Is Smart Shipping smart?

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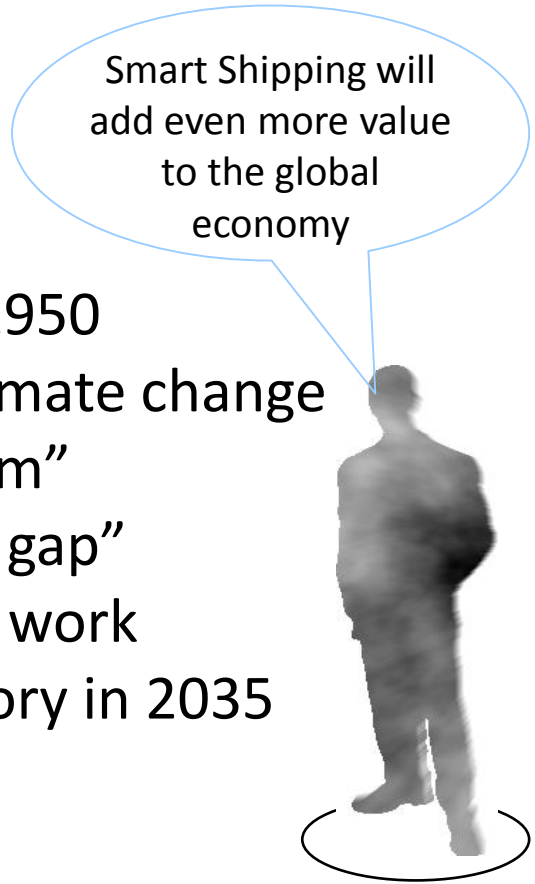
Martin Stopford, President CRSL

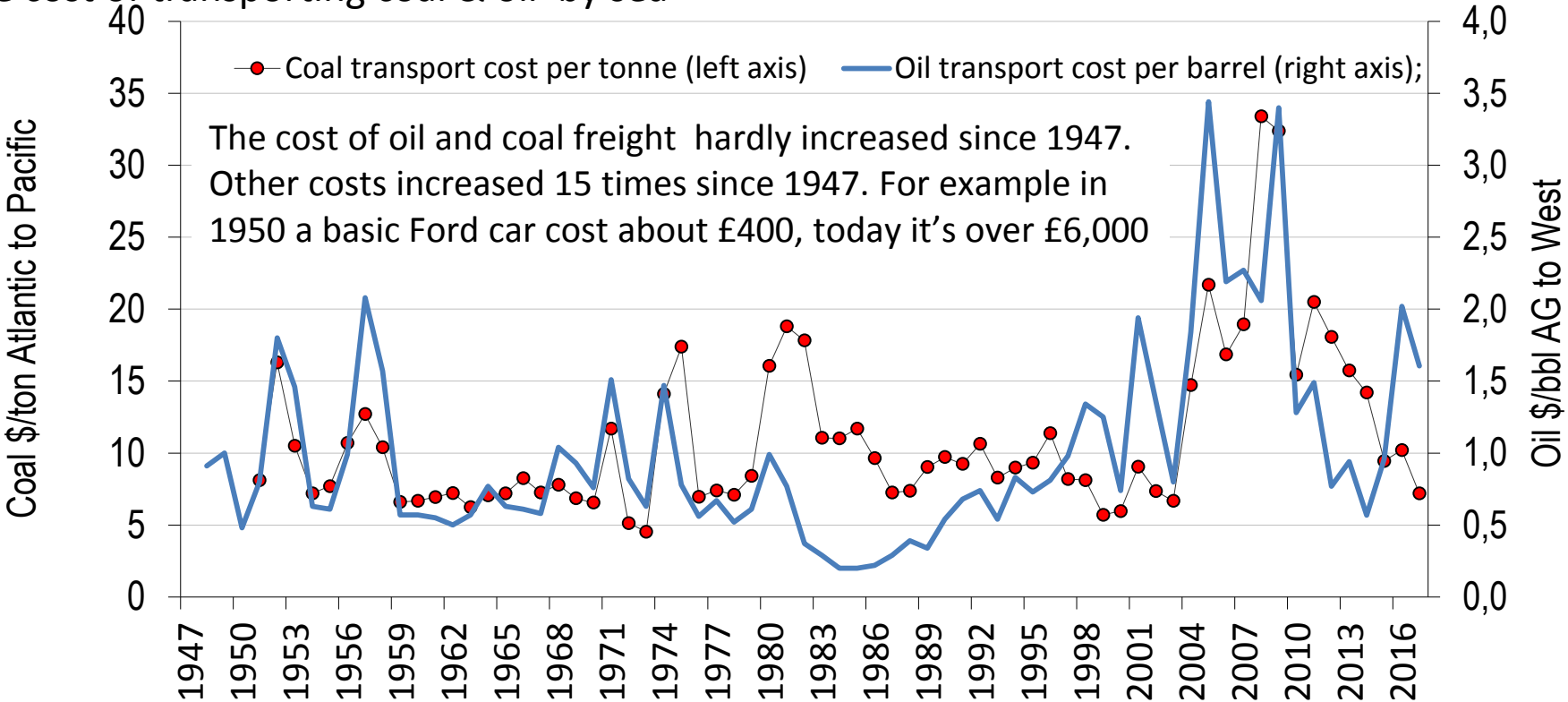
Smart Shipping – Why it's the Smart Thing To Do



- Point 1: Shipping's amazing achievement since 1950
- Point 2: Two big challenges – more cargo and climate change
- Point 3: Marine technology "running out of steam"
- Point 4: The Smart Shipping toolbox can "fill the gap"
- Point 5: How smart technology should be put to work
- Point 6: Vision – a smart shipping transport factory in 2035
- Point 7: Other industries are getting smart

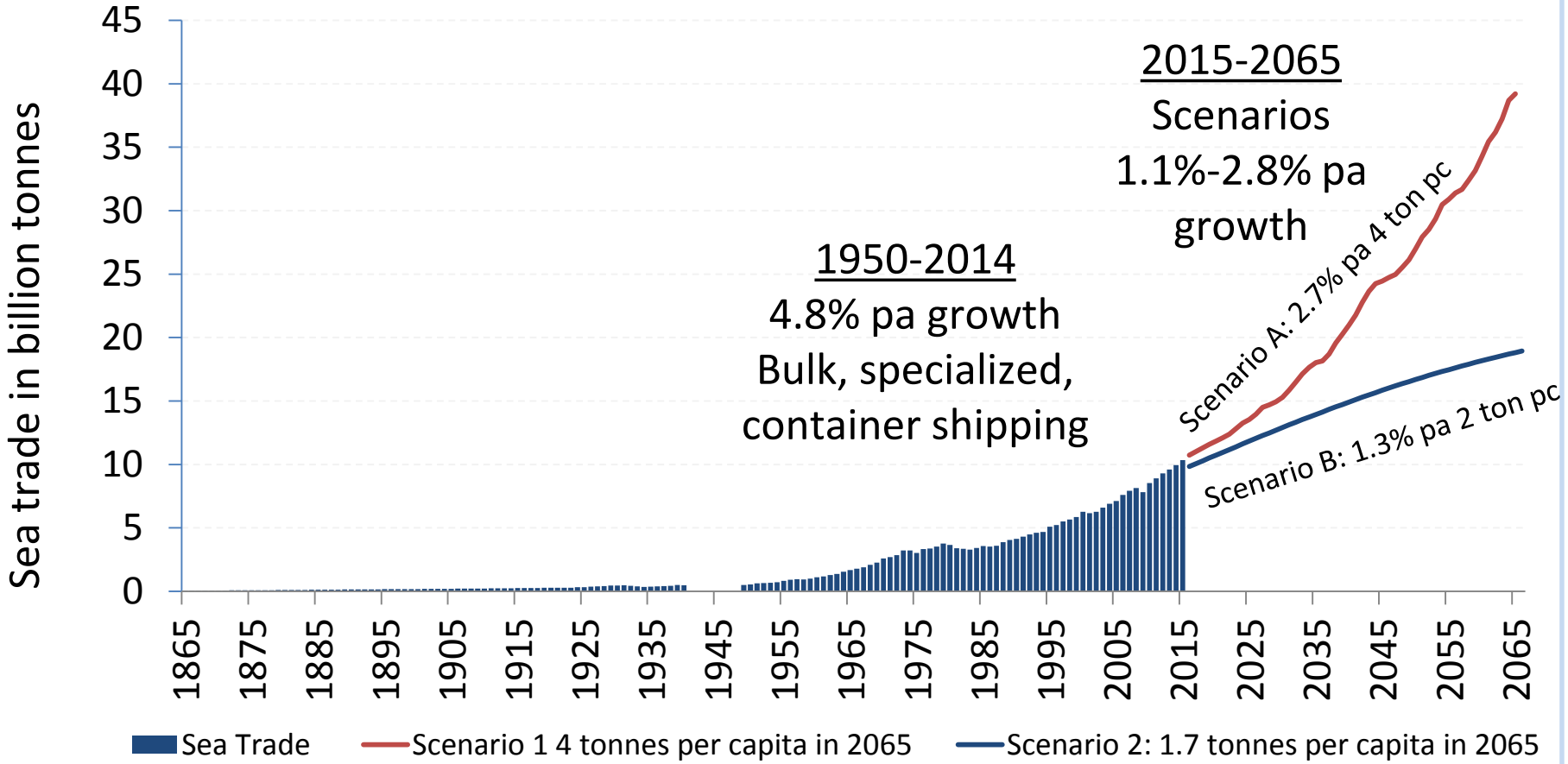
1. Shipping's amazing achievement since 1950

The cost of transporting coal & oil by sea



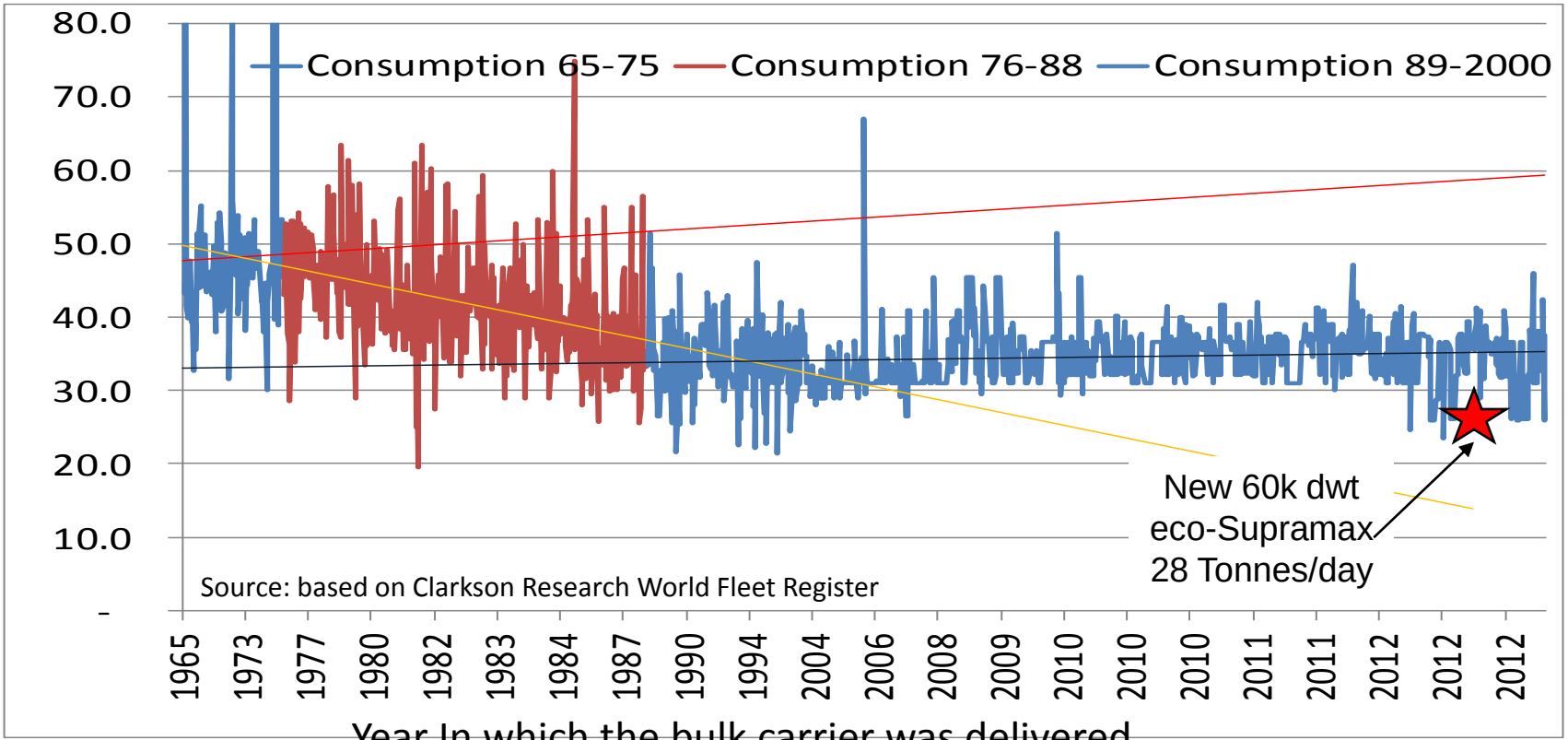
Note: costs based on spot rates for average vessel size at transport date. Tankers increased from 17,000 dwt to 280,000 dwt and dry vessels from 10,000 dwt to 77,000 dwt. Freights are at market prices and are not deflated.. Maritime Economics 3rd Ed, page 74

2. Two big challenges - more cargo and climate change



3. Marine technology "running out of steam"

Fuel consumption 60,000 dwt bulk carriers TPD at 14.5 knots in tonnes per day



4. The smart-shipping toolbox can “fill the gap”

1. **Satellite communication**: new INMARSAT Ka band + L band global offer 99.9% reliable communications across the fleet.
2. **Telematics**: sensors generate data & APIs (application programming interfaces) and declarative queries (EG SQL) manage data and generate reports.
3. **Big Data streaming, storage & processing**: Key issue volume, velocity, variety, (3 vs). Cloud provides storage. Big data analyse data to establish benchmarks and monitor.
4. **Smart phone-style apps** : to do specific jobs without big computer systems & provide management information
5. **Touch screen technology**: simplifies people/computer interaction (e.g. task check lists).
6. **Robotics:** feedback loops & artificial intelligence allow automation of many tasks (navigation, maintenance etc.)

Young engineer sees future

Auxiliary sealed & monitored

Railnova information system

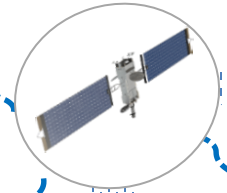
5. How smart technology should be put to work

- STEP 1: SMART SHIPS use ICT technology to improve the performance of the ship as a production unit, through improved management of operations and the automation of some processes.
- STEP 2: SMART FLEET MANAGEMENT. An even bigger potential source of value added by smart-shipping is through more efficient transport management. If the analogy with the car factory is pursued, smart-fleet- management is like introducing the FLEXIBLE production line.
- STEP 3: SMART SHIPPING-LOGISTICS: in the 1960S shipping promised "door-to-door" transport, but this vision was too challenging for the limited communications technology. Today's Smart Shipping Toolbox will breathe new life into transport logistics, allowing value to be added in many ways which were impractical or uneconomic previously.

6. Vision - A Smart-Shipping "Transport Factory" in 2035

7. PORTS & THROUGH TRANSPORT

6. SHIPBUILDERS & EQUIPMENT SUPPLIERS



Warehouse (on cloud?)

5.CUSTOMERS WITH CARGO SYSTEMS

Volume, Velocity, Variety

Company Systems:-

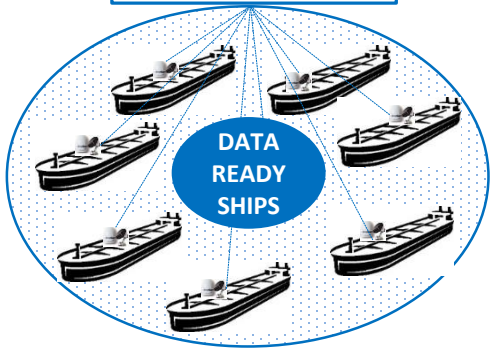
1. Host Server & DBs
2. Messaging system
3. Fleet Intranet
3. Phone system
4. LPWAN & APIs
5. Telematics Data

Fleet management

2. SHORE TEAMS

TRANSPORT FACTORY

ship servers managing data, apps & comms



1. SHIP TEAMS

Core systems

1. Navigation
2. Operations
3. Comms.

1. Technical support
2. Maintenance systems
3. Regulatory reports
4. Fleet performance
5. Personnel management

4. TECHNICAL TEAMS

1. Support systems
2. Process data
3. Automation
4. Build apps
5. Manage stats

3. SYSTEMS. TEAMS

7. Other industries are getting smart

1. UPS fleet using it on 48,000 trucks
2. Boeing Airplane Health management (AHM) System pre-installed on planes
3. Google car automates navigation (up to a point)
4. Ford motor company plans to have 20% autonomous cars by 2030
5. Formula 1 racing teams use smart data to improve car performance

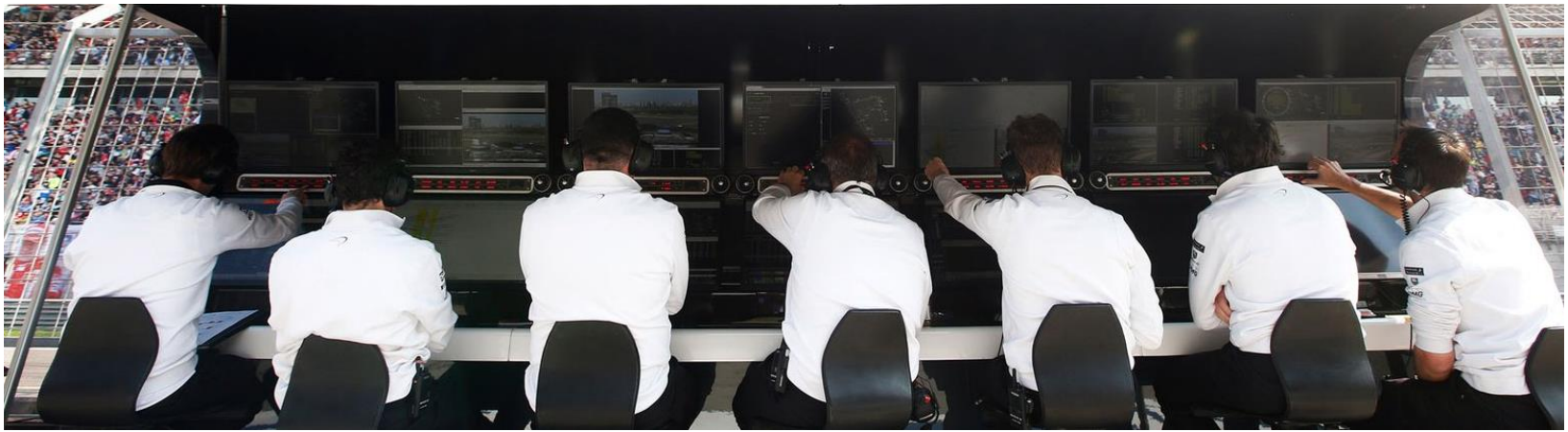
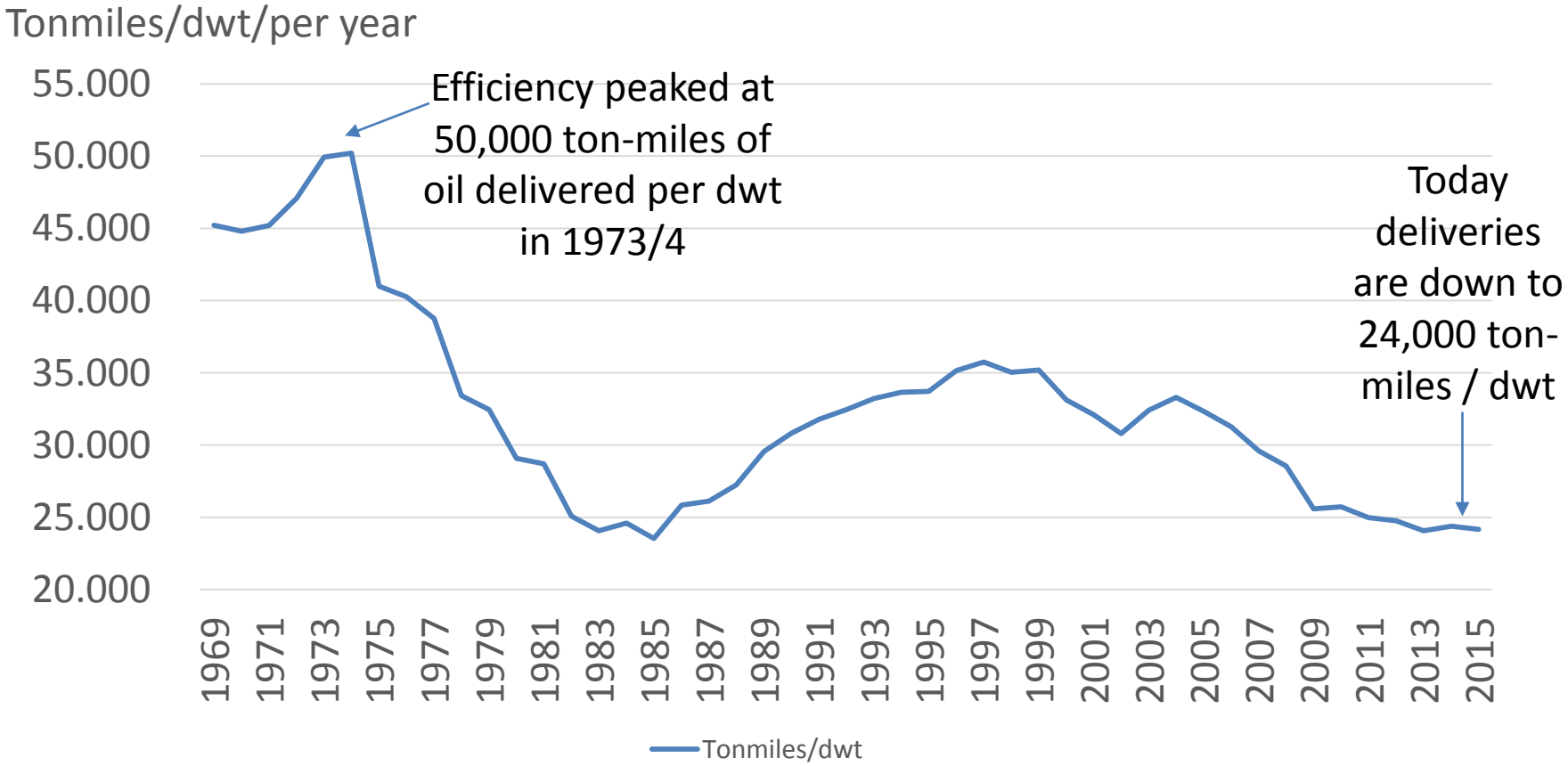


FIGURE 5 MCLAREN TEAM AT WORK DURING RACE "EVEN THE SMALLEST, MOST SEEMINGLY INSIGNIFICANT DETAILS MATTER"

Smart Shipping –
Show the world shipping is even smarter!

Tanker fleet performance – down 50% since 1973



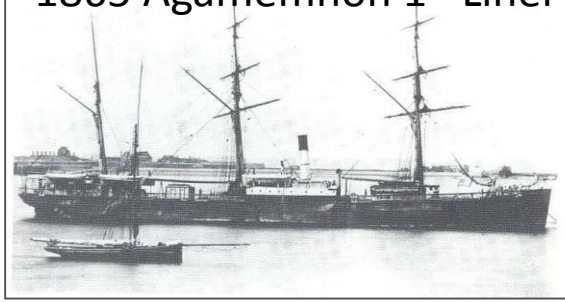
Example – UPS van management system

- UPS has 46,000 vehicles handling 16.3 million packages a day to 8.8 million customers. They store 16 petabytes of data. Savings in 2011 of 8.4 million gallons of fuel, 85 million miles off daily routes.
- For ships bunkering stops, maintenance, cargo handling, voyage scheduling focus etc points

So what were the first three revolutions?

- Revolution 1: 1866 – Alfred Holt puts Agamemnon into service, the first merchant ship able to trade globally without using sail
- Revolution 2: 1966 - Malcolm McLean launches first international container service from New Jersey to Rotterdam,
- Revolution 3: 2016 – Smart Shipping

1865 Agamemnon 1st Liner



Early VLCC Built 1973