

The Importance of Career Development Programs for Korean Seafarers: Case Studies from Key Shipping Countries

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Abstract: *This study examines the necessity of implementing Career Development Programs for seafarers(CDPs) in Korea, drawing insights from major shipping countries. The research highlights the mandatory nature of CDPs under the Maritime Labour Convention (MLC) and their potential economic benefits, including job creation for young people. Through CDP implementation, Korea could potentially create employment for an average of 4,613 maritime officers annually in the international merchant fleet and 1,450 in the domestic fleet from 2024 to 2034. The study analyzes CDP practices in countries like Norway, the UK, Germany, and Japan, revealing varying approaches to seafarer career development. It emphasizes the importance of CDPs in enhancing the competitiveness of the maritime industry, facilitating career transitions, and addressing the global shortage of qualified seafarers. The research also underscores Korea's unique national characteristics, including its reliance on maritime transport and the potential role of seafarers as a fourth military branch, which necessitate maintaining a strong national maritime workforce. The study concludes by advocating for government-led development and funding of CDPs as a crucial strategy for fostering senior maritime officers and encouraging long-term onboard service in Korea.*

Keywords: Career Development Programs for Seafarers; Shipping Industry; Maritime Labour Convention

1. Introduction

The global shipping industry is facing a significant shortage of seafarers, with a deficit of approximately 26,240 as of 2021 [1]. To support the expanding shipping market, the supply of seafarers needs to increase by about 2% annually until 2026 [1]. This shortage has led global shipping companies to intensify their efforts to secure high-quality seafarers, both for their own sustainability and the development of their respective national shipping industries [2].

Korea's shipping industry has developed uniquely, with seafarer training and overseas employment playing a crucial role in acquiring ships and shipping management expertise [3]. In the 1970s and 1980s, foreign currency earnings from Korean seafarers working abroad helped lift the country out of poverty [4]. This development path has enabled Korea to become an influential member of the International Maritime Organization ("IMO") Council Group A, actively participating in IMO diplomatic meetings and activities [3].

However, the Korean shipping industry now faces challenges with increasing seafarer turnover rates, rising from 2.5% in 2013 to 17.7% in 2022 [5]. This high turnover can lead to communication issues between experienced ship officers and less experienced onshore staff, as well as reduced motivation for senior seafarers to remain onboard.

To address these challenges, Career Development Programmes for seafarers (“CDPs”) are recognized as an effective tool. Standard A2.8 of the Maritime Labour Convention (“MLC”),¹ which Korea has ratified, requires each Member State to establish national policies for the promotion of career and skills development and employment opportunities in order to provide a stable and competent workforce for the shipping industry. CDPs help seafarers set long-term career goals, develop plans to achieve them, and continuously improve their skills. By providing a professional vision and alleviating anxiety about the future, CDPs can contribute to reducing turnover rates and retaining seafarers in the long term [6].

Currently, Korea has a limited CDPs. Implementing CDPs could help address the issues related to seafarer supply and demand, while also strengthening the competitiveness of the Korean shipping industry. Further analysis of CDP implementation in major shipping nations could provide valuable insights for developing effective programmes in Korea.

2. Research Methodology

This study employs a mixed-methods approach to investigate the necessity of implementing CDPs for Korean seafarers, drawing insights from major shipping countries. The research combines literature reviews, case studies and policy analysis to provide a comprehensive understanding of CDPs in the maritime industry. Firstly, the literature review focuses on understanding the global context of seafarer shortages and the role of CDPs in major shipping countries. It examines existing literature on maritime labor conventions, seafarer workforce reports, and case studies from countries like Norway, the UK, Germany, and Japan. Key sources include academic journals, industry reports such as the Baltic and International Maritime Council (“BIMCO”) Seafarer Workforce Report, and government publications. Secondly, Case studies analyze successful CDP models in key shipping nations. For instance, Norway's 'Maritime Career Campaign' is a collaborative program aimed at raising awareness about the maritime industry among young people, providing education and qualification systems, and outlining onshore career paths. This campaign is funded by the Norwegian Maritime Competence Foundation, which is supported by the industry. Such models provide valuable insights for developing effective CDPs in Korea. Thirdly, this study assesses the current state of Korean seafarers and projects future employment needs. It utilizes data from the BIMCO Seafarer Workforce Report and Korea's seafarer statistical yearbooks to analyze trends in seafarer employment and forecast future shortages. The analysis highlights the potential for CDPs to create employment opportunities for Korean seafarers in both domestic and international fleets. Lastly, Policy analysis evaluates the legal and policy framework supporting CDPs in Korea. It examines the MLC and its implications for national policies on seafarer career development. The study underscores the role of government in developing and funding CDPs as a strategic approach to fostering a strong national maritime workforce. This study integrates insights from various methodologies to advocate for government-led development and funding of CDPs as a crucial strategy for enhancing the competitiveness of Korea's maritime industry and addressing the global shortage of qualified seafarers. By implementing effective CDPs, Korea can create sustainable employment opportunities for its seafarers and strengthen its position in the global shipping market.

3. Korean Seafarer Workforce and the Need for Career Development Programs for Korean Seafarers: Challenges and Emerging Trends

3.1 Status of Korean Seafarer Supply

According to the 2021 BIMCO Seafarer Workforce Report, an additional 89,510 seafarers will be needed for global merchant fleet operations by 2026 [1]. As a result, major shipping countries have emphasized the need to proactively improve seafarer education, employment, and welfare levels over the next five years, anticipating a severe global shortage in the total seafarer supply [7]. To address this global seafarer shortage, the Ministry of Oceans and Fisheries of the Republic of Korea annually compiles and publishes seafarer statistics to assess the status of its national seafarers and use them as foundational data for developing comprehensive national seafarer policies [3]. As shown in Table 1, the number of employed Korean seafarers decreased from 34,751 in 2019 to 30,587 in 2023 [5].

¹ Maritime Labour Convention (MLC) 2006, which was adopted on 23 Feb 2006 and entered into force on 20 Aug 2013, is the global instrument mandating seafarers' employment rights and decent working conditions.

Conversely, the number of foreign seafarers from five countries employed by Korean shipping companies has been steadily increasing as illustrated in Table 2. In 2021, a total of 27,333 foreign seafarers were employed to replace Korean seafarers. Specifically, Korean shipping companies employ the most seafarers from Indonesia, followed by the Philippines, Myanmar, Vietnam, China, and others in that order. Based on these statistical trends, the influx of foreign seafarers may negatively impact the domestic seafarer training system, potentially leading to a subsequent decrease in the supply of competent seafarers. As of 2023, designated maritime education institutions in Korea are training approximately 1,403 seafarers annually. However, maintaining a virtuous cycle of training competent seafarers and providing sustainable employment and welfare may become challenging.

Table 1. Number of Korean National Seafarers

	2018	2019	2020	2021	2022	2023
Total	34,751	34,123	33,565	32,510	31,867	30,587
Domestic	31,795	31,214	31,035	30,337	29,919	28,864
International Voyage	16,416	16,179	16,060	15,652	15,501	16,152
Fishing Vessel Crew	15,379	15,035	14,975	14,685	14,418	12,712
Overseas Employed	2,956	2,909	2,530	2,173	1,948	1,723

Source: Korea seafarer's statistical year book 2024.

Table 2. Employment Status of Foreign Seafarers in the Last 5 Years

Year	Nationality (Unit: person)						
	Total	China	Indonesia	Vietnam	Myanmar	Philippines	Etc.
2017	25,301	1,669	8,275	4,720	4,512	5,903	222
2018	26,321	1,501	9,084	5,355	4,346	5,779	256
2019	26,331	1,304	9,498	5,452	4,306	5,557	214
2020	26,775	978	10,699	5,025	4,376	5,464	233
2021	27,333	625	11,166	4,405	4,653	5,880	604
2022	28,281	337	11,985	4,115	4,719	6,357	111
2023	30,436	218	13,107	4,322	5,025	6,878	151

Source: Korea seafarer's statistical year book 2024.

3.2 Definition of Career development programmes for Seafarers

CDPs are commonly referred to by a variety of names, including career development programmes, career management programme and job development programmes [8]. A career is the progression of work-related experience gained by an individual over a continuous period of time [8]. A career development programme is a plan designed to match an employee's skills, needs and career goals with current and future opportunities within an organisation, and is a programme that supports and promotes the long-term, continuous career development of an individual [9]. Generally, career development occurs throughout an individual's working life and is a workplace opportunity, and a career development programme can also help an employee enhance their skills or transition to a different career path [9].

In the shipping sector, CDP is defined as a human resource management process that enables seafarers to set long-term career goals and develop career plans to achieve them over the course of their working lives [10]. In particular, Standard A2.8 of MLC requires Member States to provide seafarer career development

programmes for seafarers. In addition, regulation 2.2 of MLC states that national policies should aim to support seafarers to enhance their skills, qualifications and employment opportunities. In particular, it clarifies that States should establish, after consultation with shipowners' and seafarers' organisations, clear objectives for career guidance and education and training for seafarers, including continuing education. Support for the provision of seafarer career development programmes to seafarers is a fundamental State responsibility under Article 2.8 of the MLC. States should therefore play a priority role in supporting the development of career pathways for seafarers as a driving force for the development of the maritime industry and in funding the provision of seafarer career development programmes.

The career path of a seafarer is as follows: applying for a job as a seafarer, working at sea, working ashore (shore rotation), and retiring [10]. If you are satisfied with your work at sea, you will be promoted and stay on board for life until retirement, but if there is a reason to stop working at sea, you will disembark and work ashore before retiring [11]. They may also re-board if they are motivated to return to sea after a career ashore. The CDP is a programme that identifies and meets the skills required for the next stage of life at each life stage. There are a wide range of occupations that support and work in conjunction with the shipping industry, both at the front and back end of the industry, that require people with a maritime background [12]. In the UK, traditional shipping country, many employers require people with sea-based experience and skills to fulfil specific onshore jobs in the UK economy, with the number of jobs ranging from 13,620 to 17,744, with an average of 15,682 [13].

The unique nature of seafarer poses challenges for those seeking to transition to shore-based shipping industries [12]. The isolation inherent in onboard work often hinders access to crucial information, forcing seafarers to rely heavily on their own initiative to gather the necessary details for a career change. Paradoxically, as seafarers accumulate experience, their advancing age, higher rank, and increased compensation can actually limit their shore-based opportunities. This phenomenon often encourages younger seafarers to consider an earlier transition to shore-based roles.

Career development and securing suitable employment necessitate goal-setting, acquiring relevant qualifications, gaining pertinent experience, and networking within the industry [14]. However, for seafarers, pursuing these objectives independently can be arduous, challenging, and potentially costly in terms of both time and financial resources. To address these issues, a collaborative effort is required from educational institutions, industry stakeholders, and policymakers. They need to develop and implement comprehensive professional career development programmes tailored to the specific goals of maritime professionals. Such initiatives would enhance the feasibility and predictability of transitioning to shore-based careers, providing seafarers with the expertise needed for successful career shifts.

3.3 The Need for Career Development Programs for Korean Seafarers

According to the Drewry Manning Annual Review & Forecast (2024-2025), projections for 2029 indicate that the global merchant fleet will expand by 3,574 vessels, reaching a total of 66,651 ships [15]. This growth will drive demand for 756,718 masters, while the available supply is expected to be 718,662, resulting in a shortage of 38,056 masters (-5.03%) [15]. Although the shortage of pilots on nationally flagged vessels has been addressed by hiring foreign seafarers, challenges in securing qualified foreign pilots may arise in the future [15]. Additionally, increasing reliance on foreign pilots may lead to a shortage of domestic junior pilots, causing an imbalance between senior and junior ranks and potentially disrupting the continuity of national pilot expertise. The overall number of seafarers is expected to decline further, as younger generations increasingly avoid long-term maritime careers due to improvements in quality of life. In South Korea, this issue is exacerbated by a demographic decline, reducing the number of school-aged individuals and subsequently decreasing enrollment in maritime education institutions. Furthermore, the planned abolition of the military service system that has traditionally helped retain entry-level seafarers—expected after 2026 due to population decline—will likely contribute to this downward trend [16].

To address these challenges, onboard mariners must enhance their competitiveness and ensure the safe operation of vessels by strengthening vocational education aligned with technological advancements in the shipping industry. Additionally, refresher training courses should be developed for maritime officers transitioning back to sea after extended periods onshore. However, the cost and time required for such qualifications, coupled with the frequent job changes in the maritime sector, place a significant burden on individual seafarers and shipowners responsible for funding vocational training.

Thus, CDPs are essential in three key areas:

- **Vocational Skills Development:** Training programmes should be designed to enhance seafarers' skills, support their return to sea after onshore experience, and improve their overall competitiveness. This would increase the supply of Korean seafarers and promote long-term employment in the sector.
- **Professional Development for Shore-Based Transitions:** Structured career programmes should provide maritime professionals with the necessary expertise to transition into shore-based roles, aligning with their personal career goals.
- **National-Level Seafarer Management:** The state should recognize seafarers as strategic assets critical to economic and national security. In line with obligations under MLC, policymakers, industry stakeholders, and educational institutions must collaborate to implement career development initiatives that enhance seafarer skills and facilitate their return to the maritime workforce [17].

By prioritizing these strategies, the maritime sector can ensure a sustainable workforce and strengthen the long-term stability of the industry.

4. Case Studies

4.1 Norway

The Norwegian maritime industry grew rapidly in the late 19th century due to a combination of geography, history, and maritime culture, coinciding with the increase in maritime trade [18]. Norway has played a leading role in various maritime industries, including offshore oil and gas in the North Sea, coastal shipping, and international navigation [19]. As the country with the second-largest number of national seafarers in Europe after Poland, Norway is promoting continuous development of its maritime industry. According to the 'European Union Seafarers Statistics 2022' report published by EMSA in 2024, the total number of masters and officers holding valid EU-level certificates of competency is 171,539 [20]. Norway has approximately 17,563 masters and officers with STCW certificates of competency, ranking second in the European Union after Poland [20].

Norway's representative CDP is the 'Maritime Career Campaign'. This is a collaborative program between the Norwegian Shipowner's Association and Maritimt Forum (maritime cluster) aimed at raising awareness about the importance of the maritime industry among the younger generation [19]. Through various content, it presents the current job situation in the maritime industry, education and qualification systems, and a roadmap for onshore career paths. Funding is provided by the 'Stiftelsen Norsk Maritim Kompetanse' (Norwegian Maritime Competence Foundation), which is financed by the industry, including the Norwegian Shipowner's Association [19].

The Norwegian Maritime Competence Foundation (SNMK) works to enhance the competence of Norwegian seafarers and support recruitment initiatives. Its main tasks include supporting training and education for seafarer qualifications, and collaborating with maritime cluster organizations for personnel development and support [21]. In particular, it provides detailed information on onshore jobs in the maritime industry, including job classifications, qualification requirements, educational requirements, and prospects. It presents comprehensive information not only on seafaring career development but also on onshore maritime careers [21].

The rapid changes in the maritime industry necessitate capacity building in digitalization, new technologies, information security, and new operational patterns. The Maritime Career Campaign provides and expands lifelong learning programs, offering educational opportunities not only to those in the maritime industry but also to the general public. Key programs include introduction to seafaring careers, educational courses and qualification systems, roadmaps for onshore careers, information on various jobs in the shipping industry, training of ambassadors to promote the attractiveness of seafaring careers, providing information on seafarer education institutions, and offering key figures on the maritime industry and educational information that can lead to careers in the industry [22].

In a survey conducted by the Norwegian Shipowner's Association on what competencies shipping companies will need over the next decade as the shipping industry becomes decarbonized and digitalized, 'seafaring experience' was emphasized as highly necessary [19]. It is deemed essential to have career transitions and development for onshore jobs based on seafaring experience in the increasingly advanced shipping industry.

4.2 UK

The United Kingdom has developed shipbuilding and navigation techniques since the Age of Exploration. Currently, over 95% of logistics are transported by ships. Annually, 65 million people use maritime passenger transport [23]. The UK maritime industry contributes approximately £7.6 billion to the economy and employs about 100,000 workers [23]. The UK maritime industry is competitive both domestically and internationally. As of 2023, about 24,100 UK seafarers are active at sea, which is 2% lower than pre-pandemic figures in 2019 [24]. This includes 10,930 Certificated Officers, 10,180 ratings, and 1,540 Uncertificated Officers. "Uncertificated Officers" refer to those working in technical, catering, or hotel-related duties in the cruise and ferry sectors without seafarer qualifications [24]. The UK Maritime and Coastguard Agency has issued 41,930 licenses, of which 14,960 (about 36%) were issued to UK nationals [24].

According to the Maritime 2050 People Route Map announced by the UK government, it mentions the development of maritime professional training and career development programs at the national level for continuous development of the maritime industry [25]. The UK government has established recommendations in four areas: first, motivation; second, expansion of the professional talent pool; third, skills and training; and fourth, career development. The Maritime Skills Commission (MSC) is an organization jointly established by Maritime UK and the UK Department for Transport [25]. It was established to secure a supply of talented professionals in the shipping sector to provide services to all sectors including shipping, ports, marine leisure, engineering, marine science, and professional services. The MSC is currently running 11 projects, including the Careers in Maritime Ashore program, which aims to transition careers from sea to shore.² The goals of Careers in Maritime Ashore include: Increasing interest in the maritime industry within schools and universities, Providing courses for seafarer applicants aged 16 and above, Improving accessibility to maritime-related industries, Building a pool of skilled job seekers for employers, Ensuring top-level excellence in maritime-based industries. One of the achievements of Careers in Maritime Ashore is the development of the Certificate in Maritime Studies. This course is designed for individuals aged 16 and above, including youth or job seekers looking to transition into the maritime field, aiming to provide comprehensive knowledge required in shore-based maritime industries in a short period.

The UK also operates career programs through the Marine Society, the world's first charity established for seafarers. Its origins date back to the 18th century when it trained boys to assist the British Navy and recruited sailors. After World War II, it expanded to provide seafarer education and merged with Sea Cadet in 2004 [26]. Key initiatives include: Providing scholarships for seafarers to develop themselves while maintaining their livelihoods, Offering government-approved onboard training programs, Encouraging seafarers to transition to shore-based roles through mentoring, Implementing the Sea to Shore Industry Placement Scheme (SSIPS) [26].

The SSIPS program allows maritime industry employers seeking to hire candidates with seafaring experience to register on the Marine Society website. It provides a service connecting seafarers looking to transition to shore-based roles with potential employers. The website also introduces several job placement agencies specializing in shore-based maritime careers. To prevent failures when transitioning to shore-based roles with limited information, a separate mentoring scheme is provided. A pool of volunteer mentors from experienced shore-based officers is maintained, with about 64 mentors currently active, having backgrounds in insurance, law, ship surveying, and ship brokerage [26].

According to internal data from the Marine Society, the age distribution of UK officers seeking to develop shore-based careers shows that 47% are between 25-34 years old, followed by 33% in the 35-44 age group, indicating a concentration in the young to middle-aged demographic. Additionally, mobile and web-based educational content is developed and provided to support continuous career development for seafarers. According to the 2023 performance report, 133 seafarers registered for shore-based transitions, with 21 successfully moving into shore-based positions [27].

² • Labour Market Intelligence Scoping Report, Cadet Training & Modernisation (CT&M) Programme • Careers in Maritime Ashore • Seafarer Cadet Review • Digital Learning • Exporting Maritime, Education and Training • Future Ports Workforce • Review into Unnecessary Barriers for recruiting UK Ratings • Skills for Green Jobs • Seafarer Cadet Review • People, Behaviours and Soft Skills

4.3 Germany

Germany's maritime industry holds a significant position globally, particularly excelling in shipbuilding and shipping. The shipbuilding industry has strengths in constructing cruise ships, ferries, and specialized vessels for offshore wind farms. Germany possesses world-class competitiveness in the container shipping sector, with German-flagged merchant ships accounting for about 4.5% of the world's merchant fleet [28]. Notably, in container vessels, Germany ranks second globally in market share. The German shipping industry creates approximately 480,000 jobs and generates over 30 billion euros in annual economic value. Additionally, about 86,000 people are employed in shipping-related occupations [29]. The German Federal Maritime and Hydrographic Agency (BSH) is implementing a program to transition careers in marine engineering (metallurgical engineering) and electrical technology to maritime careers [29]. Those who hold a final examination certificate in vocational education in metallurgy or electrical engineering can reduce their practical training and sea service as an electrical assistant from 18 months to 12 months [30]. The program targets professionals in marine engineering and electrical technology fields who wish to transition to maritime careers. Prerequisites for this maritime career transition include: Suitability for sea service and Mandatory practical training and sea service [30].

This initiative aims to facilitate the entry of skilled professionals from related fields into maritime careers, addressing the industry's need for qualified personnel while offering new career opportunities to individuals with relevant technical backgrounds.

4.4 Japan

Despite the significant impact of the shipping industry on Japan's national economy, there was a sharp decline in the number of national maritime officers in the late 20th century. This decline was due to social changes, with younger generations avoiding onboard work. In response, through a tripartite agreement between labor, management, and government, Japan established an overseas maritime officer training academy in the Philippines. As a result, by 2008, foreign crew members accounted for 98% of the Japanese merchant fleet. The number of Japanese national crew members decreased from 99,520 in the 2000s to 63,375 in 2021, a reduction of 36,000. Among these, ocean-going merchant sailors decreased from 5,030 to 2,165 in 2021, while coastal merchant sailors decreased from 37,058 to 28,625. The number of national fishery workers also decreased by about 20,000 [31]. Despite Japan being the world's third-largest shipping power in terms of fleet size, most of its officers and crew, including ratings, have been replaced by foreign seafarers. Unlike other European countries, Japan does not have a government-led seafarer career program. Instead, individual shipping companies operate their own seafarer career programs.

K LINE Group, a prominent Japanese shipping company, offers career development opportunities to employees, including seafarers, after 10 years of service [32]. These opportunities include specialization in areas such as ship automation, management skills, and other career development paths. Specifically for seafarer training, K LINE has established the Competence Management System (CMS) to enhance job skills and capabilities, providing an in-house job training system. Through the Audit and Training Group (ATSI), they invest in continuous personnel development education, identifying potential vulnerabilities in internal safety quality systems via Audit and Training Superintendents. They also provide computer-based training systems (CBT) onboard ships. K LINE Group's ship management companies (K Marine Ship Management, 'K' Line Ship Management Singapore, and 'K' LNG Shipping UK) have obtained certification from ClassNK to implement the seafarer competency management system on their managed vessels [32]. These programs are designed not only for seafarers' job training and maritime skill improvement but also include education programs for shore-based staff, serving as a CDP for both sea and shore employees. NYK Lines established a human resource development policy in 2005, aiming for continuous diverse capability development of all group members. The policy details include:

- 1) Flexibility and openness to understand diverse cultures and heterogeneous thinking, aligning with the group's ESG management,
- 2) Creating a leadership environment that presents clear visions and goals and encourages others to achieve set objectives,
- 3) Acquiring skills to manage administrative tasks, gaining expertise, and realizing a merit-based society,
- 4) Creating new value and approaches unbound by past precedents [33].

NYK Lines operates the Vessel Operations Meister Program, an internal certification system recognizing the continuous growth of maritime officers. Implemented in 2009, it aims to enhance safe operation and efficiency internally. Anyone with work experience on NYK vessels can participate, requiring completion of in-house education and passing examinations. Beyond mandatory seafarer training, NYK provides continuous career development programs both onboard and ashore [34]. These CDPs, while aimed at safe operation of company vessels, also serve to cultivate seafarers with necessary skills and as career development programs. Notable programs include:

- 1) Training and Assessment Record System (NYK-STARS): An online education program developed to improve maritime skills onboard for various vessel types,
- 2) Handy E-Learning Management System (HELMS),
- 3) Developed for skill development of off-duty seafarers, allowing access to the education system both onboard and ashore. NYK operates its own Maritime College, an internal educational facility designed to provide comprehensive maritime training [34].

This institution offers a structured curriculum that covers essential nautical knowledge and job-specific skills. The training programs are tailored to various positions within the maritime industry, ranging from operational roles to management-level positions for ship officers. This approach ensures a consistent and thorough education for NYK's maritime personnel, enhancing their expertise and professional development in the shipping sector [34].

4.5 Implication

Based on a comprehensive review of written survey results from experts in major maritime nations, it appears that Germany, Norway, and Japan do not operate systematic and organized CDPs, but rather implement them at the individual institutional level. Synthesizing international cases, the level of CDPs may vary by country, but both industry and government show interest, with some stakeholders independently pursuing initiatives. Notable examples include the UK and Norway, both with long maritime histories and shipping industries as national core businesses, which are developing seafarer career development programs. Germany offers educational programs to transition onshore professionals into maritime careers. Given the potential increase in demand for onshore professional personnel as the maritime industry develops, Germany's CDP deserves attention. In Japan, the government is working to improve working conditions and welfare to encourage younger generations to enter maritime careers, while shipping companies are providing CDPs. It's important to note that advanced maritime nations are grappling with similar concerns as Korea regarding CDPs. As Korea already trains and educates seafarers at the government level, there is a need to proactively operate a Korean CDPs.

Table 3. Operation Status of Career Development Programs for Seafarers in the UK, Norway, Germany, and Japan

Contents	Norway	UK	Germany	Japan
Current status of seafarer career programs or similar programs	Maritime Career Campaign	Careers in Maritime Ashore	Currently operating programs to transition onshore careers to maritime careers	While there is no government-level operation or support, individual institutions and maritime education institutions are operating such programs
Operating entity	Cooperation between Norwegian Shipowners' Association and Maritime Cluster	Marine Society	Government	Individual maritime education institutions and private shipping companies

Funding entity	Norwegian Maritime Competence Foundation	The Marine Society & Sea Cadets (British charity)	Government	Individual maritime education institutions and private shipping companies
Detailed program contents	<ul style="list-style-type: none"> • Introduction to seafaring careers, education courses, and qualification systems • Roadmap for onshore careers • Information and introduction to various jobs in the shipping industry • Ambassadors to promote and enhance the attractiveness of seafaring careers • Providing information on seafarer education institutions 	<ul style="list-style-type: none"> • Development of maritime field courses (Open Awards Level 3) • Encouraging seafarers' transition to shore-based roles through mentoring • Operating Sea to Shore Industry Placement Scheme (sea/shore employment guide) 	No direct seafarer career development program, but operating qualification programs for transitioning onshore careers to maritime careers	No government-led direct seafarer career development program
Long-term effects on seafarer retention or recruitment	Encouraging young generations to pursue maritime careers	According to the 2023 performance report, 133 seafarers registered for shore-based transitions, with 21 successfully moving into shore-based positions	help with long-term seafaring	Government policies are increasing the number of young seafarers

5. Implications

Regulation 2.8 of MLC mandates member states to establish national policies promoting career and skill development and employment opportunities to supply stable and competent personnel in the maritime sector. Paragraph 2 of Regulation 2.8 stipulates that the national policy should aim to support seafarers in strengthening their competencies, qualifications, and employment opportunities. Additionally, paragraph 3 of Regulation 2.8 requires nations to set clear objectives for vocational guidance and education and training for seafarers, including continuing education, after consulting with shipowners and seafarer organizations. CDPs can be considered a national responsibility. In Korea, the government primarily covers the costs of initial and retraining education for seafarers. However, the state's role in providing vocational guidance and continuing education for seafarers is minimal. The support for providing maritime professionals with career paths and career development programs, as developed and presented in this study, can be considered a fundamental national responsibility under Regulation 2.8 of MLC. Therefore, the government should provide financial support for offering career paths and career development programs for maritime officers, who are the driving force behind the maritime industry's development.

As observed through case studies, while the level of CDPs may vary by country, both industry and government show interest, with some stakeholders implementing their own initiatives. Notable examples

include the UK and Norway, both with long maritime histories, developing CDPs as part of their national key industries [12]. Germany offers conversion education programs for onshore professionals transitioning to the maritime sector. Given the potential increase in demand for onshore professional personnel due to future maritime industry development, Germany's CDP warrants attention. In Japan, the government is working to improve working conditions and welfare to encourage younger generations to enter the maritime field, while shipping companies primarily provide CDPs.

It's noteworthy that key shipping countries face similar concerns as Korea. Regarding the need for developing CDPs, Norway and the UK have already implemented them, the German government recognizes the need, and in Japan, the industry and related organizations acknowledge the necessity. In terms of operational entities, Norway's program is run collaboratively by the Norwegian Shipowners' Association and maritime clusters, the UK's by the Marine Society, Germany's by the government, and Japan's by individual maritime education institutions and private shipping companies. Funding sources vary: Norway's Maritime Competence Foundation, the UK's Marine Society & Sea Cadets (a British charity), the German government, and individual maritime education institutions and private shipping companies in Japan.

Considering that Korea's Ministry of Employment and Labor oversees vocational skills development projects through the Human Resources Development Service of Korea, in accordance with the National Lifelong Vocational Skills Development Act and the Framework Act on Qualifications [35], it would be appropriate for the development and operation of sea-based career paths and career development programs to be pursued under the government's proactive support and funding.

6. Conclusions

This study examined the necessity of introducing a CDP in Korea through case studies of major shipping countries. The introduction of CDP is a mandatory requirement for the government under MLC. From an economic perspective, CDP can contribute to job creation for young people. Through CDP, it's possible to create employment for an average of 4,613 maritime officers annually in the international merchant fleet and 1,450 in the domestic fleet from 2024 to 2034 [36]. The development of CDP can provide job opportunities for young people by improving the qualifications of maritime officers and facilitating their transition to onshore maritime professions. It can also lead to indirect employment effects by enabling entry into onshore shipping-related industries. Particularly, by providing career transition information for each maritime career path, the possibility and predictability of onshore work for maritime officers may increase, potentially leading to increased support for and duration of onboard service. Since maritime officers with shipboard experience are known to be the most cost-effective source of onshore maritime personnel, an increase in maritime officers can be expected to serve as a supply source for onshore positions requiring sea experience. Through effective CDP development, necessary recruitment, placement, and management standards can be provided to institutions, organizations, and companies that require maritime officers. The specialized education programs identified during the CDP development process can lead to changes in maritime education. The development of CDP can enable linked education between various maritime education institutions and maritime industry vocational education institutions, creating synergies between educational institutions. The development of career paths and career development programs for maritime officers is crucial for enhancing the competitiveness of the maritime industry and facilitating career transitions for officers. Career path development provides opportunities for maritime officers to advance into various fields. Supporting the continuous strengthening of competencies in relevant areas through career development programs is essential for the sustainable development of the national maritime industry. The complementary roles of these two processes will allow for more systematic management of maritime professionals' career development.

Korea has unique national characteristics that necessitate maintaining its own maritime officers. Not only does 99.7% of import and export cargo get transported by international merchant ships, but due to the ongoing separation of the Korean peninsula into North and South, maritime officers may need to serve as a fourth military branch in case of emergencies [3]. Therefore, it is necessary to develop and provide CDP as an important means of maritime officer supply policy to foster senior maritime officers and encourage long-term onboard service.

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