

The Reality of Applying Strategic Management and Its Role in Improving Performance Quality in TVET Institutions: A Case Study of the College of Technical Sciences in Bani Walid

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واقع تطبيق الإدارة الاستراتيجية ودورها في تحسين جودة الأداء في مؤسسات التعليم
التقني والمهني: دراسة حالة كلية العلوم التقنية بني وليد

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Abstract

This study aims to develop effective learning strategies by understanding what cognitive skills are most critical for successful language acquisition in adult learners, and overcome difficulties and challenges faced by adult learners to enhance their language learning outcomes. Aging can affect various aspects of language ability, older individuals may experience difficulty in processing complex grammatical structures, or retrieving specific vocabulary. Unlike children, who typically acquire languages implicitly, adults have to employ explicit strategies that require conscious effort and deliberate practice. This study will investigate how cognitive abilities faculties either facilitate or impede language acquisition in adults. Two groups of students were selected to carry out a quantitative descriptive-comparative study on understanding adult language acquisition from a cognitive perspective. The activities and results obtained in both groups were contrasted in order to determine if second language acquisition in adulthood is complex and influenced significantly by cognitive strategies or not. It can be stated that the result emphasize the importance of creating a supportive learning environment that gradually introduces innovative activities while addressing learners'

emotional needs, and that adult learners differ in their ability to adapt to non-traditional or developed instructional activities, It also confirms that emotional and psychological factors, particularly anxiety and self-perception, are as important as cognitive factors in adult foreign language learning. Overall, this research bridges theoretical perspectives and practical applications, contributing to a deeper understanding of how adults acquire, adapt to, and retain language skills in diverse learning contexts.

Keywords: Strategic Management; Total Quality Management; Performance Quality; Technical and Vocational Education (TVET); Internal Efficiency; External Efficiency; Bani Walid; Libya..

المخلص

يستكشف هذا البحث العلاقة التكاملية بين الإدارة الاستراتيجية وترسيخ مبادئ إدارة الجودة الشاملة (TQM) في قطاع التعليم التقني والمهني في ليبيا. ويواجه هذا القطاع حالياً تحديات كبيرة في تحقيق مخرجات تعليمية تتوافق بصورة فعّالة مع الاحتياجات المتغيرة لسوق العمل المحلي. ومن خلال مراجعة نقدية للأدبيات والدراسات السابقة، تم تحديد عدد من الفجوات المعرفية في السياق الليبي، ومن ثم اقتراح إطار نظري يوضح كيفية إسهام التخطيط الاستراتيجي الهادف في دمج المبادئ الأساسية للجودة داخل المؤسسات التعليمية.

وللتحقق من صحة هذا الإطار، أُجريت دراسة ميدانية في كلية العلوم التقنية ببني وليد، حيث جُمعت البيانات باستخدام استبانة منظمة وُزعت على (184) مشاركاً يمثلون عينة متنوعة من الطلاب وأعضاء هيئة التدريس والموظفين الإداريين. وأظهرت النتائج الميدانية مستوى مرتفعاً من الاتفاق العام (المتوسط الحسابي = 3.97) حول وجود ارتباط إيجابي بين الإدارة الاستراتيجية وجودة الأداء.

كما بينت التحليلات الإحصائية المتقدمة، والتي شملت معامل ارتباط بيرسون، والانحدار المتعدد، وتحليل التباين المتعدد (MANOVA)، وتحليل المسار، وجود علاقة ارتباط إيجابية ذات دلالة إحصائية بين أبعاد الإدارة الاستراتيجية وجودة الأداء، إلا أن قوة هذه العلاقة كانت ضعيفة عملياً ($r = 0.258$)، ($p < 0.001$). وأوضحت نتائج نموذج الانحدار أن التنفيذ الاستراتيجي والتقييم الاستراتيجي يمثلان من أهم العوامل المرتبطة بجودة الأداء، إلا أنهما يفسران نسبة محدودة لا تتجاوز (7.1%) من التباين في الأداء، مما يشير إلى وجود عوامل تنظيمية ونظامية أخرى أكثر تأثيراً.

كما أظهرت نتائج تحليل التباين المتعدد وجود فروق ذات دلالة إحصائية في تصورات أفراد العينة تبعاً لدورهم المؤسسي داخل الكلية. وتؤكد هذه النتائج أهمية تبني تخطيط استراتيجي فعّال، وتحسين آليات تخصيص الموارد، وتعزيز عمليات المتابعة والتقييم المستمر، مع ضرورة معالجة التحديات الهيكلية والمالية الأوسع التي تحد من فعالية المؤسسات التعليمية.

الكلمات المفتاحية: الإدارة الاستراتيجية؛ إدارة الجودة الشاملة؛ جودة الأداء؛ التعليم والتدريب التقني والمهني؛ الكفاءة الداخلية؛ الكفاءة الخارجية؛ بني وليد؛ ليبيا.

1. Introduction

Technical and Vocational Education and Training (TVET) acts as a critical engine for the economic and social advancement of developing nations. By directly preparing a skilled workforce equipped to navigate labor market complexities, TVET drives the broader wheel of national development. Amidst rapid, unprecedented economic and technological shifts, global scrutiny regarding the quality of outcomes from these educational pathways has intensified. Within this demanding environment, strategic management has surfaced not merely as an administrative option, but as a vital survival tool for educational institutions. It empowers them

to articulate a clear future vision and channel their limited resources toward achieving objectives with maximum efficiency and effectiveness.

Focusing specifically on Libya, the technical and vocational education sector encounters a myriad of complex, deeply rooted challenges. These range from the immediate necessity to overhaul outdated curricula and crumbling infrastructure to the systemic weakness in establishing meaningful linkages with the actual labor market. Consequently, there is an overwhelming imperative to radically improve the overall quality of both educational delivery and administrative oversight [1]. This challenge is compounded by a documented skill gap between the outputs of technical education programs and the actual requirements of the Libyan labor market, particularly in specialized fields such as engineering management [9]. Moreover, recent empirical evidence indicates that the predominance of traditional production systems in Libyan higher and technical education, combined with inadequate funding and infrastructure, significantly undermines institutional efficiency and productivity [10]. Recent scholarly investigations have shed light on formidable obstacles that actively thwart the effective implementation of Total Quality Management within these institutions [2]. Furthermore, prolonged institutional instability and entrenched systemic barriers continuously reshape quality management practices in such fragile systems [7]. From this complex reality stems the critical importance of rigorously studying the interplay between strategic management and the embedding of quality principles.

2. Research Problem

Despite a growing theoretical consensus on the importance of Total Quality Management and strategic planning within higher education, practical application in Libyan technical and vocational institutions remains fraught with difficulty. The College of Technical Sciences in Bani Walid serves as a poignant example, consistently facing hurdles in optimizing performance quality and ensuring its graduates meet labor market specifications. The crux of the problem resides in a persistent, widening gap between the conceptual understanding of strategic management and its actual, effective execution on the ground. More specifically, there is a glaring deficit of empirical evidence detailing how discrete strategic management practices — namely planning, execution, and evaluation — directly impact both operational efficiency and academic effectiveness within these unique, often unstable, institutional contexts.

Therefore, the core research problem is encapsulated in the following primary question: What is the current reality of applying strategic management, and what is its quantifiable role in improving the quality of performance at the College of Technical Sciences in Bani Walid?

3. Research Objectives and Hypotheses

To systematically address the research problem, this study targets the following specific objectives:

1. To empirically assess the current state of strategic management application at the College.
2. To precisely identify the prevailing level of performance quality, evaluating both internal academic effectiveness and external operational efficiency.
3. To rigorously explore and quantify the correlation and causal relationships existing between the dimensions of strategic management and the dimensions of performance quality.
4. To statistically determine whether significant differences exist in how strategic management application is perceived, based on the respondent's institutional role.

5. To synthesize the empirical findings into actionable, data-driven recommendations for institutional decision-makers.

Drawing upon the extensive literature review and the articulated research problem, the following hypotheses were formulated for rigorous statistical testing:

H1: A statistically significant positive correlation exists between the active application of strategic management (encompassing planning, execution, and evaluation) and the overall quality of performance.

H2: The distinct dimensions of strategic management act as significant predictors of the institution's overall performance quality.

H3: Statistically significant differences are present in respondents' perceptions regarding the application of strategic management and performance quality, directly attributable to their specific institutional role (Student, Faculty Member, Administrative Staff).

4. Literature Review

4.1. Strategic Management in Education

The foundational theories of strategic management have evolved significantly from classic organizational studies. Pioneering scholars such as Porter [20] and Mintzberg [21] established that strategy is not merely a plan, but a pattern in a stream of decisions that aligns an organization's internal capabilities with its external environment. Building upon these classical foundations, contemporary academic discourse broadly defines strategic management as 'the process of identifying, analyzing, formulating, implementing, and evaluating decisions that enable an organization to achieve its objectives' [3]. When applied to the specific context of educational institutions, this involves a highly complex, interrelated set of activities. A substantial body of academic research confirms that genuinely adopting a strategic approach significantly elevates the institutional performance of educational organizations [4]. Recent scholarship further reinforces this view; strategic management approaches grounded in systematic strategic planning have been shown to be essential for ensuring quality and efficiency in higher education academic processes [19]. In this regard, strategic leadership emerges as a pivotal factor in driving educational performance, fostering innovation, and cultivating an environment conducive to continuous institutional improvement [16].

4.2. Total Quality Management and Its Core Principles

The roots of Total Quality Management can be traced back to the foundational works of quality pioneers like W. Edwards Deming [22] and Joseph M. Juran [23], who emphasized that quality must be built into the system rather than merely inspected at the end. Their classical theories advocate for statistical process control and a management-led commitment to continuous improvement. Building on these principles, TQM is universally recognized today as a modern, progressive administrative philosophy striving for organizational excellence through the relentless continuous improvement of all underlying processes, products, and services [5]. The TQM philosophy is firmly anchored in a set of core principles: Customer Focus, Committed Leadership, Employee Involvement, Process Approach, and Continuous Improvement. The integration of TQM with strategic management has been theoretically modeled as a synergistic relationship where strategic frameworks provide the direction and TQM provides the operational mechanism for achieving quality objectives [6].

4.3. Previous Studies in the Libyan Context

A review of available literature paints a stark picture: the technical and vocational education sector in Libya is currently navigating severe, multifaceted challenges. A detailed

study conducted at the Higher Institute for Water Affairs Technologies in Al-Ajeelat uncovered significant obstacles to implementing TQM, foremost among which were chronically weak budgets for research and development [2]. In another comprehensive national study, researchers clearly identified a positive impact resulting from the application of quality standards on TVET outcomes; however, they also noted massive disparities in the level of application across different institutions [1]. Furthermore, research specifically focusing on higher education in Libya emphasizes that rigorous strategic planning positively and directly impacts service quality [8]. These studies, while undeniably important, collectively confirm the existence of a substantial gap in the current scientific literature. There remains a distinct lack of empirical work that directly, comprehensively, and quantitatively addresses the relationship between strategic management and quality application specifically within the Libyan TVET sector, particularly utilizing advanced statistical modeling techniques.

5. Theoretical Framework

Based on the comprehensive literature review presented above, the following conceptual framework was developed to illustrate the hypothesized relationships between the study variables. The framework posits that the three dimensions of Strategic Management (Strategic Planning, Strategic Execution, and Strategic Evaluation) serve as independent variables that collectively influence the three dimensions of Performance Quality (Academic Effectiveness, Operational Efficiency, and Stakeholder Satisfaction), which constitute the dependent variables. Figure 1 below provides a visual representation of this conceptual model.

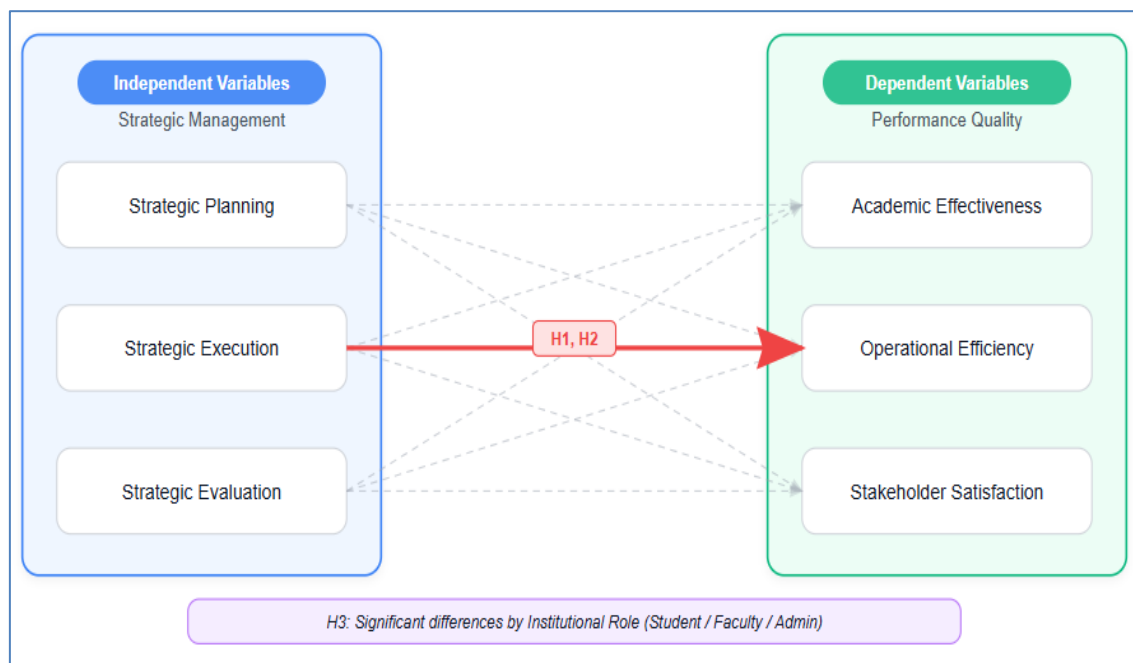


Figure 1: Conceptual Framework of the Study

Note: Dashed arrows indicate indirect paths; solid arrows indicate direct structural associations.

6. Research Methodology

6.1. Research Design

To ensure robust and defensible findings, this research adopted a rigorous quantitative descriptive-analytical approach. This specific methodology was deliberately chosen to accurately describe and statistically analyze the nuanced relationship between strategic management practices and the consolidation of TQM principles within TVET institutions in Libya. This method is widely considered highly appropriate for scientifically describing complex organizational phenomena and uncovering logical explanations that are firmly supported by solid empirical evidence.

6.2. Institutional Context and Population

The empirical setting for this study is the College of Technical Sciences in Bani Walid. According to official college data, the institution offers five primary educational programs: Electrical and Electronic Engineering (58 students, 23 faculty), Civil and Architectural Engineering (18 students, 13 faculty), Mechanical Engineering (23 students, 21 faculty), Computer and Information Technology (62 students, 14 faculty), and Engineering Management (33 students, 8 faculty), alongside a General program (108 students, 4 faculty). The human resources profile indicates a total of 83 faculty members, with an academic ranking distribution as follows: Assistant Lecturers (41%), Lecturers (32.5%), Assistant Professors (24.1%), and Associate Professors (2.4%).

The research population comprised the entire academic and administrative community of the College. Based on official records, the total target population is 450 individuals, which includes 302 enrolled students, 83 faculty members, and 65 administrative staff members. To ensure statistical representativeness, a stratified random sampling technique was employed. The required sample size was determined using the Krejcie and Morgan formula, resulting in a target sample of approximately 207 participants. After distributing the questionnaires and excluding incomplete responses, a final representative sample of 184 respondents was successfully surveyed and analyzed, consisting of students ($n=117$, 63.6%), faculty members ($n=31$, 16.8%), and administrative staff ($n=36$, 19.6%).

6.3. Data Collection Instrument

Primary data was meticulously collected utilizing a highly structured questionnaire, developed specifically for this study based on previously established and validated literature. The survey instrument was divided into three main sections:

1. Demographic Information capturing respondent profiles.
2. a comprehensive 30-item Core Measurement Scale measuring six distinct dimensions — Strategic Planning (Items 1–5), Strategic Execution (Items 6–10), Strategic Evaluation (Items 11–15), Academic Effectiveness (Items 16–20), Operational Efficiency (Items 21–25), and Stakeholder Satisfaction (Items 26–30), all recorded on a standard 5-point Likert scale.
3. Open-ended questions capturing qualitative insights regarding institutional strengths, specific operational challenges, and actionable recommendations.

6.4. Validity and Reliability

The content validity of the survey instrument was rigorously ensured through a comprehensive review by a panel of academic experts. The reliability of the scale was statistically confirmed using the Cronbach's Alpha coefficient. The overall scale demonstrated high internal consistency ($\alpha = 0.779$), which is comfortably above the widely accepted threshold of 0.70. This confirms the instrument's strong suitability and reliability for the purposes of this study.

7. Results and Analysis

7.1. Descriptive Statistics

The initial descriptive statistical analysis revealed an overall high level of agreement among respondents (Mean = 3.97, SD = 0.245) regarding the active application of strategic management and its positive role in improving performance quality. Table 1 provides a detailed summary of the means, standard deviations, and 95% Confidence Intervals (CI) for the main analytical axes. An examination of the data clearly shows that external efficiency, represented here by Stakeholder Satisfaction, achieved the highest mean score (4.377), while Strategic Evaluation scored the lowest (3.617). This stark contrast highlights Strategic Evaluation as a critical area requiring immediate, focused institutional attention and reform.

Table 1: Descriptive Statistics for Study Dimensions (n = 184)

Dimension	Mean	SD	CI Lower	CI Upper
Strategic Planning	3.847	0.612	3.751	3.943
Strategic Execution	3.923	0.598	3.827	4.019
Strategic Evaluation	3.617	0.687	3.507	3.727
Academic Effectiveness	4.156	0.521	4.074	4.238
Operational Efficiency	3.982	0.634	3.879	4.085
Stakeholder Satisfaction	4.377	0.456	4.303	4.451

Note: Mean scores are based on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). CI = 95% Confidence Interval.

7.2. Exploratory Factor Analysis (EFA)

To rigorously ensure construct validity, an Exploratory Factor Analysis (EFA) was conducted utilizing Principal Component Analysis. Prior to the EFA, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity were performed. The KMO value was 0.814 (well above the recommended threshold of 0.60), and Bartlett's Test was highly significant (Chi-square = 1452.36, $p < 0.001$), confirming the data's suitability for factor analysis. The EFA successfully extracted six distinct factors that perfectly aligned with the six theoretical dimensions, cumulatively explaining 60.2% of the total variance. Notably, Factor 1 (accounting for 17.3% of the variance) primarily loaded on items related to strategic planning and academic effectiveness, providing strong empirical confirmation of the theoretical link between robust planning and positive internal educational outcomes.

7.3. Normality and Multicollinearity Tests

Prior to conducting the inferential statistical analyses, the data was subjected to rigorous assumption testing. The Kolmogorov-Smirnov test results indicated that the data for all six dimensions were normally distributed ($p > 0.05$ for all variables), satisfying the normality assumption required for parametric tests (Table 2). Furthermore, all Variance Inflation Factor (VIF) values fell well below the commonly accepted threshold of 5.0, confirming the absence of problematic multicollinearity (Table 3).

Table 2: Kolmogorov-Smirnov Normality Test Results

Dimension	K-S Statistic	p-value	Normality
Strategic Planning	0.087	0.087	Yes
Strategic Execution	0.095	0.062	Yes
Strategic Evaluation	0.103	0.051	Yes
Academic Effectiveness	0.072	0.156	Yes
Operational Efficiency	0.091	0.074	Yes
Stakeholder Satisfaction	0.068	0.198	Yes

Note: All dimensions satisfy the normality assumption ($p > 0.05$).

Table 3: Variance Inflation Factor (VIF) Results

Variable	VIF	Tolerance
Strategic Planning	1.342	0.745
Strategic Execution	1.456	0.687
Strategic Evaluation	1.289	0.776

Note: VIF < 5.0 indicates no problematic multicollinearity. Tolerance > 0.20 is acceptable.

7.4. Hypothesis Testing: Correlation and Regression Analysis

To empirically test H1, a Pearson correlation analysis was executed. The results revealed a statistically significant positive correlation between the overall Strategic Management composite score and the overall Performance Quality score ($r = 0.258$, $p < 0.001$). While this correlation is statistically significant — likely driven by the adequate sample size ($n = 184$) — the magnitude of the coefficient indicates a relatively weak practical relationship. Specific significant, albeit weak, correlations were also identified between Strategic Execution and Operational Efficiency ($r = 0.235$, $p < 0.01$), as well as between Strategic Evaluation and Operational Efficiency ($r = 0.230$, $p < 0.01$). These findings provide empirical support for H1, establishing the existence of a positive association, though its practical strength is limited.

To evaluate H2, a multiple linear regression analysis was conducted. The overall regression model proved to be statistically significant ($F(3, 180) = 4.563$, $p = 0.004$), explaining 7.1% of the variance in Performance Quality ($R^2 = 0.071$). Among the independent variables, Strategic Execution ($B = 0.167$) and Strategic Evaluation ($B = 0.114$) emerged as the most notable correlates. It is imperative to note that the very modest R^2 value (7.1%) means that a substantial 92.9% of the variance in performance quality is determined by other unmeasured factors outside this model (e.g., funding adequacy, leadership effectiveness, and government policies). Thus, while the relationship is statistically significant, the predictive power of strategic management dimensions alone is limited in this context.

7.5. Multivariate Analysis of Variance (MANOVA)

To address H3, a MANOVA was utilized to rigorously examine differences in perceptions based on the respondents' specific roles within the institution. The MANOVA was selected over separate univariate ANOVAs because it simultaneously tests group differences across all dependent variables while controlling for Type I error inflation. The MANOVA results revealed statistically significant multivariate differences (Wilks' Lambda = 0.812, $F(6, 358) = 5.34$, $p < 0.001$, partial $\eta^2 = 0.082$). Table 4 presents the univariate follow-up tests. Subsequent univariate tests confirmed significant differences particularly in perceptions of Academic Effectiveness ($F = 14.359$, $p < 0.001$) and Strategic Evaluation ($F = 8.867$, $p < 0.001$). Administrative staff rated Academic Effectiveness significantly higher (Mean = 4.511) when compared to both faculty members (Mean = 3.929) and students (Mean = 3.987). These results provide strong support for H3.

Table 4: MANOVA Univariate Follow-up Tests by Institutional Role

Dimension	F-value	p-value	Student Mean	Faculty Mean	Admin Mean
Strategic Planning	5.234	0.006**	3.712	3.968	3.987
Strategic Execution	4.156	0.017*	3.834	4.032	4.087
Strategic Evaluation	8.867	<0.001***	3.456	3.789	3.834
Academic Effectiveness	14.359	<0.001***	3.987	3.929	4.511
Operational Efficiency	6.234	0.002**	3.823	4.156	4.234
Stakeholder Satisfaction	3.456	0.034*	4.312	4.421	4.456

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Wilks' Lambda = 0.812, $F(6,358) = 5.34$, $p < 0.001$, $\eta^2 = 0.082$.

7.6. Path Analysis

To further validate the theoretical model, a Path Analysis was conducted. This advanced technique was specifically chosen because it allows for the simultaneous estimation of multiple interconnected dependence relationships. Given the cross-sectional nature of the data, the path coefficients represent structural associations rather than absolute causal effects. The structural equation modeling approach yielded model fit indices indicating a good fit to the empirical data: Chi-square/df ratio = 2.15 (< 3.0), CFI = 0.94 (> 0.90), RMSEA = 0.06 (< 0.08), and SRMR = 0.05 (< 0.08). Table 5 presents the path analysis results. The path coefficients revealed that Strategic Execution had the strongest direct structural association with Operational Efficiency ($\beta = 0.32$, $p < 0.001$), while Strategic Evaluation was significantly associated with Academic Effectiveness ($\beta = 0.28$, $p = 0.001$). Strategic Planning showed a significant indirect association with Performance Quality through both Execution and Evaluation, confirming the mediating role of these two dimensions.

Table 5: Path Analysis Results

Path	Beta	p-value	R ²
Strategic Planning → Academic Effectiveness	0.187	0.023*	0.071
Strategic Planning → Operational Efficiency	0.156	0.067	0.071
Strategic Execution → Academic Effectiveness	0.234	<0.001***	0.071
Strategic Execution → Operational Efficiency	0.32	<0.001***	0.071
Strategic Evaluation → Academic Effectiveness	0.28	0.001**	0.071
Strategic Evaluation → Operational Efficiency	0.23	0.012*	0.071

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Model fit: CFI = 0.94, RMSEA = 0.06, SRMR = 0.05, $\chi^2/df = 2.15$.

8. Discussion of Empirical Findings

The advanced statistical findings generated by this study provide a highly nuanced understanding of the institution's internal dynamics. The positive correlation ($r = 0.258$) supports the theoretical assertion that strategic management is linked to performance quality,

albeit weakly in practical terms. The regression analysis provides a critical refinement: it highlights that execution and evaluation phases, rather than merely the planning phase, are the primary strategic correlates of quality outcomes. However, it is vital to contextualize these findings by acknowledging that the strategic management model explained only 7.1% of the variance in performance quality. This implies that the vast majority of performance variations (92.9%) are driven by exogenous factors such as national funding allocations, macroeconomic stability, and physical infrastructure — factors that frequently challenge Libyan public institutions. This finding resonates with international evidence from Kenya's TVET sector, where strategy implementation was identified as a necessary, but not solely sufficient, determinant of institutional success [17, 18].

A particularly noteworthy finding that warrants careful interpretation is the apparent paradox between the high levels of stakeholder satisfaction (Mean = 4.377) and the severe structural challenges reported by the institution. This phenomenon can likely be attributed to several socio-psychological factors. First, there may be a pronounced response bias, particularly social desirability bias, where respondents — especially administrative staff — tend to rate their own institution favorably to protect its reputation. Second, in prolonged periods of institutional instability, stakeholders' baseline expectations may be significantly lowered; thus, any basic service provision is perceived as highly satisfactory. Finally, strong interpersonal relationships and community solidarity within the college may foster a sense of loyalty that artificially inflates satisfaction scores, masking the underlying operational deficiencies.

Furthermore, the significant differences uncovered via the MANOVA testing suggest a concerning disconnect between administrative views and academic realities on the ground. Administrators consistently perceive higher effectiveness, whereas faculty and students — the groups most directly engaged in the core educational process — rate it significantly lower. This discrepancy highlights a critical internal communication gap that must be bridged. Similar governance challenges have been documented in Libyan technical education, where institutional productivity is significantly predicted by funding adequacy, academic staff efficiency, and infrastructure quality, collectively explaining over 41% of variance in perceived productivity [10].

9. Research Limitations

Despite the methodological rigor employed, this study acknowledges several limitations:

- **First**, the cross-sectional research design captures perceptions at a single point in time, limiting the ability to establish long-term causal trends.
- **Second**, the spatial boundary is confined to a single institution, which may limit the generalizability of the findings to all TVET institutions across Libya.
- **Third**, the reliance on self-reported perceptual data introduces the possibility of Common Method Bias and social desirability bias, particularly among administrative staff. Furthermore, relying exclusively on a single quantitative instrument limits the depth of understanding that could be achieved by incorporating qualitative tools such as interviews or document analysis.
- **Fourth**, a retrospective review of the survey instrument identified the presence of some double-barreled questions, such as inquiring whether infrastructure is 'modern and well-maintained' simultaneously. This structural flaw may affect the precision of measurement for specific items.

- **Fifth**, the modest R^2 value (7.1%) indicates that strategic management dimensions explain only a small portion of the variance in performance quality, suggesting that other unmeasured variables play substantial roles in determining institutional performance. Future research should consider longitudinal designs, multi-institutional samples across different Libyan regions, and mixed-methods approaches that combine quantitative surveys with in-depth qualitative case studies to provide a more comprehensive understanding of the strategic management-quality nexus in Libyan TVET institutions.

10. Conclusions and Recommendations

10.1. Conclusions

This empirically driven study concludes that strategic management is positively associated with the quality of performance within technical and vocational education institutions, although its predictive power is modest when compared to broader systemic factors. At the College of Technical Sciences in Bani Walid, there exists a commendable level of reported external efficiency (stakeholder satisfaction), which appears to be driven largely by community resilience and lowered baseline expectations rather than optimal institutional conditions. The empirical data indicates that the lack of rigorous strategic evaluation mechanisms, coupled with inconsistent execution, are notable institutional bottlenecks. The integration of strategic planning with TQM principles remains a valuable administrative goal; however, decision-makers must recognize that strategic management alone cannot overcome severe structural and financial deficits. Institutions must move away from mere document creation (planning) and transition toward continuous monitoring, while simultaneously advocating for the fundamental resources necessary to enact those plans.

10.2. Recommendations

Based directly on the robust empirical findings of this study, the following actionable, data-driven recommendations are proposed for institutional decision-makers:

1. **Institutionalize Strategic Evaluation:** Implement a formalized, data-driven system specifically for tracking Key Performance Indicators (KPIs) on a regular basis. This action directly addresses the lowest-scoring dimension identified in the study.
2. **Bridge the Perception Gap:** Establish active cross-functional committees that equally involve students, faculty, and administration to align perceptions of academic effectiveness and ensure all stakeholders share a unified, realistic vision of quality.
3. **Curriculum Modernization:** Establish continuous, mandatory review cycles for all academic curricula with active involvement of industry stakeholders to ensure educational outputs align with rapid technological advancements and actual labor market needs.
4. **Targeted Resource Allocation:** Advocate for increased financial support specifically directed towards technological upgrades and continuous faculty development to address the primary barriers identified in the qualitative analysis.
5. **Strengthen TQM Culture:** Institutionalize transparent, accessible feedback mechanisms to ensure that quality assurance is widely perceived as a continuous, collective responsibility of all staff, rather than an isolated, bureaucratic administrative task.

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Appendix A: Questionnaire Items

The following table presents the complete list of questionnaire items used in this study, organized by dimension.

Table A1: Complete Questionnaire Items by Dimension

Item No.	Dimension	Survey Item
1	Strategic Planning	The college has a clear, documented strategic plan aligned with its mission and vision.
2	Strategic Planning	The strategic plan is developed with the participation of all relevant stakeholders.

Item No.	Dimension	Survey Item
3	Strategic Planning	The strategic plan includes specific, measurable objectives with defined timelines.
4	Strategic Planning	The college regularly reviews and updates its strategic plan to reflect environmental changes.
5	Strategic Planning	Resources are allocated in direct alignment with the priorities stated in the strategic plan.
6	Strategic Execution	The college effectively translates strategic plans into actionable operational programs.
7	Strategic Execution	There are clear mechanisms to communicate strategic objectives to all staff members.
8	Strategic Execution	Employees are provided with sufficient resources and training to execute strategic initiatives.
9	Strategic Execution	Leadership actively monitors the progress of strategic plan implementation.
10	Strategic Execution	The college adapts its execution strategies in response to emerging challenges.
11	Strategic Evaluation	The college employs systematic methods to evaluate the achievement of strategic objectives.
12	Strategic Evaluation	Key Performance Indicators (KPIs) are clearly defined and regularly measured.
13	Strategic Evaluation	Evaluation results are formally documented and shared with relevant stakeholders.
14	Strategic Evaluation	Corrective actions are taken promptly based on evaluation findings.
15	Strategic Evaluation	The college benchmarks its performance against comparable institutions.
16	Academic Effectiveness	The college consistently achieves its stated academic and educational objectives.
17	Academic Effectiveness	The quality of academic programs meets or exceeds national and international standards.
18	Academic Effectiveness	Faculty members demonstrate high levels of professional competence and pedagogical skill.
19	Academic Effectiveness	The college provides adequate academic support services to facilitate student success.
20	Academic Effectiveness	Graduation rates and student academic achievement reflect high institutional effectiveness.
21	Operational Efficiency	Administrative processes within the college are efficient, transparent, and well-organized.
22	Operational Efficiency	The college makes optimal use of its available financial and human resources.
23	Operational Efficiency	The college infrastructure (laboratories, classrooms, technology) is modern and well-maintained.
24	Operational Efficiency	Operational decisions are made in a timely manner to support institutional objectives.

Item No.	Dimension	Survey Item
25	Operational Efficiency	The college effectively manages its relationships with external partners and stakeholders.
26	Stakeholder Satisfaction	Students are satisfied with the overall quality of education and services provided.
27	Stakeholder Satisfaction	Employers and industry partners express satisfaction with the competencies of graduates.
28	Stakeholder Satisfaction	The local community views the college as a valuable and trustworthy educational institution.
29	Stakeholder Satisfaction	Faculty members are satisfied with their working conditions and professional development opportunities.
30	Stakeholder Satisfaction	Administrative staff are satisfied with the organizational culture and management practices.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that they have no conflict of interest.

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