Research

The Role of the Operating Room Manager According to Operating Room Directors: a Qualitative Content Analysis Study

Citation: Tomei B., Cicala C., Spano A., Petruzzo A. "The Role of the Operating Room Manager According to Operating Room Directors: A Qualitative Content Analysis Study" (2025) *Infermieristica Journal* 4(1): 41-55. DOI: 10.36253/if-3078

Received: November 5, 2024

Revised: February 16, 2025

Just accepted online: March 15, 2025

Published: March 31, 2025

Correspondence: Bernardino Tomei - Ospedale dei Castelli, Local Health Authority (ASL) Roma 6, Rome, Italy; Email: bernardino.tomei@aslroma6.it

Data Availability Statement: All relevant data are within the paper and its Supporting Information files. This article has been accepted for publication and undergone full peer review but has not been through the copyediting, typesetting, pagination, and proofreading process, which may lead to differences between this version and the Version of Record.

Competing Interests: The author(s) declare(s) no conflict of interest.

Bernardino Tomei[1], Caterina Cicala[2], Alessandro Spano[3], Antonio Petruzzo[4]

[1] Ospedale dei Castelli, Local Health Authority (ASL) Roma 6, Rome, Italy
[2] Nursing, Technical, Rehabilitation, Assistance, and Research Management Department, IRCCS Istituti Fisioterapici Ospitalieri (IFO), Rome, Italy
[3] Agostino Gemelli University Hospital Foundation, IRCCS, Rome, Italy
[4] San Camillo Forlanini Hospital, Rome, Italy

Abstract

Introduction. In healthcare system management, managing operating rooms, which are characterized by a significant production focus and a correspondent high level of complexity, is one of the most current issues, to implement more efficient models, based on a balanced use of resources. Operating Room Management is an emerging model based on Operation Management. Although in literature it is easy to find concepts and tools regarding the Operation Management of surgical items, little is known so far about the roles which should apply these principles. The topic is shown in a few articles, many of these marginally related to it, but none derived from primary studies.

Methods. To thoroughly explore the topic, the study aimed to investigating whether the Operating Room Manager is a well-known figure, how it is defined by decision-makers with different role, and whether it is considered a resource to be integrated into current surgical paths management systems. Doctors, nurses and other figures, managers involved in the operating theatres were involved. A qualitative content analysis technique was used. This method allows analysis of both the manifest and latent content of interviews, making it suitable for exploring a 'territory' that is, to some extent, considered unexplored.

Results. Results, obtained from a sample of 11 professional figures, led to the extraction of 6 themes: The dynamism of organizational models and the balance between resources and related risks; Curriculum and complexity: a difficult choice; The

role in the management complexity regarding processes and professional figures; Competences: Knowledge of the system ("reading" the processes) and leadership; Teamworking ability; Areas of activity and development: bridge figure with other contexts and "resisting to resistances". Each theme represents the following areas: Organizational models and Operation Management; curriculum; role; skills and leadership; teamwork; area of development.

Discussion and Conclusions. Between the themes emerged from the analysis regarding the role of the Operating Room Manager, the curriculum and the areas of competence and development are fairly well-defined. However, the theme of skills and the role itself struggles to emerge, and a clear profile of the Operating Room Manager should be better defined in future studies.

Keyword: Artificial Intelligence, Prompt Engineering, Healthcare Professionals

Introduction

In recent decades, the economic situation and the progressive aging of the population have posed significant economic challenges to European healthcare systems, characterized by rising costs and budget cuts. Consequently, managers and clinical governance administrators have sought innovative organizational solutions to enhance efficiency while ensuring patient safety.[1]

This issue is particularly relevant in specific areas such as surgical pathways, where resource management and cost control are intricately linked to the inherent complexity of the process. In Italy, in 2020, the State-Regions Conference formalized an agreement between the National Government and the Regions regarding the *"Guidelines for Managing the Pathway of Scheduled Surgical Patients"*.[2]

"Complexity" is one of the most defining features of the operating room, involving intricate social interactions among various stakeholders: patients, healthcare providers, anesthesiologists, surgeons, nurses, and administrative staff. High patient expectations, unpredictability, and the challenges of scheduling surgical cases are some of the factors that make management particularly difficult. As a result, inefficiencies often arise.[3,4]

The operating room is one of the most critical environments in a hospital, both in terms of patient safety and economic impact, and it plays a central role in workload and revenue generation.[5] On the cost front, operational efficiency must account for both fixed and variable expenses. Fixed costs include supplies, contracted services, rentals, and utilities, while variable costs encompass employee salaries and benefits, fluctuating primarily based on facility usage. However, inefficiency is considered a variable cost.[6]

The increasing demand for surgical and interventional services necessitates more operating rooms. The conventional solution - building new facilities - entails not only infrastructure costs but also the need for additional staff, significantly increasing expenses. Instead, focusing on enhancing the productivity of existing facilities appears to be a more prudent strategy. Proper management and optimization of operating rooms are considered key elements of the entire process of surgical patient care.[7]

Since infrastructure and personnel represent the major expenditure categories, increasing operating room hours or productivity in terms of the number of procedures performed allows managers to distribute fixed costs across more cases. This approach reflects one of the key principles of modern operating room management, which relies on a dedicated leadership role known as the Operating Room Director.[6]

Dexter, one of the leading authors on the subject, traced one of the earliest references to operating room management roles back more than a century. According to Dexter, evidence-based management concepts were introduced to various healthcare activities as early as the 1960s, particularly in bed management, whereas

little similar work had been applied to operating room management.[8]

The role of the operating room director varies greatly at the international level and even between hospitals, as does the required training and hierarchical position.[9,11] In some facilities, the director is not necessarily a physician but works from an office and reports directly to strategic management. In others, the role is filled by a surgeon, an anesthesiologist, or a member of the nursing staff.[7]

According to some authors, a highly qualified physician, such as a surgeon, may not necessarily make an excellent decision-maker, as leadership and managerial skills do not always align with professional expertise. Physicians must acquire a set of non-clinical skills to serve as operating room directors.[9] For this reason, hospital administrators should consider a range of professionals with diverse backgrounds and training for the role of operating room director.[9]

The Italian Society of Anesthesia, Analgesia, Resuscitation, and Intensive Care (SIAARTI) strongly recommends the presence of a local Operating Room Manager (ORM) with advanced and specific skills in operating room management.[12] Recently, in Italy have dedicated academic pathways emerged at prestigious universities (second-level master's programs) in Operating Room Management,[12,13] along with specific competitions for ORM positions.[14] The ORM role, characterized by independence, strong interdisciplinary collaboration, and specific managerial training,[7,10] differs from the traditional Operating Room Director role in Italy, which is typically held by a medical director of a simple or complex unit within a medical department.

In the literature, Operating Room Management is described as a management model based on planning and analyzing the surgical pathway process using metrics, indicators, and tools typical of operations management. It emphasizes the design, implementation, and continuous improvement of organizational processes.[5,6] However, little research has been conducted on the professionals tasked with applying these principles. The topic has been addressed in a limited number of articles, often narrative reviews, editorials, or cultural discussions, and only tangentially in works focused on methodology.[8.9] We found no experimental or high-quality studies on the topic.

Due to this lack in literature, studies investigating the role of the ORM are needed to our opinion, in order to achieve a deeper knowledge on the topic. In fact, we could know if a professional (e.g., a nurse) could better play this role than a surgeon, or anesthetist. More, areas of expertise needing to be developed could be defined. A sample of professionals who already serve as an ORM or performing similar functions could be extremely useful. A qualitative study should permit to explore in deep the experiences of these qualified interviewees. In particular, the directed content analysis method could facilitate the emerging or confirming of a model describing the Operating Room Management. In fact, this method is considered particularly valuable to validate theories, since it requires a more structured process in identifying and categorizing key concepts.[15] To our knowledge, this is the first study on the topic, where this method has been applied.

Thus, regarding the ORM role, this study investigates how management systems conceptualize this emerging position and whether they align with known and established paradigms (e.g., coordinator, chief, or operating room director) or envision a different organizational model. The study could be useful in order to develop training programs specifically addressed to professionals who are actually playing or are interested in playing the role of ORM. Moreover, management health systems will be able to consider our study to properly address o re-define this role.

Therefore, the purpose of the study was to explore and understand the level of knowledge about the ORM role among qualified experts, their professional opinions on defining the role at the regulatory and operational levels, and if the sample considered this role as a resource.

Methods

Study Design

A multicenter qualitative directed content analysis study was designed.[15] Participants were recruited in five major hospitals in Rome (Italy) and in two local health authorities (Aziende Sanitarie Locali, ASL), which included some minor hospitals in the Latium region (Italy). Participants were not familiar with the interviewers' expertise in qualitative research. The rationale for employing a directed study design is based on qualitative research literature, which aims to "develop a rich understanding of a phenomenon as it exists and as it is conceived by individuals within their specific context".[16] Through the collection and analysis of the opinions of qualified experts, the study sought

to deeply explore the phenomenon described in the background section. The direction for data analysis was informed by emerging theories in the literature related to Operating Room Management as a branch of broader operations management.[1,4,5,7,8] Based on these sources, the ORM should have a specific role, a curriculum with a basic eductional level and a professional background, skills, a strong inclination to working in team. Moreover, barriers and enabling factors to the developing of the figure were considered to be investigated.

This study design allows for the identification of both manifest content and latent content, which is summarized into themes and subthemes.

Sampling

A purposive sampling approach was adopted, selecting individuals who, based on their expertise, were considered most capable of providing insights into the phenomena under investigation.

The inclusion criteria were as follows:

- At least ten years of work experience.
- Corporate or hospital district medical directors directly involved in operating room or surgical pathway management.
- Directors of Anesthesiology Units that include operating room management within their scope.
- Professionals formally appointed as Operating Room Managers.
- Personnel in charge of organizational or nursing/clinical functions within surgical platforms or pathways (e.g., nurses, surgeons).
- Nursing Coordinators of Operating Blocks.
- Engineers or other non-healthcare professionals directly responsible for or involved in operating room or surgical pathway management processes.

Exclusion criteria included any professional, regardless of organizational level, without direct involvement in the management of surgical platforms or pathways.

Participants were recruited via formal invitations, accompanied by the study design and related documents, following prior email or phone contact. During this initial contact, the study rationale and objectives were explained, and verbal consent was obtained. Written informed consent was collected later. Participants were informed that interviews would be recorded for subsequent analysis, with anonymity guaranteed.

Interviews and Setting

Interviews were conducted with 11 participants, six in person and five via video conferencing platforms, depending on the availability of the participants. Video interviews in qualitative literature and in person interviews are considered equivalent. [21,22]

The interviews were structured into two main sections and a closing section, comprising 12 open-ended questions (Table 1). The questions were developed based on the theories mentioned above, the guidelines for scheduled surgical pathways, and SIAARTI recommendations.[2,11]

The interviews were transcribed verbatim. Subsequently, participants were contacted by phone to confirm the content of their interviews. The average interview duration was 25 minutes (range: 16 to 40 minutes).

Table 1. Interview Structure

TOPIC GUIDES INTERVIEW QUESTIONS	
INTRODUCTORY	1. Operating theaters are often described as "production environments." What are your thoughts on this?
	2. When considering and/or planning the management of these environments, principles and organizational models are often required. In your opinion, which ones should guide the action?
	3. In conducting management activities in such environments, what models should be used as a foundation?
	4. Thinking about the work and activities performed within operating departments, if we were to frame them within a model, what type of activity model could we describe?
CORE	5. When we talk about organizational models, what exactly do we mean, particularly in the context where you work/manage/coordinate?
	6. Operating Room Management is already a well-studied field. What is your opinion on this?
	7. Operating platforms are among the most complex areas to manage in hospitals. Do you think a specific class of management is necessary for this context?
	8. Universities and some scientific societies (e.g., SIAARTI) have started to develop training programs and documentation around this role. Some organizations have already integrated such figures into governance structures, and competitions are held for ORM managerial positions (including for healthcare professionals). What do you think about this?
	9. How do you think such a figure could be introduced and/or utilized? Is it plausible to envision a single role? Should this figure lead independently, or should they be part of a management pool? If part of a multidisciplinary and multi-professional group, what role should they have?
	10. Who do you think should serve as the ORM? An Engineer, a Graduate Nurse, an Anesthesiologist, a Surgeon, a Public Health Physician, or someone else?
	11. What kind of training do you think an Operating Room Management expert should have? How important is the ORM's professional background, and in what ways could it influence their activity?
	12. What do you think are the enabling factors and barriers to the development of the ORM role?
CLOSING	13. What do you think are the potential applications and areas of activity/competence for such a figure?
	14. Ultimately, do you think this role is useful? Necessary? Unnecessary? Why?

Note**.** ORM: Operating Room Management; SIIARTI: Società Italiana di Anestesia Analgesia Rianimazione e Terapia Intensiva (*Italian Society of Anesthesia, Analgesia, Resuscitation, and Intensive Care*)

Data Analysis

The analysis of the interviews was conducted by two researchers working in parallel. They extracted the most significant narrative units, labeling them and progressively identifying higher-level meaning units to derive themes and subthemes. All this process was accurately tracked.

The researchers first—read and re-read the transcripts multiple times to enhance their understanding of both the overall text and its individual components, fully immersing themselves in the data. After obtaining their initial coding, they met to reach consensus on the extracted data.

The methodological rigour of our study respected the four criteria for qualitative research proposed by Lincoln and Guba. [23] Prolonged engagements in the interviews and peer debriefing in data analysis are assured for credibility. Dependability was satisfied by tracking all the decisions taken during the research. Regarding transferability, we have given a wide description of the study, included the interview structure, and described their sociodemographic characteristics, but it could be affected by lack in data saturation. Confirmability was achieved with the phone confirmation of the interview, given by all the participants at the end of the study, and by the agreement reached on the thematic analysis, achieved by the two researchers. Lastly, Authenticity is proven by the broad interview exerpts in the results section.

Ethical Considerations

The study protocol was submitted to and approved by the Lazio 1 Ethics Committee (Protocol No. 362/CE Lazio 1). The committee

received the research project along with all associated documents. Informed consent was given to all the participants, and they were all reassured regarded the anonymity of the results.

Results

A total of 11 professionals were enrolled (Table 2), including 6 men and 5 women, with an average age of 50.7 years. Regarding educational qualifications, 10 out of 11 participants held a master's degree and at least one second-level master's specialization. The average work experience of the sample was 24.7 years, with 18.4 years of direct experience in the surgical field.

Table 2. Socio-Demographic Characteristics

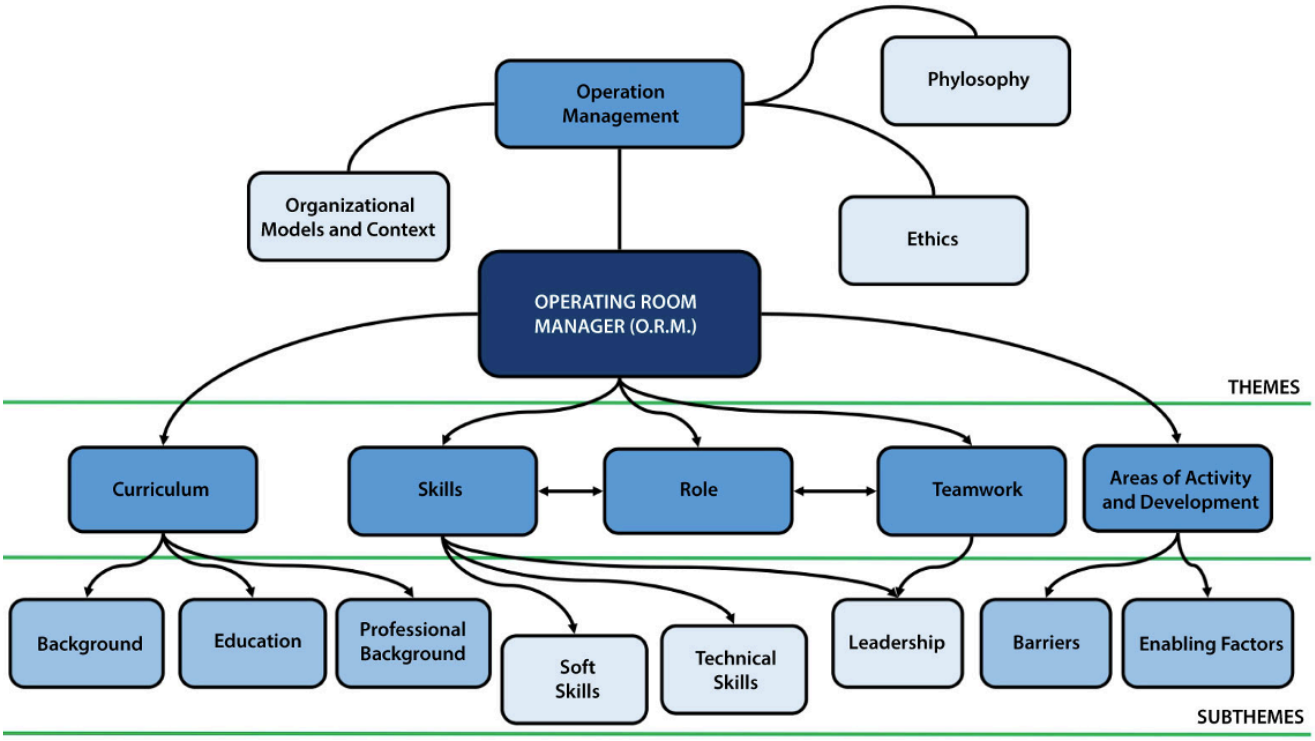
CHARACTERISTICS (N = 11)	
Age	**(M, SD)**
	50.7 (5.3)
Gender	**(n, %)**
Female	5 (45.5)
Male	6 (54.5)
Education Level	**(M years, %)**
Master's Degree	10 (90.9)
At least 1 Master II	10 (90.9)
Bachelor's Degree	1 (9.1)
Work Experience	**(M years, SD)**
	24.7 (7.6)
Work experience in Surgical Pathway	**(M years, SD)**
	18.4 (12.6)
Profession	**(n, %)**
Doctor	4 (36.4)
Nurse	5 (45.4)
Engineer	2 (18.2)
Role	**(N, %)**
Medical Director of Health Management	3(27.3)
Director of UOC (Anesthesia-Operating Unit)	1(9.1)
Position/Organizational Function	1(9.1)
Operating Room Manager	2(18.2)
Operating Block Coordinator	2(18.2)
Engineer	2(18.2)
Origin	**(N, %)**
Hospital Companies	2(18.2)
University Hospitals	3(27.3)
IRCCS	1(9.1)
Hospital of Local Health Unit	2(18.2)

Note. M: mean; SD: standard deviation; N: number; UOC: Complex Operational Unit; IRCCS: Scientific Institute for Research, Hospitalization, and Healthcare

The extracted themes were as follows:

1. The dynamism of organizational models and the balance between associated resources and risks
2. Curriculum and complexity: a challenging choice
3. The Role in Managing the Complexity of Processes and Professional Figures
4. Competencies: Process Knowledge ("Reading" the System) and Leadership
5. Teamworking skills

Figure 1. Map of Themes



Note. ***Themes correspondences***: Operation management – theme 1; Curriculum - theme 2; Role - theme 3; Skills: theme 4; Teamwork - theme 5; *Area of activity and Development – Theme 6, original from the present study.*

Themes

The Dynamism of Organizational Models and the Balance Between Associated Resources and Risks

Organizational models are dynamic. Many management patterns intersect, taking quality, control of resources and related risks into account. This theme was developed into two subthemes, both closely related to the main topic.

Organizational Models and Context: Production Lines and Constantly Changing, Intersecting Models

The theme of organizational models and operation management focuses on the control and management of processes. Regarding organizational models in general, one coordinator stated: *"Various models can intersect with each other. New models are likely to emerge, but we need to understand clearly where we are heading" (S3).* The medical director shared a similar view: *"I would say there isn't a single organizational model. There are many organizational models that should be adopted, depending on the context" (S8).*

Meanwhile, the anesthetist observed: *"Viewing it as a production line undoubtedly helps, especially because, seen in this way, one can identify tools to measure the system's efficiency and, above all, to understand the interferences within this production line" (S2).*

However, when delving into the specifics of operation management, the engineer added: *"I won't provide multiple answers; for me, the models are those suggested by operational management."* He continued, *"When we talk about Operating Room Management, we're discussing changing the status quo, and this is different from any other type of work. For example, management control analyzes data, provides results, and measures performance, but it doesn't aim to change it […]. What we do is on the surgical pathway, and it's clear because it's only here that we measure data, understand why things are going wrong, and try to change them. And this third point changes everything" (S6).*

Ethics and Philosophy: Associated Resources and Risks

The ethical aspect of the organizational models emerged from the study: It is important avoiding wasting resources, but at the same time ensuring equity.

An anesthetist remarked, *"At this historical moment, it is no longer possible to manage operating*

theaters as we did in the past. It's not acceptable to waste resources [...] also for a moral reason: when I waste time and prevent another patient from undergoing surgery, from an ethical point of view, that is a serious issue" (S2).

This perspective is supported by an Operating Room Manager (ORM), who stated: *"I don't think it's acceptable for operating room activity not to follow this orientation."* They added, *"I struggle with the boundary we often approach between the need for production—stemming from the economic and managerial obligation to optimize and move forward—and the limits of safety and quality. This includes the human aspects for patients as well as the psychological, human, and managerial aspects for the staff" (S4).*

An engineer contributed their view on the matter, stating: *"As far as principles are concerned, it's fundamentally about the equity of care [...] and objectivity in the allocation of operator slots, which are assigned accordingly" (S9).*

Curriculum and Complexity: A Challenging Choice

The theme of curriculum addresses the question of *"who"* should serve as the Operating Room Manager (ORM). The answer revolves around three clearly emerging subthemes:

Education or "Specific Theoretical Competence"

Participants referred to formal training, which should be structured and organized, whether academic or not. One ORM interviewed stated, *"[The ORM] definitely requires specific theoretical competence, meaning managerial training designed precisely to address innovation and the efficiency of the surgical pathway" (S1).*

At the same time, a Medical Director emphasized the importance of complementary skills, remarking, *"I wouldn't support training focused solely on technical and operational tools, and nothing more [...] I would dedicate a lot of training to the topic of leadership."* He also acknowledged that, *"[Referring to public health and organizational physicians] objectively, public health doctors and organizational doctors, through their specialization training, have opportunities to engage in formative experiences that, in some cases, make them more prepared" (S8).*

Another Medical Director added, *"If there were a component of study focused on managing operating theaters within the various degree programs, whether Nursing Sciences or Medicine and Surgery, across the different specialties... I believe this wouldn't be a bad idea" (S11).*

Professional Background and Experience

This subtheme underscores the importance of professional experience as a critical factor for the role of the ORM, emphasizing it must be focused on all the aspects of a surgical path. The professional should acquire it inside the field. One physician stated, *"... what is important here is a qualification that cannot be obtained [implying not formally, through a degree], and that is experience."* They added, *"A medical director is outside the operating block; they have never lived it, never been there hands-on" (S2).*

This view is supported by an engineer, who remarked, *"Unfortunately, it's a field where, if you don't know it, it's pointless to talk about it; you also need to have experience" (S6).*

A coordinator further affirmed, *"It's not a process that can be managed without field experience" (S6).* A Medical Director provided additional insight, saying, *"It's clear that if the individual comes from that world, they will have certain advantages. First, they are familiar with many of the processes within that context. Moreover, it would make them more authoritative in the eyes of their colleagues, with whom they would take on an operational role" (S8).*

In regard to which professional could take on the role of ORM, our sample referred to the potential of nurses as a manager and a neutral figure.

An engineer stated: *"... if it were just me, for example, as an engineer... objectively, I could only contribute to data, the use of technologies, and IT systems" (S9).*

On the other hand, another engineer pointed out: *"If we're talking about an anesthetist, they are a clinician, but anesthetists and surgeons are usually a bit lacking in terms of organizational training" (S6).* A Medical Director emphasized: *"They must be fundamentally super partes figures, capable of governing the process without being subjected to internal pressures" (S11).*

Similarly, an ORM stated: *"Regardless of their profession—whether they come from healthcare professions, whether they are an industrial engineer, a physician, or any other professional involved—they need to shed their professional affiliation" (S1).* A Medical Director categorically excluded surgeons, stating: *"Certainly not the surgeon, because they are too involved [...] they can participate in organizational processes [...] but risk being partial."*

Finally, regarding nurses, the Medical Director remarked: *"The nurse could work as well, but the problem then becomes: How much power and authority does the management grant them? Because*

if they're left alone without strong support from strategic and medical management, they risk being devoured by the surgeons and anesthetists..." (S10). An engineer stated: *"They work better with certain nursing figures, but sometimes those nurses lack the authority, because for a nurse it's difficult to hold certain authoritative roles within an organization" (S6).*

To conclude the theme of curriculum, an ORM summarized: *"It is a figure that must possess particular characteristics and, in addition to specific training in managing the surgical pathway and the factors that can make an operating block or multiple blocks more efficient... soft skills are fundamental. Therefore, it's about attitude, not so much the profession of origin but rather the combination of training and a personal ability to bring together people and processes" (S1).*

The Role in Managing the Complexity of Processes and Professional Figures

Regardin the role, participants highlited the role of ORM as an expert in managing complex processes, such as surgery schedules and waiting list. A Medical Director explained: *"They must be proficient in process analysis. Process analysis can be conducted by any of the figures or professions we mentioned earlier—whether a doctor, nurse, hygienist, surgeon, or management engineer" (S11).* An ORM stated: *"The idea of placing figures focused on the process is precisely to connect all the various production platforms and ensure that the patient flow—from when they enter, pass through the various phases of the surgical pathway, and then leave for follow-up—is as linear as possible" (S1).*

A Medical Director added: *"They must serve as a link between the command center—the external operation management—and the operators inside the operating room. They need to perform this bridging function" (S10).* Another Medical Director emphasized: *"The presence of an operation manager within an operating block is certainly an enriching element aimed at making certain parts of the process smoother, particularly by facilitating coordination and integration among the various figures involved" (S8).* An engineer highlighted the broader scope of the role, stating: *"Here, I'm talking about the surgical pathway, not just the operating block, because it makes no sense to focus exclusively on the operating rooms without overseeing the entire process from a broader perspective" (S6).* One ORM, a nurse, observed: *"What is typically expected of the operation manager, in this case for the surgical pathway, is to handle organizational issues. They often do not have responsibility for human resources governance, as it's quite difficult to balance the organizational aspect of such a broad surgical pathway with human resource management" (S1).* This perspective was supported by a coordinator, who stated: *"I think of aspects related more to structure rather than personnel. I would already establish such a division, separating process management from personnel management" (S3).*

Competencies: Process Knowledge ("Reading" the System) and Leadership

The competencies identified by the sample emphasize the need for knowledge and the ability to manage the processes associated with the surgical pathway or operating room operations.

Referring to the ORM role, an anesthetist asserted: *"This is not something that can be done without knowing the processes of the operating room" (S2).* An ORM elaborated that the role requires: *"Having a perspective that is as super partes and as comprehensive as possible regarding the surgical pathway of the organization where they work [...] understanding the system and identifying the points where corrections need to be introduced" (S1).* A coordinator added that the ORM must also: *"Possess individual characteristics such as communication skills and organizational abilities that, in fact, go beyond formal training" (S3).*

A Medical Director stressed the importance of effective leadership, stating: *"An operation manager with poor leadership skills, or even with a leadership style that is dysfunctional for the context in which they operate, risks failure" (S8).* One ORM highlighted the centrality of leadership in the role, remarking: *"A great ORM is a leader..." (S4).* Another reinforced this, stating: *"In my opinion, you need a leader within a pool" (S6).* Finally, another participant described the ORM as: *"The coordinator of a multidisciplinary team" (S11).*

Teamworking Skills

Teamwork, understood as collaborative efforts within a group, is one of the most emphasized elements when interviewees discuss the role of the ORM within an organization.

As one ORM stated: *"The formation of an interdependent organizational structure is essential..." (S4).* Another ORM remarked: *"There must be a team that supports the operation manager in their day-to-day operations" (S1).* An engineer highlighted the importance of clarity in team composition, stating: *"It is crucial to be very precise when forming a pool, specifying who does what, who is dedicated, and who is not [...] no organization*

can stand on its own. The organization must include the involvement of figures who can then negotiate a reorganization" (S6).

Areas of Activity and Development: Bridging Roles across Contexts and "Resisting Resistance"

Regarding areas of potential development for an ORM, participants emphasized their role in managing surgical pathways, even in relation to the potential involvement in other pathways. However, a structural support should be provided. As one Medical Director stated: *"These are all platforms (referring to outpatient services, emergency rooms, telemedicine) that will interact with the hospital and require these professional figures... you don't just create the platform; the platform needs to be managed" (S10).*

Regarding the utility and necessity of the role, a coordinator observed: *"Processes outside the operating room could be accelerated and facilitated" (S7).* Another coordinator noted: *"In very complex contexts, it's plausible that more than one ORM might be necessary" (S3).* However, an ORM warned that the role is: *"Of little use if it isn't supported both by a directive mandate and by the creation of a structure around the operation manager to sustain their activity" (S1).*

Barriers and enablers to the development

Participants also reported some barriers enablers to development of the ORM role, such as resistance of some professionals, or strong mandate from the top management. One ORM identified resistance to the unknown as a significant challenge: *"Anything unfamiliar creates a perception of losing some degree of power, which is not really the case... everyone remains within their role. This role simply inserts a function, a position that connects the different aspects of that pathway" (S1).* Another ORM, likely reflecting a nursing perspective, highlighted systemic rigidity: *"The obstacles are represented by the unwillingness to change, by the system's rigidity in holding onto spaces that were earned and acquired over time but that previously belonged to others, to other roles, and other structures" (S4).* An ORM pointed to the increasing focus on lean management and organizational efficiency: *"The Lean approach, combined with the need for economic and organizational survival, improvement, and achieving targets, has underscored the importance of having a central figure in the organization who can coordinate efforts to achieve better results" (S4).*

Another ORM highlighted the cultural challenges within public organizations: *"Organizations are so accustomed—especially in the public sector—to operating* in*"silos" and by departments, which are fundamentally closed and disconnected from one another. Without a strong directive mandate, this figure cannot possibly resist... the resistance" (S1).* Similarly, an engineer emphasized the necessity of top-down commitment: *"If management isn't involved, doesn't believe in certain improvement projects, or fails to see the link between specific actions, organizations, and the outcomes they care about, there's no future, no story" (S6).* Finally, an engineer reflected on the growing political and managerial attention to operational management: *"We're hearing more and more, at the political and managerial levels, about issues closely tied to operating room management. It's becoming relevant because people are finally understanding that when you have a production area, it means that unfortunately, the focus is concentrated there; so if you don't manage it, it doesn't produce" (S6).*

Discussion

The themes identified and developed in this study are six: 1) The dynamism of organizational models and the balance between associated resources and risks 2) Curriculum and complexity: a challenging choice 3) The Role in Managing the Complexity of Processes and Professional Figures 4) Competencies: Process Knowledge ("Reading" the System) and Leadership 5) Teamworking skills 6) Areas of activity and development: bridging roles across contexts and "resisting resistance". These are summarized in the chart shown in Figure 1.

As reported in the methods paragraph, the chart was developed from the themes explored and emerging from the interviews, with validation from the literature.

The theme related to the organizational model of Operation Management is supported by three sources.[2,17,18] Meanwhile, the themes that focus on the ORM's curriculum are corroborated by Marjamaa et al., 2008.[7] The themes regarding the role, competencies, and teamwork are addressed (albeit marginally) by several authors.[7,8,10] However, we must emphasize the fact that all the sources are not qualitative or quantitative studies, but theoretical works or deriving from other management fields, as there is a lack of literature in this field. The theme focused on the areas of activity and development of the ORM role is entirely original.

Theme 1 emerges as a macro-theme (as shown in Figure 1) not focused on the ORM figure itself but rather refers to the broader dimension of organizational models and, therefore, Operation Management.[2] This can be defined as the framework within which the organizational model of Operating Room Management and the ORM role is situated.[1,6]

The subtheme "associated resources and risks" can be linked to the philosophy and ethics of the method and the figure itself, while the other subtheme concerns organizational models, the foundational references that inspire or underpin the actions and vision of the interviewed subjects, such as Lean Management or the "lean" model. This model is rooted in continuous improvement, careful resource management, personnel development, and client focus.[17,18] The most significant elements emerging in terms of ethics and philosophy appear to be internalized by the interviewees and concern the fundamental concepts underpinning modern management models. Participants were fully aware of the economic impact of some processes, and the fair and equitable management of resources is seen not only as a principle of appropriateness in company management but also as an ethical and moral issue. At the same time, concerns were raised about whether the strong push toward production might compromise other principles of equal importance, such as safety and/or quality for the patient or organizational well-being for personnel.

Regarding organizational models specifically, the interviewees demonstrated significant awareness of the management tools at their disposal. When asked about the organizational models they follow or their opinions on them, their responses, though varied and nuanced, were well-calibrated based on their experiences and objectives. The complexity of managing a system such as surgical platforms, and more generally the surgical pathway, was consistently acknowledged, either explicitly or implicitly.

The Curriculum Theme primarily concerns training. According to the Italian State-Regions Conference, the training and education of healthcare professionals are "fundamental aspects for developing a homogeneous culture at the national level regarding the perioperative surgical pathway."[2] This assertion aligns with the awareness of the interviewees, who emphasized that structured training in management settings enables those involved to utilize and share a unified language. Regarding the type of training, opinions focused primarily on structured education, described as *"specific theoretical competence",* aimed at innovation and increasing organizational and process efficiency, as well as acquiring the necessary tools for operationalization, and therefore for managing and monitoring processes.

Another key aspect highlighted is that part of this training should be dedicated to developing system-reading skills and competencies related to leadership, bridging the topic of competencies and the subtheme of leadership.

Regarding what might be defined "experience" or professional background, all participants, albeit with different emphases, agreed that experience in the surgical field is a necessary, and in some cases indispensable. Narrative elements related to background often referenced the capacity already highlighted in the training subtheme, described as the ability to read the context—an ability or competency that emerged explicitly or implicitly in many parts of the analysis.

The concept of authority is also noteworthy, as it relates to the idea that choosing a figure with a "field-based" background implicitly acknowledges their significant competence, which is also supported in literature.[19] Regarding the question of the professional background of the ORM, there was near unanimity that the role could be filled by various professionals, although participants often focused on who should not or could not fill the role.

Two implicit aspects emerged: the first concerns the broad perspective the figure must have, highlighting the inadequacy of a vision overly focused on a single specialty. The second relates to the necessity for the figure to act as an impartial "super partes" decision-maker—a term used by several interviewees. This impartiality is often seen as a limitation of the surgeon figure, who tends to focus on their operating unit and patients and may undervalue collateral, preparatory, or assistive activities that are integral to the process from an organizational perspective.

The interviews also highlight that while nurses could be good candidates for the ORM role, their authority might not always be recognized. This reflects the earlier subtheme of "field-based" authority but here it refers to the challenge of authority in the context of the role itself.[9]

Regarding the third theme, there are various viewpoints when it comes to imagining the role of the ORM. Some see it as being embedded within operating platforms, while others envision it extending externally across the entire surgical process. It should be noted that these hypotheses may not be conflicting but rather context-dependent. A focus on process vision and activities consistently emerges as a cornerstone of what is considered the ORM's primary function, which is also the core of Operation Management:

"Operation management concerns the design and control of production processes for goods and services."[2]

The ORM is perceived as an innovative figure in terms of organizational culture, even in "production" contexts such as the operating room and, more broadly, the surgical pathway. This is because Directors of operational units typically manage both processes and human resources. In contrast, in a model based on Operation Management, they do not directly manage human resources, at least not primarily, and this distinction may influence the adoption or development of such an approach.

With reference to nursing staff acting as ORM, as previously mentioned, the lack of recognition of the role emerges as a critical issue. While this is a consideration that, by extension, can apply to any area of management, it is nonetheless relevant here, as highlighted by Muñoz & Macario, who stated: "Nurses can be impartial and may also have in-depth knowledge of all hospital structures; however, they must have the unconditional support of management and be able to engage with specialists in conflict situations".[9] The support of management, regardless of who fulfills the role, is one of the most frequently cited factors when identifying the elements that sustain or facilitate the activities and development of the ORM as a strategic figure.

Regarding the fourth theme, the reference to the *"… need for a modern healthcare organization to have specific competencies capable of utilizing appropriate methodologies and tools to achieve the organizational goal of meeting patients' needs and expectations"*[2] finds limited support in the data emerging from the interviews. This indicates the need for further exploration. However, at this stage, it is possible to roughly categorize the findings into two subthemes: **Technical Competencies** and Non-Technical Competencies.[20] With regard to **Technical Competencies,** a solid understanding of the surgical process emerges as an almost indispensable condition. A *"profound knowledge of surgical process management"* is emphasized by nearly all participants, who link it both to professional background and the ability to work effectively with the necessary management tools.

About **Non-Technical Competencies**, components such as process vision, the ability to interpret context, and the capacity to engage with multiple stakeholders are all essential elements within the skillset of a figure capable of managing complex systems.[20]

To conclude the discussion on competencies, the ability to exercise leadership is also highlighted. Although the data collected does not yet allow this to be characterized as a distinct subtheme, some authors explicitly define it as a core competency—particularly a management competency of significant importance.[20] Evidence also emerges regarding how leadership is exercised, noting the risk that poor leadership could result in "rejection" of the figure. Conversely, the presence of *"… a leader in a pool"* reinforces the idea of leadership as a critical element, providing a link to the subsequent theme of Teamwork.

In the fifth theme, the importance of teamwork is highlighted. Among the participants, there is unanimous agreement on the team-based nature of the work to be carried out, emphasizing that the team is critical for *"daily operations"* and that, when forming the *"pool",* it is essential to be precise about *"who does what"*. Significant elements emerge regarding the team's support for operational management. These elements are expressed on two fronts. On one hand, there is a recommendation to include a figure with negotiation power—someone who could be envisioned as a senior leader capable of addressing organizational decisions with strategic management. On the other hand, there is the suggestion to coordinate the actions of the operational management team directly under the company's medical management. This would require the ORM or the Operation Management Pool to be fully integrated as staff under this management, which aligns withnational Italian guidelines: "the function of Operational Management operates in synergy with Medical Management".[2]

The final theme concerns the areas in which the ORM role could develop. There is unanimous agreement on the utility and necessity of a figure dedicated to the management and optimization of processes. Regarding the *barriers* and *enabling factors* for the role's development, two subthemes emerge from the narrative data, which, in turn, align with two broader categories related to culture and organizational innovation. Interviewees identified as barriers what could be described as the "natural resistance" to change in favor of preserving the "status quo". This resistance to maintaining existing conditions and established roles was cited by some participants as a potential obstacle to the growth of the ORM role. The competition for control over areas of activity, which could be occupied by a variety of figures,

was summarized by one participant: *"Anything unfamiliar creates a perception of losing some degree of power." Considering this, there is clear agreement that the ORM role transcends a narrow logic based on professional background.*

Similarly, enabling factors are identified where a methodological framework is available to provide a shared direction for structuring management activities. Additionally, the fact that healthcare organizations, given economic constraints and resource scarcity, increasingly adopt process-based approaches to make activities more effective and, ultimately, more sustainable, is seen as a driver for development.

Another factor around which both barriers and enabling elements to ORM development can be recognized relates to the strategies and policies of organizations and external entities. Barriers are often found in entrenched siloed management structures, where silos are represented by departments or cost centers. One of the most significant obstacles is the potential lack of a strong mandate from strategic leadership. The absence of structures dedicated to operational management at the local level limits experience in this area and, consequently, the development of a culture focused on operational management. Conversely, a strong mandate from leadership facilitates the development of an organizational culture that aligns with operationalization objectives. Another favorable element for the development of Operation Management is that, due to pressing needs, it has become a priority topic for regional and supra-regional decision-makers. Evidence of this is the activity occurring at national and regional levels aimed at improving the efficiency of the surgical pathway.

Strengths and Limitations

The study has several strengths. No similar works are found in the existing literature. The selection of the recruited sample, based on its relevance to the studied topic, led to the identification of highly pertinent elements. The high profile of the recruited sample, in terms of roles and background (specifically in management), and their ability to analyze management-related topics and provide mature responses to the questions posed, resulted in a rich production of significant narrative data. The variety of the sample in terms of professional background and roles, considering an extremely specialized topic, contributes to a broad and comprehensive understanding of the phenomenon studied.

The limitations of the study include the absence of the surgeon figure among the interviewees. As with all qualitative studies, results could hardly be extended in other contexts, given the sample size and the varying sociocultural contexts. More, given the small sample size, data saturation has not been achieved, so this issue could affect transferability of the study. However, it should be considered that is extremely difficult recruiting a high number of qualified professionals, even considering the strict inclusion criteria.

Lastly, direct experience as a director of the surgical pathway was limited to only two participants.

This study has given a deeper knowledge of the ORM figure based on the model described above. However, there is still difficulty in outlining a clear profile for the ORM. While the interviewees undoubtedly understand the context and principles within which such a role should operate, its specific competencies remain undefined.

Helathcare systems should create academic courses based on the results of this study for nurses and other professionals, to manage complexity, balancing human and technical resources, risks, considering the ability of "read" the healthcare system and to overcome barriers and cultural and professional resistances. Participants indicated that only experienced professionals in surgical field should be selected for the role. However, the indicated impartiality of the role seems to exclude the figure of surgeon as reported, but this aspect should be better addressed in future studies. More, courses should be based on management control, considering multiple surgical pathways instead of a compartmentalized system. Regarding the lack of recognition of the role for nurses, this issue could be managed by organizing classes and meetings where different professionals meet to show their skills and competencies. In addition, the importance of teamwork seems suggesting to creating a support team to cooperate with to ORM, expecially in taking strategic decisions or in implementing or changing resources, when it occurs. To our opinion, either health managers or high qualified professionals (e.g., nurses, surgeons, and anesthetists) should be included in this teams. Last, healthcare directions should give a strong mandate to the ORM figure with dedicated resources.

Conclusions

A clear awareness of the topics emerged, undoubtedly linked to the characteristics of the sample. Regarding organizational models and

the systems in which they are embedded, distinct elements emerged, shaped by the interviewees' work environments and backgrounds. Despite these differences, common elements of modern management were highlighted. Such management must account for limited resources, citizen demands (with waiting list management being particularly relevant), aiming to maximize efficiency while always ensuring safety and quality of care.

Concerning the themes related to the role of the ORM, the study provides a fairly detailed definition of the curriculum as well as the areas of competence and development.

However, while the themes of competencies and roles are beginning to take shape, a unified idea remains elusive. This could be due to the fact that, as a new figure, the ORM is not yet fully integrated into the system. Nonetheless, it is clear that this role transcends the traditional paradigms of Coordinator, Chief Physician, Organizational Position, etc.

While literature is scarce in this field, future studies should recruit more professional in order to achieve a deeper knowledge of the topic. The perspective is therefore to continue the exploration through additional interviews, maintaining as far as possible a similar composition of the recruited sample while potentially expanding the scope to include extraregional centers. Since is difficult recruiting a sample with stringent inclusion criteria how we made, a methasinthesis from multiple studies should be also taken into account, to achive saturation data and implement scientific rigour.

References

1. Agnoletti V, Buccioli M, Padovani E, Corso RM, Perger P, Piraccini E, Gambale G. Operating room data management: improving efficiency and safety in a surgical block. BMC Surg. 2013; 13. doi:10.1186/1471-2482-13-7
2. Conferenza Stato Regioni. Linee di indirizzo per il governo del percorso chirurgico programmato. Luglio 09, 2020. Ultimo accesso 10 Ottobre 2024. https://www.statoregioni.it/media/2762/p1-csr-atto-rep-n-100-9lug2020.pdf
3. Bellini V, Guzzon M, Bigliardi B, Mordonini M, Filippelli S, Bignami E. Artificial Intelligence: A New Tool in Operating Room Management. J Med Syst. 2019; 44. doi:10.1007/s10916-019-1512-1
4. Lee DJ, Ding J, Guzzo TJ. Improving Operating Room Efficiency. Curr Urol Rep. 2019. doi:10.1007/s11934-019-0895-3
5. Divatia J, Ranganathan P. Can we improve operating room efficiency? J Postgrad Med. 2015; 61. doi:10.4103/0022-3859.147000
6. Boggs SD, Tan DW, Watkins CL, Tsai MH. OR Management and Metrics: How It All Fits Together for the Healthcare System. J Med Syst. 2019; 43. doi:10.1007/s10916-019-1272-y
7. Marjamaa R, Kirvelä O. Who is responsible for operating room management and how do we measure how well we do it? Acta Anaesthesiol Scand. 2007. doi:10.1111/j.1399-6576.2007.01368.x
8. Dexter F. A brief history of evidence-based operating room management: then and now. Anesth Analg. 2012; 115:10-11. doi:10.1213/ANE.0b013e31824cba97
9. Muñoz Alameda L, Macario A. Advances in operating room management. The role of operating room director. Rev Esp Anestesiol Reanim. 2017; 64. doi:10.1016/j.redar.2016.11.004
10. Baumgart A, Schupfer G, Welker A, Bender HJ, Schleppers A. Status quo and current trends of operating room management in Germany. Curr Opin Anaesthesiol. 2010; 23(2):193-200. doi:10.1097/ACO.0b013e328336b8b4
11. Bressan F, Agnoletti V, Girardi F, Sorbara C, Dell'Atti I, Piccioni F, Coletta G (Gruppo G.I.O.R.G.I.O.) SIAARTI. Gestione Organizzativa e Anestesiologica del Percorso Perioperatorio: buone pratiche per la Fase 2 Covid-19. 2020; Maggio 20:11. Ultimo accesso 10 Ottobre 2024. https://www.buonepratichesicurezzasanita.it/images/Covid-19/Documenti/SocietaScientifiche/SIAARTI/U_Gestione_organizzativa_anestesiologica_del_percorso_perioperatorio_SIAARTI.pdf
12. Università Cattolica di Roma. Master di II livello in Operating Room Management. Ultimo accesso 10 Ottobre 2024. https://www.unicatt.it/master-operating-room-management-avvisi#sep
13. Università di Bologna. Master di I livello Il Controllo di gestione nelle sale operatorie: Operating Room Management. Ultimo accesso 10 Ottobre 2024. https://www.unibo.it/it/studiare/dottorati-master-specializzazioni-e-altra-formazione/corsi-alta-formazione/2023-2024/il-controllo-di-gestione-delle-sale-operatorie-operating-room-management
14. Azienda Unità Sanitaria Locale di Ferrara. Concorso Pubblico per titoli ed esami a n. 1 posto di Dirigente delle Professioni Sanitarie infermieristiche, tecniche, della riabilitazione, della prevenzione e della professione ostetrica - area infermieristica esperto nell'Operation Management delle Sale Operatorie e Reti Endoscopiche. Ultimo aggiornamento 23 Marzo 2023. Ultimo accesso 10 Ottobre 2024. https://www.ausl.fe.it/amministrazione/bandi-e-concorsi/concorsi-pubblici/concorso-pubblico-per-titoli-ed-esami-a-n-1-posto-di-dirigente-delle-professioni-sanitarie-infermieristiche-tecniche-della-riabilitazione-della-prevenzione-e-della-professione-ostetrica-area-infermieristica-esperto-nelloperation-management-delle-sale
15. Hsieh H, Shannon S. Three approaches to qualitative content analysis. Qual Health Res. 2005:1277-1288.
16. Garrino L, Dimonte V. Disegni e approcci alla ricerca qualitativa. In: Polit DF, Beck CT. Fondamenti di Ricerca Infermieristica. McGraw Hill; 2018:212.
17. Bianciardi C, Bracci L, Burroni L, Guercini J. Lean Thinking in Sanità: Da strategia a modello operativo. Società Editrice Esculapio; 2014.
18. Lega F, Trinchero E. Governare la sala operatoria nell'ospedale del XXI secolo. Qualità, sicurezza, efficienza. Egea; 2016.
19. Kondrat B. Operating room nurse managers--competence and beyond. AORN J. 2001. doi:10.1016/s0001-2092(06)61838-3
20. Lavalle F. Management sanitario e gestione delle risorse umane. Carocci Faber; 2018.
21. De Villiers C, Farooq M B, Molinari M. (2022). Qualitative research interviews using online video technology–challenges and opportunities. Meditari Accountancy Research, 30(6), 1764-1782.
22. Krouwel M, Jolly K, Greenfield S. (2019). Comparing Skype (video calling) and in-person qualitative interview modes in a study of people with irritable bowel syndrome–an exploratory comparative analysis. BMC medical research methodology, 19, 1-9.
23. Lincoln YS and Guba EG. Naturalistic Inquiry. Vol. 75. Newbury Park, CA: SAGE Publications, 1985.