The Impact of

Artificial Intelligence

on the Future of the Human Workforce

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Meet **HR** Experts

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"Building Today's Talent, Achieving Tomorrow's Excellence "

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People at the Centre of Change: AI Transforming Human Competences

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Why AI & Human Competence?

AI is transforming jobs and competence requirements: most maritime roles will soon require digital skills across shipping, ports, offshore, and logistics.

Demand is rising fast: ~70% of jobs need basic digital literacy within 5 years

~30% need advanced data/cyber/automation competences

Career relevance is clear: ~80% of professionals see technology upskilling as essential for progression

Risk of inaction: ~25% more digital training need by 2030

otherwise, ~15% qualified-workforce shortfall

Investment in human capital is the prerequisite for safely and effectively leveraging AI

AI Adoption and Competence Gap

AI in maritime is expanding fast (~35% annual growth), driving AI-assisted navigation, predictive maintenance
20% potential productivity boost **by 2027 vs 10%** of maritime workers having **AI-related skills – the gap**

Global upskilling initiatives:
Global Maritime Forum targets **100,000 workers upskilled by 2030 (**"Maritime Workforce 2030" program)
IMO specialized modules on **AI, automation, and emerging technologies**
Technology may attract **younger** talents and **help address the gender gap** (women ~2% of seafarers today).

Digital Transformation: A Double-Edged Sword

Enhanced situational awareness

Predictive maintenance

Optimized routing

Reduction of human error

Efficiency gains in ports, logistics, and navigation

VS

Overreliance on automation

New cyber vulnerabilities

Data privacy risks

Loss of fundamental skills

And AI systems that sometimes operate beyond human understanding

Industry Skill Demands

Technical skills

Data literacy
Cybersecurity
Operation of automated systems
Remote vessel monitoring
AI-assisted navigation tools

+

Human-AI collaboration

Decision-making with AI input
Interpreting algorithmic outputs
Supervising autonomous processes

+

Soft skills

Communication
Teamwork across human-AI teams
Adaptability
Leadership in uncertain conditions

"Data literacy and the ability to interact with AI are becoming essential competencies"

M. Mokkinis, OneLearn Global

Academic Insights – Research evidence

AI is reshaping maritime competence needs: digital/data skills must grow alongside core seamanship competences

Adaptive training is urgent: a "skill resilience" approach is needed to continuously identify gaps and update MET programs

Autonomous/MASS future demands hybrid competence: operational + digital/IT + oversight/decision-making skills, beyond current STCW coverage

21st-century & soft skills are now safety-critical: critical thinking, communication, teamwork in human-AI teams, adaptability, resilience

AI can improve competence if implemented well, but two gaps block progress:

- Train the trainers

- Timely update of standards/policies (STCW)

(e.g., Livingstone, 2023; Reyes, 2025; Belabyad et al., 2025; Pazaver & Kitada, 2025; Salem & Hassan, 2025)

Case Studies: Success Through Upskilling

AD Ports Group uses **agentic AI "digital co-workers"** for repetitive, data-heavy tasks - blueprint for a hybrid *"human-AI workforce"*

Humans shift to higher-value work: problem-solving & leadership

"**not replacing humans, but elevating human potential**."

Staff collaborates with AI tools to improve day-to-day tasks: AI powered schedules, analytics, vessel speed optimization, etc.

Maersk and Mitsui O.S.K. Lines (MOL) combine **digital training + AI deployment":**

Improved operational efficiency -12%

Downtime decreased – 40%

Data accuracy improved – 30%

Faster identification of abnormalities in engine performance, etc.

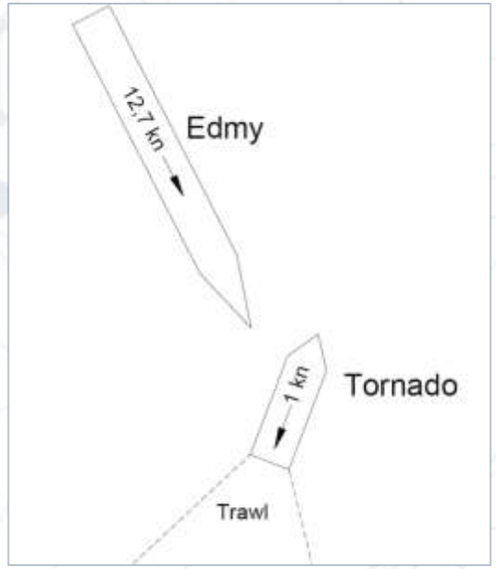
AI integration succeeds when people stay at the centre of change

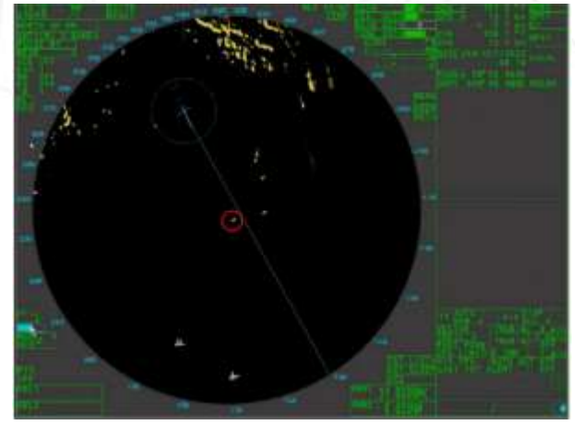
Case Study – When Tech Goes Wrong

Edmy & Tornado collision (Norway, 2022): overreliance on AIS/ECDIS led to missed visual lookout and failed hazard detection.

Automation complacency risk: "no digital target" ≠ "no danger"

De-skilling effect: traditional competencies (manual navigation, lookout, independent judgment) decline when humans over rely on automated systems





The humans are central to safety: proper training and changing mindset is needed alongside introduction of AI tools

Lessons from Success & Failure

Success factors	VS	Failure factors
Skilled humans		Blind trust in automation
Transparent AI		Poor training
Training in AI interpretation		Lack of governance
Continuous learning		No ethical or operational oversight
Organizational buy-in		

Competences for the AI Era

Human

Communication, leadership, teamwork in AI-enabled settings

Cognitive

Critical thinking, decision-making under uncertainty, systems thinking

Ethical

Bias awareness, privacy, explainability

Meta-competences

Learning-to-learn, resilience, wellbeing literacy

> The future belongs not to AI, but to **humans who know how to use AI**
>
> Kai-Fu Lee, 2018

Role of MET Institutions

Designing AI-Ready Curricula

AI literacy modules, ethics, bias, data privacy, human-AI teamwork exercises, simulation where cadets must override AI, critical reflection on AI errors

AI-Supported Assessment

Adaptive testing, AI-driven performance analytics, feedback loops for mastery learning (Khan, 2023), automated formative assessment, transparent AI-use declarations (WMU policy, 2025)

Preparing Educators

Training in AI tools, digital resilience, understanding of AI-assisted assessment, confidence to guide students through AI uncertainties, pedagogical strategies for hybrid learning environments

Supporting Seafarers

Training in resilience, psychological safety, hybrid skill identity ("mariner + digital operator"), wellbeing support integrated with technical training

Strategic Role of the WMU

Established in 1983 within the framework of the International Maritime Organization (IMO), a Specialized Agency of the United Nations.

WMU is not just an academic institution; it is **our university** – a shared resource for the global maritime community, including Egypt

WMU's **contributions**, in **close coordination with IMO**, include:

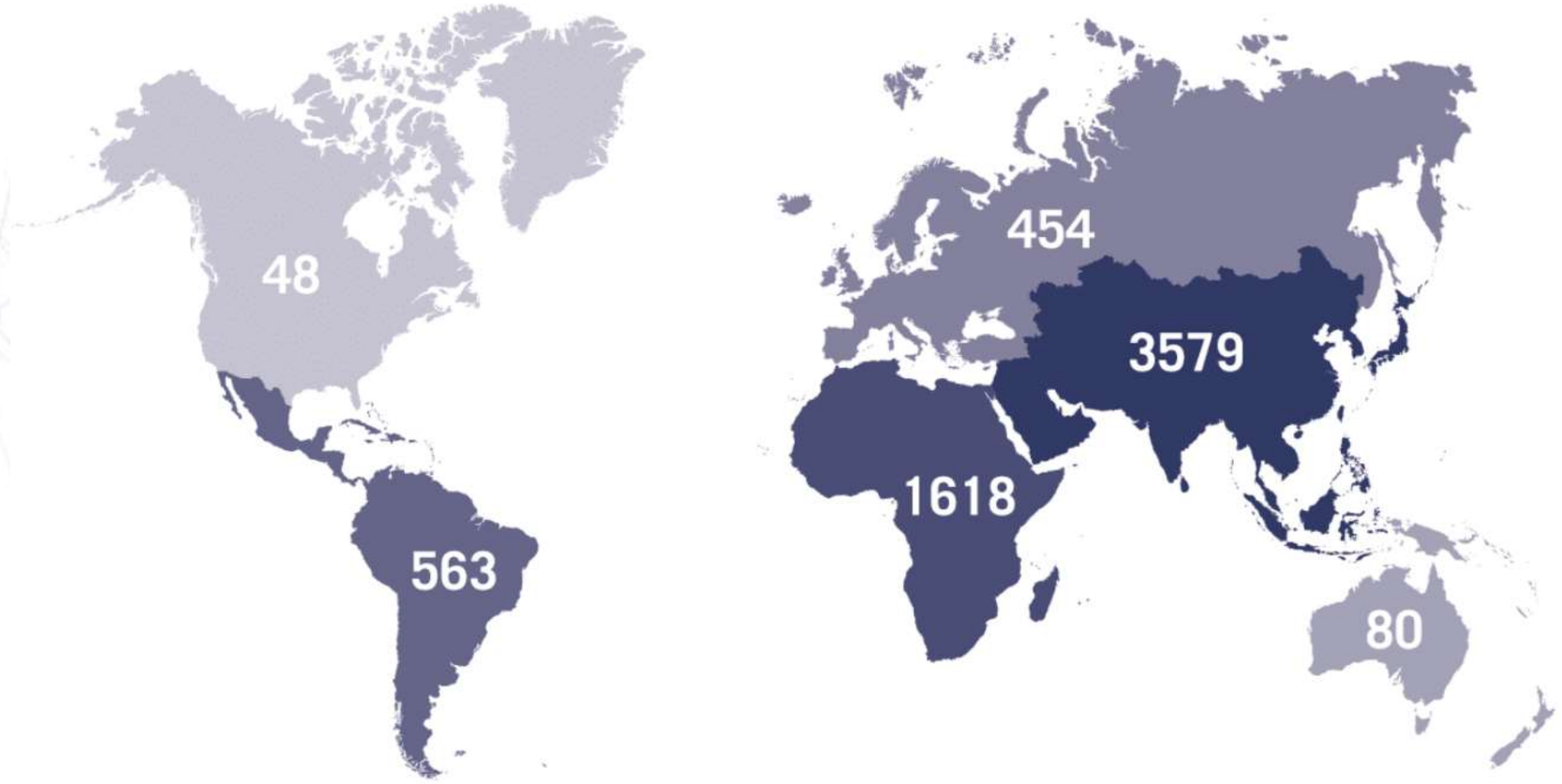
- Facilitating Coordination and Dialogue
- Supporting Capacity Development
- Leading Research and Innovation
- Promoting Diversity and Inclusion

GLOBAL IMPACT

6,342 Alumni

171 Countries and Territories

1,493 Female Graduates



Preparing "E-Farers": WMU's Future Skills Work

WMU "Future of Work" research: investigates how AI/automation will reshape maritime jobs and required competences

Transport 2040 flagship project: building a smart-shipping roadmap and defining reskilling/upskilling needs for future "e-farers"

People-centred transition: developing policy guidelines to keep technology shifts **fair and inclusive** for maritime workers

Curriculum & STCW influence: WMU research pushes integration of **21st-century skills** into training standards

Key competence priorities: digital literacy, problem-solving, adaptability, and continuous learning

People using AI: that is the future.

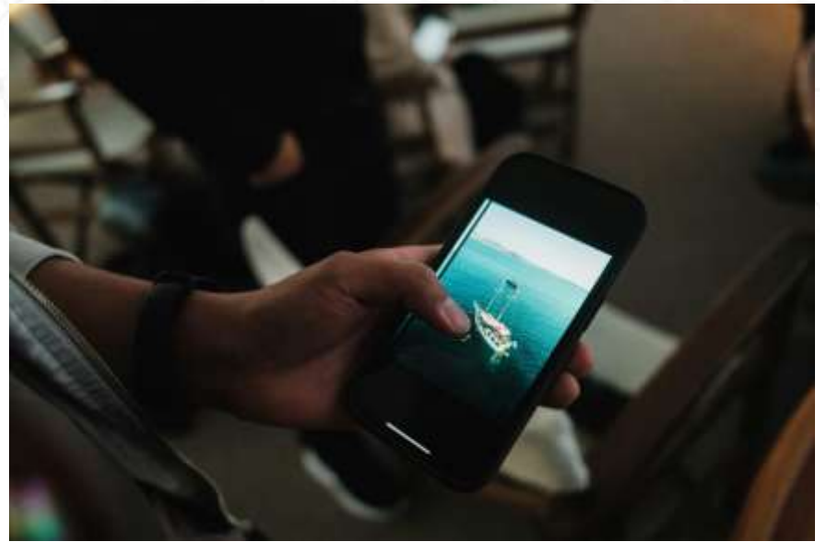
AI is a competence amplifier

Humans remain the decision-makers

Training becomes continuous

Safety culture evolves

MET institutions lead global transformation



Building Maritime Competence for the AI Era - Together

Possible areas for co-operation

Co-design AI-ready curricula and joint programmes

Develop shared training for educators and trainers

Pilot innovative assessment and simulation approaches

Support industry and administrations with evidence-based guidance for human-centred AI

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About me

In MET - more than 25 years:

Lithuanian Maritime Academy (Klaipeda, LT) – 20 years

- project and international relations
- associate professor
- deputy director for academic affairs

WMU – since 2019

Educational background:

- PhD in Education Sciences (Klaipeda University, Lithuania),
- MSc in Maritime Affairs, MET (World Maritime University, Sweden),
- MSc in Mathematics (Vilnius University, Lithuania)

Research interests:

- Educational effectiveness and innovations
- Action research strategy
- Mental health, well-being, resilience in the maritime industry

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