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Strategies for Remaining Competitive Without Compromising Quality in the Aerospace Industry

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Abstract

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MA, Regent University, 2013

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Abstract

The lack of strategic initiatives to elevate quality manufacturing and customer-centric business models has precipitated the monetary collapse of many aerospace organizations. Concerns arise when the focus on revenue supersedes the goal of quality workmanship. Grounded in total quality management (TQM), the purpose of this qualitative multiple case study was to explore strategies that seven aerospace leaders used to increase and maintain profitability through TQM to gain a competitive advantage. Data were collected using semistructured face-to-face interviews and a review of organizational documents. Five themes were identified through thematic analysis: (a) applying operational excellence, (b) optimizing capacity planning and resource allocation, (c) accelerating employee engagement through training, (d) promoting customer-centricity, and (e) streamlining strategic and supportive stewardship. A key recommendation is for aerospace leaders to mandate risk-assessment tools at the onset of new programs. The implications for positive social change entail educating aerospace employees on the reciprocity between competitive stature and TQM. By amalgamating TQM and competitive edge, leaders of aerospace companies with 500 or more employees may focus on the superior subsidies of ecological sustainability and public safety.

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Dedication

I dedicate this research study to my Heavenly Father Yahuah, His Son Yahusha HaMashiach, and the Holy Spirit, who granted me the grace and wisdom to complete this program. Additionally, I dedicate this research to my incredible wife, Nadina Ward, for her unconditional love, support, and encouragement, and also to my three children, Tionne, Magnolia, and Nautica.

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Section 1: Foundation of the Study

Maintaining the consistency of competitive distinction, quality workmanship, and progressive monetary performance permeates the agenda of business leaders within the aerospace and defense (A&D) industry (Patil et al., 2023). Section 1 delineates the background of the business problem, the problem and purpose, the population and sampling, and the nature of the study. The research question, interview questions, corresponding assumptions, limitations, and delimitations, significance of the study, and literature review are also included in this section.

Background of the Problem

As a dynamic industry that reciprocated technological breakthroughs, aerospace remained vulnerable to gaps in managerial strategies that cultivated and sustained a competitive advantage amid marketplace volatility (Leite & Chagas, 2020, p. 242). Although the global marketplace advocated rivalry among aerospace manufacturers, the cost of poor quality (COPQ) absorbed $1 million for every $10 million of revenue, which translated into a 10% forfeiture of aerospace sales (Patel & Desai, 2020). The domestic and global aerospace companies suffered monetarily when the corporate aspirations of obtaining a competitive edge inadvertently marginalized quality assurance as a cost rather than as an investment.

Remaining competitive required a continuous deployment of resources, revenue, and radical thinking due to disruptive technologies and novelties that permeated the performance of a global marketplace (Hummel et al., 2019). The quality of a product or service corresponded to the reputation and relevance of a business (Oschman, 2019).

Most stakeholders chose to invest in a sure thing; however, strategic shareholders considered risky investments that yielded propitious returns (Eggleton, 2004). Monetary risks facilitated a competitive edge amid global rivalry, and quality workmanship served as a prerequisite for long-term affluence and marketplace credibility (Hackman & Wageman, 1995).

Although reputability and profitability remained reciprocal counterparts from a socioeconomic perspective, the consciousness of shareholders and investors gravitated to the rudimentary balance that existed between the sustainability of quality workmanship and a company's competitive edge. Various industries faced great scrutiny whenever quality was forfeited as a result of exigent circumstances surrounding on-time delivery. The unexpected pressures of meeting customers' commitments usually stemmed from the failure of not performing capacity planning, which conveyed whether an enterprise possessed the infrastructure, capital, and resources to fulfill the terms and conditions of a contract. Although many industries shared the same challenges and situational turbulence on commercial and military levels, the A&D industry were the sole sectors of focus in the current study to promote a feasible approach toward meaningful research and positive social change.

Problem and Purpose

The specific business problem was that some aerospace leaders lack effective business strategies that increase and maintain profitability through total quality management (TQM) and for gaining a competitive advantage. The purpose of this qualitative multiple case study was to explore the effective business strategies that

aerospace leaders used to increase and maintain profitability through TQM for gaining a competitive advantage.

Population and Sampling

Data were collected from seven purposefully sampled senior managers and executives in the A&D industry in the western region of the United States, who were interviewed using a semistructured process to evoke experiences using effective strategies to increase and maintain profitability via TQM to gain a competitive edge. I also reviewed organizational documents for pertinent information.

Nature of the Study

I selected the qualitative method to address the study's purpose. According to Pagan (2019), qualitative research cannot be categorized as a product but rather a process of exploring social phenomena. The quantitative method would have been appropriate if the scope of the study had included the testing of hypotheses or close-ended questions about variables' characteristics or relationships (see Chowdhury et al., 2020). I did not intend to test any hypotheses or examine variables' characteristics or relationships; therefore, a quantitative method was not applicable. The mixed-methods approach incorporates qualitative and quantitative data within a single study (Baskarada & Koronios, 2018). Because the mixed-methods approach incorporates both quantitative and qualitative methodology, this approach was not appropriate for addressing the purpose of the current study.

Although I contemplated phenomenology and ethnography as possible qualitative designs, the case study offered a more appropriate design in comparison to alternative

designs (see Houghton et al., 2013). Using the case study design allowed for the exploration of business strategies employed by aerospace executives. According to Yin (2018), single-case studies are vulnerable and confined in scope, whereas multiple-case studies enable the researcher to compare findings across cases to increase the study's validity. Ethnography and phenomenology involve assorted social phenomena and the commonality of first-person life experiences, respectively (Hyett et al., 2014). Phenomenology involves exploring the personal meanings of participants' experiences while ethnography addresses the cultural experiences of multiple persons (Ngenye & Kreps, 2020). A qualitative multiple case study was the appropriate design for the current study.

Research Question

What effective business strategies do aerospace leaders use to increase and maintain profitability through TQM for gaining a competitive advantage?

Interview Questions

1. What specific strategies do you use to implement TQM for gaining and sustaining competitive advantage?
2. What notable challenges did you experience while developing strategies to implement TQM to gain and sustain a competitive edge?
3. How did you successfully address and overcome these key challenges?
4. Based on your experience, how does TQM impact financial performance?
5. How is TQM prioritized and made sustainable throughout operations?

6. What TQM-related training is provided to facilitate competitive strategies among leadership?
7. What additional information would you like to add regarding your organization's strategies to implement TQM to gain and sustain a competitive edge?

Conceptual Framework

The conceptual framework for this qualitative multiple case study was TQM, which was formulated during the 1920s by Shewhart, Juran, and Deming, and was progressively cultivated by other eminent practitioners (Best & Neuhauser, 2006). Policy deployment and daily management are the strategic methodologies for the development and execution of operational objectives (Agrawal, 2020). Juran (1993) created a process that allowed business leaders to systematically perform root cause analysis on systemic issues, which impacted operational performance and competitive edge. This method became known as the Juran trilogy, which consisted of quality planning, quality control, and quality improvement (Rawan et al., 2018). Deming advocated the plan-do-check-act (PDCA) cycle to strengthen long-term quality improvements that catalyzed sustainable business strategies, which magnified how to achieve competitive edge. The Deming approach reinforced the TQM philosophy by using transformative methods to alleviate operational expenditures, process variations, and systemic failures in the environment of manufacturing (Petersen, 1999).

The absence of TQM impedes the monetary growth of an aerospace conglomerate (D'Intino et al., 2008). TQM enables aerospace executives to engage in strategic problem

prevention and problem solving by mitigating, controlling, and resolving manufacturing mishaps and process variations. The conceptual framework of TQM was expected to assist my comprehension of the strategies and models that organizational leaders develop, tailor, and improve to increase and sustain performance improvements.

Operational Definitions

Advanced product quality planning (APQP): APQP is a five-phase method that outlines the essential steps to satisfy customers' requirements (Pop & Ţîţu, 2020).

Corrective action request (CAR): A CAR is a petition to investigate a systemic issue or series of problems (Ehrenberg-Azcárate & Peña-Claros, 2020).

Management review meeting (MRM): MRM is an assembly of an organization's leadership to review the effectiveness of the quality management system (Ramu, 2017).

Nonconformance report: An NCR is a document that records any deviation or failure to meet quality standards or design (Ford et al., 2023).

Quality Management System (QMS): A QMS is a system of processes and procedures that mitigate risks and satisfy customer requirements (J. Wang & Liu, 2023).

Root cause corrective action (RCCA): RCCA is a method of problem solving to prevent repetitive nonconformance reports (Anurag & Iyer, 2019).

Assumptions, Limitations, and Delimitations

Although assumptions are concepts and ideas that are prevalent among people, such limitations should be cognizant to the researcher (Theofanidis & Fountouki, 2018). Assumptions function as a sophisticated system of claims that lead to the discovery of new knowledge (Staller, 2012). According to Mir (2018), assumptions represent the

worldviews or philosophies that people possess. Limitations are weaknesses in a study that are beyond the control of the researcher. Delimitations are the parameters and scope of the study.

Assumptions

From a qualitative perspective, assumptions are what scholars and practitioners believe to be true but have not been validated or confirmed (Hathaway, 1995). In the current qualitative study, there were three assumptions. The first assumption was that all information shared between me and the participants was true and accurate due to the reciprocal understanding of confidentiality. The second assumption was that all participants possessed superior knowledge of aerospace manufacturing and quality concepts that supported continuous improvement and organizational sustainability. The third assumption was that the respondents would provide considerable insight regarding sound strategies that promoted profitability by synthesizing TQM and competitive edge.

Limitations

Limitations are the weaknesses of the study that are beyond the control of the researcher (Wargo, 2015). Although limitations convey the weaknesses or opportunities within a qualitative study, limitations also ensure the transferability and transparency of the research (Ross & Zaidi, 2019). When concerns regarding confidentiality were addressed, respondents communicated candidly during the interviews in the current study. The attributes of managerial and subsidiary personnel confined the limitations of the qualitative study. Therefore, the results of the study were limited to large aerospace companies in the United States rather than aerospace organizations around the world.

Delimitations

Although limitations are beyond the researcher's control, delimitations are within the researcher's dominion of influence. Delimitations delineate the limits or boundaries of the study (Theofanidis & Fountouki, 2018). The current study comprised aerospace organizations that have operated for 10 or more years. The participants consisted of salaried personnel employed by aerospace companies composed of 500 or more employees. By using qualitative methodology, I explored a business problem through systems, environments, personnel, and relationships. The findings from this qualitative study may be used as a managerial apparatus to calibrate the heterogenous strategies of competitive edge.

Significance of the Study

Creating cultural awareness for supporting a strategic framework for implementing and sustaining TQM enables organizational members to achieve resultant benefits (Douglas, 2016). One of the key reasons for conducting the current qualitative study involved understanding how organizational leaders developed, deployed, and implemented strategies and processes for achieving operational objectives through quality principles. The reciprocal relationship between quality and competitive edge transcends the aerospace industry. Any industry or business that provides a product, software, or service can be more lucrative with the application of TQM principles (Pheng & Hong, 2005). The social impact of elevating the cognizance pertaining to competitive strategies including TQM can galvanize global leaders to add value and sustainability to the aerospace industry while creating a work culture of customer-centricity. Effective

leadership cannot exist without a vision that promotes quality improvement and competitive edge (Durana et al., 2019). By realizing the competitive strategies that intertwine with TQM, aerospace leaders can align the efforts of their organizations to meet or exceed industry standards and customers' requirements.

Contribution to Business Practice

The findings, conclusions, and recommendations of my qualitative multiple case study could close the performance gaps that currently exist among business leaders within the A&D industry. Schoemaker and Tetlock (2017) affirmed that some short-term business philosophies have inadvertently complicated tactical developments for integrating TQM within business planning for achieving and sustaining a competitive edge. Results from the current study could improve key manufacturing processes, which could reduce COPQ.

Implications for Social Change

Beyond the aerospace and aviation industries, the results from this study might have implications for effecting general positive social change. With methods that synthesize TQM and business strategies, aerospace executives could effectively manage personnel, processes, and procedures to integrate heterogeneous aerostructures for improving the safety of air travel. The derivative cost savings associated with the symmetry of TQM and competitive business strategies could accelerate more job opportunities, which could strengthen domestic and global economies.

A Review of the Professional and Academic Literature

The purpose of this qualitative multiple case study was to explore the effective business strategies that aerospace leaders use to increase and maintain profitability through TQM and for gaining a competitive advantage. To systematically and accurately identify existing business strategies used by aerospace leaders, I used a substantial number of peer-reviewed articles and scholarly seminal books to provide adequate depth and background to the literature review. Over 87% of the references were published between 2018 and 2023; all of them were retrieved from databases in the Walden University Library. Peer-reviewed articles represented 99% of the references. The literature review begins with a description of TQM, including the tools, competitive strategies, and certifications within the aerospace industry that preserve quality workmanship and marketplace sustainability. The theorists and respective experiences involving the development of TQM are also assessed to convey the correlation between historical and present-day applications. While searching the literature, I used the following keywords: *competitive advantage*, *competitive strategies*, *TQM*, *A&D*, *continuous improvement*, *Kaizen*, *total quality management*, *Lean Six Sigma*, *operational performance*, *change management*, *situational leadership*, *servant leadership*, *transformational leadership*, and *transactional leadership*.

This comprehensive review of academic literature is divided into several sections, including the conception and maturity of TQM in the aerospace industry, as well as the competitive advantage and cost savings that emanate from its effective deployment. The change-management philosophies, TQM tools, and best practices to ensure sustainability

are also discussed to evaluate the relational implications of TQM and competitive advantage. The focus of this study was limited to the aerospace and aviation industries. The tenets of TQM philosophy, as well as the aerospace certifications and standards, are also evaluated to understand the potencies and vulnerabilities of its structured integration. To substantiate the scholastic premise of this qualitative case study, peer-reviewed articles were used to explore the effective business strategies that aerospace leaders use to increase and maintain profitability through TQM for gaining a competitive advantage.

Many business philosophies have conveyed the monetary significance and competitive advantage that are associated with TQM (Lepistö et al., 2022). Whether leaders pursue the detection of discrepancies or the prevention of possible defects, the natural tendency to deploy reactive versus proactive business strategies continues to permeate the modern realm of aerospace manufacturing (Hudson, 2021). The sustainability of a company's position in the global marketplace remains subservient to the competitive strategies strategically deployed across the segments of the enterprise (Danso et al., 2019). The competitive stature and profitability of any corporation are associated with the dissemination of TQM elements, which may govern managerial decisions that impact internal and external customer relationships.

The correlation between TQM and competitive advantage is a proverbial tenet; however, the implementation of the notable method is minimally performed among global organizational leadership (Benzaquen & Charles, 2022). To understand how TQM amplifies profitability and competitive edge, the origin and relevance of TQM must be systematically surveyed and scrutinized (Martínez-Gómez et al. 2020). Because quality

remains a comprehensive area of managerial interest, the capacity to effectively communicate between the design phases of manufacturing to the moment a product is released to a customer remains an invaluable doctrine, which yields long-term success and marketplace dominance.

Juran, Deming, and Crosby are the historical names associated with the conceptualization of TQM (Huarng & Chen, 2002). However, the intricate landscape of TQM remains inclusive of prototypical practitioners such as Shewhart, Feigenbaum, and Harrington (Chakraborty, 2020). The relationship between TQM and competitive edge is comprehensible due to the direct correspondence of customer-centricity, which defines customer satisfaction from beginning to end. Irannejad et al. (2023) stated that organizational leaders can manage the intensity of customer satisfaction through TQM principles that permeate the life cycle of a particular product or service.

Regardless of the industry, customer satisfaction is the dominant driver of competitive edge, which impacts financial performance or organizational profitability (Tunahan & Kutlu, 2023). TQM is a definitive methodology that undergoes broad application by both domestic and global organizational leaders in the A&D industry. The history of TQM must be understood prior to the exploration of competitive strategies, which accommodate and complement its effectiveness among executives in aerospace manufacturing. The versatility of TQM remains unquestionable; however, the sustainability of it is application and training continue to pose a challenge to contemporary leadership and subsidiary personnel that bear the responsibility of quality workmanship (Bhat et al., 2023b).

Aside from theorists of TQM and the researchers of competitive advantage, a comprehensive methodology known as advanced product quality planning (APQP) was adopted from the automotive industry by aerospace executives (Pop & Ţîţu, 2020). As a risk-prevention tool that streamlined strategic problem solving, APQP became a quality sensation within the A&D industry. Although APQP is new to the A&D industry, some of its subcategories incorporate the more recognizable philosophies such as lean manufacturing and continuous improvement initiatives (Raicu et al., 2021). To facilitate sustainable quality improvements, the International Aerospace Quality Group established AS9145 to accommodate categorical customer requirements. Comprising five phases, AS9145 is an aerospace standard that depicts the planning, risk prevention, design, manufacturability, and analysis of quality products or services from beginning to end. From concept to maturity, the rudimentary purpose of AS9145 is to homogenize the processes used by aerospace organizations to produce a quality product or service, which exemplifies satisfactory levels of repeatability and reproducibility. The five phases of AS9145 consist of the following:

- planning and defining the program
- verification of product design and development
- verification of process design and development
- internal production part approval process
- production launch, assessment, and improvement

The reduction of poor quality and the augmentation of customer-centricity produce a competitive edge that emanates a TQM framework, which enhances the financial performance of aerospace organizations and respective suppliers.

Although APQP involves a methodical strategy that reciprocates competitive edge and financial growth, other business strategies warrant deliberation in the form of quality tools, leadership styles, and models of change management that bring about positive social change and operational excellence (Syreyshchikova et al., 2021). TQM is considered both a business strategy and a change management model that stimulates competitive advantage, profitability, and sustainability (Sfakianaki, 2019). Competitive strategies involving TQM to attain profitability cannot exist without the strategic merger of multidisciplinary resources, robust processes, structured employee training, and the unwavering support of top management. To appreciate the complexity and competency of the TQM methodology, its origin and historical application must be defined to demonstrate viability to the aerospace industry.

The Birth of TQM in Aerospace

The lifespan of a well-built aircraft is approximately 25 years (Lazur et al., 2013). Between inception and delivery to a customer, many challenges and issues transpire, which heavily influence the competitive advantage of many aerospace manufacturers. The pressure to predict and prevent defects while cultivating technological novelties were contributory factors to global organizational leaders to develop a managerial concept, which nurtured organizational excellence and customer-centricity (Rajesh et al., 2022). During the 1980s, the A&D industry adopted TQM to detect and prevent NCRs while

pursuing sustainable means of strategic problem solving, which yielded higher levels of customer satisfaction and employee engagement (Pitman et al., 1994). Dahlgaard et al. (2019) stated that TQM was created to improve the applications of process improvement, strategic deployment, and human resource management. Without the consistency of managerial commitment and oversight, the benefits of productivity, profitability, cultural synergy, and competitive advantage cannot be achieved (Cheng, 2018).

Time and persistence remain essential to the strategic implementation of TQM, which determines the longevity and financial performance of any enterprise (Green et al., 2019). From a correlational perspective, TQM impacts the safety and satisfaction of various stakeholders such as organizational members, shareholders, customers, and investors. Without quality manufacturing, safety becomes a grave risk, and the premature distribution of unsafe products and services may disrupt the profit margins and competitive edge of any business (Zgair et al., 2023). The TQM framework not only upholds the safety aspects of quality manufacturing, but it also reduces the operational expenditures that derive from process variation, which remains evident through excessive rework, uncontrollable scrap, and sporadic warranty claims from customers. The scrap, rework, and customer returns are consolidated into a singular metric known as COPQ, which is avoidable through the continual application of TQM principles (Agrawal, 2020).

Although some practitioners perceive TQM as an antiquated rubric or criterion, the progressive applications of quality improvement tools substantiate TQM’s contemporary relevancy (LugoSantiago, 2017). Quality manufacturing provides peace of mind to the customer while yielding sustainable forms of revenue for global leaders in the

aerospace and aviation industries. The intent is to reciprocate some of the cost savings from the manufacturer back to the customer to promote customer loyalty, brand equity, and marketplace superiority. From a correlational perspective, TQM remains influential in the application of lean manufacturing and Kaizen initiatives, which alleviate monetary waste and operational inefficiency. According to Meybodi (2020), lean manufacturing has yielded significant benefits to organizational leaders in regard to maximizing value-added activities and minimizing superfluous expenditures within the manufacturing process. The competitive edge of any business remains acquiescent to the systems and methods that facilitate strategic approaches to consistent customer satisfaction, sustainable manufacturing, and progressive sales growth (Smagowicz et al., 2024).

The concept of TQM started with an engineer's goal to bring a manufacturing process into statistical control by mitigating or removing the variations, which were causing nonconforming conditions. Shewhart was working at the Western Electric Company when he developed the idea for TQM in the form of statistical quality control (Benková et al., 2023). Shewhart wanted to use statistics to drive quality improvements. By improving the process, operational expenditures were greatly reduced, and operational efficiency was augmented. As a result, TQM provided a managerial framework to execute quality manufacturing systematically, which increased profitability and competitive advantage.

Although the conceptual roots of TQM originated in the United States, the aggressive application and maturity of TQM was first accomplished through Japanese manufacturing (Horban et al., 2020). The Japanese model for TQM established a

managerial paradigm for quality manufacturing, cost and waste reduction, customer satisfaction, and competitive edge (Mahibha, 2021). The first all-inclusive application of TQM in the United States occurred within the A&D industry (Nizamidou et al., 2019). An aerospace organization can neither be profitable nor competitive without the strategic application of quality tools (Jach et al., 2022). The absence of such tools creates risks for organizational leaders, employees, customers, and shareholders.

TQM Tools

Juran and Deming worked with Shewhart at the Western Electric Company to explore additional concepts and strategies comprising statistical process control. Afterward, Juran and Deming expanded on Shewhart's quality concepts and taught the Japanese the rudimentary steps of formulating a TQM system and culture. Three of the most prominent TQM tools created by Shewhart were statistical process control, control charts, and the plan-do-study-act cycle, which later became known as the PDCA cycle (Kukhar et al., 2021). In May of 1924, Shewhart introduced the control chart as a tool to distinguish the difference between special causes and common causes of systemic issues in the manufacturing environment (Bradford & Miranti, 2019). Statistical process control was delineated as an analytical decision-making tool to increase process improvement by decreasing process variation. PDCA was a continual process to improve quality from inception to completion of a particular product's life cycle.

In the A&D industry, TQM emerged through the usage of control charts, which often accommodated strategic problem solving and waste reduction (Alwan et al., 2023). TQM became a managerial initiative to accomplish two tasks: reduce operational

expenditures and increase customer satisfaction (Raihan et al., 2024). By achieving these objectives, aerospace corporations are better positioned in the marketplace. According to Ye and Zheng (2023), revenue increases when the cost of manufacturing includes risk assessments and quality planning.

Juran was very familiar with the importance of measuring COPQ. Although the concept of COPQ originated in 1951 from Juran, it gained further responsiveness in 1956 from Feigenbaum (Ireson & Juran, 1952). Feigenbaum introduced four categories of quality costs: prevention, appraisal, internal failure, and external failure (Carnell, 2023). Feigenbaum also coined the term “hidden factory,” which described the waste and costs associated with failures in the manufacturing process. COPQ was later popularized by IBM quality expert Harrington (1987). Juran, Feigenbaum, and Harrington agreed that TQM was essential to operational excellence and competitive stature.

As an interdisciplinary philosophy that has relevance to small businesses and large corporations, TQM poses a substantial challenge in its deployment when clear communication and support are not provided by top management (Abdi & Ajit, 2022). More specifically, TQM is seldom communicated or implemented amongst cross-functional stakeholders. How organizational members respond to one another remains pivotal to a corporation’s competitive advantage (Lainamngern & Sawmong, 2019). The conveyance of TQM between engineering and production personnel remains somewhat intricate and ambiguous, which leads to an unfavorable perception toward quality improvement. However, aerospace leaders have been receptive to strategic planning that cultivates zero defects in the manufacturing process.

The zero-defect plan (ZDP), which was created by Dr. Philip Crosby, had progressively impacted the production environments of multifarious American aerospace manufacturers (Agrawal, 2020). ZDP comprised of cost-reduction through mistake-proofing, which was a proactive method that focused on the prevention of defects during the design and production phases. ZDP transitioned from a simplistic management philosophy to an industry-wide business strategy that promoted error-proofing, first-time quality, and firm compliance to customers' requirements. According to Venter (2022), Crosby conceived four distinct tenets of quality performance, which became known as the Four Absolutes of Quality:

1. Quality is defined as conformance to requirements.
2. The system for causing quality is prevention, not appraisal.
3. The performance standards must be zero defects.
4. The measurement of quality is the price of nonconformance.

To remain profitable and competitive in a global marketplace, organizational leaders must focus on proactive methodologies that prevent quality issues in the production environment (Freitag & da Silva, 2021). The pursuit of prevention remains synonymous to managerial efforts involving continuous improvement initiatives that seek to eliminate waste or unnecessary costs in manufacturing.

As a tactic to reduce operational costs while amplifying an organization's competitive edge, Shigeo Shingo developed "poka-yoke," which was a Japanese term for mistake-proofing (Belu et al., 2015). As TQM focuses on continuous improvement, mistake-proofing or error-proofing is a tool that endeavors to improve processes by

preventing the initial occurrence of defects or issues. Poka-yoke is a universal application that reciprocates competitive edge, predictability, and employee proficiency (Daroń & Górska, 2023). By integrating poka-yoke into the various manufacturing processes, aerospace leaders can mitigate operational expenditures while promoting a first-time quality culture. Mistake-proofing or error-proofing tools include fault tree analysis, failure mode and effects analysis (FMEA), and APQP. The most proficient way to prevent a defect or nonconformance involves eradicating its origin (Astanti et al., 2022).

Time, money, and resources are impacted when employees inadvertently create errors during the manufacturing process, which impedes contractual requirements and on-time delivery to various customers (Singh & Gurtu, 2022). Errors or nonconformances are a form of waste. They are unnecessary costs to the business. Crowdle et al. (2023) believed that operational efficiency was contingent upon process improvements that alleviated extraneous wastes from customary activities performed by employees. In efforts to moderate operational redundancy and standardize quality workmanship, Taiichi Ohno published the Toyota Production System (TPS), which identified seven forms of muda or wastes (Elrhanimi & Abbadi, 2021). An eighth waste was later identified once TPS became westernized. Taiichi eradicated inefficiency and complacent thinking from the workplace, which were counterproductive to quality manufacturing. The eight forms of muda are: (a) overproduction, (b) waiting, (c) unnecessary transportation, (d) over or under-processing, (e) excess inventory, (f) unnecessary motion, (g) making defective products, and (h) underutilized team members (Coleman, 2013).

From a TQM perspective, poka-yoke is a form of continuous improvement that seeks to remove any waste that may exist within a process (García-Alcarazet al., 2022). One of the most prominent mistake-proofing tools used throughout the aerospace industry is the FMEA. The purpose of the FMEA is to identify potential failures that may exist within the design or production phases of a product or service (Nicolin & Nicolin, 2021). Correspondingly, countermeasures or preventive actions are also listed to address the respective failures or NCRs.

There are only two types of FMEA tools: DFMEA and PFMEA, which assess the potential failures or risks within the design and process stages of a particular product or service (Ivančan et al., 2023). Initially used to assess risks, failures, and process-variations in the U.S. military, the FMEA has a rich history, which includes its continuous application during the Apollo and subsequent National Aeronautics and Space Administration missions (Zhang et al., 2022). The FMEA was a risk-prevention tool used by business leaders to detect potential failures, which arose during the early stages of design and process validation (A. Moreira et al., 2021). According to Seiti et al. (2018) FMEAs are very effective in identifying organizational failures and uncertainties, which are prioritized by calculating the risk priority number (RPN), which is a product of three factors, occurrence (O), severity (S), and detection (D).

Competitive Strategies

Aside from the tools and managerial devices that facilitate strategic problem-solving and continuous improvement, the business strategies of the A&D industry can be consolidated to the generic competitive strategies, which were developed by Michael

Porter (Souza et al., 2020). Cost leadership, differentiation, and focus are the three rudimentary strategies that aerospace leaders use to achieve and sustain a competitive edge in the global marketplace (Karafantis & Leslie, 2019). Cost strategy involves lowering operational expenses to offer similar products or services at a lesser price compared to competitors in the same line of business (Hagos et al., 2018). According to Bartunek (2020), the differentiation strategy entails a company marketing a unique product or service that is not being manufactured by any other corporation. Focus strategy means that organizational leaders can pursue either a cost strategy or a differentiation strategy to acquire and sustain a competitive stature.

The predominant strategy used by chief-level executives in the A&D industry is the cost strategy, which remains very evident through the measurement of COPQ (Lawand et al., 2019). The lower the COPQ, the greater the profits for the organization, or the lesser cost that gets reallocated to the customer. Cost versus revenue is the dominant theme in the monthly Operations Review meeting that require the attendance of senior management from multidisciplinary departments (Thomas, 2018). TQM falls within either category of competitive strategies depending on the nature of the aerospace business (i.e., product, service, software/hardware, etc.).

The quality tools and competitive strategies that enhance the relevance and revenue of aerospace organizations remain inadequate without appropriate leadership styles to accommodate the strategic deployment of TQM (Kassotaki, 2019). Situational leadership, servant leadership, transformational leadership, and transactional leadership are the most frequently used leadership styles within the aerospace and aviation

industries; however, TQM requires a hybrid form of leadership to build a quality culture that reciprocates customer satisfaction, competitive edge, and perpetual profitability (Melton et al., 2014). More specifically, good quality is not situational; however, customer requirements and customer expectations may change over time, which directly correlate to customer satisfaction. Customer satisfaction remains subjective to what a customer deems acceptable or satisfactory. To reward employees for favorable performance is transactional leadership; and managing competing priorities that change ad hoc derive from situational leadership. According to Sosik et al. (2018), transformational leadership involves motivating various stakeholders to change or reform an existing culture.

Servant leadership is an altruistic approach to managing other persons or stakeholders by setting aside personal aspirations to ensure the team remains motivated, productive, and engaged (Xie, 2020). A true practitioner of TQM will have the managerial capacity to blend various leadership styles to propagate and sustain a highly skilled and motivated workforce (Shokri, 2019). Finding the balance between leadership styles creates a TQM culture that yields a competitive advantage for the organization.

The scholastic material that describes the elements and tools of TQM as they relate to strategic integration and sustainable implementation are somewhat complex (Everard, 2022). Some business leaders suggest that TQM is composed of seven principles while other practitioners affirm that eight principles remain associated with the TQM framework (Acquah et al., 2023; Altayeb & Alhasanat, 2014). The origination of TQM, as well as the various tools such as the PDCA and ZDP tools are also subjects of

contradiction (Psarommatis & May, 2023). The methods and tools of TQM are highly essential to the competitive advantage of any aerospace enterprise; however, the origin is somewhat ambiguous when scholars explore the historical application of such a universal paradigm (Bouranta, 2020).

Although the number of principles are trivial, the strategic communication and application of each principle evolved over time amongst practitioners, scholars, and aerospace professionals. TQM has been reformed into Six Sigma tools, APQP initiatives, ZDP planning, and lean manufacturing philosophies; however, the comprehensive purpose of TQM has proven advantageous to many industries. The A&D industry achieves a best-in-class quality system to offset avoidable costs that impact customer satisfaction, competitive edge, and organizational sustainability. The demands of the marketplace have an irregular occurrence; thus, the need to achieve, improve, and sustain a competitive stature in a volatile marketplace remains an enigma (Gijo et al., 2021). Revenue and any costs that depreciate its value are remediated through the TQM methodology.

In the same way Deming, Juran, and Shewhart struggled to integrate conjectural strategies and scientific approaches to the production floor, modern aerospace leaders have faced progressive hardships during TQM deployment (McLeod & Schapper, 2020). To facilitate such strategies, the appropriate change management models needed to be coordinated by key stakeholders. While many change management models exist, three universal models remain worthy of elucidation: Lewin’s model, McKinsey 7-S model, and Kotter’s model. The respective change management theories are uniquely beneficial

to the integration, deployment, and sustainability of TQM. Whether a business possesses a strong quality culture is contingent upon the priorities that are cascaded from top management (Oluwayomi, 2022). TQM is a transformational endeavor, which addresses the fostering of positive cultural change, as well as the improvement of manufacturability and mitigation of operational waste (R. Chen et al., 2020).

Introduced as paradigmatic approach to cultural change within an enterprise, Lewin's model identified three stages: unfreeze, change, and refreeze (Burnes, 2020). The concept remains synonymous to an organizational culture that is frozen or stuck in an unproductive state. The thawing process involves reforming the status quo within an organization. Once the unfreezing phase is complete, the implementation of change must be orchestrated through cogent and cross-functional communication and the ongoing support of organizational headship. The third step within Lewin's model involves refreezing, which refers to the continuity of changes that were implemented; thereby effectively establishing the new status quo for the enterprise (Page & Schoder, 2019). For many aerospace companies, TQM represents a disruption to the status quo, which is often needed to achieve competitive advantage and sustainability in a volatile marketplace (Youssef & Youssef, 2018).

The McKinsey 7-S model involves seven elements of business: strategy, structure, systems, shared values, style, staff, and skills (Paquibut & Naamany, 2020). The application of the McKinsey 7-S model involves identifying the area that necessitates alignment, determining a paradigmatic organizational design, ascertaining when and where changes are to be made, implementing the planned change, and reviewing the

seven elements. For organizational leaders to maintain a competitive edge in the A&D industry, it remains imperative to identify any risks that exist within the systems and processes of a business. The 7-S model reveals the risks that may disrupt a corporation's capacity to remain profitable and competitive (Kukkamalla et al., 2021).

The deployment of the 7-S model requires the engagement, support, and direction of cross-functional headship. Once the organizational design has been reviewed, steps must be taken to align and enforce the seven "hard" and "soft" elements of the 7-S model (Shaqrah, 2018). The hard elements comprise of strategy, structure, and systems. The soft elements entail shared values, skills, style, and staff. The McKinsey 7-S model is a tool for strategic planning that orchestrates organizational change through the assessment of seven elements, which correlate to the planning phases of TQM (Galli, 2018). Having a clear understanding of how the seven elements work together is critical to a company's capacity to maintain a competitive advantage in an industry that remains prone to marketplace volatility.

Kotter's theory is an 8-step method that systematically orchestrates organizational change: creating a sense of urgency, building a core coalition, forming a strategic vision, getting everyone onboard, removing barriers and reducing friction, generating short-term wins, sustaining acceleration, and solidifying all changes (Sittrop & Crosthwaite, 2021). As a top-down management approach, the Kotter's model uses ambiguity as a tactical means of promoting constructive changes while reducing stakeholders' resistance.

With an emphasis on synergetic efforts and cross-functional engagement, the acceptance of change is contingent upon its favorable impact to organizational culture.

The profitability, sustainability, and competitive advantage of any aerospace organization cannot reach maturity without the strategic integration of TQM tools and principles (Sidhu et al., 2019). Communicating the benefits of the proposed changes to all employees is an effective means of promoting a strategic vision. Kotter's model represents a diplomatic process whereby transformational change becomes an organizational campaign, which is sponsored by top management. Through trust, transparency, and innovative teamwork, business leaders have extensively used Kotter's theory to deploy sundry forms of organizational change (Eriksson & Anders, 2018).

Reciprocity of TQM and Competitive Edge

TQM is irrefutably a pivotal element to the sustainability and competitive stature of any enterprise or corporation (Hudnurkar et al., 2023). From an organizational standpoint, strategic planning and managerial commitment are progressively authoritative in the implementation and standardization of TQM initiatives (Oschman, 2017). The goals and objectives of TQM comprise of quality improvement and customer-centricity through the palliation of operational waste, process-variation, and redundant costs that are continuous with inferior quality. From a correlational standpoint, TQM is a change management philosophy that accommodates competitive edge by improving operational performance and work ambiance via continuous improvement (Chiarini et al., 2018). When quality is propagated and pragmatically employed at every level of an enterprise, the next phase of TQM entails acquiring adequate support from senior leadership to ensure long-term consistency and sustainability.

In conjunction with leadership commitment, synergetic efforts must exist between managerial and subsidiary personnel, which involves the empowerment of organizational members and positive employee engagement. According to Cavallone and Palumbo (2022), constructive training activities created better engagement with employees, which later equated to higher morale, elevated productivity, and stronger revenue projections. While TQM transcends the realm of customer satisfaction and operational excellence, it functions as a managerial tenet to satiate the best interests of all stakeholders. Achieving employee satisfaction and customer satisfaction in parallel is also a TQM principle that oftentimes becomes reflexively evaded in the familiar pursuit of sustainable sales growth, customer loyalty, and residual revenue.

The relational reciprocity between societal safety and quality workmanship remains an indisputable derivative of TQM canon. According to Stolzer (2000), competitive advantage and organizational sustainability are the outcomes of a well-structured quality management system, which validates the maturity of risk assessments and safety adherence in the workplace. Furthermore, operational risk management remains delineated by TQM principles, which correlate to the safety and wellbeing of organizational members; especially in the manufacturing areas comprised of multifarious machinery (Häggström et al., 2023). Although quality workmanship and environmental health and safety (EH&S) are good business practices, the combination and consistency of both philosophies remain subservient to employee training, managerial provision, monetary support, and a definitive pattern of consistency (Alghaseb & Alshmlani, 2022).

When safety management and quality manufacturing are prioritized by organizational headship, the reputation, revenue, and stakeholders' relationships are individually preserved within an enterprise (Bäckström et al., 2023). Oftentimes, the revenue of a business remains correlational to reputability (Maha et al., 2022). The reputability of an organization is linked to the quality of a particular product or service. The quality of the product or service remains acquiescent to the design created by engineering. The design cannot happen without proper planning, and proper planning can only derive from the requirements and requests set forth by the customer.

As a postmodern canon of marketplace distinction, TQM functions as the chief catalyst for organizational sustainability. The absence of strategic foresight has blinded global organizational leaders in their endeavors to mitigate unnecessary expenses, which impact the potential profit margins and marketplace superiority of both original equipment manufacturers (OEMs) and suppliers within the A&D industry. Nonetheless, the organizational costs to formulate a robust QMS reciprocates a noteworthy return on the initial investment (Robitaille, 2023). From an entrepreneurial perspective, aerospace leaders must become increasingly cognizant of the managerial axiom, which mandates that sustainability and corporate social responsibility are unavoidable tenets of brand equity and competitive edge.

Quality must be built into every stage of the product life cycle to ensure customer satisfaction (Alberti et al., 2024). From concept to maturity, quality planning and defect-prevention are critical milestones that determine the sustainability and relevance of a business. Competitive pricing and good quality are the prerequisites to a company's

competitive stature (Sander, 2021). The absence of either of the aforementioned elements will determine the longevity and survivability of any business, regardless of the industry.

TQM Facilitates Sustainability

While various components are pivotal to the relevance and sustainability of an enterprise, TQM remains the predominant catalyst (Bertoni, 2017). In addition to being one of the many models of change management, TQM is a cross-functional philosophy that accentuates the intricate avenues that reciprocate long-term customer satisfaction. Customer-centricity, which represents customer satisfaction from cradle to grave, remains essential to the sustainability, profitability, and competitive edge of any business (Chan & Raharja, 2024). An aerospace enterprise that truly promotes a customer-centric business culture will put the customer first to ensure a sustainable position in the global marketplace. More specifically, the survivability of an aerospace company is connected to senior leadership's commitment to long-term customer satisfaction. By disregarding the consolation and contentment of customers, an aerospace corporation cannot possess a sustainable position amongst other companies that are competing to be the manufacturer of choice.

Sustainability also incorporates the vocational growth and development of organizational members (N. Chen et al., 2024). Without proper coaching, mentorship, and training, the relationship between managerial and subsidiary personnel will naturally influence or induce external relationships with customers. The sustainability of a business involves a managerial complexity that must pacify the wants and needs of employees who interact and fabricate the very products and services being used by both domestic

and global clientele. The effectual stewardship of TQM involves building a sustainable business culture of quality that meets or exceeds contractual requirements, which are outlined by the customer (Menon et al., 2023). Sustainable business relationships between aerospace manufacturers and customers are directly connected to the consistency of quality workmanship, competitive pricing, and strategic innovation.

Global aerospace leaders must remain consistently cognizant of the assorted facets of organizational sustainability. From a more profound perspective, an aerospace enterprise must have perpetual sales growth, a highly proficient workforce, and a sustainable infrastructure to accommodate the current and future needs of new and existing customers if volume increases over time. Regardless of the scenarios, a TQM system must be formulated, managed, and preserved to yield customer satisfaction and competitive edge (Emir & Sulistyowati, 2024).

The sustainability of an organization must be thoroughly analyzed by aerospace leaders from various perspectives, which entail the quality of workmanship and its direct impact to customer safety (Wolniak et al., 2023). TQM promotes a thorough examination of a sustainable infrastructure and the inner mechanics of an enterprise. More specifically, the strategic management of people and processes is the essence of TQM when considering the relationship between positive employee engagement and customer satisfaction. According to Nienaber and Martins (2020), it was confirmed that over $400 billion is lost annually by employers due to employees not experiencing constructive engagement in the workplace. Top management must consider such critical issues during the planning stages of any new business, program, or initiative (Tran et al., 2022). Any

risks or vulnerabilities that may disrupt positive employee engagement or customer satisfaction must be systematically addressed and met with respective countermeasures (Grieve & Van der Stap, 2020). The sustainability of any business is based upon the effectiveness of managerial inputs and outputs, which are clearly defined by a robust QMS (G. Santos et al., 2021). The cross-functional deployment of shop-floor automation, strategic innovation, and defect-prevention collectively facilitate a world-class quality organization (Karim et al., 2021).

TQM Facilitates Competitive Edge

Pursuing innovation strategies is not enough to maintain a competitive edge in a volatile marketplace. The reduction of operational inefficiencies and expenditures will also need consideration when utilizing TQM to facilitate the prevention of defects and any forms of process-variation (Mittal & Gupta, 2021). The integration of TQM into the company culture entails the reduction of two things: waste and unnecessary costs (Clancy et al., 2023). The algorithm to competitive advantage remains clear, and yet many manufacturers fail to grasp how TQM effectively reciprocates sustainable sales growth and proficient manufacturability (Khan et al., 2020). More explicitly, the consistency of a corporation's competitive edge is driven by customer satisfaction.

Without the contentment of domestic and global clientele, competitive advantage can neither be obtained nor prolonged by organizational headship, which impacts the revenue, reputability, and sustainability of any enterprise (Taifa et al., 2020). Competitive pricing and superior quality are distinct features that influence the marketability of an organization. However, the strategic planning of a robust and value-added QMS can

promote synergetic relationships amongst key stakeholders (Wahid & Grigg, 2022). TQM remains advantageous to both internal and external customers; the internal customers being fellow employees, and the external customers being the aerospace or aviation companies that procure specific products or services (Bouranta et al., 2019).

TQM was not created to solely facilitate competitive edge, but rather to drive higher levels of safety, customer satisfaction, cost-reduction, defect-prevention, and strategic problem-solving, which are all vital to a company's quality culture. The main goal of TQM is to reach alignment between customers' requirements and organizational performance (Ahmeti & Zeqiri, 2023). Competitive edge is neither a phase nor stage within the TQM framework, but rather an output of systematic application and maturity. The word "total" necessitates cross-functional engagement, empowerment, planning, strategic innovation, and sponsorship from all organizational members: both managerial and subsidiary personnel at every level of the business.

According to Agarwal and Ojha (2023), the core objective of TQM involves driving the consistency of customer satisfaction, which entails organizational compliance to customers' requirements. Such acquiescence remains a pivotal prerequisite of a corporation's competitive advantage. When considering the principles of TQM, aerospace executives can strategically align the goals and objectives of the business with the needs of the customer. The competitive stature of an organization is directly impacted by operational performance, sales growth, and consistently providing quality products or services to all customers (Kareska, 2023). Regardless of the industry, there will be an incessant demand for high-quality products and services for minimal costs, which is

achievable by cultivating a work culture that proactively eliminates waste throughout the life cycle of any program (Skorupińska et al., 2024).

TQM's Impact on Aerospace and Defense

As a multi-layered management philosophy in the aerospace and aviation industries, TQM functions primarily to reduce operational waste while improving organizational deliverables comprised of workplace efficiency and on-time delivery (Toke & Kalpande, 2022). A&D executives exploit TQM to supplement lean manufacturing and continuous improvement initiatives by using leading indicators or meaningful metrics to propel creativity, progressive productivity, and strategic problem-solving amongst organizational members (Tasdemir & Gazo, 2018). Competitive edge and organizational sustainability remain subjective to the cadence and consistency of business leaders promoting the tenets of TQM through integrated product teams. The greater impact of TQM to the A&D industry entails an improvement of manufacturing yields, the fabrication of safer aircraft, and significant improvements to the design and delivery of various products and services to a diverse realm of domestic and global clientele. Ahidar et al. (2019) accentuated that TQM transcends the traditional meaning of a management philosophy; it is the sovereign temperament that permeates the DNA of company culture and the soul of manufacturing.

For many organizational leaders within the A&D industry, TQM is perceived as tedious, time-consuming, and unreasonably expensive; however, the consequences of such marginal thinking threaten the sustainability and competitive advantage of any corporation (Sainis et al., 2022). A suitable analogy involves the preventive maintenance

of a particular part or machine; the absence of the preventive maintenance would inadvertently produce unexpected expenditures and downtime, as well as safety risks. The costs and organizational risks that stem from a nonexistent QMS far outweigh the costs of creating a QMS that demonstrates an emphasis on operational efficiency, employee training, continuous improvement, and unwavering compliance to industry standards and customers' requirements. COPQ adversely impacts a company's bottom line (Hassan et al., 2023). Aside from the monetary aftermath of having an inadequate QMS, the infinite possibilities of injuries and warranty claims become an astronomical uncertainty, which eventually eradicates a company's capacity to remain relevant or profitable in an industry that demands cost-savings and on-time delivery of quality products. TQM remains invaluable to the intricate realms of military, commercial, and business aviation (Alhumud et al., 2023).

To understand the historical impact of TQM on the A&D industry, one must consider the growing pains that accompany a newly discovered technology. The technology of flying an aircraft was still considered an experimental science 5 years after the famous "first flight" in 1903 by the Wright brothers (Wu et al., 2021). Fast forward four decades, the originators of the aircraft engines owned a company that later fabricated defective engines for the U.S. military during World War II, which later resulted in a highly publicized story involving testimony under oath before Congress (Johnson, 2004). Not only was the inspection of aircraft engines compromised, in many cases the inspection itself was rarely performed prior to any product being delivered to the customer. The installation of defective engines on military aircraft created a panic

amongst organizational leaders throughout the military. The safety of fellow servicemembers who piloted these military aircraft was unequivocally jeopardized by the absence of quality controls and countermeasures to detect, correct, and prevent similar issues from reoccurring. Hence, the initiative of creating a QMS that aligned with the needs, safety, and satisfaction of the customer took conception.

At one point in time in the A&D industry, safety and quality were prioritized by top management, which allowed the TQM philosophy to be integrated at every level of the organization. The competitive edge of aerospace companies soon became acquainted with the presence or absence of a legitimate QMS that embraced or mimicked a TQM framework (Stanojeska et al., 2020). Aerospace leaders progressively became cognizant that a TQM business culture remained synonymous with marketplace dominance, competitive edge, customer loyalty, sustainable sales growth, and quality manufacturing.

Lessons Learned and TQM Sustainability

When considering the impact and sustainability of TQM within the A&D industry, structured training followed by its systematic deployment would necessitate ownership from organizational leaders (Mathur et al., 2023). If aerospace leaders would adopt the global concept of “lessons-learned” or “read-across,” the sustainability of a sound quality culture would reciprocate higher levels of productivity, profitability, customer satisfaction, and competitive edge (Barbosa et al., 2022). More specifically, lessons-learned and read-across are essentially the same philosophy, which involves benchmarking and disseminating best practices.

As formerly mentioned, TQM is a dynamic credence that orchestrates positive cultural change and operational efficiency; both of which are nearly impossible without managerial support, capital, and a robust infrastructure that is both quality and customer-centric. Nonetheless, the lessons-learned approach allows organizational leaders to foster a well-trained workforce that familiarizes itself with historical issues to prevent future manufacturing mishaps (Murphy et al., 2023). When best practices are shared across the business, organizational members progressively elevate productivity by working more efficiently, which reduces operational expenditures (Noronha et al., 2022). While TQM is a change-management philosophy that brings sustainability to a business, the risk of TQM fading from company culture remains acquiescent to the priorities and vision of top management.

The sustainability of TQM is demonstrated by the lessons-learned philosophy that allows continuous improvement to be the proactive antidote to operational waste and superfluous spending. Just as Dr. Shewhart created the control chart to respectively discern the distinction between common and special causes, TQM was rooted in the philosophy to strategically predict and prevent the recurrence of operational waste, such as rework, scrap, and warranty returns (Skinner et al., 2023). Once the knowledge has been discovered to correct and prevent systemic NCRs, the knowledge must be shared with other employees to increase operational efficiency, profitability, and competitive advantage (Bhat et al., 2023a). Any inertia surrounding TQM application can be circumvented by the vision, competitive strategies, and change management philosophies employed by chief-level executives in the industry.

Lessons-learned is not only advantageous to the operational areas of an enterprise, it is also beneficial to the quality, safety, and financial ambits of a business. Through the collective usage of Lean Six Sigma and Define, Measure, Analyze, Improve, and Control, the deployment of a lessons-learned approach would facilitate the maturity of strategic problem-solving in the production environment (Antony et al., 2019). Oftentimes, COPQ is measured internally, and sometimes externally by customers to better understand avoidable costs and future strategies for quality planning (Faciane et al., 2021).

Nonetheless, COPQ is a lagging indicator that tells the story of a past event. Leading indicators provide organizational leaders the ability to prevent future mishaps that impact a company's bottom line. In essence, a lessons-learned repository can be used as a leading indicator to offset unnecessary manufacturing costs, which are constantly reciprocated to the customer throughout the product life cycle (Ali, 2022). From a correlational standpoint, a paradigm-shift of cultural norms would be needed to have a lessons-learned ideology ingrained into the company culture.

In conjunction to the repository of company-wide best practices, action plans for improvement must be mandated and constantly reviewed to ensure the prioritization of lessons learned for all organizational members. Suárez-Barraza et al. (2019) asserted that improvement action plans are essential to the eradication of root causes identified within manufacturing processes. From a deeper perspective, lessons-learned is a derivative TQM philosophy, which bridges the gap between operational inadequacies and quality workmanship. Sunder and Prashar (2020) accentuated that lessons-learned contributed to the governance and continuity of TQM principles. The maturity of any continuous

improvement program will be contingent upon organizational leaders being biased for action and prioritizing a TQM mindset amongst managerial and subsidiary personnel. With many industries becoming customer-driven enterprises, the TQM approach involves an emphasis on the communication and cooperation of various stakeholders (Jamshidi, 2019). Additionally, lessons-learned from project management studies have concluded that poorly managed infrastructures remain consequential to excessive organizational issues and company-wide challenges (Hatakka et al., 2020).

Industry Certifications and Competitive Advantage

AS9100 and Nadcap are individual certifications that respectively identify QMS effectivity and compliance to industry requirements, which govern the criteria of processes, which are deemed special or unique in nature (Jagtap, 2019). The National Aerospace and Defense Contractors Accreditation Program (Nadcap) is a global accreditation of special processes, which are used throughout various industries to manufacture a variety of products and services in accordance with meticulous guidelines. Nadcap was formulated in 1990 by the Performance Review Institute (PRI). AS9100 was initiated by the International Aerospace Quality Group (IAQG) in October 1999, to homogenize the methodologies of addressing and remediating quality and safety risks within aerospace organizations (Chonsalasin et al., 2020).

The effectivity of the QMS, as well as the organizational infrastructure remain heavily scrutinized during the audit process, which identifies the potential risks that may develop when organizational inputs and outputs reciprocate patterns of dissimilarity. Quality planning and defect-prevention are the most essential and accommodative stages

of the product life cycle, which directly impact how customer satisfaction is incorporated, mandated, and sustained from concept to maturity (Hu et al., 2022). When either an AS9100 or Nadcap surveillance audit is being performed by a third-party, the overall objective is to determine whether contractual guidelines, customer requirements, quality workmanship, supplier performance, and product traceability are prioritized by top management (Lenning et al., 2022).

While many aerospace leaders experience a variety of challenges, the adherence to procedures or processes are the primary areas of focus when auditors assess the risks and vulnerabilities of an enterprise. The auditors usually have a predefined checklist with industry requirements while any opportunities for improvement are listed as observations in the audit report. Any observations that clearly violate customer requirements or industry guidelines are recorded as either minor or major findings during the audit process. These audit findings must be addressed with containment, root cause investigation, CARs, preventive actions, and objective evidence that proves all audit findings were resolved via corrective actions that were implemented.

Prior to Nadcap and AS9100 certifications, the International Organization for Standardization (ISO) was founded in 1947, and the very first ISO standard was created and published in 1951, which established nominal temperature requirements for industrial length measurements (Heires, 2008). ISO operates as a worldwide federation composed of members within respective technical committees. In order for an International Standard to achieve publication, there must be an approval of 75% from committee

members. The renowned ISO 9001 was published in 1987 to streamline the edifice and effectivity of a comprehensive QMS (Lazibat et al., 2022).

While ISO represents an international standard for sundry industries and business environments, AS9100 serves as the aerospace and aviation version of ISO 9001. Definitively speaking, AS9100 comprises all the elements of the ISO 9001 QMS requirements: customer focus, leadership, engagement of people, process approach, improvement, evidence-based decision making, and relationship management, which represent the seven principles of quality management (Oschman, 2019).

The distinct differences between AS9100 and ISO 9001 involve the following areas: planning for product realization, purchasing and purchased product, production and service provision, and non-conforming process. The basic concept of achieving either an AS9100 or ISO 9001 certification is to demonstrate the presence and preservation of a robust QMS, which conveys an organizational commitment to customer-centricity and quality manufacturing (Bakhtiar et al., 2023). TQM represents a paradigm-shift in how top-management prioritizes an organizational culture that is committed to risk-prevention, operational efficiency, and consistent customer satisfaction (Everard, 2022).

The recertification of either the AS9100 or ISO 9001 standard requires a successful audit once every three years. Contingent upon audit performance, the intervals of recertification for Nadcap can be 12, 18, or 24 months. From a business development perspective, an active certification that demonstrates company-wide commitment to quality management creates a global opportunity for aerospace leaders to achieve competitive advantage amid marketplace rivalry (Chountalas et al., 2020). According to

Rajesh et al. (2021), many OEMs require suppliers or vendors to retain an A9100, ISO 9001, or Nadcap certification as a prerequisite for preliminary and perpetual purchase orders, which directly impact the profitability and competitive advantage of any aerospace enterprise.

AS9145 is not a standard for certification, but rather a guideline for aerospace manufacturers to become permanent practitioners of mistake-proofing, risk-prevention, and quality planning from concept to maturity (Pop & Ţîţu, 2020). The AS9145 canon derived from an aerospace necessity to formally create a universal standard of quality requirements, which remain rudimentary to customer-centricity, quality improvements, risk management, and risk prevention. The reluctance of its adaptation is attributed to the misperception of short-term execution when AS9145 warrants a long-term commitment to strategic quality planning, which entails the prevention of failure modes that may arise during the various stages of the manufacturing process (Tokmakova et al. 2022).

Transition

Section 1 introduced the leadership styles and existing strategies that aerospace executives use to achieve and maintain a competitive edge in the global marketplace without compromising the integration and deployment of TQM. Section 1 provided the historical context and conceptual framework of TQM. With operational expenditures and process variations impacting the sustainability of quality manufacturing, on-time delivery, and customer-centricity, aerospace OEMs and suppliers remain prone to the progressive loss of revenue. Aerospace leaders need strategies that foster the consistency of TQM principles while improving operational performance, which remains essential to

an aerospace company's competitive edge. The literature review provided the historical origins and applications of TQM, as well as the reciprocal relationship between competitive advantage and TQM tools, which enable global organizational leaders in the A&D industry to execute sustainable business growth.

Section 2 entails the study's purpose, role of the researcher, selection of research method and design, criteria for the participants, and the actions taken for ethical research. In addition, Section 2 includes the instruments and techniques for data collection, data organization, and data analysis, followed by the reliability and validity of my study.

Section 2: The Project

Section 2 comprises the purpose statement, my role as the researcher, an overview of the participants, the research method and design, justification of the population and sampling, and ethical research. Section 2 also encompasses the data collection instruments, the techniques for data collection and data organization, data analysis, and reliability and validity.

Purpose Statement

The purpose of the qualitative multiple case study was to explore the effective business strategies that aerospace leaders used to increase and maintain profitability through TQM for gaining a competitive advantage.

Role of the Researcher

My role as the qualitative researcher included collecting, organizing, and analyzing data. Goldkuhl (2019) affirmed that the role of the researcher is essential to the processes of data generation and data interpretation. My role throughout the qualitative case study involved recruiting potential participants and scrutinizing data, which were collected from senior managers and executives in the A&D industry. The accuracy of qualitative data depends on the scholastic aptitude and vocational experience of the researcher, as well as the data collected through audio recordings and in-depth field notes (Bazrafshan et al., 2023). I possess a Master of Arts in Organizational Leadership and have worked in the A&D industry as a dimensional measurement analyst, quality engineer, quality manager, quality director, and global director of operations. I have also led several Kaizen events and Lean Six-Sigma initiatives to facilitate continuous

improvement, audit-readiness culture, augmentation of operational performance, and sustainable customer satisfaction. As a global quality executive, I have supported other global organizational leaders to acquire and maintain a world-class quality culture within the realms of business aviation and commercial and military aerospace. In reviewing the literature surrounding TQM and managerial techniques to mitigate operational expenditures, I increased my knowledge and understanding of competitive strategies that leaders use to maintain a competitive stature in the A&D industry.

As a qualitative researcher, my duties and responsibilities involved the recognition and avoidance of bias and subjectivity, as well as any preconceived notions or personal perceptions that corresponded to the research problem. To ensure impartial results, I used an epoché approach to govern the processes of data collection and data analysis. Roberts (2019) noted that epoché is a form of bracketing, which involves the researcher setting aside any assumptions, theories, or previous experiences to maintain the integrity of the data collection and analysis phases of the study. Because I dealt with human participants, I ensured that ample consideration was made for the Belmont Report, which functions as an amalgamation of ethical principles and guidelines for any research involving human subjects. As indicated in the Belmont Report, consent forms are instrumental in reducing any bias, risk, and fragility in a study. Kedong et al. (2019) stated that a consent form provides participants an opportunity to make an informed decision regarding any ethical and regulatory parameters pertaining to participation in a study. In order to guide the interview process, I formulated an interview protocol and ensured that all interview questions aligned with the research question and that all

research was performed in an orderly and ethical fashion. According to Yeong et al. (2018), a robust interview protocol is essential to acquiring quality data during the interview process of a qualitative study.

Participants

According to Yin (2018), a researcher is required to conduct a qualitative case study in a single or multiple case format; the latter necessitates a cross-case analysis to confirm a compelling position within the academic domain. My qualitative case study included managerial stakeholders from various departments within the A&D industry. To qualify for inclusion in this qualitative study, all research participants needed to be senior managers and executives from aerospace companies who used effective business strategies to increase and maintain profitability through TQM for gaining a competitive advantage in the United States.

Qualitative researchers should establish a working relationship with participants through trust and ethical accountability (Portacolone et al., 2019). Building trust is fundamental to successful research. I requested the names, email addresses, and telephone numbers of prospective participants from the human resources executive. I developed rapport with each of the participants during the preliminary communication, which addressed the nature and purpose of the study (see Sherriff et al., 2019). I assured the participants that their identities would be protected and that I would maintain confidentiality throughout the case study. I disseminated a consent form as an attachment via email to the participants. Afterwards, I conducted all interviews in a private, natural setting to accommodate transparent responses and honest feedback related to the

experiences of each participant. The eligibility of each participant was contingent upon any independent or collective experiences leading an initiative that was customer focused and quality driven. In addition to age, experience, and leadership application, all participants were actively employed in the A&D industry.

Research Method and Design

The research methodology must be appropriate to the research question that warrants scholarly exploration and discovery. When contemplating the various research methods and designs, I concluded that the qualitative method and multiple case study design were the most suitable to achieve the purpose of my research. The goal was to explore a particular phenomenon through discernable events or experiences.

Research Method

According to Baskarada and Koronios (2018), scholarly research comprises three research methods known as qualitative, quantitative, and mixed methods. The selection of a suitable research method determines the effectiveness of a study (Basias & Pollalis, 2018). According to Smith (2018), data sources commonly used in qualitative case studies include physical artifacts, documents, interviews, archived records, direct observations, and participants' observations. The scope of my research was experience driven rather than numbers driven, which eliminated the need for quantitative methodology. My study required a qualitative approach. I focused on the behaviors and experiences associated with a select group of participants within an industry. A qualitative study provides a depiction of any activity that has transpired through the encounters of the participants and the observations of the researcher. I did not need to test

any hypotheses; therefore, quantitative and mixed-methods approaches were not feasible for the study.

Research Design

Tomaszewski et al. (2020) stated that qualitative research can include one of four designs, which are case study, ethnography, narrative, and phenomenology. The selection of the appropriate design significant to the structure of interview questions, relevance of data, and the systematic analysis of data throughout the study. The principal objective of the research design is to ensure that the collected data adequately address the research question (Rezigalla, 2020). For the current qualitative study, I used a case study design. Often perceived as an avenue for obtaining dynamic empirical data, a case study offers a comprehensive or holistic perspective of the subject being explored (Basias & Pollalis, 2018). My study did not focus on organizational culture but rather on the effective business strategies that aerospace leaders used to maintain competitive leverage in a global marketplace through the application of TQM. Therefore, a qualitative case study was the most suitable design in comparison to other designs, which would not have addressed the purpose of the study. By using a multiple case study, I was able to explore the business strategies that aerospace leaders used to increase and maintain profitability and competitive advantage through the execution of TQM principles.

Ethnography, narrative, and phenomenology are qualitative research designs that would not have enabled me to answer the research question. According to L. Santos et al. (2021), the focus of a phenomenologist is the exploration of facets of the human experience. The goal of phenomenology is to explore a worldly experience that is

subjectively lived (Neubauer et al., 2019). This was not the purpose of my study. The ethnographic design focuses on the social contexts, shared beliefs, and cultural settings of people (Rashid et al., 2019). This is a form of research that necessitates the researcher becoming integrated into the environment that is being studied (Moretti, 2020). The ethnographic design was not appropriate because ethnographers endeavor to assess the community or culture of a group through interviews, interactions, and other forms of communication (see Whalen, 2018). My study was not an assessment of a social group or culture, but rather an exploration of business strategies used by aerospace leaders; therefore, I chose a multiple case study design. A narrative approach is a qualitative design that explores the multidimensional aspects of the human existence through structured interviewing or storytelling (Sahito & Vaisanen, 2019). The perspective of the entire group is neglected when a researcher uses the narrative design. Therefore, the narrative design was not suitable for my study.

Data saturation transpires when no new information is being gathered during the data collection process (Saunders et al., 2018). Data saturation is the moment when additional efforts to collect data have proven to be unnecessary. According to Guest et al. (2020), data saturation is the conceptual rubric for assessing qualitative data collection. Data saturation occurs when the collection of supplemental data will not yield any new information, and the themes of interest have been satisfactorily acquired (Fofana et al., 2020). To affirm that data saturation was achieved in my study, I kept asking the same series of questions with all participants during the interview process until no new information was obtained.

Population and Sampling

The research design and data analysis are enhanced when the appropriate population is defined and selected by the researcher (Ochodo et al., 2019). For my qualitative study, the population included senior managers and executives in the A&D industry who were geographically located in the western region of the United States. Consideration of the selected organizations was predicated on the successful implementation of TQM strategies that yielded increased revenue and competitive advantage.

Sampling strategies are pivotal to conducting quality research (Berndt, 2020). Purposeful sampling is the method of selecting participants with the most relevant background and information. Campbell et al. (2020) asserted that purposeful sampling entails matching the sample population to the goals and objectives of the study. Selection of sampling strategy, sufficiency of sample size, and data saturation are essential to the quality of the data being collected throughout the study (Gill, 2020). My participants possessed extensive experience using business strategies to improve organizational profitability and performance through TQM to achieve competitive stature in a global marketplace. While I remained cognizant of expectations regarding data saturation, I was able to recruit a sample of seven participants.

I communicated with the human resources executive to facilitate the selection of participants who had experience using business strategies to increase revenue, operational performance, and competitive edge through strategic quality initiatives. According to Karhunen and Ledyaeva (2021), effective leadership is made evident through the

strategic use of resources and competitive strategies. To explore this phenomenon, I conducted interviews in a secluded conference room to allow maximum engagement from the participants without any distractions (see McGrath et al., 2019). The option of online interviews was suggested due to the volatility of coronavirus outbreaks and corresponding variants that impacted the health and availability of participants. If the participants opted for an online or remote interview, the prerequisite was a private room or a secluded area that allowed for free discourse.

Ethical Research

To minimize any risk, bias, or preconceptions, I used the informed consent form to alleviate barriers of participation in the qualitative case study. Mariam et al. (2019) mentioned that research participants must have the freedom to participate or not participate in a study as appropriated by principles of ethics. Before establishing contact with any of the research participants, I obtained approval from the Walden University Institutional Review Board (approval number 08-05-22-1005508). Geier et al. (2021) asserted that consent forms are pivotal tools that ensure ethical research and the protection of participants. To facilitate ethical research, I asked the participants to read and sign the consent form before commencing with the semistructured interviews. It was my intent to maintain confidentiality and privacy for all participants. Although many complexities exist within the realm of qualitative case studies, trust and mutual respect should be consistent between the researcher and the participants (Glenna et al., 2019). Although qualitative research involves transparency and ethical guidelines, the researcher

bears the responsibility to communicate and validate the rights, roles, protections, and freedoms that are afforded to all participants (J. Swain & Spire, 2020).

In the current study, all participants had the option to discontinue participation before or during the interview process without any consequence. To facilitate a serene and safe setting, researchers must operate within an ethical framework to ensure participants are empowered to discontinue the study for any reason at any time (Burns et al., 2020). I ensured that all participants understood that their participation was voluntary, uncoerced, and protected.

Additional tools or instruments to mitigate participatory barriers involve the common practice of providing participants with an incentive to recognize the voluntary allotment of time committed to the research study. According to Mintrop et al. (2018) researchers have proven that incentives motivate and increase the engagement, efforts, and contributions of study participants. From a contrasting viewpoint, incentives are not a fail-safe methodology to counter inadequate engagement from persons invited to participate in a case study (Blumenberg & Barros, 2018). The intent of providing an incentive was to promote better rates of participation throughout the interview process. Congruently, Target gift cards and appreciation letters were disseminated once the study concluded, and all findings were individually shared with research participants. As mentioned by Afkinich and Blachman-Demner (2020), monetary incentives or gift cards remain predominant motivators for participation in a research study.

To ensure confidentiality throughout my research, the names of companies and respective participants were neither mentioned nor disclosed. Roth and Unger (2018)

stated that true confidentiality is when researchers remain committed to the participant's privacy by eliminating any data or information that may reveal the identity of any participants in the study. Alphanumeric coding was used instead of names to protect the participants' identities and to preserve the integrity and privacy of all collected data. According to Ngozwana (2018) researchers bear the responsibility of safeguarding and concealing data to ensure differentiation and privacy of all study participants. To facilitate the protection and confidentiality of research participants, I stored electronic data as a password-protected file on my personal computer and as cloud data with encryption for a duration of 5 years. After the 5 years have transpired, all electronic data shall be permanently deleted as annotated in the consent form and appendices.

Data Collection Instruments

As the primary instrument of data collection for this qualitative study, I used semistructured interviews comprised of open-ended questions to foster flexible discourse between me and the participants. According to Hua et al. (2020) semistructured interviews were beneficial to the exploration and investigation of targeted phenomenon. Semistructured interviews were a conventional methodology of data collection, which efficaciously provided prolific sets of data for subsequent analysis (Peesker et al., 2019). According to Jerman et al. (2019) semistructured interviews were the most widely used methods of data collection for qualitative research.

Semistructured interviews were used to facilitate the collection of data from all research participants. Before the onset of the predefined interview questions, the participants were allotted 5 minutes to briefly describe their vocational and personal

backgrounds to facilitate consolation, trust, and transparency between interviewer and interviewee. To ensure an effective and methodical interview process, I adhered to an interview protocol (see Appendix), which included seven questions to address the central research question. Each semistructured interview commenced with a brief review of the study's purpose, as well as the participant's rights, freedoms, and confidentiality. The participants were notified that all inquisitions and responses would be captured through an audio-recording device. Linehan et al. (2019) argued that semistructured interviews were instrumental in the solicitation of original thoughts and experiences from research participants. To capture these experiences, I allocated 45 to 60 minutes to each participant to respond to the seven open-ended questions. To ensure mutual comfort, communicational reciprocity, and free flow of information, I used a recorder to capture all responses from the participants during the interview. Audio recording had proven to be an inexpensive and fairly straightforward process that effectively facilitated meaningful engagement between the researcher and participant (Kohrs, 2018). Once all interview questions had been asked and answered, the participants were thanked for their time, and the audio-recording was stopped. At the conclusion of each interview, the participants were informed that all responses would be transcribed and analyzed accordingly by the researcher.

In order to extract and analyze extensive amounts of empirical data, Bin Makhashen et al. (2020) argued that methodological triangulation was a sound process to validate the quality, validity, and reliability of qualitative research. When a convergence of resources was used to attain a deeper understanding of research findings,

methodological triangulation had been achieved, and researchers were better positioned to comprehend the sundry perspectives of participants (Heesen et al., 2019). To confirm methodological triangulation, I reviewed customer score cards and performance reports, as well as any organizational documents that were either proprietary or publicly accessible. The aforementioned information was combined with the data collected from participants' responses during the interview process.

Although I used semistructured interviews as the medium for data collection, I allowed all research participants additional time and flexibility to freely convey their respective responses. Being that my research was a qualitative case study, I used member checking during the data collection process to establish tenets of trustworthiness and credibility with participants throughout the study. The concept of member checking entailed the endorsement of a researcher's analyses of responses rendered during the interview process from the participants. According to Iivari (2018), the technique of member checking encouraged progressive participatory practices and provided participants the opportunity to be co-analysts of information shared when answering the seven open-ended questions. From the perspectives of Lovelace et al. (2020), member checking was a form of respondent validation, which involved soliciting feedback from participants to ensure that the annotated transcripts are a true representation of their respective views. Correspondingly, Nguyen et al. (2020) emphasized the practice of member checking being an efficacious way of substantiating accuracy of emergent themes during the process of data analysis.

Data Collection Technique

According to Wiseman et al. (2019), some of the conventional data collection techniques for qualitative studies comprised of interviews, questionnaires, and structured play-based activities. Kustiyani et al. (2021) argued that many researchers use qualitative methods to acquire a deeper understanding of specific phenomena. The data collection technique for this qualitative case study was in-person semistructured interviews. The semistructured interviews were methodical; however, flexibility was rendered to the researcher to obtain more profound and prolific data content. Data collection techniques remained instrumental in obtaining contextual and situational data to clarify responses from participants (Wiseman et al., 2019).

According to Millatasyifa and Nurhasanah (2021), qualitative data collection techniques consisted of observations, interviews, and documentation. I conducted face-to-face meetings to assess any body language or non-verbal actions that could have manifested when the research participants were answering questions. Nonverbal cues such as body language, eye contact, and gestures were easily observed during face-to-face interactions, which naturally and progressively reciprocated trust and transparency between researcher and participant (van Coller-Peter & Manzini, 2020).

Research participants were required to answer seven open-ended questions during the interview process. Weller et al. (2018) mentioned that open-ended questions remain pivotal to the exploration of in-depth topics, processes, and correlations. From the semistructured interviews, I intended to gain perspective on the effective business

strategies that aerospace leaders used to increase and maintain profitability through TQM for gaining a competitive advantage.

Before the interview process was deployed, I had all research participants agree to a suitable date, time, and location once the informed consent forms had been signed and acknowledged. Rau et al. (2020) stated that the willingness to participate in a qualitative study must be clearly indicated with a valid consent form, which represented an element of ethical research for human subjects. From an advantageous standpoint, the usage of semistructured interviews provided a descriptive assessment of the experiences, attitudes, and perspectives of participants in relation to the questions asked by the researcher (Allen et al., 2019). In addition to the semistructured interviews, I reviewed annual reports, meeting minutes, and diverse company documents to support responses acquired during the interview process. Magalhães et al. (2019) emphasized the importance of using more than one source to strengthen the validity, accuracy, and reliability of the data collection process.

The disadvantages of semistructured interviews were mostly attributed to time constraints with research participants, as well as the additional barriers of member checking. Securing an uninterrupted span of participants' time was a challenge due to the unexpected nature of the A&D industry; especially when seeking the engagement and feedback of organizational leaders that managed cross-functional teams. Additionally, the availability of face-to-face interviews was also contingent upon the allotment of set times that did not conflict or interfere with the professional and personal events of the research participants.

Understandably, people were more amenable to virtual meetings or telephonic discussions versus the in-person interviews. Additional disadvantages or weaknesses associated with semistructured interviews entailed data loss, cultural/language barriers, and inadvertent bias regarding the continuity of questions presented to all research participants (DeJonckheere & Vaughn, 2019). Regarding the benefits and limitations of document reviews, the former remained uniformly cost-effective and efficient while the latter entailed selectivity bias, as well as insufficient detail to address questions from the researcher (Bowen, 2009).

In tandem, the process of member checking necessitated additional time from the research participants to ensure an accurate explication of responses. Although time constraints impacted the process of data collection and analysis, the scholastic framework of member checking remained vital to the qualitative study. I used member checking to ensure methodical validity and credibility of all analyzed data, which involved sharing my thematic analysis and parallel interpretations with the interviewees via email. Copies of each transcription were reviewed with participants via Microsoft Teams meetings. After interviewees' responses were reviewed for accuracy, each participant was emailed a copy of the analysis.

Data Organization Technique

While data repositories functioned as a contemporary means to support qualitative research, data management strategies were conducive to the storage and repurposing of research data. Predominant functions of research data management entailed the provision of secure online research and the promotion of data sharing or reusage (Antonio et al.,

2020). Ultimately, the researcher bore the responsibility of safeguarding any and all data collected from participants, which was essential to the integrity and ethical premise of the study (Neaton et al., 2018). I intended to use multifarious forms of tracking or recordkeeping throughout my qualitative case study, which included field notes, reflective journals, and research logs. The field notes captured furtive cultural dynamics while reflective journals descriptively divulged multidimensional experiences and observations from the researcher's perspective. Confidentiality was upheld through the usage of alphanumeric coding to preserve the names and identities of all research participants. Based on the rudimentary needs of data organization and alphanumeric coding, I used NVivo to perform a thorough analysis of the qualitative data while formulating themes. According to the university statutes, I will permanently eradicate all printed documents and electronic files after 5 years.

Data Analysis

Naturally, the value of any data collected remained subservient to the nature in which they were analyzed. A baseline for qualitative analysis entailed the collection of pertinent material and subsequent thematic coding, which reciprocated emergent patterns that allowed researchers to acquire a deeper understanding of the phenomenon being studied (Lowe et al., 2018). Yin (2018) delineated five techniques for case study analysis, which were known as pattern matching, explanation building, time-series analysis, logic models, and cross-case synthesis. The cross-case synthesis was only applicable to multiple-case studies. To achieve synthesis within a case study, a cross-case analysis was conducted, which allowed data to be assessed from multifaceted modes (Medeiros et al.,

2018). For my qualitative multiple case study, I used the cross-case synthesis technique to better understand the patterns of business strategies that organizational leaders used to maintain profitability and competitive edge through the application of TQM principles in the A&D industry. I transcribed the audio-recorded responses from the respective interview sessions performed with each research participant. Considered to be the first step of data analysis, transcription remained essential to the accuracy and interpretation of collected data (Rennie et al., 2018). After the transcription had been performed, I commenced the process of thematic coding. According to Williams and Moser (2019), coding was an intricate methodology that allowed collected data to be gathered, catalogued, and thematically sorted to provide a prudent platform for the conception of meaning.

To ensure triangulation, I used heterogeneous data collection strategies to substantiate my findings from the semistructured interviews. Renz et al. (2018) mentioned that triangulation was a commonly used method for mitigating researcher bias while strengthening the design and validity of one's study. When researchers scrutinized data from multifarious sources, the credibility and trustworthiness of the data became validated (Greyson, 2018). Carter et al. (2014) accredited four types of triangulation, which included methodological, investigator, data source, and theoretical. For my qualitative study, I used methodological triangulation to authenticate responses obtained from participants during the interview process. Methodological triangulation specifically addressed the historical development and usage of amalgamated methods to strengthen the credibility and reliability of the study (Leckner & Severson, 2019).

Transcription of Interview Notes

Although transcription was indeed an arduous and tedious task, it endowed the best index for analysis, as well as a greater understanding of the data collected during the interview process (Roy et al., 2020). Correspondingly, transparency of transcription and thematic coding were methodologies used to mitigate inadvertent bias of the researcher (Aishath et al., 2019). I transcribed all audio recorded interviews as previously communicated to all research participants. To validate the quality and integrity of the transcriptions, all research participants were provided with a paraphrased description of respective responses. As a conventional method to capture the voices of research participants, member checking allowed the researcher to achieve validity of the responses collecting during the interview process (Candela, 2019).

Reading Transcription of Notes

Utilizing the heuristic method, I segregated and categorized all interview notes into themes. According to Huffman and Tracy (2018), the heuristic methodology allowed a qualitative researcher the opportunity to “play detective” with the collected data to reveal assumptions and formulate noteworthy claims. The collection and coding of relational data were instrumental in obtaining insight from structured observations (Decuypere, 2020). Additionally, it remained imperative to assess the interview notes to reciprocate an empirical framework for systematic coding and emergent themes. The inductive coding approach was used to analyze the responses from participants to substantiate the creation of codes from qualitative data. According to Hemmler et al. (2020), inductive coding was a proven methodology that involved the preservation of

contextual data collected from research participants. Using an inductive process allowed researchers to immerse themselves into the data, which facilitated the process of thematic coding (Parameswaran et al., 2020).

Organizing Codes Into Themes

After assigning codes to the interview notes, which derived from the participants' responses, I arranged the codes into nascent themes for accurate analysis. MacPhail et al. (2016) asserted that the coding of qualitative data remained acquiescent to the transcription of interview notes. By categorizing the data transcribed from the interviews, systematic coding facilitated the formulation of themes, which elucidated the experiences and perspectives of each research participant. By arranging the qualitative data into thematic codes, the researcher efficaciously showed the correlation between the participants' responses and the conceptual framework being explored throughout the study.

Interpreting the Meaning of Themes

As mentioned by Raskind et al. (2019), the most pivotal stage of qualitative research entails the intricate process of data analysis and the identification of emergent themes. O'Kane et al. (2021) asserted that automated software improved the transparency and legitimacy of qualitative data analysis. Regarding the final stage of qualitative analysis, I construed the meaning of nascent themes based on the purpose of the multiple case study. The coding, sorting, and organizing of qualitative data remained an onerous task; thus, it remained paramount to select an automated software to accommodate the analysis of transcribed data. Maher et al. (2018) accentuated that NVivo was a

phenomenal data management software that supported qualitative analysis and thematic coding. Once the themes were established, the next step involved finding the meaning of such themes to facilitate the construction of actionable conclusions. Using NVivo provided contextual meaning, as well as a multifaceted perspective to the process of qualitative analysis (Lovelace et al., 2020). Hence, I used NVivo to simplify and accelerate the analysis of qualitative data.

Reliability and Validity

Cypress (2017) accentuated that reliability remained grounded in the consistency and transparency of research applications while validity was concerned with the legitimacy and accuracy of research findings. From a correlational standpoint, reliability and validity functioned collectively to provide a realm of authenticity of collected data. Spiers et al. (2018) asserted that reliability was rooted in data adequacy while validity related to the appropriateness of data. Hayashi et al. (2019) mentioned that reliability and validity operated as vital elements to quality research. In addition to reviewing company documents and performance reports, member checking was used to achieve reliability and validity for this current study.

Reliability

A qualitative study is strengthened or legitimized by the reliability and validity derived from the researcher's analysis. Scholars and practitioners rely on research findings to choreograph supplementary research and business decisions. From a conjectural perspective, a margin of variability remains putative; however, qualitative researchers must ensure reliability through the continuous validation of form and context

from the collected data (Leung, 2015). As mentioned by O'Connor and Joffe (2020), reliability concerns the stability or permanency of research findings across time, frameworks, and instruments within a qualitative study. While validity represents the extent to which a measurement or research finding yields the correct answer, reliability represents the degree to which research finding reciprocates reproducibility or the same answer (McDonald et al., 2019). As stated by Yin (2018), reliability involves the replication of procedural applications to alleviate any errors or partiality that may inadvertently derive from the qualitative researcher. According to Langtree et al. (2019), reliability refers to the consistency of research processes being used, which remain comparable to dependability and any considerations to the procedural steps taken throughout the qualitative case study. As a qualitative researcher, sufficient preparation for the data collection process conclusively demonstrated a degree of dependability regarding research findings (Yin, 2018).

The extent to which future researchers can consistently conduct comparable studies refers to the dependability of research findings. In addition to how procedural steps are documented from a case study, dependability is the consistency and reliability of research findings (Korstjens & Moser, 2018). As an external process that substantiates the accuracy of research findings, dependability minimizes the errors of qualitative research by enabling other researchers to conduct similar studies. To ensure dependability in my qualitative research, I disseminated emails to all study participants to review the analysis of the collected data to authenticate the integrity of all data and alleviate any presumptions in the research findings. Campbell et al. (2020) acknowledged the

intricacies and challenges of researchers managing dependability; however, member checking in conjunction with a well-accepted sampling strategy sufficiently alleviated any such challenges. Dodds et al. (2018) stated that member checking enhances a case study's credibility and ensures the accuracy of transcripts. According to Brear (2019), member checking is a well-established technique, as well as a transformative process that establishes holistic validity.

Taking notes during the interview process remained inferior to the methodology of simply recording the responses of each study participant. The preservation of participants' responses was achieved through audio recordings, which enhanced the reliability and dependability of research findings (Yin, 2018). In addition to note taking, I used an audio-recording device to record the interview sessions to corroborate the responses from each participant. Prior to each interview, I performed a thorough quality check of the recording device to ensure audibility and unobstructed playback for subsequent transcriptions of responses obtained from research participants. Respective member checking was performed with each interviewee to validate responses, as well as the precision of the data collection process. Shahab et al. (2019) asserted that reliability is defined by high correlation. Thus, member checking provides substantial credibility and reliability through systematic correlations between researcher's interpretation and respondent validation (Naidu & Prose, 2018). To ensure reliability of the qualitative study, I used a diversity of sources and review any public documentation pertaining to the operational and monetary performance of select aerospace organizations. By using a

variety of evidentiary sources in a qualitative study, the researcher is able to affirm the reliability of qualitative research findings (Maroun, 2018).

Validity

As mentioned by Rose and Johnson (2020), a researcher's endeavors at achieving validity remains synonymous to analytical efforts to comprehend the accuracy of research findings. The accuracy of data plays a rudimentary role to the validity of any qualitative study. To ensure the validity of my research findings, I certified that my findings were credible, confirmable, and transferable per advisory of Long and Gambling (2019). Validity is fundamentally the delineation and interpretation of collected data. According to Hayashi et al. (2019), validity is an essential attribute of qualitative research, which encompasses the descriptive, interpretive, and theoretical ambits of collected data.

Credibility

Within a qualitative study, credibility involves the believability of researcher analysis (Rose & Johnson, 2020). According to Stahl and King (2020), credibility deals with the congruency between research findings and reality; it provides confidence and fidelity to the research process. I intended to achieve credibility through data saturation and using viable processes, such as member checking, reviewing internal company documents, and conducting multiple interviews with numerous aerospace organizations. Credibility is primarily substantiated through member checking and triangulating data from multifarious sources, which remain pertinent to the trustworthiness of research findings (Haven et al., 2020). To ensure accuracy of interpretation and credibility of responses, I provided each research participant with a copy of their responses via email.

Confirmability

Haven and Van Grootel (2019) avowed that confirmability concerns whether the data analysis is coherent and whether the interpretation of the data is unbiased. Chung et al. (2020) considered confirmability to be the concept, which delineates the extent to which the results from a study can be substantiated or achieved by others. Therefore, confirmability is the objectivity or neutrality of research findings, which exclude the subjectivity of personal perspectives (McGinley et al., 2021). To achieve confirmability throughout my research, I used triangulation, which Yin (2018) defined as a methodology that encompasses the utilization of sundry sources to validate confirmability of a qualitative study. Renz et al. (2018) argued that confirmability is strengthened by the triangulation of data, which entails the usage of multifarious sources. In my qualitative case study, used a diversity of sources, which comprise of interviews, note-taking, observations, and company documents to authenticate my research findings.

Transferability

In qualitative research, Langtree et al. (2019) affirmed that transferability refers to whether research findings are potentially pertinent to another person, group, time, setting, or context. Fusch et al., (2018) stated that transferability entails the capability of a study to be duplicated or transferred to other studies. Daniel (2018) mentioned that transferability does not promote generalizability and remains parallel to the concept of reliability, which is necessary to assess a phenomenon in sufficient detail. To amplify transferability, I provided adequate information regarding the context and meaning of the qualitative research, as well as the preconceptions that were significant to the study.

Guest et al. (2020) mentioned that data saturation in a qualitative study is reached when no further informational novelty can be acquired or assessed. According to Aldiabat and Le Navenec (2018), once the data saturation has been reached, the data collection process can cease. To ensure data saturation, I conducted follow-up interviews with research participants after the initial interviews had been performed.

Transition and Summary

Section 2 included the research methodology and design, as well as the justification surrounding the selection of a multiple qualitative case study to explore effective business strategies that aerospace leaders use to increase and maintain profitability through TQM for gaining a competitive advantage. I provided in-depth information regarding the selected participants of the study. Section 2 also included meaningful information regarding ethical research, data collection instruments, techniques for data collection and data organization, and an explanation of data analysis. Section 2 concluded with the validity and reliability of my study.

In Section 3, I will present the findings, applications to professional practice, implications for social change, and recommendations for action. Subsequently, I convey my recommendations for further research and reflections of the overall doctoral journey.

Section 3: Application to Professional Practice and Implications for Change

Section 3 includes the presentation of findings that address the strategies aerospace leaders use to remediate conventional and nonconventional challenges that impede TQM maturity in the pursuit of profitability and competitive advantage. This section also provides the relevance and application of business strategies used by aerospace leaders to increase profitability via TQM to gain a competitive edge in the aerospace industry.

The purpose of this qualitative multiple case study was to explore the effective business strategies that aerospace leaders use to increase and maintain profitability through TQM for gaining a competitive advantage. I gathered data from seven participants in the western region of the United States using face-to-face interviews and reviewed their organizations' public and proprietary documents to strengthen the credibility of accumulated data for triangulation. The findings revealed effective business strategies that aerospace leaders use to promote quality manufacturing, revenue growth, and competitive edge in the global marketplace through TQM by applying operational excellence, optimizing capacity planning and resource allocation, accelerating employee engagement through training, promoting customer-centricity, and streamlining strategic and supportive stewardship.

Presentation of the Findings

The research question for this qualitative study was the following: What effective business strategies do aerospace leaders use to increase and maintain profitability through TQM for gaining a competitive advantage? I discovered five emergent themes to answer

my research question: (a) applying operational excellence, (b) optimizing capacity planning and resource allocation, (c) accelerating employee engagement through training, (d) promoting customer-centricity, and (e) streamlining strategic and supportive stewardship.

Theme 1: Applying Operational Excellence

Findings from manufacturing key performance indicators (KPIs), performance review documents, profit and loss statements, semistructured interviews, field notes, and thematic analysis revealed how senior leaders in the A&D industry used operational excellence (OpEx) or continuous improvement to increase and maintain profitability through TQM for gaining a competitive advantage. During the interviews, participants described an assortment of strategies used in their organizations to achieve and perpetuate operational excellence. When asked what strategies are used to implement TQM for gaining and sustaining competitive advantage, AL4 replied

> when you have a multi-site organization, it is really important to drive common KPIs and share lessons learned in their factories. The goal is continuous improvement, and the culture of the organization is the strongest weapon of the quality system.

AL6 responded to the same question by saying “the quality system needs to be structured in a way that complements or accommodates the needs of the customer. So I’m actually working on re-architecting our entire quality system to remove any redundancies while ensuring alignment to site directives.” The responses from AL4 and AL6 substantiated the scope of peer-reviewed articles referenced in the literature review,

which indicated the correlation between continuous improvement and driving customary metrics to achieve cost savings throughout the business. My analysis of participants' responses and shopfloor metrics regarding throughput and delivery, which derived from the weekly productions reviews, indicated that each aerospace leader remained committed to synergetic efforts to achieve operational excellence by promoting a quality-conscious culture that homogenized KPIs to reciprocate value-added actions (see Table 1). In addition to the semistructured interviews, the meeting minutes and productions charts depicting operational performance conveyed how organizational goals and objectives were communicated from top management to direct-labor personnel. Quality and operational KPIs concerning first-pass yield and on-time delivery were measured daily by the integrated product teams. KPIs were reviewed daily in the individual work cells, and the senior organizational leaders attended a monthly meeting known as the operations review to evaluate those KPIs to determine the overall health of the business. As mentioned in the literature review, lean manufacturing remains tantamount to operational excellence or continuous improvement, which entails an in-depth RCCA investigation for any of the eight forms of waste.

Table 1

Frequency of Emergent Themes: Applying Operational Excellence

Interview participant	Number of references	Coverage	Words and phrases	Frequency
AL7	5	10.89%	prioritizing quality, culture shift, process improvement	57
AL6	9	16.45%	common KPIs, lessons learned, data-driven, analytical, operating systems	77
AL5	7	18.37%	value-added actions, sustainability, reduce waste, process efficiency	79
AL4	10	8.51%	quality and delivery, profit margins, TQM implementation	43
AL3	4	12.11%	data analysis, continuous improvement, resolving risks	61
AL2	8	9.45%	relevant countermeasures, proactive problem-solving	52
AL1	3	4.23%	COPQ reduction, improving product designs, differentiate from competitors	34

Environmental safety and operational reliability serve as critical areas of interest, and TQM functions as a competitive constituent within the A&D industry (Yoon & Kim, 2022). To gain and sustain competitive advantage, aerospace leaders have implemented TQM strategies to ensure operational integrity and the perpetuity of quality workmanship. This involves a continuous improvement process by which communications from customers and employees are used to ascertain opportunities for improvement while implementing remedial solutions. Aerospace companies also prioritize the application of operational excellence (or continuous improvement) to ensure that an adequate number of employees possess the core skills and competency to manufacture high-quality products and services in a timely manner. Haigney and Murphy (2023) noted the importance of organizational leaders proactively promoting operational excellence via structured training modules that elevate the core competencies of their

employees. By certifying the permeation of TQM into the multiple levels of product manufacturing, organizational leaders are situated to achieve operational excellence and maintain a competitive edge in the aerospace and aviation industries.

Prioritizing Quality Culture

Aerospace leaders comprehend the concept of TQM being neither finite nor solitary in its methodical application, but rather a progressive process of continuous improvement that warrants cross-functional collaboration and execution. Aerospace leaders focus on building a culture of continuous improvement to gain and sustain a competitive advantage. According to Antony et al. (2023), competitive advantage in the marketplace remains acquiescent to business leaders perpetuating a work culture that prioritizes quality workmanship via continuous improvement and strategic problem solving. This culture entails a mindset of constantly seeking ways to pursue defect prevention and lean manufacturing, which reciprocates a permanency of customer satisfaction.

Aerospace leaders encourage their employees to participate in problem-solving and decision-making processes while evaluating their work to identify opportunities for refinement. Fan and Preston (2022) affirmed that profitable businesses possess a quality culture that promotes collective or holistic problem solving from its organizational members. Profitable businesses also provide training and resources to support this culture. With a culture of continuous improvement, aerospace companies can adapt to changing customer needs, improve their products and services, and preserve strategic foresight to outmaneuver marketing tactics by their competitors. According to Guven et

al. (2022), continuous improvement initiatives allow organizational leaders to orchestrate better operational performance via TQM while achieving competitive stature in the global marketplace. Data analyzed from the current respondents indicated that devising a salubrious culture of continuous improvement requires aerospace leaders to prioritize the effectiveness of a strong QMS, which entails creating and homogenizing meaningful metrics, sharing lessons learned, focusing on capacity planning, setting coherent goals and objectives, developing strategic direction, and obtaining top management's commitment toward TQM implementation.

Common KPIs and Lessons Learned

Aerospace leaders use data-driven decision making as a strategy to implement TQM for gaining and sustaining competitive advantage. Kaspi and Venkatraman (2023) validated how business leaders use metrics and lessons learned to improve quality manufacturing and achieve revenue growth. By collecting and analyzing data related to various aspects of the business, organizational leadership can make cognizant decisions that lead to augmented levels of operational quality and efficiency. This involves using metrics, KPIs, and statistical tools to recognize business trends, patterns, and areas for improvement. By using data to induce managerial decisions, aerospace leaders reduce manufacturing risks while improving process controls and customer satisfaction. Furthermore, analytical decision making empowers managerial personnel to monitor and evaluate operational performance, enabling them to adapt to fluctuating circumstances in the global marketplace.

Overall, data-driven decision making is a key strategy for aerospace leaders to implement TQM while procuring competitive advantage. As mentioned by Clancy et al. (2023), business leaders who practice data-driven quality management are better positioned in the marketplace to achieve progressive profit margins. My analysis of the responses from participants indicated that all business decisions remained acquiescent to interactive processes, procedures, and operating systems that reciprocated measurable performance from respective departments. According to AL7, measuring operational performance through meaningful metrics remains tantamount to measuring an organization's ability to remain competitive and profitable within the A&D industry.

Quality assurance processes and certifications are used as a strategy to implement TQM, which involves implementing a set of processes and standards to guarantee that products and services acquiesce to customers' expectations. To achieve this, business leaders pursue various certifications such as AS9100 or ISO 9001, which provide a framework for implementing sturdy systems of manufacturability that reciprocate eclectic forms of risk management and process control. According to Kareska (2023), marketplace survivability and competitive advantage remain acquiescent to business leaders embracing a customer-centric business model, which entails risk mitigation and process automation via QMS standards. By adhering to these standards, aerospace leaders can demonstrate their commitment to quality and differentiate themselves from competitors. Additionally, quality assurance processes and certifications can help organizational leaders identify a spectrum of opportunities for improvement and implement corresponding countermeasures to improve customer satisfaction.

Overall, quality assurance processes and certifications are a key strategy for aerospace leaders to implement TQM and gain a competitive advantage. According to Lepistö et al. (2022), a corporation's competitive advantage and nominal revenue growth cannot exist without policies and procedures that adhere to TQM principles, which remain embedded in the ISO 9001 certification. Adherence to such certifications can be reinforced by assessing manufacturing mishaps, contractual flow-downs to suppliers, cost and schedule conformity, detection of process variations, traceability of documentation and hardware, and a robust internal audit program that identifies foreseeable risks within a company's QMS.

The A&D industry is competitive, and one key aspect of TQM involves systematically reducing the COPQ, which encompasses the costs associated with producing defective products that are dispositioned as rework, scrap, or warranty returns. Ruchi and Mayank (2019) asserted that top management's commitment to COPQ reduction impacted an organization's ability to be profitable and competitive in the global marketplace. By reducing COPQ, aerospace leaders can improve profitability, increase customer satisfaction, and promote their brand for quality workmanship. This is achieved by implementing rigorous quality control processes, training employees to identify and address quality issues, and improving product designs, supply chain processes, and manufacturability.

Reducing COPQ remains an industry-wide perquisite for sustaining TQM in the aerospace industry, which facilitates long-term success in the global marketplace. Galli (2019) noted the strong correlation between COPQ reduction and monetary maximization

for shareholders, which derived from mitigating manufacturing costs through TQM application. In the current study, the main areas identified from the data analysis requiring attention were the costs associated with CARs, eliminating various forms of waste in the production workflow, and identifying and resolving manufacturing risks. According to AL1, aerospace leaders are constantly assessing relevant countermeasures that can reduce or eliminate manufacturing mishaps in the form of rework, scrap, and warranty returns from customers.

Value-Added Actions

Regarding ensuring TQM sustainability in production environments, the current participants recommended several value-added actions including developing control charts, implementing CARs, reducing COPQ, ensuring reliability of production parts, performing internal audits, conducting quarterly MRMs, and using a PDCA approach to delineate what good looks like for operational stakeholders and external business partners who leverage outsourcing capabilities. Gasper and Mwenda (2023) confirmed that PDCA is a value-added technique that impacts financial performance and operational efficiency.

Assessing the financial impact of any change-management philosophy is an effective tactic to cope with the challenges of implementing TQM. Due to the significant investment of monetary resources and personnel hours, aerospace leaders may face resistance from stakeholders who view TQM as an exorbitant or unnecessary exercise. Singh et al. (2023) addressed the organizational resistance that transpires at the onset of any TQM initiative; however, organizational leaders must invest optimally to minimize monetary waste associated with process variation or manufacturing mishaps.

By conducting a cost-benefit analysis, aerospace leaders can properly assess the monetary impact of TQM while validating its potential return on investment. Crowdle et al. (2023) stated that a cost-benefit analysis enables organizational leaders to systematically pursue cost savings via quality manufacturing and Kaizen activities. Business leaders can also identify areas where TQM can mitigate costs and improve profitability, such as reducing waste and defects, improving process efficiency, and increasing customer satisfaction. By demonstrating the financial benefits of TQM, leaders can secure cross-functional buy-in and managerial support for TQM implementation.

By systematically identifying organizational risks and consistently monitoring operational metrics, organizational leaders can dually increase profit margins and on-time delivery, which reciprocates a more competitive stature in the global marketplace of A&D. As mentioned by AL2, key performance indicators or metrics are the catalysts for many continuous improvement projects and organizational initiatives. Numerical data and customer feedback are the inputs for everyday decisions made by aerospace leaders. A thorough analysis of COPQ coherently conveys the cost-benefit of specific action-items. An example would be monitoring the performance of external partners known as suppliers. The quality and delivery of products received from these vendors directly impact the company's costs associated with scrap, rework, or warranty returns, which are rudimentary elements of COPQ.

Cost-reduction or cost-cutting is an effective countermeasure used by aerospace leaders to cope with the challenges that may arise during various stages of a newly awarded program from a customer. The research study of Norhana et al. (2023)

substantiated how companies become more competitive and lucrative by implementing cost-cutting strategies that were quality-centric. TQM aims to improve process efficiency and reduce waste, which can lead to significant cost-savings for aerospace companies. Leaders can identify areas of the organization where TQM can reduce costs, such as alleviating scrap and rework, optimizing inventory management, and improving supply chain efficiency.

More specifically, aerospace leaders can infuse many of the TQM elements into an existing CRP (Cost Reduction Program) to offset and even eradicate operational expenditures. They can also implement cost management tools and techniques, such as value stream mapping to identify cost-drivers and opportunities for improvement. Value stream mapping is a proven methodology that allows organizational leaders to alleviate operational expenditures by eliminating waste and focusing on quality manufacturability (Mishra et al., 2020). By focusing on cost-reduction, aerospace leaders can ensure that TQM initiatives remain symmetrical to the organization's financial goals and objectives. As per data analysis, cost reduction can be obtained by reducing COPQ, eliminating waste, improving quality of workmanship, designing out process variation, and performing PFMEAs to purge unnecessary steps or movements in the production areas. As stated by AL1, TQM can have a profound impact on financial performance, especially in the areas that necessitate a fervent focus on lean manufacturing.

From the data analysis, it also emerged that quality MRMs, kaizen events, customer scorecards, quality certifications, corrective action board meetings, sales inventory operations planning meetings, operations review meetings, critical design

reviews, supplier performance reviews, and talent reviews are also constructive strategies used to implement TQM for gaining and sustaining competitive advantage. As mentioned by AL2, shop-floor performance, supplier on-time delivery, product quality, capacity planning, and risk management remain essential areas that necessitate managerial oversight to ensure consistent customer satisfaction and competitive edge. When business leaders proactively mitigate risks during the design phases of manufacturing, the quality and field performance of these products are progressively elevated, which lead to sustainable relationships between customers, shareholders, and employees (He et al., 2023).

Linkage to the Literature Review

Continuous improvement was a derivative of TQM philosophy that empowered organizational leaders with rudimentary knowledge to establish a competitive edge in a volatile marketplace (R. Chen et al., 2020). Correspondingly, Suárez-Barraza et al. (2019) associated the cost-savings of operational excellence through the management of standardized KPIs, which directly impacted a company's competitive advantage and revenue forecast. All responses from the study participants confirmed the implementation of KPIs deriving from continuous improvement initiatives to help drive-cost savings and more competitive bids with potential customers in the aerospace industry.

Linkage to the TQM Conceptual Framework

TQM has many branches, one of the most significant of which is continuous improvement. The studies Jum'a et al. (2023) highlighted the importance of TQM enhancing a corporation's competitive edge by managing meaningful metrics that assess

operational performance, as well as the satisfaction of aerospace clientele. Operational excellence provides a unique framework that allows TQM to be lucrative, competitive, and customer-centric simultaneously for all aerospace organizations. The responses from the study participants confirmed how their organizations' continuous improvement initiatives served as critical prerequisites to the competitive contracts that were being secured by the business development team.

Theme 2: Optimizing Capacity Planning and Resource Allocation

The second theme that emerged from the qualitative analysis was capacity planning and resource allocation. The responses to the second interview question signified several challenges involving the infrastructure, which primarily concerned resource constraints deriving from inadequate or erroneous capacity planning. To properly allocate resources requires aerospace leaders to analyze their organization's operational capacity against current and future demands from both domestic and global clientele. Each of the seven participants identified strategies they used to remediate shortage of resources when capacity planning was not properly executed by business development and program management stakeholders. Sub-themes were identified through thematic analysis, which were used by the study participants to address systemic issues surrounding resource allocation and capacity planning (Table 2).

Table 2

Frequency of Emergent Themes: Optimizing Capacity Planning and Resource Allocation

Interview participant	Number of references	Coverage	Words and phrases	Frequency
AL7	7	12.78%	limited bandwidth, deficiencies in infrastructure, not enough employees	63
AL6	11	18.34%	gaps in people and tools, need for additional labor, production planning not performed	63
AL5	9	20.26%	capacity planning, resource allocation, shortage of skilled labor, lack of resources	75
AL4	12	10.42%	unbalanced workloads, hiring contract labor, process improvement teams	44
AL3	6	14.09%	mitigating personnel shortages, strategic assessment of new contracts	58
AL2	10	11.33%	cross-training, cross-functional support, internal audits of processes	47
AL1	5	6.12%	minimal resources, limited technology, machining constraints	39

Participants identified the exigence associated with the quantity and competency of skilled labor in the workplace, as well as in the contemporary job market. More specifically, having enough resources to satiate the customers' demand for products being delivered on-time was one challenge. However, the greater challenge resided with employing skilled labor that could consistently produce a level of manufacturability that meets customers' requirements. The dearth of resources directly impacted operational throughput, monetary performance, and the morale of all managerial and subsidiary personnel.

Capacity planning (when properly executed with cross-functional stakeholders) would meticulously identify the strengths and vulnerabilities within the organization's

infrastructure. Yang et al. (2023) emphasized the importance of business leaders properly assessing the capacity of their organization to validate whether additional resources, equipment, and materials are needed to accommodate a prospective customer's demand. Capacity planning remains a derivative of strategic planning, which usually transpires at the onset of the company's new fiscal year when capital expenditure (CapEx) and annual operating plan (AOP) are respectively reviewed for operational improvements and organizational spending. Hence, capacity planning and resource allocation must be thoroughly examined to accommodate current and foreseeable customer demand.

Several responses from the study participants revealed sporadic efforts from corporate headquarters in hiring third-party consultants to assess the overall health of the business in parallel to relieving some of the inundated bandwidth of existing employees due to systemic resource constraints. During the interview, AL6 mentioned the grave sensitivity of dispersing appropriate workloads to available resources. If organizational leaders disregard the bandwidth of their employees, a substantial strain is placed upon the QMS, which imposes additional risks to customers. The additional stress will irrefutably increase the probability of customer escapes and counterfeit material. A TQM culture cannot exist without assessing the workload that is allocated to each employee, which impacts an organization's capacity to stay profitable and competitive in a global marketplace (Binci et al., 2022).

AL2 gave this response when discussing their perspective of resource allocation: "Having resources to implement and drive certain changes is important, right? I think between the gaps, deficiencies, and audit findings is the question of whether there are

enough resources to actually close some of those gaps and deficiencies." AL3 also expressed a similar notion: "Lack of resources is one of the biggest challenges that we have. I would say focus on planning and create a process improvement team to evaluate more efficient ways to use existing resources." From a correlational perspective, AL1 asserted the following: "Getting the support and buy-in from top management remains pivotal to the procurement and allocation of critical resources to support the business."

Resource Constraints

Aerospace leaders use the allocation of resources and support for TQM as a strategy to gain and sustain competitive advantage. Lu et al. (2022) stated that a company's competitive edge remains subservient to the optimal allocation of resources, which maximizes productivity and profitability. By allocating multifarious forms of resources such as monetary funding, shopfloor equipment, and skilled personnel toward TQM initiatives, organizations can prioritize quality improvement and ensure its success. By allocating resources and providing managerial support for TQM, organizational leaders can amplify quality manufacturing, increase efficiency, and improve customer satisfaction, which collectively lead to a competitive advantage in the aerospace industry. Overall, the allocation of resources and support for TQM is a key strategy for aerospace leaders to gain and sustain competitive advantage. The initial codes convey allocation of resources, a quality council, and a top management steering committee as strategies that aerospace leaders use to implement TQM.

Lack of resources and managerial support can be significant challenges for aerospace leaders when developing strategies to implement TQM to gain and sustain a

competitive edge. TQM implementation requires recurrent investments in training, tools, and technology, as well as managerial commitment to ongoing improvement. If resources are limited, organizational leaders may struggle to make the necessary investments to implement TQM effectively. In the studies of Antony et al. (2023), the lack of resources was the predominant cause of manufacturing mishaps and customer issues that were quality-related. Additionally, without the vital support from top management and other key stakeholders, the implementation of TQM may lack the monetary sponsorship and managerial velocity to succeed. Aerospace leaders need to proactively prioritize resources and secure cross-functional support from key stakeholders to ensure the successful implementation, permeation, and permanency of TQM.

Strategic Planning

Each of the study participants discussed the various strategies that aerospace leaders deploy to successfully accommodate new programs or an influx in volume from existing customers. For the engineering leaders, it was mentioned that they deployed design for excellence (DFX) as a cost-savings strategy comprised of designing a particular product with minimal waste and variation. The quality leaders deployed an initiative known as APQP with AS9145 as the framework to guide interdepartmental planning on all new product integration programs. It was noted that APQP was inclusive of DFX due to the rigorous assessment of design risks, which were needed to remediate any engineering mishaps or challenges that could potentially disrupt the manufacturing workflow. A preliminary manufacturing readiness review was performed prior to the

acceptance of a new contract, which demonstrated whether the company possessed the capacity to meet contractual requirements from the customer.

Third Party Consultants

When current resources were dissipated or overexerted due to customers' unexpected demands for more products, remedial actions included the procurement of contractual services to support engineering, supply chain, quality, and other functions within the operational infrastructure. The studies of Kikwasi et al. (2023) affirmed that implementation barriers were best resolved by third party consultants or contractors, which led to timely project execution. Oftentimes, aerospace leaders had time-constraints in acquiring skilled labor to support legacy product-lines and newly acquired programs, which created the opportunity of hiring contract labor to level out critical resources to accommodate workloads for each department. When new programs are awarded to an aerospace company, there is a tendency for customers to increase their demand, which necessitates additional labor that is not readily available.

A common countermeasure entails aerospace leaders working with various contract houses to fill a variety of positions needed to support the heterogeneous areas of production (O. Moreira & Rodrigues, 2023). In some cases, contract employees are provided vocational options of becoming direct-hires when their performance meets or exceeds the expectations of the hiring manager. Aside from the support functions in operations, third party consultants can also advise organizational leaders to create strategic and tactical action plans to increase operational efficiency through shop-floor automation and process controls.

Linkage to the Literature Review

The responses from the study participants strongly supported the premise of acquiring appropriate resources and employees to successfully meet customer demand and competitive growth. As mentioned in the literature review, mismanagement of resources equates to a form of operational waste that adversely impacts a corporation's monetary goals, which threatens an organization's capacity to attain optimal manufacturing levels. In a case study performed by Crowdle et al. (2023), it was confirmed that the excessive absorption of resources to perform trivial tasks created zero value for customers and employees. An aerospace company loses its competitive advantage if its resources are misallocated or overburdened, which creates seismic financial risks to shareholders and investors alike.

Linkage to the TQM Conceptual Framework

One of the most essential elements of TQM is risk-management, which entails the strategic allocation of resources and proactive capacity planning. Without the right number of employees or headcount, aerospace companies can neither be competitive nor profitable due to resource constraints. Each study participant advocated the dire need for resources in the form of skilled labor in nearly every department. The participants also unanimously identified the organizational need to properly assess the existing infrastructure and strategically plan for changes to accommodate foreseeable demands from the global marketplace The overexertion or the underutilization of skilled labor unfavorably impacts a company's profit margin. Bugdol (2020) argued that proper resource allocation and capacity planning were core tenants of TQM philosophy. Hence,

aerospace leaders must function as profitable practitioners of lean manufacturing by carefully planning the exploitation of key resources to achieve revenue targets.

Theme 3: Accelerating Employee Engagement Through Training

Employee engagement and training was the third theme that emerged from the thematic analysis. According to King (2024), organizations are more productive and innovative when the training and engagement of employees are prioritized and regularly recurring. Responses from each study participant substantiated that the engagement and training of both managerial and subsidiary personnel are paramount in remediating challenges that arise when implementing TQM to gain and sustain a competitive edge. As mentioned in the body of knowledge, TQM accentuates the dire need for all organizational members to be the rightful recipients of structured training and continuous engagement, which irrefutably ensures a profitable, productive, and quality-centric work environment for all employees. All participants indicated the critical requisite to accelerate employee engagement through cross-functional training and vocational development (Table 3).

Table 3

Frequency of Emergent Themes: Accelerating Employee Engagement Through Training

Interview participant	Number of references	Coverage	Words and phrases	Frequency
AL7	9	10.18%	employee engagement, employee training, job rotation	57
AL6	10	16.71%	cross-functional training, employee skills matrix, employee retention	62
AL5	12	18.25%	employee development, mentorship program, process improvement teams	67
AL4	6	8.49%	alleviate workplace complacency, invest in development programs	51
AL3	10	12.51%	synergetic decision-making, adding value to different parts of the business	59
AL2	7	9.63%	workforce equilibrium, employee turnover, workforce displacement	54
AL1	5	4.84%	structured training, construct levels of engagement, responsibility (RACI) matrix	26

Lack of qualified TQM personnel can pose a severe encumbrance for aerospace leaders when developing strategies to implement TQM to gain and sustain a competitive edge. In the research study of Rahman et al. (2020), it was proven that skilled labor directly impacted operational efficiency. TQM requires specialized knowledge and skills, and aerospace organizations may undergo exhaustive efforts to recruit qualified or proficient personnel to lead TQM initiatives. This can be incredibly challenging in a highly competitive industry where skilled employees are in high demand. Aerospace leaders may need to invest in training and development programs to build a pipeline of qualified TQM personnel. They may also need to collaborate with universities and other organizations to develop a talent pool with the necessary skills and knowledge to support TQM implementation.

Disparities in competency levels, lack of sufficiently trained personnel, inadequate foundational knowledge of quality concepts, and late career employees not well-versed with data automation are challenges which emerged from the thematic analysis. As mentioned by AL4, many late-career professionals are inept or novices in the proficiency of data automation and analysis, which adversely impacts the vocational capacity to mentor early-career professionals or organizational members new to the A&D industry. Additionally, aerospace leaders face the colossal challenge of employee turnover and workforce displacement, as well as workload equilibrium involving subsidiary personnel.

Cross-Functional Training and Job Rotation

All study participants communicated the dire need for healthy levels of employee engagement, which directly correlated to favorable rates of attrition or employee retention. By cross-training employees on different aspects of the job, the morale of organizational members improves in conjunction with the overall performance and productivity of the business. Cross-functional training from cross-functional teams reciprocates higher levels of operational proficiency and employee morale (Hoque, 2022). The responses from the participants also emphasized the necessity of performing job rotations for interns or newly hired employees. This tactic alleviates workplace complacency, as well as organizational drag by allowing employees to attain more value or vocational currency by learning the duties and responsibilities of other team members in various departments.

As mentioned by some of the respondents, employees experience a constructive level of engagement when provided structured training and suitable instances to apply such training to the betterment of the organization. The studies of McInerney and Niewiarowski (2022) asserted that structured training consistently cultivated creative thinking and positive employee engagement. While AL6 asserted that job-related training remained an incessant area of vulnerability for many team members, AL7 emphasized the importance of standardizing TQM training for all managerial and subsidiary personnel, which progressively improves process and product consistency for all manufacturing workflows within each program. When a standardized process has been defined and annotated for professional posterity, the concept of process and product consistency becomes more attainable for all employees, which favorably galvanizes employee engagement.

AL4 mentioned that challenges arise when building cross-functional teams; however, the discretionary energy that derives from constructive employee engagement usually tips the scale in the right direction. From a correlational standpoint, AL2 stated that operational efficiency remained acquiescent to employee morale, competence, and self-confidence. By having pride in one's work, employees are more inclined to produce quality work, which promotes a vocational atmosphere of trust and collaboration for all team members.

Employee Retention and Development

Aerospace leaders use engagement and collaborations as a strategy to implement TQM for gaining and sustaining competitive advantage. This involves engagement with

internal and external stakeholders, such as suppliers, customers, and employees, which leads to collaborative efforts in the pursuit of better products and services. Moreover, a continuous improvement culture cannot exist without reciprocal feedback, constructive career trajectories, and multifarious avenues for employee growth and development. As mentioned by Hills (2022), employee retention remains subservient to the onboarding process, professional training, synergetic initiatives, and leadership styles that are experienced by organizational members.

Overall, engagement and collaborations are a key strategy for aerospace leaders to implement TQM and gain a competitive advantage. Data analysis from the respondents showed that internal and external collaborations are irrefutably vital when considering compliance or adherence to industry standards. Healthy and sustainable forms of engagement amongst team members are suggestive strategies for implementing TQM in the workplace (Nienaber & Martins, 2020). As stated by AL3,there must be a continual focus on operational planning to create process improvement teams, which evaluate process-gaps that can be remediated and later indoctrinated into the onboarding and training programs for employees.

Process Improvement Teams

Team formation and engagement is another effective tactic used by aerospace leaders to cope with the challenges of implementing TQM to gain and sustain a competitive edge. TQM implementation requires an ambiance of teamwork, collaboration, and continuous improvement. Process improvement teams allow business leaders to strategically deploy cross-functional resources to remediate manufacturing

mishaps and other quality-related issues (Bhat et al., 2023a). Business leaders can promote team formation by encouraging cross-functional engagement and creating integrated product teams focused on specific TQM initiatives. They can also engage employees by providing training and development opportunities, encouraging participation in improvement projects, and proactively recognizing any efforts or contributions to sustain a TQM mindset in the workplace.

By fostering a culture of teamwork and engagement, aerospace leaders can certify that team members are aligned with the same vision and goals, and everyone is motivated to contribute to the successful permeation of TQM. The rudimentary team formation and engagement tactics that emerged from the data analysis include contributing value-added solutions, diversity in team formation, employee retention and satisfaction, cross-training of employees, hiring consultants, conducting kaizen events, synergetic decision-making, rotational job program, conducting MRMs for QMS effectivity, calibrating all employees to specific skills matrices, and infusing quality planning into the design phases of product development.

From a correlational standpoint, TQM training is another effective practice used by aerospace leaders to cope with the challenges of implementing TQM to gain and sustain a competitive edge. TQM training remains pivotal to an organization’s competitive edge, revenue potential, and marketplace sustainability (Biju et al., 2021). The main areas identified for TQM training from the data analysis of the respondents included ADP procedures, AS9100 certification, ISO certifications, IPC and J-Standard certifications, managing systemic NCRs, obtaining cross-functional buy-in for quality-

centric initiatives, KPI management, TQM training for top management, and controlling process variations. As AL1 mentioned, many defense contractors internally sponsor initiatives that propagate lean manufacturing, waste reduction, continuous improvement, relationship management, and design for manufacturability, which address the building blocks of TQM. Congruently, AL5 stated that cross-training employees mitigates the probabilities of employee burnout while circumventing single points of value that may inadvertently disrupt operational performance.

An effectual training system is used by aerospace leaders as a strategy to implement TQM for gaining and sustaining competitive advantage. Wash (2023) advocated that progressive profit margins and operational efficiency were connected to effectual employee training. By providing comprehensive or holistic training to employees, organizations can ensure that their workforce possesses the necessary skills and knowledge to meet quality standards and customer expectations. This includes providing training on quality management techniques, process improvement methodologies, and other relevant skills. By investing in their workforce, aerospace leaders can improve efficiency, proficiency, mistake-proofing, risk-mitigation, and marketplace stature amongst competitors. Furthermore, an employee-centric training program fosters a culture of vocational growth and development, which remains essential for staying competitive and agile within the rapidly evolving aerospace industry.

An effectual training program is reflected as a strategy by the initial codes which advocate TQM implementation: competitive advantage, firefighting, fire-prevention, cost-reduction, personal competency, and team development. In the assertions of AL3,

the process starts with improving the analysis and remediations of manufacturing mishaps, which derive from flawed designs and nonexistent control plans. From a correlational perspective, organizational leaders must develop and refine the executable bandwidth of employees, which will symmetrically yield higher levels of customer satisfaction, employee morale, and operational throughput.

Linkage to the Literature Review

Many of the participants' responses conveyed a strong need for favorable employee engagement and structured vocational training. The research of Paquibut and Naamany (2020) validated that employee engagement and training were lead determinants of a company's sustainability and profitability. When organizational members are professionally trained, employees feel a sense of empowerment and self-worth, which is foundational to TQM culture. The research study conducted by Nienaber and Martins (2020) verified the correlation between positive employee engagement and an organization's financial performance. Internal company documents from all research partners showed that employee satisfaction was organically related to favorable engagement with other employees and managers.

Linkage to the TQM Conceptual Framework

The principles of TQM philosophy involve an employee-centric perspective that promotes the critical consistency of relevant training and favorable employee engagement. Study participants stated that properly trained employees had a lower rate of manufacturing mishaps, which helped to minimize production costs. The TQM perspective communicates the advantage of investing in the constructive engagement of

all organizational members, which is eventually reciprocated through quality workmanship and efficient labor utilization. The disengaged or untrained employee does not stay long with the employer due to a mutual realization of subpar work performance. The studies of Cavallone and Palumbo (2022) substantiated that TQM and operational excellence were acquiescent to the concept of enhancing positive employee engagement through training and managerial support. Training and employee engagement are branches of the TQM framework, which makes it all the more pragmatic for positive employee engagement to be accelerated by the frequency and quality of vocational training.

Theme 4: Promoting Customer-Centricity

The fourth theme that emerged from the qualitative analysis was customer-centricity. To truly comprehend the essence of customer-centricity, organizational leaders must focus on customer satisfaction from cradle to grave in the customer experience. In the studies of Addis (2023), it was affirmed that a company's cultural ecosystem must coalesce the feedback and consolation of both employee and customer, which directly impacts levels of customer satisfaction and marketplace sustainability. From the moment the customer is introduced to the benefits and capabilities of a particular company's product to the moment that product is delivered to the customer, the satisfaction of the customer must be achieved and preserved. Without customer-centricity, no organization can be profitable or possess a competitive advantage in the global marketplace. The voice of the customer must be captured to truly calibrate operational performance to the requirements and expectations contractually conveyed by the customer. Customer

satisfaction must be continuously measured and pursued to safeguard the delicate relationship between corporation and client.

According to Ishizaka et al. (2019), customer scorecards capture the voice of the customer or the client's point of view regarding usage of a particular product or service, which are meaningful data for quality improvements and business development. Whenever a customer scorecard shows unfavorable quality or delivery scores, top management must proactively address and resolve any issues or challenges that may adversely impact the company's relationship with the customer. Such deliberations often transpire in the form of *escalation meetings* to review all data, variables, and risks that collectively or individually contributed to nonconforming products or services being delivered to the customer. As mentioned by the respondents, monitoring customer returns, reviewing customer scorecards, and improving customer satisfaction were crucial rudiments to TQM, profitability, and competitive advantage (Table 4).

Table 4

Frequency of Emergent Themes: Promoting Customer-Centricity

Interview participant	Number of references	Coverage	Words and phrases	Frequency
AL7	7	12.89%	customer satisfaction, customer scorecards, customer audits	62
AL6	10	14.45%	monitoring customer-returns, on-time delivery, re-calibrating quality objectives	74
AL5	8	11.37%	voice of the customer, quality workmanship, customers' need and expectations	60
AL4	5	7.54%	customer engagement, customer-centric business model, customer relationships	35
AL3	8	13.11%	customer input, warranty returns, cost-savings to customer, reviewing growth opportunities	66
AL2	7	10.45%	building customer loyalty, building rapport and trust, using social media to build brand	58
AL1	4	6.23%	improving customer experience and responsiveness, obtaining customer feedback	31

Regarding the relationship between TQM, competitive edge, and customer satisfaction, AL5 provided the following statement: "If the quality of your product is good, financial performance will naturally follow suit. What winning looks like remains symmetrical to how much revenue is being generated." AL2 made a corresponding assertion regarding customer satisfaction: "The ultimate end goal is understanding your customers' needs and expectations. I make sure that all members of the quality team understand the grave importance of adding value to each customer's program." AL3 also gave this response when referencing customer satisfaction: "I'd say the key KPI is going to be our customer scorecards. That's customer satisfaction, and that will have a direct impact on our profitability."

Aerospace leaders use TQM to strategically gain and sustain competitive advantage by prioritizing customer satisfaction and engagement. Kumar et al. (2023) substantiated that prioritization of the customer's experience remained paramount to a corporation's competitive edge and survivability. By placing a keen focus on satiating customers' needs and expectations, organizations can differentiate themselves from their competitors and build strong relationships with their clientele. To achieve this, aerospace leaders implement various strategies such as conducting customer surveys, gathering feedback, and implementing improvements based on customer input. They also engage with customers through various channels such as social media, email, and other communication platforms to establish rapport and trust. By prioritizing customer satisfaction and engagement, aerospace leaders can build a loyal customer base and gain a competitive advantage in their industry. The survey respondents suggested different strategies for improving customer-centricity by engaging customers with strategic alternatives, reviewing opportunities for growth based on feedback from customers' scorecards, monitoring customers' returns, and recalibrating quality objectives to align with the actual voice of the customer.

Monitoring Customer Returns

When discrepant products or materials are delivered to customers, those same items are returned for a refund or replacement. To elevate the customer's experience, business leaders must improve their customer awareness by strategically investigating and remediating customer returns (Swain, 2023). The customer returns were categorized into two categories, which respectively involved favorable or unfavorable impacts to

organizational revenue. More specifically, if a customer return transpired within the warranty period, the cost to repair and replace the defective products adversely impacted the company's bottom line. If the customer returns transpired outside ethe warranty period, this presented an opportunity for revenue, which involved the customer paying for services to have the product repaired or replaced depending on the serviceability of the returned merchandise. In either scenario, the responsiveness and timeliness of the repair or replacement were measured as components of customer satisfaction. When any product was returned to ORG1 or ORG2, an NCR was annotated in the receiving inspection area, and an internal corrective action was initiated to investigate the RCCA of the discrepant product. The engineering team would investigate the customer return to determine whether the nonconforming condition was caused internally or was customer-induced.

Customer Scorecards

The areas of quality and delivery are fundamental areas that are consistently measured and analyzed by customers. Depending on the customer, customer scorecards were disseminated for feedback, or the customers independently provided monthly feedback via an electronic portal. On-time delivery and the quality of workmanship were measured on a scale between 0 and 100 percent. The color green meant that customer's expectations and requirements were successfully met while the color red signified that the organization failed to meet contractual commitments outlined by the customer. The customer scorecard is an effective tool for measuring the customer's experience with the quality, service, and delivery of aerospace products. In every case, the product and

corresponding paperwork had to be without any clerical errors, cosmetic flaws, or functional discrepancies. From a TQM perspective, the paperwork bears equal significance to the product being delivered (Maisiri et al., 2023).

Customer Satisfaction

The contractual requirements and demands that customers mandate prior to doing business with any organization lay the ground rules for customers satisfaction. As mentioned by Lokesh et al. (2022), a company's competitive edge is based on high levels of customer satisfaction and customer loyalty. The SOW (statement of work), pricing, scheduling, design analysis, procurement risks, and production capacity are systematically and meticulously reviewed by cross-functional stakeholders from both the customer and the company accepting the contract. As long as the contractual terms are not violated, customer satisfaction remains favorable, and the likelihood of future business from the customer becomes viable. When the quality or delivery of the agreed upon product are disrupted, customer satisfaction becomes unfavorable, which jeopardizes an organization's leverage of obtaining repeat business from a dissatisfied customer. Customer satisfaction plays a pivotal role in whether a company's business development team can continue or expand the business, which impacts competitive edge, profitability, and marketplace sustainability.

Linkage to the Literature Review

Customer satisfaction can either make or break the financial footing of any aerospace company. All study participants agreed that customer-centricity served as the true north for sales forecast and competitive advantage. The studies of Irannejad et al.

(2023) validated that a corporation's survivability and competitive edge cannot exist without a TQM framework that focuses on two things: customers' needs and customers' satisfaction. After the client's needs are communicated, the satisfaction of the client is what contributes to continual business growth and a notable brand in the global marketplace.

Linkage to the TQM Conceptual Framework

The paramount purpose of TQM is to reciprocate customer satisfaction throughout the entirety of the program being supported. The customer's experience receiving and using the product are just as important as the product itself. In the research of Lepistö et al. (2022), it was mentioned that organizations embraced a TQM framework to improve product reliability, operational performance, and most importantly customer satisfaction. The existence of customer-centricity would not exist without a company culture that adopts a TQM mindset and philosophy. The responses from each of the study participants confirmed that customer scorecards were reviewed monthly to capture the voice of the customer regarding the on-time delivery of quality goods.

Theme 5: Streamlining Strategic and Supportive Stewardship

Strategic and supportive stewardship was the fifth theme that emerged from the qualitative analysis. Without strategic and supportive stewardship, organizations can neither be lucrative nor competitive in the contemporary marketplace (Wang et al., 2022). Top management must be both strategic and supportive of their employees to truly promote a TQM culture that promotes and preserves a customer-centric, competitive business model that is lucrative. Getting the buy-in and support from top management

when refinements or improvements are needed remain critical to organizational sustainability and competitive edge in the global marketplace.

One of the many forums that promote top management dialogue and engagement is the management review, which involves a cross-functional review of metrics and KPIs to evaluate QMS effectivity, as well as the overall health of the business. Without the guidance and support from senior leadership, firefighting becomes the normalcy of managerial decision-making while fire-prevention becomes the conjectural lip-service that rarely transitions into fruition. I summarized the subsidiary themes identified through thematic analysis as contemporary strategies used by aerospace leaders to proliferate strategic, supportive stewardship (Table 5).

Table 5

Frequency of Emergent Themes: Streamlining Strategic and Supportive Stewardship

Interview Participant	Number of References	Coverage	Words and phrases	Frequency
AL7	5	7.29%	strategic management, supportive leaders, standardizing organizational metrics	33
AL6	9	13.85%	top management buy-in, MRMs, fire-fighting, situational stewardship	43
AL5	7	15.57%	managerial training, fire-prevention, changing the culture, servant leadership	45
AL4	10	5.44%	ambivalent communication, reactive vs proactive problem-solving	22
AL3	4	9.71%	foreseeable risks, competing priorities, inadequate CI plans	39
AL2	8	6.35%	prioritizing quality over revenue, QMS effectivity, develop employees	29
AL1	3	5.93%	clear communication, common goals, data-driven decision making	24

When addressing specific strategies to implement TQM for gaining and sustaining competitive advantage, AL1 made the following comments: “One of the things that has

always been important in my career is ensuring that top managers have training in TQM." When answering the question of how TQM is prioritized and made sustainable throughout operations, AL6 offered the following statements: "The company's strategic direction must prioritize the integration of TQM into every part of the business, which directly impacts the attainment of future contracts that reciprocate progressive revenue projections." AL5 offered some context surrounding managerial focus on profitability as it pertains to the persistent paradox between firefighting and fire-prevention: "The culture is slowly changing from being firefighters to fire-preventers. And right now, everybody's just very reactive because of the lack of resources and training. And it's hard to change that culture when you're being pressed to chase revenue."

Top Management Buy-In

Analysis of the participants' responses reflected directional ambiguity from top management, minimal or nonexistent continuous improvement initiatives, and resource constraints, which were experienced by aerospace leaders who developed strategies to implement TQM to gain and sustain a competitive edge. In the scholastic assertions of Cao et al. (2022), the cognitive awareness and support of top management are critical to an organization's competitive stature. In the affirmations of AL7, there were various challenges involving subsidiary personnel being resistant to the implementation of specific processes that acquiesced to industry standards and certifications. Similarly, the necessity of coherent communication between managerial and subsidiary personnel remains paramount to synergetic efforts, which reciprocate TQM principles that perpetuate productivity, profitability, and competitive advantage.

Perceiving TQM as costly can be a challenge to implement TQM to gain and sustain a competitive edge. The initial investment in TQM implementation can be high, as it requires changes to organizational culture, processes, and technology. Leaders may also need to invest in training and development to ensure that employees have the necessary skills to support TQM. However, it is important to recognize that the benefits of TQM can outweigh the costs in the long run. By improving quality and reducing waste, TQM can increase efficiency and profitability, which can ultimately help aerospace companies gain and sustain a competitive edge in the industry. As mentioned by AL1, organizational leaders view TQM as a costly initiative, which adversely impacts resource allocation, labor utilization, and delivery commitments to customers. However, the emphasis must be placed on the potential ROI (return on investment) that naturally correlates to quality manufacturing, which undeniably impacts whether organizational headship can grow the business with new and existing customers.

Management Reviews

Demonstrating TQM benefits to top management is an effective tactic used by aerospace leaders to cope with the challenges of implementing TQM to gain and sustain a competitive edge. The MRM is a cross-functional forum that allows top management to objectively assess the effectivity of the QMS, as well as the overall health of the organization's infrastructure. According to Theodorou and Anastasakis (2009), MRMs are collaborative meetings held at planned intervals to review top management's commitment to the QMS, as well as any known risks that necessitate managerial awareness and remediation. By presenting data and evidence of the benefits of TQM,

aerospace leaders can secure the necessary support and resources from top management to ensure the success of TQM implementation.

During the MRM, internal and external risks are assessed by measuring the operational performance of the organization, as well as the operational performance of external partners known as suppliers. When products or services are outsourced, this creates potential risks to productivity, profitability, and customer satisfaction, which need to be managed and coherently communicated to top management. As mentioned by AL1, top management is primarily concerned with the monetary benefit of TQM, and they require reassurance that a strong QMS elevates the customer's experience during all stages of the manufacturing process.

Without a systematic and robust management review, the company's competitive edge becomes equivocally imperiled. The KPIs and metrics in the management review provide top management with operational transparency to effectively run the business. The respective MRMs from ORG1 and ORG2 have a quarterly cadence to promote situational awareness and managerial focus around customer satisfaction, risk management, continuous improvement, and the professional growth and development of all employees.

Firefighting Versus Fire Prevention

By prioritizing resource allocation and securing cross-functional support from key stakeholders, aerospace leaders are better suited to face operational challenges that unexpectedly arise in the manufacturing environment. Being able to evoke firefighting versus fire-prevention in a leadership role entails situational awareness, managerial

agility, and selfless stewardship (Dixon et al., 2019). Marketplace vulnerability stems from organizational leaders lacking the strategic foresight to discern between tactical and strategic decision-making when the situation calls for it.

Business leaders also have the option of creating structured training programs while collaborating with universities and other organizations to develop a talent pool with competencies geared toward TQM principles, change management, and manufacturing maturity. Additionally, aerospace leaders may use change management strategies to remediate cultural resistance and ensure cross-functional alignment in pursuit of homogenized goals and objectives. Change management accommodated by inclusive leadership and cross-functional participation promotes workplace synergy and employee satisfaction (Katsaros, 2022). Nonetheless, the deployment of change management strategies must be accommodated by a leadership style that resonates with the people and culture of the organization. In many cases, aerospace leaders must adopt a hybrid style of stewardship that is servant-like, situational, transactional, and transformational to reconcile operational chaos, which derives from premature decision-making that averts comprehensive risk assessments.

While reviewing proprietary documentation and charts from ORG1 and ORG2, it was very apparent that any vulnerabilities in the initial planning phases of a new program would later cause operational challenges when products transitioned from the prototype phase to low-rate and high-rate production. The firefighting consisted of band aid or one-off solutions due to managerial short-cuts that adversely impacted the infrastructure to support additional demand from new and existing customers. As the proverbial saying

goes, *failing to plan is planning to fail*. From a quality perspective, fire-prevention takes the form of mission assurance, which entails the implementation of countermeasures to address and resolve foreseeable risks that potentially impact the delivery of quality merchandise to both domestic and global clientele. Strategic and supportive stewardship makes it plausible to perform a paradigm-shift in the quality culture, which facilitates a critical conversion from reactive to proactive problem-solving. Furthermore, firefighting only yields a negative impact to the company's bottom line while fire-prevention yields cost-savings, which can be reciprocated to customers to strengthen competitive advantage and future profitability for the organization.

Linkage to the Literature Review

From the studies of Karhunen and Ledyaeva (2021), it was proven that effectual leadership reciprocated a business culture of strategic innovation, standardized processes, and supportive management. While the research of Souza et al. (2020) accentuated strategic problem-solving and mitigation of operational expenditures, the distinctive attribute of supportive stewardship was not definitized or materialized. Business leaders are responsible for creating a supportive atmosphere that promotes strategic innovation and autonomy for all employees at every level of the organization (Ye et al., 2022). According the participants' responses, top management incessantly communicated the strategy; however, the managerial support and stewardship remained sporadic throughout the organization. Once a strategic and supportive style of leadership is streamlined in every department, the journey of achieving financial goals and competitive advantage via TQM become more feasible.

Linkage to the TQM Conceptual Framework

The studies of Ansari (2022) had proven that strategic and supportive stewardship could transform the infrastructure of any business. While aerospace companies have many leadership roles, there must be a singular voice; a definitive message that resonates with every organizational member. That message must convey top management's commitment to the professional growth and development of all employees via a TQM lens; otherwise, competitive advantage and profitability are not attainable. Managerial mentorship of subsidiary personnel remains tantamount to an organizational leader who champions TQM principles. The qualitative feedback from each study participant communicated a cultural appetite for leadership support, training, and standardization of work within each department.

Applications to Professional Practice

As an intricate business philosophy in the western region of the United States, TQM is a strategy that aerospace leaders use to remain profitable in a marketplace of global rivalry. Change management philosophies remain synonymous with continuous improvement slogans that aim to elevate operational efficiency while mitigating unnecessary and sporadic expenditures. The terms *continuous improvement* and *operational excellence*, which are used interchangeably throughout the A&D industry, are pivotal elements of the TQM philosophy, as well as the AS9100 (Rev. D) standard.

TQM is a change management philosophy that allows organizational leaders to build a business model that is profitable, competitive, and sustainable by prioritizing the welfare of a company's infrastructure and its customer base. Findings from the

qualitative study showed that some senior leaders in the A&D industry lack effective strategies to increase and maintain profitability through TQM for gaining a competitive advantage. Senior leaders in the aerospace industry can use the findings of this qualitative study to engage managerial and subsidiary personnel to strategically initiate a TQM framework that progressively improves customer satisfaction, financial performance, operational efficiency, and the professional growth and development of employees at every level of the organization. Findings also indicated symmetrical relationships between operational excellence, employee training, and quality workmanship, which allow aerospace companies to be more competitive when pricing future contracts with new or repeat customers.

By reviewing customer scorecards, aerospace leaders can initiate kaizen events to improve on-time delivery of quality products to both commercial and military customers. These kaizen events not only promote healthy levels of employee engagement, but they also allow organizational members to alleviate process variation, create new training material, and reduce operational expenses, which collectively contribute to the company's sustainable growth. From a correlational standpoint, the customer scorecards create a direct linkage between the voice of the customer and the application of lean manufacturing concepts in the production areas.

While the kaizen events promote lean manufacturing and teambuilding skills amongst employees, the focus of capacity planning and resource allocation become prioritized by top management to alleviate reactive or firefighting scenarios that adversely impact profit margins. Single points of failure are mitigated through cross-

training and closely monitoring labor utilization. Findings from the study confirmed that overexertion led to higher frequencies of manufacturing mishaps, which caused late deliveries to customers, as well as oscillations of inventory costs. By closely monitoring and swiftly addressing resource constraints, employees were more likely to sustain quality workmanship and better operational performance, which translated into more revenue for shareholders and investors. Aerospace leaders employed third-party consultants and contractors to help balance the workload or bandwidth of existing employees. If the workload continued to grow in volume, some of the contractors were converted into direct-hire employees. As an effective communication channel for resource allocation, aerospace leaders conducted MRMs to monitor any gaps or foreseeable risks that could potentially impact customer satisfaction, employee training, and competitive stature in the A&D industry.

Strategic and supportive stewardship was the most influential element to the company's culture and overall performance. Coherent and consistent communication was rated as a critical skillset at every level of the business due to the volatility of customers' demands, unexpected material shortages, unsatisfactory supplier performance, and unfavorable levels of attrition due to competitive compensation. The aerospace leaders unanimously agreed that obtaining top management's approval for any initiative created an undisputed momentum to get projects done in a swift, collaborative manner without any roadblocks or resistance.

Findings from the study substantiated that supportive stewardship and strategic planning dictated whether the organization would successfully meet or exceed customers'

expectations. In every instance, operational capacity was evaluated quarterly against the customers' demands. More specifically, there were systemic challenges of customers wanting more product at a faster pace, which naturally caused operational constraints until augmentations in the infrastructure were completed. Nonetheless, organizational headship was measured by their collaborative efforts to implement timely countermeasures to address situational challenges that impacted internal and external stakeholders alike. While compensation and career trajectory were the primary concerns of employees, the company's profitability, sustainability, and competitive advantage were chief areas of concern for shareholders and investors. Aerospace leaders who lack strategies to remain profitable and competitive through TQM implementation may use the findings of this study to improve their style of stewardship, as well as their understanding of employee engagement, customer-centricity, capacity planning, and operational excellence.

Implications for Social Change

The journey of positive social change involves the vocational or scholastic application of novel ideas and tools that impact the eclectic realms of global manufacturing and corporate social responsibility. Correspondingly, A&D companies share similar obstacles and infrastructural challenges at various levels that impede competitive edge, monetary performance, and marketplace perpetuity. When considering material shortages and low-performing vendors that lack the critical resources to accommodate the growing demand of manufactured goods, sporadic risks become the end-result to the sundry sectors of military, commercial, and business aviation. The

asymmetry of the A&D industry is not only caused by domestic and global procurement challenges, but there is also the persistent encumbrance of unfavorable attrition, which remains acquiescent to disengaged employees, poor work culture, and noncompetitive compensation. Oftentimes, commercial and military aerospace companies are left in limbo due to exigent circumstances surrounding unexpected employee turnover, managerial incompetence, and underperforming suppliers that consistently ship products late with poor workmanship. Having a robust QMS that remains fervently supported by top management could potentially remediate the systemic challenges concerning employee engagement, effectual leadership, design for manufacturability, and proactive resource allocation. By improving the engineering designs and manufacturing processes that directly influence operational performance, the safety and reliability of military and commercial aircraft would be greatly improved. The cost-savings from building a quality-centric organization would also allow aerospace OEMs and suppliers to create more job opportunities and training programs for aerospace professionals, which favorably impacts economic growth and sustainability.

The implications of social change include the potential to mitigate manufacturing mishaps in the western region of the United States, which can cause functional failures and catastrophic scenarios involving commercial planes, fighter jets, helicopters, and other forms of aircraft. The safety of servicemembers and civilians is upheld when TQM successfully permeates the eclectic phases of aerospace manufacturing, as well as the recruitment, training, and salubrious engagement of new-hires and experienced professionals in the aerospace and aviation industries. By using TQM to alleviate COPQ,

the cost-savings can be re-invested into an aerospace company's infrastructure, which allows organizational members to be professionally trained and have access to novel technologies that improve aircraft safety, reliability, and airworthiness. By educating aerospace leaders and production personnel on the grave significance of TQM implementation, the safety of commercial and military aircraft is preserved, and more job opportunities are afforded from the cost-savings associated with reciprocal relationships between quality manufacturing and customer satisfaction. Correspondingly, defense contractors, commercial airlines, aerospace suppliers, and government officials can use this qualitative study in their respective communities to suitably choreograph global competitive edge and profitability via TQM.

Recommendations for Action

Researchers provide scholastic recommendations for qualitative research to specify effectual methods of exploring contemporary phenomenon (Greckhamer et al., 2018). It is essential that aerospace companies continuously explore ways to remain competitive, profitable, and relevant to the volatile industry of A&D. Having a TQM framework will definitively reciprocate progressive profit margins and marketplace sustainability (Sahoo, 2018). Customer satisfaction remains acquiescent to timely delivery of quality products; however, the infrastructure must be preserved and effectively managed to achieve long-term competitive advantage (Msosa, 2023). I identified five suggestive strategies from this qualitative study to benefit both existing and aspiring organizational leaders in the aerospace and aviation industries. The recommendations include (a) OpEx initiatives, (b) systematic capacity planning, (c)

proactive employee engagement and training, (d) customer-centric acumen, and (e) hybrid leadership strategy.

Findings from the quality study indicated that continuous improvement initiatives were an effective means to alleviate manufacturing waste and expenditures while improving operational performance. OpEx initiatives such as kaizens can be used to address the costly variables associated with customer escapes, customer returns, and excessive amounts of rework and scrap, which are commonly and collectively categorized as COPQ (Thomas, 2018). The cost of poor workmanship erodes an aerospace company's profitability, competitive edge, and most importantly its reputability in the global marketplace. From a correlational standpoint, TQM encompasses operational excellence as one of its pillars in the pursuit of process controls and higher levels of customer satisfaction. By identifying the different areas of the business were wasted efforts or overexertion sporadically pervade the workforce, aerospace space leaders can redirect that same energy toward other parts of the business that may be hemorrhaging due to inadequate resources or support.

Leaders can also conduct continuous improvement workshops to address and remediate any manufacturing mishaps that may unfavorably impact monetary performance and contractual commitments to customers. The workshops or seminars can be hosted by internal stakeholders or be choreographed by external stakeholders to provide an impartial perspective on organizational vulnerabilities that require convalescence. The outputs from these workshops should comprise of tactical action plans with process-owners and commitment dates, as well as corresponding metrics or

KPIs to measure, manage, and sustain process improvements in any particular area. Having managerial and subsidiary personnel participate in OpEx initiatives and other kaizen events will build an organizational brand of constructive collaboration that will irrefutably improve the morale, engagement, and professional development of all employees (Galeazzo & Furlan, 2021). A policy deployment meeting should be conducted by top management at the beginning of each fiscal year in an offsite setting with a 4-day duration. The purpose of this meeting is to review historical data and operational performance, and then formulate a 5-year strategy that reciprocates systematic and progressive improvements in all sectors of the business.

By allowing continuous improvement initiatives to progressively permeate the work culture, aerospace leaders are better equipped to proliferate TQM into the processes involving accurate capacity planning and resource allocation (Antony et al., 2023). As the second theme identified in the study, capacity planning and resource allocation was a passionate, yet neglected area of interest from top management. While capacity planning involves whether an aerospace organization has the right people, machinery, software, and critical components for a specific infrastructure, resource allocation involves actually assigning appropriate tasks to relevant stakeholders (Zhao et al., 2022).

When existing programs are expected to increase volume or when new programs are awarded to an aerospace company, a cross-functional steering committee involving top management needs to assess the essential resources needed to successfully meet contractual compliance and customers' expectations. Not having enough capacity to meet the needs of the customer will impact a corporation's capacity to stay competitive,

customer-centric, and cost-effective (Thürer & Stevenson, 2022). In addition to steering committees, program managers can partner with various stakeholders from business development, operations, supply chain, and design engineering through a contract review process that efficaciously examines any organizational risks associated with existing and newly awarded programs.

When capacity planning and resource allocation are properly situated prior to production-readiness, the task of managing employee engagement and training becomes more viable (Blayone & VanOostveen, 2021). The third theme, which was categorized as employee engagement and training, was limited to PowerPoint presentations via ADP, which signified a severe level of disengagement between managers and their direct-reports. The ripple effects of the pandemic caused many HR professionals to conduct onboarding and vocational training via online forums; however, the employee engagement surveys conveyed a high level of dissatisfaction with this virtual process. A suggestive countermeasure for employee engagement and training entails performing onsite onboarding and in-person training to reinforce the company's brand and cultural cohesiveness. An additional recommendation would be to establish an executive mentorship program that necessitates monthly touchpoints between mentor and mentee with areas of professional development coherently identified at the onset of the mentorship. Top management would need to hold organizational leaders accountable to this monthly cadence to ensure cultural sustainability. Other tools or apparatuses for improving employee engagement involve top management conducting an all-hands meetings with light refreshments or catered meals. This meeting should have a monthly

cadence with an agenda encompassing a high-level overview of the company's operational health, financial performance, customers' perceptions, and foreseeable opportunities for growth.

When employees become the recipients of structured onboarding and training programs in conjunction with mentorships and collaborative workshops, employee engagement naturally elevates to a level of contentment, which symmetrically impacts the customer's experience (Cavallone & Palumbo, 2022). Identified as the fourth theme from the study, customer-centricity remains the most influential element of competitive advantage for any business; especially in the A&D industry. One of the core tenets of TQM involves pursuing an equilibrium between employee satisfaction and customer satisfaction (Oluwafemi & Okon, 2018).Employees with good morale tend to reciprocate better levels of customer service and quality workmanship. When customers' expectations are met with the on-time delivery of quality products, customer satisfaction is achieved. When the quality or delivery of a desired product deviates from contractual commitments, customer satisfaction is not attained. There is a strong correlation between high levels of customer satisfaction and competitive advantage, which directly impacts an organization's ability to be both profitable and sustainable in the aerospace industry. A strategic countermeasure to propagate a customer-centric workplace would be initiating a quarterly review of customer scorecards to truly assess the voice of the customer regarding their satisfaction with the quality and delivery of the goods and services being provided to both domestic and global clientele. If any of the scorecards show unfavorable ratings in quality or delivery, an internal corrective action would need to be generated,

which should trigger a cross-functional team to conduct an RCCA investigation. Once the root causes and CARs have been identified and implemented, the objective evidence of the corrective actions' effectivity needs to be recorded in a lesson learned repository. The lessons learned repository would be reviewed anytime a customer return, customer escape, or customer complaint has been received and documented accordingly in the organization's QMS.

Strategic and supportive stewardship was a critical area of interest due to the direct correlation between leadership styles and workplace culture. As the fifth and final theme identified in the study, there remains a resolute cogency between leadership style and competitive advantage. A hybrid style of stewardship is needed to effectively propagate TQM principles while preserving managerial tenacity to achieve competitive edge, operational efficiency, favorable attrition, and customer-centric stature in the global marketplace. Systemic instability remains subservient to aerospace leaders that lack vision, competence, coherent communication, and interpersonal skills or social intelligence (Feenstra et al., 2020). Organizational leaders in the aerospace and aviation industries need to be supportive and strategic when managing their team members (Park et al., 2021). The absence of either characteristic will adversely impact the people, process, and productivity of any enterprise. A recommendation would be for top management to perform quarterly skip-level meetings to truly assess how their direct reports' leadership styles are impacting other employees. Top management needs to provide the financial support to improve the software, hardware, tools, and other elements of the company's infrastructure to ensure optimal performance and

sustainability. Another recommendation would be for top management to enforce monthly one-on-one meetings between managerial and subsidiary personnel. More specifically, anyone who manages others should be meeting with their direct reports once a month to recalibrate managerial expectations that coincide with organizational goals and objectives. Strategic, supportive stewardship is needed to accommodate the multifaceted change-management philosophy of TQM, which allows all employees to share responsibility in building a strong, sustainable quality culture.

Aerospace leaders may use the results of this study to achieve operational excellence, positive work culture, and quality workmanship by implementing a structured TQM program that accommodates the professional needs of managerial and subsidiary personnel. Study findings may also aid aerospace leaders in critical processes that involve capacity planning and resource allocation, which allow employees to maximize productivity without overexerting their mental or physical bandwidth with excessive tasks that transcend their scope of responsibility. Scholars, business leaders, and practitioners of continuous improvement all play a pivotal role in implementing the strategies identified in this study, which benefits a wide array of stakeholders in corporate America, and within the realm of aerospace manufacturing. I will disseminate the findings of my qualitative study through knowledge sharing within my professional learning network, as well as through business journals and other academic publications. I may also present my research findings in symposiums, trainings, and vocational seminars that focus on operational excellence, quality-centric leadership, and strategic capacity-

planning. Attendees of these events, which focus on professional growth and development, will be provided appropriate training materials and literature for reference.

Recommendations for Further Research

The findings of this multiple case study stipulated a groundwork for future researchers to explore the vulnerabilities of remaining competitive and profitable via TQM application in the western region of the United States. Supplementary surveys, studies, and scholastic examinations could concentrate on strategies to promote adequate capacity planning and cross-functional design reviews in the aerospace and aviation industries, especially amongst commercial and military aerospace suppliers in the Western region of the United States. The focus of this qualitative study was on the effective business strategies that aerospace leaders use to increase and maintain profitability through TQM for gaining a competitive advantage.

Prospective researchers are encouraged to expand the scope of the population by increasing the quantity of aerospace companies as well as the corresponding sample size. The credibility of one's research findings remains subservient to the reliability and validity of one's qualitative analysis. Incorporating additional aerospace organizations in other regions of the United States, such as the East Coast and Midwest would improve the reliability and validity of research findings. The A&D industry is progressively growing on both a domestic and global landscape; future researchers could apply the study to other aerospace manufacturers in other countries. A quantitative study that examines the correlation between TQM, operational excellence, resource allocation, and

design for manufacturability could complement the academic literature surrounding the A&D industry.

Reflections

Although I possess extensive experience and aptitude in the A&D industry, I did not allow personal views or preconceived notions to influence my decisions during the systematic processes of data collection and analysis, which allowed me to assimilate a deeper understanding of the business problem. The research participants in this study comprised of seasoned aerospace leaders who managed multifaceted production areas in their respective organizations. Due to organizational intricacies involving leadership meetings, continuous business travels, revenue challenges, company acquisitions, and other uncertainties, I encountered extensive waiting periods when attempting to choreograph meetings with each study participant. Nonetheless, all study participants were very responsive, cooperative, and shared an eager level of engagement when sharing their professional perceptions, experiences, and supportive documentation. Additional deliberations derived from the positive energy and persona that was conveyed by the research participants. In addition to their pervasive interest in my doctoral study, each research participant expressed a pure and profound commitment to their duties and responsibilities in their respective organizations, as well as to the professional well-being of their fellow employees.

Regarding my personal experience at Walden University, my doctoral journey was indeed an arduous one with exigent circumstances that transpired inside and outside the virtual classroom. Nonetheless, I prevailed and remained steadfast despite financial

and academic obstacles. I attended two residencies; the first was onsite in San Antonio, and the second residency was done virtually due to the pandemic. The residences were very insightful and added value to my overall experience as a DBA student. The guidance and support from my chair and committee members have been remarkably prodigious.

Conclusion

The ambidextrous journey of competitive advantage and incremental revenue will incessantly pervade the goals and objectives of organizational leaders in the A&D industry. However, the sustainability of a business remains acquiescent to four things: a well-designed product built with good quality, a customer-centric culture, effectual leadership, and the perpetual pursuit of strategic innovation and continuous improvement. Some business leaders make significant investments in remaining competitive in the global marketplace; hence, substantial funding remains incessantly reciprocated to a manifold of R&D projects. However, minimal investment is placed towards the vocational growth and development of both managerial and subsidiary personnel.

Aerospace leaders need to invest in a structured training program for all employees to ensure salubrious levels of attrition and elevated cost-savings via quality-centric processes. If a product or service has discrepancies in its design or lacks coherent work instructions to build it, the monetary mishap entails the utter ruin of a corporation's competitive edge, reputability, and financial performance. Employees at every level of an organization must be properly onboarded, trained, and mentored to ensure propitious employee engagement.

Quality tools and operational excellence must be embedded within an aerospace company's policies and procedures to impact workplace culture and customer-centricity. TQM is the change management philosophy that empowers aerospace leaders to cultivate a gold standard of strategic and supportive stewardship, which further solidifies the universal correlation of built-in quality, progressive profit-margins, and competitive advantage in the global marketplace. TQM has many elements, but its primary purpose is to ensure that quality remains interwoven with the planning, designing, and manufacturing phases of a product's life cycle, which drives down the cost of doing business.

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Appendix: Interview Protocol

Interview: Strategies aerospace leaders use to increase and maintain profitability through TQM for gaining a competitive advantage.

1. Face–to–face interviews will begin with a preliminary overview of the research topic.
2. I will clarify the voluntary nature to participate in the study, as well as the flexibility to withdraw at any time.
3. I will certify that all research participants read and ask related questions prior to signing the consent form.
4. I will provide all participants a copy of the consent form for respective keeping.
5. I will inform all participants of the interviewing process and procedures, which entail the usage of an audio–recording device.
6. The duration of the interview will be restricted to 45 to 60 minutes for 7 interview questions, in addition to any follow–up inquiries.
7. I will inform participants via email once my interpretations of the transcriptions are finalized and ready for review to ensure data accuracy.
8. Once the interviews conclude, I will thank each participant for agreeably partaking in the research study.