End-to-End Automation and the Port of the Future

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IN LEAN-BUSINESS, CYCLE TIME IS KING

• Marine transport is getting **slower** as ultra large container ships reduce their sailing speed to conserve fuel
• The primary driver for the shipping industry has been cost per ton shipped
• For the largest customers of containerised freight, they have leaned-out their supply chain in every aspect except the speed of marine transport.
• Do they want more control in order to speed up delivery and make their transport logistics more nimble?
• How will this impact ports and inland freight connections?
FREIGHT DELIVERY WILL BE THOUGHT OF AND MEASURED IN MINUTES NOT DAYS

- Consumers (all of us) want what everything to be where we want it, when we want it and at a price we are willing to pay
- Is the marine freight industry immune from this trend or ripe for disruptive change?

https://www.youtube.com/watch?v=MXo_d6tNWuY
WHAT MIGHT TRIGGER DISRUPTIVE CHANGE?

Are there significant *unmet needs* of our customers or stakeholders?

- Cost per ton shipped is very low, but is it fast enough?
- Bunker fuel and diesel are cheap but are they clean enough?
- Ultra-large container ships are good for the larger shipping companies and some ports.
- But what about the vast majority of ports in the world that cannot handle them?
- Are the inland freight issues created by ultra-large container ships increasing costs for our customers? Blocking faster delivery times? Creating serious traffic congestion and environmental problems?
CHALLENGES WITH ULTRA LARGE CONTAINER SHIPS

LIMITED NUMBER OF SUITABLE PORTS CREATE INEFFICIENT QUEUING OF CONTAINER SHIPS OUTSIDE THE PORT

INCREASING INLAND FREIGHT CONGESTION ISSUES

NUMBER OF UK PORTS THAT CAN HANDLE CARRIERS OF 19000 TEU
ISSUES IN CURRENT SUPER PORTS

Ultra large container ships in port take a long time to load & unload.

Loading & checking lorries slows the process down further.

Fixed scheduling systems cause lorries to queue.
WHAT MIGHT A FUTURE MARINE TRANSPORT WORLD LOOK LIKE?

Some of the possible innovations:

• More nimble point to point delivery
• Faster
• Cleaner
• Fully automated end to end
THE CONTAINER SHIP OF THE FUTURE?

- ELECTRIC DRIVE
- PHOTOVOLTAICS
- WIND ASSIST
- NATURAL GAS HYBRID
- FULLY AUTOMATED
- FITS INTO SMALLER PORTS
- 500 TEUs
- FAST - 20+ NM/HR
- Mass produced
- Auto load / unload
- Platooning
- Environmentally friendly & efficient
AUTOMATED PORT AT SEA

DEEP OCEAN CARGO TRANSFER OCCURS BETWEEN SHIPS AT SEA SO THEY'RE OPTIMISED FOR THEIR DESTINATION

VARIABLE LOCATION OF AUTOMATED PORT

LIVERPOOL

SHIPS MANAGED IN OFF SHORE PORTS SO THEY COME INLAND WITH CARGO NEEDED FOR THAT PORT
THE PORT OF THE FUTURE?

SMALLER SHIPS WITH PRIMARILY LOCAL GOODS ONBOARD

STANDARDISED MASS PRODUCED CARGO HANDLING SYSTEMS

AUTOMATED ENTRY GATES

AUTOMATED LORRIES

AUTOMATED CHECKING AND EXIT
OTHER INNOVATIONS IN PORT OPERATIONS

• Fully automated container handling point-to-point
• Automated lorries picking up and dropping off containers
• Virtual port gates allow automated entry and exit
• Paperless freight and customs documentation
• Electronic security seals, verification and tracking for containers
• Automated submersible and surface craft for harbour and quay inspections
• Automated flying vehicles for crane and terrestrial port inspection
• Dynamic, real-time scheduling for ports and motor freight operators
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