

# Employee Perceptions of Safety Measures and Operational Efficiency in ADNOC (UAE)

Mohammed Ali Ibrahim Alhosani

Institute of Technology Management and Entrepreneurship

Universiti Teknikal Malaysia Melaka, Malaysia

Sazelin Binti Arif (corresponding Author)

Institute of Technology Management and Entrepreneurship

Universiti Teknikal Malaysia Melaka, Malaysia

E-mail: [sazelin@utem.edu.my](mailto:sazelin@utem.edu.my)

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## Abstract

In ADNOC's high-hazard, asset-intensive operating environment, safety systems and operational continuity are closely connected because disruptions can translate into downtime, production delays, and increased costs. This study provides a descriptive assessment of employees' perceptions of Safety Measures (SM) and Operational Efficiency (OE) within ADNOC (UAE). Data were collected from 30 safety-domain staff using a self-administered questionnaire distributed through approved organisational channels, with responses captured on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). Safety Measures were assessed across four ADNOC-relevant dimensions, Advanced Safety Technology (AST), Compliance with Safety (CWS), Emergency Response (ER), and Personal Protective Equipment (PPE), while Operational Efficiency was measured as perceived outcomes through Perceived Downtime Reduction (PD) and Perceived Productivity Improvement/Stability (PI). Descriptive results indicated generally favourable perceptions of safety measures (overall SM Mean = 3.95) and operational efficiency outcomes (overall OE Mean = 3.90). Among safety dimensions, AST and PPE received the highest ratings, while within OE, PD was rated higher than PI, suggesting that respondents more strongly associated safety practices with operational continuity and reduced disruption than with longer-term productivity gains. The questionnaire demonstrated strong internal consistency across all constructs (Cronbach's  $\alpha$  range: 0.882–0.934), with excellent reliability for SM

overall ( $\alpha = 0.966$ ) and OE overall ( $\alpha = 0.932$ ). The findings provide ADNOC with a baseline profile for internal benchmarking and for prioritising improvement attention across safety-measure domains and perceived operational efficiency outcomes.

**Keywords:** safety measures, operational efficiency, employee perceptions, ADNOC (UAE)

## 1. Introduction

The oil and gas sector operates as a high-risk socio-technical system in which safety and operational continuity are tightly coupled that rare but consequential events can disrupt production, reduce asset availability, and increase operating costs (Reason, 1997; Weick & Sutcliffe, 2015). In response, many organizations formalize safety governance through occupational health and safety management systems intended to identify hazards, control risk, and improve organizational performance (ISO, 2018). Consistent with the hierarchy-of-controls perspective, safety is commonly managed through layered interventions that include engineering and administrative controls and, where residual risk remains, personal protective equipment (OSHA, 2023; CDC/NIOSH, 2024).

In the United Arab Emirates (UAE), ADNOC represents a relevant context because of its scale and integrated operations, where maintaining stable performance is critical (ADNOC Distribution, 2024). In such asset-intensive environments, operational efficiency is not only a cost objective but also a continuity objective: downtime and productivity losses can impose substantial penalties, and many industry performance approaches emphasize the value of monitoring operational stability alongside safety management (IOGP, 2023). For this reason, the present study focuses on operational efficiency at the perceptual level, using employee responses to describe perceived operational efficiency outcomes, specifically perceived downtime reduction and perceived productivity improvement/stability.

Although organizations invest heavily in safety-related practices and controls including safety technologies, compliance activities, emergency readiness, and PPE which there remains a practical need for organization-specific descriptive evidence on how employees perceive the current strength of these measures and how they perceive operational efficiency outcomes. Employee perceptions are widely used in safety research because they provide insight into “how safety is experienced” in daily work and can support benchmarking and targeted improvement actions (Zohar, 1980; Griffin & Neal, 2000; Neal, Griffin, & Hart, 2000). From an operational standpoint, emergency preparedness practices (e.g., drills, equipment readiness, and response capability) are also widely recognised as key elements of resilience in hazardous operations (IOGP, 2024; NFPA, 2025).

Accordingly, this paper presents a descriptive survey-based assessment of employee perceptions of Safety Measures (SM) in ADNOC across four dimensions which are Advanced Safety Technology (AST), Compliance with Safety (CWS), Emergency Response (ER), and Personal Protective Equipment (PPE) and employee perceptions of Operational Efficiency (OE) outcomes, measured as perceived downtime reduction and perceived productivity improvement/stability. The findings are intended to support benchmarking and help inform practical prioritization of safety improvement initiatives within high-hazard operations, including PPE management as a risk control measure (HSE, 2025).

## 2. Literature Review

This literature review establishes the conceptual foundation for examining employees’ perceptions of Safety Measures and their relationship with Operational Efficiency in

ADNOC-type oil and gas operations. In high-hazard process industries, safety systems are closely tied to operational continuity because incidents, near misses, and process deviations can trigger unplanned shutdowns, recovery delays, and productivity instability. The review therefore draws on process safety and operational excellence perspectives to explain why structured safety interventions are expected to support reliability-based efficiency outcomes. To support measurement development, the review also synthesizes how safety measures are commonly conceptualized as a bundle of complementary controls, and how operational efficiency can be meaningfully captured through perceived downtime reduction and perceived productivity improvement and stability.

### *2.1 Selection of ADNOC as Case Study*

ADNOC (UAE) was selected as the case study context because it operates in a high-hazard, asset-intensive oil and gas environment where maintaining safe and stable operations is essential. In such settings, safety is closely linked to operational continuity, because incidents and process disruptions can lead to downtime, production losses, and increased operating costs. High-reliability perspectives emphasise that organisations in complex and risky industries must sustain disciplined operations and dependable routines to prevent failures and maintain performance (Reason, 1997; Weick & Sutcliffe, 2015). ADNOC provides a suitable setting to examine this issue because its operations involve large-scale facilities and integrated activities where safety controls and operational efficiency outcomes are continuously managed together.

In addition, ADNOC places strong organisational emphasis on health, safety, and well-being as part of performance and sustainability priorities, making it a relevant environment for studying employees' perceptions of safety measures (ADNOC Distribution, 2024). The company context also aligns with recognised safety management expectations and structured approaches to hazard control, such as occupational health and safety management systems and layered risk controls (ISO, 2018; OSHA, 2023; CDC/NIOSH, 2024). Therefore, using ADNOC as the case organisation provides both practical and theoretical relevance for describing how employees perceive safety measures (technology, compliance, emergency readiness, and PPE) and perceived operational efficiency outcomes in a high-hazard operating environment.

### *2.2 Safety Measures Dimension*

In ADNOC-type oil and gas operations, safety is achieved through a coordinated set of controls rather than a single practice. These controls are designed to prevent incidents, reduce exposure to hazards, and sustain stable operations in environments where process deviations can escalate quickly. Accordingly, this study conceptualizes Safety Measures as a multidimensional construct representing the organization's practical safety system as experienced by employees. Safety Measures are operationalized through four complementary dimensions that reflect the main layers of risk control in high-hazard work: Advanced Safety Technology, Compliance with Safety, Emergency Response, and Personal Protective Equipment. Together, these dimensions capture how ADNOC-type organizations combine technology-enabled prevention, disciplined rule adherence, preparedness for abnormal events,

and frontline protective barriers to support consistent safe performance and operational continuity.

### 2.2.1 Advanced Safety Technology (AST)

Modern safety systems increasingly rely on technology to detect hazards early, reduce exposure, and support timely decision-making. Investments in modern safety technology signal organizational commitment to proactive risk control (AST1), a core requirement of occupational health and safety management systems (ISO, 2018). These technologies support accident prevention through monitoring, alarms, sensors, and digital safety tools (AST2), which are essential for tracking key process safety performance indicators (IOGP, 2023). However, technology only contributes effectively when it remains current and fit-for-purpose, making regular updates important (AST3). In high-risk tasks, the benefit of advanced safety technology is also shaped by user competence; training employees to use advanced safety equipment increases correct use and reduces misuse or over-reliance (AST4). Overall, safety technology is often positioned as a critical barrier within a layered defense system that can reduce the probability of human error in safety-critical work by supporting standardization, detection, and timely intervention (AST5) (Reason, 1997).

### 2.2.2 Compliance with Safety (CWS)

Compliance is a core mechanism through which safety rules translate into consistent safe behavior (Neal, Griffin, & Hart, 2000). Strict adherence to protocols (CWS1) reduces variation in work execution and limits shortcuts that can escalate risk, a fundamental aspect of maintaining a strong safety climate (Zohar, 1980). Routine safety audits (CWS2) provide structured verification and help detect gaps between “work as imagined” and “work as done.” When non-compliance is reported and corrected (CWS3), organizations strengthen accountability and learning through corrective action processes, preventing repeated deviations (ISO, 2018; UK HSE, 2025). Clear communication of safety rules (CWS4) supports shared understanding and reduces ambiguity, especially in complex operations with multiple teams and contractors. Finally, perceived personal responsibility for compliance (CWS5) reflects internalization of safety expectations, which typically strengthens day-to-day self-regulation beyond external monitoring.

### 2.2.3 Emergency Response (ER)

Even with strong prevention controls, high-hazard environments require preparedness for abnormal events (IOGP, 2024). Frequent drills (ER1) reinforce readiness and help employees practice roles, routes, and coordination under realistic conditions. Knowing evacuation procedures (ER2) supports timely action during emergencies and reduces confusion that can increase harm and delay recovery. Access to emergency equipment (ER3) ensures that basic response resources are available when needed. Well-trained response teams (ER4), such as facility fire brigades, improve the speed and quality of containment, rescue, and stabilization actions (NFPA, 2025). Post-incident reviews (ER5) support organizational learning by identifying root causes, improving procedures, and strengthening resilience for future events (Weick & Sutcliffe, 2015).

#### 2.2.4 Personal Protective Equipment (PPE)

PPE remains a foundational layer of protection in hazardous tasks where exposure cannot be fully eliminated by higher-level controls (CDC/NIOSH, 2024; OSHA, 2023). Consistent wearing of required PPE (PPE1) is a direct indicator of rule enactment at the frontline. The usability of PPE where comfort and functionality (PPE2) that matters because poor fit or discomfort can reduce compliance and increase workarounds (UK HSE, 2025). Regular inspection and replacement (PPE3) ensure PPE remains effective and reduces the risk of failure. Training on PPE use (PPE4) supports correct selection, fitting, and maintenance, which are essential for protection quality. Ultimately, PPE is expected to reduce perceived risk of injury by limiting exposure to physical, chemical, or operational hazards (PPE5).

#### 2.3 Operational Efficiency (OE)

Operational Efficiency in high-hazard oil and gas environments is best understood through a reliability-based lens. Efficiency is not only a matter of producing output with fewer resources, but also the ability to maintain stable operations with minimal disruptions, rework, and recovery time. Because incidents and process deviations can interrupt production schedules and create significant downtime, operational efficiency is closely linked to the prevention of disruptions and the consistency of execution. In this study, Operational Efficiency is measured through employee perceptions of two outcomes that reflect operational continuity and performance stability: perceived downtime reduction and perceived productivity improvement and stability.

##### 2.3.1 Perceived Downtime Reduction (PD)

Operational efficiency in process industries is often linked to continuity: stable operations reduce interruptions and protect output (Weick & Sutcliffe, 2015). From an employee perspective, safety measures that prevent incidents and control process deviations are expected to minimize unplanned downtime (PD1). When incidents rarely disrupt production schedules (PD2), operations maintain steadier throughput and reduce recovery costs, aligning safety goals with operational key performance indicators (IOGP, 2023). Short recovery time after incidents (PD3) reflects both preparedness and effective coordination, including timely response and restoration. Alignment between maintenance schedules and safety checks (PD4) reflects planned reliability management, where preventive actions support both safety assurance and operational continuity. Resource allocation that supports both safety and output (PD5) highlights the practical reality that staffing, tools, and planning decisions can either reduce bottlenecks or increase operational vulnerability.

##### 2.3.2 Perceived Productivity (PI)

Beyond avoiding interruptions, safety can influence productivity through workforce confidence, smoother workflows, and reduced disruption-related rework. Safety practices that enhance workflow efficiency (PI1) often do so by clarifying processes, improving coordination, and reducing uncertainty during critical tasks, linking safety climate to broader performance outcomes (Griffin & Neal, 2000). Fewer accidents leading to higher productivity (PI2) reflects reduced absence, less disruption, and fewer operational stoppages.

When employees feel safe, they may work with greater confidence and focus (PI3), which can support stable performance, especially in demanding environments. Training that improves both safety and output (PI4) reflects skill development that can raise task competence and reduce errors. Finally, the perception that safety investments yield long-term productivity gains (PI5) aligns with the view that reliable operations, supported by strong safety controls that help sustain performance over time in complex systems (Weick & Sutcliffe, 2015).

Safety measures in high-hazard operations are best understood as a bundle of complementary controls rather than a single practice (Reason, 1997). In this pilot study, highlighting the importance of preliminary research in specific contexts (van Teijlingen & Hundley, 2001; Hertzog, 2008), employees' perceptions of safety measures are captured through four practical dimensions, advanced safety technology (AST), compliance with safety (CWS), emergency response (ER), and PPE practices (PPE). Operational efficiency is captured as perceived outcomes through downtime reduction (PD) and productivity improvement/stability (PI), reflecting continuity and stable performance in asset-intensive settings. Taken together, these dimensions provide a descriptive measurement framework for benchmarking current perceptions in ADNOC (UAE) and identifying strengths and improvement priorities aligned with corporate HSE goals (ADNOC Distribution, 2024), without testing causal relationships at this stage.

### **3. Methodology**

This study employed a pilot, descriptive survey design to examine safety-domain employees' perceptions of workplace safety measures and perceived operational efficiency outcomes within ADNOC (UAE). The primary purpose was to generate an initial benchmarking profile of how respondents evaluate key safety practices and to identify which safety-measure items appear relatively stronger or weaker in this organisational context. The study was not designed to test causal relationships or to make organisation-wide generalisations.

#### *3.1 Study Design and Participants*

A total of 30 respondents participated in the survey. Participants were drawn from eligible ADNOC staff working in safety-domain roles. The questionnaire was distributed through approved organisational channels, including face-to-face distribution and internal email. Participation was voluntary, and responses were provided via a self-administered instrument using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

Given the small pilot sample size and the focus on safety-domain staff, the findings should be interpreted as a preliminary snapshot of perceptions within this subgroup rather than as representative of ADNOC employees across all functions, sites, or shift patterns. In addition, the total number of employees invited and the response rate were not recorded during this pilot deployment, which further limits conclusions about representativeness. Future studies should adopt a larger, stratified sampling strategy across business units, asset types, and day/night shifts to enable subgroup comparisons and improve generalisability.

### *3.2 Measures and Instrument Structure*

The survey instrument operationalised Safety Measures (SM) across four dimensions: Advanced Safety Technology (AST), Compliance with Safety (CWS), Emergency Response (ER), and Personal Protective Equipment (PPE). Operational Efficiency (OE) was measured as *perceived* operational efficiency outcomes captured through two dimensions: perceived downtime reduction and perceived productivity improvement/stability. All items were assessed using the same five-point Likert response format.

### *3.3 Data Analysis*

Data were analysed using descriptive statistics to summarise the pattern of responses across the sample. Specifically, means, standard deviations, medians, and item- and dimension-level rankings were computed to describe overall trends and to compare the relative strength of perceptions across safety-measure and operational-efficiency dimensions.

### *3.4 Ethics and Governance*

This study involved employee survey responses collected within an organisational setting. Participation was voluntary, and informed consent was obtained through an information statement provided at the beginning of the questionnaire, which explained the study purpose, confidentiality provisions, and participants' right to decline or withdraw without consequence. No personally identifying information was collected, and findings are reported only in aggregated form. Data were stored securely and accessed only by the researcher for academic purposes. The study was conducted in accordance with institutional research governance requirements, and ethics approval (or a minimal-risk ethics waiver for anonymous survey research) was obtained from the relevant university authority prior to data collection.

## **4. Results and Analysis**

This section presents the results of the questionnaire survey and analyses the findings in relation to the study's measurement framework. The analysis focuses on the reliability and internal consistency of the survey instrument and provides descriptive interpretation of how respondents perceive Safety Measures and Operational Efficiency dimensions. Given the study's descriptive orientation, the results are presented to benchmark current perceptions and identify patterns across the lower-order constructs, rather than to test causal relationships.

### *4.1 Reliability of the Questionnaire Survey*

Reliability was assessed using Cronbach's alpha ( $\alpha$ ) to evaluate the internal consistency of the questionnaire scales. Cronbach's alpha indicates the extent to which items within a dimension measure the same underlying concept, with higher values reflecting stronger internal consistency (Cronbach, 1951).

Table 1. Results of Cronbach's alpha

<b>Dimension</b>	<b>Number of Items</b>	<b>Cronbach's <math>\alpha</math></b>
AST	5	0.895
CWS	5	0.894
ER	5	0.913
PPE	5	0.934
<b>Safety Measures overall</b>	20	0.966
PD	5	0.922
PI	5	0.882
<b>Operational Efficiency overall</b>	10	0.932
<b>All items</b>	30	0.975

Table 1 shows that all dimensions demonstrated high reliability, with Cronbach's alpha values ranging from 0.882 to 0.934 for the individual constructs. Specifically, AST ( $\alpha = 0.895$ ), CWS ( $\alpha = 0.894$ ), ER ( $\alpha = 0.913$ ), and PPE ( $\alpha = 0.934$ ) indicate strong internal consistency for the four safety-measure dimensions. The combined Safety Measures overall scale also showed excellent reliability ( $\alpha = 0.966$ ). For operational efficiency outcomes, PD ( $\alpha = 0.922$ ) and PI ( $\alpha = 0.882$ ) were both reliable, and the combined Operational Efficiency overall scale was also high ( $\alpha = 0.932$ ). Finally, the reliability of the full instrument across all items was very high ( $\alpha = 0.975$ ), suggesting that the questionnaire items are consistently measuring their intended constructs and are suitable for descriptive analysis in this study (Cronbach, 1951).

#### 4.2 Safety Measures Dimension-Level Results

The dimension-level results provide an overview of employees' perceptions of safety measures in ADNOC across the four domains of Advanced Safety Technology (AST), Compliance with Safety (CWS), Emergency Response (ER), and Personal Protective Equipment (PPE). Dimension scores were computed by averaging the five items within each domain, and the overall score was computed by averaging all 20 safety-measure items.

Table 2. Dimension-level

<b>Dimension</b>	<b>Mean</b>	<b>SD</b>	<b>Median</b>	<b>Min</b>	<b>Max</b>	<b>Rank</b>
AST (5 items)	3.97	0.66	4.00	2.60	5.00	1
CWS (5 items)	3.94	0.76	4.10	2.00	5.00	3
ER (5 items)	3.93	0.81	4.20	2.00	5.00	4
PPE (5 items)	3.96	0.83	4.10	2.00	5.00	2
Overall (all 20 items)	3.95	0.70	4.08	2.15	4.90	—

Table 2 presents the dimension-level descriptive statistics for the pilot study, summarizing respondents' perceptions across four safety-measure dimensions and the overall scale (20

items). Overall perceptions were positive, with mean scores clustered close to 4.0 (Overall Mean = 3.95, SD = 0.70), indicating generally favourable agreement with the safety-measure statements. Among the dimensions, AST recorded the highest mean (Mean = 3.97, SD = 0.66; Rank 1), followed closely by PPE (Mean = 3.96, SD = 0.83; Rank 2). CWS (Mean = 3.94, SD = 0.76; Rank 3) and ER (Mean = 3.93, SD = 0.81; Rank 4) showed slightly lower averages, though still above the midpoint of the scale. The medians (4.00–4.20) further reinforce that responses tended to lean toward agreement, while the minimum and maximum values suggest some variability across respondents, particularly within CWS, ER, and PPE compared with AST.

#### 4.2.1 Advanced Safety Technology (AST) Item Results

This subsection reports item-level descriptive statistics for the AST dimension to identify which aspects of safety technology are perceived as strongest and which may require improvement. Item ranking was based on the mean score, with the standard deviation used to break ties where means were equal.

Table 3. AST items

Item	Mean	SD	Rank
AST1	3.90	0.80	3
AST2	3.90	0.84	4
AST3	3.87	0.82	5
AST4	4.07	0.69	2
AST5	4.13	0.78	1

Table 3 reports the item-level descriptive statistics for Advanced Safety Technology (AST). Overall perceptions were positive, with mean scores clustered near 4.0 (range: 3.87–4.13). AST5 received the highest rating (Mean = 4.13, SD = 0.78; Rank 1), indicating strong agreement that technology reduces human error in safety-critical tasks. AST4 ranked second (Mean = 4.07, SD = 0.69), suggesting respondents generally agreed they are trained to use advanced safety equipment; it also shows the lowest variability, reflecting more consistent responses. AST1 and AST2 shared the same mean (Mean = 3.90) but were ranked differently due to variability, with AST1 (SD = 0.80; Rank 3) slightly more consistent than AST2 (SD = 0.84; Rank 4). AST3 recorded the lowest mean (Mean = 3.87, SD = 0.82; Rank 5), indicating comparatively weaker agreement that safety technology is regularly updated, though perceptions remain above the midpoint of the scale.

#### 4.2.2 Compliance with Safety (CWS) Item Results

Item-level results for the CWS dimension are presented to examine how respondents perceive adherence to safety protocols, audit practices, reporting and correction of non-compliance, communication of safety rules, and personal responsibility for compliance. As with the other dimensions, items are ranked primarily by mean values to highlight relative strengths and

weaker areas.

Table 4. CWS items

Item	Mean	SD	Rank
CWS1	3.73	0.87	5
CWS2	3.87	0.86	4
CWS3	4.13	0.97	1
CWS4	3.97	0.81	3
CWS5	4.00	0.83	2

Table 4 presents the item-level descriptive statistics for Compliance with Safety (CWS). Overall, responses were generally favorable, with mean scores ranging from 3.73 to 4.13. The highest-rated item was CWS3 (Mean = 4.13, SD = 0.97; Rank 1), indicating strong agreement that non-compliance is reported and corrected. CWS5 ranked second (Mean = 4.00, SD = 0.83), reflecting a high sense of personal responsibility for complying with safety standards. CWS4 followed (Mean = 3.97, SD = 0.81; Rank 3), suggesting positive perceptions that safety rules are clearly communicated. By comparison, CWS2 (Mean = 3.87, SD = 0.86; Rank 4) and CWS1 (Mean = 3.73, SD = 0.87; Rank 5) were rated lower, implying comparatively weaker agreement regarding the regularity of safety audits and the strict adherence to safety protocols, respectively.

#### 4.2.3 Emergency Response (ER) Item Results

This subsection summarizes item-level descriptive findings for the ER dimension to evaluate employee perceptions of emergency preparedness practices, including drill frequency, evacuation knowledge, equipment accessibility, response team capability, and post-incident learning. Ranking is used to indicate which emergency response elements are perceived more positively and which are relatively weaker.

Table 5. ER items

Item	Mean	SD	Rank
ER1	3.87	1.01	5
ER2	3.80	0.96	4
ER3	3.97	0.98	2
ER4	4.13	0.90	1
ER5	3.87	0.94	3

Table 5 summarizes the item-level descriptive statistics for Emergency Response (ER). Mean scores indicate generally positive perceptions, with values ranging from 3.80 to 4.13. ER4

achieved the highest rating (Mean = 4.13, SD = 0.90; Rank 1), suggesting respondents perceived emergency response teams as well trained. ER3 ranked second (Mean = 3.97, SD = 0.98), indicating relatively strong agreement regarding the accessibility/availability of emergency equipment. ER5 (Mean = 3.87, SD = 0.94; Rank 3) and ER1 (Mean = 3.87, SD = 1.01; Rank 5) show similar average agreement, although ER1 exhibits higher variability, implying more diverse views on the frequency of emergency drills. ER2 recorded the lowest mean (Mean = 3.80, SD = 0.96; Rank 4), indicating comparatively weaker confidence in employees' knowledge of evacuation procedures.

#### 4.2.4 Personal Protective Equipment (PPE) Item Results

The PPE item-level results are presented to assess perceptions of PPE use and enforcement, comfort and functionality, inspection and replacement practices, training, and perceived protection outcomes. Items are ranked to identify the most positively perceived PPE practices and those that may require further attention.

Table 6. PPE item

Item	Mean	SD	Rank
PPE1	4.10	0.88	1
PPE2	3.90	0.84	4
PPE3	3.97	0.93	3
PPE4	3.97	0.89	2
PPE5	3.87	1.11	5

Table 6 presents the item-level descriptive results for PPE. Overall, mean scores are close to 4.0, indicating generally positive perceptions of PPE practices. PPE1 recorded the highest mean (Mean = 4.10, SD = 0.88; Rank 1), suggesting strong agreement that employees consistently wear the required PPE. PPE4 ranked second (Mean = 3.97, SD = 0.89), followed closely by PPE3 (Mean = 3.97, SD = 0.93), indicating broadly favorable views regarding PPE training/support and PPE inspection/replacement. PPE2 ranked fourth (Mean = 3.90, SD = 0.84), reflecting slightly lower agreement about PPE comfort and functionality. PPE5 was the lowest-rated item (Mean = 3.87, SD = 1.11; Rank 5) and showed the greatest variability, suggesting respondents differed more in the extent to which they believe PPE reduces injury risk.

#### 4.3 Summaries of Safety Measures (SM) Toward Operational Efficiency (OE)

Overall, the descriptive results indicate that employees reported generally favourable perceptions of safety measures across all dimensions, with mean scores close to 4.0. From an operational perspective, these findings suggest that safety measures are viewed as being implemented at a relatively strong level, which is relevant because consistent safety controls can support operational continuity by reducing disruptions and enabling stable work execution. In this study, the results are interpreted as a baseline benchmarking profile of

safety measures that can inform future assessments of perceived operational efficiency outcomes (downtime reduction and productivity improvement/stability) and guide prioritization of improvement initiatives, especially in items that received comparatively lower scores or higher variability.

#### 4.4 Operational Efficiency (OE) Dimension-Level Results

This subsection reports the descriptive results for Operational Efficiency (OE) measured through two dimensions: Perceived Downtime Reduction (PD) and Perceived Productivity Improvement/Stability (PI). Dimension scores were computed by averaging the five items within each dimension, while the overall OE score was computed by averaging all ten OE items.

Table 7. Dimension-level results (OE)

<b>Dimension</b>	<b>Mean</b>	<b>SD</b>	<b>Median</b>	<b>Min</b>	<b>Max</b>	<b>Rank</b>
PD (5 items)	4.01	0.75	4.10	2.40	5.00	1
PI (5 items)	3.80	0.78	3.80	2.00	5.00	2
Overall, OE (10 items)	3.90	0.71	4.05	2.30	4.90	-

Table 7 presents the dimension-level descriptive statistics for OE. Overall perceived operational efficiency was positive (Mean = 3.90, SD = 0.71), with the median (4.05) indicating that responses tended to lean toward agreement. Among the two dimensions, PD recorded the higher mean (Mean = 4.01, SD = 0.75; Rank 1), suggesting stronger perceived agreement that operational continuity-related outcomes (e.g., reduced disruption and quicker recovery) are present. PI was comparatively lower (Mean = 3.80, SD = 0.78; Rank 2), indicating more moderate perceptions regarding productivity improvement and long-term productivity benefits.

##### 4.4.1 Perceived Downtime Reduction (PD) Items

Item-level results for PD are presented to identify which downtime-related outcomes respondents perceived most strongly and which items were relatively weaker. Items were ranked primarily by mean scores, with standard deviation used to break ties where means were equal.

Table 8. PD item-level

Item	Mean	SD	Rank
PD1	4.03	0.81	1
PD2	3.97	0.85	5
PD3	4.00	0.91	4
PD4	4.03	0.85	2
PD5	4.00	0.87	3

Table 8 summarizes the PD item-level descriptive statistics. All PD items were rated relatively high (means approximately 4.0), reflecting generally favorable perceptions of downtime-related outcomes. PD1 ranked first (Mean = 4.03, SD = 0.81), indicating stronger agreement that safety measures minimize unplanned downtime. PD4 ranked second (Mean = 4.03, SD = 0.85), suggesting positive perceptions that maintenance schedules align with safety checks. PD5 and PD3 followed closely (Means = 4.00), while PD2 ranked lowest (Mean = 3.97, SD = 0.85), indicating slightly weaker agreement that incidents rarely disrupt production schedules, although the score remains above the midpoint.

#### 4.4.2 Perceived Productivity (PI) Items

This subsection reports item-level descriptive statistics for PI to examine perceptions of productivity improvement and stability associated with safe working conditions, workflow efficiency, and training. As with PD, items were ranked by mean values, and standard deviation was used to break ties.

Table 9. PI item-level

Item	Mean	SD	Rank
PI1	4.00	0.83	3
PI2	4.07	0.69	1
PI3	4.03	0.89	2
PI4	3.47	1.01	4
PI5	3.43	1.22	5

Table 9 presents the PI item-level results and shows greater variation compared with PD. The highest-rated item was PI2 (Mean = 4.07, SD = 0.69; Rank 1), indicating strong agreement that fewer accidents contribute to higher productivity. PI3 ranked second (Mean = 4.03, SD = 0.89), suggesting respondents generally agreed that employees work more confidently due to safe conditions. PI1 also scored positively (Mean = 4.00; Rank 3), reflecting agreement that safety practices enhance workflow efficiency. In contrast, PI4 (Mean = 3.47, SD = 1.01; Rank 4) and PI5 (Mean = 3.43, SD = 1.22; Rank 5) were notably lower and more variable, indicating mixed perceptions regarding whether training improves both safety and output and

whether safety investments yield long-term productivity gains.

#### *4.5 Summaries of Operational Efficiency (OE)*

Overall, respondents expressed generally positive perceptions of operational efficiency outcomes, with the overall OE mean approaching 4.0. Across the two OE dimensions, perceptions were stronger and more consistent for perceived downtime reduction (PD) than for perceived productivity improvement/stability (PI). This suggests that respondents more readily associated current conditions with operational continuity and reduced interruptions than with sustained productivity gains.

Within the PI dimension, several items received relatively high ratings (PI2–PI3), indicating agreement on certain short- to medium-term productivity-related outcomes. However, the comparatively lower and more variable scores for PI4 and PI5 point to less consistent perceptions regarding the linkage between training and output, as well as the realisation of longer-term productivity returns. Taken together, these descriptive findings provide a useful baseline for benchmarking perceived efficiency outcomes and for identifying specific areas where further organisational attention or clarification may be warranted.

Importantly, these results reflect perceptions reported by a small pilot sample of safety-domain employees. They should therefore be interpreted as a descriptive profile of perceived outcomes for internal benchmarking and prioritisation, rather than as evidence of operational impact or cause-and-effect relationships between safety measures and objective efficiency performance.

#### *4.6 In the Context of ADNOC*

ADNOC operates in a high-hazard, asset-intensive environment where operational continuity is a strategic priority. In this context, the descriptive results show a broadly consistent pattern between how safety-domain employees perceive safety measures and how they perceive operational efficiency outcomes. ADNOC's emphasis on health, safety, and well-being as a component of organisational performance provides a relevant foundation for interpreting these workforce-level perceptions (ADNOC Distribution, 2024). Overall, respondents reported favourable perceptions across the four safety-measure dimensions (AST, CWS, ER, and PPE), with mean scores close to 4.0, suggesting that key controls are visible and generally supported in day-to-day operations. This pattern is consistent with the logic of formal safety management systems, which structure risk control through systematic requirements and practices (ISO, 2018; HSE, 2025), and with the hierarchy-of-controls principle, which emphasises layered controls spanning engineering, administrative measures, and PPE to reduce risk and support stable execution (CDC/NIOSH, 2024; OSHA, 2023). In parallel, perceived operational efficiency outcomes were also positive, particularly in relation to downtime reduction, aligning with industry perspectives that link process safety management and performance indicators to operational stability and continuity (IOGP, 2023).

At the dimension level, Advanced Safety Technology (AST) and PPE received the strongest ratings, while perceived downtime reduction (PD) emerged as the most strongly endorsed efficiency outcome. Within the ADNOC setting, this alignment is meaningful because robust

barriers, disciplined controls, and consistent protective practices are widely recognised as mechanisms that help prevent disruptions and support reliable operations in complex systems (Reason, 1997; Weick & Sutcliffe, 2015). Item-level patterns further reinforce this descriptive connection. Highly rated safety items, such as technology reducing human error, reporting and correcting non-compliance, well-prepared emergency response capability, and consistent PPE use, co-occur with strong ratings on downtime-related outcomes, including minimising unplanned downtime and aligning maintenance activity with safety checks. Emergency preparedness is also central in hazardous operations, as it supports resilience and recovery during abnormal or escalating events (IOGP, 2024; NFPA, 2025). More broadly, using employee perceptions to benchmark safety-related practices is well established in safety climate research as a practical means of understanding how safety is experienced and enacted at the workforce level (Zohar, 1980; Griffin & Neal, 2000; Neal et al., 2000; Zohar, 2010).

At the same time, the descriptive profile indicates areas where perceptions were comparatively weaker or more variable. Within safety measures, lower ratings on strict adherence to protocols and evacuation knowledge may reflect uneven experiences across worksites, shift patterns, or levels of exposure to drills. For operational efficiency, the lowest-rated items related to whether training translates into output improvement and whether safety investments deliver long-term productivity gains. This suggests that respondents more readily associate safety with immediate continuity outcomes, particularly downtime reduction, than with broader and longer-term productivity benefits. In a descriptive pilot study, such differences are best interpreted as prioritisation signals for review and improvement planning rather than as evidence of cause-and-effect relationships. Consistent with guidance on pilot studies, the present results should therefore be treated as an initial baseline useful for assessing feasibility and refining measurement before broader deployment (van Teijlingen & Hundley, 2001; Hertzog, 2008). Where internal consistency is reported, it should be interpreted using established guidance for reliability metrics such as Cronbach's alpha (Cronbach, 1951).

Finally, it is important to emphasise the interpretive boundaries of the evidence. The findings represent employees' perceptions of safety measures and perceived operational efficiency outcomes. Although safety and operational continuity are conceptually linked in high-hazard environments, this study does not include objective operational performance indicators (e.g., downtime records or production KPIs) and does not test causal relationships. Accordingly, the observed alignment between stronger perceived safety measures and stronger perceived efficiency outcomes should be understood as perceptual co-occurrence within a small pilot sample, not as evidence that safety measures produce measurable operational gains.

## **5. Conclusion**

This paper provides a descriptive baseline of how employees in ADNOC (UAE) perceive safety measures and perceived operational efficiency outcomes. Overall, respondents reported favourable perceptions across the four safety-measure dimensions which are Advanced Safety Technology, Compliance with Safety, Emergency Response, and PPE, suggesting that key controls are visible and generally supported in daily operations. Reliability testing indicated

strong internal consistency for all constructs and for the overall scales, supporting the suitability of the questionnaire for descriptive profiling in this setting. In terms of operational efficiency, perceptions were positive overall, with downtime reduction rated slightly higher than productivity improvement/stability. Item-level patterns highlight practical strengths (well-rated technology, PPE use, and response-team capability) alongside areas where perceptions were relatively weaker or more variable (evacuation knowledge and the perceived long-term productivity returns of safety investments). As a descriptive study, these findings should be interpreted as benchmarking signals rather than causal evidence; however, they offer actionable insight for prioritising review and improvement attention and for guiding future, larger-sample studies that can test relationships using inferential methods.

Because the data are cross-sectional and perception-based, the findings should not be interpreted as demonstrating operational effects; future studies should triangulate survey perceptions with objective performance indicators and broader sampling across roles and sites.

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