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| RESEARCH ARTICLE

Innovation in Orthopedic Services: Service Excellence with C-arm Technology at Hospitals in Sragen using Business Model Canvas (BMC) and Swot Analysis

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| ABSTRACT
This comparative study aims to enhance orthopedic services through innovation and business strategy. It specifically focuses on the implementation of C-Arm technology in Sragen hospitals, Indonesia and the utilization of Business Model Canvas (BMC) and SWOT analysis in a private hospital to improve orthopedic surgery services. The research assesses the impact of C-Arm technology on service excellence, patient outcomes, and operational efficiency in Sragen hospitals. It also explores how strategic planning using BMC and SWOT analysis can enhance orthopedic services in the private hospital. The study employs a mixed-methods approach, including a literature review, case studies, data collection from various stakeholders, BMC implementation, and SWOT analysis. The findings aim to provide valuable insights into the role of C-Arm technology, its influence on service excellence, and the effectiveness of business strategy development in the orthopedic healthcare sector. The research offers practical recommendations for hospitals seeking to improve orthopedic care and operational efficiency through innovation and strategic planning.

| KEYWORDS

Innovation, orthopedic services, C-Arm technology, business strategy development, Business Model Canvas (BMC), SWOT analysis, service excellence, private hospital, Sragen

| ARTICLE INFORMATION

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1. Introduction

Orthopedic services play a crucial role in providing essential medical care and improving the well-being of individuals with musculoskeletal disorders and injuries. To enhance service delivery and patient outcomes, healthcare providers must integrate innovation and strategic planning as technology and healthcare continue to advance. This comparative study aims to investigate the combined effect of implementing C-Arm technology and employing Business Model Canvas (BMC) and SWOT analysis on orthopedic services at hospitals in Sragen, Indonesia, and a leading private hospital. C-Arm technology has revolutionized orthopedics by enabling real-time imaging facilitating precise and minimally invasive procedures. Its impact on surgical precision, reduced radiation exposure, and overall patient care is widely recognized. Sragen hospitals have started incorporating C-Arm technology into their orthopedic departments to elevate service excellence and patient care. However, the extent to which it influences operational efficiency and overall service delivery in these hospitals remains an area requiring further investigation(Terzić et al., 2010).

Concurrently, strategic planning has become essential in navigating the complex healthcare industry. Utilizing strategic tools such as Business Model Canvas (BMC) and SWOT analysis provides a structured approach for medical facilities to develop business strategies, identify areas for improvement, and optimize service delivery. A distinguished private hospital renowned for its orthopedic surgery services has embraced these strategic planning methods to enhance its orthopedic care and overall hospital performance. Through the effective integration of innovation and strategic planning, this hospital aims to strengthen its market

position and achieve service excellence. This research seeks to address the research gap regarding the utilization of C-Arm technology in orthopedic services in hospitals located in Sragen. Moreover, by examining the research gap in the context of Sragen, this comparative study seeks to examine the impact of implementing C-Arm technology in Sragen hospitals on service excellence, patient outcomes, and operational efficiency. Additionally, it will explore how the utilization of Business Model Canvas (BMC) and SWOT analysis at a private hospital enhances its orthopedic surgery services and contributes to its overall business strategy(Nandi et al., 2019). The findings will not only enrich the understanding of the benefits and challenges associated with this technology but also offer recommendations for optimizing its implementation and maximizing its impact in hospitals(Dixit, 2016). The research will adopt a mixed-methods approach, encompassing literature reviews, case studies, data collection from medical professionals, administrators, and patients, as well as the implementation of BMC and SWOT analysis.

The utilization of strategic management tools like the Business Model Canvas (BMC) and conducting a SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats) can be instrumental in guiding this private hospital towards success and establishing their leadership in the field of orthopedic surgery services. Identifying the key activities and resources necessary for delivering exceptional orthopedic surgery services is crucial. This includes skilled orthopedic surgeons, well-trained nursing staff, advanced medical equipment, state-of-the-art operating rooms, rehabilitation facilities, and efficient administrative support. By allocating these resources optimally, private hospitals can ensure smooth operations and the delivery of high-quality care. Lastly, strategic partnerships with medical device manufacturers, rehabilitation centers, research institutions, or insurance providers can greatly enhance orthopedic surgery services. Collaborations offer opportunities for innovation, expanded service offerings, access to new markets, and the ability to leverage complementary expertise and resources(Najjar et al., 2013).

By employing the BMC and conducting a SWOT analysis, private hospitals specializing in orthopedic surgery services can gain a comprehensive understanding of their business model and effectively develop a strategy that capitalizes on strengths, addresses weaknesses, leverages opportunities, and mitigates threats. These strategic management tools provide invaluable insights and guidance, positioning private hospitals to excel in the competitive healthcare industry and deliver outstanding orthopedic surgery services. This research aims to examine and evaluate the business model of Orthopedic Surgery Leading Services, a private Hospital. The findings of this study are expected to yield valuable insights into the role of C-Arm technology in orthopedic services, its influence on service excellence, and the effectiveness of business strategy development in the healthcare sector(Pfannstiel & Rasche, 2017). Furthermore, the research aims to provide practical recommendations for hospitals and medical facilities seeking to improve orthopedic care and operational efficiency through the integration of innovation and strategic planning. Ultimately, by comprehending the impact of innovative technologies and strategic decision-making in orthopedic services, this study aims to contribute to the advancement and enhancement of healthcare services in the field of orthopedics. The study will focus on analyzing the company's business development through the utilization of two strategic analysis tools, namely the Business Model Canvas (BMC) approach and SWOT analysis. The research will specifically investigate the case of Orthopedic Surgery Leading Services, a private Hospital and provide insights into its business model and strategic factors.

2. Literature Review

Literature Review on C-Arm Technology in Orthopedic Services, Service Excellence in Healthcare, and Strategic Planning Methods for Business Development in the Medical Field

2.1 Introduction:

C-Arm technology has emerged as a crucial tool in orthopedic services, offering real-time imaging capabilities during surgeries and procedures. Achieving service excellence in healthcare requires effective utilization of technology and strategic planning to optimize patient outcomes and operational efficiency. This literature review aims to explore existing research on C-Arm technology in orthopedic services, service excellence in healthcare, and strategic planning methods for business development in the medical field(Mcdonnell et al., 2015).

2.2 Arm Technology in Orthopedic Services:

Numerous studies highlight the growing adoption of C-Arm technology in orthopedic services. These studies examine the benefits of C-Arm technology in improving surgical precision, reducing radiation exposure, and enhancing overall patient care. Researchers have explored its applications in various orthopedic procedures, such as fracture reduction, joint replacements, and spine surgeries. The literature also addresses the challenges and limitations of C-Arm technology, such as cost considerations and the need for specialized training for medical professionals(Back et al., 2022a).

2.3 Service Excellence in Healthcare:

Service excellence is a critical aspect of healthcare delivery, focusing on meeting patients' needs and expectations. The literature delves into the various dimensions of service excellence, including patient satisfaction, quality of care, and patient-centeredness. Researchers have explored the role of communication, empathy, and patient engagement in achieving service excellence.

Additionally, studies have investigated the impact of service excellence on patient loyalty, healthcare outcomes, and overall healthcare system performance(Karpf et al., 2009).

2.4 Strategic Planning Methods for Business Development in the Medical Field:

Strategic planning is essential for medical organizations to navigate the dynamic healthcare landscape successfully. Researchers have examined different strategic planning models and frameworks, including the Balanced Scorecard, SWOT analysis, and Business Model Canvas (BMC). These studies explore how strategic planning helps medical facilities adapt to changes, enhance competitiveness, and align their goals with market demands. The literature also discusses the importance of stakeholder involvement, leadership, and organizational culture in effective strategic planning(Zoran et al., 2009).

2.5 Business Model:

Understanding Business Models as Methods: According to Wheelen & Hunger (2008), a business model is the approach employed by companies to generate profits in the business environment in which they operate. Similarly, the Rappa defines it as the method used by a company to sustain its business and ensure survival. From these definitions, we can conclude that a business model is a means or strategy for creating value. Furthermore, when we focus on the strategy aspect, a business model can be described as the interplay between a company's capabilities and resources, as well as the activities undertaken to acquire and create value, resulting in profit generation. However, it is important to acknowledge that this definition is a synthesis of various perspectives and writings on the subject, particularly in relation to strategy.

Components of a Business Model: A business model encompasses various factors that contribute to value creation for the organization. These factors include:

1. Target Market: Identifying the specific group of customers that the company serves.
2. Value Proposition: Determining what the company offers to its customers.
3. Production Process: Defining how the company manufactures or delivers its products.
4. Profit Generation: Outlining the strategy for making a profit.

2.6 SWOT analysis

SWOT Analysis is a method used to evaluate the strengths, weaknesses, opportunities, and threats present in an organization, project, or business situation. This method is designed to assist in a comprehensive understanding of the internal and external conditions that impact the performance and strategies of an entity(Terzić et al., 2010).

The main components of SWOT analysis are as follows:

1. **Strengths**: Strengths refer to internal assets or resources that provide a competitive advantage to the organization. These can include high-quality human resources, state-of-the-art technology, a strong brand, a large customer base, or unique expertise that differentiates the organization from its competitors.
2. **Weaknesses**: Weaknesses refer to internal factors that hinder the performance of an organization. These may include limited resources, technological limitations, a lack of key expertise, dependence on one or a few major customers, or a slow bureaucratic structure.
3. **Opportunities**: Opportunities are external factors that can be leveraged by the organization to achieve a competitive advantage or growth. Examples of opportunities include increasing market demand, the development of new technologies, favorable regulatory changes, or opportunities for expansion into new markets.
4. **Threats**: Threats refer to external factors that can pose risks or problems for the organization. Threats can include intense competition, changes in consumer trends, economic fluctuations, or unfavorable government policy changes.

2.7 SWOT Matrix:

The TOWS Matrix, also known as the SWOT Matrix, is a tool used to compile strategic factors for company development. This matrix demonstrates how external opportunities and threats can be aligned with the strengths and weaknesses of a company. The four quadrants of the matrix represent different strategic approaches: SO (Strengths-Opportunities), WO (Weaknesses-Opportunities), ST (Strengths-Threats), and WT (Weaknesses-Threats) strategies(Back et al., 2022b).

2.8 Business Model Canvas (BMC)

Osterwalder and Pigneur (2010) introduced a method known as the Business Model Canvas, which serves as a tool for visualizing ideas, logical thinking, and frameworks in the same way that a piece of paper is essential for a writer, a canvas for a painter, or a computer screen for a designer. This canvas is particularly useful for business people, entrepreneurs, and managers in profit and non-profit organizations. The Business Model Canvas helps describe and visualize how organizations create, communicate, and deliver value to customers.

The Business Model Canvas (BMC) provides a common language for describing, visualizing, assessing, and modifying business models. It enables a clearer understanding of complex and large organizations, facilitating effective communication by transforming unspoken assumptions into concise information. The BMC consists of nine key elements: Customer Segments, Value Propositions, Channels, Customer Relationships, Revenue Streams, Key Resources, Key Activities, Key Partnerships, and Cost Structure(Pfannstiel & Rasche, 2017). They are explained below:

1. **Key Partners:** These are the partners involved in the organization's operations, serving various purposes such as cost savings through economies of scale and risk reduction in resource acquisition.
2. **Key Activities:** These activities play a crucial role in the success of the business model by delivering value to customers. Not all activities are categorized as key resources, which are essential for the organization's success in providing value.
3. **Key Resources:** These are the most important assets that determine the successful operation of the business model. They can include physical, intellectual, and human resources, with intellectual resources being particularly valuable due to their difficulty in imitating.
4. **Value Proposition:** It represents the unique offering that determines whether a product or service is chosen by customers. The value proposition aims to solve customer problems or fulfill their desires in a distinctive way compared to competitors.
5. **Customer Relationship:** This element focuses on building and maintaining relationships with customers, acquiring new customers, retaining existing ones, and offering additional products or services to them.
6. **Channels:** Channels describe how the organization communicates with customer segments and delivers its value proposition. This includes raising awareness, facilitating product or service provision, product or service delivery, and after-sales service.
7. **Customer Segments:** These are the specific parties that use the organization's products or services based on their needs. They contribute to the organization's revenue generation, typically by directly paying for the services or goods they purchase.
8. **Cost Structure:** This element encompasses all costs incurred after the implementation of the business model. The cost structure is influenced by the company's chosen strategy, whether it prioritizes low costs or unique advantages.
9. **Revenue Streams:** This element outlines how the organization generates income from each customer segment. The flow of funds is vital for the organization's sustainability. See figure.1.1 below:

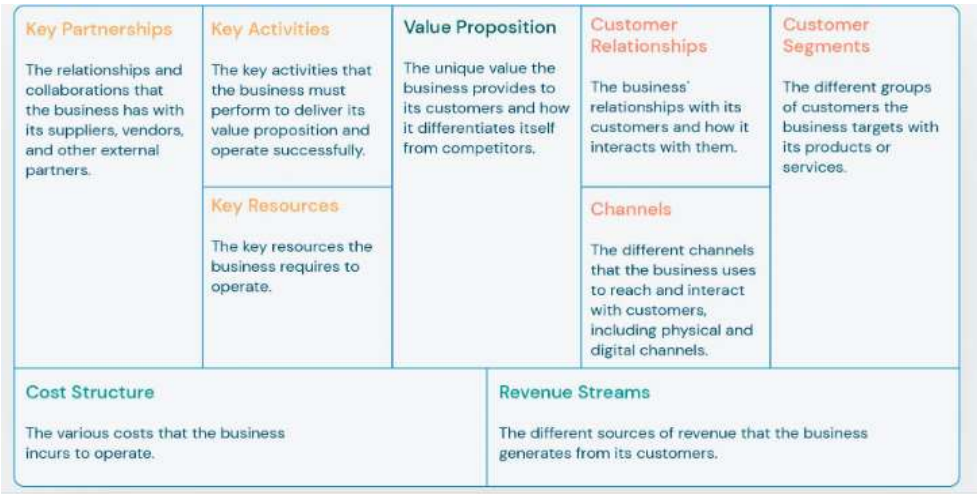

Table 1 *Source: https://blog.invgate.com/business-model-canvas*

3. Methodology

3.1 Introduction

This research utilized a combination of SWOT analysis and the Business Model Canvas as the methodological framework. Data was collected through primary and secondary data collection methods. Primary data collection involved interviews with orthopedic team members, hospital staff, and patients who have received orthopedic services. Additionally, surveys and observations were also conducted to gain comprehensive insights into orthopedic services. Secondary data was obtained through relevant literature, industry reports, and hospital records(Rheinisch, 2002).

SWOT analysis was used to evaluate internal strengths such as advanced orthopedic equipment (C-Arm), high-quality orthopedic services, and competent medical teams. Internal weaknesses such as high costs will also be identified. On the other hand, external opportunities were analyzed, including the growing demand for orthopedic care and the potential for increased hospital capacity and promotion. External threats, such as competition with other hospitals and regulatory changes, will also be assessed(Nandi et al., 2019).

Furthermore, the Business Model Canvas was utilized to analyze and visualize the key components of the orthopedic service's business model. This included key activities such as patient management, inventory procurement and management, training, and budget planning. The value proposition focused on orthopedic services utilizing advanced technology such as the C-Arm. Customer relationships were examined through communication channels such as social media and efforts to build long-term relationships with patients. Customer segments were identified based on categories such as gender and age. Revenue streams were analyzed, including revenue from medical services, health insurance, government programs, donations, and other additional services(MacLachlan & Scherer, 2018).

The collected data was analyzed using both qualitative and quantitative approaches. Qualitative analysis involves coding and categorizing findings from interviews and surveys, while quantitative analysis employs statistical techniques to analyze survey data and measure the impact of specific factors on orthopedic services. The results of this research were used to identify gaps in orthopedic services, develop improvement strategies, and provide recommendations to optimize the performance of orthopedic services(Mcdonnell et al., 2015).

3.2 Research Method

1. **Literature Review:** This research conducted an extensive review of the existing literature on C-Arm technology in orthopedic services, service excellence in healthcare, and strategic planning methods for business development in the Sragen.
2. **Case Studies:** This research performed a comparative analysis of two hospitals in Sragen that have implemented C-Arm technology in their orthopedic departments, evaluating the impact on service excellence, patient outcomes, and operational efficiency.
3. **Objective:** This research aimed to investigate the impact of C-Arm technology adoption on orthopedic services' excellence in hospitals located in Sragen, Indonesia, and explore the potential for enhancing orthopedic surgery services at a private hospital through the implementation of strategic planning methods, specifically Business Model Canvas (BMC) and SWOT analysis.
4. **Data Collection:** The research employed a mixed-methods approach; it involved both primary and secondary data collection methods. Primary data was gathered through interviews, surveys, and observations with various stakeholders, including orthopedic team members, hospital staff, and patients. Secondary data was collected from published literature, industry reports, BMC implementation, SWOT analysis, and hospital records. The data covered information related to the strengths, weaknesses, opportunities, and threats of the orthopedic service, as well as the various components of the Business Model Canvas.
5. **SWOT Analysis:** The SWOT analysis assessed the internal strengths and weaknesses of the orthopedic service, as well as the external opportunities and threats it faces. The strengths were identified by examining the competence of the orthopedic team, the advanced orthopedic equipment, and the complete facilities. Weaknesses were determined by considering factors such as high costs. Opportunities were identified by analyzing the growing demand for orthopedic care and the potential for market expansion. Threats were assessed by evaluating competition from other hospitals and changes in regulations and policies.
6. **Business Model Canvas:** The Business Model Canvas was used as a framework to analyze and visualize the key components of the orthopedic service's business model. It included key activities such as patient management, inventory management, training, and budget planning. The value proposition focused on the high-quality orthopedic services provided using advanced equipment like the C-Arm. Customer relationships were examined through customer service channels like social media and long-term relationships with patients. Customer segments were identified, including men, women, children, adults, and the elderly. Revenue streams will be analyzed, considering medical services, insurance, government programs, donations, and other additional services.
7. **Data Analysis:** The collected data was analyzed using qualitative and quantitative methods. Qualitative analysis involved coding and categorizing interview responses and open-ended survey questions to identify themes and patterns related to the SWOT analysis and the Business Model Canvas. The quantitative analysis involved statistical techniques to analyze survey data and assess the impact of various factors on the orthopedic service.
8. **Results and Recommendations:** Based on the analysis of the SWOT and Business Model Canvas, the research presented the findings regarding the strengths, weaknesses, opportunities, and threats of the orthopedic service. It provided

recommendations for improving the service based on the identified gaps and opportunities. The results were used to develop strategies for enhancing the orthopedic service's performance, addressing weaknesses, capitalizing on strengths, and leveraging opportunities.

9. **Expected Contribution:** This research aims to provide valuable insights into the role of C-Arm technology in orthopedic services, its impact on service excellence in hospitals, and how private hospitals can enhance their orthopedic surgery services through strategic planning. The findings contributed to the body of knowledge in healthcare innovation and business strategy development, offering practical recommendations for hospitals aiming to improve their orthopedic care and overall operational efficiency.

4. Results and Discussions

4.1 Overview of orthopedic surgery services

The private hospital offers leading orthopedic surgery services provided by a skilled team, advanced facilities, and technology. They perform various surgeries for musculoskeletal conditions and injuries, including joint replacements and repairs. The hospital takes a multidisciplinary approach, offering comprehensive care, including assessments, therapy, and rehabilitation. They prioritize patient comfort and safety, providing dedicated recovery spaces and assistance with pain management and mobility. The hospital stays up-to-date with advancements through research and training, ensuring patients receive the best available treatments. Overall, their goal is to improve patients' quality of life and restore function and mobility.

Figure 4.1: The branches of Orthopedic Surgery Leading Services in a private hospital can include:

1) No	*2) Branches*	*3) Duties*
1.	**Joint Replacement Surgery**	This branch focuses on the replacement of damaged or deteriorated joints, such as hip, knee, shoulder, or elbow joints, with artificial implants to restore function and alleviate pain.
2.	**Sports Medicine**	This branch specializes in the treatment of sports-related injuries, including fractures, ligament tears (such as ACL or MCL tears), tendonitis, and cartilage damage. It involves both surgical and non-surgical interventions to help athletes recover and return to their sports activities.
3.	**Spine Surgery**	This branch deals with conditions affecting the spine, such as herniated discs, spinal deformities (scoliosis or kyphosis), spinal stenosis, and spinal fractures. Surgical procedures may include spinal fusion, disc replacement, or decompression surgeries to relieve pain and restore spinal stability.
4.	**Trauma Surgery:**	This branch focuses on the treatment of orthopedic injuries resulting from accidents, falls, or other traumatic events. It involves the management of fractures, dislocations, and complex injuries that require immediate surgical intervention for proper alignment, stabilization, and healing.
5.	**Pediatric Orthopedics:**	This branch specializes in the diagnosis and treatment of musculoskeletal conditions and injuries specific to children and adolescents. It includes the management of conditions like scoliosis, limb deformities, clubfoot, and pediatric fractures.

Table 4.1: *Source: Orthopedic Surgery Leading Services in a private hospital*

4.2 Strategic Management

Managerial implications for a private hospital offering leading orthopedic surgery services can be explained below:

- **Strengthening Communication Channels:** Companies focused on improving their communication channels with dealers and end consumers to gain a competitive edge. This was achieved by leveraging technological advancements and utilizing the company's capabilities to provide unique value. Offering easy access and efficient service delivery are crucial factors in attracting patients. Companies can also utilise their databases to generate revenue independently, reducing dependence on dealers. Implementing dedicated projects aimed at business development and revenue growth is a viable strategy.
- **Updating Channels and Operational Processes:** Companies in the orthopedic surgery sector can enhance their existing applications to provide patients with improved access to a broader range of data. This will enhance the overall patient experience and optimize the flow of operations in the business model. By embracing these updates, companies can enhance efficiency, increase patient satisfaction, and generate more revenue.
- **Diversifying Revenue Streams:** Companies providing orthopedic surgery services should explore non-retail project financing opportunities. This may involve hiring project managers from outside the company and collaborating with the

IT team to maximize the potential of their databases. By diversifying revenue streams beyond retail financing, companies can tap into new sources of income and achieve overall revenue growth.

4.3 Business Model Canvas (BMC)

Using the Business Model Canvas, let's describe the business model of a private hospital that offers leading orthopedic surgery services in Table 4.2 Business Model Canvas for Orthopedic Private Hospitals in Sragen:

<table>
<tr>
<td rowspan="2">Key Partnerships
Medical suppliers
Local physicians
Insurance firms
Detailer
Health Insurance
Educational Institution
Health authorities
Government</td>
<td>Key Activities
Orthopedic consultations
Surgical Interventions
Medical consultations
Surgical interventions
Personalized medical care
Efficient appointment Scheduling
Patient management
Registration
Recording of medical information
Arrangement of treatment schedules
Queue management,
Doctor examinations prescriptions
Drug administration
Operations
Management and maintenance of facilities
Procurement and inventory management (stock inventory)
Training, Seminars, continuing education
Electronic medical record
Reporting
Budget planning</td>
<td rowspan="2">Value Propositions
Advanced orthopedic treatments
High-quality healthcare
Short waiting Times
Orthopedic and traumatology surgery services
Using a sophisticated and innovative orthopedic device, namely the C-Arm
Patients can be given a shuttle service to the hospital to get orthopedic surgery services
Has enormous benefits, namely minimizing surgical incisions and length of operation as well as speeding up and being precise in invading devices into the patient's body as well as taking pen or plate and wire devices from the patient's body</td>
<td>Customer Relationships
Personalized medical care
Trust and transparency
Efficient appointment Scheduling
Customer service with social media, namely Instagram, YouTube and Facebook Hospital
Hospitals build long-term relationships through the following services:
Check once after the operation
WA about complaints from patients
Suggestion box located in the hospital environment in a strategic place
Clear communication
Timely updates
Post-operative support
Follow-up consultations.</td>
<td rowspan="2">Customer Segments
Patients with orthopedic conditions
Sports enthusiasts
Elderly patients
Men and women, both children and adults and the elderly
Patients in need of orthopedic surgery, including individuals with fractures, joint disorders, sports injuries, or other orthopedic conditions.</td>
</tr>
<tr>
<td>Key Resources
Medical equipment
Trained medical staff
Doctor
Nurse
Specialist
Other clinical staff
Administrative officer
Janitor
Security guard</td>
<td>Channels
Hospital website
Referrals from local physicians
Social media</td>
</tr>
</table>

Cost Structure	Revenue Streams
Personnel costs Medical equipment Acquisition costs Employee salary Training Maintenance costs Electricity water Pharmacy costs Marketing costs	Orthopedic procedures and surgeries Consultation fees Revenue from insurance companies Medical services (doctor consultations, hospitalization fees, pharmacies, operating costs, laboratory test fees) Health Insurance Government program Donate or donation Other services (parking, nutrition catering, hall rental)

Table 2: Orthopedic services with C-arm expertise in the hospital

1. ***Value Proposition.*** The hospital provides high-quality orthopedic surgery services delivered by experienced surgeons, state-of-the-art medical equipment, advanced surgical techniques, personalized patient care, and a reputation for successful outcomes.
2. ***Customer Segments.*** The hospital's target customers are patients in need of orthopedic surgery, including individuals with fractures, joint disorders, sports injuries, or other orthopedic conditions.
3. ***Customer Relationships.*** The hospital fosters trusted relationships with patients through a patient-centric approach, providing compassionate care, clear communication, timely updates, post-operative support, and follow-up consultations.
4. ***Channels.*** The hospital reaches out to potential patients through various channels, such as referrals from other healthcare professionals, online marketing, advertising, and partnerships with insurance providers.
5. ***Revenue Streams.*** The hospital generates revenue through different sources, including surgical fees, hospitalization charges, consultation fees, diagnostic tests, medical equipment sales, and partnerships with insurance companies.
6. ***Key Activities.*** The hospital's key activities involve providing accurate diagnoses, offering pre-operative consultations, performing orthopedic surgeries, managing patient hospitalization, providing post-operative care, conducting follow-up consultations, and continuously improving surgical techniques.
7. ***Key Resources.*** The key resources for the hospital include highly skilled orthopedic surgeons, specialized nursing staff, advanced medical equipment (e.g., imaging technology, surgical instruments), well-equipped operating rooms, and a comprehensive range of orthopedic implants.
8. ***Key Partnerships.*** The hospital may collaborate with medical device manufacturers to ensure access to the latest orthopedic implants. Additionally, partnerships with insurance providers help streamline payment processes and enhance patient affordability.
9. ***Cost Structure.*** The hospital incurs various costs, including surgeon salaries, nursing and support staff wages, facility maintenance expenses, medical equipment acquisition and maintenance costs, marketing expenses, administrative overhead, and regulatory compliance costs.

4.3 SWOT Analysis

The evaluation of the company's internal and external factors is conducted through the utilization of the Business Model Canvas (BMC) tool. This analysis incorporates a SWOT analysis to identify potential areas for improvement and development. An illustration of the Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) elements is presented in Table 4.3 below.

Strengths	***Weaknesses***	***Opportunities***	***Threats***
1. Highly skilled and experienced orthopedic surgeons.	1. Limited capacity for patient intake due to high demand.	1. Growing aging population with a higher incidence of orthopedic issues.	1. Increased competition from other private hospitals offering similar services.
2. State-of-the-art surgical facilities and advanced medical equipment.	2. High cost of orthopedic surgeries, limiting accessibility for some patients.	2. Increasing public awareness and demand for specialized orthopedic services.	2. Potential changes in healthcare policies and reimbursement rates.

3. Well-established reputation and positive patient feedback.	3. Reliance on third-party insurance providers for reimbursement, leading to delayed payments.	3. Expansion opportunities into new geographic areas with underserved orthopedic patient populations.	3. Risk of lawsuits or malpractice claims, potentially damaging reputation and financial stability.
4. Comprehensive range of orthopedic procedures, including joint replacements, spine surgeries, and sports medicine.	4. Difficulty attracting and retaining top talent due to intense competition in the field.	4. Strategic partnerships with rehabilitation centers, physiotherapy clinics, and sports teams.	4. Technological advancements leading to disruptive innovations in orthopedic treatments.
5. Efficient patient scheduling and management system, minimizing waiting times.	5. Reliance on external suppliers for medical implants and equipment, leading to supply chain risks.	5. Increasing demand for medical tourism in the orthopedic field.	5. Economic recessions or financial downturns affecting patients' ability to afford elective orthopedic surgeries.

Table 3: Analysis SWOT with C-arm expertise in the hospital
SWOT Analysis Combined with Business Model Canvas

The results are summarized in the SWOT analysis table of the BMC elements. This summary highlights the two elements with potential for development, which are channels and revenue streams. As stated by Osterwalder and Pigneur (2010), channels refer to how a company establishes communication with customers to convey the value of its offerings. The following are the key findings in Table 4.4 as below:

BMC Elements	**SWOT Analysis**
Key Partners	Strategic partnerships with rehabilitation centers, physiotherapy clinics, and sports teams.
Key Activities	Highly skilled and experienced orthopedic surgeons performing a comprehensive range of orthopedic procedures, including joint replacements, spine surgeries, and sports medicine.
Key Resources	State-of-the-art surgical facilities and advanced medical equipment.
Value Proposition	Well-established reputation and positive patient feedback, efficient patient scheduling and management system, and comprehensive orthopedic services.
Customer Segments	Growing aging population with a higher incidence of orthopedic issues, increasing public awareness and demand for specialized orthopedic services, and potential medical tourism market.
Channels	Collaborations with insurance providers for reimbursement and marketing and promotional activities to attract patients seeking specialized orthopedic services.
Customer Relationships	Focus on patient safety, quality assurance, and positive patient experience.
Revenue Streams	High-cost orthopedic surgeries, potential revenue from medical tourism, and reimbursement from third-party insurance providers.
Cost Structure	Investment in surgical facilities, equipment, talent acquisition, and risk management protocols.
Key Partnerships (SO Strategy)	Collaborate with rehabilitation centers and physiotherapy clinics to offer comprehensive orthopedic care.
Key Activities (SO Strategy)	Expand orthopedic surgery facilities and hire more surgeons to meet the increasing demand.
Key Resources (WO Strategy)	Develop cost-effective orthopedic surgery packages or financial assistance programs to improve accessibility for patients.
Value Proposition (WO Strategy)	Enhance marketing and promotional activities to attract more patients seeking specialized orthopedic services.
Customer Segments (WO Strategy)	Implement training and development programs to improve talent acquisition and retention.
Channels (WO Strategy)	Collaborate with insurance providers to streamline reimbursement processes and reduce payment delays.
Customer Relationships (ST Strategy)	Maintain a strong focus on patient safety and quality assurance to minimize the risk of lawsuits.

Revenue Streams (ST Strategy)	Enhance the hospital's unique value proposition and differentiate the orthopedic services from competitors.
Cost Structure (WT Strategy)	Implement effective cost control measures and negotiate favorable contracts with suppliers to manage the impact of reimbursement changes.
Key Partnerships (WT Strategy)	Improve operational efficiency and patient throughput to maximize capacity utilization.

Table 4.4, source: author

Channels perform several functions, including:

1. Increasing patient awareness of the hospital's specialized orthopedic surgery services, advanced surgical techniques, and experienced orthopedic surgeons.
2. Assisting patients in evaluating the hospital's value proposition by highlighting the quality and success rates of orthopedic surgeries, personalized patient care, use of advanced technology, and comprehensive rehabilitation programs.
3. Allowing patients to make specific orthopedic surgery-related purchases, such as scheduling elective procedures, choosing specific implant options, or opting for specialized treatment packages.
4. Providing value to patients through the hospital's expertise in orthopedic surgeries, state-of-the-art surgical facilities, access to the latest medical equipment, and a dedicated team of healthcare professionals focused on delivering excellent outcomes and patient satisfaction.
5. Offering post-surgery support services to patients, including rehabilitation programs, physical therapy, pain management, and follow-up consultations to ensure optimal recovery and long-term orthopedic health.

According to Osterwalder and Pigneur (2010, p.40), the cost structure encompasses all the expenses required to operate a business model. The Business Model Canvas categorizes cost structure into the following types:

1. Cost-Driven: This refers to a business model that focuses on minimizing costs. The aim is to maintain a lean cost structure by offering a value proposition at a low price.
2. Value-Driven: These are companies that prioritize value creation in designing their business model and are less concerned with the costs associated with it.
   Based on the overall SWOT analysis of the BMC elements for Orthopedic Surgery Leading Services in a private hospital.

4.4 SWOT Matrix:

The SWOT Matrix serves as a valuable tool for identifying strategies to drive business development. It involves analyzing the internal strengths and weaknesses specific to the orthopedic surgery service provider, as well as the external opportunities and threats within the healthcare industry. This analysis generates eight strategic options: SO (Strengths-Opportunities), WO (Weaknesses-Opportunities), ST (Strengths-Threats), and WT (Weaknesses-Threats) strategies. Table 4.5 below shows the SWOT matrix for orthopedic surgery:

Strengths (S)	**Weaknesses (W)**
1. Highly skilled and experienced orthopedic surgeons.	1. Limited capacity for patient intake due to high demand.
2. State-of-the-art surgical facilities and advanced medical equipment.	2. High cost of orthopedic surgeries, limiting accessibility for some patients.
3. Well-established reputation and positive patient feedback.	3. Reliance on third-party insurance providers for reimbursement, leading to delayed payments.
4. Comprehensive range of orthopedic procedures, including joint replacements, spine surgeries, and sports medicine.	4. Difficulty attracting and retaining top talent due to intense competition in the field.
5. Efficient patient scheduling and management system, minimizing waiting times.	5. Reliance on external suppliers for medical implants and equipment, leading to supply chain risks.

Opportunities (O)	**Strengths-Opportunities (SO) Strategies**	**Weaknesses-Opportunities (WO) Strategies**
1. Growing aging population with a higher incidence of orthopedic issues.	1. Expand orthopedic surgery facilities and hire more surgeons to meet the increasing demand.	1. Develop cost-effective orthopedic surgery packages or financial assistance programs to improve accessibility for patients.

2. Increasing public awareness and demand for specialized orthopedic services.	2. Enhance marketing and promotional activities to attract more patients seeking specialized orthopedic services.	2. Collaborate with insurance providers to streamline reimbursement processes and reduce payment delays.
3. Expansion opportunities into new geographic areas with underserved orthopedic patient populations.	3. Establish satellite clinics or partnerships in underserved areas to provide orthopedic services locally.	3. Implement training and development programs to improve talent acquisition and retention.
4. Strategic partnerships with rehabilitation centers, physiotherapy clinics, and sports teams.	4. Collaborate with rehabilitation centers and physiotherapy clinics to offer comprehensive orthopedic care.	4. Diversify suppliers or establish stronger relationships with existing suppliers to mitigate supply chain risks.
5. Increasing demand for medical tourism in the orthopedic field.	5. Develop specialized medical tourism packages and services to attract international patients.	5. Explore innovative pricing models or financing options to make orthopedic surgeries more affordable for medical tourists.

Threats (T)	**Strengths-Threats (ST) Strategies**	**Weaknesses-Threats (WT) Strategies**
1. Increased competition from other private hospitals offering similar services.	1. Enhance the hospital's unique value proposition and differentiate the orthopedic services from competitors.	1. Improve operational efficiency and patient throughput to maximize capacity utilization.
2. Potential changes in healthcare policies and reimbursement rates.	2. Stay updated with policy changes and proactively adapt the business model to ensure financial sustainability.	2. Implement effective cost control measures and negotiate favorable contracts with suppliers to manage the impact of reimbursement changes.
3. Risk of lawsuits or malpractice claims, potentially damaging reputation and financial stability.	3. Maintain a strong focus on patient safety and quality assurance to minimize the risk of lawsuits.	3. Implement robust risk management protocols and invest in malpractice insurance to mitigate

Table 4.5, source: author

5. Conclusions and Suggestions

5.1 Conclusions:

1. The implementation of C-arm technology in orthopedic services has the potential to enhance diagnostic accuracy, surgical precision, and patient outcomes.
2. Both hospitals in Sragen and the private hospital have recognized the importance of integrating innovation and business strategy to improve orthopedic services.
3. The adoption of C-arm technology in the hospitals in Sragen has shown promising results, leading to improved patient satisfaction and shorter recovery times.
4. The private hospital's leading orthopedic surgery services have benefited from the strategic use of C-arm technology, resulting in a competitive advantage in the market.

5.2 Suggestions:

1. Develop a comprehensive innovation roadmap: Both hospitals should create a clear plan outlining the integration of C-arm technology in orthopedic services. This roadmap should include the acquisition and installation of C-arm equipment, training programs for healthcare professionals, and a timeline for implementation.
2. Foster collaboration and knowledge sharing: The hospitals in Sragen and the private hospital should collaborate with orthopedic experts, medical device manufacturers, and research institutions to share knowledge and best practices related to C-arm technology. This collaboration can facilitate continuous learning and improvement in orthopedic services.
3. Improve cost-effectiveness: Consider exploring cost-effective alternatives to C-arm technology without compromising diagnostic accuracy and surgical precision. This could involve partnerships with medical device manufacturers or research institutions to develop affordable solutions tailored to the hospitals' specific needs.
4. Enhance patient experience and communication: Utilize digital platforms and telemedicine solutions to improve patient communication and engagement. These technologies can help educate patients about the benefits of C-arm technology and facilitate remote consultations for follow-up care.

5. Strengthen marketing and branding efforts: The private hospital should leverage its leading orthopedic surgery services and C-arm technology to differentiate itself in the market. This can be achieved through targeted marketing campaigns, showcasing success stories, and building a strong brand image centered on innovation and patient-centric care.

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