depth understanding of how BPA impacted QMS implementation, focusing on implementation processes, technology challenges, and outcomes. Triangulation was used to validate the findings by comparing insights from multiple data sources, ensuring a comprehensive understanding of the impact of BPA on QMS. Triangulation involved cross-checking data from interviews, documents, and observations to confirm the consistency and reliability of the findings. The findings were synthesized into a cohesive narrative that describes the impact of BPA on QMS, highlighting key insights and implications for practice. Multiple data sources, including interviews, documents, and observations, were used to validate the findings and provide a comprehensive view of the impact of BPA on QMS.

4. Results

Process mapping can be defined as the systematic effort to group a series of activities (processes) into interconnected groups to facilitate the control of these activities as a unified system. Business process development, as part of QMS BPA-based implementation, has been a long journey for CCG. The journey started from QMS development and progressed to the development of Progresia, which is BPA-based, leading to ISO 9001:2015 and ISO 37001:2018 certification recognition from independent certification bodies, as shown in Figure 1.

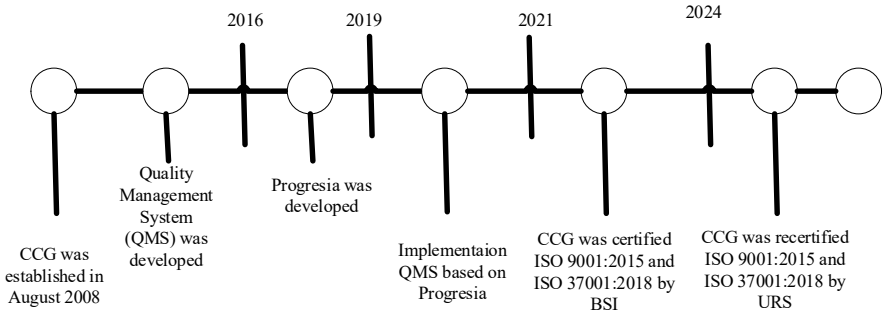

Fig. 1. Time Line of QMS-BPA Based Implementation

Cognoscenti Consulting Group (CCG) identified seven core processes: marketing, project management, training management, human resource management, general management, financial management, and organizational innovation management. Each of these core processes is further broken down into subprocesses. The process map within CCG's organization is illustrated in Fig. 2.

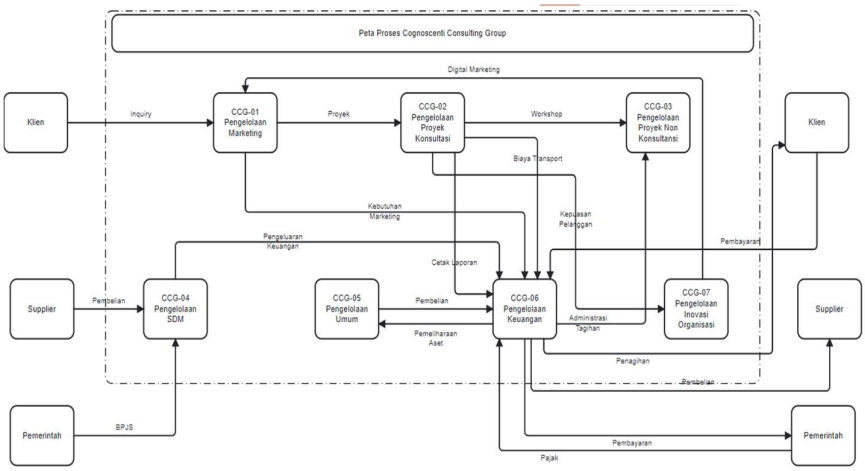

Fig. 2. Process Map

In this context, a process is a series of logically connected activities that continuously process inputs, add value, and produce outputs, as depicted in the business process diagram. A subprocess, on the other hand, is a series of activities within a process designed to support the parent process in achieving its specific objectives. For instance, the subprocess map for the CCG-02 process is depicted in Fig. 3.

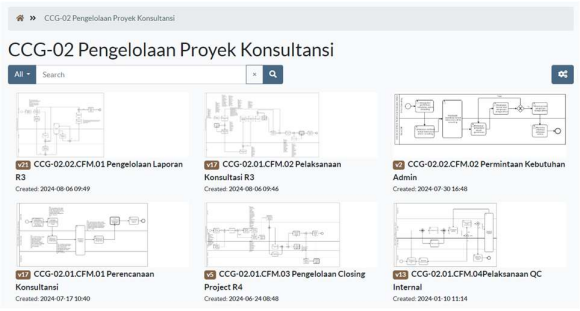

Fig. 3. Sub Process Map

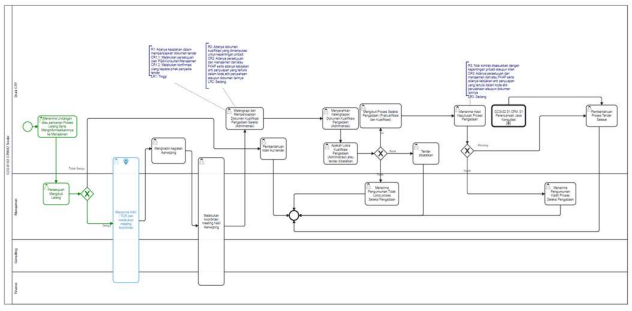

Fig. 4. Cross Functional Map

In the process map or sub-process map, the work units involved in the process or sub-process are not yet visible. This is methodologically the case because the process map and sub-process map are diagrams that show the relationship between a series of activities in a certain scope. To see which work units are involved, we need another dimension of the business process called a relationship map. Process Map & Sub Process Map is a map that shows the relationship between one process and another. The Relationship Map shows the relationship between a particular process and the actors involved in the process. The ultimate activity of mapping the business process map is the cross-functional map (CFM), which is a map that shows the relationship between the actors involved in one process and what the roles of each actor are (Fig. 4). The relationship between processes, sub-processes, relations, and cross-functions is illustrated in Fig. 5, which CCG management calls the 3-Dimensional Business Process Mapping Framework. This is a useful framework to develop integrated business process map.

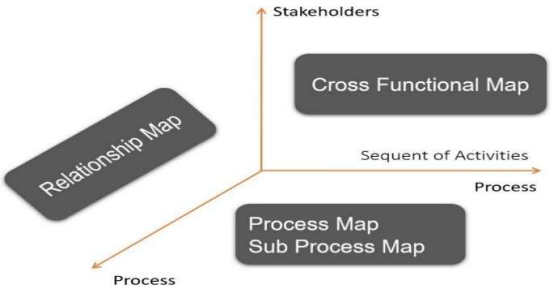

Fig. 5. 3-Dimensional Business Process Mapping Framework

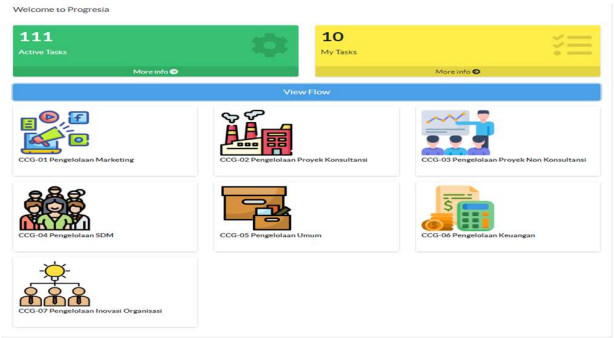

Fig. 6. Main Menu of Progresia

Next, the business process map that has been compiled is built into an application named Progresia. This application was developed to support CCG in carrying out operational activities digitally. The Progresia application displays a clear work system flow in the company, enabling the implementation of clear, effective, efficient, fast, measurable, simple, transparent, and participatory work system processes and procedures for all business process activities, which are properly recorded in the electronic system. The form of main menu of the Progresia application is shown in Fig. 6, which reflect the seven processes of the company.

Every time an employee runs a process, the Progresia application will present a dynamic form that needs to be inputted according to the process needs. Furthermore, the process will move according to the cross-functional map that has been prepared, with different colors indicating the progress of the activity in the process (Fig. 3). This feature ensures that the process can be monitored in real-time, providing a service level framework that can be met by each party involved. The integration of BPA technology into the QMS process led to significant time savings and error reduction, with leadership playing a pivotal role in this successful implementation. According to interviewees, tasks that previously required manual intervention, such as data entry and report generation, were significantly streamlined using BPA. This shift not only improved efficiency but also reduced the likelihood of errors, contributing to overall process reliability. Table 1 illustrates the differences in usage before and after implementing the Progresia application, highlighting the tangible benefits of automation.

Table 1
Impact of Utilizing the Progresia Application

No	Without the Progressia application	With the Progressia application	Impact of benefits
1	Activities regulated in the business process are carried out partially, sequentially following the document flow	All activities in the business process can be carried out simultaneously and in real time	Save time
2	Documents use hardcopy as evidence of business process implementation	Documents use softcopy / soft files as evidence of the implementation of the business process	Save time, cost and storage space
3	Work process flow is driven manually depending on the personnel's understanding and experience of the business process	The work process flow is automatically driven according to the flow in the business process	Improve process accuracy and reduce errors
4	Work process result archives are stored manually and spread across each work unit	Archives of work process results are stored centrally in a digital database by the application	Improve transparency and traceability
5	Disposition and approval from superiors can be done manually	Disposition and approval of superiors can be done digitally with clear and documented records	Save time and improve document accuracy and traceability
6	Work process flow implemented according to the business process cannot be monitored before the process is known to have been completed	The work process flow carried out according to the business process can be monitored in real time by each work unit involved	Improve productivity and teamwork
7	Changes to the business process can be done manually and distributed/socialized manually	Changes to the business process can be carried out centrally and automatically socialized in the application system	Save time, effort and cost
8	Reports can be made by manually recapitulating	Reports can be created by conducting an integrated recapitulation	Save time and effort
9	Compiling business processes using media that need to be shared/socialized manually	Web-based applications that can be easily installed and opened by all parties involved	Save time and easy access
10	Implementing business processes requires personnel to read and understand manually	The implementation of the business process becomes fun for users because it is carried out step by step according to the stages in the application	Improve productivity and teamwork

BPA embodied in Progresia ensures that quality management practices adhere to consistent standards, reduce variability, and increase the reliability of service delivery. By utilizing this Progresia application, companies can run business processes digitally, allowing all activities and interactions between employees and work units (divisions) to be conducted digitally. Furthermore, the traceability of the process or work that has been done can be monitored through the application online. Likewise, the reporting system can easily be designed and realized according to needs. The Progresia application allows all work to be done online, integrated, and saves time and money. The use of the Progresia application as a form of work system can be designed, built, implemented, and monitored quickly and easily.

5. Discussion

The implementation of BPA enables continuous monitoring of quality metrics, allowing for proactive identification and resolution of potential issues. This capability is particularly beneficial for maintaining service quality, as emphasized by Bruccoleri et al. (2023), who discuss the role of BPA in optimizing business processes and mitigating information overload. Automated processes lead to faster response times for client inquiries and requests, thereby enhancing the overall client experience. The ability of organizations to deliver timely and accurate services directly contributes to increased client satisfaction, aligning with Ghosh & Lever's (2020) findings on BPA's impact on service delivery speed and accuracy. These observations are consistent with Zancul et al. (2016), who underscore the importance of automation in supporting innovative service offerings. BPA showcases the ability to efficiently scale operations, accommodating increased client demand without compromising quality. This adaptability to changing client requirements and market conditions is a direct result of the flexibility inherent in automated processes. These findings are in line with Meyer et al. (2020), who emphasize the scalability of BPA in dynamic environments.

Despite the numerous benefits of BPA, firms often encounter challenges when integrating new technologies with existing legacy systems. Participants emphasized the importance of careful planning and implementation to prevent disruption. This observation aligns with Heckmann & Maedche (2018), who discuss the complexities involved in technology integration for business process automation. Effective change management practices, including employee training and engagement, are crucial for overcoming resistance and ensuring the successful adoption of BPA tools. Addressing organizational culture and employee perceptions is essential, as highlighted by Alhaqbani et al. (2016), who underscore the role of leadership in fostering an environment conducive to technological change.

Resistance to change is a significant challenge, underscoring the importance of involving employees in the BPA implementation process. Training and support are essential to help employees adapt to new technologies and embrace new ways of working. The role of leadership in fostering an environment that supports technological change is critical in this regard. Aligning BPA initiatives with the strategic objectives of the organization is vital for maximizing their impact. Leadership is crucial in articulating a clear vision for BPA's role in enhancing quality management and service delivery. This

strategic alignment is essential for achieving the desired outcomes and realizing the full potential of BPA. Leadership emerged as a critical factor in the successful implementation of QMS based on BPA. Leaders at Cognoscenti Consulting Group (CCG) were instrumental in setting a clear vision for the adoption of BPA, aligning it with the company's strategic objectives. This alignment ensured that the implementation of BPA was not just a technical upgrade but a strategic initiative aimed at enhancing the company's overall performance and service quality. Leaders at CCG articulated a clear vision that connected the benefits of BPA with the company's long-term goals, such as improving client satisfaction, increasing operational efficiency, and maintaining consistent quality standards. This strategic alignment was crucial in gaining buy-in from all levels of the organization, ensuring that BPA was viewed as an essential tool for achieving the company's objectives. By aligning BPA with the strategic goals, leaders made it easier to justify the investment in technology and to motivate employees to embrace the changes.

One of the most significant contributions of leadership was in managing the change associated with implementing BPA. Leaders recognized the potential resistance from employees who were accustomed to traditional processes and proactively addressed these challenges through comprehensive training programs and ongoing support. This approach helped to mitigate resistance and facilitated a smoother transition to the new automated processes. Leadership also fostered a culture of continuous improvement and innovation, encouraging employees to see the value in the new system and to engage with it fully. By involving employees in the transition process from initial planning to execution, leaders ensured that the workforce was not only prepared for the changes but also felt a sense of ownership over the new processes. This engagement was critical in overcoming initial resistance and in building a supportive environment for BPA implementation.

Leaders also played a key role in monitoring the effectiveness of the new systems. They established mechanisms for continuous feedback and improvement, ensuring that the BPA system could be refined and adapted as needed to meet evolving business needs. This ongoing oversight helped to sustain the benefits of BPA over the long term and ensured that the system remained aligned with the company's strategic goals. Moreover, leadership's commitment to quality and process optimization was evident in their regular review of performance metrics. Leaders used these metrics to assess the impact of BPA on quality management and to identify areas for further improvement. This commitment to continuous monitoring and improvement ensured that the BPA system not only met initial expectations but also continued to deliver value as the organization grew and evolved.

The findings of this study provide valuable insights into the practical implications of BPA for QMS in the management consulting industry. Firms that effectively integrate BPA into their QMS can achieve a competitive advantage by delivering high-quality services more efficiently. As noted by Santos et al. (2019), BPA can significantly improve efficiency and reduce costs, benefiting service industry operations. BPA offers significant cost savings through reduced process time and error rates, making it an attractive investment for consulting firms looking to optimize operations. These findings are in line with Arantes et al. (2023), who identified key factors for automation that improve operational efficiency. By leveraging BPA tools to perform real-time monitoring, firms can encourage more intensive supervision and reduce errors due to negligence by implementers. The scalability of BPA tools allows firms to quickly and effectively update their management systems in line with changing organizational dynamics without sacrificing quality. The implementation of BPA fosters a culture of innovation and continuous improvement, encouraging employees to embrace new technologies and ways of working.

The findings of this study highlight the critical role of BPA in improving operational efficiency and quality management in consulting firms. Process Automation integration resulted in substantial time savings and error reduction, supporting previous research that highlights the role of automation in improving operational efficiency. By automating repetitive and rule-based tasks, firms can allocate human resources more strategically, focusing on tasks that require complex decision-making and human expertise. This shift not only improves process efficiency but also enhances overall service quality. The ability to automate routine tasks and focus on strategic activities positions consulting firms to respond more effectively to client needs, thereby driving client satisfaction and loyalty. This is in line with research by Ghosh & Lever (2020), which highlights the potential of BPA to improve service delivery and client engagement.

Beyond consulting, these insights are relevant to other service-oriented industries that prioritize quality and efficiency. The ability to automate routine processes can yield similar benefits across sectors such as healthcare, education, and hospitality, where maintaining high service standards is critical to success. The scalability and flexibility of BPA tools make them well-suited to a variety of applications, supporting Meyer et al.'s (2020) findings on BPA's adaptability in dynamic environments. BPA's success in improving client satisfaction suggests potential for further exploration of BPA-driven personalization in other client-facing industries. As technology advances, firms may increasingly rely on BPA to deliver tailored solutions, supporting the trend toward personalized experiences in the broader marketplace. While the benefits of BPA are evident, the study also highlights several challenges and considerations associated with its implementation. Integrating new technology with existing legacy systems poses significant challenges, echoing Heckmann & Maedche's (2018) findings on the complexity of technology integration. Successful BPA implementation requires careful planning, strategic alignment with business objectives, and effective change management practices.

To address integration challenges, organizations must prioritize a robust IT infrastructure and invest in technology that integrates with existing systems. Collaboration between IT and operations teams is critical to designing and implementing BPA solutions that align with business needs, supporting Santos & Aires' (2023) recommendation on leveraging automation to improve business processes. The findings of this study highlight the significant impact of Business Process Automation on a Quality Management System in a management consulting firm. By integrating a BPA tool such as Progresia, the firm achieved substantial improvements in efficiency, quality management, and flexibility in changing circumstances. These findings underscore the potential of BPA to revolutionize quality management practices in the consulting industry, offering a roadmap for organizations seeking to improve their service delivery and operational excellence. This study contributes to the growing body of literature on BPA and QMS, providing valuable insights for practitioners and academics alike. As technology continues to advance, the integration of BPA into quality management systems will remain a critical focus for organizations seeking to maintain a competitive edge and deliver exceptional service in a rapidly changing business environment.

6. Conclusions and Limitation

This study explored the impact of Business Process Automation (BPA) on the Quality Management System (QMS) within a management consulting firm, focusing on key drivers, implementation strategies, and resulting performance improvements. The research provided a comprehensive understanding of how automation can enhance service quality and operational efficiency. Several key drivers for integrating BPA into QMS were identified, including the need to improve operational efficiency, maintain consistent quality standards, and enhance client satisfaction. By automating repetitive and manual tasks, the firm significantly reduced process time and error rates, freeing up human resources for more strategic, value-added activities. These findings align with existing literature that emphasizes the role of automation in enhancing operational efficiency and ensuring consistent quality (Arantes et al., 2023).

Successful BPA implementation requires strategic alignment with business objectives and a strong focus on change management. CCG, as a consulting firm, employed a comprehensive training program and involved employees throughout the transition process, which was crucial in overcoming barriers and ensuring the smooth integration of the BPA tool. This study highlights the importance of leadership in fostering an organizational culture that embraces innovation and continuous improvement, supporting the findings of Alhaqbani et al. (2016). Integrating BPA into the company's QMS led to significant improvements in performance and efficiency. Automation of key processes resulted in time savings, reduced errors, and enhanced service quality, which in turn led to increased client satisfaction and loyalty. Furthermore, BPA enabled better resource allocation, optimized workforce utilization, and allowed the firm to concentrate on tasks requiring human expertise. These findings are consistent with theoretical frameworks that underscore the role of automation in improving organizational performance (Bruccoleri et al., 2023; Nataly Inêz Fernandes dos & Renan Felinto de Farias, 2023). As organizations navigate the complexities of the modern business environment, integrating BPA into quality management systems will remain a critical priority. Embracing automation technologies presents opportunities to improve service quality, enhance operational performance, and secure a sustainable competitive advantage in a rapidly changing world.

While this study provides valuable insights, it also opens avenues for future research. Future studies could explore the impact of BPA on QMS across different industries, identifying unique challenges and opportunities in each sector. Long-term studies could assess the ongoing impact of BPA on quality management and operational performance, offering insights into the evolving role of automation in business processes. As BPA technology continues to advance, future research should investigate new tools and techniques and their potential impact on quality management practices. Additionally, further research could delve into employee experiences and perceptions of BPA implementation, providing a deeper understanding of the human aspects of automation and its influence on organizational culture.

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