

# Work Planning and the Use of Innovation in Managing the Operating Room Construction Project to Completion

Penkhae Sukko<sup>1\*</sup>, Vichit U-On<sup>2</sup>

<sup>1,2</sup>Graduate College of Management, Sripatum University, Bangkok, Thailand; taiyaa@gmail.com

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Operating room  
construction project;  
Quality;  
Service delivery.

**Abstract.** This study investigates the influence of personal factors - gender, age, education level, and occupation - on planning, task management, and innovation use in the context of operating room construction projects. It aims to evaluate how these variables affect service delivery quality and satisfaction among users and service providers. Quantitative analysis was conducted across three main dimensions: service speed, staff facilitation, and project management success. The results show that gender, age, and education level do not significantly impact service delivery or perceived project quality, while occupational differences do affect staff facilitation and overall project success. High satisfaction ratings were observed for service speed, supported by modern systems and responsive communication, though weaker areas included integration with hospital appointment systems. The study further identifies the critical role of technological advancement in enhancing surgical outcomes and healthcare accessibility. These findings align with established models of service quality, emphasizing that successful operating room construction projects depend on user satisfaction, effective system use, and strategic communication. The study concludes by recommending improved communication practices, staff training, and greater technological awareness to ensure high-quality service delivery and sustainable innovation in healthcare project management.

## 1. INTRODUCTION

### 1.1. Background and Importance of the Problem

In the management of all types of organizations, a project is considered a critical component that aligns with strategic issues and development strategies of various departments within the organization. This alignment aims to drive the strategic intent—including the vision, mission, and strategic priorities of senior executives—into actionable strategies and operational tactics at the operational management level. Regardless of whether the strategies are defensive or reactive, intended to solve existing problems or address emerging needs, or offensive or proactive, aimed at preventing issues and creating opportunities, there is often a misconception that strategic management does not necessarily require project-based thinking or execution. Many believe that routine operations at the operational level can address all tasks and activities. In reality, however, this is not the case. To eliminate this misunderstanding, it is crucial to clarify the nature and scope of a project, so that all stakeholders recognize its importance. In today's highly competitive environment, there is an increasing demand for high-quality products and services to enhance customer satisfaction. Organizations must strive to improve customer satisfaction to build reputation and societal acceptance. Modern organizational management must be able to review and revise managerial concepts and models to cope with complex activities. Managing through projects enables organizations to achieve their objectives more effectively.

A project is defined as a process involving the use of various resources to invest in and create outcomes that are beneficial to the target group (Mateo, Carral, Diaz, Fraguera, & Iglesias, 2018). Project activities must be independent units that can be analyzed, planned, and managed. They must have clear objectives, a defined start and end time, operate within a specified budget, and produce outcomes that meet predefined quality standards. A project does not necessarily involve the creation of physical assets, such as factories, houses, condominiums, dams, or roads. It can also include non-tangible activities such as employee training or organizational restructuring. Thus, a project is a process composed of multiple planned activities that translate the strategic intentions of top management into tactics to be implemented at the operational level. These activities must follow a predetermined sequence to produce results or benefits in accordance with the project's goals (Fewings & Henjewe, 2019).

In today's dynamic and rapidly changing environment, project management faces significant challenges. Organizational leaders must understand and adapt to constant change. Project managers are therefore required to plan effectively to reduce uncertainty and to drive projects forward through participation, rapid decision-making, and timely problem-solving in all dimensions—ultimately ensuring the achievement of project objectives. The nature of project management is characterized by flexibility, allowing adaptation in response to changing conditions and environments.

Project management involves the planning and allocation of various resources—both human and material—while forecasting the project's direction and duration from initiation to completion. It includes setting specific timeframes for individual tasks to ensure work efficiency and to support accurate cost estimation (Jonathan & Stanley, 2022). Organizations use projects as vehicles to achieve strategic goals through distinct, time-bound activities. Projects are often subject to constraints and risks that may hinder success. With proper risk management frameworks, organizations can identify, assess, and mitigate risks, reducing the likelihood of failure and associated losses. Unlike routine operations, project-based management is a strategic tool for achieving success. Project managers utilize principles, skills, techniques, and tools to plan, execute, monitor, control, and close projects—ensuring timely completion, budget adherence, and compliance with quality standards. These practices align with the organization's strategic objectives, support long-term goal achievement, and maintain competitive advantage. Complex projects or those involving advanced technologies require effective planning and management to optimize limited administrative resources.

\*Corresponding author.

Organizations with project management experience are better equipped to perform efficiently under both internal and external environmental constraints, as well as time limitations—offering them a distinct advantage over those lacking such experience (Jake, Jim & Rose, 2018).

A systematic approach to project management clarifies the project scope and helps define necessary tasks without redundancies or omissions, underscoring the importance of structured project planning. The study on planning and the use of innovation in managing the operating room construction project aims to create a more efficient and accessible system. It provides valuable input for developing systems that meet the needs of doctors, patients, and regulatory standards. Moreover, it helps build a reliable and standardized healthcare system, enhancing the credibility and competitiveness of public hospitals and medical institutions on an international scale.

## 1.2. Research Question

- 1) How can project planning and the use of innovation contribute to the successful construction and management of an operating room that meets medical and service standards?
- 2) What project management strategies ensure that the construction of the operating room is completed on time, within budget, and at the desired quality?
- 3) How can innovation be applied in operating room design and construction to improve efficiency and patient care delivery?

## 1.3. Research Objective

The objectives of this study are as follows:

- 1) To enhance convenience and responsiveness for users, especially in emergency situations, through improved accessibility and system efficiency.
- 2) To provide supporting data for the development of system design frameworks that align with user needs and comply with relevant medical and regulatory standards.
- 3) To establish a reliable and standardized system that enhances the credibility of medical services and strengthens the international competitiveness of public healthcare institutions.

## 2. LITERATURE REVIEW

### 2.1. Related Concepts and Theories

#### 2.1.1. Concepts and Theories on Satisfaction

Maslow's Hierarchy of Needs is a psychological theory developed by Abraham H. Maslow in 1943, presented in his paper titled "A Theory of Human Motivation." Maslow proposed that human needs can be classified into five hierarchical levels, arranged from the most basic to the highest. Individuals must first satisfy lower-level needs before progressing to higher-level ones. These five levels of needs are:

##### 1) Physiological Needs

These are the most basic human survival needs, such as hunger, thirst, and shelter—collectively known as the essentials: food, clothing, medicine, and housing. In a consumer context, customers at this level seek products and services that fulfill basic living requirements, such as food outlets, pharmacies, housing, vehicles, and mobile phones.

##### 2) Safety Needs

Once physiological needs are satisfied, the desire for security and stability emerges. This includes physical safety, job security, savings, personal health, and protection from accidents or illnesses. Customers in this stage look for products and services that provide safety and stability, such as CCTV systems, insurance, savings plans, or secure housing.

##### 3) Belonging and Love Needs

With safety assured, individuals seek emotional connections, love, and social inclusion—such as relationships with family, friends, and romantic partners. Customers may desire services that foster emotional fulfillment, like matchmaking, wedding planning, or group tours. Products like luxury vehicles (e.g., BMW, Benz) may also fulfill this need by gaining social approval.

##### 4) Esteem Needs

After achieving love and belonging, individuals strive for respect, self-esteem, and social recognition. This includes aspirations for high job positions, recognition, or achievements. Products and services at this level include luxury items, premium services, expensive jewelry, and five-star accommodations that reflect one's success and status.

##### 5) Self-Actualization Needs

This is the highest level of need—where individuals aim to realize their full potential and achieve personal growth or life goals. These needs are deeply personal and abstract, driven by passion or inspiration rather than material desires. Products and services at this level are harder to define, as fulfillment stems more from psychological growth than tangible goods.

#### 2.1.2. Concepts and Theories on Services and Service Quality

According to the Royal Institute Dictionary (1982, p. 463), "service" means the act of assisting or providing convenience, such as giving or receiving services.

Kotler (cited in Jittima Theeraphan-Setthian, 2006, p. 9) defines service as any act or performance that one party can offer to another that is essentially intangible and does not result in ownership. Its production may or may not be tied to a physical product.

The Service Association of Thailand (cited in Jittima Theeraphan-Setthian, 2006, p. 9) defines service as work performed for others, which benefits and satisfies the recipients. Additionally, the service provider should derive happiness from providing the service.

#### 2.1.3. Concepts and Theories on Information System Success

Suchada Keeranun (1998) defines an information system as a system composed of various elements including computer hardware, software, networks, databases, system developers, system users, and relevant personnel or specialists. These

components work together to define, collect, store, and process data into information to support organizational operations such as decision-making, planning, management, control, and performance evaluation.

Sutitthep (2009) explained that information is the result of data processing, which does not necessarily require computers. In the past, data processing was done manually, such as through paperwork and human calculations, which could lead to errors. With the adoption of computers for Electronic Data Processing (EDP), tasks became faster, and the resulting information became more accurate and reliable.

#### 2.1.4. Concepts and Theories on Project Development

A project is an activity that has clearly defined objectives, goals, timelines, budgets, processes, and activities in a sequential order. It must have a project manager responsible for managing various activities to ensure they proceed according to the plan, within the allocated time and budget. Projects can be divided into three types, as follows (Prachai Ongwongsakul, 2020):

##### 1) Improvement Project

This type of project has a short duration due to the urgent need to address a problem. It involves mobilizing both internal and external personnel to work quickly on resolving issues in ongoing operations. In cases where regular operations cannot solve the problem or when additional personnel cannot be hired, the issue must be categorized as a project to address the problem. This type of project does not involve creating something new but focuses on fixing problems that arise in ongoing tasks quickly and within a limited time, so regular operations can continue without these issues.

##### 2) Innovative Project

This type of project focuses on creating something entirely new to replace existing elements through new innovations. The goal is to create innovation to solve problems without taking a long time to implement the project. It involves starting a new project that does not incorporate any of the old elements. After discarding the old system, this type of project requires inventing new innovations to solve problems and cannot rely on existing solutions. Sometimes, it is challenging to distinguish between this type and the first type, as both require new innovations to solve problems.

##### 3) Research and Development Project

This type of project may involve elements of the first or second types, with flexible characteristics. The project may aim to experiment and draw conclusions or propose new ideas that may not necessarily benefit directly from the innovations or concepts suggested. Alternatively, it could be a pilot project with a scope that typically involves testing before launching a larger-scale project by an organization with sufficient funding and strength. This type of project is common in countries and enterprises focused on developing innovations and presenting new ideas, often reinvesting the profits into experimental or pilot projects.

#### 2.2. Literature Surveys

Johnson and Onwuegbuzie (2004) discuss the rise of mixed methods research as a valid approach combining quantitative and qualitative research techniques. They explore how the integration of both methods provides a more comprehensive understanding of research questions, emphasizing the importance of methodological triangulation. The article offers practical advice for researchers to balance both approaches in a way that strengthens the validity and reliability of their findings.

Kotler and Keller (2006) present an in-depth guide to marketing management, covering essential topics such as market segmentation, product positioning, and digital media strategies. The authors integrate case studies to highlight real-world applications of marketing principles, providing students and professionals with both theoretical foundations and practical insights into contemporary marketing strategies. This book serves as a fundamental resource for anyone studying or practicing marketing.

Sujatha (2015) offers a comprehensive, practical guide to research methodology for beginners. The book provides a clear, step-by-step approach to designing, conducting, and analyzing research. Sujatha covers both qualitative and quantitative research methods, making the text accessible to students and early-career researchers. The author includes examples and exercises to build foundational research skills, making it a valuable resource for anyone starting their research journey.

Garland (2017) provides a thorough exploration of improvement project management strategies, emphasizing the importance of organizational success through structured project management. The book covers various aspects of project management, including resource allocation, risk management, and team collaboration. Garland uses case studies to illustrate practical applications, making it an invaluable resource for both students and professionals in project management fields.

Yin (2017) presents a detailed guide to case study research methods, with a focus on design and data collection strategies. The author explores various types of case study research, including exploratory, explanatory, and descriptive approaches. The book also covers ethical considerations, data analysis techniques, and how to write and present case study findings. As one of the leading texts on case study methodology, this book is an essential resource for researchers and practitioners conducting case study research in diverse fields.

Smith and Redding (2018) investigate the impact of innovation projects on organizational success. The authors use mixed methods to assess how innovation initiatives contribute to long-term business growth, competitive advantage, and market expansion. The study underscores the importance of aligning innovation projects with strategic business goals and discusses the role of leadership in supporting innovation efforts to drive organizational performance.

Lillis and Wang (2019) explore the evolving nature of research and development (R&D) in the context of the digital age. The article discusses the integration of new digital tools, artificial intelligence, and global collaboration in reshaping R&D practices. The authors examine the challenges and benefits of adopting these technologies, emphasizing their role in enhancing innovation and organizational competitiveness across industries.

Prachai (2020) outlines key concepts and frameworks in project development and management, focusing on the practical tools necessary for successful project execution. The book addresses topics such as project scope, budgeting, and risk management. The author uses real-world examples to demonstrate how these concepts are applied in various industries, making the book a valuable resource for both students and professionals involved in project management.

## 2.3. Conceptual Framework

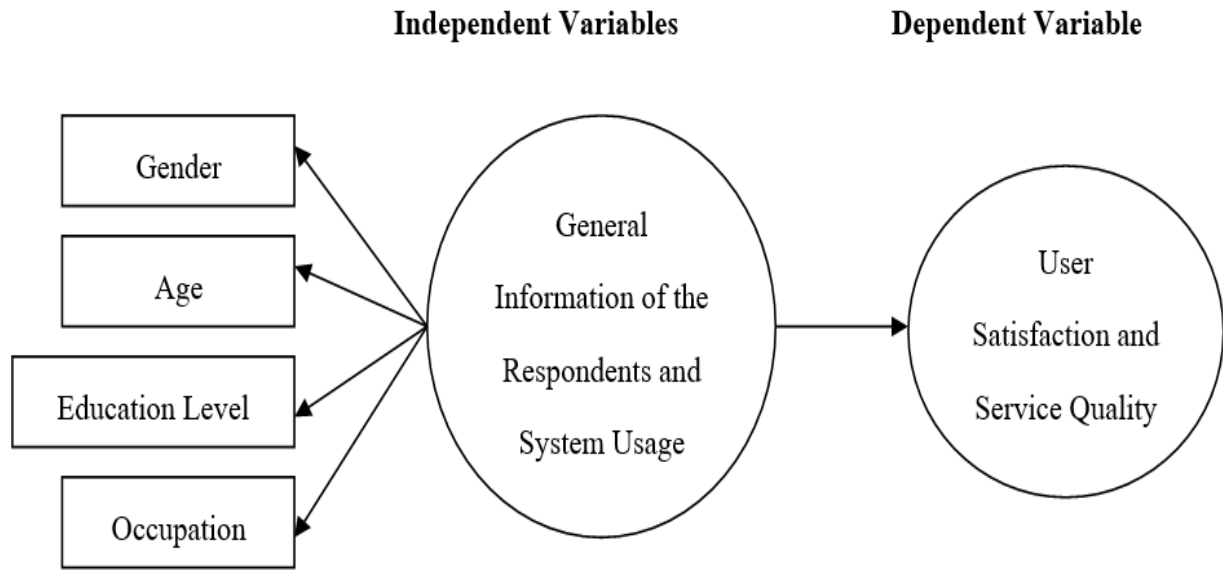


Figure 1: Conceptual Framework

## 2.4. Research Hypothesis

### 2.4.1. Demographic Factor Hypotheses

*H<sub>1</sub>: Gender influences the planning and implementation of innovations in the successful management of an operating room construction project.*

*H<sub>2</sub>: Age influences the planning and implementation of innovations in the successful management of an operating room construction project.*

*H<sub>3</sub>: Education level influences the planning and implementation of innovations in the successful management of an operating room construction project.*

*H<sub>4</sub>: Occupation influences the planning and implementation of innovations in the successful management of an operating room construction project.*

### 2.4.2. Statistical Hypothesis Testing

#### 1) Relationship between Personal Factors and User Satisfaction

Null Hypothesis (H<sub>0</sub>): Personal demographic differences (gender, age, education level, occupation) have no influence on the planning and implementation of innovations in the successful management of an operating room construction project.

Alternative Hypothesis (H<sub>1</sub>): Personal demographic differences (gender, age, education level, occupation) are related to the planning and implementation of innovations in the successful management of an operating room construction project.

#### 2) Relationship between Quality Factors and User Satisfaction

Null Hypothesis (H<sub>0</sub>): Quality-related factors (system quality, service quality, system usage) have no effect on satisfaction regarding the planning and implementation of innovations in the successful management of an operating room construction project.

Alternative Hypothesis (H<sub>1</sub>): Quality-related factors (system quality, service quality, system usage) affect satisfaction regarding the planning and implementation of innovations in the successful management of an operating room construction project.

## 3. RESEARCH METHODOLOGY

### 3.1. Research Design

This study uses a quantitative research approach by collecting data through structured questionnaires. The aim is to analyze how personal demographic factors and perceived quality affect planning and the use of innovation in managing operating room construction projects. The data collected is statistically analyzed to test hypotheses and support the research objectives.

### 3.2. Population and Sample

The population comprises medical personnel (doctors and nurses) who have worked in surgery-related roles for more than one year, and patients who have undergone surgical procedures. The total sample size is 384 participants, determined through accidental sampling.

The sample size was calculated using the formula:

$$n = \frac{Z^2 \cdot p \cdot (1 - p)}{E^2}$$

Where:

- $n$  = Sample size.
  - $Z = 1.96$  (for 95% confidence level).
  - $p = 0.5$  (Maximum variability).
  - $E = 0.05$  (Margin of error).
- This yields a sample size of approximately 384.

### 3.3. Research Instruments

The data collection tool is a questionnaire consisting of four parts.

Part 1: Screening Questions.

Part 2: Demographic Data - gender, age, education level, and occupation.

Part 3: Satisfaction and Quality Perception - questions addressing.

1. Speed of service.
2. Support provided by staff.
3. Successful project management.

Part 4: Open-ended Suggestions.

The questionnaire was developed based on a review of academic literature, theories, and previous research to define key concepts and construct relevant and valid items.

### 3.4. Data Collection

Data was collected by distributing questionnaires to the target group of doctors, nurses, and surgical patients using accidental sampling. Prior to full deployment, the questionnaire underwent pilot testing for validity and reliability.

### 3.5. Statistics Used for Data Analysis

1) Descriptive Statistics are used to describe the basic features of the data, including: Mean, Median, Mode, Standard Deviation, and Frequency distributions and charts.

2) Inferential Statistics include.

- Independent t-test - To compare mean scores between two independent groups.
- One-way ANOVA - To compare means across more than two demographic groups and test significant differences in perceptions and planning behavior.

## 4. DATA ANALYSIS AND FINDINGS

### 4.1. Introduction

This chapter presents the results of the data analysis conducted using quantitative methods. The findings reflect the responses of 384 participants regarding their experiences and opinions on planning and innovation in managing operating room construction projects. The results are divided into three parts: screening questions, demographic information, and service satisfaction levels.

### 4.2. Data Analysis of the Quantitative Data

#### 4.2.1. Screening Question: Operating Room Usage

To ensure the relevance of the responses, participants were asked whether they had experience using an operating room. The majority (64.10%) reported regular use, while 29.40% indicated they had used the services once. The remaining 6.50% had never used an operating room.

Table 1: Screening question: Operating room usage.

| Operating room usage | Frequency | Percentage (%) |
|----------------------|-----------|----------------|
| Regularly uses OR    | 246       | 64.10          |
| Used once            | 113       | 29.40          |
| Never used           | 25        | 6.50           |
| Total                | 384       | 100.00         |

#### 4.2.2. Demographic Characteristics of Respondents

The demographic analysis showed that the majority of respondents were female (62.50%), and most were aged between 25–34 years (51.60%). Educationally, more than half held a bachelor's degree (57.80%), and a significant portion were business owners or entrepreneurs (41.40%).

#### 4.2.3. Satisfaction with Service and Innovation Implementation

Participants were asked to evaluate their satisfaction in three key areas: service speed, staff facilitation, and project success in operating room development. Overall, all areas received high average scores.

1) Speed

Respondents rated the speed of service highly, particularly in terms of the efficiency and standardization of staff services (mean = 3.87), and communication channel responsiveness (mean = 3.85). Integration with appointment systems scored slightly lower (mean = 3.57) shown in Table 2.



Table 2: Satisfaction with service speed.

| Aspect of service speed                                | Mean score | Level of importance |
|--------------------------------------------------------|------------|---------------------|
| Fast and standard staff service                        | 3.87       | High                |
| Modern and responsive access system                    | 3.85       | High                |
| Responsive communication channels (Phone, email, chat) | 3.85       | High                |
| Integration with appointment system and follow-up      | 3.57       | Moderate            |
| Overall                                                | 3.7953     | High                |

## 2) Staff Facilitation

Staff facilitation received a high overall mean score of 3.94. The highest rated factor was the integration of patient data with legal identity verification systems (mean = 4.18), followed by responsiveness in customer service (mean = 4.10) shown in Table 3.

Table 3: Satisfaction with staff facilitation.

| Aspect of staff facilitation                                         | Mean score | Level of importance |
|----------------------------------------------------------------------|------------|---------------------|
| Linked patient database with legal verification systems              | 4.18       | High                |
| Customer service responsiveness (Queries, problem-solving, guidance) | 4.10       | High                |
| Staff's ability to advise and solve problems effectively             | 3.52       | High                |
| Overall                                                              | 3.9396     | High                |

## 3) Project Management Success

The success of the project was rated highly, with the most important aspect being the advancement of operating room technology, which helps reduce patient mortality (mean = 4.25). Improved access to healthcare for underserved populations was also noted (mean = 4.19) shown in Table 4.

Table 4: Satisfaction with project management success.

| Aspect of project success                                   | Mean score | Level of importance |
|-------------------------------------------------------------|------------|---------------------|
| Use of modern medical equipment reducing surgical mortality | 4.25       | Very high           |
| Improved healthcare access for underprivileged groups       | 4.19       | High                |
| Improved patient survival and access to welfare             | 3.84       | High                |
| Overall                                                     | 4.0432     | High                |

## 4.3. Summary of the Results

The analysis demonstrates that respondents generally hold positive views regarding planning and innovation in operating room construction project management. All evaluated aspects - service speed, staff facilitation, and project outcomes - achieved high satisfaction scores, reinforcing the relevance of incorporating technology and process innovation to enhance project success.

## 5. CONCLUSION, DISCUSSION, AND RECOMMENDATION

### 5.1. Conclusion

Analysis of the Impact of Personal Factors (Gender, Age, Education Level, and Occupation) on the Study of Planning, Task Management, and Innovation Use in Operating Room Construction Project Management Regarding User and Service Provider Satisfaction and Quality

#### 5.1.1. Gender

1) Service Speed: Gender differences do not affect the study of planning, task management, and the use of innovations in the management of operating room construction projects regarding user and service provider satisfaction and quality, classified by gender at a significance level of 0.05.

2) Staff Facilitation: Gender differences do not affect the study of planning, task management, and the use of innovations in the management of operating room construction projects regarding user and service provider satisfaction and quality, classified by gender at a significance level of 0.05.

3) Project Management Success: Gender differences do not affect the study of planning, task management, and the use of innovations in the management of operating room construction projects regarding user and service provider satisfaction and quality, classified by gender at a significance level of 0.05.

#### 5.1.2. Age

1) Service Speed: Age differences do not affect the study of planning, task management, and the use of innovations in the management of operating room construction projects regarding user and service provider satisfaction and quality, classified by age at a significance level of 0.05.

2) Staff Facilitation: Age differences do not affect the study of planning, task management, and the use of innovations in the management of operating room construction projects regarding user and service provider satisfaction and quality, classified by age at a significance level of 0.05.

3) Project Management Success: Age differences do not affect the study of planning, task management, and the use of innovations in the management of operating room construction projects regarding user and service provider satisfaction and quality, classified by age at a significance level of 0.05.

### 5.1.3. Education Level

1) Service Speed: Differences in education level do not affect the study of planning, task management, and the use of innovations in the management of operating room construction projects regarding user and service provider satisfaction and quality, classified by education level at a significance level of 0.05.

2) Staff Facilitation: Differences in education level do not affect the study of planning, task management, and the use of innovations in the management of operating room construction projects regarding user and service provider satisfaction and quality, classified by education level at a significance level of 0.05.

3) Project Management Success: Differences in education level do not affect the study of planning, task management, and the use of innovations in the management of operating room construction projects regarding user and service provider satisfaction and quality, classified by education level at a significance level of 0.05.

### 5.1.4. Occupation

1) Service Speed: Occupational differences do not affect the study of planning, task management, and the use of innovations in the management of operating room construction projects regarding user and service provider satisfaction and quality, classified by occupation at a significance level of 0.05.

2) Staff Facilitation: Occupational differences affect the study of planning, task management, and the use of innovations in the management of operating room construction projects regarding user and service provider satisfaction and quality, classified by occupation at a significance level of 0.05.

3) Project Management Success: Occupational differences affect the study of planning, task management, and the use of innovations in the management of operating room construction projects regarding user and service provider satisfaction and quality, classified by occupation at a significance level of 0.05.

## 5.2. Discussion

### 5.2.1 Factors Affecting Work Planning and Innovation in Surgical Room Construction: Focus on Service Speed and Satisfaction

Overall, it is rated highly with a value of 3.7953. When considering each aspect, the staff's speed and international service standards, efficiency, and fast response were ranked highly, with a value of 3.87. The next aspects are the speed of access, flexibility, and modernization, which significantly reduce working time, with a value of 3.85. Lastly, the speed, sufficiency, and convenience of contact channels for assistance (e.g., phone, email, or chat) were also rated highly, with a value of 3.85. The lowest rating was for the integration of information with the hospital's appointment system and the follow-up by staff, with a value of 3.57, indicating relatively less importance. This aligns with the research of Samit Sachukorn (1999, p. 3), who stated that service is an action or interaction with the users that aims to provide benefits in various ways, such as facilitating and meeting customer needs.

### 5.2.2. Factors Affecting Work Planning and Innovation in Surgical Room Construction: Focus on Staff Facilitation and Satisfaction

Overall, it is rated highly with a value of 3.9396. When considering each aspect, the database system linking patient information with the Department of Local Administration for verification has the highest rating, with a value of 4.18. This is followed by customer service focused on responding to needs and expectations, such as answering inquiries, solving problems, and providing product/service advice, with a value of 4.10. The last aspect is staff's ability to provide advice and solve problems effectively, with a value of 3.52. This aligns with the research on project success, which includes achieving the project's objectives and goals in both quantitative and qualitative terms, ensuring the use of resources efficiently to meet the objectives (Sarath & Siong, 2021).

### 5.2.3 Factors Affecting Work Planning and Innovation in Surgical Room Construction: Focus on Project Management Success

Overall, it is rated highly with a value of 4.0432. When considering each aspect, the advancement of surgical rooms with modern medical equipment that reduces the mortality rate from surgeries has the highest rating, with a value of 4.25. This is followed by surgical room projects that increase healthcare access for people with limited health insurance, with a value of 4.19. The last aspect is the development of surgical room construction projects that save patients' lives and improve access to efficient welfare, with a value of 3.84. This is consistent with the research on the efficiency of information technology operations, which involves using information technology in organizations and its positive impact on operational efficiency (DeLone & McLean, 1992; Petter et al., 2008; Chan, 2000). Researchers and practitioners involved in information technology recognize the importance of assessing the effectiveness of operations and the success of information technology within business organizations. Two major approaches to evaluating the effectiveness of information technology are: measuring the benefits from the use of information technology and assessing how it creates competitive advantages. The success factors measured include system quality, information quality, usage, user satisfaction, individual impact, and organizational impact. The system quality and information quality factors affect usage and user satisfaction, which in turn impact individual and organizational outcomes. System quality, as described in the DeLone and McLean (2003) model, includes factors like ease of use, reliability, response time, availability, convenience of access, and adaptability. This is consistent with Veeraraghavan's (2014) research on information system quality, which focuses on user satisfaction with factors such as system flexibility, response, and integration.

## 5.3. Recommendation

It is recommended to place emphasis on the public dissemination of up-to-date political information to students. Particularly, there should be a focus on developing modern and comprehensive communication strategies, ensuring that students have access

to accurate and timely information. It is also advised to allocate dedicated personnel to manage communication efforts, ensuring that users consistently receive relevant news and updates.

There should be initiatives aimed at promoting the development of knowledge and understanding regarding the use of modern communication technologies. This includes processes that promote awareness of key information, such as operating hours, registration channels, and access procedures. The goal is to ensure accurate and continuous understanding for all stakeholders involved.

## REFERENCES

- Al Karim, R. (2013). Customer satisfaction in online shopping: A study into the reasons for motivations and inhibitions. *Journal of Business and Management*, 11(6), 13–20.
- Al-Maghrabi, T., Dennis, C., & Halliday, S. (2011). Antecedents of continuance intentions towards e-shopping: The case of Saudi Arabia. *Journal of Enterprise Information Management*, 24(1), 85–111.
- Anderson, R. E., & Srinivasan, S. S. (2003). E-satisfaction and e-loyalty: A contingency framework. *Psychology & Marketing*, 20(2), 123–138.
- Andrews, L., Kiel, G., Drennan, J., & Boyle, M. V. (2007). Consumers' perceptions of risk, trust, and e-services. *Australasian Marketing Journal (AMJ)*, 15(2), 97–105.
- Ayo, C. K., Adewoye, J. O., & Oni, A. A. (2011). Business-to-consumer e-commerce in Nigeria: Prospects and challenges. *African Journal of Business Management*, 5(13), 5109–5117.
- Bashir, A., Mehboob, I., & Bhatti, W. K. (2015). Effects of online shopping trends on consumer-buying behavior: An empirical study of Pakistan. *Journal of Management and Research*, 2(2), 1–24.
- Bhatti, A. (2020). Online shopping behavior model: A literature review and proposed model. *International Journal of Business and Management*, 15(5), 55–75.
- Bianchi, C., & Andrews, L. (2012). Risk, trust, and consumer online purchasing behaviour: A Chilean perspective. *International Marketing Review*, 29(3), 253–275.
- Butt, M. M. (2020). Examining the role of trust and quality dimensions in the actual purchase of online products. *Journal of Retailing and Consumer Services*, 52, 101923.
- Cheema, U., Rizwan, M., Jalil, M. A., Khan, K. U., & Rizwan, A. (2013). The trend of online shopping in 21st century: Impact of enjoyment in TAM model. *Asian Journal of Empirical Research*, 3(2), 131–140.
- Chiu, C. M., Lin, H. Y., Sun, S. Y., & Hsu, M. H. (2009). Understanding customers' loyalty intentions towards online shopping: An integration of technology acceptance model and fairness theory. *Behavior & Information Technology*, 28(4), 347–360.
- Childers, T. L., Carr, C. L., Peck, J., & Carson, S. (2001). Hedonic and utilitarian motivations for online retail shopping behavior. *Journal of Retailing*, 77(4), 511–535.
- Dai, B., Forsythe, S., & Kwon, W. S. (2014). The impact of online shopping experience on risk perceptions and online purchase intentions: Does product category matter? *Journal of Electronic Commerce Research*, 15(1), 13–24.
- Delafrooz, N., Paim, L. H., & Khatibi, A. (2010). Understanding consumers internet purchase intention in Malaysia. *African Journal of Business Management*, 5(3), 2837–2846.
- Duarte, P., Costa e Silva, S., & Ferreira, M. B. (2013). Trust and credibility: The moderating role of website design. *Journal of Retailing and Consumer Services*, 20(3), 334–342.
- Forsythe, S. M., & Shi, B. (2003). Consumer patronage and risk perceptions in Internet shopping. *Journal of Business Research*, 56(11), 867–875.
- Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in online shopping: An integrated model. *MIS Quarterly*, 27(1), 51–90.
- George, J. F. (2004). The theory of planned behavior and Internet purchasing. *Internet Research*, 14(3), 198–212.
- Gupta, A., & Arora, N. (2017). Consumer attitude towards online shopping: An exploratory study from India. *International Journal of Management Studies*, 4(1), 1–12.
- Haider, S. H., Gillani, S. H. M., & Qureshi, M. A. (2017). Awareness of online shopping and its impact on consumer buying behavior: Evidence from Pakistan. *International Journal of Academic Research in Business and Social Sciences*, 7(6), 614–631.
- Harris, L. C., & Goode, M. M. H. (2004). The four levels of loyalty and the pivotal role of trust: A study of online service dynamics. *Journal of Retailing*, 80(2), 139–158.
- Hsu, C. L., Chang, K. C., & Chen, M. C. (2012). The impact of website quality on customer satisfaction and purchase intention: Perceived playfulness and perceived flow as mediators. *Information Systems and e-Business Management*, 10(4), 549–570.
- Javadi, M. H. M., Dolatabadi, H. R., Nourbakhsh, M., Poursaeedi, A., & Asadollahi, A. R. (2012). An analysis of factors affecting on online shopping behavior of consumers. *International Journal of Marketing Studies*, 4(5), 81–98.
- Kwek, C. L., Tan, H. P., & Lau, T. C. (2010). Investigating the shopping orientations on online purchase intention in the e-commerce environment: A Malaysian study. *Journal of Internet Banking and Commerce*, 15(2), 1–22.
- Lim, Y. J., Osman, A., Salahuddin, S. N., Romle, A. R., & Abdullah, S. (2016). Factors influencing online shopping behavior: The mediating role of purchase intention. *Procedia Economics and Finance*, 35, 401–410.
- Ling, K. C., Chai, L. T., & Piew, T. H. (2010). The effects of shopping orientations, online trust and prior online purchase experience towards customers' online purchase intention. *International Business Research*, 3(3), 63–76.
- Pappas, I. O. (2016). Marketing strategies, perceived risks, and consumer trust in online buying behaviour. *Journal of Retailing and Consumer Services*, 29, 92–103.
- Pappas, N., & Patelis, T. E. (2016). Moderating effects of online shopping experience on customer satisfaction and repurchase intentions. *International Journal of Retail & Distribution Management*, 44(2), 183–204.
- Rana, M. I., Osman, A., & Rahman, R. A. (2015). Factors affecting online shopping behavior among young consumers: A case study of mobile phone industry in Klang Valley, Malaysia. *International Journal of Social Science and Humanity*, 5(2), 264–269.
- Rehman, M., & Ibrahim, M. (2011). Internet banking: The trend of online shopping in 21st century. *International Journal of Academic Research*, 3(2), 451–456.
- Salisbury, W. D., Pearson, R. A., Pearson, A. W., & Miller, D. W. (2001). Perceived security and World Wide Web purchase



- intention. *Industrial Management & Data Systems*, 101(4), 165–177.
- Sharma, N., & Crossler, R. E. (2014). Disclosing too much? Situational factors affecting information disclosure in social commerce environment. *Electronic Commerce Research and Applications*, 13(5), 305–319.
- Shao, W., & Li, X. (2009). Understanding online consumer behavior: The theory of planned behavior perspective. *Journal of American Academy of Business*, 14(1), 46–52.
- Shergill, G. S., & Chen, Z. (2005). Web-based shopping: Consumers' attitudes towards online shopping in New Zealand. *Journal of Electronic Commerce Research*, 6(2), 79–94.
- Yulhasri, R., & Daud, N. M. (2011). Factors that influence customers' buying intention on shopping online. *International Journal of Marketing Studies*, 3(1), 128–139.