

Barco control room report



2025

BARCO

Barco control room report

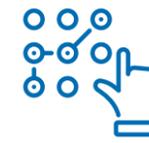


Contents



Research methodology

06



Challenges in operational efficiency

How control room efficiency impacts security productivity and decision-making.

08



Emerging challenges in control rooms

The main challenges, as identified by 2,000+ control room professionals.

16



Workflow challenges

Exploring control room workflows, across roles and markets.

36



Collaboration and remote working

The dynamics of remote working and collaboration in a changing professional landscape.

42



Future readiness

Reflecting on continued future success in control rooms.

50



Executive summary

Control rooms are at the heart of critical operations across various industries with the market undergoing rapid transformation. As operational complexities grow and technological innovations accelerate, the demands placed on control room professionals have never been greater. To navigate this shift effectively, we believe it is essential to understand the emerging trends and fundamental challenges that shape the control room landscape.

Our second global control room survey, targeting professionals working in or around control rooms, focuses on identifying key factors impacting operational efficiency in control rooms. We must continuously validate or adapt our assumptions and insights, as **continuous improvement brings us where it matters**. It is crucial to identify what holds control room professionals back in doing their job and what they need to meet their responsibilities at the highest standard.

Significant research findings include

- Emerging challenges are workflow complexity and reactive decision-making
- Control room professionals are 34% more productive in highly efficient control rooms
- Common challenges, such as workflow complexity and reactive decision-making, exist across industries, but unique root causes arise with industry specific challenges
- Highly efficient control rooms spend less time monitoring and relatively more time optimizing
- There is a greater emphasis and support for (remote) collaboration with external stakeholders in highly efficient control rooms.

This report aims to help management prioritize improvements that drive operational efficiency by providing valuable insights into the complexities of control room operations. We believe these findings will drive informed decision-making and empower the future of control room management to navigate and lead in this rapidly changing, mission critical environment.

Barco Control Rooms



Research methodology



To assess the challenges, pain points, and priorities shaping control rooms worldwide, we have collected data through different measures of activity: round table discussions, in-depth interviews, desk research, and a global online survey.

Round table discussions

We have conducted qualitative sessions with control room professionals across industries and roles to explore challenges and root causes to fuel the quantitative questionnaire.

In-depth interviews

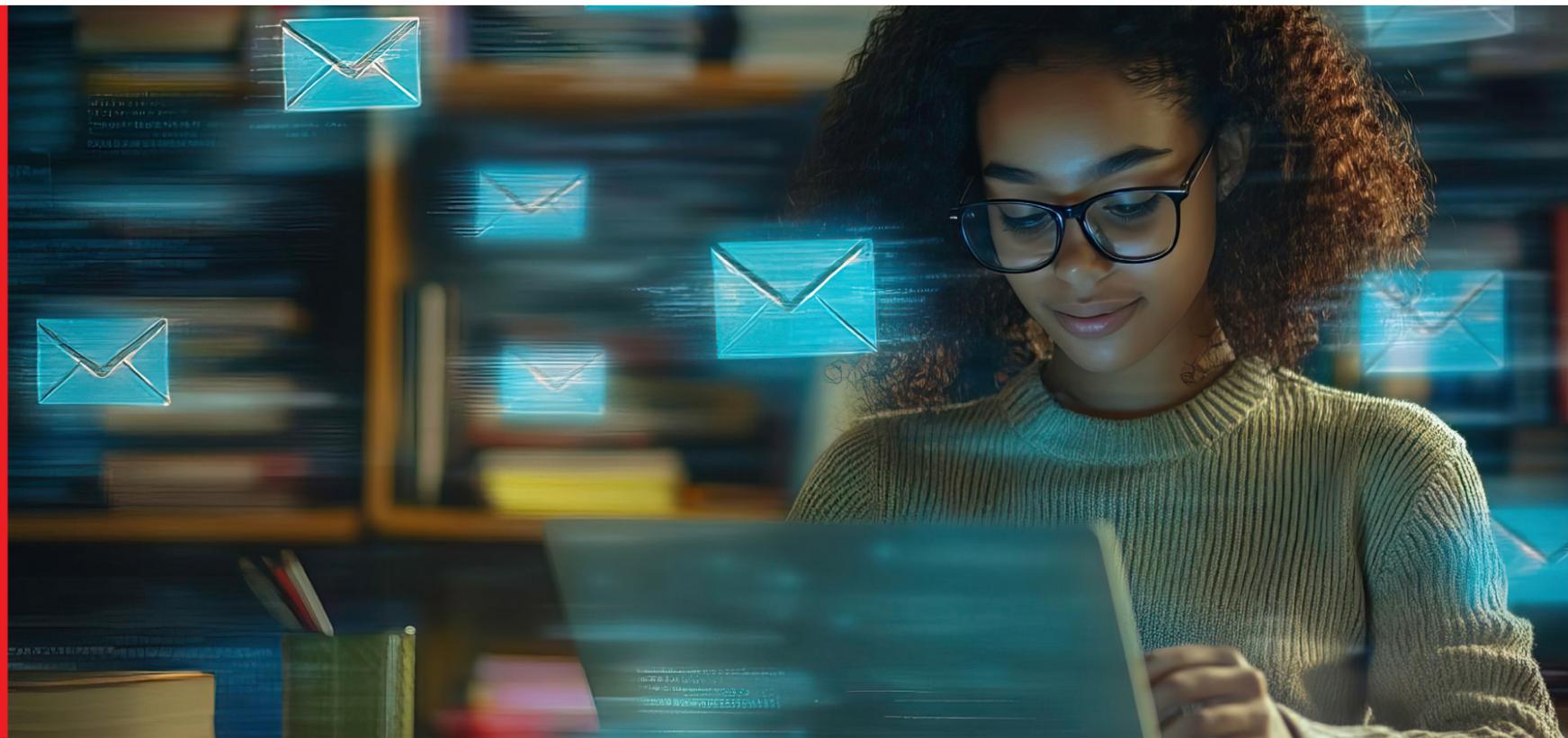
Interviews conducted among industry experts to understand strategic priorities, key control room challenges in their organization and key trends they recognize in the market.

Desk research

Barco leverages the 2022 Barco Control Room research to build a deeper understanding of the challenges of the control room market.

Online survey

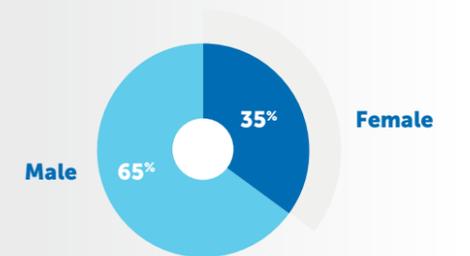
The survey was conducted online to enhance reach and accessibility. Approximately 2,000 respondents, across regions and 6 well represented different industries, participated. The targeted profiles were operators, supervisors, IT managers and C-level executives working in and around the control room. The profiles were validated with multiple quality checks to ensure the right target group.



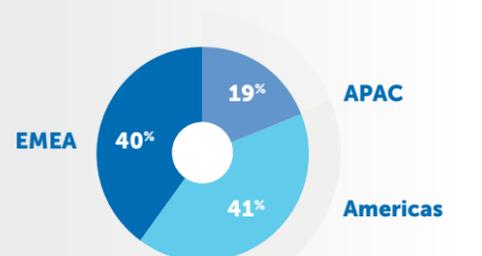
2,144

control room professionals

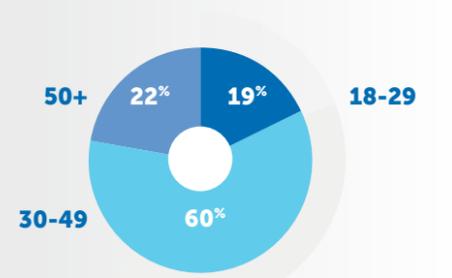
GENDER



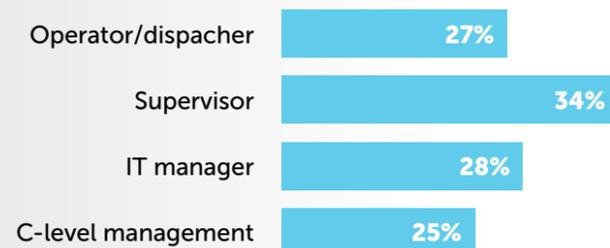
REGION



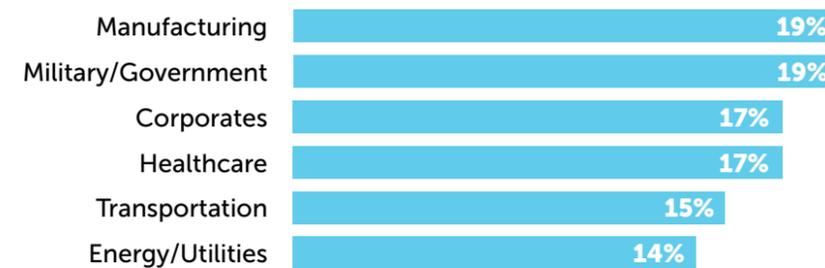
AGE



ROLE OF CONTROL ROOM PROFESSIONAL



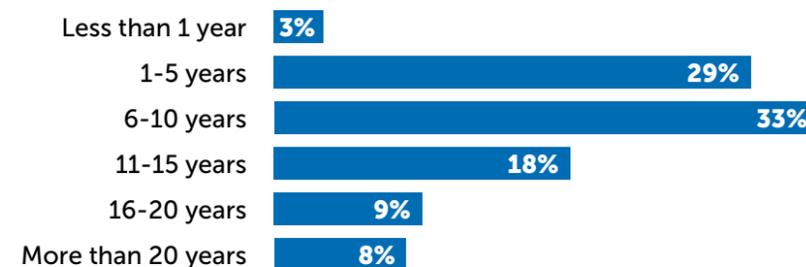
TARGETED INDUSTRIES



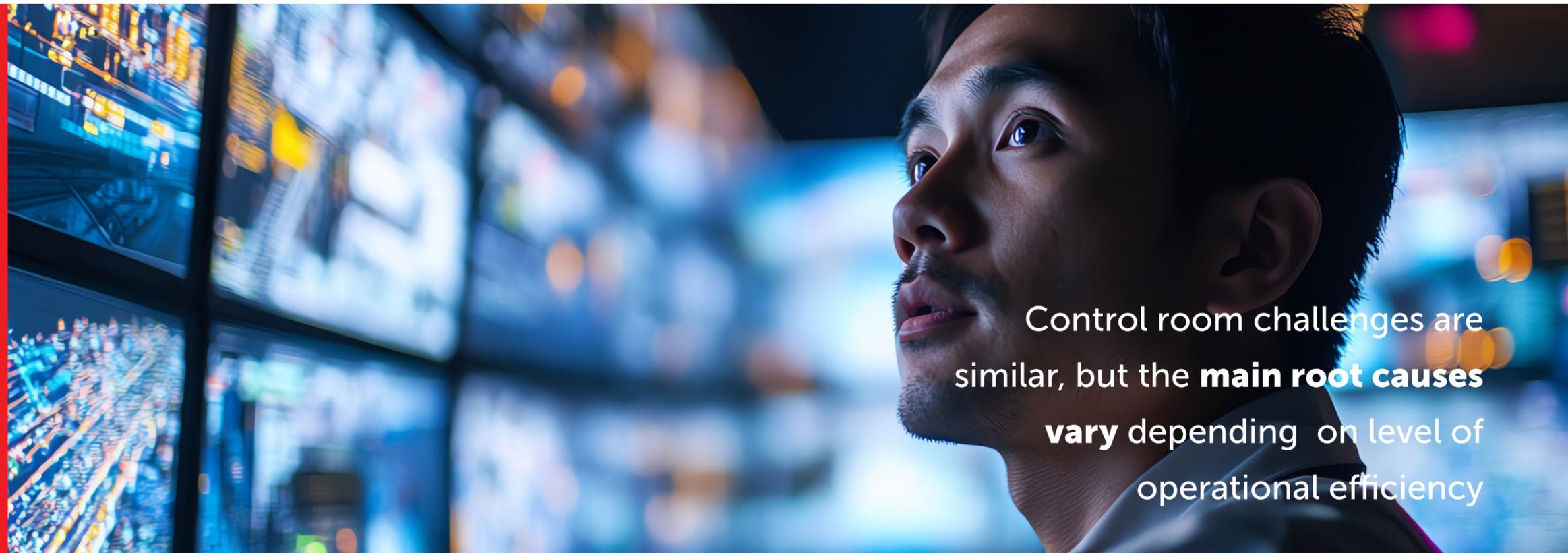
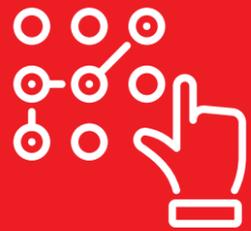
TECHNICAL LEVEL



CONTROL ROOM EXPERIENCE



Challenges in operational efficiency



Control room challenges are similar, but the **main root causes vary** depending on level of operational efficiency

Operational efficiency is fundamental to effective control room performance, as it directly impacts productivity, workflow and decision-making. Control room professionals play a crucial role in monitoring and managing control room operations, making critical decisions that affect public or patient safety, energy efficiency, plant productivity, efficient traffic management, cyber security, and more. This report highlights different root causes of control room problems based on operational efficiency.

Operational efficiency

To assess the operational efficiency of control rooms, respondents were asked to rate their operations on a scale from 1 to 10. Analyzing the responses from over 2,000 control room professionals, we identified three distinct levels of efficiency. These levels will serve as a foundational framework throughout the report for evaluating and enhancing control room performance.

Low efficient control rooms with a scoring between 1 to 6 represent 21% of the total. Significant problems in this level include **lack of knowledge transfer and information sharing**.

Moderately efficient control rooms, with scores between 7 to 8 represent 56% of the total, with **operator fatigue** and **keeping up with intrusion threats and cyber risks** being identified as significant problems.

Highly efficient control rooms with a score from 9 to 10 represent 23% of the total, with **keeping up with intrusion threats and cyber risks** being identified as a significant problem.

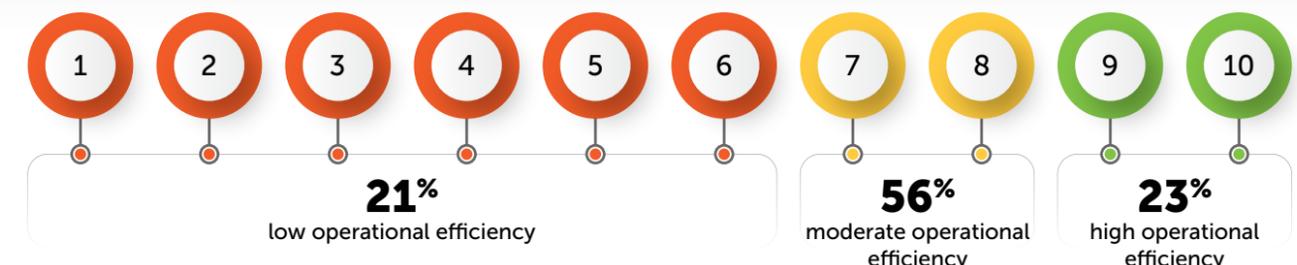
Effective performance to me is delivering the right information, at the right time, with confidence and the best possible outcome.

Senior engineer, Healthcare Operations

When segmented by role, IT managers reported a higher than average score of 7.7 for operational efficiency. This suggests that technology-driven solutions may play a critical role in optimizing control room operations. IT managers often lead in implementing emerging technologies which contributes to smoother operations.



The control room operational efficiency score has a global average of 7,5 suggesting a rather positive perception overall. However, as results on challenges in operational efficiency show, there is still room for improvement. While a relatively high score might create a positive perception, it is essential to address the necessary actions. These steps are crucial and can have a substantial impact on future performance and potential risks.



The KPI framework for success

Every individual or organization wants to be successful. However, success in a control room is multifaceted and often more complex. This raises the question: what defines success in a control room? And how can we measure it?

Success in control rooms is shaped by the unique challenges and priorities of mission critical environments. Roundtable discussions with control room professionals across industries and regions, were initiated by Barco. These discussions provided valuable qualitative insights for this control room research. These perspectives are reflected in the key performance indicators (KPIs) researched in this survey.



Measuring success across roles

Success, however, is nuanced and role specific, linked to the responsibilities associated with each role. This becomes clear when comparing between roles.

The findings indicate that while success in control rooms is broadly aligned around responsiveness and precision, the nuances across roles reveal diverse priorities tied to specific responsibilities. By addressing these differences and aligning on shared goals, control room teams can enhance both individual performance and collective outcomes.

Some notable perspectives shared include:

In our control rooms the average time to answer a call is 10 seconds. An average response is within 2 minutes. Operators are struggling with this.

Manager Dispatching,
Law Enforcement



There is not one indicator for success. There are multiple actions to take.

Control room supervisor,
Oil and Gas



Success is depending on the people in the center. Without having a regular focus on happiness or satisfaction, they're not going to perform effectively.

Director of Government Affairs,
Emergency Operations



Operators

Response time to alarms or incidents is highlighted as a key indicator of success by 41% of operators. This highlights the critical importance of fast and efficient responses to maintain control room effectiveness.

Control room supervisors

Up to 49% of control room supervisors emphasize the importance of correct actions taken by operators. This shows their critical role in ensuring that their team is well-trained, informed, and equipped to respond effectively to evolving situations, minimizing risk and maximizing operational efficiency.

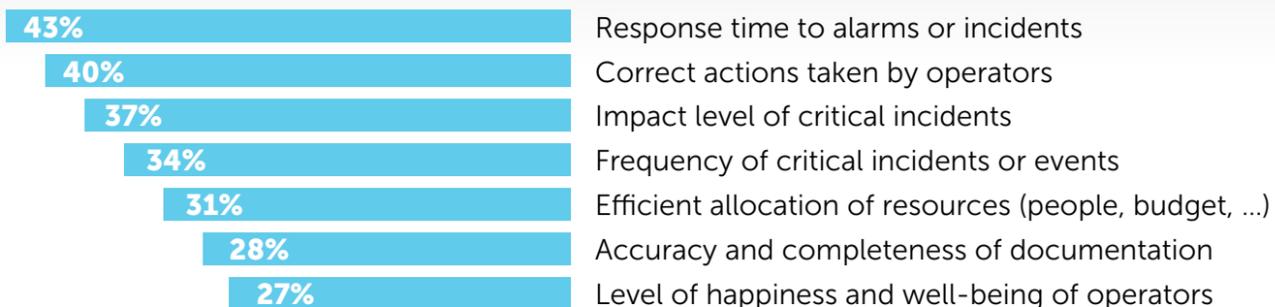
IT managers

Among all professionals, 42% of IT managers indicate impact level and frequency of critical incidents to be key indicators for success in the control room. This focus highlights their emphasis on mitigating risks and ensuring system resilience in mission critical situations.

C-level management

32% of C-level executives prioritize the accuracy and completeness of documentation compared to other roles. This reflects the strategic importance they place on maintaining a reliable documentation of events, which is essential for optimizing control room operations, compliance, audits, and strategic readiness.

KEY PERFORMANCE INDICATORS FOR SUCCESS IN CONTROL ROOMS



43% state incident response time as crucial

40% emphasize the importance of correct actions taken by operators

Differentiating root causes of inefficiencies

While control rooms face similar key challenges, the root causes vary significantly depending on the level of operational efficiency.

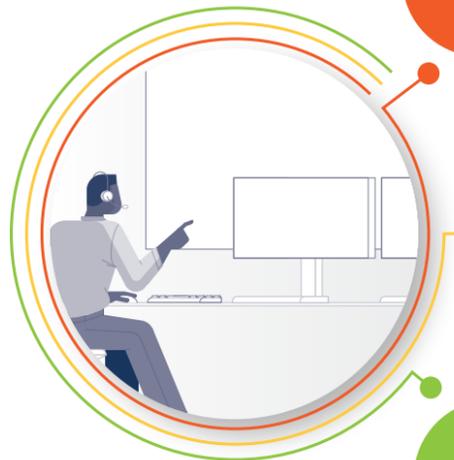
Cyber security risks, a major concern across industries, illustrate how these differences manifest.



These insights reveal that while cyber security is a common challenge across all control rooms, the underlying causes differ based on the efficiency level. This emphasizes the need for tailored solutions to address specific vulnerabilities.

ROOT CAUSE OF CONTROL ROOM CHALLENGES: DIFFERENCES IN OPERATIONAL EFFICIENCY

Managing cyber risks



1-6

32% software updates are not implemented or not on time implemented
28% stress coming from usability issues

7-8

31% aging or outdated technology
23% concerns about the persisting security policy measures

9-10

43% concerns about cyber security incidents
36% complex or less resilient systems and technologies

In low efficient control rooms (1-6)

Cyber security issues are less severe but stem from more fundamental problems. **Delayed software updates** (32%) and **usability challenges that lead to operator stress** (28%) are selected as the primary root causes. This shows a reactive rather than proactive approach to maintenance and security, which supports operational inefficiency.

In moderately efficient control rooms (7-8)

Respondents identified **aging or outdated technology** (31%) and **the persistent challenges posed by existing security policies** (23%) as key cyber security issues. These findings suggest that while these systems may still perform adequately, outdated infrastructure and rigid policy measures can hinder their ability to adapt to modern threats.

In highly efficient control rooms (9-10)

Cyber security emerges as a significant challenge, with respondents identifying **concerns about cyber security incidents** (43%), and the **complexity or less resilient systems and technologies** (36%) as key root causes. A possible explanation is that these control rooms often operate with highly automated and integrated systems, where the impact of a single cyber incident can cascade through the entire operation. Furthermore, these systems are often optimized for performance, which may come at the expense of security, leaving them more vulnerable to emerging threats.

The urgency to act

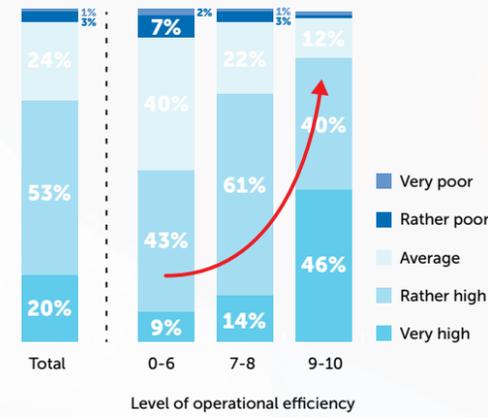
The research data shows a strong link between personal productivity and control room efficiency. In highly efficient control rooms, productivity rises exponentially, with 46% of control room professionals being highly productive. Data suggests this is mainly driven by:

- High priority on investments in control room technology
- More efficient workflows
- Stronger support for collaboration
- Greater use of specialized applications like CAD, network monitoring tools, access control, building management systems, CCTV, and more

Control room professionals are **34%** more productive in highly efficient control rooms

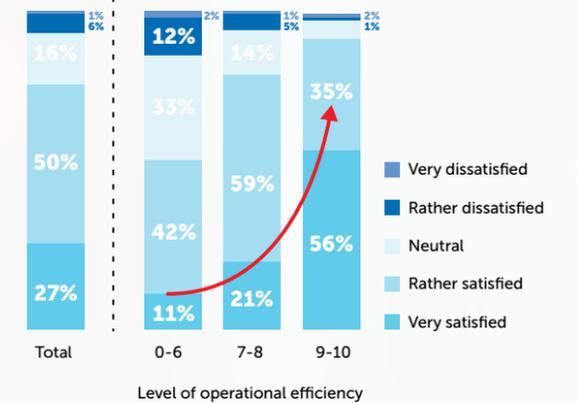
PERSONAL PRODUCTIVITY INCREASES IN HIGHER EFFICIENT CONTROL ROOMS

How would you rate your own personal productivity in general?



91% OF CONTROL ROOM WORKERS ARE SATISFIED WHEN WORKING IN HIGHLY EFFICIENT ENVIRONMENTS

All things considered, how satisfied are you with your work overall?



Job satisfaction and retention

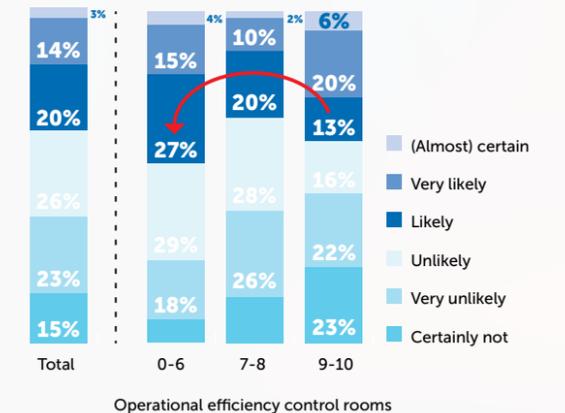
Control room efficiency also impacts job satisfaction. In highly efficient control rooms, 91% of professionals report being satisfied with their job. In contrast, less efficient control rooms face higher turnover risks, with up to **50% of staff considering a job change**, compared to the broader trend of **35% post-pandemic**.

UP TO 50% ARE LIKELY TO LEAVE THEIR JOB IN 6 MONTHS TIME IN LESS EFFICIENT CONTROL ROOMS

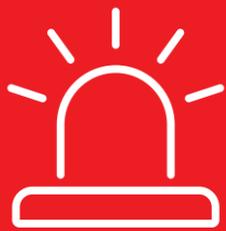
How likely are you to switch jobs within the next 6 months?

The paradox shown in the graph indicates a high percentage of professionals in highly efficient control rooms are likely to switch their job. This can be explained because these control rooms attract top talent, who actively seek advancement.

This highlights the crucial need for retention strategies focused on efficiency, technology, and employee engagement to retain talent and drive success.



Emerging challenges in control rooms



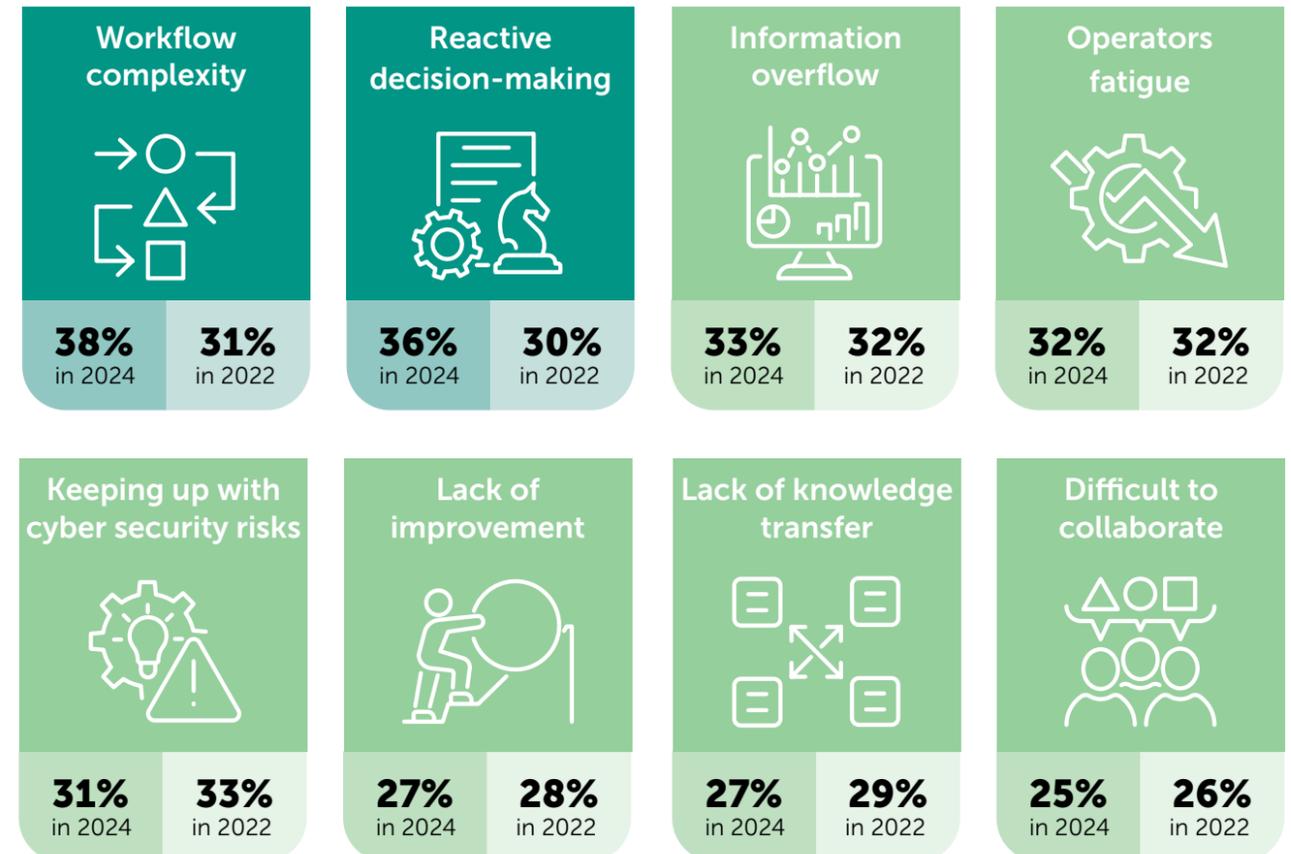
Common challenges exist across industries, but **unique root causes arise** with industry specific challenges

The control room market is a dynamic and mission-critical environment where the seamless integration of technology and human expertise is paramount. Understanding the evolving landscape of control rooms requires a deep understanding of the challenges faced by professionals in this demanding field.

The 2024 Barco control room research highlights the key challenges shaping the future of control rooms. These challenges, highlighted in the chart, were confirmed by over 2,000 control room professionals such as end-users and decision-makers as substantial problem areas in the control room market.

Emerging challenges are workflow complexity and reactive decision-making

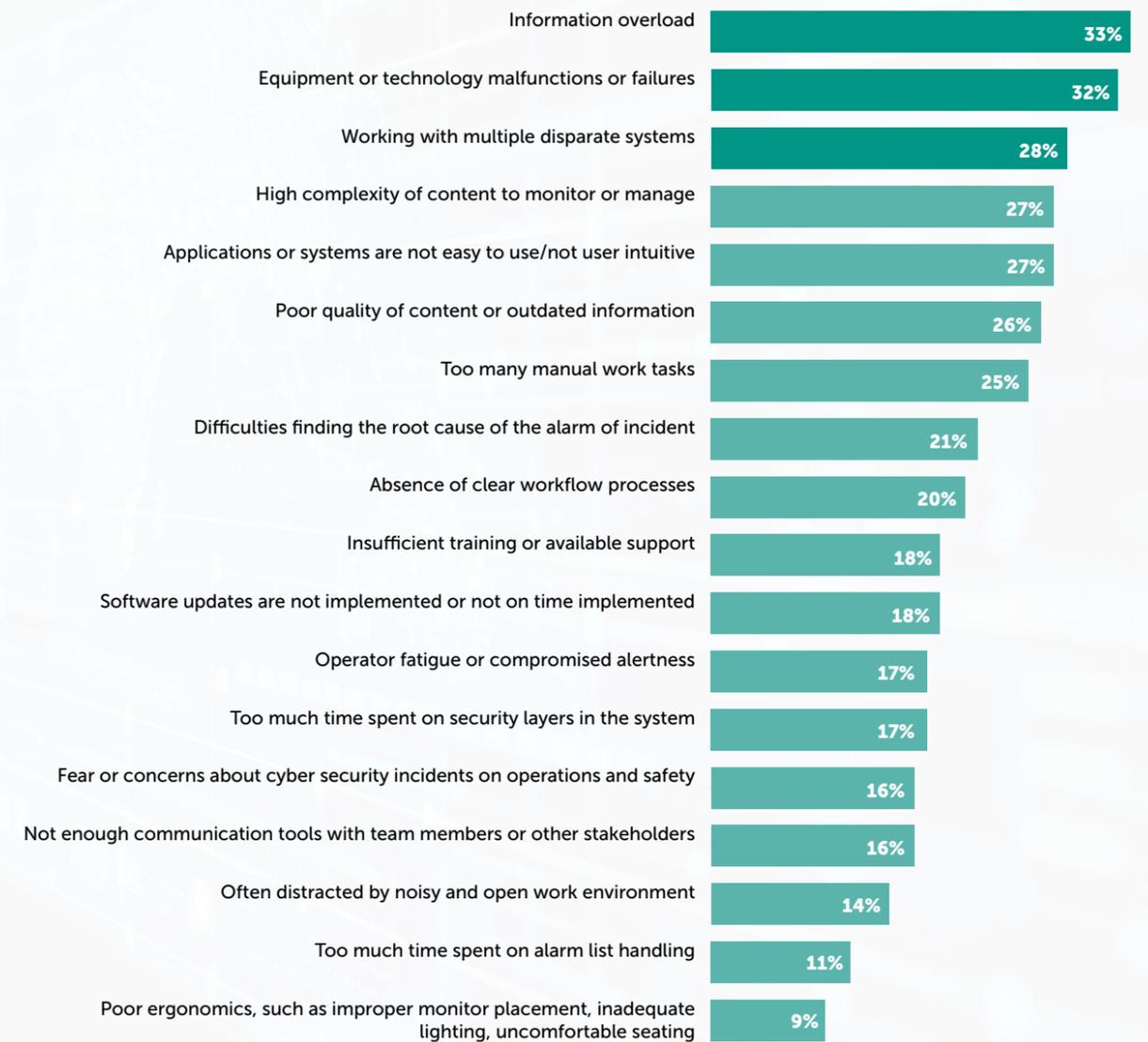
In recent years, control room operations have faced emerging challenges that significantly impact their efficiency. The Barco control room report indicates that since 2022, workflow complexity challenges have risen from 31% to 38%, and reactive decision-making challenges have increased from 30% to 36%, reflecting the escalating demands on control room professionals. Information overflow has also become a more substantial challenge in 2024, further complicating control room operations.



Workflow complexity

Workflow complexity is a significant challenge in many control rooms, directly impacting operational efficiency and effective decision-making. According to the control room professionals, the primary causes of this complexity are information overload, equipment or technology malfunctions or failures, and working with multiple disparate systems.

ROOT CAUSES OF WORKFLOW COMPLEXITY IN THE CONTROL ROOM



This aligns with a growing market trend: control room professionals are increasingly seeking platforms that integrate systems and information sources to streamline workflows.

Understanding the relevance of these challenges requires collaborative discussions within the team.

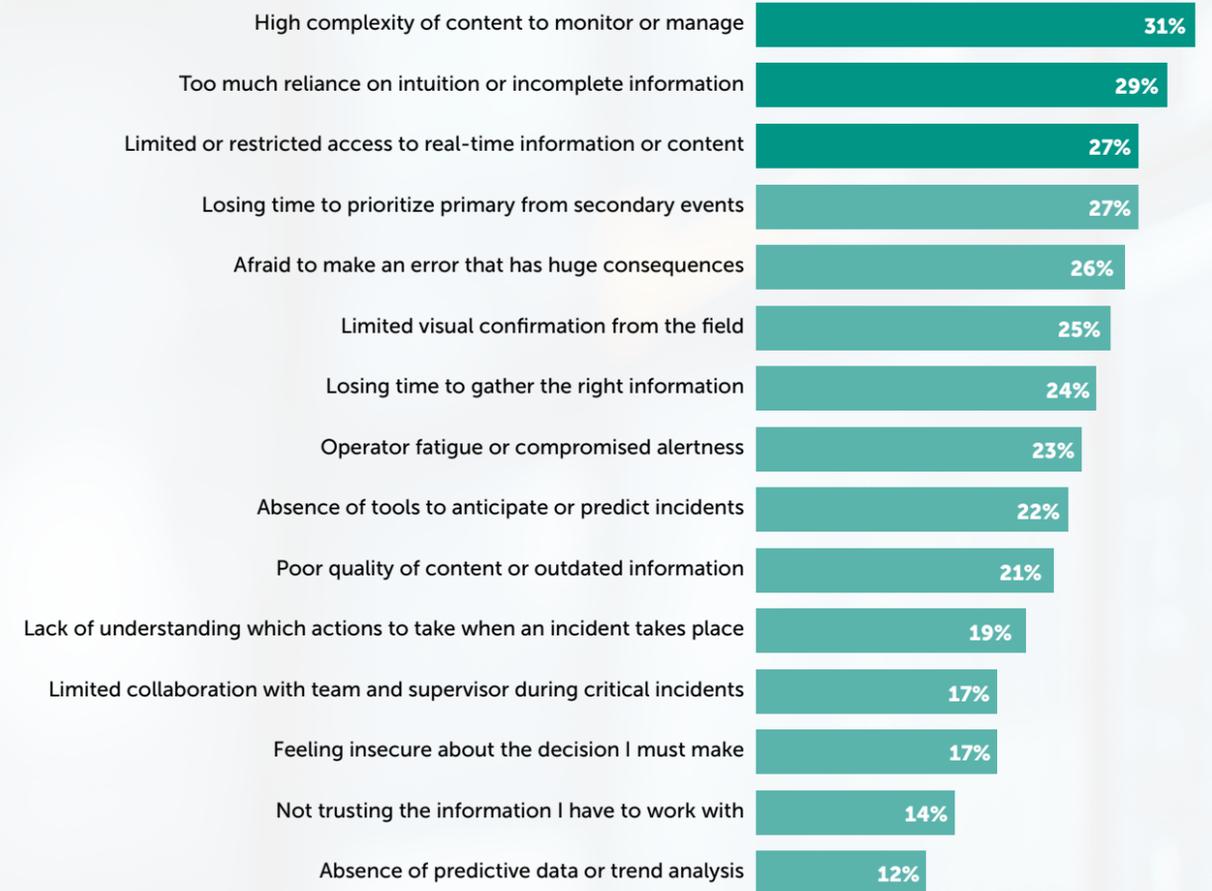
Analyzing and prioritizing the list of issues will yield valuable insights. Specifically, this process can identify:

- Challenges that are critical and require immediate attention
- Challenges that need focus in the near future
- Challenges that can be deferred to a later stage

Reactive decision-making

Reactive decision-making is an emerging challenge in control rooms. The primary root causes include an over-reliance on intuition or incomplete information, the high complexity of content to monitor or manage, and limited or restricted access to real-time information.

ROOT CAUSES OF REACTIVE DECISION-MAKING IN THE CONTROL ROOM



This challenge is driven by several factors. Control room professionals often struggle with the high complexity of content they need to monitor and manage. Additionally, they frequently have to rely on intuition or incomplete information.

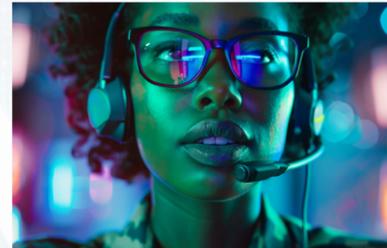
Limited or restricted access to real-time information or content prevents them from being on top of the crisis. These obstacles hinder professionals from being proactive, leaving them to respond reactively instead.

Industry-specific challenges

Barco serves six industries globally with its control room solutions: Government & Military, Energy & Utilities, Transportation, Manufacturing, Healthcare, and Corporates. As discussed in the previous section, results of the 2024 Barco control room research reveal that these industries consistently prioritize two common challenges: workflow complexity and reactive decision-making. The third pressing challenge varies depending on the industry, offering valuable insights into the dynamics of each.

CHALLENGES

Government & Military



- Workflow complexity
- Reactive decision-making
- Keeping up with intrusion, threats and cyber risks**

Energy & Utilities



- Workflow complexity
- Information overflow**
- Reactive decision-making

Transportation



- Workflow complexity
- Reactive decision-making
- Operator fatigue**

CHALLENGES

Manufacturing



- Workflow complexity
- Reactive decision-making
- Lack of continuous improvement**

Healthcare

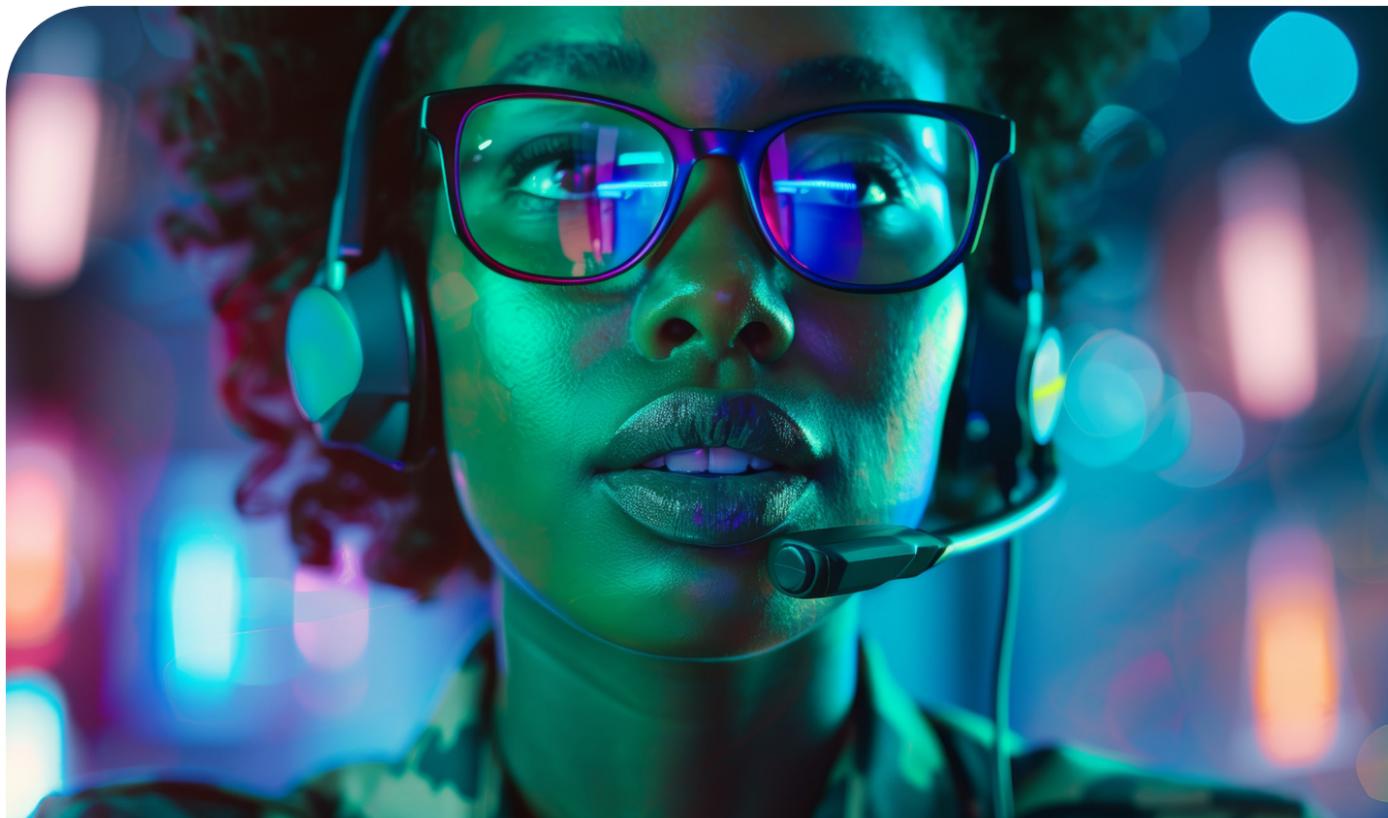


- Reactive decision-making
- Workflow complexity
- Lack of knowledge transfer or information sharing**

Corporates



- Workflow complexity
- Information overflow**
- Reactive decision-making



Government & Military

Workflow complexity

Reactive decision-making

Government & Military

Control rooms or command centers in the Government and Military industry are essential for national security and operational oversight. They coordinate activities, monitor operations, and ensure real-time decision-making. These mission critical environments face significant challenges, including reactive decision-making, workflow complexity and the constant need to keep up with intrusion, threats and cyber risks.

Workflow complexity is often driven by **equipment or technology malfunctions**, as well as **poor quality of content and outdated information**. Reactive decision-making arises from **limited or restricted access to real-time information or content**, which many control room professionals identify as a key root cause. Additionally, **the over-reliance on intuition or incomplete information** is another significant factor.

Government & Military | Energy & Utilities | Transportation | Manufacturing | Healthcare | Corporates

Government & Military

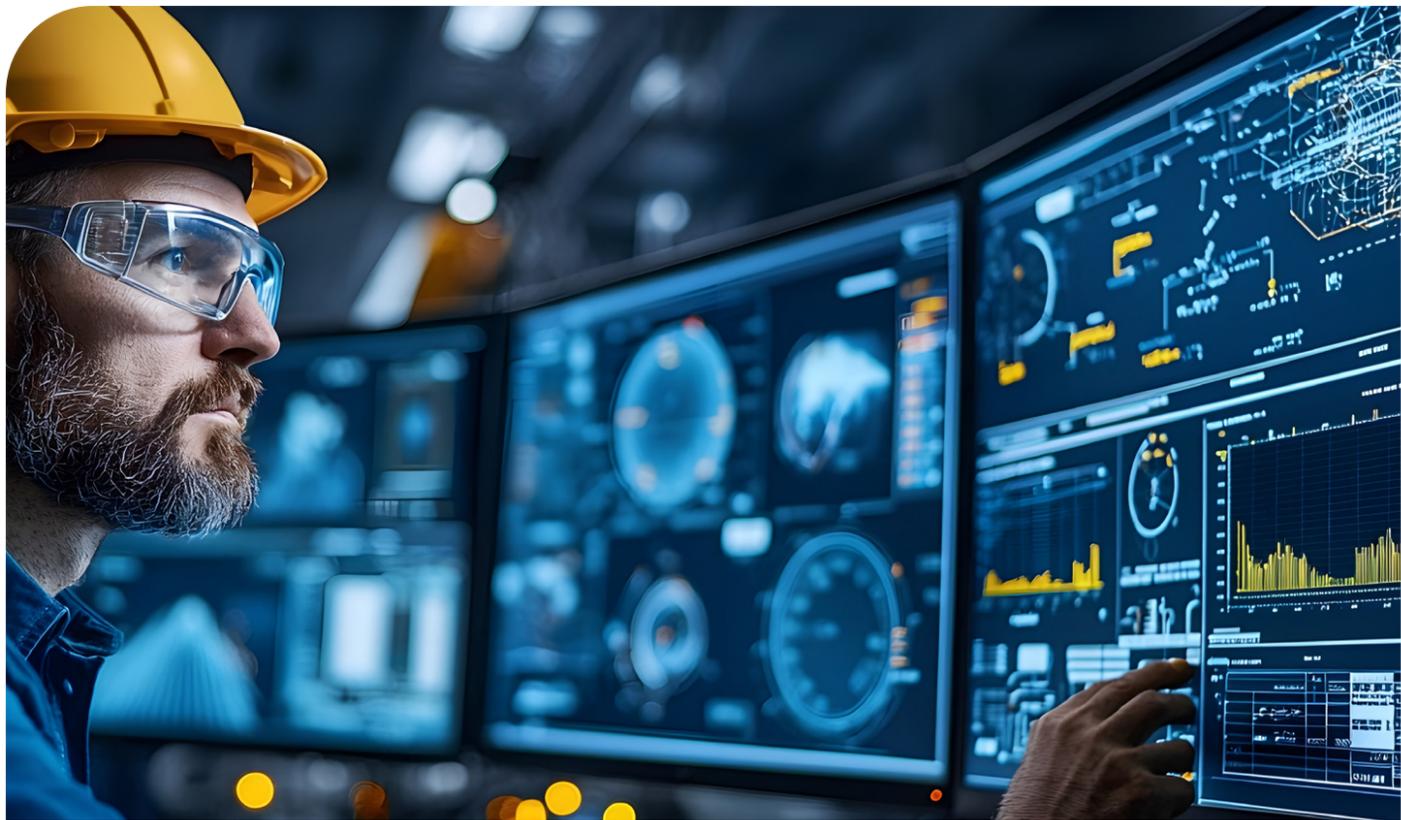
Key root causes for keeping up with intrusion, threats and cyber risks in Government and Military are:

<p>31% Software updates are not or not on time implemented</p>	<p>31% Rapidly evolving threats</p>	<p>30% Complex or less resilient systems or technologies</p>	<p>24% Lack of cloud-based sources of information, via secure IP</p>
---	--	---	---

Keeping up with cyber security risks

The third major challenge in this industry is keeping up with intrusion, threats and cyber risks. Given the sensitive nature of the information managed, and the strategic importance, these facilities are prime targets for cyberattacks from hostile nations, terrorist organizations, and malicious individuals. The rapid advancements in technology and the increasing sophistication of cyber threats make this a growing concern.





Energy & Utilities

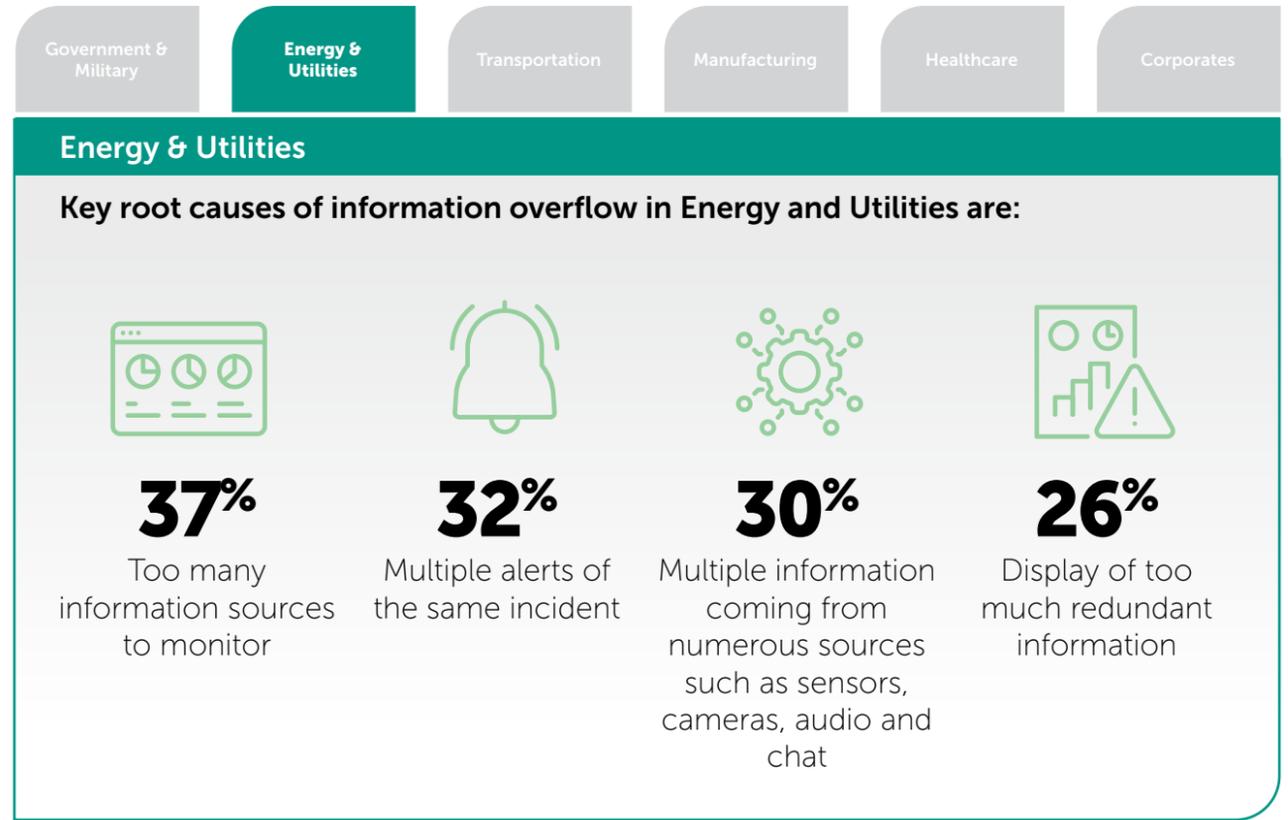
Energy & Utilities

Workflow complexity

Reactive decision-making

Control rooms in the Energy and Utilities sector are essential to monitor and control the base load and manage production supply to meet customer demand. They manage energy generation, transmission, and distribution. Next to the common challenges faced across industries, including reactive decision making and workflow complexity, information overflow is significantly impacting their efficiency and effectiveness.

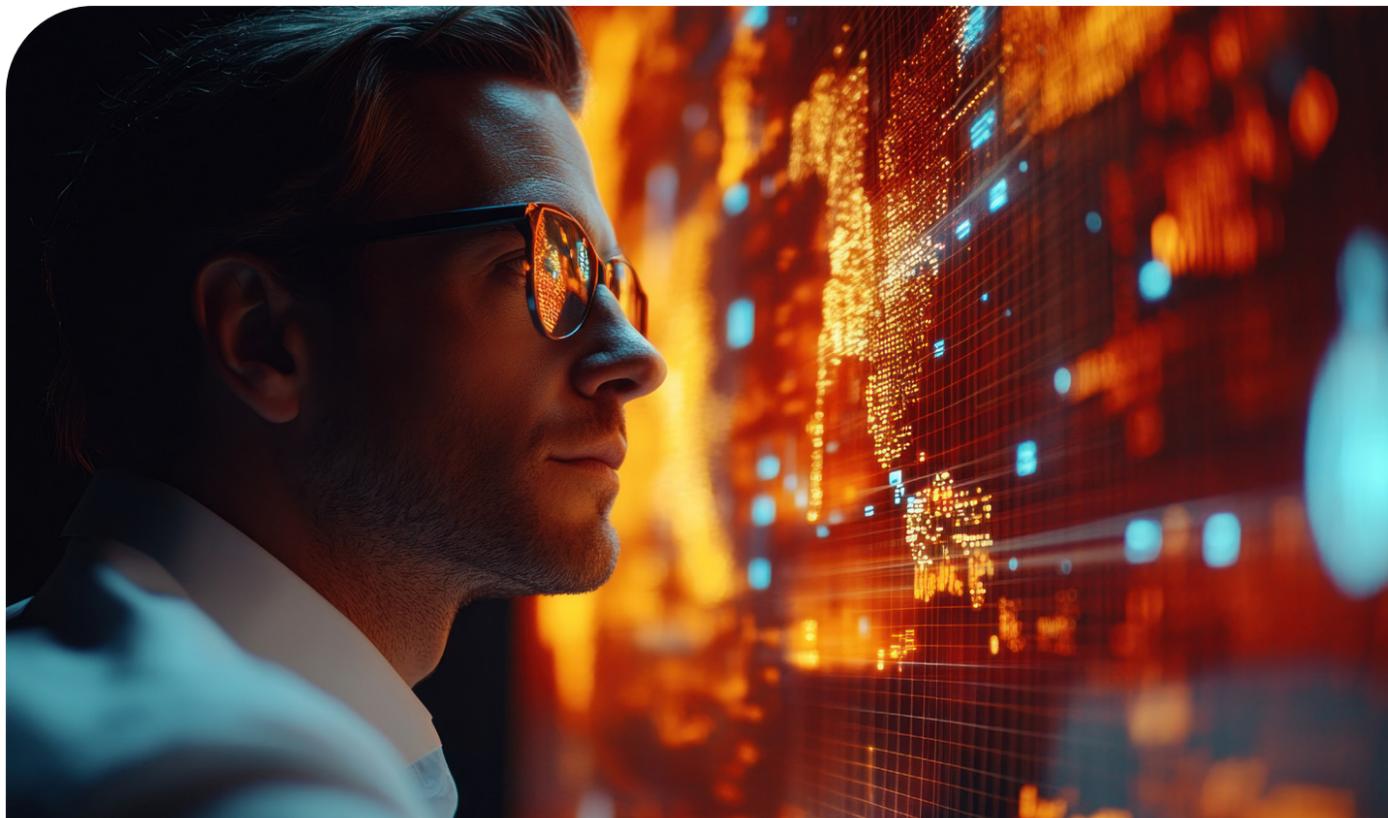
Workflow complexity often arises from **information overload**, which many control room professionals identify as a key root cause. Additionally, the challenge of **working with multiple disparate systems** adds to the complexity. Reactive decision-making is driven by **the time lost in gathering the right information and the absence of tools to anticipate or predict incidents**.



Information overflow

Information overflow is a third major challenge in the Energy & Utility market. Control room professionals face an overwhelming amount of data from various sources, such as sensors, cameras, audio, chat, and redundant information. Multiple alerts for the same incident and the need to monitor numerous information streams complicate their tasks. The integration of IoT sensors, smart grids, SCADA systems, and other data sources can support in this challenge. However, many energy and utility control rooms have been in operation for years, resulting in aging infrastructure and legacy systems. Upgrading these systems to align with technological advancements and cybersecurity standards is both challenging and costly.





Transportation

Workflow complexity

Reactive decision-making

Transportation

Control rooms within Transportation are essential for ensuring safe, efficient, and reliable operations. They serve as the central hub for monitoring and managing various aspects of transportation systems. However, these environments face several challenges, including workflow complexity, reactive decision-making, and operator fatigue.

Workflow complexity arises from **information overload**, which many control room professionals identify as a key root cause. Additionally, the challenge of **too much time spent on security layers in the system** further complicates operations. Reactive decision-making is driven by the **high complexity of content that needs to be monitored or managed** and the **fear of making errors with significant consequences**.

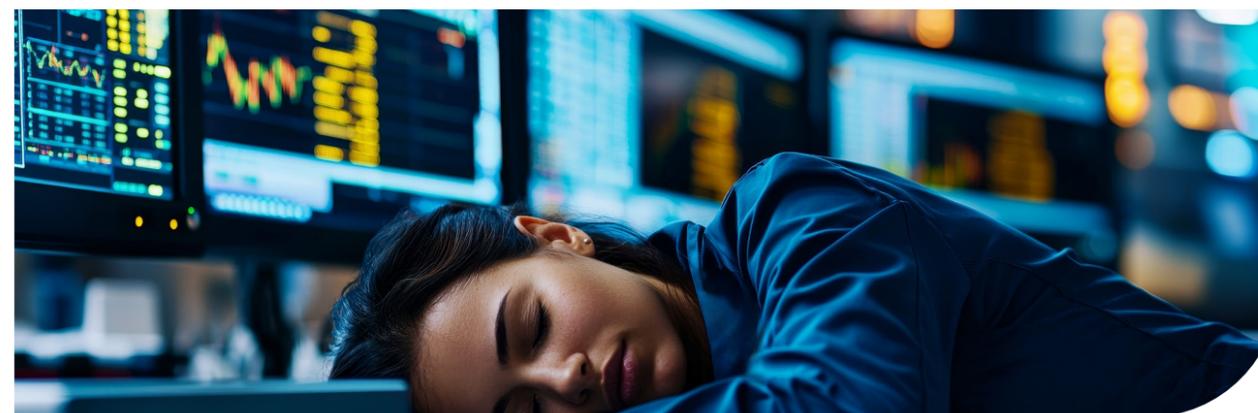
Transportation

Key root causes for operator fatigue in Transportation are:

<p>36% Many repetitive or routine tasks</p>	<p>35% Information overload</p>	<p>32% Irregular shifts or long work hours</p>	<p>28% Many manual work tasks</p>
--	--	---	--

Operators fatigue

The third major challenge in this industry is operator fatigue. Monitoring traffic is a significant responsibility, requiring operators to observe numerous cameras and manage vast amounts of real-time data without causing delays or errors. The pressure to make rapid, accurate decisions in critical situations can be intense, and the increasing number of data sources adds to the fatigue operators face. The ever-growing number of flights, trains, and road traffic also makes the possibility of incidents a constant concern.





Manufacturing

Workflow complexity

Reactive decision-making

Manufacturing

The control room in Manufacturing plays a pivotal role as the central hub where operators monitor and manage the entire production process. It allows for real-time data collection and visualization, enabling operators to quickly identify and address bottlenecks, inefficiencies, and potential issues. Key industry challenges include workflow complexity, reactive decision-making and lack of continuous improvement.

Workflow complexity often stems from **equipment or technology malfunctions**, a primary cause identified by many control room professionals. Additionally, the prevalence of **numerous manual work tasks** intensifies operational challenges. Reactive decision-making is impacted by the **complex nature of content that must be monitored or managed**, as well as the time lost in **gathering the right information**.

Government & Military | Energy & Utilities | Transportation | **Manufacturing** | Healthcare | Corporates

Manufacturing

Key root causes for "Lack of continuous improvement" in Manufacturing are:

<p>32%</p> <p>Limited resources (time, budget, personnel) to invest in control room technology improvements</p>	<p>31%</p> <p>Software is not up to date</p>	<p>31%</p> <p>Too little to say or involvement in decision making in my control room</p>	<p>30%</p> <p>There is not enough understanding of correctly utilizing control room technology</p>
--	---	---	---

Lack of improvement

Control rooms often struggle with limited time, budget, and personnel, making it difficult to invest in technology improvements. This lack of resources hinders the ability to upgrade systems and implement new solutions. Outdated software may lack the latest features and security updates, making it harder to optimize control room operations. Additionally, limited input from operators in decision-making can result in decreased ownership and motivation. A lack of understanding of how to correctly utilize control room technology can prevent operators from fully leveraging the tools at their disposal.





Healthcare

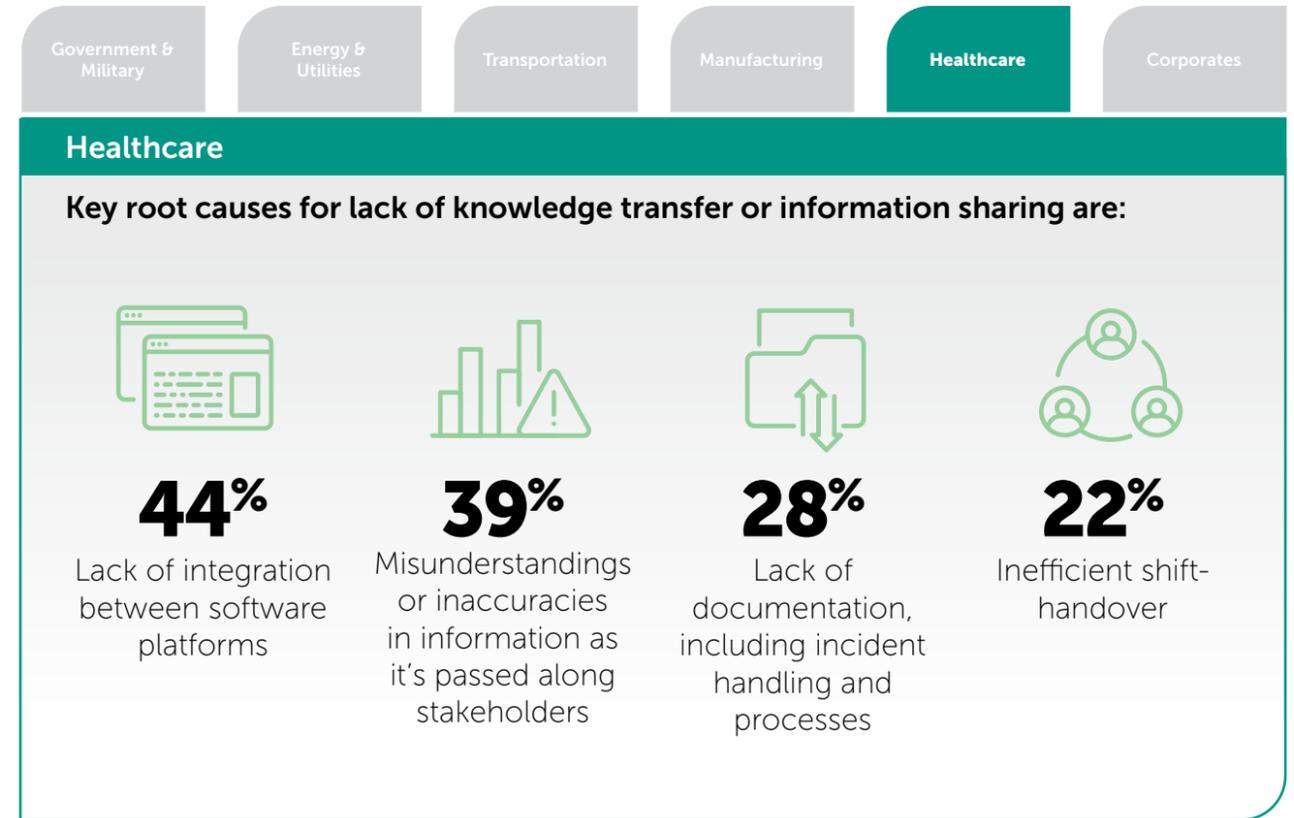
Reactive decision-making

Workflow complexity

Healthcare

Control rooms in Healthcare —whether in emergency hospital operations, security operations, or healthcare diagnostics— are essential to improve patient care and outcome, and ensure safety and security of patients and staff. They serve as a hub to bring together all relevant data and information to drive informed decision-making. Control rooms in this industry experience significant challenges, including workflow complexity, reactive decision-making and the lack of knowledge transfer and information sharing.

Reactive decision-making is primarily driven by the **time lost in prioritizing primary events from secondary ones, operator fatigue or compromised alertness, and a lack of understanding of the correct actions to take in case of an incident.** Workflow complexity often arises from **equipment or technology malfunctions**, which many control room professionals identify as a root cause. Additionally, challenges such as **poor quality of content, outdated information, and excessive manual work tasks** further complicate operations.



Lack of knowledge transfer

The third significant challenge in this industry is lack of knowledge transfer or information sharing. Delivering patient care, monitoring patients or samples, responding to emergencies and keeping patients and staff safe, take place in a healthcare operational environment. Nurses, doctors and other healthcare professionals face immense pressure from fragmented systems or interoperability, which can result into outdated information. Additionally, misunderstandings, insufficient documentation and rushed handovers further complicate information sharing. High patient volumes, budget cuts and increasing turnover of staff further amplify this challenge.





Corporates

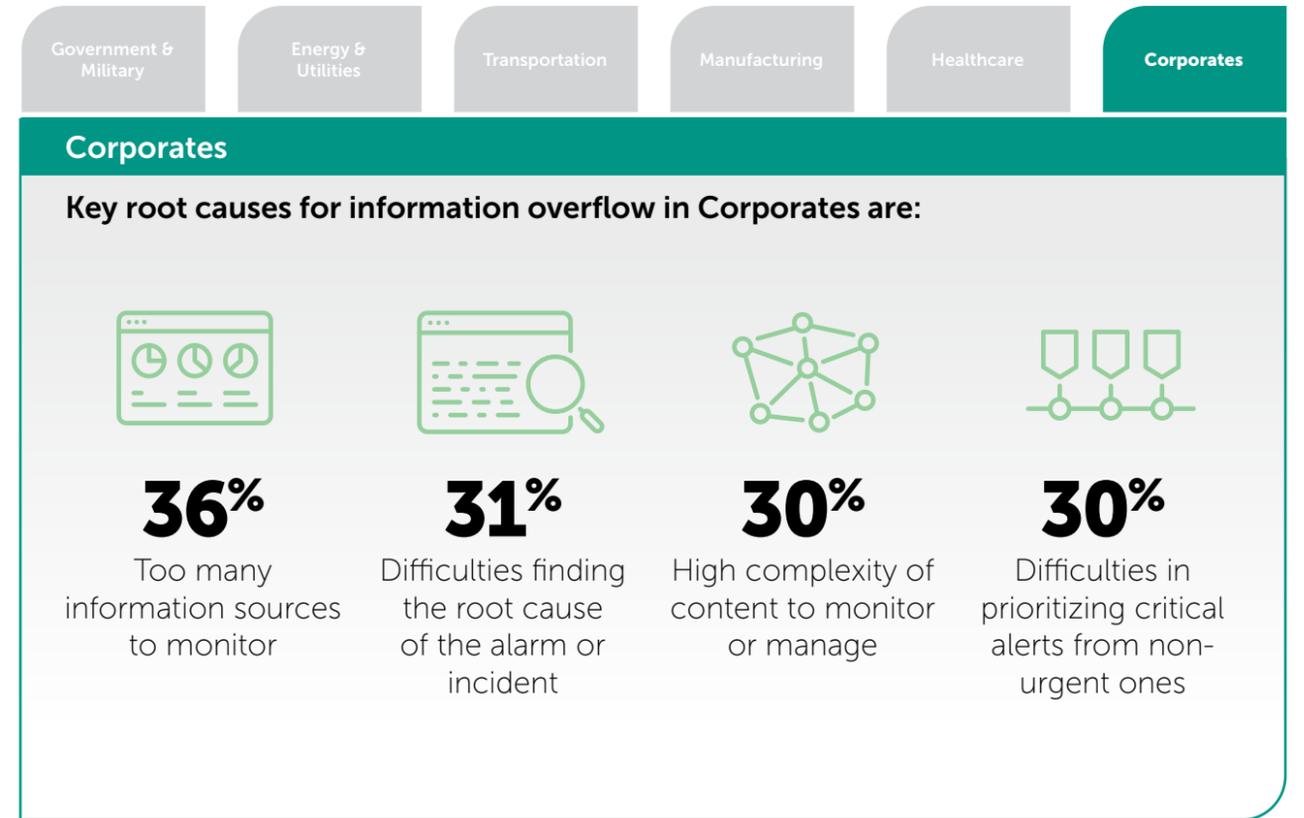
Corporates

Workflow complexity

Reactive decision-making

In corporate environments, such as finance, social media, and retail, control rooms play a crucial role in efficiently monitoring and responding to critical incidents. These control rooms are responsible for tasks such as monitoring money traffic and trading activities in finance, social media brand monitoring, and overseeing security systems. However, these environments face several significant challenges, including workflow complexity, information overflow, and reactive decision-making.

Workflow complexity often stems from **information overload**, as many control room professionals identify this as a primary root cause. Additionally, professionals highlight the challenge of **applications or systems that are not user-friendly or intuitive**. Key factors contributing to reactive decision-making include **excessive reliance on intuition or incomplete information and the limited visual confirmation from the field**.

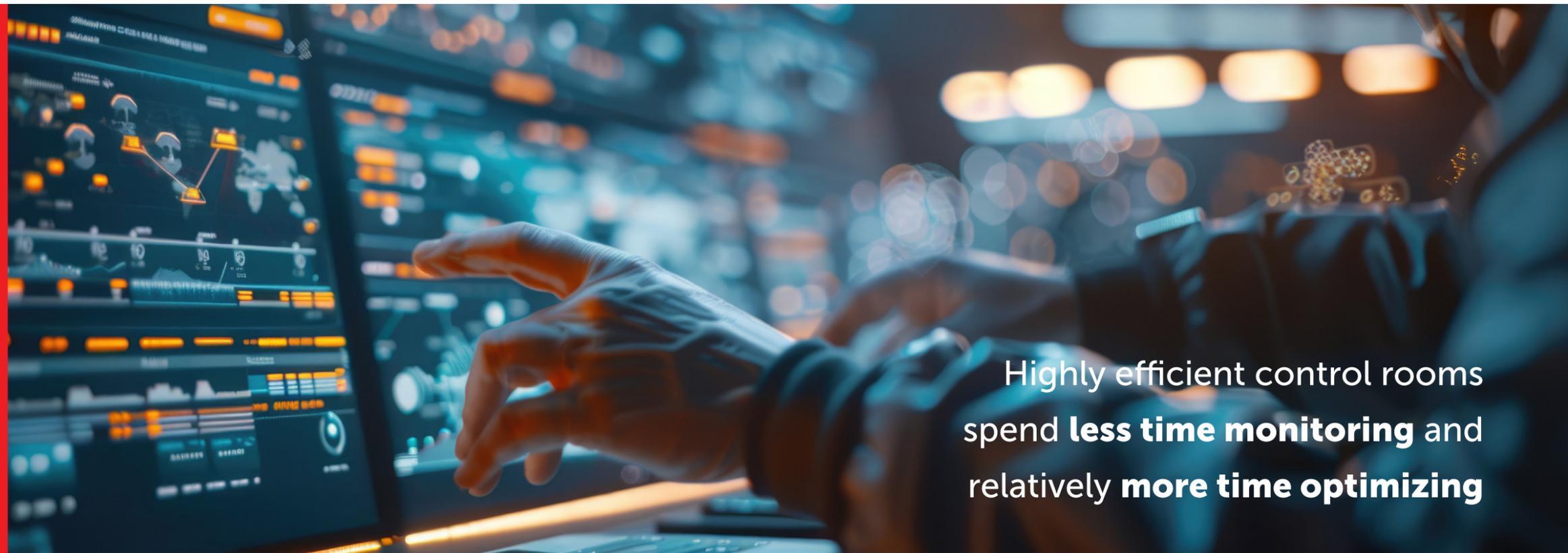


Information overflow

One of the other major challenges faced is information overflow, driven by the large volume of information sources such as real-time data, video feeds, and images that must be constantly monitored. This influx of data leads to an increasing number of alarms and alerts, which not only heightens the pressure on operators but can also cause significant delays in response times.



Workflow optimization

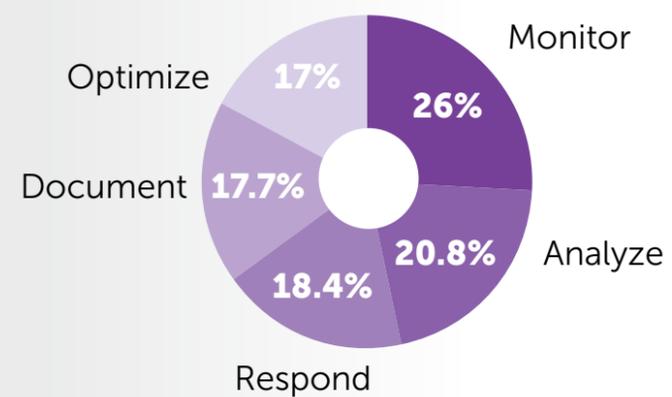


Highly efficient control rooms spend **less time monitoring** and **relatively more time optimizing**

The operator workflow

The operator workflow in a control room typically comprises five key areas. These areas include Monitor, Analyze, Respond, Document and Optimize. Each area plays a crucial role in ensuring smooth and efficient control room operations, enabling control room professionals to effectively manage and respond to mission critical situations.

TIME SPENT PER WORKFLOW AREA



Monitor

This area focuses on the continuous observation and tracking of information sources of the operation, monitoring system performance, equipment or device, and alerts to detect anomalies or threats.



Analyze

Analyzing covers evaluating and interpreting data to assess the situation to identify patterns, trends and root causes, and determine appropriate actions. This includes reviewing historical data for trends and recurring issues and communicating with others for additional context.



Respond

This area encompasses the actions taken to address identified issues or anomalies, handle critical incidents or mitigating risks.



Optimize

Optimization involves the continuous reviewing and adjusting of processes and systems with necessary changes and improvements to maximize efficiency and improve performance and output.



Document

Documentation is about the systematic recording of all activities, decisions, and outcomes taken during the process for compliance, analysis, and training.

Primary workflow area of control room professionals

Monitoring remains the primary task of control room operations across all roles. However, there are notable differences in how time is allocated among different workflow areas. The 2024 Barco control room research reveals the following:

Monitor:

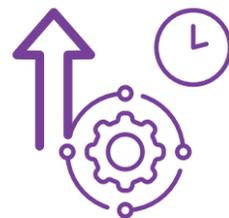
Operators allocate the highest percentage of their time to monitoring activities (28%), followed by supervisors (26%), IT managers (25%), and C-level executives (26%)



Smaller control rooms, with 1-5 operators, spend significantly more time on monitoring.

Respond and document:

Operators dedicate a significantly larger portion of their time to responding (20%) and documenting (20%) compared to supervisors, IT managers, and C-level executives.



Larger control rooms, with more than 11 operators in the control room spend more time on optimization.

Analyze and optimize:

In contrast, supervisors, IT managers, and C-level executives invest a greater share of their time in analyzing and optimizing control room operations.

The impact of workflow on operational efficiency

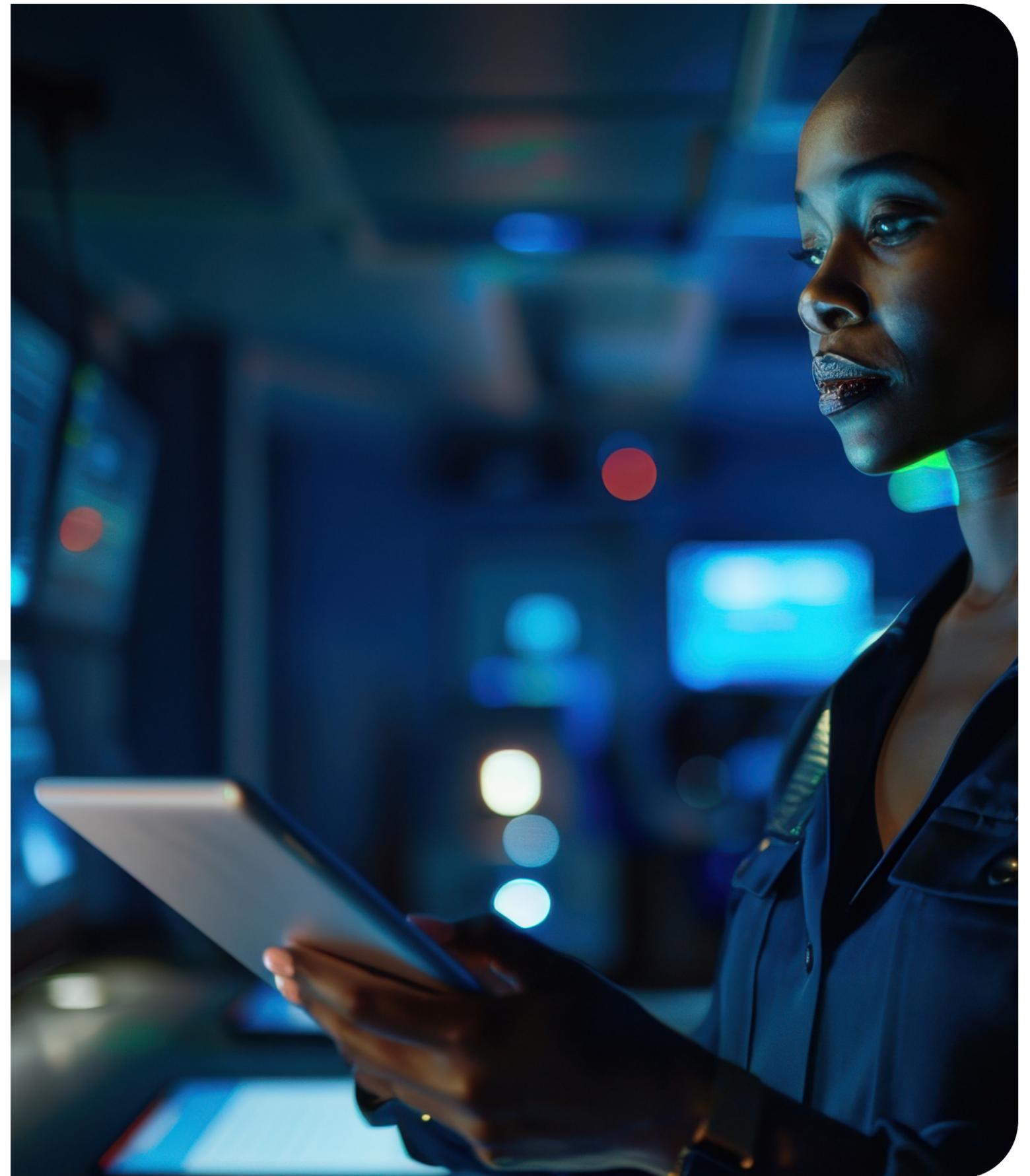
High-efficiency control rooms **spend less time on monitoring and more on optimization** compared to low-efficiency ones, which **spend more time across all areas except for optimization**. Notably, even highly efficient professionals find response workflows inefficient.



Not surprisingly, professionals with poorly perceived productivity tend to label each area of their workflow as somewhat inefficient. In contrast, those who are highly productive view every area of their workflow as very efficient. The only exception is **responding to alarms or incidents: highly productive professionals state this workflow area as very inefficient**.



Optimized workflows drive efficiency by reducing time spent on low-value activities. **Military and Government, Energy and Utilities, and Transportation industries prioritize monitoring**, while **corporate control rooms focus on analyzing**. In Healthcare relatively more time is spent on responding and documenting.



The role of Standard Operating Procedures (SOPs)

Standard Operating Procedures (SOPs) are step-by-step instructions created by an organization to help control room professionals carry out routine operations. The goal is to optimize efficiency, quality and uniformity, while minimizing miscommunication and failure to comply with industry regulations.

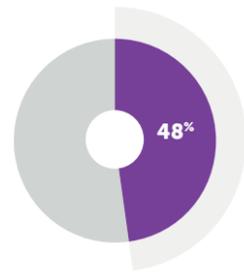


You have to check the actions taken and assess if it was difficult to implement the right procedures, because an operator doesn't face emergency events regularly.

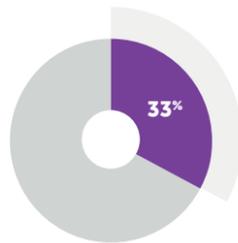
Operations manager Energy and Utilities



OUR DATA INDICATES THAT:



48% implement SOPs for both emergency and non-emergency scenarios.



33% have SOPs solely for emergency situations.

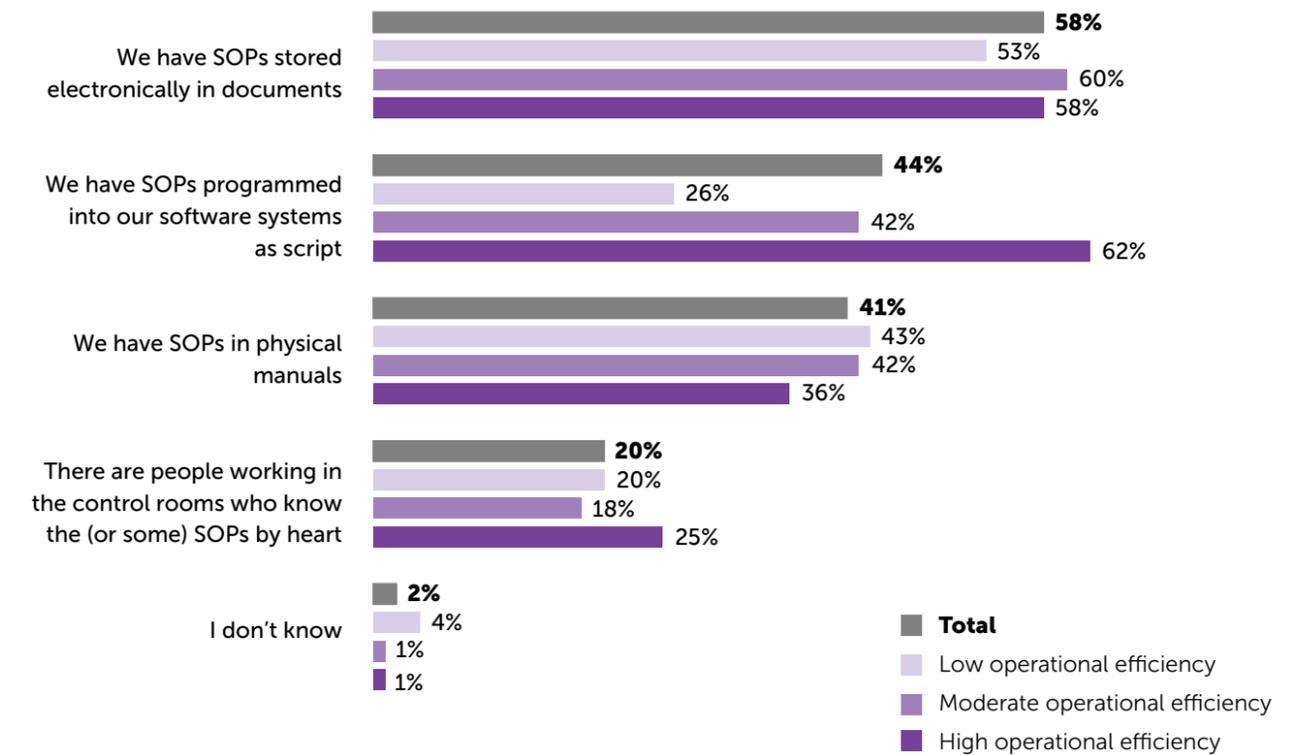


14% of control rooms have SOPs exclusively for non-emergency situations.

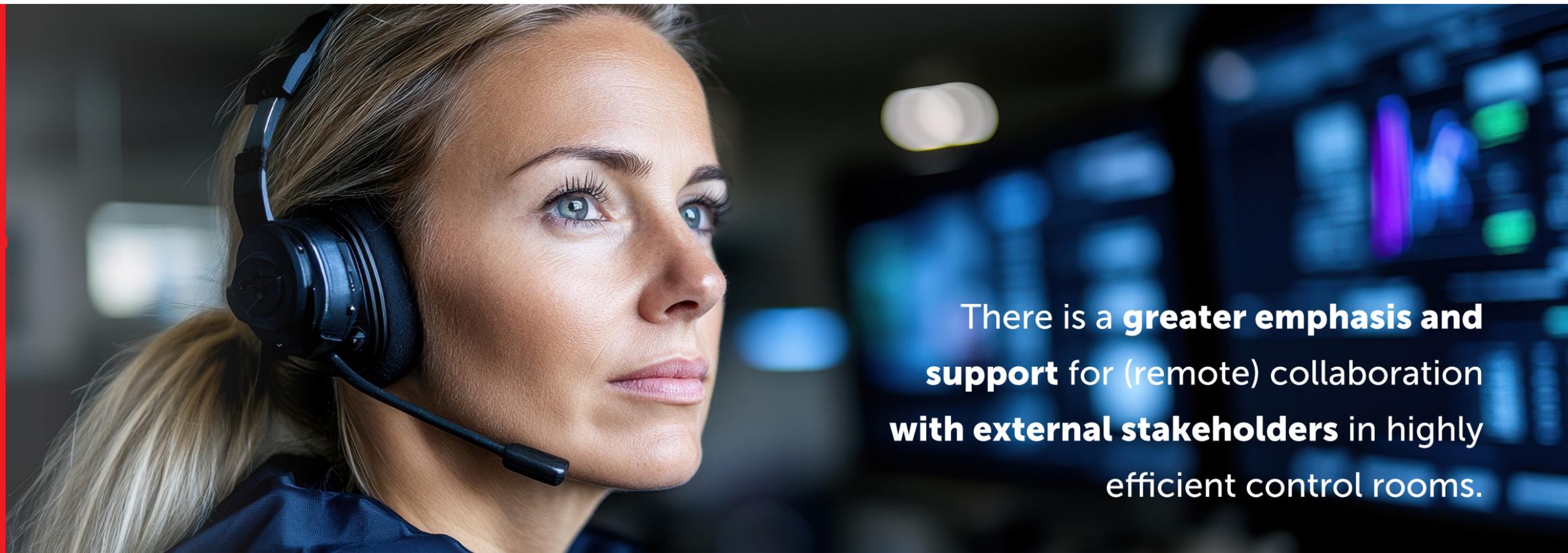
The 2024 Barco control room research shows that nearly every control room (95%) operates with established SOPs. These SOPs are crucial for ensuring consistency, safety, and efficiency in control room operations.

These findings underscore the importance of making SOPs a mandatory condition for control room operations. By standardizing procedures, control rooms can enhance their readiness and responsiveness, thereby improving overall operational efficiency. Control rooms with well-documented SOPs **operate more efficiently**, with professionals more likely to follow structured procedures.

IN WHICH FORM ARE THESE STANDARD OPERATING PROCEDURES (SOPs) ACCESSIBLE IN YOUR CONTROL ROOM?



Collaboration practices



There is a **greater emphasis and support** for (remote) collaboration **with external stakeholders** in highly efficient control rooms.

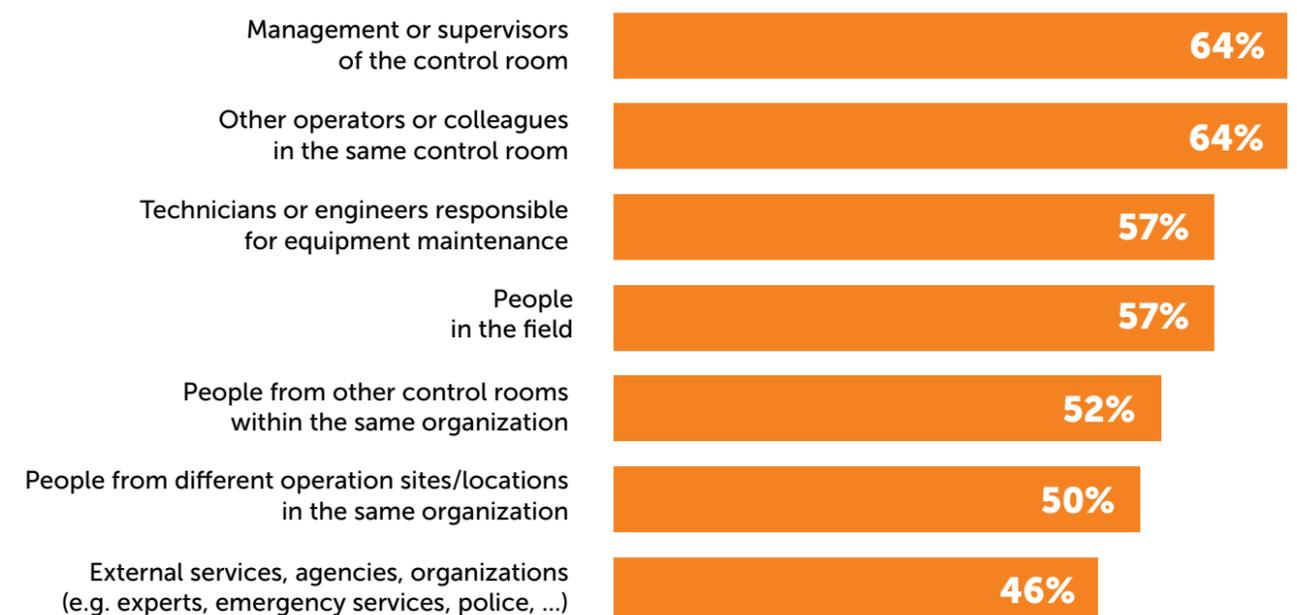
As new technology emerges, collaboration practices are evolving, and remote working is becoming a more viable option for efficient control room practices.

Collaboration practices in the control room

Not surprisingly, the most frequent collaboration practices in control rooms occur internally. Control room professionals primarily engage with control room managers or supervisors (64%), colleagues within the same control room (64%), and technicians or engineers responsible for equipment maintenance (57%).

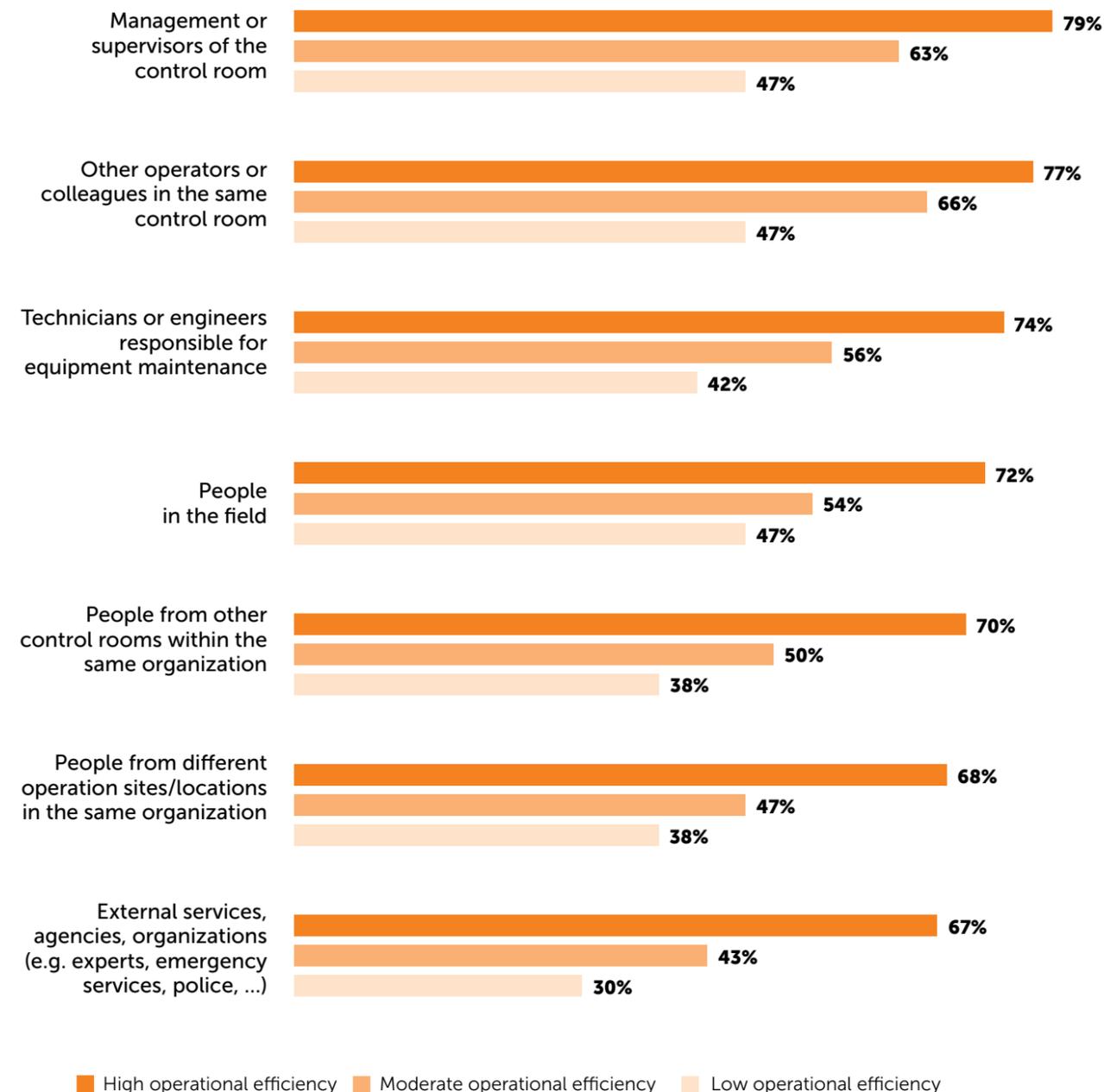
However, external collaboration is also significant, with nearly half of control rooms engaging with stakeholders outside their immediate environment or across sites.

HOW FREQUENTLY DO YOU COLLABORATE WITH ...



The 2024 Barco control room research reveals that highly efficient control rooms engage in more frequent collaboration and stakeholder groups, both inside control rooms and beyond. In contrast, lower-efficiency control rooms tend to collaborate less frequently, suggesting that stronger collaboration—especially with external stakeholders—correlates with higher control room performance. Additionally, high-efficiency control rooms place greater emphasis on supporting external collaboration, particularly through remote capabilities, further enhancing their operational agility and responsiveness.

HOW FREQUENTLY DO YOU COLLABORATE WITH ...



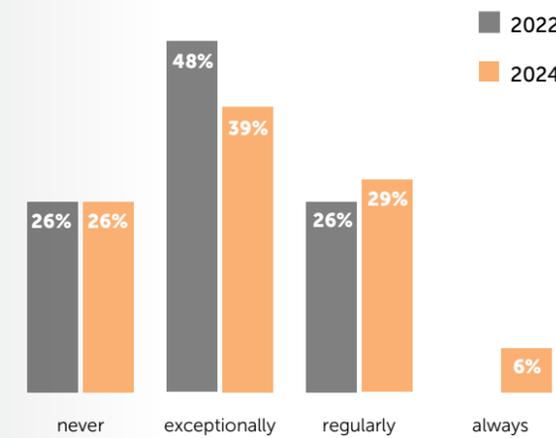
The evolution of remote working in control rooms

In the evolving landscape of control room operations, remote working has gained traction in recent years, reshaping the future of this critical market. Defined as the practice of operating outside the physical control room, remote working allows control room professionals to manage operations from diverse locations. While traditionally considered impractical for operational roles, emerging technologies and changing workplace dynamics have made remote work increasingly feasible. This paradigm shift leverages advanced technologies to enhance control room efficiency.

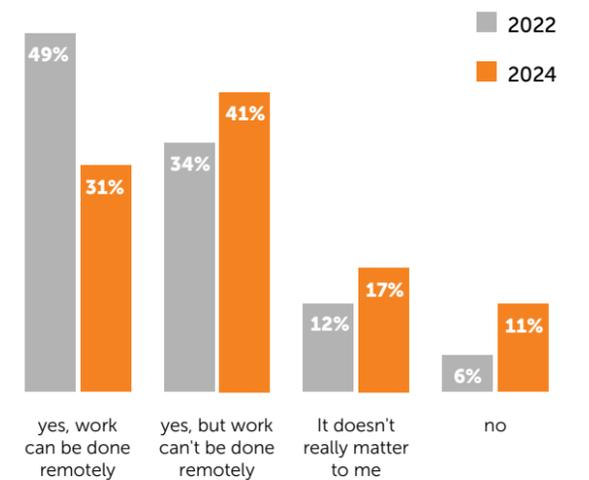
The COVID-19 pandemic has acted as a catalyst, accelerating the adoption of remote working and underscoring both its benefits and challenges. Organizations seem to have recognized the necessity for operational continuity, cost optimization, and access to a broader talent pool.



ON AVERAGE HOW OFTEN DO YOU WORK FROM HOME OR REMOTELY?



WOULD YOU LIKE TO WORK FROM HOME OR REMOTELY?



Post-pandemic research from 2022 indicated a notable presence in remote working, with 48% of control room professionals working remotely on an exceptional basis. By 2024, the trend stabilized, with slightly more professionals regularly working remotely (26% in 2022 vs. 29% in 2024) or always (6% in 2024). The share of professionals who have never worked remotely has remained unchanged.

A key finding is the high willingness among control room professionals to work remotely. Interestingly, in 2022, a larger share of professionals (49%) reported being both willing and able to work remotely compared to 31% in 2024, suggesting that pandemic-driven necessity temporarily increased remote work adoption.



Tasks most efficient for remote operations

Today, remote work appears to be most efficient for administrative tasks, such as handling emails, making appointments, planning and reporting, according to 60% of control room professionals.

Moreover, moderately to highly efficient control rooms see significantly more benefits in remote working than low efficient control rooms in tasks that can be efficiently executed remotely.



60%

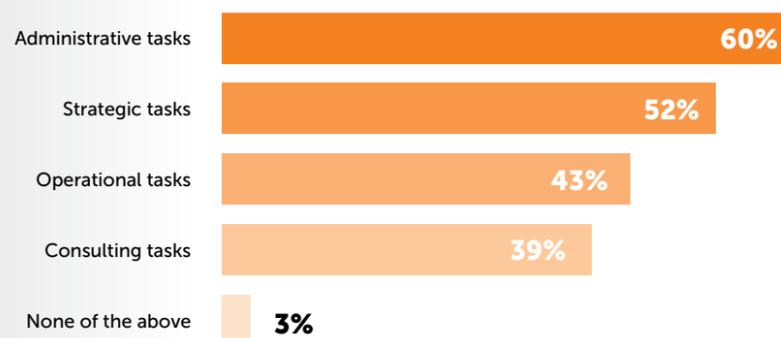
of control room professionals believe remote work is most efficient for administrative tasks



31%

of control room professionals are willing and able to work remotely in 2024

WHICH OF THE FOLLOWING TASKS CAN BE EFFICIENTLY EXECUTED REMOTELY?



Challenges in remote working

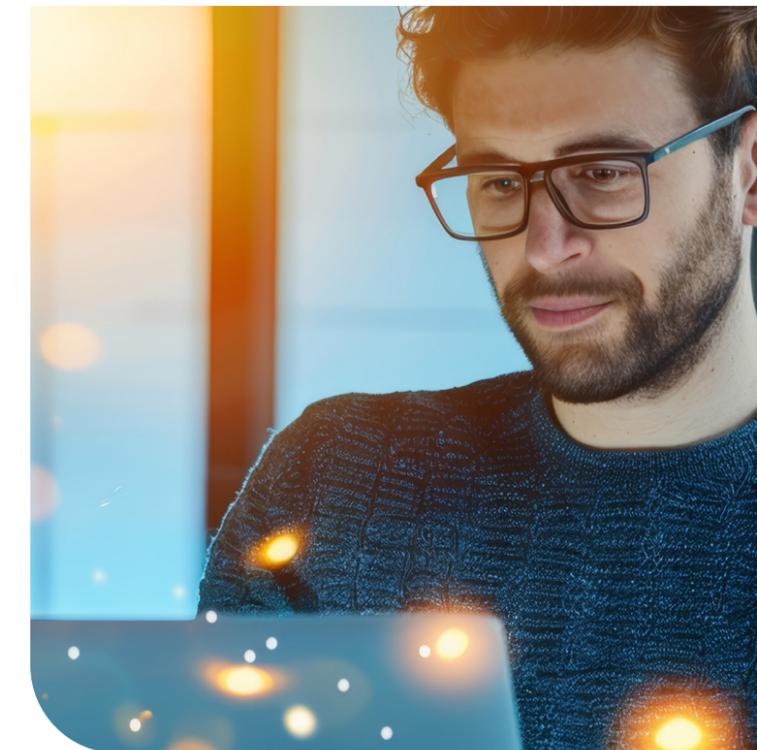
Control room professionals face significant challenges when transitioning to remote work, with many citing reasons that make remote working unfeasible in their control room.



38%

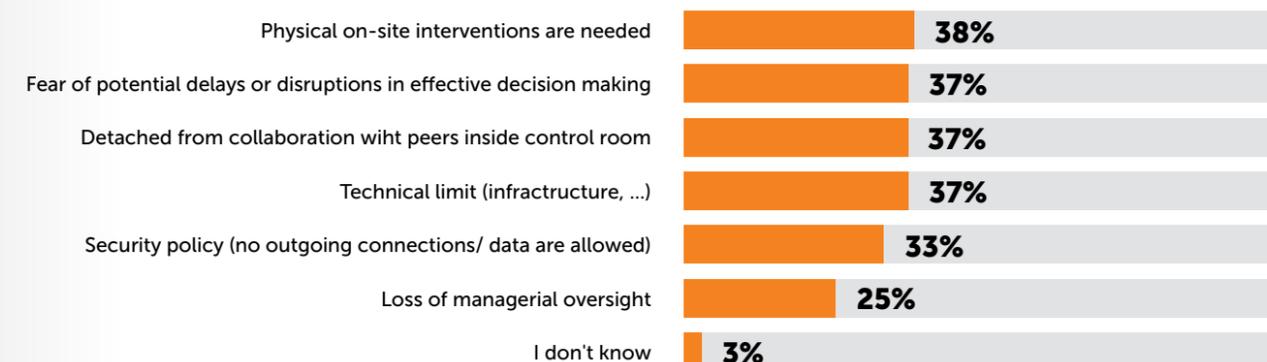
of control room professionals believe physical onsite interventions are necessary

This is in line with feedback received from focus groups with control room professionals across industries: "The work that is happening is site-oriented. If you're in charge of security, you have to be on site". At the same time, 37% express concerns about potential delays or disruptions in decision-making, feeling detached from collaboration with peers: "Solving a crisis cannot be done from home".



Another 37% struggles with technical limitations, such as inadequate infrastructure. Additionally, 33% are not able to work remotely due to restrictive security policies: "company policy is not to share data outside the control center". Moreover, 25% of control room professionals report a perceived loss of managerial oversight, making it difficult to monitor performance and maintain team cohesion.

WHAT ARE THE MAIN OBSTACLES OR DIFFICULTIES YOU FACE TO REMOTE WORKING IN YOUR CONTROL ROOM?



Industry-specific challenges

Remote working presents unique challenges across various industries, with Manufacturing facing the most significant hurdles. In this industry, the reliance on physical onsite interventions is particularly pronounced, likely due to the necessity for direct interaction with machinery and equipment, or on-site security measures. The assumption here is that the complexity and critical nature of Manufacturing operations make it more challenging to adapt fully to remote working models.

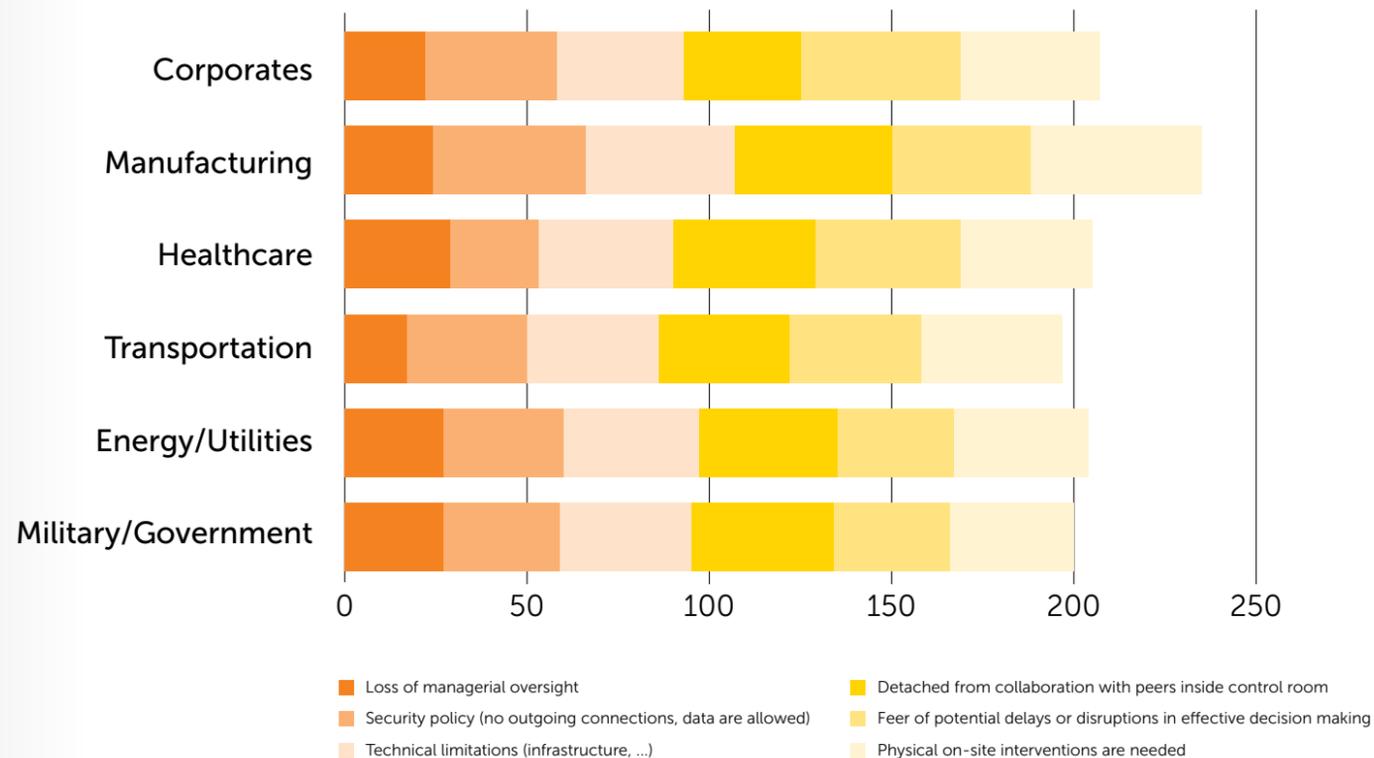


We need to take away workload from the operator and involve field workers in the workflow through mobile devices.

Control Room manager,
Process Control Operations



WHAT ARE THE MAIN OBSTACLES OR DIFFICULTIES YOU FACE TO REMOTE WORKING IN YOUR CONTROL ROOM?

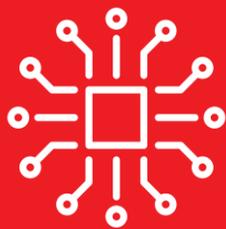


By recognizing these industry-specific challenges, control rooms can tailor their remote working strategies to address the needs and constraints of their control room operations.

Addressing these challenges requires robust security measures, enhanced collaboration tools, and strategies to ensure seamless operations.



Future readiness in control rooms



The control room market is undergoing a fundamental transformation. Traditionally focused on monitoring and raising alarms, control rooms are shifting towards a more strategic role—directing and supporting of operations. As organizations rely more on control rooms for broader operational continuity, their role now extends beyond safety and security, including building management, production monitoring, ICT, emergency services, and operator well-being.

58%

states that overall safety will be better when we use AI technology



70% of highly productive control room professionals state that today, risks and uncertainty have never been so high

The evolving role of control rooms

This evolution brings both opportunities and challenges. Control rooms are becoming complex information hubs, requiring operators to manage critical challenges such as workflow complexity, reactive decision-making, and information overload. While technology enhances operational efficiency, effective functional design remains a challenge. Many control rooms still operate reactively, relying on past lessons rather than supporting the proactive potential of emerging technologies. To embrace future readiness, control rooms must adopt a forward-thinking approach that integrates advanced skills, emerging technology-driven capabilities, and a redefined vision of the control room of the future.

68%

of control room professionals is willing to embrace artificial intelligence in their daily activities in the control room

Future skills for control room professionals

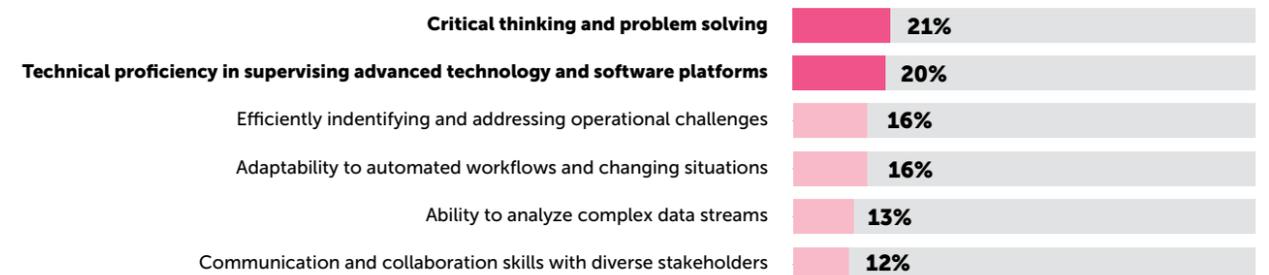
As the role of control room operators evolves, so must their skill sets. The next generation of operators will require a mix of technical, analytical, and decision-making skills to navigate these mission-critical environments. According to 2,000 control room professionals, the two most important future skills in control room operations are critical thinking and problem solving (21%), closely followed by technical proficiency in supervising advanced technology and software platforms (20%).



21%

of professionals find critical thinking and problem solving the most important skill for future readiness

IN YOUR OPINION, WHAT SKILL WILL BE MOST IMPORTANT FOR THE PROFESSIONAL OF THE CONTROL ROOM OF THE FUTURE?



Impact of AI technology in the control room

Emerging technologies such as AI are set to redefine control room operations, offering significant benefits across key workflow areas. The 2024 Barco control room research shows that the impact of AI technology seems most pronounced in the following areas, each outlined with a potential use case:



66%

of highly efficient control rooms perceive the use of AI in control rooms as a threat for human jobs

As is shown in the graph, C-level executives and IT managers align closely with operators and supervisors on advantages of AI in the control room. However, given their management responsibility to anticipate long-term trends, they place greater emphasis on forward-looking and operationally beneficial control room areas. IT and C-level management score significantly higher in areas such as **process optimization (42%)**, **predictive insights (38%)**, **incident response (37%)**, **information analysis and decision making (36%)**, and **filtering of information or alarms before they come into the control room (32%)**, recognizing these as the most beneficial for AI implementation.



Data monitoring

AI can significantly **improve situational awareness** by continuously analyzing large datasets, identifying anomalies, and **predicting potential disruptions before they escalate**. By **managing information overload** and focusing on critical insights, this proactive approach helps in minimizing downtime and enhances operational efficiency.



Risk management

AI can help **anticipate security threats, operational failures, and system vulnerabilities**. By enabling these risk mitigation strategies, control rooms can **reduce interruptions, loss of revenue, non-compliance fines**, while also **avoiding ransomware risks** and maintaining high levels of efficiency.



Process optimization

Technology can **drive workflow optimization** by identifying and reducing inefficiencies and thus **enhancing response times**. In industries such as Manufacturing or Oil & Gas, optimized control rooms can significantly **increase throughput and/or output**, resulting in higher operational efficiency and financial gains.



Anomaly detection

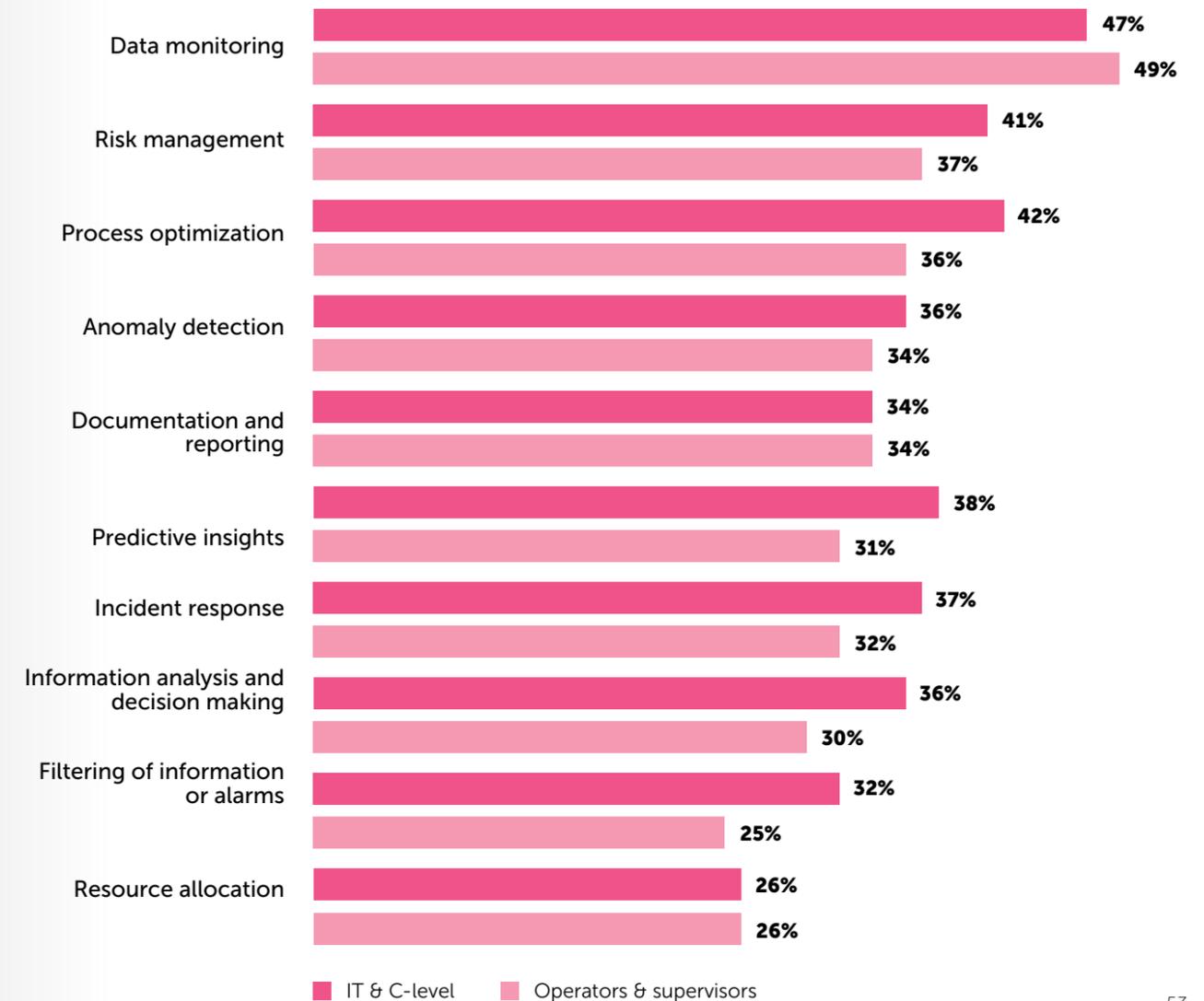
AI systems can support **identifying irregularities and deviations from normal patterns**, enabling prompt intervention and risk mitigation of potential issues. This approach strengthens operational focus.



Documentation & reporting

Automated reporting tools can support in **improving accuracy, ensure compliance, and reduce administrative burdens on operators**. This allows operators to allocate more time to other critical workflow tasks, improving productivity and operational efficiency.

BIGGEST ADVANTAGES FOR AI TECHNOLOGY IN THE CONTROL ROOM



A vision for the future

As control rooms transition from reactive monitoring centers to hubs, their strategic importance within organizations will only grow.

Leveraging over 30+ years of experience and expertise in control rooms, Barco envisions the transformation of control rooms through four key trends.

1. From viewing everything to exception-based viewing

Operators are shifting from monitoring all data continuously to focusing on critical incidents. This approach reduces cognitive overload and improves efficiency by displaying the right information at the right time. Exception-based viewing consolidates different data flows into a single, reliable view for operators, giving them better control over the situation.



2. From response-driven to proactive decision-making

Emerging technology will enable control rooms to transition from reactive responses to strategic foresight. By providing access to relevant data and facilitating informed decision-making, control rooms can anticipate events and develop more predictive and effective responses. For example, early detection of a tunnel fire enables the differentiation between primary and secondary events and allows for proactive actions to prevent congestion. Additionally, sensors combined with historical data may predict and prevent potential fires by identifying early warning signs of an emerging threat.



3. From operational execution to strategic supervision

The role of the operator will evolve from monitoring and alarming to directing and supporting. This shift moves control rooms from an operational environment to an insights room. Similar to a pilot relying on autopilot to fly a plane, operators will become supervisors of more autonomous operations, focusing on user-oriented systems. Presenting information in a way that is user oriented is essential to engage the next generation of operators. Throughout their lives, this generation has been confronted with changes in technologies at such a fast pace. That is also what they are seeking in their work and they need to be challenged in this way. They want to see how their input makes a difference and drives change.



4. From control room to insights hub

By aggregating and analyzing data from multiple sources, control rooms will transform into intelligence units. This evolution is crucial as it strengthens the role of the control room, especially in the aftermath of crisis events like the 2024 flooding in Spain. People expect better prevention and faster responses, and new tools for insights will make control rooms more effective and adaptable.





With these trends in mind, Barco is committed to driving the future of control rooms, ensuring we remain at the forefront of technological advancements and operational excellence.

Understanding the challenges in the control room market is essential in this endeavor. We welcome your insights and invite you to contact us for further discussion or brainstorming.

www.barco.com/controlroomreport

From the leading global brand



Barco is a global leader in control room solutions, with an impressive installed base. We have been around since 1934, building a solid reputation as a manufacturer of innovative and qualitative visualization solutions. Our HQ is in Belgium, but our presence is global, with offices and factories located in strategic positions all around the world.

Active in the control room industry since the early 1990s, we have gained deep expertise in market dynamics, operational requirements, and evolving technologies.

The information and data given are typical for the equipment described. However any individual item is subject to change without any notice. The latest version of this brochure can be found on www.barco.com.

www.barco.com/controlroomreport

BARCO