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Sustainable Benefits of Quality Management (QM) Application on Products and Services Delivery in South African Manufacturing Industry

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Abstract

The South African manufacturing industry is a crucial driver of economic development, yet it continues to face challenges related to productivity, cost efficiency, and customer satisfaction. This study investigates the sustainable benefits of Quality Management (QM) application in the delivery of products and services within the South African manufacturing sector. Through a quantitative cross-sectional survey involving 400 respondents—including managers, operators, and labourers—this study explores how the implementation of Quality Management Systems (QMS), such as ISO 9001:2015, influences performance outcomes. Descriptive and exploratory factor analyses were employed to identify and categorise the benefits of QM practices. The results reveal that QM application significantly contributes to business sustainability by reducing cost and time wastage, promoting continuous improvement, enhancing customer satisfaction, and fostering employee collaboration. Six principal components were identified: Ensuring the company's financial growth, encouraging workers' growth, Cost and time savings, promoting cooperation and teamwork, improving performance and productivity, and Ensuring customer satisfaction. These components collectively explain 64.95% of the variance in observed responses, underscoring the holistic and far-reaching impact of quality management on organisational success. The findings support existing literature that advocates for employee involvement, leadership commitment, and data-driven decision-making as critical elements of successful QM implementation. The study concludes that sustained commitment to quality not only improves internal efficiencies but also enhances external competitiveness. It recommends that organisations adopt a strategic approach to QMS implementation, supported by continuous training, inclusive decision-making, and alignment with customer needs. Policymakers and industry regulators are also encouraged to provide support structures that facilitate QMS adoption across the manufacturing landscape.

Keywords
Quality Management System, Manufacturing Industry, ISO 9001:2015, Customer Satisfaction, Organisational Performance

1. Introduction
Abbie, Greg, Rick and Dave (2015) stated that in manufacturing industries, the level of adoption of QMS is hindered by some factors such as shortage of support program, shortage of money or finance, non-assistance from top-management, documentation failure, customers focus failure as well as misunderstanding of quality cost. Satisfying customers in the manufacturing industry means that the issues need to be addressed. And one of such ways is ISO 9001:2015 software that are used by many industries in making sure that QMS standards are being complied to, in order to enhance quality, productivity, and customers' satisfactions. *Vecchi and Brennan (2011)* postulated that the

implementation of QMS is done by organisations for the improvement of quality performance of employees and provision of products and services that are of high quality through development of quality system. While *John and Campbell (2016)* stated that certification of ISO 9001:2015 by companies is for the organisation reliability and credibility with further additions to satisfaction procedures of production and other relevant measures of management that organisations comply to.

The manufacturing sector in South Africa has seen notable contributions from various divisions, including petroleum, chemical products, rubber and plastic products (which contributed 9.6%, -2.1 percentage points), food and beverages (which contributed 2.9%, -0.9 percentage points), basic iron and steel, non-ferrous metal products, metal products, and machinery (which contributed 3.9%, -0.7 percentage points), despite this, there was a 3.5% decrease in the sector in November 2020 compared to the previous fiscal year *(South African Market Insight, 2022).* In order to overcome these obstacles and produce high-quality goods and services, a quality management system (QMS) must be implemented. The QMS's guiding principles include process approach, people engagement, leadership, evidence-based decision-making, customer focus, and relationship *management (Uwadia et al., 2022; Techiequality, 2023).* Seeing how important it is to having a functional QMS in the manufacturing industry, this study therefore seeks an empirical evaluation of the sustainable benefits of quality management (QM) application in products and services delivery in South African manufacturing industry with the intention of achieving quality performance of employees, organisation, and customer satisfaction on products and services delivered in the said industry.

2. Concept of Quality Management System (QMS)

Providing good quality services and operations at a reasonable and stable cost is one of the best ways for organisations to satisfy their customers and sustain their business *(Nanda, 2005).* The product or operation should be reliable, meaning that it should perform well without any problems. *Fahmi (2020)* asserted that effective quality management is instrumental in enhancing both employee and organisational performance, facilitating continuous improvement, and meeting customer expectations and demands. This, in turn, enables organisations to compete effectively in global markets. *Creech (1994)* advocated that the primary objective of every organisation should be to produce high-quality services. Additionally, *Creech (1994) and Ghalayini and Noble (1996)* emphasised the importance of implementing quality procedures to ensure superior service quality, tailored to the specific context of the organisation, including its market environment, product plans, and geographical locations. *Oakland and Tanner (2006)* articulated that quality procedures are designed to align with the organisation's objectives by eliminating wasteful practices from production operations. The aforementioned procedures are of the utmost importance to organisations because they enable them to meet and exceed customer expectations, comply with safety and hygiene regulations, and adhere to production, labelling, and delivery standards and practices *(Chapman, 2009). Evans and Lindsay (2007)* emphasised the criticality of managerial dedication to organisational quality procedures in order to ensure their successful execution. Furthermore, proficient leadership is critical in order to enable employees to effectively implement diverse methodologies for augmenting quality and delivering products of superior quality.

As pointed out by *Kellen (2003),* fundamental elements such as quality framework and operations control play pivotal roles in fostering organisational growth. These elements not only steer business operations but also facilitate executives in effecting changes to the company's system design. Quality models serve to establish business objectives and furnish progress updates. *Dale et al. (2016)* underscored the significance of quality management plans such as ISO 9000 certification and personnel evaluation. *Susilawati, Tan, Bell and Sarwar (2013)* emphasised the importance of assessing manufacturing processes through the utilisation of quality tools. Success requires the implementation of a QMS that documents processes, procedures, and duties with extreme precision. This requires the participation of senior management, training, and data analysis, in addition to collaboration.

3. The Roles of Employee and Management in the Application of Quality Management System

The QMS depends on the involvement of employees at all levels. The employees have different roles such as:

3.1 Get Involved in the Quality Management Application Process

The active participation of every employee is vital for the effective execution of the QMS. This encourages a culture of cooperation and dedication to advancement, inspiring the entire organisation to embrace the QMS and uphold top-notch operations. By showcasing their dedication to the company's prosperity and customer contentment through quality implementation, employees play a pivotal role in facilitating efficient production *(Juran and Gryna, 2009).*

3.2 Work as a Team

Teamwork is essential for successful QMS implementation in all organisations, including SAMI *(Kristensen, Hammer, Bartels, Suñol, Groene, Thompson, Arah, Kutaj-Wasikowska, Michel and Wagner, 2015).).* It promotes effective communication and strengthens organisational integration by ensuring everyone is involved. The benefits of teamwork include increased productivity, reduced absenteeism and turnover, improved problem-solving skills, trust-building, and personal *fulfillment (Mangi, Kanasro, Burdi, and Rehman, 2015).* Therefore, teamwork among workers is a critical factor for successful QMS implementation in SAMI.

3.3. Take Ownership of the Company Success

As per *Huq and Stolen (1998),* it's incumbent upon employees to take responsibility for the organisation's success by adhering to all quality standards in their production processes. Additionally, each individual should diligently fulfill their tasks and responsibilities for the betterment of the company. It's imperative for everyone to safeguard and uphold what is entrusted to them. Thus, it will be very advantageous for SAMC and its clients to view quality management as a personal duty.

3.4 Contribute to Improvements and Share Knowledge

It is mandatory for all personnel to participate in training sessions aimed at enriching their expertise and abilities in enhancing quality. Furthermore, employees are urged to contribute their perspectives and suggestions, drawing from their experiences and knowledge, to bolster the company's ongoing quality enhancement efforts *(Juran, 2009).* Collaboration is emphasised over individual efforts as it fosters a more effective teamwork dynamic. Obtaining opinions and ideas from every employee regarding how to improve quality and performance will additionally support the organisation in optimising output and accomplishing its *goals (Juran, 2009).* This practice must therefore be adopted by all SAMS personnel in order to ensure the company's long-term viability.

3.5 Accept New Ideas and Change

Adopting new ideas can lead to improved quality and growth within a company. While implementing quality management can present challenges, it ultimately benefits the company's progress and operations. Employees should feel comfortable sharing their suggestions and accepting new ideas and systems introduced through training. Engaging employees in the development process and decision-making can foster a sense of appreciation and commitment towards the organisation's achievements *(Schraeder, 2009).*

3.6 Focus on Customer Needs and Satisfaction

When customers are satisfied, the continuity of the business is guaranteed. There should be no other priority in quality management implementation besides meeting the client's needs. This is because without customers, there would be no revenue, rendering the company obsolete *(Knowles, 2011).* Hence, each employee at SAMI is tasked with directing their focus and efforts towards meeting the needs of the customer through continuous quality management, as the customer is the cornerstone of the business.

3.7 Share Responsibilities (Top Management) with Every Employee

Acting on the employees' suggestions and interpreting their ideas wisely can encourage and motivate them to contribute more *(Kulkani, 2012).* This can also help employees better understand the application of Quality Management Systems (QMS) and identify areas where clarification is needed. By involving all employees in the process, the application of QM can be improved and benefit the entire organisation *(Kulkani, 2012).*

4. Research Methodology

This study employed a quantitative cross-sectional survey design to investigate the sustainable benefits of Quality Management Systems (QMS) on South Africa's manufacturing sector. The research utilised structured questionnaires to collect primary data, supplemented by secondary sources such as journals, industry reports, and archived materials. The study was geographically centred in Johannesburg due to its prominence in manufacturing activities and accessibility to relevant professionals. The target population included approximately 400 individuals such as managers, operators, and labourers directly involved in quality management. A census sampling method was adopted, and data collection was conducted in two stages while observing COVID-19 regulations. A pilot study, as recommended by *Majid et al. (2017)*, was carried out to refine the questionnaire, identify ambiguities, and improve question clarity. The questionnaire, divided into five sections, focused on driving factors, impacts, barriers, and benefits of QMS in the delivery of products and services. Data collection occurred between June and November 2023 using online surveys for safety and reach. For analysis, a five-point Likert scale was employed, and the mean item score (MIS) was calculated using a specific equation to rank responses Factor analysis was conducted to identify the underlying dimensions of the sustainable benefits of Quality Management (QM) application. *(Pallant, 2011; Yong and Pearce, 2013).* Key EFA techniques included the Kaiser-Meyer-Olkin test, Bartlett's test, pattern matrix, and scree plots. To determine the appropriate number of factors to retain, both the Kaiser criterion (eigenvalues greater than 1) and scree plot analysis were employed. The Kaiser criterion initially identified six components. This was supported by the scree plot, which showed an inflection point after the sixth component. The agreement between the two methods provided empirical support for the six-factor solution. Although more advanced techniques such as parallel analysis are often recommended to enhance factor retention decisions, this was not implemented in this study due to software limitations. However, the components that were retained contributed significantly to the overall variance. Future studies may benefit from including parallel analysis to further strengthen factor retention decisions. Furthermore, to ensure the integrity of findings, emphasis was placed on reliability and validity, with employee involvement being highlighted as essential to the success of QMS implementation *(Birolini and Birolini, 2017; Moodliyar, 2008).*

5. Findings

The demographic analysis of respondents reveals varied educational backgrounds, age groups, and professional affiliations within the manufacturing industry. The majority of respondents hold a bachelor's degree (20.5%), closely followed by those with honours (20%) and master's degrees (19.5%). A smaller proportion possess either a doctorate or a post-matric certificate (13.3% each), while 11.9% have a professional degree and only 1.4% hold a national vocational certificate. Regarding age distribution, the largest group falls within the 35–49 years range (33.8%), followed closely by those aged 50–70 years (32.9%). Younger participants aged 25–34 and 18–24 account for 19.5% and 12.4% respectively, with a minimal number aged 76 (1%) and 82 (0.5%) years. In terms of job affiliation, the respondents held various positions in the manufacturing sector, with operators making up the largest group at 15.2%, followed by quality management directors (14.3%), supervisors (12.9%), and processing workers (12.4%). General labourers and managers each comprised 11.9%, material handlers 11.4%, and assemblers 10%. The work experience of respondents also varied, with 26.7% having 6–10 years of experience, and 19.5% having 1–5 years. Additionally, 16.7% had 11–15 years, 14.3% had over 20 years, 13.8% had 16–20 years, while only 9% had less than one year of experience in the manufacturing industry.

5.1 Descriptive analysis for sustainable benefits of QM application

Table 1 presents the results of the descriptive statistics, displaying the benefits' ranking, mean item score (MIS), and standard deviation (SD). The respondents assigned high average ratings to the factors on a five-point Likert scale, where 1 (Strongly disagree); 2 (Disagree); 3 (Neutral); 4 (Agree); and 5 (Strongly agree). The MIS values ranged from 4.37 to 4.93, implying that all listed benefits are perceived as important, though to slightly varying degrees. The result shows that 'enables the company to remain in business' was ranked first with MIS of 4.93 and SD of 0.250. The factor ranked next is 'reduce time wastage' having a MIS of 4.83 and SD of 0.374, followed by 'reduce cost' which was ranked third and which have a mean item score of 4.73 and SD of 0.443, 'enables continuous improvement' is the factor ranked fourth, it has a mean item score of 4.69 and SD of 0.463, 'enables finance savings was ranked fifth with MIS of 4.69 and SD of 0.476. The respondents ranked sixth, with MIS of 4.68 and SD of 0.487 'promotes teamwork', while promotes customer satisfaction was ranked seventh with MIS of 4.67 and SD of 0.473, 'enables cooperation' was ranked eight with MIS of 4.65 and SD of 0.498, 'increases competitive advantage' was ranked ninth with MIS of 4.60 and SD of 0.490, 'reduce wastage and rework' was ranked tenth with MIS of 4.57 and SD of 0.497, while 'reduces goods and services rejection' with MIS of 4.56 and SD of 0.507 was ranked eleventh. Promote the company's productivity and efficiency, improves communication among workers, and create faithful clients were all ranked twelfth with MIS of 4.54 and SD of 0.499, 0.509, and 0.509 respectively, while 'enhances operation performance indicators to measure the quality and cost of goods' and 'eradicates loss of customers' were ranked fifteenth and sixteenth with MIS of 4.48, 4.37 and SD of 0.501, 0.557 respectively.

The uniformity in the ratings, across all 16 variables may signal a potential ceiling effect, which is a situation where Likert scale does not allow sufficient differentiation among highly recognised benefits. The minimal difference in responses (e.g., SD = 0.250 for the highest-rated item) indicates a significant agreement, yet may also signify response biases such as social desirability or acquiescence bias, wherein respondents are inclined to concur with positively framed items, especially in a professional context where quality management is esteemed. Business-critical factors (such as cost, time, and business continuity) dominate the rankings, indicating that organisations prioritise QM for its easily observed benefits. In contrast, fewer measurable outcomes, like customer loyalty and performance metrics, may be less immediately apparent, despite still being significant.

Table 1: Descriptive Analysis for Sustainable Benefits of QM Application

Codes	**Sustainable Benefits of QM Application**	**MIS**	**Std. Deviation**	**Rank**
BQA1	Enables the company to remain in business	4.93	0.250	1
BQA2	Reduce time wastage	4.83	0.374	2
BQA3	Reduce cost	4.73	0.443	3
BQA4	Enables continuous improvement	4.69	0.463	4
BQA5	Enables finance savings	4.69	0.476	5
BQA6	Promotes teamwork	4.68	0.487	6
BQA7	Promotes customer satisfaction	4.67	0.473	7
BQA8	Enables cooperation	4.65	0.498	8
BQA9	Increases competitive advantage	4.60	0.490	9
BQA10	Reduce wastage and rework	4.57	0.497	10
BQA11	Reduces goods and services rejection	4.56	0.507	11
BQA12	Promote the company's productivity and efficiency	4.54	0.499	12
BQA13	Improves communication among workers	4.54	0.509	12
BQA14	Create faithful clients	4.54	0.509	12
BQA15	Enhances operation performance indicators to measure the quality and cost of goods	4.48	0.501	15
BQA16	Eradicates loss of customers	4.37	0.557	16

5.2 Factor analysis for sustainable benefits of QMS application

Correlation matrix analysis was carried out in order to determine the suitability for factor analysis, of the identified sustainable benefits of QM application. The result indicates the 0.3 and above coefficient value which is suitable for the factor analysis as shown in Table 2.

Table 2: Correlation Matrix for Sustainable Benefits of QM Application

	BQA1	**BQA2**	**BQA3**	**BQA4**	**BQA5**	**BQA6**	**BQA7**	**BQA8**	**BQA9**	**BQA10**	**BQA11**	**BQA12**	**BQA13**	**BQA14**	**BQA15**	**BQA16**
BQA1	**1.000**															
BQA2	**0.393**	**1.000**														
BQA3	**0.184**	**0.482**	**1.000**													
BQA4	**0.100**	**0.154**	**0.290**	**1.000**												
BQA5	**-0.048**	**0.072**	**0.106**	**0.290**	**1.000**											
BQA6	**0.113**	**0.254**	**0.103**	**0.162**	**0.303**	**1.000**										
BQA7	**0.110**	**0.115**	**0.085**	**0.068**	**0.191**	**0.558**	**1.000**									
BQA8	**0.135**	**0.227**	**0.157**	**-0.036**	**-0.016**	**0.254**	**0.452**	**1.000**								
BQA9	**0.135**	**0.109**	**0.085**	**0.099**	**0.076**	**0.060**	**0.238**	**0.327**	**1.000**							
BQA10	**0.058**	**0.071**	**0.194**	**0.088**	**-0.007**	**0.018**	**0.000**	**0.104**	**0.415**	**1.000**						
BQA11	**0.064**	**0.108**	**0.259**	**0.178**	**0.095**	**0.130**	**0.034**	**-0.023**	**0.245**	**0.465**	**1.000**					
BQA12	**0.217**	**0.232**	**0.269**	**0.243**	**0.102**	**0.217**	**0.027**	**0.123**	**0.111**	**0.329**	**0.453**	**1.000**				
BQA13	**0.156**	**0.171**	**0.179**	**0.119**	**0.184**	**0.153**	**0.085**	**0.135**	**0.093**	**0.053**	**0.136**	**0.520**	**1.000**			
BQA14	**0.135**	**0.145**	**0.099**	**0.223**	**0.135**	**0.156**	**0.248**	**0.139**	**0.069**	**-0.106**	**0.000**	**0.139**	**0.251**	**1.000**		
BQA15	**0.070**	**0.168**	**0.095**	**0.018**	**0.042**	**0.041**	**0.214**	**0.222**	**0.032**	**0.009**	**-0.018**	**0.032**	**0.144**	**0.286**	**1.000**	
BQA16	**-0.030**	**0.019**	**0.146**	**0.141**	**0.085**	**0.058**	**0.053**	**0.020**	**-0.045**	**0.178**	**0.004**	**0.045**	**0.002**	**-0.006**	**0.318**	**1.000**

To determine the adequacy of data for exploratory factor analysis, both the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were conducted. According to Field (2013), the KMO value should fall between 0.6 and 1 for factor analysis to proceed. Additionally, for Bartlett’s test of sphericity, significance is indicated at $P \leq 0.05$, as stated by Williams (2011). Table 3 presents the results, showing a KMO value of 0.634 and a significant Bartlett’s test of sphericity value of 0.000. These findings suggest that the survey responses are valid and suitable for exploratory factor analysis.

Table 3: KMO and Bartlett's Test for Sustainable Benefits of QMS Application

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.634
Bartlett's Test of Sphericity	Approx. Chi-Square	733.865
	Df	120
	Sig.	0.000

Table 4 shows the communalities for the sustainable benefits of QM application. As noted by *Field (2009),* the minimum extraction to be accepted for data inclusion is 0.3. Examination of the extraction values in Table 4 reveals none lower than 0.3, suggesting a strong fit of the variables within their respective components without variance. The high extraction values depicted in the table instill confidence in the reliability of the factor grouping.

Table 4: Communalities for Sustainable Benefits of QMS Application

Sustainable Benefits	**Initial**	**Extraction**
Enables the company to remain in business	1.000	0.524
Reduce time wastage	1.000	0.730
Reduce cost	1.000	0.628
Promote the company’s productivity and efficiency	1.000	0.517
Enhances operation performance indicators to measure the quality and cost of goods	1.000	0.599
Reduce wastage and rework	1.000	0.653
Enables continuous improvement	1.000	0.759
Improves communication among workers	1.000	0.644
Increases competitive advantage	1.000	0.574
Create faithful clients	1.000	0.756
Enables finance savings	1.000	0.616
Promotes teamwork	1.000	0.720
Enables cooperation	1.000	0.713
Promotes customer satisfaction	1.000	0.504
Reduces goods and services rejection	1.000	0.728
Eradicates loss of customers	1.000	0.725
Extraction Method: Principal Component Analysis.		

Upon confirming the suitability of the dataset, exploratory factor analysis was conducted. Eigenvalues exceeding 1 for the barriers to QM application were extracted, aligning with Kaiser’s criterion, which involves retaining factors with eigenvalues surpassing 1.0. Table 5 reveals that six factors satisfied this criterion. The eigenvalues for these six factors are 3.264, 1.853, 1.481, 1.362, 1.300, and 1.131, collectively explaining 64.947% of the total variance.

Table 5: Total Variance Explained for Sustainable Benefits of QMS Application

Component	**Initial Eigenvalues**			**Extraction Sums of Squared Loadings**			**Rotation Sums of Squared Loadings**		
	Total	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	3.264	20.399	20.399	3.264	20.399	20.399	2.000	12.497	12.497
2	1.853	11.582	31.981	1.853	11.582	31.981	1.979	12.367	24.863
3	1.481	9.257	41.238	1.481	9.257	41.238	1.804	11.272	36.135
4	1.362	8.513	49.751	1.362	8.513	49.751	1.618	10.110	46.245
5	1.300	8.127	57.878	1.300	8.127	57.878	1.610	10.065	56.310
6	1.131	7.069	64.947	1.131	7.069	64.947	1.382	8.637	64.947
7	0.951	5.942	70.890						
8	0.780	4.875	75.764						
9	0.751	4.693	80.457						
10	0.685	4.279	84.736						
11	0.519	3.242	87.978						
12	0.488	3.048	91.027						
13	0.452	2.826	93.853						
14	0.391	2.446	96.299						
15	0.304	1.901	98.200						
16	0.288	1.800	100.000						
Extraction Method: Principal Component Analysis.									

Likewise, Figure 1 displays the scree plot, depicting the eigenvalue plotted against the component number. Upon observation of the graph, as the component number increases, the graph's line gradually inclines diagonally towards the bottom of the horizontal axis (component number). This trend arises because each successive factor explains a smaller portion of the total variance. Further scrutiny unveiled that retaining only six factors is justified, as a noticeable shift in the plot's trajectory occurs at the sixth factor.

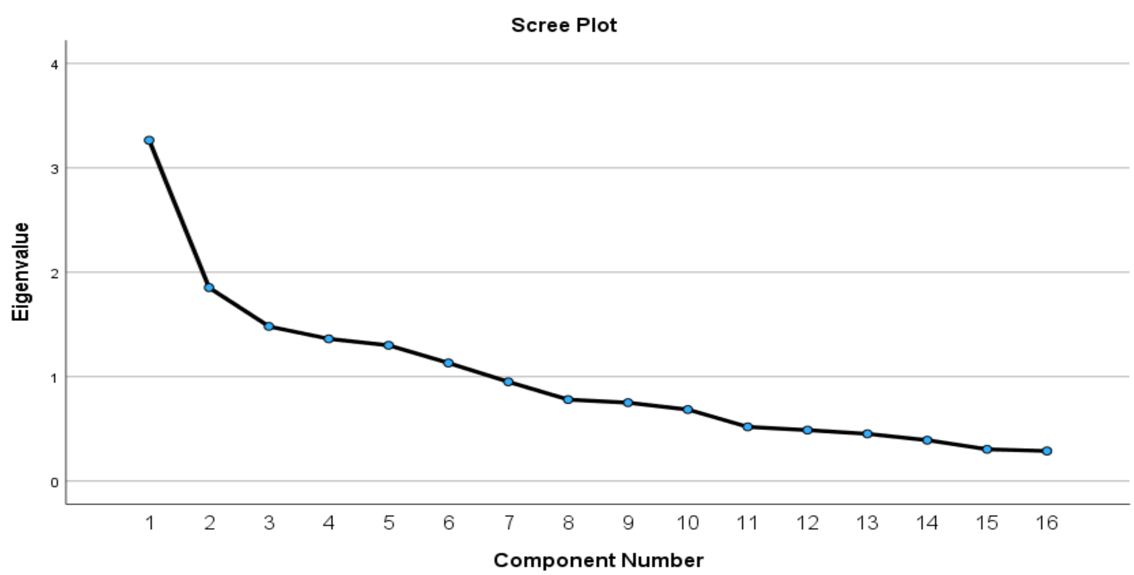

Figure 1: Scree Plot for Sustainable Benefits of QMS Application

The rotational component matrix which reveals the corresponding loading variables and the accompanying loading values of the sustainable benefits were extracted and presented in Table 6. The Table shows the rotated matrix with 16 variables that were identified from the literature and factored into six clusters and interpreted based on the inherent relationship of variables in that cluster.

1. The first extracted principal factor which accounts for 20.399% of the total variance, contains three variables ‘Create faithful clients’ (85.1%), ‘Enables finance savings’ (72.6%), and ‘Increases competitive advantage’ (57.7%). The variables reflect benefits connected to customer loyalty, financial efficiency, and market positioning, all of which are fundamental to long-term business viability and financial success. This factor was subsequently named Ensures company’s financial growth due to the similarity in the variables
2. Loaded in factor 2 are three variables which are ‘Enables continuous improvement’ (83.1%), ‘Improves communication among workers’ (72.8%), and ‘Reduce wastage and rework’ (57.9%). Accounting for 11.582% of the total variance, this factor centres around internal development, employee coordination, and process enhancement, therefore, highlighting the role of QM in the promotion of a learning-oriented work environment. It was labelled Encourages workers’ growth.
3. The third factor, comprising three variables explains 9.257% of the total variance. The variables included in this factor includes ‘Reduce time wastage’ (83.2%), ‘Reduce cost’ (68.6%) and ‘Enables the company to remain in business’ (66.1%). These variables reflect operational efficiency, capturing QM’s ability to reduce time and resource wastage. Since cost and time optimisation are central pillars of quality management systems, this factor was named Cost and Time Savings
4. The fourth factor contains three variables which includes ‘Enables cooperation’ (82.6%), ‘Promotes teamwork’ (62.3%) and ‘Promotes customer satisfaction’ (58%) and explains 8.513% of the variance. The focus here is on collaborative workplace relationships and their downstream effect on customer experience. This factor highlights the interpersonal and organisational culture aspect of QM and was labelled Promotes cooperation and teamwork.
5. Loaded in factor five are two variables which explains 8.127% of the variance. These variables are ‘Enhances operation performance indicators to measure the quality and cost of goods’ (74.4%), and ‘Promote the company’s productivity and efficiency’ (63.9%). Both variables reflect performance measurement and output improvement, which are essential for benchmarking and continuous improvement under QM practices. They were subsequently named Improves performance and productivity.
6. Loaded in factor six are two variables which include ‘Eradicates loss of customers’ (80.8%) and ‘Reduces goods and services rejection’ (74.7%). They account for 7.069% difference in variance and focuses on external customer outcomes, specifically product/service quality and customer retention. The factor was labelled as Ensures customer satisfaction.

Table 6: Rotated Component Matrix for Sustainable Benefits of QMS Application

Sustainable Benefits	**Component**					
	1	2	3	4	5	6
Ensures company’s financial growth						
Create faithful clients	0.851					
Enables finance savings	0.726					
Increases competitive advantage	0.577					
Encourages workers’ growth						
Enables continuous improvement		0.831				
Improves communication among workers		0.728				
Reduce wastage and rework		0.579				
Cost and time savings						
Reduce time wastage			0.832			
Reduce cost			0.686			
Enables the company to remain in business			0.661			
Promotes cooperation and teamwork						
Enables cooperation				0.826		
Promotes teamwork				0.623		
Promotes customer satisfaction				0.580		

Improves performance and productivity						
Enhances operation performance indicators to measure the quality and cost of goods					0.744	
Promote the company's productivity and efficiency					0.639	
Ensures customer satisfaction						
Eradicates loss of customers						0.808
Reduces goods and services rejection						0.747
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalisation.[a]						
a. Rotation converged in 9 iterations.						

The component correlation matrix, which illustrates the relationship among the six principal factors, is displayed in Table 7. A robust relationship is denoted by positive values, whereas a weak relationship is indicated by negative values among the factors.

Table 7: Component Transformation Matrix for Sustainable Benefits

Component	**1**	**2**	**3**	**4**	**5**	**6**
1	0.423	0.447	0.507	0.447	0.365	0.176
2	-0.748	0.628	-0.067	0.039	0.051	0.192
3	0.448	0.609	-0.191	-0.373	-0.491	-0.109
4	0.207	0.122	-0.685	-0.100	0.681	0.007
5	0.114	-0.138	-0.044	-0.219	-0.096	0.953
6	0.068	-0.020	-0.481	0.776	-0.388	0.106
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalisation.						

Fahmi (2020) argued that effective quality management can improve employees and organisational performance, leading to continuous improvement and meeting customer expectations and demands, which can also help the organisation compete in the global markets. These are some of the sustainable benefits of QMS application in an organisation, as identified in literature. Furthermore, delivery of products and services that meet customer needs, improved quality, performance, responsiveness, and costs reduction, and improved customer and employee satisfaction were also identified as benefits of QMS application in an organisation *(Cai, 2009)*. These relates to the findings of this study. Previous empirical studies have shown that many TQM practices significantly influence management decisions *(Abdullah & Bett, 2018; Irfan & Kee, 2013; Talib, Rahman, & Qureshi, 2013)*. According to some researchers, recognising the role of TQM is crucial for its successful implementation *(Talwar, 2011; Salaheldin, 2009; Talib, Rahman, & Qureshi, 2010)*.

6. Conclusion and Recommendations

This study set out to explore the sustainable benefits of quality management (QM) application in the delivery of products and services within the South African manufacturing industry. Drawing on both empirical data and theoretical perspectives, the findings affirm that the implementation of a Quality Management System (QMS) yields substantial advantages for manufacturing firms. Key among these benefits are enhanced customer satisfaction, cost and time savings, improved operational efficiency, and the fostering of a collaborative organisational culture. The results also highlight that QMS enables continuous improvement, reduces wastage and product rejection, and strengthens competitive advantage—factors which are all critical for sustainability and long-term business success. Through exploratory factor analysis, the study further distilled these benefits into six core dimensions: ensuring the company's financial growth, encouraging employee development, promoting cost and time savings, enhancing cooperation and teamwork, improving performance and productivity, and ensuring customer satisfaction. These clusters reveal the multi-faceted value that quality management brings—not only in terms of tangible outcomes like cost reduction and process efficiency but also in cultivating intangible assets such as trust, teamwork, and innovation within the workforce.

Given the findings, it is recommended that manufacturing organisations in South Africa invest in robust quality management frameworks such as ISO 9001:2015 and ensure that their implementation is not merely symbolic but deeply embedded in everyday operations. Top management must lead by example, fostering a culture of quality that cascades through all levels of the organisation. Employee engagement should be prioritised through regular training, empowerment initiatives, and feedback mechanisms that value their input in the continuous improvement journey. Moreover, the integration of QMS should be viewed not as a compliance exercise but as a strategic tool for achieving excellence in service and product delivery. Finally, policymakers and industry bodies should support manufacturing firms—especially small and medium enterprises—by creating enabling environments for QMS adoption. This includes funding training programmes, providing technical support, and facilitating knowledge-sharing platforms. With consistent application and a commitment to quality at all levels, the South African manufacturing sector can not only remain competitive in global markets but also thrive sustainably.

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