



## INNOVATIVE LEADERSHIP IN ALIGNING SEAFARERS' SKILLS AND POLICY IN THIS ERA OF EMERGING TECHNOLOGIES: IMPLICATIONS FOR A REGIONAL STRATEGIC POLICY AND TRAINING FRAMEWORK TOWARDS SUCCESS IN A DYNAMIC WORLD

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**Abstract** : This paper investigates the impact of emerging technologies on seafarers' roles, focusing on how various Asia-Pacific countries are adapting their policies and skills development in the digital era. Using a descriptive research methodology—comprising observation, literature review, and content analysis, the paper explores the challenges and opportunities associated with the adoption of advanced maritime technologies and also examines the evolving landscape of seafarers' skills and policies amidst emerging technological advancements in the maritime sector, with focus on their implications for regional strategic policy development and training frameworks within the Asia-Pacific region. As digitalization, automation, and innovative maritime technologies reshape maritime operations, the demand for a highly skilled, adaptable, and technologically proficient seafarer workforce becomes paramount. The study explores current skills gaps, policy challenges, and opportunities for harmonizing regional standards to support sustainable maritime growth. Furthermore, it proposes a comprehensive strategic policy framework and a modular training program tailored to the unique needs of Asia-Pacific maritime nations, fostering resilience, safety, and competitiveness in the face of rapid technological change. Moreover, the findings also inform policymakers, industry stakeholders, and maritime education providers on effective strategies to equip seafarers with future-ready skills, ensuring the region's maritime sector remains robust and responsive to ongoing technological transformations. Ultimately, the study provide a roadmap for regional stakeholders especially in the Asian countries to harness emerging technologies effectively, ensuring a resilient, competent, and future-ready maritime workforce in the Asia-Pacific maritime context towards success in a dynamic world.

**Key words** : Blockchain, challenge, digitalization, the emerging technologies, IoT, opportunity, seafarers' skills, strategic frameworks, sustainable maritime practices.

### 1. INTRODUCTION

The maritime industry is currently in the **midst of a technological revolution**, propelled by rapid advancements in automation, digitalization, artificial intelligence (AI), blockchain, and the Internet of Things (IoT).

These **emerging technologies** created **impact on seafarers' roles**. As automation and autonomous ships becomes more prevalent, seafarers are increasingly required to manage complex systems, troubleshoot issues, and make strategic decisions. While these tasks may not be as physically demanding as traditional seafaring roles, they require a high level of technical proficiency and adaptability.[1] Likewise, the advent of digitalization in the maritime industry has brought about a significant shift in the way data is managed, communication is conducted, and maintenance is predicted. To navigate these changes effectively, seafarers must possess a high level of digital literacy.

Similarly, the use of AI and Data analytics for route optimization, safety monitoring, and cargo management, certainly requires an understanding of data-driven decision-making.[2], [3], [4] The use of Blockchain is for\_ secure transactions and documentation, that it necessitates for the seafarers to be familiar with digital credentials and cyber security awareness. Regarding IoT or Internet of Things , although sensors and connected devices enhance monitoring and maintenance, however, these requires technical adaptability on the part of the seafarers.[5]

### 2. METHODOLOGIES

Using a descriptive research methodology—comprising observation, literature review, and content analysis, the paper explores the challenges and opportunities associated with the adoption of advanced maritime technologies and also examines the evolving landscape of seafarers' skills and policies amidst

emerging technological advancements in the maritime sector, with focus on their implications for regional strategic policy development and training frameworks within the Asia-Pacific region.[6], [7]

### 3. RESULTS AND DISSCUTIONS

#### 3.1 Skills and Policy Alignment by Diverse Nations

To ensure that the seafarers shall continue to thrive professionally, enabling their career growth and resilience., the evolving changes underscore the critical need by countries **to strategically align seafarers' skills and policies** with these emerging technologies, **Table 1** summarizes the various country specific focuses, policies and skills in this digital era.[8], [9]

Table 1. Country-Specific Focus, Policy and Skills

Country (15)	Focus	Policy	Skills
Australia	Sustainable maritime practices and technological resilience.	Promote advanced cybersecurity, digital port operations	Cybersecurity data analytics, automation management.
Canada	Safety, environmental sustainability, and digital innovation	Update certification standards, support adaptive training programs.	Data management, environmental monitoring, and remote vessel operations.
China	Large fleet, advanced shipbuilding, and port infrastructure.	Align national standards with IMO, promote advanced certifications in automation and cybersecurity.	Automation, data analytics, cyber threat management, and port digitalization.
Chinese Taipei	Innovation in maritime technology and research	: Support lifelong learning pathways, foster industry-academia collaboration	Digital navigation, IoT systems, and maritime R&D.

India	Large seafarer workforce, digital transformation	Standardize digital skills certifications, promote e-learning	Cybersecurity, digital navigation, automation.
Indonesia	Developing a large seafarer workforce, port modernization	Improve digital literacy, certification recognition	Digital navigation, safety, automation basics.
Japan	Robotics, AI, and autonomous ships	Support R&D, develop specialized training pathways.	AI, automation, systems engineering
Korea	High-tech shipbuilding, autonomous vessels.	Lead innovation, develop specialized certifications.	Robotics, AI, systems integration.
Malaysia	Developing a skilled seafarer workforce for global shipping hubs.	Standardize digital certification, promote continuous professional development	Digital literacy, automation, cybersecurity.
Papua New Guinea	Focus on Capacity building for local seafarers and integration into regional maritime frameworks.	Develop national digital competency standards and strengthen regional cooperation via the Pacific Islands Forum.	Basic digital literacy, safety management, and certification recognition.
Philippines	Largest global seafarer source, need for upskilling.	Expand digital training access, recognize digital certifications	Digital literacy, cyber awareness, e-navigation.

Singapore	Maritime digital hub, smart ports.	Harmonize regional standards, promote advanced certifications.	IoT, AI, port automation, cyber resilience.
Thailand	Regional shipping hub, port logistics.	Promote digital port management, upskill workforce.	IoT, digital documentation, automation.
USA	Cybersecurity, environmental standards.	Update certification standards, foster innovation.	Data analytics, cyber threat management, sustainable operations.
Vietnam	Growing maritime sector, workforce development.	Align training with international standards, promote regional cooperation.	Automation, cybersecurity, digital documentation.

The **policy and skills alignment** is not just a matter of adapting to change, but a crucial step towards ensuring the safety, efficiency, and sustainability of the maritime industry.

### 3.2 Key Challenges and Opportunities

The **Asia-Pacific region** is a global maritime hub, hosting major shipping nations, shipbuilding industries, and a large seafarer workforce. These rapid adoption of emerging technologies presents both **challenges and opportunities**.

**Challenges** include Resistance to change among traditional seafarers and experienced seafarers; Skill gaps in digital and technological competencies; Inadequate or outdated training frameworks; Limited awareness of career pathways in emerging tech sectors; Variability in policies across nations and companies; High costs associated with training and technology adoption; Cyber security vulnerabilities and risks; **and** Ensuring inclusivity and equal access to training globally across diverse communities. On the other hand, **Opportunities** include Enhanced safety, operational efficiency, and environmental performance; New career pathways in maritime digitalization, cybersecurity, automation, and maritime technology sectors; Improved environmental sustainability through optimized operations; Strengthening resilience and adaptability of the maritime workforce; Creating new employment

avenues, improving employability, and enhancing career progression prospects; and Leadership roles in maritime innovation and technology management.

### 3.3 Proposed Regional Policy and Training Framework

For **diverse nations** like those 15 countries listed on **Table 1, aligning skills and policies** is vital to ensure seafarers' career growth, safety, and industry competitiveness amid these technological shifts. Considering the specific context, strengths, and challenges of countries in embracing Emerging Technologies, a regional policy and training framework for the Asia-Pacific maritime sector is proposed to align seafarers' skills with emerging technologies in the maritime industry based on the principles for Regional and National Alignment. The **Five Principles for National and Regional Alignment** are Harmonization of standards to facilitate mobility and mutual recognition; Continuous skills development aligned with evolving industry needs; Inclusion of emerging technologies in education and certification frameworks; Promotion of industry-government collaboration for innovation and workforce resilience and Focus on sustainability, safety, cyber security, and soft skills alongside technical skills.[10], [11]

The **Vision** is to develop a **resilient, digitally literate global seafarer workforce**, capable of operating and managing advanced maritime technologies safely and efficiently. The **Objectives** are to integrate emerging technologies into maritime operations; Equip seafarers with relevant technical and soft skills; Foster continuous professional development; establish international and national standards for digital competencies and promote cybersecurity and safety awareness. **Table 2** presents the proposed national and regional strategic pillars with its objectives and strategic actions for skills and policy alignment.[12]

Table 2. Proposed Regional Strategic Pillars (National and Regional)

Regional Strategic Pillars	Objectives	Strategic frameworks and Actions for Skill and Policy Alignment
1. Regulatory, Standards Development, and <b>Harmonized Policy Development</b>	Develop a regional framework aligned with IMO standards, tailored to the Asia-Pacific context	<u>Policy and Regulatory Alignment</u> <b>a. Update International Standards</b> (International Maritime Organization) frameworks like the STCW



		<p>Convention must evolve to include digital competencies.</p> <ul style="list-style-type: none"><li>- Revise IMO's STCW Convention to embed digital and technological competencies.</li><li>- IMO<ul style="list-style-type: none"><li>- Establish certification pathways for emerging skills</li><li>- Establish a regional maritime digital competency standard through ASEAN, APEC, or BIMSTEC collaboration.</li><li>- Develop Certification Standards</li><li>- Establish globally recognized certifications in digital competencies</li><li>- Promote mutual recognition of digital certifications and qualifications)</li><li>- Establish mentorship and career development schemes.</li><li>- Facilitate regional and global networking platforms.</li></ul></li></ul> <p><b>b. National Policy Initiatives</b> (Countries should develop national strategies for</p>			<p>digital skills, certifications, and continuous professional development.)</p> <ul style="list-style-type: none"><li>- Establish national policies for digital skills accreditation</li><li>- Develop national frameworks for continuous professional development (CPD).</li><li>- Incentivize maritime companies to invest in training and career development.</li><li>- Recognize and credential digital skills formally.</li><li>- Ensure inclusive policies by addressing digital divides to include seafarers from developing regions.</li></ul> <p><b>c. Port and Industry Engagement and Collaboration</b> (Harmonized policies across ports, shipping companies, and regulatory bodies to facilitate seamless technology adoption.)</p> <ul style="list-style-type: none"><li>- Promote industry-led training programs.</li></ul> <p><b>d. Safety and Security</b></p>
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		<b>Regulations</b> <ul style="list-style-type: none"> <li>- Update protocols to address cybersecurity risks and automation safety standards.</li> <li>- .Coordinate cyber security policies to protect maritime infrastructure</li> </ul>			<b>Progression</b> <p><b>a. Core Digital Skills</b></p> <ul style="list-style-type: none"> <li>- Operating automated and integrated systems.</li> <li>- Cybersecurity awareness and best practices. (Protecting vessels and data from cyber threats.)</li> <li>- Data analytics and decision support tools.</li> <li>- Digital documentation and blockchain literacy.</li> </ul> <p><b>b. Specialized Technical Skills</b></p> <ul style="list-style-type: none"> <li>- Maintenance, Operating, and troubleshooting of automation and Digital systems.</li> <li>- Software programming and system integration.</li> <li>- Cybersecurity incident management.</li> </ul> <p><b>c. Soft Skills</b></p> <ul style="list-style-type: none"> <li>- Adaptability and lifelong learning mindset.</li> <li>- Leadership in technological change.</li> <li>- Problem-solving and critical thinking. In dynam2.2ic environments.</li> <li>- Cross-cultural communication in digital environments.</li> </ul> <p><b>d. Career Pathways</b></p> <ul style="list-style-type: none"> <li>- Technical specialist roles</li> </ul>
2. Strengthen Maritime Education and Skill Development	Upgrade maritime education institutions to include emerging tech.	<b>1. Curriculum Development</b> <ul style="list-style-type: none"> <li>- Integrate Technology Training into Maritime Education</li> <li>- Update or revise maritime curricula by integrating digital skills (digital literacy, automation, cyber safety, and data analytics)</li> <li>- Facilitate exchange programs among regional maritime academies.</li> <li>- Promote industry-academia partnerships for practical training, and</li> <li>- Develop specialized certification programs in maritime technology</li> </ul> <b>2. Training Needs, Competency, and Skill Development for Career</b>			



		<p>(e.g., automation, cybersecurity).</p> <ul style="list-style-type: none"> <li>- Digital officers or cyber safety managers.</li> <li>- Maritime data analysts or IT coordinators.</li> <li>- Leadership roles in innovation and digital transformation</li> </ul> <p><u>3. Career Development Programs</u></p> <p>a. <b>Continuous Learning &amp; Upskilling</b></p> <ul style="list-style-type: none"> <li>- E-learning platforms, webinars, and virtual classrooms.</li> <li>- Short-term certification courses in digital and tech skills.</li> <li>- Industry internships and secondments in tech-focused roles.</li> </ul> <p>b. <b>Talent Identification &amp; Succession Planning</b></p> <ul style="list-style-type: none"> <li>- Use digital tools to identify high-potential seafarers.</li> <li>- Create clear career ladders with progression milestones.</li> <li>- Support leadership development in tech-driven roles.</li> </ul> <p>c. <b>Supportive Policies</b></p> <ul style="list-style-type: none"> <li>- Flexible training options</li> </ul>			<p>for working seafarers.</p> <ul style="list-style-type: none"> <li>- Recognition of prior learning and experience.</li> <li>- Career counselling and guidance services.</li> </ul>
	<b>3. Industry and Government Collaboration</b>	Foster public-private partnerships to pilot innovative solutions—			<ol style="list-style-type: none"> <li>1. Support regional innovation hubs for maritime technology</li> <li>2. Encourage shipping companies to adopt digital tools and share best practices</li> <li>3. Develop regional pilot projects for autonomous ships and smart ports.</li> <li>4 Collaborate with tech companies for training and innovation. and</li> <li>5. Facilitate knowledge exchange and joint innovation projects.</li> </ol>
	<b>4. Infrastructure, Resources, and Digital Ecosystem</b>	Invest in digital infrastructure (simulators, e-learning platforms, and digital laboratories), port modernization, and cyber security.			<ol style="list-style-type: none"> <li>1. Upgrade port facilities with IoT and automation.</li> <li>2. Implement secure digital communication systems.</li> <li>3. Create regional cybersecurity frameworks.</li> <li>4. Ensure access to up-to-date technology on ships and at training centers.</li> <li>5. Coordinate cyber security policies to protect</li> </ol>



		maritime infrastructure
5.. <b>Monitoring, Evaluation, and Continuous Improvement</b>	Track progress and adapt policies.	1. Establish a regional maritime digital skills task force 2. Conduct regular assessments of skills development programs 3. Foster Lifelong Learning (Encourage ongoing professional development and adaptive learning platforms) 4. Share best practices and 5. Ensure regular feedback mechanisms for continuous policy refinement.

### 3.4 Asia-Pacific Region- Specific Recommendations & Focus Areas Format of the Paragraph

- **South Korea & Japan**
  - Leverage advanced shipbuilding and technology R&D capabilities.
  - Focus on autonomous ships, AI, and robotics.
  - Enhance cyber resilience strategies.
- **China**
  - Scale digital transformation in ports like Shanghai and Shenzhen.
  - Promote digital skills in the large seafarer workforce.
  - Develop domestic certification standards aligned with international norms.
- **Singapore & Malaysia**
  - Act as regional digital innovation hubs.
  - Foster innovative port initiatives and maritime digital ecosystems.
  - Strengthen cybersecurity frameworks.
- **Philippines & Vietnam**
  - Up skill large seafarer populations for digital competencies.
  - Develop affordable, accessible training programs.

- Promote regional cooperation on seafarer welfare and certification.
- **Thailand & Australia**
  - Focus on sustainable maritime practices with digital tools.
  - Enhance cybersecurity and safety standards.
  - Support regional research and development initiatives.

## 4. RECOMMENDATIONS

This section provides Strategic, Implementation, Modules and Training Program recommendations.

### 4.1 Common Strategic Recommendations

- *Harmonize Standards & Certifications-* Develop regional frameworks for digital competencies, mutual recognition, and portability of certifications.
- *Strengthen Education & Training-* Incorporate emerging tech modules into maritime curricula and also Promote online learning, simulators, and industry internships.
- *Promote Industry-Government Collaboration-* Foster public-private partnerships for innovation hubs and pilot projects and encourage shipping companies to invest in crew upskilling.
- *Focus on Soft Skills & Leadership-* Equip seafarers with adaptability, problem-solving, and leadership skills for tech-driven environments.
- *Invest in Infrastructure & Cybersecurity-* Modernize port and vessel digital infrastructure and Implement regional cybersecurity frameworks.

### 4.2 Implementation Recommendations

- Phased Rollout:- Pilot programs in key maritime hubs, followed by global expansion.
- Funding and Incentives: Grants, subsidies, and recognition for early adopters.
- Inclusion: Ensure training is accessible to seafarers from diverse backgrounds and regions.
- Collaboration with Industry: Leverage industry expertise and real-world scenarios.

These require a collaborative effort among **maritime authorities** for Policy oversight, certification standards, and funding. The **maritime education and Training Institutions** are responsible for curriculum development and delivery, as well as assessment. [13] **Shipping companies** should actively facilitate the on-the-job training and career development of seafarers,

particularly those who must be passionate about training, acquire new skills, and pursue career advancement. **Table 3** summarizes the recommended action plan for implementing skills and policy alignment .[12], [13]

Table 3. Recommended Implementation Roadmap

<b>SHORT TERM</b> (1-2 years)		Policy harmonization, pilot projects, curriculum updates / establish regional task forces, initiate pilot training programs, update maritime curricula		
Phase	Time Frame	Key Activities	Responsible Parties	Expected Outcomes
<b>1 Initiation</b>	0-6 months	Establish a regional and national task force; conduct a needs assessment, and develop a curriculum outline.	Maritime authorities, industry bodies	Clear understanding of skill gaps and training needs.
<b>2. Development</b>	6-12 months	Develop training modules; Update curriculum and certification standards, and partner with training providers	Training institutions, Maritime academies, regulators and industry partners	Ready-to-implement training programs and standards
<b>3. Implementation</b>	12-24 months	Pilot training programs; launch online learning platforms, and integrate digital skills into certification	Maritime authorities, companies, and academies	Increase digital literacy and skills among seafarers

<b>4. Evaluation &amp; Expansion</b>	24+ months	Monitor progress, gather feedback and scale successful programs	All stakeholders	Broader adoption, continuous improvement, and sustainable career pathway
<b>MEDIUM TERM</b> (3-5 years)		Expansion of training, infrastructure upgrades, certification standardization; Scale successful pilots, upgrade port and vessel digital infrastructure, and mutual recognition of certifications		
<b>LONG TERM</b> (5+ years)		Full integration, continuous innovation, <b>regional leadership</b> ; Maintain adaptive policies, foster innovation hubs, lead global maritime digital standards		

#### 4.3 Recommended Module and Training Program in the Era of Emerging Technologies

Objective: To prepare the maritime workforce for the future, ensuring safety, security, and operational excellence in the face of technological advancements.[11] Continuous review and stakeholder engagement are vital for its success. **Table 4** provides the contents of the modules for the training program .

Table 4 Module Contents for the Training Program

Modules	Contents
<b>Module 1:</b> Introduction to Digital Maritime Environment	Overview of <b>emerging technologies</b> ( automation, AI, IoT, and digitalization etc.) in the maritime industry Its Impact on seafarer roles Its Impact on safety, efficiency, and environmental sustainability. Future industry trends and career opportunities
<b>Module 2:</b> Digital Skills and Technologies	Operating automated systems and ship management –software- Hands-on training on vessel automation



	<p>systems.</p> <p>Understanding IoT sensors and data collection</p> <p>Basics of cybersecurity for seafarers ( Best practices for cybersecurity, data integrity, and incident response)</p> <p>Cyber hygiene and safe use of digital tools.</p> <p>Digital documentation and blockchain applications</p>
<p><b>Module 3:</b> Maintenance and Troubleshooting of Digital Systems</p> <p>- -</p>	<p>Diagnosing issues in automation and control systems</p> <p>Routine maintenance of IoT devices</p> <p>Troubleshooting cybersecurity threats and emergency response procedures</p>
<p><b>Module 4:</b> Data Analytics and Decision-Making</p>	<p>Introduction to Data Analysis Tools</p> <p>Basics of data collection, analysis, and visualization.</p> <p>Using data for safety, navigation, and efficiency</p> <p>Using data analytics for route planning, maintenance, and safety management.</p> <p>Case studies on data-driven decision-making</p>
<p><b>Module 5:</b> Digital Communication and Documentation</p>	<p>Secure digital communication protocols.</p> <p>Electronic documentation, certificates, and blockchain applications.</p>
<p><b>Module 6:</b> Soft Skills for the Digital Era</p>	<p>Change Management and adaptability</p> <p>Critical thinking, problem-solving, and innovation.</p> <p>Leadership and teamwork in technologically advanced environments.</p>
<p><b>Module 7:</b> Career Pathways, Continuous Learning Development, and Certification</p>	<p>Access to online courses, webinars, and industry updates.</p> <p>Certification pathways aligned with international standards for advanced skills</p> <p>Opportunities in maritime</p>

	<p>digitalization, cybersecurity, and data science</p> <p>Mentoring, networking, and lifelong learning resources</p>
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**Delivery Methods:** E-learning modules and webinars, Simulator-based practical training, On-the-job digital competency assessments, and Industry workshops and seminars. [13]

## 5. CONCLUSIONS

Aligning seafarers' skills and policies with emerging technologies is crucial for the future resilience and competitiveness of the maritime industry. It requires a collaborative approach involving international standards, national policies, industry initiatives, and continuous education to equip seafarers with the capabilities needed in an increasingly digital and automated maritime environment. By fostering continuous learning, updating regulatory frameworks, and establishing clear career pathways, the maritime sector can attract, retain, and advance talented professionals who are prepared for the digital age.

On the other hand, aligning seafarers' skills and policies across these diverse nations requires a collaborative, flexible, and forward-looking approach. Emphasizing digital literacy, industry partnerships, and continuous professional development will ensure seafarers are prepared for the technological future, supporting career growth and maritime industry resilience.

The **Asia-Pacific region's maritime sector**, through APEC SEN, can capitalize on **emerging technologies** by developing a harmonized, inclusive, and forward-looking regional policy and training ecosystem. This approach will enhance safety, competitiveness, and sustainability, positioning the region as a global leader in maritime innovation.

For the Seafarers' Skills and Policy Alignment in an Era of Emerging Technologies, the implementation strategies and action plans can be summarized using the mnemonic **APEC SEN**. Mnemonic is a technique where a pattern of letters, ideas, or associations for example using **action verbs** assists us in remembering something. **Let us APEC SEN :**

**A – Advance** the state-of-the-art training facilities, e-learning platforms, and existing training curricula to include digital modules.

**P - Promote** lifelong learning and up-skilling aligned with industry needs, and promote awareness campaigns on digital career opportunities.



E – **Encourage** all Seafarers to acquire relevant digital skills for career advancement

C - **Collaborate** with maritime training institutions, industry players, and international bodies for skills development to create sustainable career pathways in the digital marine industry.

S - **Standardize** certification and qualification frameworks for emerging skills across countries by committing to integrating digital competencies into seafarer training and certification.

E – **Evaluate and monitor** the skill development outcomes regularly, in recognition of digital skills as integral to career advancement.

N- **Never give up** in supporting lifelong learning and recognizing new competencies for the continuous professional development, focusing on digital skills and emerging technologies, to enhance career progression opportunities for seafarers.

## 6. REFERENCES

- [1] APEC SEN and AMFUF previous meetings and discussion.
- [2] Baylon, AM, Dragomir, C.M., 2022, “*Next type of maritime leaders for a sustainable global future maritime business*”, Handbook of Research on the Future of the Maritime Industry, pp 268-289.
- [3] Dragomir, C.M., Utureanu, S., 2022, „*Overview on Romanian Highschool Students' Attractiveness for Maritime Transport Studies*”, OVIDIUS University Annals Economic Sciences series, Vol. XXII, Issue 2, pp 51-57, Constanta, Romania.
- [4] Dragomir, C.M., Utureanu, S., 2022, „*Careers in Maritime Transport - Gender Equality and Climate Change Perspectives*”, OVIDIUS University Annals Economic Sciences series, Vol. XXII, Issue 2, pp 58-67, Constanta, Romania.
- [5] Dragomir C.M., Baylon A., Bauk, S., 2025, “*Updating STCW with rubric-based criteria for evaluation in the context of AI/GPTs - human collaborative MET learning*”, IAMU proposed project.
- [6] Education Projects - Keid In Electrical Wynnum. <https://keidinelectrical.com.au/project/education/>.
- [7] Jin Kii Seor (2022) “Post COVID-19 Reaction: APEC SEN Distance Learning Platform for Seafarers” <https://aimp2.apec.org/sites/PDB/Lists/Proposals/DispForm.aspx?ID=2872>
- [8] Maritime Industry Outlook (2025) | StartUs Insights. <https://www.startus-insights.com/innovators-guide/maritime-industry-outlook/>
- [9] OGP National Handbook Implementing an Action Plan and Commitments (2025) <https://www.opengovpartnership.org/national-handbook/implementing-action-plans/>
- [10] Reports, S., 2024, “*Sonoma County Winegrowers Toast New Partnership with Acrisure Arena and Coachella Valley Firebirds*”, The Public Record, 53(52), 1-2.
- [11] Ross C. Brownson, Elizabeth A. Baker, Terry L. Leet, Kathleen N. Gillespie, William R. True, 2010, “*Developing an Action Plan and Implementing Interventions*”, pp 206–231.
- [12] Top 10 Trends in Maritime Industry, 2025, “*Start Us Insights*”, <https://www.startus-insights.com/innovators-guide/maritime-trends-innovations/>.
- [13] Nas, S., Celik, B., 2012, “*The academician profiles of maritime higher education institutions in Turkey*”, Journal of Marine Technology and Environment, Vol. 2, pp 105-114, Nautica publish House Constanta, Romania.