



How Disruptive Technologies Can Achieve Sustainable Port Development and Operations

The Disruptive Power of AI

5th March 2021

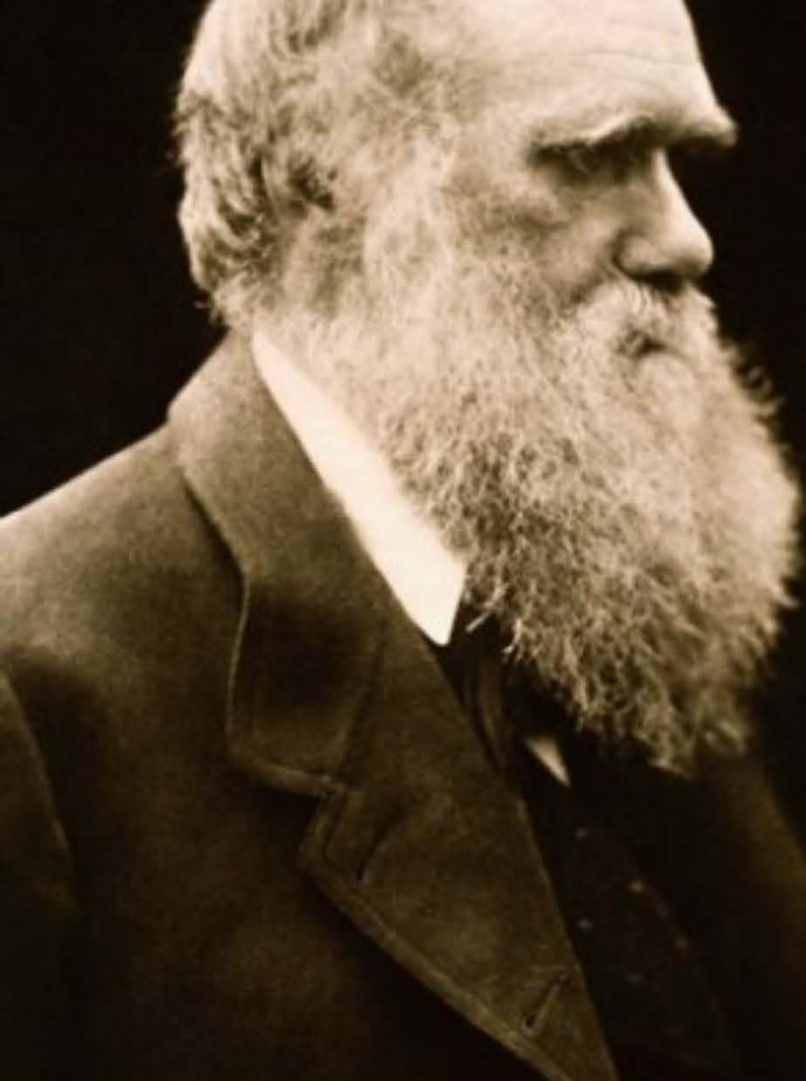
JOIN US ON
Friday 5 March 2021

WEBINAR
How Disruptive Technologies
Can Achieve Sustainable Port
Development and Operations

10am - 11:30am CET
5pm - 6:30pm Hong Kong
Zoom Webinar ID: 873 9417 7595

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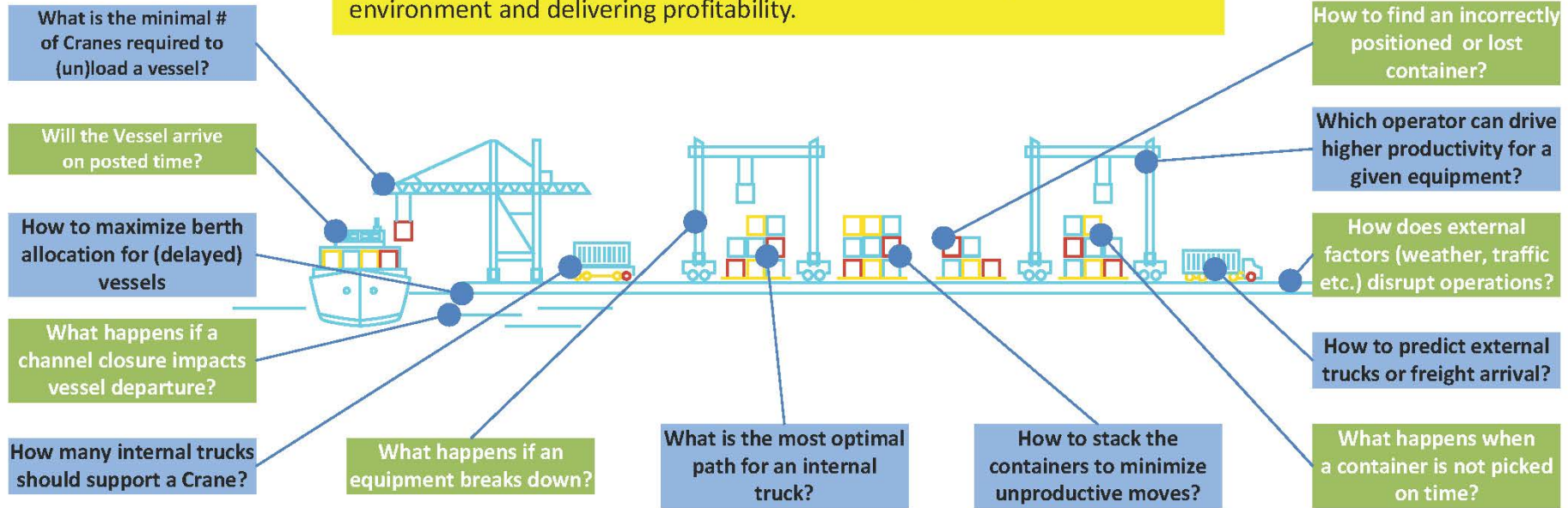


“It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is *the most adaptable to change.*”

- Charles Darwin

Ongoing Challenges ...

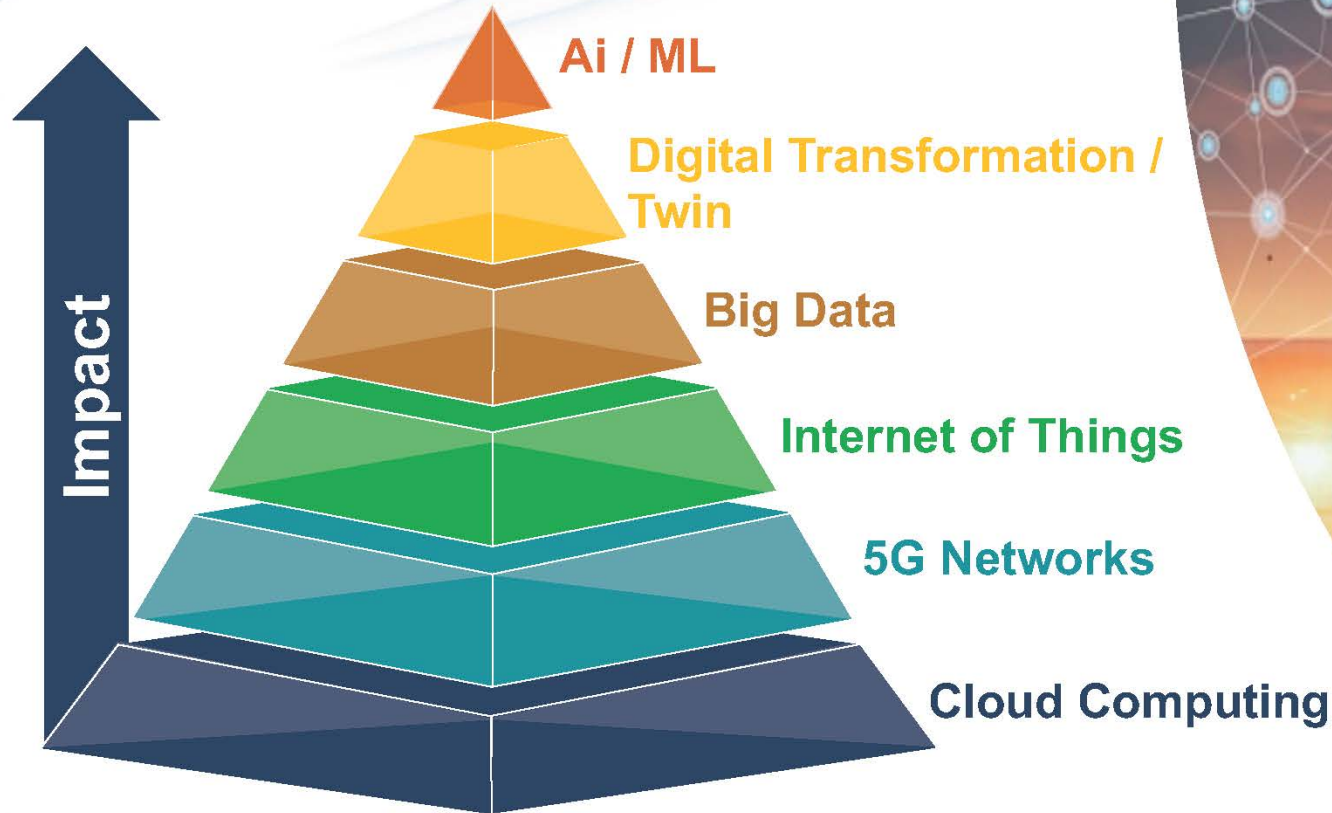
Despite these challenges, ports are tasked with optimizing service to the lines and truckers consistently all while considering their impact on the environment and delivering profitability.



UNCERTAINTIES

OPTIMIZATIONS

Disruptive Technologies



Cloud Computing

Facilitating the Storage of Big Data

Software as a Service (SaaS)

- The Terminal Enterprise Architecture in the Cloud.
- Outsourcing your IT Complexity as a service.
- Moving to Usage-Based charging
- Impacting on how IT is delivering this service to the business
- Testing new applications, it is much more cost-effective to do so on the cloud than on existing IT infrastructure.
- **Resulting in Cyber Security** architectures redefined.



SaaS
PaaS
IaaS

Software as a Service
Platform as a service
Infrastructure as a Service

5G Networks

Generating more DATA

A Game Changer For Ports and Terminals

- **More capacity and faster connections with High response times**
- Improved foundations for automated operations and artificial intelligence
- More connected terminal with less infrastructure
- AGVs will respond more precisely to remote manipulation
- Supports augmented and virtual reality-based maintenance from remote locations.
- **Security By Design for 5G**



Internet of Things (IoT)

Generating more DATA

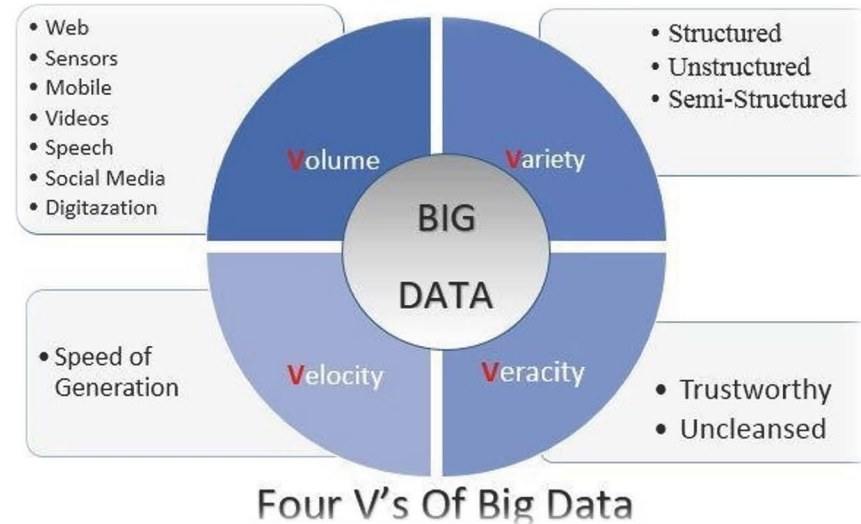
5G is a strong enabler to implement IoT

- IoT is a means of connecting physical objects and for ports and terminals, it means that equipment can **transfer data through sensor technology** and make everyday operations independent, automated and efficient.
- Many companies invest in developing Sensor Technologies

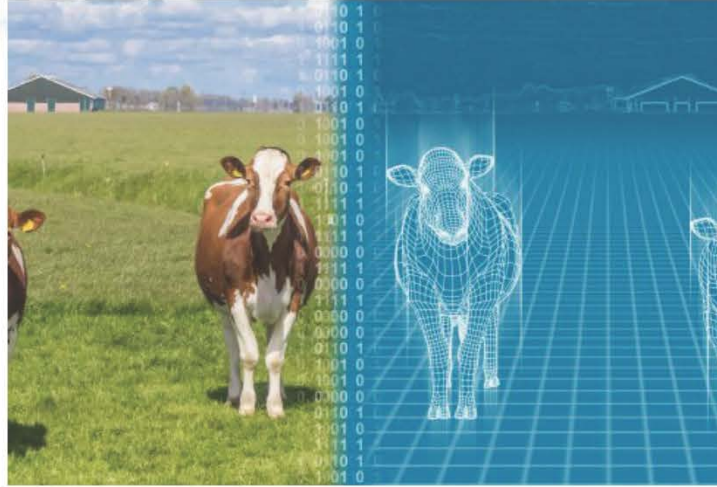


More Big Data ... The 4V's

1. **Volume:**
 - 90 percent of all today's data was created in the past couple of years.
2. **Variety**
 - Big data seems to be unstructured (log files, sensor, audio, image, video files etc.)
3. **Veracity:**
 - Veracity refers to the trustworthiness of the data.
4. **Velocity:**
 - Speed at which data is being generated.



Digital Transformation / Digital Twinning



- Provide a tool for visualization of terminal operations
- Improved internal and external communication
- **Qualification and analytics of operational data**
- **Optimisation of terminal performance**
- **No risk decommissioning of new equipment and software**

The Ai factor...

Traditional Software Logic

Manually Configure Engineering Rules

Human Heuristics

Assigns penalties for certain events

Difficult to modify and adjust parameters for optimality

Configuration parameters less effective or contradictory over time

Manual update are limited to preprogrammed set of parameters

Not adaptable

Artificial Intelligence

Set Business Rules (Engineering rules are derived)

Self-Learns Terminal characteristics (penalties)

Self optimizing or auto updates penalties or based on terminal modifications

Learn from all contributing factors - weather, traffic, operator performance

Need minimal set of operational rules

Adapts in Realtime

Low Investment / Geniuses NOT Required

Ai Impact...

1 Customer Satisfaction

- Increase Yard & Berth productivity
- Ensure SLA's conformance
- Superior Quality of Service

2 Operational peak efficiency

- Terminal Focuses on the fundamentals
- Improve Berth & Yard utilization
- Increase CHE usage
- Maximize moves per hour
- Reduce Vessel turnaround time



3 Self Sustainability

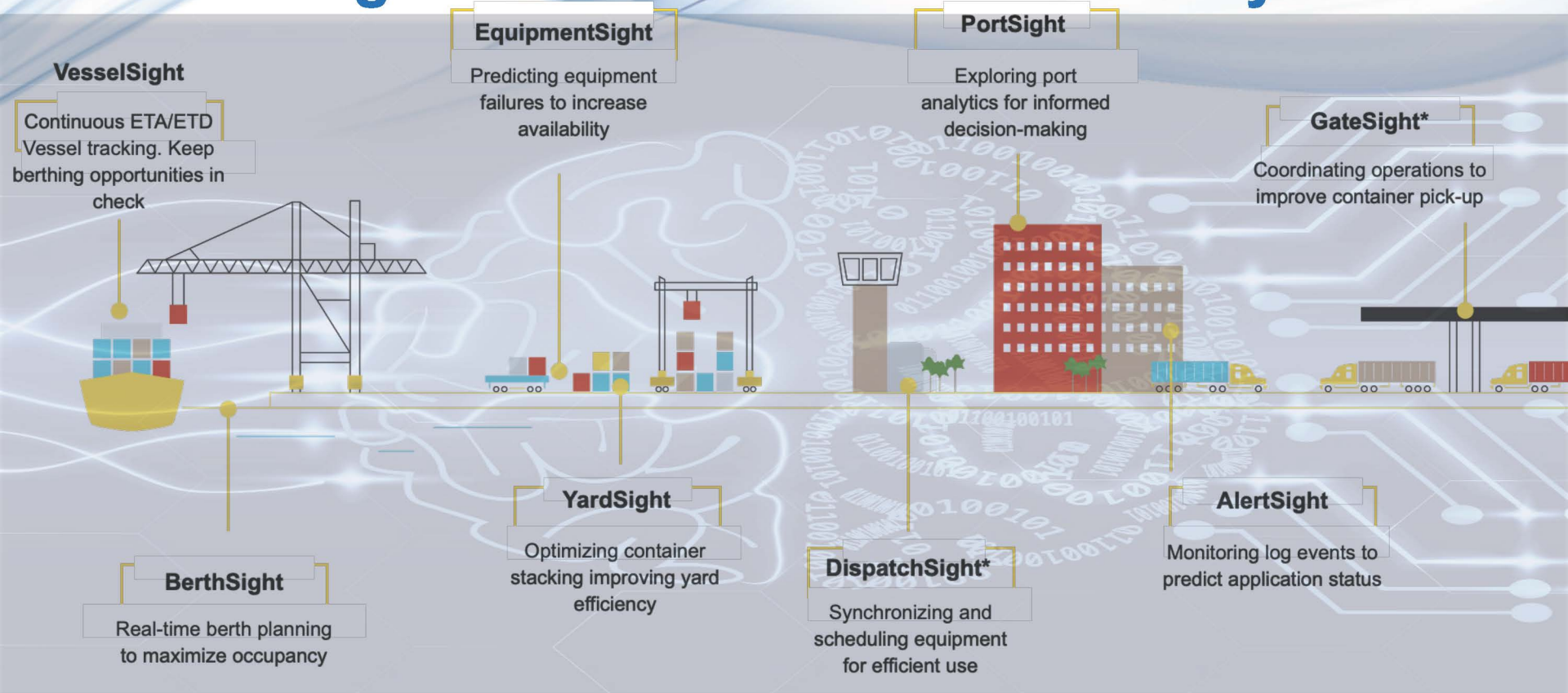
- Access deeper operational awareness
- Recommendations for intelligent decision-making
- Strategic and efficient workflows

4 Adaptation to changes

- Keep berthing opportunity windows in check
- Accurately project vessel ATA & ATD
- Avoid disruptions to the operations

'Ai – Bringing Technology Closer to the Business, it is my eyes and ears' – Quote from Terminal CEO

Introducing the AiCON Suite...Powered by Ai



YardSight improves operational efficiency



Objective: expand the operational efficiency of RTG's by improving overall work balancing from better input to stacking based on fuller view of RTG work queues.

Approach: Quantify and optimize specific metrics centered on a base line and targets to measure the improvement in Productive moves.

Objective: Expand operational efficiency improving prime movers' utilization to reduce its number and/or improve current 25mph prod.

Approach: Use AI to improve laden trip time for discharge and load. Quantify and optimize key metric to measure the improvement in Productive moves

Objective: reduce the number of rehandles for import boxes which currently stands at an average of 1.32 extra moves per delivery based on 68.7%-yard utilization.

Approach: Use AI to review stacking & delivery history to help improve re-handle ratio based on two-month base line.

SD

Reduced Standard deviation

13.5

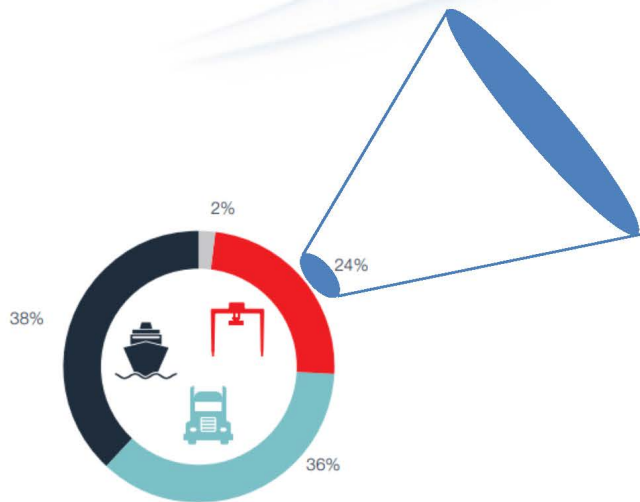
mins

Reduced truck
trip average from 18 to
13.5 mins per trip.

10%

reduction in re-handles,
proportional to the
utilization for each month.

Significant reduction in CO2 emissions (pleasant Side Benefit)



Source: Kalmar Global 2020 Report

Average carbon dioxide (CO2) emissions of diesel-electric rubber-tired gantry (RTG) cranes at ports worldwide in 2017, by consumption
(in 1,000 kilograms CO2e per year)



YardSight side effects lead to significant reduction in Prime Mover distance traveled and enhancements in RTG utilization per Container move.

This will lead to a CO2 reduction of ~100,000 Kg per RTG per year!

EquipmentSight : AI Module for Equipment Failure Prediction

Client Profile:

- A fully automated terminal with 59 AGV's in operation.

Objectives:

- **Predict** a critical AGV failure 2-8 hours in advance
- **Minimize** operational impact

Approach:

- Create a prototype that can predict failures with at least 75% precision
- Integrate the solution with the existing standard operating procedures

Results:



Confidence Level in Predicting AGV failures 2-4 hours in advance



High Risk AGVs identified to date - anomalies validated by the Client Engineering team

Thank You

As for the future, your task is not
to foresee it, but to
enable it"



Antoine de Saint-Exupéry

French writer, poet, aristocrat,
journalist and pioneering aviator.