PORT CALL OPTIMIZATION
THROUGH DATA QUALITY

A practical study with good practices, lessons learned and recommendations for implementation

In collaboration with:

dcsa • TIC 4.0 • IPCSA International Port Community Systems Association

CONTENTS

1

INTRODUCTION

The implementation of Guidelines on Harmonized Communication and Electronic Exchange of Operational Data for Port Calls presents several challenges for ports worldwide. Recognizing the value of shared global experiences, the International Association of Ports and Harbors, in collaboration with chainPORT, the Digital Container Shipping Association (DCSA), the Terminal Industry Committee 4.0 (TIC4.0), and the International Port Community Systems Association (IPCSA), formed a supply chain resilience task force in 2023.

This task force is a part of the Initiative *Supply Chain Resilience in Ports* and aims to enhance resilience in Just-in-Time (JIT) Port Calls by improving data quality. Its efforts will complement existing IMO FAL guidelines and the GIA Just-in-Time Arrival Guide.

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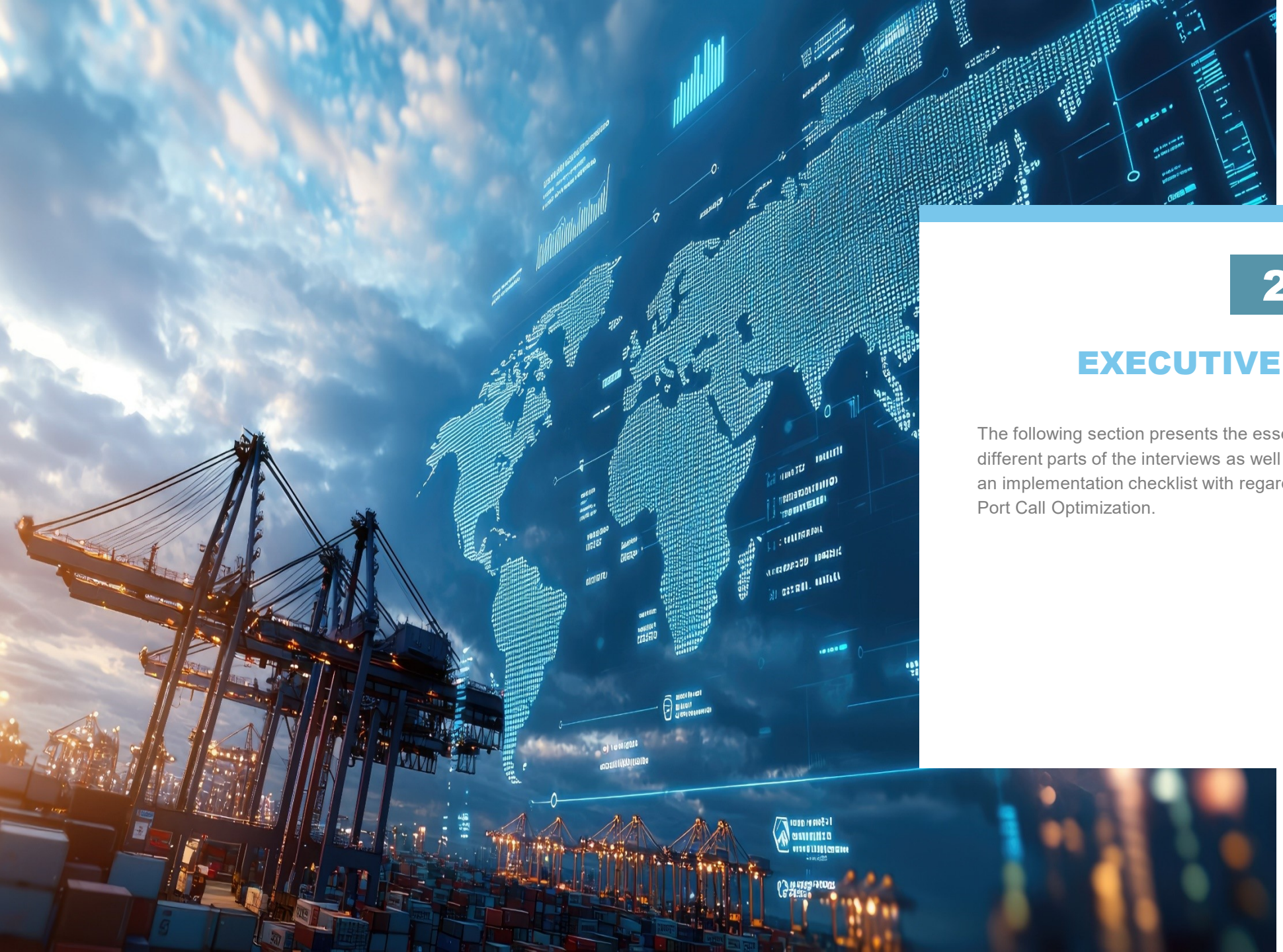

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EXECUTIVE SUMMARY

The following section presents the essential findings obtained from the different parts of the interviews as well as the key findings summarized in an implementation checklist with regard to data quality in the context of Port Call Optimization.

EXECUTIVE SUMMARY

Topics of the study[1)]

A General Knowledge of Guidelines/Requirements

Part A emphasizes the adoption of guidelines from international bodies such as IMO, DCSA, and ITPCO, as they encapsulate best practices and foster coordination and standardization across ports and stakeholders.

B Level of Implementation

Part B highlights that ports are at various implementation stages, mainly between the demonstration and live operation phase, and that pilot projects are critical for testing systems and demonstrating benefits.

C Non-Data-related Aspects

Part C stresses the need for stakeholder cooperation through clear communication and agreed processes. Additionally, it highlights the importance of managing organizational changes and establishing data governance to address legal constraints.

D Data-related Aspects

Part D stresses that real-time data access and accuracy through timely updates is critical for the JIT Port Call Process. It also underscores challenges in integrating and synchronizing data, while highlighting the importance of maintaining high data quality.

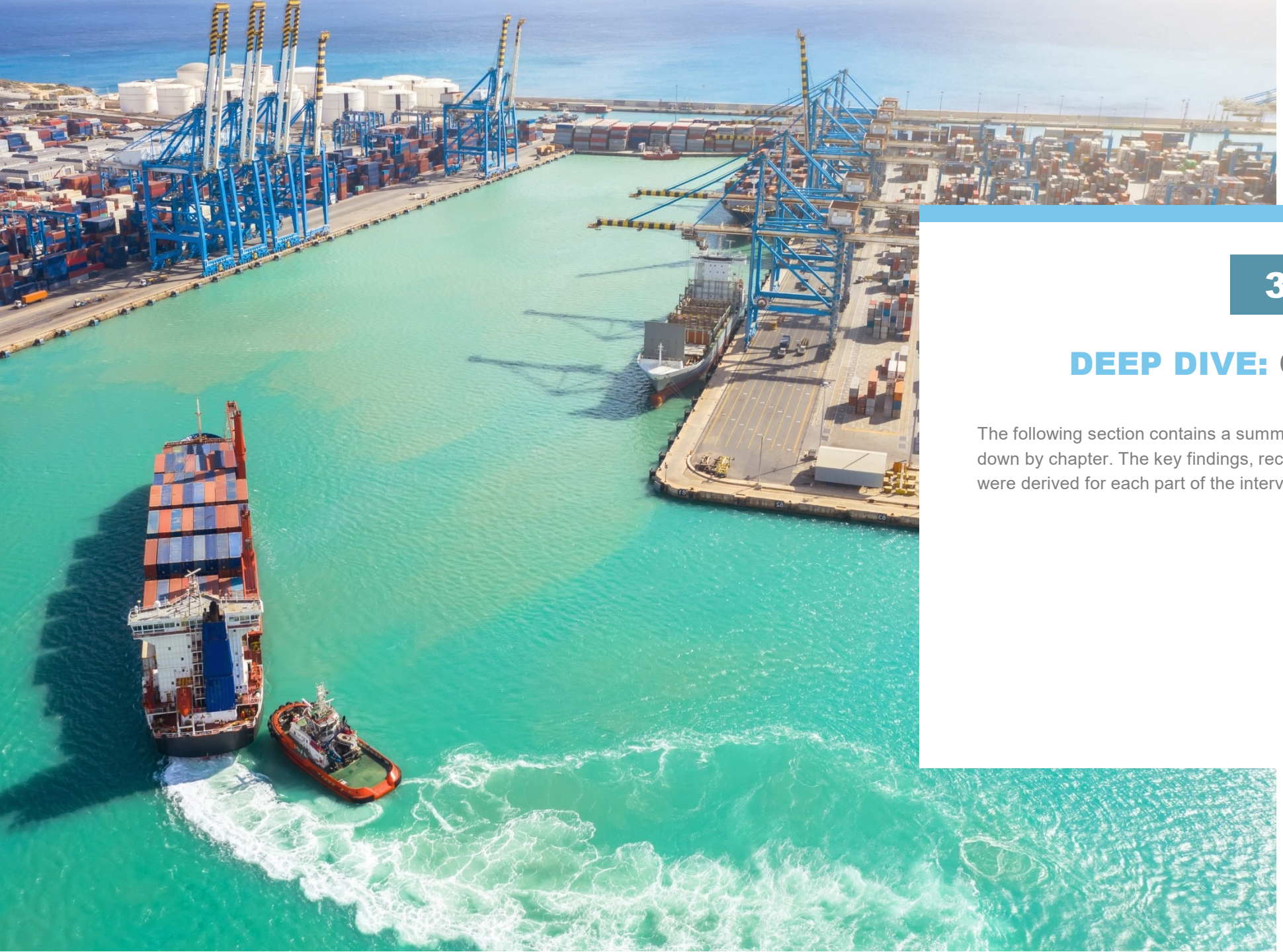
E Project Performance and Key Performance Indicators (KPIs)

Part E highlights the need to set KPIs for evaluating implementations (with vs. Without JIT practices), focusing on metrics, for example, time deviations and quality of cargo flow. It emphasizes continuous feedback and iterative improvements, and underscores the value of pilot projects to refine processes before scaling up.

F Plans for Further Implementation

Part F outlines plans for a step-by-step inclusion of stakeholders (starting with shipping lines and terminal alignment and then port, PCS operators, etc.) and further elements to enhance Port Call Optimization. It stresses the importance of international standards and highlights the need for future pilot projects to drive ongoing improvements.

1) This study was conducted in a series of eight qualitative in-depth interviews.



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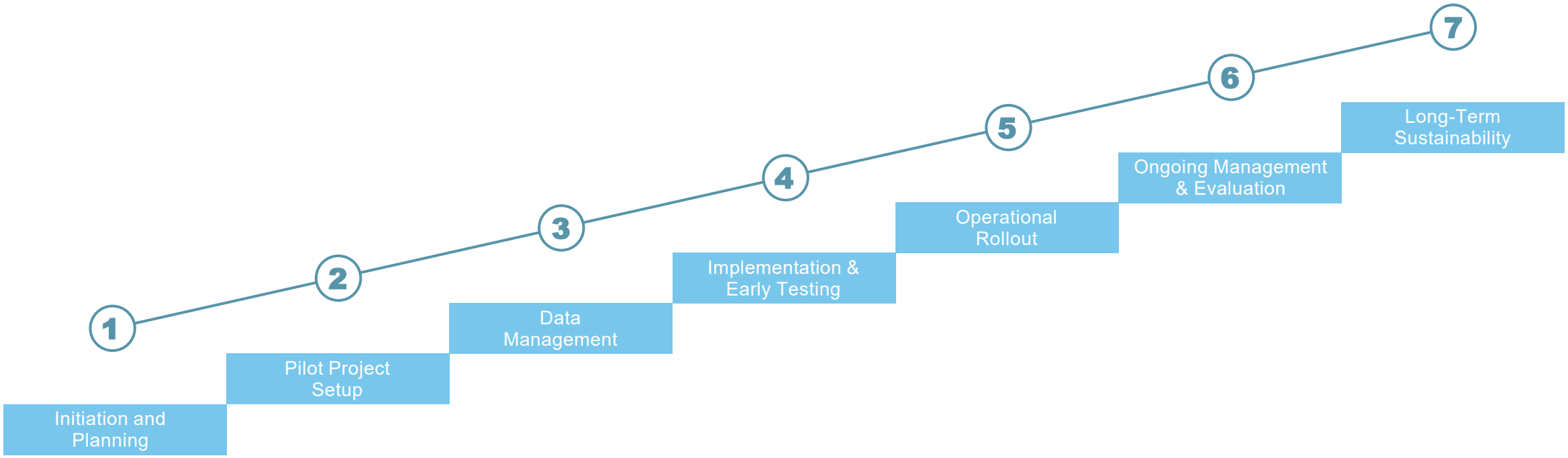
DEEP DIVE: CHECKLIST

The following section contains a summary of all interview results broken down by chapter. The key findings, recommendations and best practices were derived for each part of the interview.

DEEP DIVE: CHECKLIST

Port Call Optimization Implementation Checklist with regard to Data Quality

The following steps for an implementation checklist were derived from the results of the interviews.
The following page describes the individual steps in more detail.



DEEP DIVE: CHECKLIST

Checklist steps in detail:

The following steps for successful implementation were derived to share experiences and lessons learned by ports already implementing PCO.

1 Initiation and Planning

Adopt Guidelines:
Reference international standards and guidelines such as those from IMO, DCSA, ITPCO, S-211, and IHO.

Initial Planning Document:
Create a local joint study or report addressing key questions such as reducing idle times at berths and improving capacity usage as well as defining how to measure these indicators.

Stakeholder Engagement:
Identify and engage all relevant stakeholders, including port authorities, terminal operators, shipping lines, and service providers.

2 Pilot Project Setup

Funding and Budgeting:
Secure funding and resources for the pilot project. Ensure clarity on who is financing the pilot and plan the budget accordingly.

Technical Development:
Work with technical partners and developers to design and implement the necessary IT infrastructure and platforms for data collection, processing and presentation.

Memorandum of Understanding (MoU):
Establish MoUs and technical governance agreements with all involved parties to ensure commitment and clarity on roles and data collaboration.

3 Data Management

Real-Time Data Collection:
Identify relevant sources of data (real-time, asynchron) and systems, if legacy exists. Design To-Be System architecture to consolidate the data stream for the process. Use technologies like electronic navigational charts (ENC) and automated data exchange systems.

Data Quality Control:
Ensure the accuracy, reliability, and trustworthiness of collected data. Use standard identifiers and synchronize timestamps across systems.

Frequent Updates:
Ensure frequent and accurate updates of operational data. Address issues where systems are not used for real-time updates and data entry, like ensuring that the tugboats send data in real-time rather than only when they return to base.

4 Implementation & Early Testing

Pilot Implementation
Conduct pilot projects with willing stakeholders to test the Port Call Optimization system in a controlled environment with defined scope and a small numbers of stakeholder like starting with 1 Terminal.

Iterative Testing and Feedback:
Gain experience through trials with various vessels and scenarios (i.e. different wetter conditions, traffic volumes (peak and non-peak time), system interruption, etc.). Learn from each trial and continuously improve the system.

Data Validation and Verification:
Regularly validate and verify data to ensure it meets required standards. Use ISO standards and other validation methods.

5 Operational Rollout

Expand Stakeholder Involvement:
Gradually include further terminals, stakeholders and port call elements like other relevant timestamps or Information for the process. Ensure all parties have a clear and common understanding and agreement on the process.

Implementation Phases:
Implement changes incrementally, starting with nautical data and then moving to operational data involving terminal operations and services.

Technology Utilization:
Consistently use technology for data collection, integration, and synchronization. Address any integration challenges between different systems.

6 Ongoing Management & Evaluation

Performance Measurement:
Set up KPIs to measure the success and efficiency of the Port Call Optimization system. Regularly assess performance.

Continuous Improvement:
Encourage regular feedback and continue to make improvements based on new findings and challenges. Address gaps like inconsistency of timestamps and different interval of data synchronization in different systems.

Maintain Data Governance:
Keep data governance policies up-to-date and ensure ongoing alignment with international standards.

7 Long-Term Sustainability

International Standardization:
Work and feedback towards maintaining international standards to minimize local discrepancies and ensure consistency across ports globally.

Stakeholder Commitment:
Foster ongoing commitment from all stakeholders to ensure the long-term sustainability of the optimized port call system.

Infrastructure and Resource Management:
Regularly review and optimize the required infrastructure and resources to support sustained operations.

DEEP DIVE: CHECKLIST

Additional Sub-Elements from Standards and Guidelines:

The steps from the practical experience of ports that are already in the process of implementation can be supplemented with additional elements through input from various standards and guidelines mentioned in the course of the interviews.

1	2	3	4	5	6	7
Initiation and Planning	Pilot Project Setup	Data Management	Implementation & Early Testing	Operational Rollout	Ongoing Management & Evaluation	Long-Term Sustainability
▪ **Adopt Guidelines** ▪ **Initial Planning Document** ▪ **Stakeholder Engagement**	▪ **Funding and Budgeting** ▪ **Technical Development** ▪ **Memorandum of Understanding (MoU)**	▪ **Real-Time Data Collection** ▪ **Data Quality Control** ▪ **Frequent Updates**	▪ **Pilot Implementation** ▪ **Iterative Testing and Feedback** ▪ **Data Validation and Verification**	▪ **Expand Stakeholder Involvement** ▪ **Implementation Phases** ▪ **Technology Utilization**	▪ **Performance Measurement** ▪ **Continuous Improvement** ▪ **Maintain Data Governance**	▪ **International Standardization** ▪ **Stakeholder Commitment** ▪ **Infrastructure and Resource Management**
Standards for Timestamps and Geo References: Implement standards for timestamps and geo references to ensure consistency and accuracy in data collection and reporting (IMO – FAL.5-Circ.52).	**Port Call Process Mapping:** Adopt a standardized port call process mapping, which includes detailed steps for berth arrival planning, services planning, pilot boarding place arrival planning, and start cargo operations (i.e. DCSA – JIT Port Calls 1.2 Data Definitions, IMO FAL.5-Circ 52, GIA/IMO – JIT Arrival Guide, etc.).	**Data Element Definitions:** Use standardized data element definitions based on the IMO Compendium and other relevant specifications to ensure uniformity in data exchange (IMO – FAL.5-Circ.52).	**Facilitate Simultaneous Operations (SimOps):** Enable simultaneous operations in ports to optimize port stays and improve efficiency (IMO – Ship Port Interface Guide).	**Pre-Clearance Optimization:** Optimize port stays by implementing pre-clearance procedures to reduce waiting times and improve scheduling (IMO – Ship Port Interface Guide).	**Data Ownership and Collaboration:** Clearly define data ownership and collaboration responsibilities to ensure accountability and transparency in data management (ITPCO – Port Information Manual).	**Electronic Data Exchange Systems:** Implement electronic data exchange systems to facilitate seamless information flow across different stakeholders and systems (IMO – Ship Port Interface Guide). **Standardization Bodies:** Engage with robust standardization bodies to maintain and update standards, ensuring they are non-commercial, financially sustainable, and trusted by the industry (ITPCO – Port Information Manual).

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ADDITIONAL BEST PRACTICES & RECOMMENDATIONS

The following section contains best practices and recommendations that go beyond the topics mentioned by the interview participants. They were identified as part of a gap analysis and clustered in relation to data quality in Port Call Optimization.

ADDITIONAL BEST PRACTICES & RECOMMENDATIONS

In addition to the results of the interviews, the following recommendations and best practices were derived from the guidelines and standards named by the participants as part of a gap analysis[1].

Data Collaboration and Standardization

Promote Publication of Port Master Data in a Digital Format:
Encourage the publication of Port Master Data in a standardized digital format to ensure accessibility and up- to-date information for all nautical staff on board. This can help eliminate unnecessary buffers in Under Keel Clearance (UKC).

Develop Incentives for Data Collaboration[2]:
Create incentives for ports and terminals to collaborate through data regularly and increase awareness of international compliance with standards like IHO S-44. This can improve the compatibility of Chart Datum and the usability of surveys in official ENCs or paper charts.

Mandate Data Collaboration for Public Interests:
Mandate data Collaboration based on public interests such as nautical safety and environmental protection. This can ensure that critical information is available to all relevant parties.

Digital Platforms and Systems

Implement a Single Window Environment:
Focus on developing a Single Window Environment for maritime transport to reduce administrative burdens and harmonize trade facilitation mechanisms. This involves using specified data sets and harmonized data elements to avoid duplication and allow data reuse across transport modalities.

Develop Digital Platforms for Port Planning Information:
Digital platforms should be connected through the implementation of common interfaces to ensure global interoperability. This can facilitate better coordination and planning among stakeholders.

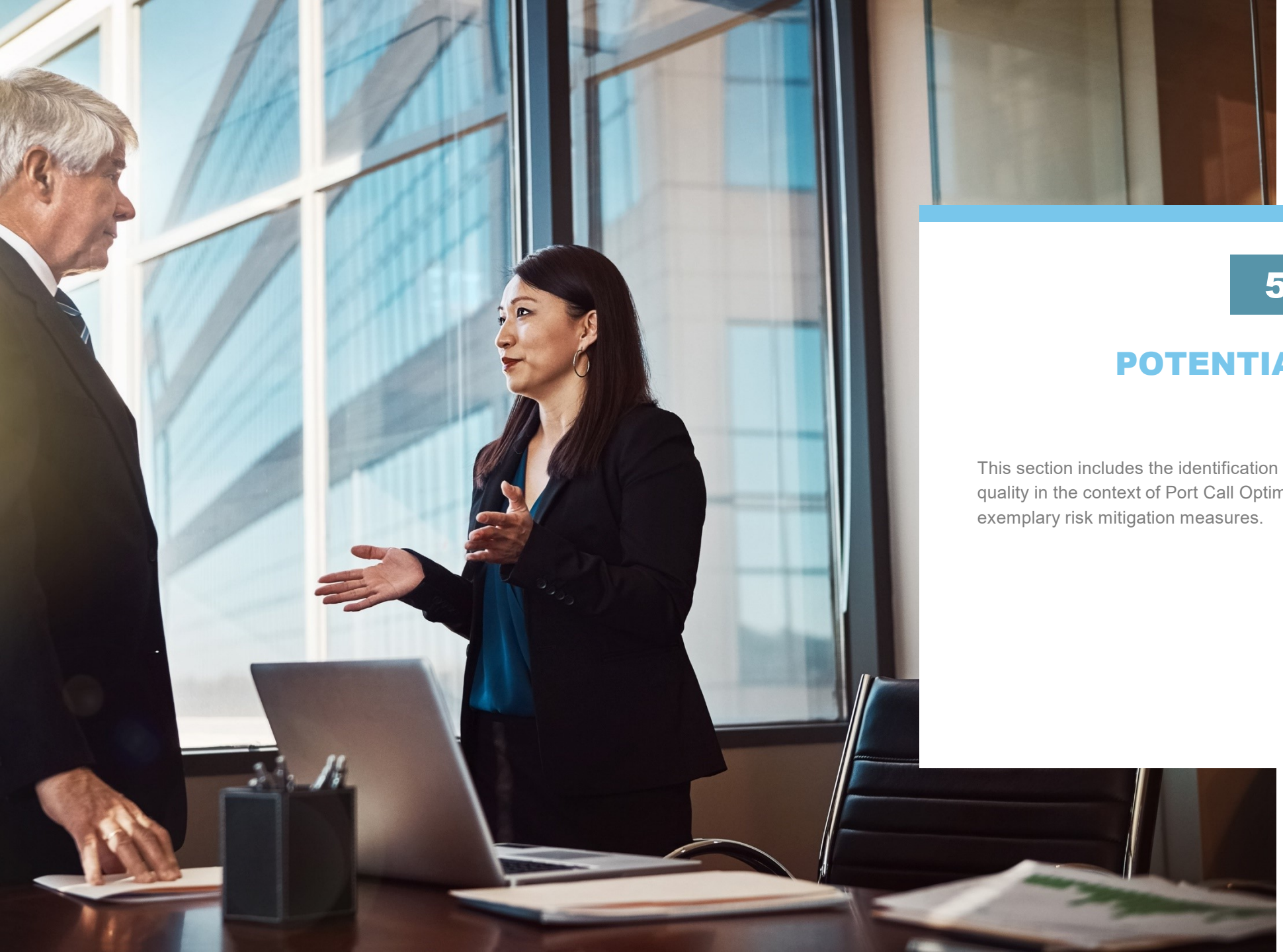
Use Port Community Systems (PCS) and/or Maritime Single Window (MSW):
Utilize PCS / MSW to facilitate the exchange of operational data between ship managers and port information management systems provided by port authorities or PCS / MSW Operators. This can streamline communication and improve coordination among stakeholders.

Data Quality and Timestamp Management

Adopt JIT Timestamp Interface Standard Documentation provided by established organizations like IMO, DCSA, IPCSA:
Implement JIT Timestamp Interface Standards to outline the relevant data attributes of each timestamp and explain, in a technology-agnostic manner, how (and in what sequence) timestamps should be reported. This ensures consistency and accuracy in reporting.

Develop a Logical Information Exchange Diagram:
Implement guidelines that define a logical information exchange diagram to support different types and sizes of ships and ports. This ensures flexibility and adaptability to various local processes and circumstances.

1) Based on following documents: DCSA - JIT Port call Data definitions1.2; IMO - FAL.5-Circ.52; GIA/IMO - JIT Arrival Guide; GIA/IMO - Ship- Port Interface Guide; ITPCO/IHMA/IAPH - Port Information Manual 3.01
2) More information on Data Collaboration, see: https://www.weforum.org/agenda/preview/e7f3b292-5be4-4dfc-9162-119a11898653/



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POTENTIAL RISKS

This section includes the identification of potential risks in relation to data quality in the context of Port Call Optimization implementation as well as exemplary risk mitigation measures.

POTENTIAL RISKS

Possible Data Quality Risks with PCO Implementation (1 of 2)

The following risks and risk areas were derived from the participants' responses.

Data Integration Issues

Potential issues arise from the lack of unique identifiers, leading to tracking difficulties and operational inefficiencies

Data Accuracy and Update Frequency

Possibility of inaccurate updates and operational inefficiencies due to non- digital methods and delayed real-time data

Data Validation and Reliability

Possible integration challenges and synchronization errors from non-standard identifiers and technical integration efforts

Identification and Tracking

Challenges may arise from stakeholder misalignment and the need for clear legal agreements for responsible data collaboration

Stakeholder Communication and Legal Risks

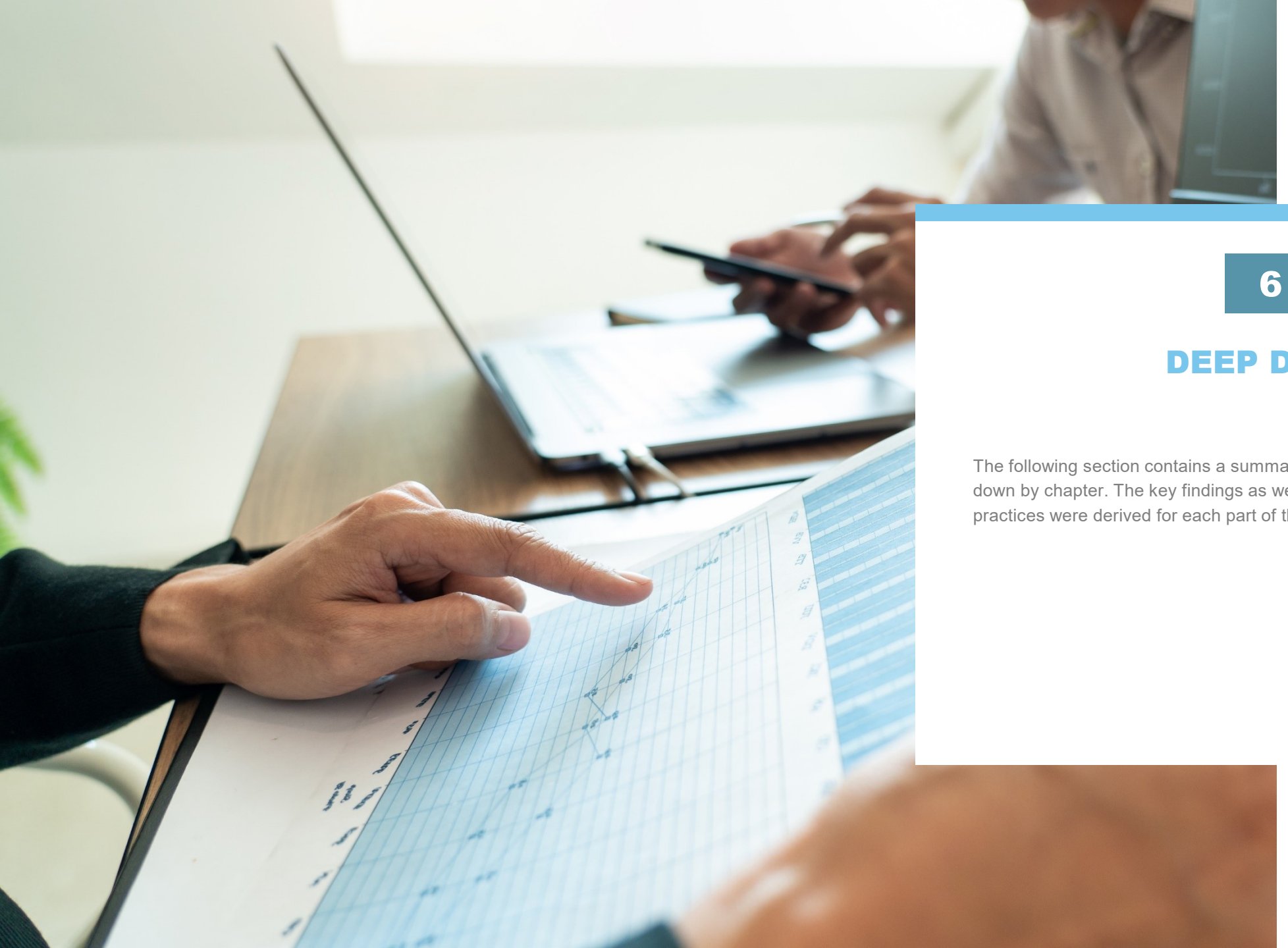
Risks could arise due to problems with data validation and the reliability of non-standardized systems which causes issues in stakeholder communication

POTENTIAL RISKS

Possible Data Quality Risks with PCO Implementation (2 of 2)

The following risk areas were identified from the interviews in connection with data quality and the optimization of port calls. Possible risk mitigation measures are assigned to the risk areas as follows

	Data Integration Issues	Data Accuracy and Update Frequency	Data Validation and Reliability	Identification and Tracking	Stakeholder Communication and Legal Risks
Risk description	**Non-Standard Identifiers and Definitions:** Systems not using standard identifiers and match (e.g., timestamps, location data) can lead to integration challenges and potential data synchronization errors. **Technical Integration Problems:** Participants noted difficulties in integrating systems that do not align perfectly, requiring additional effort to ensure data flows correctly and updates are synchronized.	**Inaccurate Updates:** Challenges arise when either the accuracy of data updates is compromised, or updates are not provided frequently enough. This includes situations where non-digital methods are used, leading to outdated or incorrect data. **Real-Time Data Availability:** Ensuring that real-time data is consistently available and reliable is crucial, as any delays or lack of synchronization in updates can lead to operational inefficiencies and misinformed decisions.	**Data Validation Challenges:** Standardization and the validation of data across different systems pose significant challenges, especially when integrating with systems that do not adhere to common standards. **Reliability Concerns:** The overall reliability of data can be questioned if there are frequent mismatches or delays in updates. Stakeholders need to trust the data and its sources for effective optimization.	**Lack of Unique Identifiers:** Not having a common unique identifier for operations makes tracking port calls difficult, leading to potential data mismatches and operational inefficiencies.	**Stakeholder Alignment:** Aligning different stakeholders, who may have varying interpretations of key operational terms and inconsistent practices, can lead to communication breakdowns and inefficiencies. **Legal Constraints:** The need for clear memorandums of understanding (MoUs) and data governance agreements to manage data Collaboration responsibly and comply with legal standards.
Exemplary risk mitigation measures	**Standardization and Guidelines:** Rigorously adopt international standards and guidelines to reduce discrepancies and ensure consistency in data handling. **Incremental Integration:** Start with smaller, manageable scopes for data integration and gradually expand based on feedback and proven success.	**Frequent Data Updates:** Implement systems that ensure frequent and accurate data updates to maintain data reliability and trustworthiness.	**Robust Data Validation:** Establish and enforce robust data validation methodologies to verify the accuracy and reliability of incoming data.	**Use of Unique Identifiers:** Implement unique identifiers for operations to streamline tracking and integration across different systems.	**Stakeholder Engagement and Communication:** Foster transparent and continuous communication among stakeholders to ensure alignment and cooperation. **Legal and Contractual Clarity:** Develop clear legal agreements and data governance policies to manage data collaboration securely and legally.



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DEEP DIVES

The following section contains a summary of all interview results broken down by chapter. The key findings as well as recommendations and best practices were derived for each part of the interview.

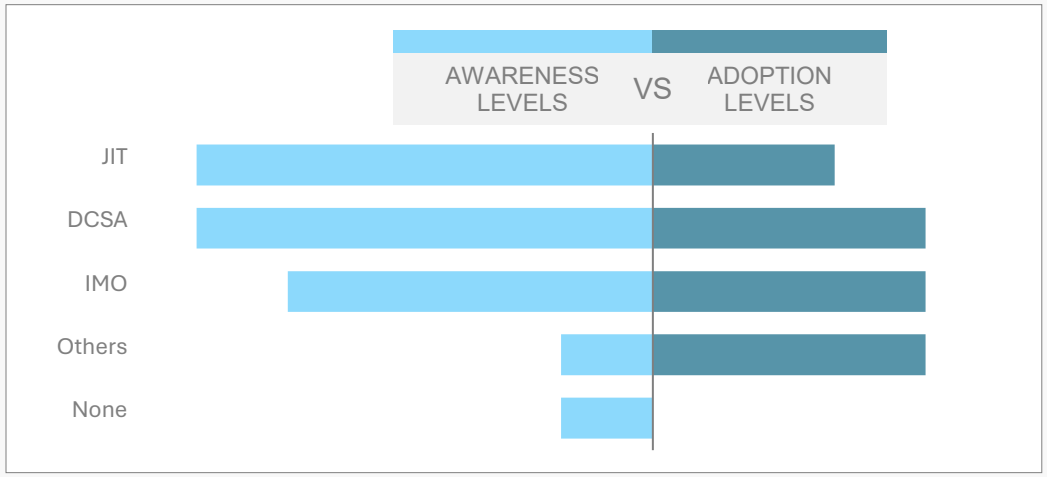
DEEP DIVES

Details from Part A: Awareness of Documents and Guidelines on PCO

The interviews revealed a high level of awareness of the standards and guidelines and showed a broad acceptance of these. In particular, the respondents emphasized the use of established guidelines.

AWARENESS OF GUIDELINES AND STANDARDS

More than half of all ports interviewed are familiar with JIT and DCSA, half with IMO. Only a few other familiar documents were mentioned, such as guidelines from ITPCO (Port Information Manual) and IHO (S-100), which were included in the "Others" category.



ESSENTIAL OUTCOMES

Adoption of Guidelines:
Participants highlighted the use of established guidelines from international organizations such as IMO, DCSA, and ITPCO to provide a common framework for implementation.

Understanding Guidelines:
Emphasis was placed on the importance of familiarizing all stakeholders with these guidelines to ensure coordinated efforts.

Human Capital:
Acknowledgement of the need for sufficient and well-trained human resources to implement and maintain Port Call Optimization systems effectively.

BEST PRACTICES AND RECOMMENDATIONS

Start with Clear Guidelines and Standards:
Utilize existing guidelines and standards from international bodies such as IMO, DCSA, and ITPCO. Reference specific guidelines and standards like S-211 and IHO.

Secure Funding and Resources:
Ensure sufficient funds and resources are allocated for digital solutions and pilot projects. The human capital involved should be well-trained and capable of ensuring the project's success.

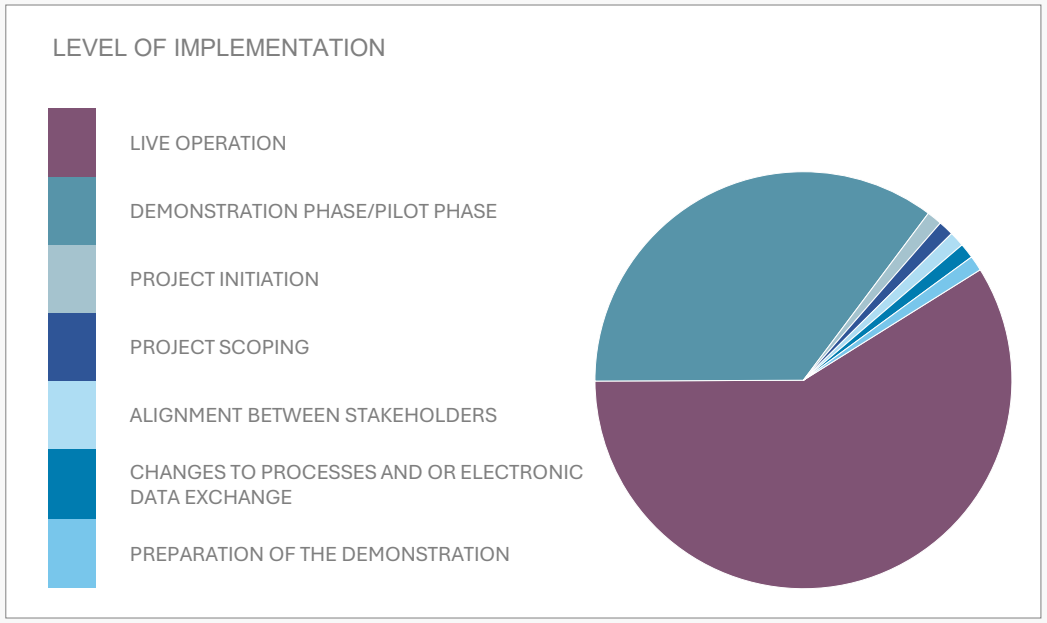
DEEP DIVES

Details from Part B: Level of Implementation

The mixed implementation status shows operational effectiveness and areas for further improvement, focusing on pilot testing and stakeholder consultation.

CURRENT STATUS ON IMPLEMENTATION

The Implementation Status is predominantly in the live operation phase, with the majority of components actively operational. However, some aspects are still undergoing pilot testing and demonstrations. This mixed status suggests that while the core elements of the PCO are functional and in use, a few remaining components require additional refinement and stakeholder alignment to transition fully into live operation.



ESSENTIAL OUTCOMES

Stages of Implementation:
Ports are at different stages of implementing Port Call Optimization, but mostly in between ‘Demonstration phase/pilot phase’ to ‘Live operation’.

Pilot Projects:
Conducting pilot projects is a critical first step. Currently these pilots help test systems in a controlled environment and demonstrate benefits.

Funding and Support:
The need for securing adequate funds and support from other stakeholders (such as IT departments) is essential for successful implementation.

BEST PRACTICES AND RECOMMENDATIONS

Pilot Projects:
Conduct pilot projects with willing participants to test guidelines and standards in the systems and demonstrate benefits. Use real implementation rather than just testing in controlled environments. Start with small scopes and gradually expand to involve more stakeholders.

Leverage Technology and Digital Solutions:
Invest in digital platforms, APIs, and technologies such as electronic navigational charts (ENC) and automated data exchange systems. Ensure that the IT department is fully engaged and supportive.

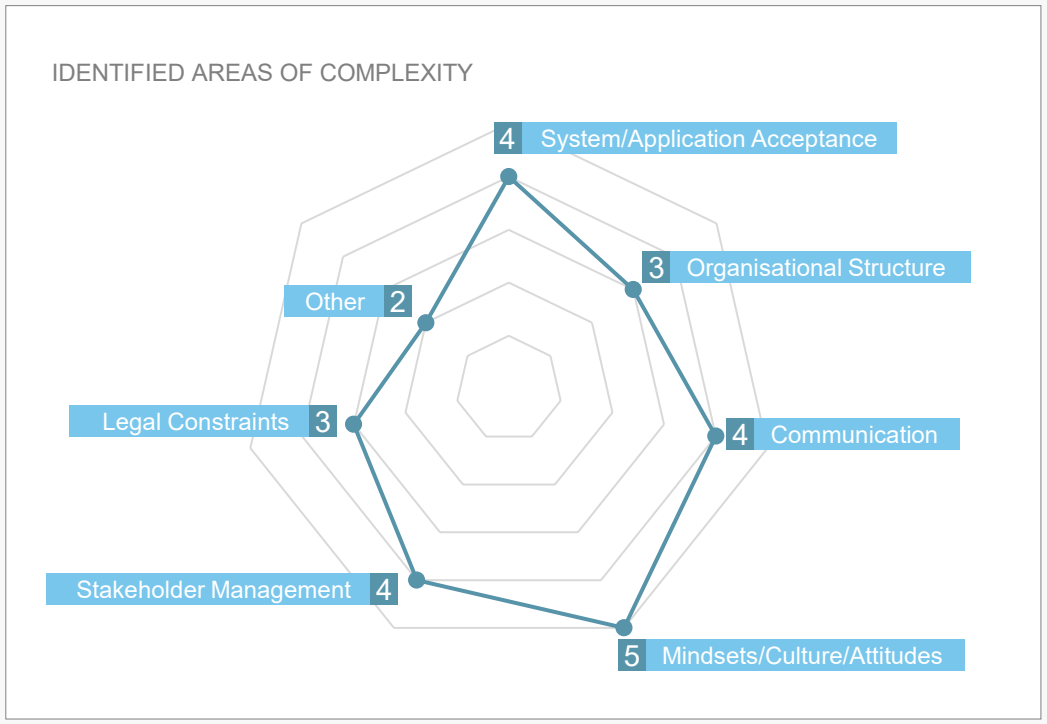
DEEP DIVES

Details from Part C: Non-Data-related Aspects

Identified challenges emphasized robust stakeholder management and the importance of addressing organizational and cultural shifts, with respondents highlighting the need for clear processes and legal frameworks.

IDENTIFIED CHALLENGES

Ports faced significant challenges such as convincing stakeholders to adopt new systems and standardized processes, modifying organizational roles, and ensuring clear communication. Additionally, overcoming cultural resistance, aligning stakeholders' interests, and navigating legal constraints posed substantial hurdles.



ESSENTIAL OUTCOMES

Stakeholder Management:
Building trust and fostering cooperation among diverse stakeholders is vital. It involves clear communication and agreement on definitions and processes.

Organizational and Cultural Changes:
Addressing changes in roles, structures, and organizational mindsets. Managing resistance to these changes is crucial for implementation.

Legal and Governance Issues:
Navigating legal constraints and establishing clear data governance agreements to manage data collaboration responsibly.

BEST PRACTICES AND RECOMMENDATIONS

Stakeholder Involvement and Coordination:
Engage multiple stakeholders early, including port authorities, terminal operators, shipping lines, and service providers like pilots and tugboats. Foster clear communication and ensure all parties understand and agree on definitions and processes.

Address Organizational and Cultural Changes:
Anticipate and manage changes in organizational structures, roles, and processes. Address cultural and mindset changes to ensure acceptance of new systems and processes.

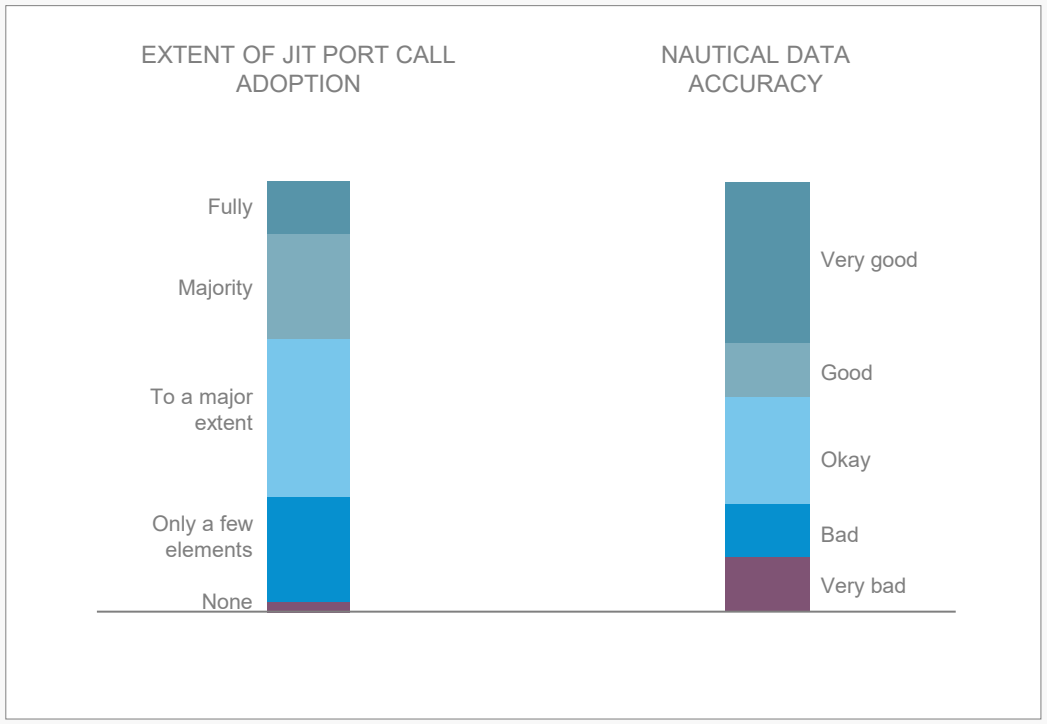
DEEP DIVES

Details from Part D: Data-related Aspects

The analysis indicated a significant commitment to enhancing data accuracy and integration. Respondents highlighted the critical need for real-time data access and emphasized efforts towards standardizing and harmonizing data definitions.

EXTENT OF ADOPTION AND NAUTICAL DATA ACCURACY

The main issues affecting accuracy include human factors in updating estimates and discrepancies between systems. There are also challenges in achieving real-time data transmission, particularly from tugboat services using outdated technology. Efforts are underway to improve data accuracy through system modernization and better data integration.



ESSENTIAL OUTCOMES

Real-Time Data Access:
Ensuring the availability and accuracy of real-time data is critical. This includes implementing technologies that provide timely updates and minimize delays.

Data Integration and Standardization:
Integrating systems with non-standard identifiers and ensuring synchronization of data is challenging but necessary for consistency.

Data Quality:
Ensuring data accuracy, reliability, and frequent updates is a persistent challenge. Reliable data forms the backbone of effective Port Call Optimization.

BEST PRACTICES AND RECOMMENDATIONS

Manage Data Quality and Accuracy:
Focus on the accuracy and reliability of real-time data. Implement and synchronize key timestamps like ETA Berth, ATA Berth, and RTD Berth (Ref: IMO Compendium on Facilitation and Electronic Business) to improve operational efficiency. Address data-related challenges proactively.

Standardize and Harmonize Definitions:
Work towards internationally standardized definitions but be prepared to adapt these to local challenges and conditions. Ensure all stakeholders agree on definitions to avoid conflicts and misunderstandings.

DEEP DIVES

Details from Part D: Data Quality Principles

These findings reflect the participants' experiences and views on the key data quality principles critical for effective Port Call Optimization

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PARTICIPANTS' EXPERIENCES AND VIEWS

ACCURACY

High Accuracy within Systems:
Participants indicated that the accuracy of system data, particularly for pilots and port controllers, is currently high.

Improvement through Machine Learning:
There's an indication that accuracy can be further improved with increased terminal- specific data and machine learning.

ACTIONABLE

Real-Time Updates for Decision-Making:
Data is updated instantly when changes are made, ensuring that the information is actionable immediately.

Reduced Manual Input:
The process is automated to reduce the need for manual data entry, making the data more actionable.

FREQUENCY

Instantaneous Updates:
Frequent updates occur almost instantaneously, with web applications updating every minute to reflect changes.

Daily Manual Submissions:
In some cases, data is manually submitted once a day, highlighting a mixed approach of automation and manual input.

TIMELY

Data Availability:
Data is generally available when needed, supporting timely decision-making.

Instantaneous Updates:
Changes are reflected instantly, ensuring that the most current data is available.

RELIABLE

Data Reliability:
The information is generally considered trustworthy, though there are challenges that occasionally affect reliability.

Consistency in Real-Time Data:
The emphasis on real-time data enhances the reliability of the information.

VERIFICATION

Verification through Standards:
Ensuring data reliability by adhering to international standards based on the IMO Compendium related to Berth-to-Berth Movement of the Ship and other additional international standards for Door-to-Door Movement.

Systematic Verification Processes:
Systems are in place to verify the information automatically, reducing the reliance on manual validation.

VALIDATION

Challenges with Mapping:
Without unique identifiers for port calls, accurately mapping orders can be complex. Standardization is key to improve this process and ensure more seamless data integration.

Comparative Validation:
Events are compared to ensure they follow established rules and standards.

STANDARDIZATION

Use of International Standards:
Adoption of international standards to ensure consistency and reliability.

Challenges with Non-Standard Systems:
Difficulties arise when integrating systems that do not use standard identifiers.

Use Common Language and definition provided by international organizations:
A unified guideline is necessary to facilitate communication and standardization across different systems.

DEEP DIVES

Details from Part E: Project Performance and Key Performance Indicators (KPIs)

The analysis highlighted improvements in coordination, flexibility, and efficiency post-implementation. Respondents emphasized the importance of advanced planning and real-time data Collaboration for positive stakeholder feedback.

COMPARISON BEFORE AND AFTER IMPLEMENTATION

BEFORE INTRODUCTION	AFTER INTRODUCTION	IMPROVEMENTS
Coordination: ▪ Activities were less coordinated ▪ Frequent last-minute changes and emergency planning	**Coordination:** ▪ Streamlined advanced planning ▪ Clear sequence of ship arrivals	**Coordination:** ▪ Enhanced coordination and advanced planning
Communication: ▪ Need to explain and justify changes ▪ Inefficient real-time data Collaboration	**Communication (Feedback):** ▪ Positive stakeholder feedback ▪ Reduced need for contingency planning	**Communication:** ▪ Better real-time data Collaboration and transparency
Efficiency: ▪ Long turnaround times (average 8 hours) ▪ Inadequate alignment of capacity requirements	**Efficiency:** ▪ Reduced turnaround times (down to 2 hours) ▪ Elimination of unnecessary operations	**Efficiency:** ▪ Reduction in turnaround times ▪ Smoother operations with fewer last-minute changes
Flexibility: ▪ Limited planning flexibility	**Flexibility:** ▪ Planning 3-4 hours ahead ▪ Improved adaptation to new procedures	**Stakeholder Trust:** ▪ Positive feedback and reliability of new processes

ESSENTIAL OUTCOMES

Performance Measurement:
Setting up relevant KPIs to evaluate implementations, focusing on metrics like deviations between estimated and actual times, and the quality of cargo and information flow.

Continuous Improvement:
Gathering feedback continuously and making iterative improvements. Addressing gaps identified during evaluations is essential.

Early Results from Pilots:
Pilot projects provide valuable initial data to refine processes before scaling operations.

BEST PRACTICES AND RECOMMENDATIONS

Evaluate Performance:
Set up Key Performance Indicators (KPIs) to measure the success of implementations. Regularly review and evaluate performance based on these KPIs, looking at factors like deviation between estimated and actual times and the quality of cargo and information flow.

Ongoing Optimization:
Encourage continuous feedback and improvements. Do not be afraid to test new approaches and make necessary adjustments. Embrace change management principles to ease the transition for all stakeholders.

DEEP DIVES

Details from Part F: Plans for Further Implementation

The participants' recommendations can be summarized as follows to enable ports to effectively implement JIT port calls in order to increase efficiency, reduce congestion and promote better cooperation among stakeholders.

GENERAL RECOMMENDATIONS FROM OTHER PORTS ON PCO

Scope of Pilot	Start with a small, manageable scope to test the concept and expand gradually as confidence builds.
Timeline	Implement the project in clear, staged phases with well-defined timelines and regular assessments.
Timestamps	Apply standardized terminology for timestamps and ensure all stakeholders agree on their definitions to avoid confusion.
Guidelines	Leverage existing guidelines and tailor them to meet local needs and specific project requirements.
Stakeholders	Engage all relevant stakeholders early in the process to ensure buy-in and smooth coordination.
Change Management	Promote trust and ensure stakeholder commitment through personal interactions and transparent communication.
Financial and Role Clarity	Secure management commitment and funding early, and clearly define roles and responsibilities among all parties.
Data Accuracy	Ensure the accuracy and reliability of data shared on the digital platform, maintain stakeholder trust through consistent validation.
Communication	Maintain strong relationships through effective communication, regular updates, and addressing stakeholder concerns promptly.
Real Implementation	Focus on practical, iterative execution based on actual results, rather than prolonged pilot phases, to achieve real-world benefits.

ESSENTIAL OUTCOMES

Expanding Scope:
Plans to include more stakeholders and additional elements carry a step-by-step approach to enhance Port Call Optimization.

International Standardization:
Emphasizing the importance of international standards to minimize discrepancies and improve overall efficiency.

Future Pilot Projects:
Planning for future phases and pilots to continue learning and improvements based on initial implementations.

BEST PRACTICES AND RECOMMENDATIONS

Build Trust and Foster Cooperation:
Build trust and cooperation among all stakeholders. Ensure open communication and show the benefits of implementations to encourage participation. Develop good relationships with key players such as terminal operators and shipping lines.

Incremental Implementation and Flexibility:
Implement changes incrementally, building "block by block." Be flexible and willing to adjust based on feedback and challenges encountered in different ecosystems.

7

LIST OF ABBREVIATIONS

APIs	Application Programming Interfaces
ATA	Actual Time of Arrival
DCSA	Digital Container Shipping Association
ENC	Electronic Navigational Charts
ETA	Estimated Time of Arrival
GIA	Global Industry Alliance
HVCC	Hamburg Vessel Coordination Center
IAPH	International Association of Ports and Harbors
IHMA	International Harbour Masters Association
IHO	International Hydrographic Organization
IMO	International Maritime Organization
IPCSA	International Port Community Systems Association
ISO	International Organization for Standardization
ITPCO	International Taskforce on Port Call Optimization
JIT	Just-In-Time
KPIs	Key Performance Indicators
MoU	Memorandum of Understanding
MSW	Maritime Single Window
PCS	Port Community Systems
PCO	Port Call Optimization
RTD	Requested Time of Departure
SimOps	Simultaneous Operations
TIC 4.0	Terminal Industry Committee 4.0
UKC	Under Keel Clearance

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