OPERATIONAL ASSESSMENT OF THE OPERATING THEATRE COMPLEX IN A HEALTHCARE FACILITY: A CASE STUDY

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Introduction

Public-private partnerships (PPPs) in healthcare have emerged as a viable solution to address the challenges faced by healthcare systems globally, particularly in the operation theater domain. Operation theatres are critical components of healthcare facilities where surgical procedures are performed, demanding high-quality infrastructure, equipment, and skilled personnel. PPPs offer a collaborative approach between the public sector, typically represented by government entities, and private sector stakeholders, such as healthcare providers or corporations. In the context of operation theatres, PPPs can facilitate the construction, management, and maintenance of state-of-the-art surgical facilities, leveraging the expertise and resources of both sectors. Through PPPs, governments can harness private sector innovation and efficiency while ensuring equitable access to surgical services for the population.

The rising demand for healthcare services has prompted institutions to strike a challenging balance between cost-cutting, service improvement, and equity of access while pursuing the overarching goal of improving patient value. Patient flow management, a complex but vital business activity, influences hospital productivity and patient outcomes. The hospital must successfully manage the increasing needs of an unexpected and changing volume of patients with the hospital resources available while ensuring that each patient reaches each step of care as needed. As a result, boosting hospital patient flow has become a policy objective if hospitals can fulfil strategic and operational hospital goals. One strategy a hospital can implement to improve the efficiency of growth, clinical outcomes, and patient experience is the effective utilization of resources such as beds and operating rooms and the availability of professional personnel. Even the hospital, in this case, attempted to provide patient care at an affordable cost and improve performance to keep ahead of their competitors and to find potential improvement areas.

The Operation Theatre complex (OT), the heart and the most crucial revenue generator of any hospital, accounting for 50 to 60% of total revenue, is an essential and critical component of any hospital. It takes a significant investment and a large team of experts, including surgeons, anaesthetists, operating room technicians, assistants, nurses, and other specialists, making it Labouré- and money-intensive. Suitable investments are necessary for fixture and equipment installations and meeting design specifications to provide rigorous aseptic conditions.

Typically, an operating room operates on an eight-hour schedule, excluding emergencies. During those eight hours, four extensive operations at maximum can be completed; however, if an ideal operation mix is adopted, this number can rise to five to six large operations every day. However, technology inefficiencies and human errors make it difficult to optimize operating rooms completely. Nevertheless, as a significant investment for any hospital budget, it is necessary to use it properly to maintain a favourable cost-benefit ratio.

The tertiary care hospital in Mumbai aims to provide quality patient care to the individuals and increase the revenue generated by the hospital. To achieve this, we studied the vital revenue-generating department -the OT complexes of the hospital. The department's performance was evaluated, and opportunities for improvement were identified as adequate management of an operation theatre is necessary to increase surgical production in any institution.

Review of Literature

Author	Study Location	Sample Size	Methodology	Salient Features
A.P. Pandit et al. (2018) “A Study of Factors Affecting Utilization of OT”	India	120	Quantitative data collection and analysis of OT utilization metrics	• OT time was underutilized due to delays and poor scheduling. • Mismatch between scheduled and actual surgery times caused inefficiencies. • Long pre-operative and post-operative waiting times impacted OT flow. • Shortage of skilled staff limited OT utilization capacity. • Recommended reducing surgical days by improving daily efficiency. • Suggested hiring more staff and adopting advanced technology for better management.
Nitin RV et al. (2016) An Empirical Study on Marketing Mix Tactics for Healthcare Services in a Tertiary Care Hospital”	Tertiary Care Hospital (India)	200	Empirical analysis of hospital's marketing mix	• Ambiance of the hospital plays a critical role in attracting and retaining patients. • Affordability of services is essential to cater to patients from all economic backgrounds. • Quality of care significantly influences the hospital’s brand perception. • Soft skills of staff (communication, empathy) impact patient satisfaction and loyalty. • Effective marketing mix strategies are necessary to build a strong hospital brand. • Increased patient inflow directly contributes to the hospital’s revenue and sustainability.
Abhinav Sarma et al. (2020) Healthcare Marketing in India with Special Reference to Hospitals: Challenges, Opportunities	India	50	Qualitative study of marketing strategies and challenges in healthcare	• Healthcare marketing in India faces challenges like regulatory constraints, lack of awareness, and ethical concerns. • Strategic marketing helps hospitals differentiate themselves in a competitive environment. • Patient-centric approaches and transparent communication are key to building trust and loyalty. • Digital platforms and social media offer new opportunities for hospital outreach

and Strategies”				and engagement. • Long-term patient relationships can be achieved through consistent service quality and strong brand reputation. • Emphasizes that planned marketing efforts are crucial for sustaining growth in the healthcare sector.
A.B. Bakker et al. (2011) “Key Questions Regarding Work Engagement”	United States	100	Literature review and conceptual framework	• Work engagement is defined as a positive, fulfilling, work-related state of mind characterized by vigor, dedication, and absorption. • Leadership and social environment are key drivers in fostering employee engagement. • Job crafting empowers employees to shape their tasks and roles, maintaining engagement levels. • Work engagement positively impacts employee health and well-being. • Sustainable engagement requires organizational support and recognition of individual contributions. • A research agenda focused on understanding the dynamics and long-term impact of engagement.
Shanafelt TD et al. (2016) “Executive Leadership and Physician Well-being: Nine Organizational Strategies to Promote Engagement and Reduce Burnout””	Mayo Clinic (USA)	50	Case study approach; organizational strategy analysis	• Identified burnout as a major issue affecting physician performance and well-being. • Proposed 9 organizational strategies to promote physician engagement and reduce burnout. • Emphasized the importance of leadership involvement and accountability in implementing well-being initiatives. • Demonstrated that even low-cost interventions can yield significant improvements in engagement. • Highlighted the need for ongoing efforts and institutional commitment for sustained impact. • Shared successful examples from the Mayo Clinic to support the effectiveness of these strategies.
J. Moon et al. (2020) Organizational Strategies to Promote	United States	30	Analytical and empirical research comparing non-profit vs. for-profit hospitals	• Service mix plays a critical role in determining hospital profitability. • Non-profit hospitals tend to offer premium specialty services to boost output and competitiveness. • For-profit hospitals often increase

Engagement and Reduce Burnout”				profitability by raising prices on basic routine care. • Non-profits invest more in national advertising to attract patients beyond local markets. • Competition widens the gap between the two types of hospitals in service delivery and cost structure. • non-profits carefully balance their service portfolio to sustain competitiveness and financial viability.

Research Gap

• Limited studies in India focus on comprehensive OT operational assessments, especially under Public-Private Partnership (PPP) models.

• Most existing research emphasizes time-motion or efficiency metrics without addressing broader systemic issues.

• Stakeholder perspectives on marketing, pricing, staff engagement, and equipment challenges are often overlooked.

• Mixed-method approaches combining both quantitative and qualitative data are rarely applied in OT performance studies.

Research Questions

- **Main Question**:
    - What are the key operational, managerial, and systemic factors contributing to the underutilization of the OT complex in a PPP-based multispecialty hospital?
- **Sub-questions**:
    - What are the current OT utilization rates, and how do they compare with benchmarks?
    - What challenges are perceived by key stakeholders regarding OT operations?
    - What strategic measures can enhance OT utilization, hospital revenue, and staff satisfaction?

Research Objectives

• To assess the current utilization levels of the OT complex.

• To identify key operational and managerial challenges affecting OT performance.

• To evaluate the impact of marketing, pricing, employee engagement, and equipment functionality on OT utilization.

- To propose strategic recommendations for enhancing OT efficiency and hospital revenue.

Methodology

- **Study Design**:

A mixed-method, cross-sectional study was conducted to assess the operational efficiency and utilization of the Operation Theatre (OT) complex in a multi-specialty hospital operating under a Public-Private Partnership (PPP) model.

- **Study Setting**:

The research was carried out at a tertiary care multi-specialty hospital located in Mumbai, which houses multiple modular OTs, including a dedicated Cardiac Operation Theatre (COT).

- **Study Period**:

The study was conducted over a three-month period from March 2025 to May 2025.

- **Data Collection Tools**:

  - Quantitative Data: Surgical volume records from hospital MIS were analyzed to calculate OT utilization rates.
  - Qualitative Data: A Focused Group Discussion (FGD**)** was conducted using a semi-structured questionnaire with 10 stakeholders, including surgeons, OT nurses, biomedical engineers, and OT managers.

- **Sampling Technique**:

Convenience sampling was used to select FGD participants based on their involvement in OT operations and availability.

- **Data Analysis**:

  - Quantitative data was compiled and analyzed using MS Excel to compute utilization percentages and surgical trends.
  - Qualitative data was analyzed using direct content analysis to develop themes and subthemes.
  - A Conceptual Framework (Coding Tree) and a Cause-and-Effect (Ishikawa) Diagram were developed to visualize the challenges.
  - The DMAIC (Define, Measure, Analyze, Improve, Control) model was applied as a quality improvement tool throughout the study.

- **Conclusion:**

- The case study shed light on the underlying issues that contributed to the underutilization of the OT complex. The case study revealed two significant findings: poor marketing, branding, and pricing strategies, as well as poor employee engagement and remuneration, all of which contributed to the hospital's low patient flow, which resulted in low surgery volumes.

- Keywords: Operation Theatre Utilization, Public-Private Partnership, Healthcare Management, Revenue Enhancement, DMAIC, Hospital Performance, Stakeholder Engagement,

- **Results and Discussion:**

- The operation theatres in this hospital were underutilized, and the utilization rate was found to be, on average, 32.5%, 16.2%, 15.2%, and 14% for cardiac operation theatre (COT), OT 2, OT 1, and OT 4 respectively. The focus group discussion findings highlighted that the hospital should improve its marketing and branding strategies, rationalize the surgery tariff rates, improve employee engagement and compensation, and maintain and update hospital medical equipment.