

An independent review of the economic requirement for trained seafarers in the UK

Final Report to DfT and Review Panel

December 2011



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Glossary of key terms

Additionality	The extent to which new economic activity (measured as jobs, income and production) adds to existing economic activity rather than replaces it.
Cadets	A trainee officer. This report uses the term “cadet” and “trainee” interchangeably.
Certificate of Competency (CoC)	In the UK, these are certificates issued to seafarers following a successful assessment and examination. The required standards of competence are set out by the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978 as amended and its associated code.
Certificate of Equivalent Competency (CEC)	In the UK, these are certificates issued by the MCA to seafarers of non-UK countries to allow them to work as Officers on UK registered-ships. The MCA checks that applicants for CECs are qualified to the same standards as holders of UK CoCs.
Comparative advantage	A situation in which a country, individual, company or region can produce a good at a lower opportunity cost than a competitor.
Counterfactual	A hypothetical measure of what would have happened in the absence of a policy intervention or event.
Deadweight Tonnage (Dwt)	A measure of how much weight a ship can safely carry. It is the sum of the weights of cargo, fuel, fresh water, ballast water, provisions, passengers, and crew. It is expressed in long tonnes of 2,240 pounds (1,016 kilograms).
Demand for seafarers	The requirement by the shipping industry for individuals to work at sea. This can be disaggregated to focus on demand for ratings, officers and UK/non-UK seafarers.
Demand for ex-seafarers	The requirement by the maritime cluster for individuals with a seafaring background. This can be disaggregated to focus on UK/non-UK ex-seafarers.
Direct effects	These are the initial and immediate economic activities generated by an industry, sector, project or development. Direct impacts are often referred to as first-round impacts as they coincide with the first round of spending in the economy.
Ex-seafarer	Individuals who previously worked at sea, but now work outside the shipping sector (either in the maritime cluster or elsewhere)
Flag of Convenience	Registering a ship in a different sovereign state from which the ship-owner is based (also referred to as an Open Register).
Flag state	International law requires that every merchant ship be registered in a country. The country in which a ship is registered is called its flag state. A ship operates under the laws of its flag state.
Free rider issue	An example of market failure, where an individual, or a group of individuals, consume or pay less than their fair share of the cost of a common resource. More commonly known as the “free rider problem” in economics.
Indirect effects	These are the changes in employment, income and production levels in associated industries that supply inputs into the industry where the first round spending has occurred.
Induced effects	These are the effects of spending by households in the overall economy as a result of direct and indirect effects from the generated economy activity in the original and associated industries.
International Maritime Organisation (IMO)	The United Nations specialised agency with responsibility for the safety and security of shipping and the prevention of marine pollution by ships.
Maritime cluster	The part of the maritime sector that is based onshore and includes, among other sectors, port services, financial and legal services related to maritime activities, training and research and development. This is also known as the maritime services sector.
Maritime sector	The shipping sector and maritime cluster combined.
Market failure	Where the operation of a free market does not result in the optimal allocation of resources.
Maritime and Coastguard	The UK agency responsible for implementing the Government’s maritime safety

Agency (MCA)	policy and preventing the loss of life on the coast and at sea.
Merchant Navy	The name given to the UK's commercial shipping sector.
Multipliers	The relationship between a particular economic activity and the total additional economy activity it generates.
Officer	Members of ships' management. They typically work in two departments – navigation (also known as deck) and engineering.
Offshore	Activities carried out at sea.
Onshore	Activities related to the maritime sector carried out on land.
Opportunity cost	The cost of the next best alternative not chosen (forgone).
Rating	Members of ships' crews that assist officers across all departments.
Seafarer	Individuals who predominately work at sea. They are typically found in the shipping, energy and leisure shipping segments of the maritime sector.
Shipping sector	The part of the maritime sector that is concerned with the carriage of goods and passengers, as well as the chartering of vessels.
Standards of Training, Certification and Watchkeeping (STCW)	Basic qualification standards for masters, officers and watch personnel on merchant ships as required by the International Maritime Organisation through the STCW Convention.
Support for Maritime Training (SMarT)	A UK Government scheme that gives financial assistance to recognised training providers (i.e. shipping companies and other sponsoring organisations) providing merchant navy training.
Tonnage Tax	An alternative to corporation tax, whereby tax is levied on a fixed notional profit, calculated by reference to the net tonnage of ships, instead of the actual profits earned from shipping activities.

1 Executive summary

60 Second Summary

- ⇒ The maritime sector is a major contributor to the UK's economy and of strategic importance. As well as the more obvious at-sea or offshore activities (the "shipping sector") in which seafarers work, the sector also consists of a sizeable on-shore component (the "maritime cluster") which relies, to some extent, on a steady supply of ex-seafarers to function effectively.
- ⇒ The maritime sector is different, by way of certain distinct characteristics; chief amongst these is the highly mobile nature of both labour and shipping companies. Since the shipping sector and maritime cluster are closely linked, changes to the policy environment in one are likely to have consequences on the other, and ultimately the wider UK economy.
- ⇒ Given the importance of the sector, the UK Government provides a package of support mechanisms. Presently, one of the key shipping industry support mechanisms the Government provides is a subsidy for seafarer training – known as SMarT. SMarT is worth £12 million in 2011/12 and covers up to 40 per cent of all training costs. It provides an incentive for shipping companies to train new cadets onboard ships as they are "compensated", in part, for the costs. Upon completion of the training, these seafarers are free to move to another company which benefits from their skills but has not contributed to their training.
- ⇒ Stakeholders from the shipping sector have indicated a strong preference for UK seafarers at the officer level, and there is also a strong preference for UK ex-seafarers in the maritime cluster. These preferences do not necessarily extend to seafarers at the rating level, where there appears to be a greater degree of substitutability with non-UK labour.
- ⇒ Projections made as part of this study show a gap between the demand for, and supply of, trained UK seafarers. The period 2016 to 2019 will see this gap peak. By 2021 the gap is expected to be c. 3,500 in the case of deck and engine officers at sea, and over 1,600 in the case of ex-seafarers (mainly ex-officers) in the maritime cluster. Those shortfalls are equivalent to 10 per cent and 9 per cent, respectively, of total projected demand in those sectors. These gaps would be even greater if SMarT were discontinued without an effective replacement.
- ⇒ The demand gap for UK seafarers is unlikely to be filled by market forces alone, perhaps forcing shipping companies to adopt second-best solutions in the form of non-UK officers and technical ratings. Moreover, a lack of trained UK seafarers will result in a reduction in UK ex-seafarers available to the maritime cluster, reducing its competitiveness over time. Logically, on this basis, there appears to be a continuing rationale for a policy intervention to support maritime training.
- ⇒ Based on the evidence available, SMarT has had a positive impact in increasing the number of UK cadets who will become officers and go on to benefit the UK economy throughout their careers at sea and elsewhere. Last year (2010), 200 additional cadets entered the industry through SMarT (above those entering as a result of Tonnage Tax requirements). As each additional UK-trained seafarer is in demonstrable demand from shipping companies and the wider Maritime Cluster and they are likely to generate more output than the average worker in the UK, there is likely to be a positive return, and thus Value for Money, to Government from investing in SMarT – not least in promoting growth through jobs for UK residents.
- ⇒ Having reviewed potential options on a number of criteria, as well as for Value for Money, we believe there are three viable options needing further

consideration by the panel and the Minister; a continuation of SMaRT; the introduction of a levy and grant system; or an apprenticeship model.

⇒ These views represent Deloitte and Oxford Economics conclusions on the basis of the available evidence and within the remit of the study.

[continued overleaf]

Background

- ⇒ The Minister for Shipping wishes to conduct an independent assessment of the economic requirement for seafarer training in the UK.
- ⇒ This report presents the independent findings from the research, to be reviewed by the industry panel, before recommendations for future action are made to the Minister for Shipping.

Method

- ⇒ For the purposes of this study the demand for seafarers refers to UK based shipping companies' need for seafarers working at sea. Demand for onshore seafarers or, more precisely, ex-seafarers, refers to UK based shipping companies' need for ex-seafarers and demand in other UK based organisations where an ex-seafarer is required. Supply refers to the stock of UK trained seafarers.
- ⇒ In order to assess the requirement for UK seafarers and ex-seafarers; assess the efficiency and effectiveness of as-is training; and develop options for future funding for training, the following methodology has been deployed:
 - A literature review of academic articles, policy documents and press articles;
 - A stakeholder consultation consisting of one-to-one discussions with panel members, an industry workshop and an online survey;
 - Developing a bespoke economic model to provide a view on future realised and derived demand for trained seafarers and the future supply of UK trained seafarers; and
 - A synthesis of the above to answer the key research questions to provide an independent view on the whether there is a continued need for Government intervention and, if so, how is the most efficient and effective way for this to be done.

Maritime: a unique sector?

- ⇒ Analysis confirms that seafarer training is a very complex issue: both in terms of defining the parameters of the problem and because of the unique characteristics of the maritime sector.
- ⇒ The maritime sector differs to other sectors in the economy in a number of ways. Namely:
 - A critical role in facilitating trade: the maritime sector transports over 90 per cent of the UK's visible imports and exports.
 - High levels of labour mobility: the labour market for seafarers is considered global, meaning that many seafarers (especially for those from developed countries) are able to easily move between jurisdictions.
 - High mobility of shipping companies and other maritime companies: especially for shipping, the "switching costs" of flagging out (both in financial terms and administrative terms) is said to be low, meaning they often face incentives to exploit arbitrage opportunities and re-locate to the most favourable location.
 - Maritime legacy: the UK is recognised as having a "world class" maritime cluster deriving from historical legacy and ongoing concentration of skills and expertise.

- Length and nature of training: the training required to become a certificated seafarer combines elements of academic and vocational study. Currently, cadets finish training/qualifying almost debt free, but similar to the medical and legal professions, it can take a prolonged period of time to achieve senior officer status. Newly qualified officers need a minimum of 18 months sea service and approximately 6 months at college to gain a Chief Mate or Second Engineer CoC. Actual promotion depends on employment potential in the various companies.

Seafarer training

- ⇒ The basic structure for seafaring training in the UK follows an apprenticeship-style format. While seafarers are trained in a tertiary capacity, shipping companies play a significant role due to offshore training requirements.
- ⇒ The modern officer training programme in the UK involves developing a mastery across a range of seafaring skills including navigation, seamanship and ship stability, as well as other more obviously transferable skills such as IT, business and law, engineering and electrics. There are certain minimum academic and physical requirements to become an officer, and the length of time to achieve the status of Junior Officer is normally three years.
- ⇒ Unlike Officer training, there are no minimum academic qualifications for Ratings qualifications, although potential Ratings must also meet medical and eyesight requirements. Students studying to become Ratings must also undertake compulsory training and spend time at sea.
- ⇒ All countries which are signatory to STCW and provide training leading to Officer of the Watch must incorporate sea service in their training in order to issue a STCW CoC. The UK does differ in the way training is provided however. For example, the Danish and Dutch 'front-load' their training to students of a much younger age as part of their tertiary/further education. The UK training programme is regarded as marginally superior to other European schemes.
- ⇒ The cost of seafarer training is largely borne by shipping companies (although there are a small number of charitable sponsorships available), with assistance from Government. In this sense, funding for seafarer training differs to many other industries in the UK in that employers receive support for training [prospective] employees. Many other industries do not receive this kind of support, whilst others in the national interest only receive complete support at given stages. From one extreme to the other, examples of training support include:
 - The professional services industry where, once employed, professional qualifications are paid for by the firm, and individuals may be paid less to reflect this contribution;
 - The construction industry, which funds training through a levy on firms in proportion to size;
 - The National Health Service, where in some instances day release and funding of part-time degrees is covered by the Government; and
 - Military training, which is wholly funded by Government.

Current Market characteristics

- ⇒ As noted in the academic literature, market forces have changed the nature of shipping and the demand for and supply of seafarers. Our consultations and survey suggested that that there is not a global shortage of seafarers in quantitative terms per se, rather a shortage of quality seafarers (and certain specialist skills). In some cases, nationality is a proxy for high quality, with UK seafarers considered in high regard.

Demand

- ⇒ For ratings, there is a tendency to demand and employ cheaper foreign labour which is in greater abundance from emerging markets. For officers, however, there appears to be a preference for UK seafarers due to qualification levels, experience, and also the ease in employing UK residents.
- ⇒ The academic literature suggests that companies are continuing to train and recruit a large number of British seafarers into highly specialised and technical roles due to the confidence placed by these companies on the UK seafarer training programme, certification procedures and proven track record of British seafarers.

Supply

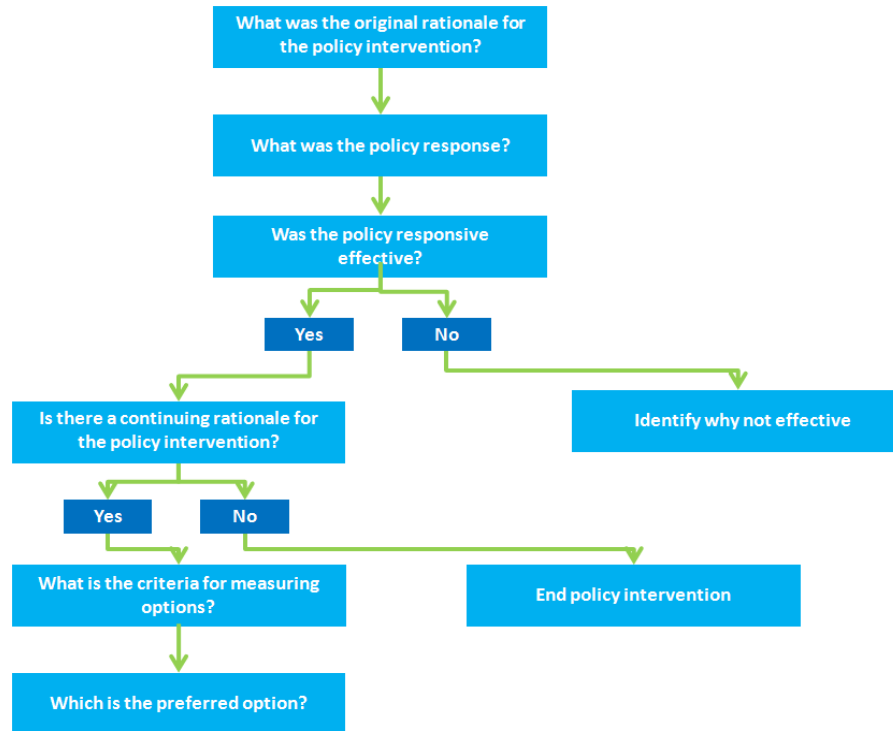
- ⇒ Attracting the next generation of seafarers is recognised as a challenge by the relevant authorities.
- ⇒ The EU has identified the maritime sector as an area it wishes to encourage and remain strong in for a combination of economic, environmental and national interests, and work is already underway from UK stakeholders to ensure that the industry has a ready supply of potential entrants (funding issues notwithstanding). EU Maritime State Aid Guidelines acknowledges this and allows for an exception to the general rules which discourage state aid.
- ⇒ Finally, while SMarT aims to provide funding to shipping companies with the aim of increasing the intake of trainees into the industry, such a policy will not achieve its full potential if there is a lack of demand from shipping companies for UK seafarers due to cost considerations.

A “free-rider” issue

- ⇒ The direct costs of training are currently borne jointly by shipping companies and Government, and there is some evidence of a “free-rider” issue.
- ⇒ Seafarers, ex-seafarers, shipping companies and Government each benefit from this funding in different ways. It reduces costs at the point of training for seafarers, ex-seafarers and shipping companies, and for the Government the contribution of the aforementioned then confers wider benefits for the UK economy.
- ⇒ However, ex-seafarers contribute significantly in an on-shore capacity for third parties whom do not need to fund training but nonetheless benefit from the skills that accrue directly from SMarT and indirectly through time at sea (though third parties will still have to fund separate training to ready seafarers for on-shore roles)
- ⇒ Recent evidence from the co-authors of this study, Oxford Economics, suggests that the on-shore element of the maritime industry contributes significantly to the UK’s economy with employers preferring ex-seafarers for around 16,000 shore-based jobs (and for half of these, seafaring experience is deemed essential). Thus the knock-on benefits to third parties are deemed to be significant.
- ⇒ It can be argued, that the Government is subsidising training to compensate shipping companies for the free riding of other, related, third parties. These third parties then contribute to the economy, however – in other words there is payback to the investment by Government.

Tackling the issue

- ⇒ The driver tree below introduces the questions posed and answered in considering a future course of action for the Government.



Has SMarT been effective?

- ⇒ The actual impact of SMarT in 2009 is not the simple difference between the 450 cadet trainees in 1998 and 925 cadet trainees in 2009 (before and after the introduction of SMarT). This is because it is highly likely that in the absence of SMarT, the number of new cadets being trained would not have remained static at 450 each year.
- ⇒ The number of cadets will have been influenced greatly by other factors including the introduction of the tonnage tax in 2000 – which itself includes an obligation that participating companies must train at least one officer trainee for each 15 officer posts in existence on the vessels that it operates.
- ⇒ Our consultations show that the industry firmly believes that SMarT has been effective in increasing the number of cadets and therefore trained UK seafarers from 2000 levels.
- ⇒ Our best estimate is that in 2010 c. 200 additional cadets were introduced into the industry as a result of SMarT funding beyond the 650 funded by SMarT but as a result of tonnage tax requirements.
- ⇒ With 200 additional seafarers entering service each year the returns to UK plc in terms of the productivity differential with the wider UK economy (c. £14,500 per annum in today's prices) over 20 years is of the order of £58 million. Against costs to Government of £12 million per annum this represents a cost: benefit ratio of 4.8. When accounting for the £18 million contribution of shipping companies, a total cost of £30 million per annum reduces this benefit: cost ratio to 1.9.
- ⇒ In summary, this review suggests that SMarT has been effective.

Is there likely to be demand for UK seafarers in future?

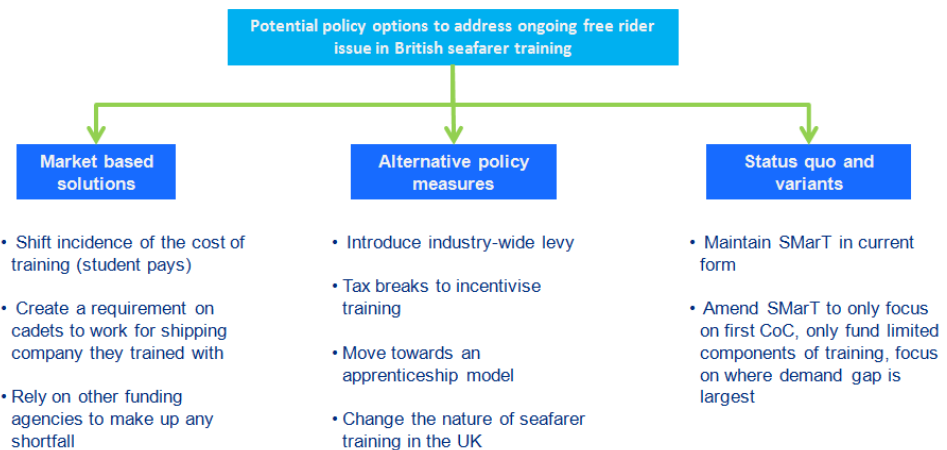
- ⇒ Forecasts made by Oxford Economics suggest that there will continue to be a gap between the demand for trained UK seafarers / ex-seafarers and the supply of trained UK seafarers (where seafarers in this case refers to officers).
- ⇒ Based on certain assumptions, a gap is forecast to develop between demand for, and supply of, trained UK seafarers, peaking in the 2016-2019 period. By 2021 this gap will have reduced slightly to c. 3,500 in the case of deck and engine officers at sea and over 1,600 in the case of ex-seafarers (mainly ex-officers) in the maritime cluster. Those shortfalls are equivalent to 10 per cent and 9 per cent, respectively, of total projected demand in those sectors

Does market failure persist?

- ⇒ In other markets, economic theory predicts that the gap mentioned above would, over time, close as higher demand will lead to increased wages for seafarers and ex-seafarers, which in turn would incentivise more students to train as seafarers, increasing supply.
- ⇒ However, this may not occur in the case of seafaring due to the nature of the UK training programme. The at-sea component of training will mean that even if there is an increase in the number of students wishing to complete cadet training, unless shipping companies are prepared to accommodate these increased numbers the total supply of trained seafarers will not increase.
- ⇒ On this basis, it is possible to conclude:
 - the whole demand gap for UK seafarers is unlikely to be filled by market forces alone;
 - rather, shipping companies are likely to react to a shortfall in supply of UK seafarers by turning to second-best solutions in the form of non-UK officers and technical ratings; and
 - accordingly, the market failure for trained UK seafarers is expected to persist and requires continued intervention.

What are the policy options for intervention?

- ⇒ Each of the options outlined below are predicated on the following three assumptions, which have been made taking into account the evidence received and analysis conducted:
 - Shipping companies have a preference for UK-trained seafarers.
 - Companies in the maritime cluster have an even stronger preference for UK-trained ex-seafarers.
 - By 2021, there will be gap between demand for and supply of UK-trained seafarers that, if left unfilled, will lead to a decline in available number of ex-seafarers for the maritime cluster reducing its competitiveness and contribution to the UK's economy.
- ⇒ On the basis there would appear to be three categories of options available to policy-makers. These are summarised below.



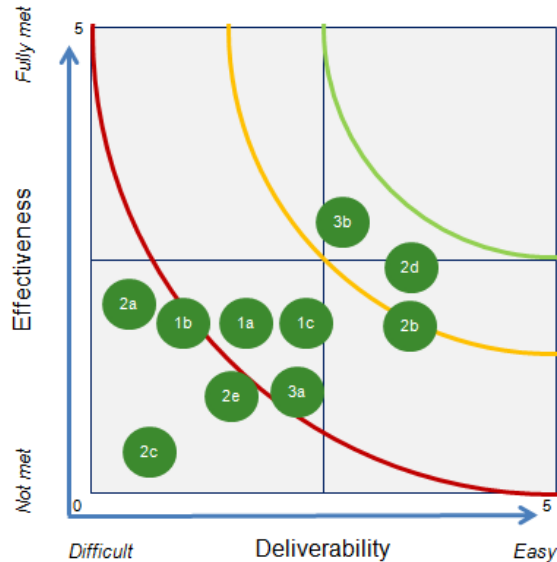
On the basis of the research, each of the above options has been arbitrarily scored on the following measures to provide an overall indication of suitability:

- ⇒ **The cost of the remedy to Government:** The (broad-brush) financial cost of the remedy.
- ⇒ **Effectiveness:** The extent to which remedies are likely to be effective in eliminating the market failure.
- ⇒ **Long-run sustainability:** Whether this remedy is likely to be viable in the long run (10 years)
- ⇒ **Acceptability:** Who bears the financial cost of the remedy and whether it will command industry-wide support.
- ⇒ **Ease of implementation:** How quickly the remedy could be implemented and the extent to which it does not disrupt existing schemes.
- ⇒ **Efficiency:** Whether this remedy might represent the best use of resources.

Detailed scoring for the above measures can be seen in the main body of the document. The figure below summarises the different options along the simplified axes of effectiveness (including long-term sustainability) and deliverability (in terms of cost, ease of implementation and acceptability).

The Long List Summary

The figure below summarises the different options along the simplified axes of effectiveness (including long-term sustainability) and deliverability (in terms of cost, ease of implementation and acceptability).



Key:

1a – creating a requirement for cadets to work for the shipping company they served with in a supernumerary capacity with

1b – greater reliance on other existing funding schemes for training

1c – requiring individual students to bear the full cost of training

2a – imposing an obligation on shipping companies to train UK seafarers

2b – introducing an industry-wide levy and grant system to fund seafarer training

2c – introducing tax breaks for training

2d – moving towards an apprenticeship-based model for UK seafarer training

2e – fundamentally revising the structure of UK seafarer training

3a – 2010 SMarT

3b – 2011 SMarT

Note: the positioning of the option bubbles is approximate and illustrative

Based on Deloitte's and OE's understanding of the sector, individually, none of the identified options is clearly in the upper right quadrant and scores highly on both effectiveness and deliverability.

Nonetheless, the closest options to this are 2011 SMarT (i.e. the current provision), an industry-wide levy and grant system, an apprenticeship based model, 2010 SMarT, and requiring students to fund the cost of training.

These five options have been shortlisted and are analysed in greater depth below, with respect to benefits, costs and value for money.

At the opposite end of the scale, given the current fiscal situation and HM Treasury's position on tax receipts, changes to the tax regime for training purposes are unlikely to be deliverable in practice.

The Short List

The analysis below considers each of the five options in terms of total costs, costs to Government, benefits and thus benefit: cost ratios as a means of comparing each option.

Benefit assumptions

A simple means of calculating the economic benefit of a seafarer, and also ex-seafarers, trained through SMaRT is to assess the productivity differential between the average worker in the maritime sector and the UK productivity average for all workers.

By this method, for each year in work a SMaRT beneficiary generates approximately £14,500 in additional output relative to the output of a UK worker displaying average productivity.

By isolating the net effects of SMaRT in terms of numbers of cadets trained, it is possible to calculate the net benefits to the UK economy over a working life (assuming that this productivity differential holds and a working life in this respect averages 20 years – above the 8-10 years spent at sea but less than a standard working life of over 40 years)

These are used to give an indication of benefits arising from SMaRT and, in conjunction with costs, and indication of Value for Money for the independent panel and Shipping Minister to base subsequent analysis and decisions on. Full results are presented in the main body of the analysis (page 102).

	Estimated total option cost per annum (for all parties) (£m) ^a	Assumed total benefit based on 20-year Maritime productivity differential (£m) ^a	Total Benefit:Cost Ratio (C) / (A)	Government Benefit:Cost Ratio (D) / (B)
Student bears full cost of training	27.0 - 35.0	-	0	0
Industry levy	32.0	58	1.8	7.2
Modified SMaRT	30.0	58	1.9	4.8
Original SMaRT	37.5	87	2.3	5.8
Apprenticeship model	n.a.	n.a.	n.a.	n.a.

Student bearing full cost of training

The costs of this option are likely to be significant, both in terms of what students are required to pay as well as potential costs to Government arising from non-collection – as many seafarers are at sea and, as result non-domiciled, for extended periods, they are not subject to the tax system and collection through PAYE might not be feasible.

However, the main issue relating to this funding option is the move from a position of 'zero' cost to students (adjustments to subsequent wage payments notwithstanding) to full costs to students. This is likely to make a career as a seafarer much less enticing and as such, relative to the other policy options available, the benefit to cost ratio is likely to be significantly lower than other options. This approach is likely to exacerbate the demand and supply gap of UK seafarers demonstrated in this study.

Levy and grant system

This would involve the identification of participants and collection of grant contributions that would then be paid to shipping companies and other organisations providing seafarer training. As costs are shared more widely than in the status quo, the benefit to cost ratio for Government's initial outlay is high.

A modified SMarT and an industry-levy are not mutually exclusive. As well as a levy and grant system in isolation, it would be entirely feasible to modify the components of SMarT and introduce an element of industry funding alongside Government funding.

However, it should be noted that research suggests that the introduction of a new levy (regardless of size and purpose) could work to deter shipping companies and other maritime companies from locating in the UK. Further, in some instances a levy could offset benefits from the tonnage tax and could not be introduced in isolation.

In summary, a levy would likely make for a more agreeable distribution of costs across the wider maritime sector and solve the free-rider issue, although we note it may not be a popular choice amongst stakeholders and identification, monitoring and collection costs could be high.

SMarT

The benefits from current SMarT provision has been estimated at £58 million against a cost of £30 million (£12 million of which comes from Government). Accordingly the benefit: cost ratio for Government inputs is higher than the total benefit: cost ratio.

Increased provision (per the 2010 original SMarT funding) would lead to greater benefits and higher benefit: cost ratios. This is because the calculated benefits to each additional UK trained seafarer are greater than the associated costs. Without considering the fiscal environment, the optimal policy solution would be train UK seafarers to the point where total demand for UK seafarers is fulfilled and gaps are zero.

Apprenticeship scheme

We have not considered this option as part of our study, but note that it is also likely to be a feasible option.

Discussions over apprenticeship programmes for (i) ratings; and (ii) cadets are ongoing between the sector, DfT and BIS. Progress has been made but several issues still need to be resolved. At this stage, no clarification over the funds available for such programmes has been made.

Conclusion and next steps

The analysis in this report has shown that there is a demand for UK trained seafarers at officer level and for ex-seafarers (mainly officers) in on-shore roles in the wider economy. The analysis also shows that, if current conditions persist, that there is likely to be significant gap between the supply of and demand for UK trained seafarers by 2021.

Given that seafarers contribute significantly to the UK economy, and that SMarT has had a positive upward effect on the number of trained cadets (c. 200 per annum above tonnage tax induced training), additional training is likely to be beneficial to the UK economy.

Moreover, jobs that could otherwise be taken by competent overseas labour are more likely to be taken by UK citizens – an important consideration in terms of generating employment growth in the UK per current policy imperatives.

If the current fiscal situation was stronger, the argument for increased Government funding of SMarT (or similar) would also be stronger – each seafarer trained is likely to be net-beneficial to the UK economy.

However, given the current situation, and the analysis above, Deloitte and Oxford Economics feel that the three main options open to Government are:

1. **A continuation of SMarT** – which could feature an increase in funding back to 2010 levels or a more targeted programme towards officers (given substitutability at ratings level) based on 2011 funding levels – each would help fill some of the gap outlined in this study.
2. **The introduction of a levy and grant system** – under which shipping companies, Government **and** third party beneficiaries all pay a more equitable share of training costs, presuming associated issues can be overcome; and
3. **An apprenticeship model** – if separate discussions on this bear fruit, apprenticeships could be used to provide the training required for UK seafarers.

These views represent Deloitte and Oxford Economics conclusions on the basis of the available evidence and within the remit of the study.

We recognise that opinion may differ amongst stakeholders and the panel reviewing this document, but understand that they will bring their own experience to bear on the recommendation to the Minister of Shipping.

2 Introduction

2.1 Background

The Minister for Shipping wishes to conduct an independent assessment of the economic requirement for seafarer training in the UK.

This assessment must ascertain the requirement for seafarers, UK citizen and foreign-born, both on-ship and on-shore, and consequently the need for training for those seafarers.

The research should also consider the efficiency and effectiveness of as-is training and the way it is currently funded, before laying out a series of options for future funding provision on the basis projected training requirements and best practice for other vocational training programmes.

Finally, the research will then be scrutinised by an independent panel that will select a preferred option for the Minister to consider.

Deloitte and Oxford Economics (OE) have been commissioned to undertake the independent assessment.

2.2 Project Scope

DfT's terms of reference for the study are:

- ⇒ to review the UK requirement for trained seafarers at sea over the next decade;
- ⇒ to review the UK requirement for trained seafarers ashore over the next decade;
- ⇒ to examine the extent to which the above requirements have to be met by UK seafarers;
- ⇒ to review the effectiveness and efficiency of the existing funding arrangements and the future need for Government intervention to ensure the supply of trained seafarers;
- ⇒ to identify options for supporting the training of seafarers and make recommendations which address the issue of value for money and are reflective of future UK requirements for trained seafarers; and
- ⇒ to examine whether previous training targets are reflective of future needs.

Issues outside of scope

The focus of this independent review has been the economic requirement for UK seafarer training. However, it should be noted that the UK Government provides wider support to the UK maritime sector through measures such as the tonnage tax and other investment incentives. Further, the European Commission (and individual Member States) also has a number of policy initiatives to promote European seafarer training. All of these measures interact, to varying degrees, with seafarer training in the UK.

Detailed consideration of these additional support measures for the maritime sector have been placed outside this review's scope, and do not form part of the analysis. However, Deloitte and OE would recommend that any final decision on seafarer training in the UK consider these contextual issues to account for any unintended consequences that could affect the wider sector through inter-linkages between different support measures in the maritime sector.

2.3 Purpose of this document

This document is the final report for the aforementioned independent review by Deloitte and OE for the DfT. The report sets out the findings and recommendations of the review. In particular, this final report:

- ⇒ presents the findings from an industry-wide consultation on seafarer training in the UK, including the results of a workshop, panel member discussions and an online survey;
- ⇒ presents forecasts on the expected supply and demand for UK trained seafarers and ex-seafarers;
- ⇒ contains analysis of the market failure and a review of potential remedies; and
- ⇒ contains a set of recommendations and proposed next steps.

This final report also contains material previously submitted to DfT as part of the review's interim report.

2.4 Structure of this document

This report is structured as follows:

- ⇒ **Chapter 3** outlines the review's methodological approach and activities undertaken by Deloitte and OE;
- ⇒ **Chapter 4** places the review in context by providing a factual overview of the UK maritime sector and training arrangements;
- ⇒ **Chapter 5** draws out some key themes from the literature on the subject of seafarer training;
- ⇒ **Chapter 6** contains selected international comparisons of other countries' approaches to seafarer training;
- ⇒ **Chapter 7** has an overview of the results of a stakeholder consultation exercise carried out as part of this review;
- ⇒ **Chapter 8** presents a summary of the modelled forecasts for seafarer demand and supply;
- ⇒ **Chapter 9** considers whether there is an ongoing rationale for supporting seafarer training in the UK and how alternative support measures might be assessed; and
- ⇒ **Chapter 10** sets out the final independent recommendations of Deloitte and OE answering the review terms of reference.

Further details of the assumptions used in the modelling exercise and a bibliography are placed in annexes.

2.5 Stakeholders

In addition to DfT, there are a number of other stakeholders groups in the UK maritime sector. A selection of these stakeholders is listed overleaf in Table 2.5.a.

Table 2.5.a: Stakeholders in the UK maritime industry

Stakeholder category	Examples
Government agencies	Maritime and Coastguard Agency and the Skills Funding Agency.
Shipping companies and ship management companies	Such as Maersk, BP Shipping, P&O, Carnival, Northern Marine Management, Stena AB, and so on.
Industry bodies	Merchant Navy Training Board and Port Skills and Safety Ltd.
Trade associations	Chamber of Shipping, British Marine Federation, British Ports Association, British Tug Owners Association, Maritime London, UK Major Ports Group and Society of Maritime Industries.

Stakeholder category	Examples
Trade unions	Nautilus International, UNITE and National Union of Rail, Maritime and Transport Workers (RMT).
Professional bodies	Institute of Maritime Engineering, Science and Technology and The Nautical Institute.
Maritime colleges and universities	International Association of Maritime Institutions, Maritime Skills Alliance and the Association of Marine Electronic and Radio Colleges.

As part of this review, a number of these stakeholders were invited to the stakeholder workshop¹ and/or were sent an online survey to complete and distribute amongst their membership.

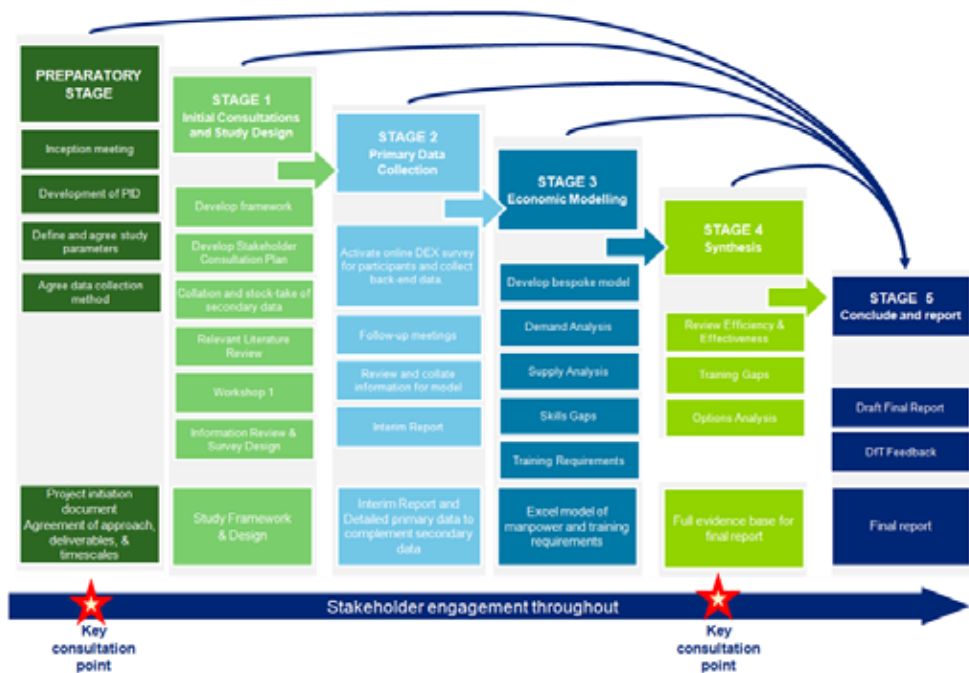
¹ The choice of stakeholder invitees was made on the suggestion of DfT.

3 Methodology

3.1 Overview

As set out in the Project Initiation Document, Deloitte and OE have used a five stage methodology proposed for this review. This final report marks the completion of Stage 5.

Figure 3.1.a: Review methodology



The specific tasks undertaken in each work-stage are explained in the remainder of this chapter.

3.2 Preparatory Stage

During this stage, Deloitte and OE completed the following:

- ⇒ attended an inception and progress meeting with DfT;
- ⇒ agreed a workshop date, location, time and participant list with DfT; and
- ⇒ agreed a definition for “UK seafarers” with DfT.

3.3 Stage 1: Initial Consultations and Study Design

During stage one, Deloitte and OE

- ⇒ researched secondary sources to understand current training provision, funding and associated legislation including: SMarT; State aid memoranda; and the tonnage tax criteria;
- ⇒ conducted a literature review on policy papers, academic articles, press articles and relevant legislation and regulations;
- ⇒ designed a workshop for up to 25 industry stakeholders (identified by DfT); and
- ⇒ designed and built a web-based survey for stakeholders using DeloitteDEX – a secure web-based survey system.

3.4 Stage 2 – Primary Data Collection

During stage two, Deloitte:

- ⇒ launched an online survey to collate comparable data using Deloitte DEX and granted access to relevant stakeholders on the basis of e-mail sent by membership organisations to their members – approximately 115 responses were received; and
- ⇒ held a stakeholder workshop attended by 16 stakeholder organisations, as well as representatives from DfT.

3.5 Stage 3: Economic Modelling

During stage three, OE developed a bespoke model of the demand and supply for UK trained seafarers and ex-seafarers to 2020 consisting of:

- ⇒ a view on the future realised and derived demand for trained seafarers and ex-seafarers from the demand for merchant shipping and the maritime cluster and other macroeconomic factors;
- ⇒ a view of the future supply of UK trained seafarers and ex-seafarers based on current seafarer statistics and stock/flow modelling of potential industry inflows and outflows;
- ⇒ a view on current vacancy levels and skills gaps (in tandem with qualitative outputs from Deloitte’s work in stage two); and
- ⇒ baseline projections and two scenarios around this baseline to take account of alternative futures (e.g. with respect to international flows of labour)

In keeping with the definitions to be outlined in Chapter 4, the model considered the distinction between:

- ⇒ ratings and officers;
- ⇒ the shipping sector and maritime sector; and
- ⇒ UK and international seafarers.

The results of the online survey, as well as further collection of statistics, were used to calibrate the model and generate forecasts.

3.6 Stage 4 – Synthesis

During stage four, Deloitte and OE carried three tasks in light of the earlier research:

- ⇒ assessed market failure with respect to the training of UK seafarers;
- ⇒ assessed demand and training gaps; and
- ⇒ assessed efficiency and effectiveness of potential remedies.

The outputs from this stage were used to inform the final recommendations and provide an independent view and reasoning on the following key research questions:

- ⇒ is there a need for continued Government intervention?;
- ⇒ if yes, is this intervention best provided in its current form, in a new form or aligned with existing best practice elsewhere in Government, for example apprenticeships?; and
- ⇒ what is the optimum level of Government intervention?

4 Review context

This chapter sets out the context to this review. It presents some descriptive statistics about the maritime sector in general, and the shipping sector and maritime cluster in particular. The latter part of the chapter outlines the current training regime for seafarer training in the UK and associated support schemes.

This chapter is intended to act as a primer for those unfamiliar with the sector and seafarer training. For those already well acquainted with the issues, this chapter can be skipped.

4.1 The UK Maritime Sector

The UK maritime sector is very diverse, covering a range of activities and services, beyond shipping. The sector includes commercial shipping, ports, maritime legal and financial services, leisure shipping, education and training, commercial fishing, oil and gas, defence, energy, conservation, manufacture, maritime technologies and research and agriculture.

Whilst some media narratives have suggested that the British maritime sector is in decline due to well-documented falls in employment in the shipbuilding sector and shipping industries, it remains a significant contributor to the UK economy. As OE² point out, the industry is a larger employer than the general medical practice industry and makes a larger contribution to UK GDP than civil engineering. The sector is responsible for 1.8 per cent of total UK employment, 1.9 per cent of UK GDP and 1.6 per cent of total government revenue.

Data on the entire UK maritime sector is not readily available. However, one of the most recent studies by OE³ examining the economic impact of the sector to the UK suggested that in 2009 the sector:

- ⇒ directly created 227,000 jobs and an additional 304,000 jobs through indirect and induced effects;
- ⇒ directly contributed £13.1 billion to UK GDP and an additional £13.4 billion through indirect and induced effects; and
- ⇒ generated £3.1 billion in tax receipts for the Exchequer directly and a further £4.7 billion through indirect and induced effects.

However, it should be noted that the above data only refer to the maritime services sector (defined as ports, shipping and maritime business services). It does not include maritime activities such as training, oil and gas, defence and manufacturing, suggesting the above figures may underestimate the full contribution of the sector.

For the purposes of this review, the sector is split into two sub-sectors:

- ⇒ the **shipping sector** which covers the part of the maritime sector that is concerned with the carriage of goods and passengers and the chartering of vessels; and
- ⇒ the **maritime cluster** which covers the parts of the maritime sector that are based onshore including, but not limited to, ports, legal and financial services, research and development and training.

The two sub-sectors are very closely interlinked. Figure 4.1.a below illustrates.

Figure 4.1.a: Components of the UK maritime sector

² *The economic impact of the UK's Maritime Services Sector*, Oxford Economics, May 2011.

³ *Ibid.*



Source: <http://www.marinetraffic.com/ais/>, Deloitte Analysis

While there is some overlap between these sub-sectors, with many businesses operating in both, stakeholders have suggested this is the most commonly used split and aligns with the definition of seafarers and ex-seafarers (see below and glossary also).

Contribution of the shipping sector to the UK economy

The UK shipping sector is a key element of the wider maritime sector. It is estimated that 90 per cent of the UK's visible trade is transported by sea (globally ships carry 77 per cent of world trade)⁴.

As OE note⁵ the shipping sector has, in general, enjoyed buoyant growth over the last decade following the introduction of the tonnage tax in 2000. OE estimate that that the shipping sector alone contributed around £13 billion to UK GDP (direct, indirect and induced effects) in 2009 compared to nearly £10 billion in 2007. In 2009, the sector supported 268,000 jobs and generated £3.7 billion in tax receipts⁶. An earlier OE report⁷, also found that the shipping sector was more productive than many other industries, given the finding that each worker within it produced 11.4 per cent more GDP than the average worker in the UK economy.

The deadweight tonnage (dwt) of trading ships on the UK register was 17.3 million dwt in 2009, representing an increase of 531 per cent from the 1991 figure of 2.7 million dwt. The UK registered trading fleet totalled 701 ships in 2009. However, ships on the UK register are not necessarily owned by UK interests and vice versa.

In 2009, UK companies directly owned 21.5 million dwt and had a controlling interest in 35.5 million dwt. In addition, UK companies managed 64.4 million dwt. The total world tonnage of trading vessels in 2009 reached 1,249 million tonnes⁸. According to UNCTAD⁹ statistics, the UK is ranked 13 out of 35 flags of registration on January 2010 by share of world tonnage (it has 1.39 per cent of world dwt). However, it is instructive to note that this figure represents an increase of over 11 per cent from 2009.

The UK, and Europe more widely, remain major centres of shipping traffic. Figure 4.1.b shows the level of maritime traffic at a point in time on September 27th 2011. The hotspots represent areas with a significant number of vessels at a particular geographic

⁴ Quoted in *STEM Choices 7. Industry Focus: UK Maritime Industry*, www.futuremorph.org/db/documents/STEM-choices-UK_Maritime_Industry.pdf

⁵ Ibid.

⁶ It is important to note that the individual contributions of the shipping sector and maritime cluster do not sum exactly to the total contribution of the maritime sector. This is because the overall contribution has to be adjusted to account for any potential double counting caused by overlapping economic activity.

⁷ *The economic contribution of the UK shipping industry in 2007*, Oxford Economics, Final Report (2009)

⁸ All statistics quoted from *Transport Statistics Report: Maritime Statistics 2009*, DfT and National Statistics

⁹ *Review of Maritime Transport 2010*, UNCTAD, www.unctad.org/en/docs/rmt2010_en.pdf

location at this time. From this snapshot¹⁰, it is clear that Europe remains a major global hub with the most traffic passing through.

Figure 4.1.b: World sea freight traffic, September 2011



Source: www.marinetraffic.com/ais/; Deloitte Analysis

Within Europe itself, one is able to see large traffic flows through UK ports. As Europe is important in a global shipping context, likewise the UK appears very important to the European shipping trade (and therefore global shipping trade) if one looks at traffic alone. For example, a 2010 report by Marisec, shows that nine out of the top 20 nations in terms of millions of gross tonnes of shipping are in Europe. The UK ranks fifth amongst these nine nations.

The UK shipping industry is subject to a number of regulations and pieces of legislation from a number of sources. These include:

- ⇒ Various **United Nations agencies such as the International Maritime Organisation and International Labour Organisation**: For example, compliance with the ILO's 2006 Maritime Labour Convention (MLC)¹¹ which provides comprehensive rights and protection at work for the world's seafarers;
- ⇒ **European maritime legislation**: For example, compliance with EU maritime safety standards legislation; and
- ⇒ **UK legislation**: For example, the minimum training obligation as part of the tonnage tax regime requiring companies to train one officer trainee for each 15 officer posts in existence on the vessel it operates.

The Maritime and Coastguard Agency (MCA), an executive agency of DfT, is responsible for implementing the maritime safety policy in the UK

Contribution of the maritime cluster to the UK economy

The UK is widely regarded internationally as having a centre of maritime excellence (the "maritime cluster") – The International Maritime Organisation's HQ is in London. The UK is seen as being particularly strong in providing maritime financial and legal services, research and development of offshore oil and gas extraction, marine manufacturing and yacht design, building and racing.

¹⁰ It is assumed September is a representative month.

¹¹ This has not yet entered force.

Data is not available for all the elements that make up the maritime cluster. However, OE have recently estimated the contributions of the ports industry and maritime business services sector as:

- ⇒ the ports industry contributing £16.9 billion to UK GDP, supporting 337,000 jobs and raising over £5.7 billion in tax revenue; and
- ⇒ the maritime business sector, centred in the City of London, contributing £3.8 billion to UK GDP, supporting 68,000 jobs and raising £1.4 billion in tax revenue.

In 2009, UK ports handled over 500 million tonnes of freight traffic (more than any other European country), although since 1999 domestic traffic has fallen by 26 per cent¹².

4.2 Seafarers and ex-seafarers

Seafarers are those individuals who predominately work at sea. They are typically found in the shipping, oil and gas and leisure shipping segments of the maritime sector. Upon leaving the shipping sector, ex-seafarers often move onshore to work in the maritime cluster or go on to work in the wider economy in a role unrelated to the maritime sector.

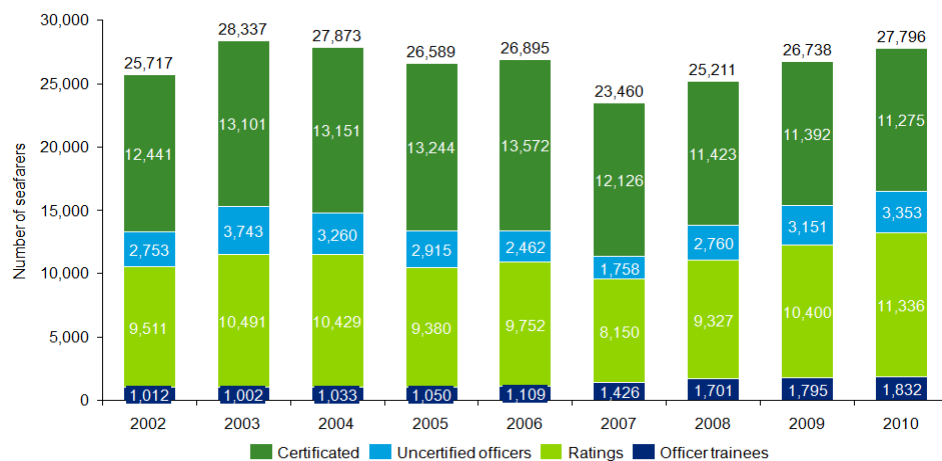
Seafarers can be categorised as:

- ⇒ **Officers:** who are members of the ship’s management. Officers typically work in two departments – navigation (deck) and engineering. Whilst on duty (called a “watch”), a Deck Officer is responsible for steering and manoeuvring the ship, controlling navigation and communications. Engineering Officers are responsible for operating and maintaining mechanical and electrical equipment throughout the ship.
- ⇒ **Ratings:** are seafarers who assist Officers across all departments.

Newly qualified Deck Officers join at the rank of OOW Deck Officers and can progress to become Chief Mate/Officer and finally Master. Engineering Officers begin as OOW Engineering, moving to 2nd Engineer and then Chief Engineer. Rankings for ratings vary by Deck and Engineering and include Third Mate, Bosun, Able and Ordinary Seaman.

The figure below charts the number of UK national seafarers active at sea.

Figure 4.2.a: Number of UK national seafarers active at sea, 2002 – 2010*



Source: DfT / National Statistics UK Seafarer Statistics 2010¹³

The number of UK national certificated officers active at sea has declined since 2002 – DfT estimates that since 1997 the number of active certificated officers at sea fell by 21 per

¹² Source: *Factsheet: Maritime Statistics*, Department for Transport

¹³ Assumes a retirement age of 62. Numbers rise with a retirement age of 65

cent. One reason given for this decline is the insufficient number of new entrants coming to seafaring (see chapter 5), although the number of officer trainees (cadets) has increased since 2002. A second reason given for the decline in active seafarers has been the move by many certificated officers onshore to work in the maritime cluster. Accordingly, they are not currently at sea and hence do not appear in the above statistics.

Data received from the online survey conducted as part of this review suggests that less than 25 per cent of cadets who begin training for the CoC fail to complete the qualification, suggesting that the majority of the current cohort of cadets will go on to become officers.

One consequence of the decline in UK seafarer numbers has been an ageing of the “stock” of seafarers. As the number of new, younger seafarers entering the active stock of seafarers is less than those leaving, the age profile of all seafarers has been getting older. As Figure 4.2.b below shows, two-thirds of UK certificated active officers are over 40 years old.

Figure 4.2.b: Age profile for Certificated Officers and Ratings, 2010



Source: DfT / National Statistics UK Seafarer Statistics 2010

The 2010 Manpower Update¹⁴ provides some global context to the demand and supply for seafarers. The report indicates that there is a slight (2 per cent) shortage of officers globally. However, this shortage is more acute in specialised areas such as tankers. Interestingly, demand for seafarers has continued to grow in a global context in spite of the recession. Crucially, it is highlighted that the shortage is expected to persist (even in a “conservative” level of demand growth scenario) unless maritime training is increased and measures are taken to reduce wastage rates.

Chapter 8 contains this review’s estimates of future demand and supply for seafarers based on new research and stakeholder consultations.

Seafarer pay and working conditions

A 2009 Nautilus International survey of seafarers’ living and working conditions¹⁵ illustrated that pay, average leave and tour length are the three most important aspect of their living and working conditions. Out of these, seafarers placed the most importance on increased pay and the least on a reduction in tour lengths.

Table 4.2.a below shows a sample of average salaries across different grades in the shipping sector.

¹⁴ *The Worldwide Demand for and Supply of Seafarers*, BIMCO/ISF Manpower 2010 Update

¹⁵ A Nautilus International survey of seafarers’ living and working conditions, 2011, Nautilus International, www.nautilusint.org

Table 4.2.a: Annual net salary per officer rank

Rank	Containers	Tankers	Offshore supply vessels
Master	£54,331	£59,925	£55,165
Chief Engineer	£51,077	£56,393	£51,379
Second Engineer	£41,000	£45,695	£44,036
Average Pay	£48,803	£54,004	£50,193

Source: Deloitte/OE Analysis on 2011 pay data provided by Nautilus International

From 2011 pay data provided by Nautilus International on selected shipping companies holding agreements with the union in the container, tanker and offshore supply vessel sectors, Deloitte and OE analysis shows by way of an example that officers of different ranks who work aboard tankers received the highest average salary of c.£54,000¹⁶ - this may reflect the aforementioned shortage of officers on tankers.

In comparison, seafarers aboard supply vessels and containers received a lower average salary (£50,193 and £48,803 respectively). Whilst these figures are mean averages and may be biased upwards or downwards, they compare favourably with mean UK average salary of c.£24,000¹⁷.

This data also shows that seafarer pay has increased in the last three years across all categories within the shipping industry¹⁸. The officers who received the highest growth in pay over the three years were those who worked aboard supply vessels, at a rate of 3.9 per cent, although these officers also received the lowest number of leave days - 183 days of leave p.a. Annual pay for seafarers aboard containers grew the least over the past three years at a rate of 2.2 per cent - although seafarers within this category receive 233 days of leave p.a., the greatest amongst the four categories.

Data has not been available on annual salaries of ratings or ex-seafarers.

4.3 Seafarer training

Traditionally, seafarer training in the UK followed an informal system of apprenticeships whereby trainees or cadets were attached to, and worked with, master mariners and chief engineers to acquire skills and experience. Recent changes notwithstanding, the current training structure for both ratings and officers maintains the basic apprenticeship-style format, with shipping companies playing a significant role in the training of cadets¹⁹. Upon completion of training, cadets receive both an academic qualification and a professional qualification and, in contrast to other countries' seafarer training programmes, the UK seafarer training system allows students to immediately enter into a defined profession (see Chapter 6 for international comparisons). The combination of practical and academic training means seafarer training is similar to other sandwich courses that combine work experience with classroom based study.

There are certain minimum standards that all potential seafarers must meet before entering the profession. All professional seafarers are required, by law to meet basic requirements covering medical fitness, training and experience. Primarily, seafarers must be medically fit with good eyesight and hearing. In addition to these physical requirements, there are specific training requirements for officers and ratings that must meet international and national statutory requirements covering different aspects of training and qualifications in the Merchant Navy.

¹⁶ Average pay is calculated from the 2011 pay data provided by Nautilus International across the seafarer ranks of Master, Chief Engineer and Second Engineer

¹⁷ Source: *Labour market statistics: October, 2011*, www.ons.gov.uk/ons/dcp171778_237932.pdf. Figure calculating by multiplying average weekly wage of £463 by 52 weeks.

¹⁸ Based on the analysis of the four categories in the 2011 Nautilus International data

¹⁹ Although it should be noted that shipping companies do not employ cadets during their training.

The 1978 International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) adopted by the International Maritime Organisation (IMO), as amended in 1995 is the primary influence on seafarers' standards in the Merchant Navy²⁰. 124 of the 192 countries are signatories to the convention, meaning that, with only limited exceptions, all professional seafarers around the world must hold certificates that are STCW compliant.

Individual countries are responsible for ensuring their national training schemes are compliant. In the UK, the MCA is responsible for ensuring the provisions of STCW are complied with. It has developed a suite of National Occupational Standards (NOS) that are consistent with STCW.

Certificates of Competency (CoCs) are issued to those seafarers who meet these requirements. There are multiple CoCs covering the different crew duties and officer ranks. Broadly speaking these divide between deck department CoCs, engineering CoCs and Watch Ratings. A CoC is valid for five years, unless otherwise stated²¹. Each master, officer and radio operator intending to serve at sea must revalidate the certificate at least once every five years. Watch Rating certificates do not have an expiry date and do not need to be revalidated every five years.

As noted above, based on the online survey, around a quarter of cadets fail to complete their CoC. Data from the online survey suggests that 75 per cent or more trainees who completed their first CoC went on to work with the shipping company they had trained with. However, it should be noted that the majority of shipping companies did not guarantee a job upon completion. This is consistent with a survey by Nautilus International in 2010 of cadets which found 75 per cent of cadets optimistic about future career and employment prospects²².

Officers can only serve on a UK ship if they hold a UK CoC or a UK Certificate of Equivalent Competency (CEC). A CEC is issued by the MCA, allowing seafarers to work as officers on UK-registered ships. An equivalent process applies (as provided for under STCW) for UK seafarers wishing to work on foreign ships – they will need to apply for a CEC with the relevant maritime authority of the country where the ship is registered.

Figure 4.3.a below shows the number of UK CECs currently in issue and the nationality of those officers holding them.

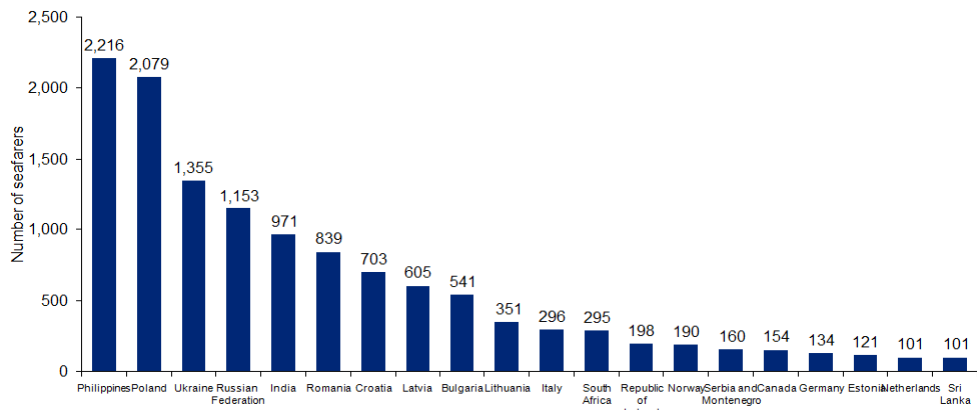
²⁰ Changes to the convention were adopted in June 2010 (known as the Manila amendments) that will come into force from January 2012. Among the most relevant changes to this review were:

- Improved measures to prevent fraudulent practices associated with certificates of competency and strengthen the evaluation process (monitoring of Parties' compliance with the Convention);
- Revised requirements on hours of work and rest and new requirements for the prevention of drug and alcohol abuse, as well as updated standards relating to medical fitness standards for seafarers;
- New certification requirements for able seafarers;
- New requirements relating to training in modern technology such as electronic charts and information systems (ECDIS);
- New requirements for marine environment awareness training and training in leadership and teamwork;
- New training and certification requirements for electro-technical officers;
- Updating of competence requirements for personnel serving on board all types of tankers, including new requirements for personnel serving on liquefied gas tankers;
- New requirements for security training, as well as provisions to ensure that seafarers are properly trained to cope if their ship comes under attack by pirates;
- Introduction of modern training methodology including distance learning and web-based learning;
- New training guidance for personnel serving on board ships operating in polar waters; and
- New training guidance for personnel operating Dynamic Positioning Systems.

²¹ Accordingly, the number of certificated officers in the UK shown in Figure 4.3a refers to those holding CoCs that are currently valid. No data is available for those officers working elsewhere in the maritime sector holding expired CoCs.

²² *Cadet Survey 2010*, Nautilus International

Figure 4.3.a: Nationality of non UK officers holding CEC, 2010*



Source: DfT / National Statistics *UK Seafarer Statistics 2010*

*These are non-UK nationals holding equivalency certificates required to serve on a UK registered ship. Not all will be working on UK ships however.

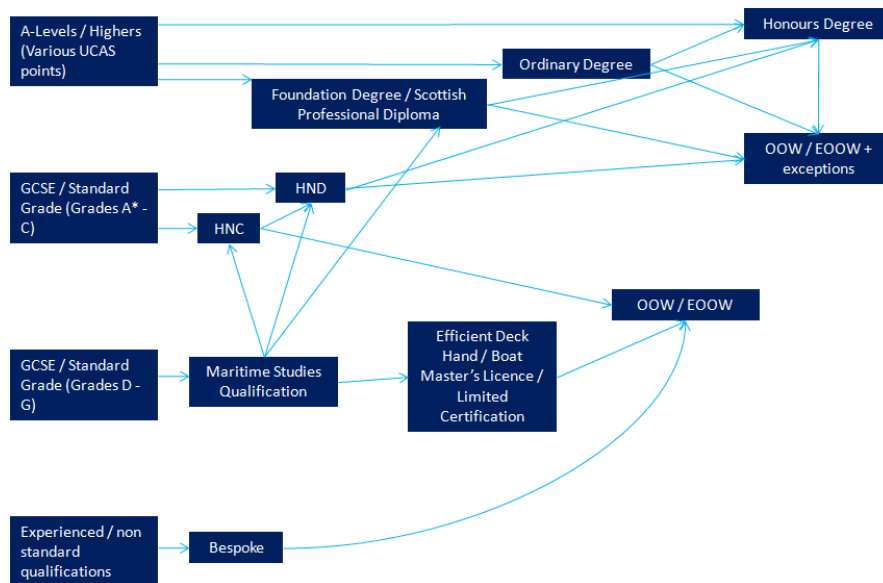
More details about Officer and Rating training routes are provided below.

Officer training

The modern officer training programme in the UK comprises of time spent at sea and time spent on shore at a nautical college. Training involves developing a mastery of a range of traditional seafaring skills such as navigation, seamanship and ship stability. In addition, deck officers study courses in IT, business and law, whilst engineering officers study marine engineering principles, thermodynamics, ship construction and electrics.

The main entry routes to becoming an officer are shown below.

Figure 4.3.b: Officer entry routes and qualifications



Source: adapted from Merchant Navy Training Board

All entry routes lead to the seafarer achieving the STCW Officer of the Watch (OOW) certification, qualifying the seafarer as a Junior Officer. This is the first stage of gaining full professional seafaring qualifications (Master and Chief Engineer level). It takes three years to train for a first CoC in deck or engineering.

Rating training

Unlike officer training, there are no minimum academic qualifications for ratings qualifications, although potential ratings must meet medical and eyesight requirements. However, that notwithstanding, potential ratings usually need to possess three GCSEs/Scottish Standard Grades between Grade A* and D.

Candidates studying to become Deck Ratings undertake safety and professional training, coupled with sea-time, to obtain a Navigational Watch Rating certificate (Rating Grade 2). They can then progress to become a Grade 1 Deck Rating and may obtain an Able Seaman's Certification following completion of the Efficient Deck Hand Certificate, the Proficiency in Survival Craft & Rescue Boats certificate and further sea service.

Engineering Ratings study for the Engine Room Watch Rating Certificate. Other Ratings in specialist roles, such as those serving on tanker ships, are required to have additional training and vocational qualifications.

Catering Rating qualifications are those associated with food preparation, cooking and serving. Cooks can obtain the MCA Certificate of Competency as Ship's Cook and other ratings may obtain suitable qualifications issued by the catering industry in general.

Seafarer training providers

The Merchant Navy Training Board lists around 15 institutions that offer seafarer education, training programmes and courses leading to an OOW CoC²³. These include dedicated maritime colleges as well as universities with a tradition of maritime training and research. There are over 300 training centres in the UK which have MCA approval to deliver various forms of training courses. A number of these institutions are also run for profit.

SMarT funding is paid to the training provider – under SMarT, a training provider is a sponsoring company (usually the shipping company).

4.4 Support for seafarer training in the UK

The UK Government has historically provided support for seafarer training in the UK. Previously support for UK seafarers had been provided through GAFTS and DOCS.

By the 1990s the decline in the maritime skills base had become critical and many were arguing for Government intervention. After assessing the situation, the Government adopted its first ever comprehensive policy for shipping outlined in the Government White Paper *British Shipping: Charting a New Course* in 1998. It is this policy which laid the ground for the main instruments for the recovery of shipping – one of which was the SMarT (Support for Maritime Training) scheme.

The focus of this review is primarily on SMarT and accordingly other support mechanisms for seafarer training, and the maritime sector more generally, are not described in detail. Nonetheless, it is important to place SMarT in the context of wider initiatives designed to promote the UK shipping sector and maritime cluster. Other initiatives include the tonnage tax (introduced in 2000) and other investment incentives. These are out of scope of this review and are not discussed in this review.

The SMarT (Support for Maritime Training) scheme

In the absence of government support for seafarer training, the full cost of training would either be borne by employers (in this case shipping companies due to the offshore element of cadet training) or employees themselves. According to Gekara (2008)²⁴, the cost of a full course per cadet is c. £40,000 for a three to four year programme. This cost

²³ See www.mntb.org.uk/nautical_colleges_amp_universities-18.aspx.

²⁴ *Globalisation, State Strategies and the Shipping Labour Market. The UK's Response to Declining Seafaring Skills*, Gekara (2008)

may be prohibitive for many potential cadets and shipping companies may face a disincentive to commit to this cost if they fear cadets will not stay with them post-completion – choosing instead, to go to another area of the maritime sector which pays more (what is known as the “free rider” issue in economics). Hence, there is often a role for government to play to correct for this market failure.

Accordingly, the aim of SMarT is to provide government funding for the recruitment and training of cadets in the UK and, as a result, increase the number of officer trainees, which in turn benefits the whole sector.

It should be noted here that the original aim of SMarT was not just cadets. The scheme was originally divided into five different categories with the objective of covering the training process in full. This included recruitment, training and funding of cadet programmes and also covering all possible paths of seafarers’ skill development. The scheme provides up to 50 per cent of actual training costs to employers. Unlike other vocational training schemes, SMarT funding is provided to employers to support existing employees, rather than being directed at the unemployed²⁵.

SMarT is administered by the Marine Technology Support Unit (MaTSU), which itself is an independent unit of AEA Technology plc. MaTSU acts as an Administering Body (AB) in accordance with contract specifications. Although SMarT is administered by MaTSU for the payment of funds, it is the MCA which manages the scheme and holds the budget

There are five SMarT programmes which are approved by the MNTB and MCA.

- ⇒ **SMarT 1:** this is where the bulk of funding is directed. It is for trainees serving in a supernumerary capacity (i.e. they are not regular active members of the crew during training) and involves following an approved programme of training leading to a first certificate of competency as a deck, engineer or dual officer. Completion of this training leads to trainees receiving their first STCW Certificate of Competency.
- ⇒ **SMarT 2:** this is for junior officer trainees and leads to a second STCW certificate of competency – this is shore-based.
- ⇒ **SMarT 3:** is for ratings, officers and other experienced seafarers following an approved shore-based programme lasting 52 weeks or less.
- ⇒ **SMarT 4:** is for officers already holding certificates of competence. They undertake shore based training to re-validate their certificates to meet the requirements of STCW 95. This category was scheduled to close in July 2002, as it was expected that all officers would have re-validated their certificates by this date.
- ⇒ **SMarT 5:** is for ratings and experienced seafarers undertaking approved training leading (more than 52 weeks) to specified level 2 Vocational Qualification (such as apprenticeships) and serving in a supernumerary capacity. It also applies to fishing vessel personnel, ex-service personnel and other experienced seafarers undertaking sea service in a supernumerary capacity in order to obtain merchant navy qualifications.

To be eligible for receipt of payment under SMarT, a training provider must be:

- ⇒ an organisation based in the EEA or British Isles;
- ⇒ have entered into a written agreement with the MCA undertaking to provide training places for eligible trainees; and

²⁵ Although, when considered in the round with the provisions of the tonnage tax around recruiting new cadets, it can be argued that SMarT supports the training of the unemployed.

- ⇒ be able to provide and monitor the training opportunities necessary for trainees to meet the requirements of the relevant approved training programmes leading to a UK Certificate of Competency.

To be eligible for payment under SMarT, trainees have to:

- ⇒ be a national of a Member State of the EEA;
- ⇒ ordinarily resident in the UK;
- ⇒ proficient in spoken and written English; and
- ⇒ sponsored by a training provider.

Under SMarT, Training providers are typically shipping companies themselves (sometimes in consortia).

The SMarT scheme has been approved by the European Commission to comply with State aid guidelines under Article 107(3)(c) TFEU²⁶, first in 1998 and then again in 2004 (when SMarT 5 was introduced).

In its 2004 clearance of SMarT, the EC noted the rationale for the scheme as addressing:

- ⇒ the continuing serious shortfall in officer recruitment;
- ⇒ a falling proportion of cadets continuing to second certificate training;
- ⇒ a reported high drop-out rate during officer training (as much as 25%);
- ⇒ the above average age profile amongst the UK officer population;
- ⇒ low numbers of ratings progressing to officer qualifications;
- ⇒ increasing demand for highly skilled ratings and
- ⇒ declining opportunities for unskilled ratings.

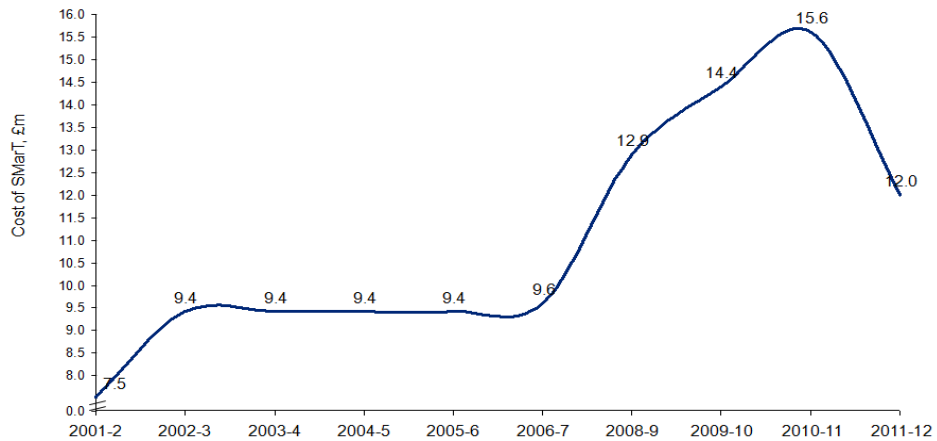
The EC's clearance is based on the supernumerary SMarT scheme meeting the general criteria of being proportional, non-discriminatory and transparent and, where appropriate, relating to training carried out on board ships entered in a Community register.

The financial cost of SMarT to Government varies between its different levels. The total support available for UK seafarer training was recently revised £12 million for the financial year 2011-12²⁷. Figure 4.4.a charts the total cost of SMarT since its introduction.

Figure 4.4.a: Annual cost of SMarT

²⁶ That is aid to facilitate the development of certain economic activities or of certain economic areas, where such aid does not adversely affect trading conditions to an extent contrary to the common interest.

²⁷ See MGN 431(M) The Government Support for Maritime Training Scheme (SMarT) – Revised Arrangements from 1 April 2011 to 31 March 2012, www.dft.gov.uk/mca/mgn_431.pdf

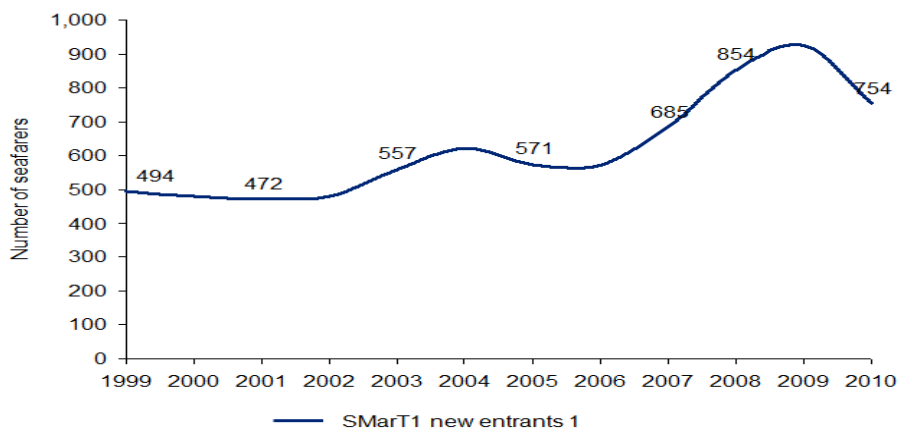


Source: DfT

Total annual funding rose from £7.5 million in 2001-2 to a peak of £15.6 million in 2010-11, before falling to £12 million for 2011-12. In terms of cumulative spend, a total of £110 million has been spent to support UK seafarer training through SMarT.

Figure 4.4.b below shows the number of new cadets starting under SMarT1 since 1999.

Figure 4.4.b: Officer trainee starts under SMarT, 1999 – 2010



Source: DfT / National Statistics UK Seafarer Statistics 2010

Data from the online survey shows that around half of all shipping companies received SMarT funding for all of their cadets, with funding typically covering between 25 and 50 per cent of the total cost of training.

On the basis of a more general question on drop-out rates from CoC courses (irrespective of funding source), it would be reasonable to assume the drop-out rates from SMarT-funded cadets is also less than 25 per cent over a three year period – though it is not possible to say how much less. As a comparison, HESA reports that the non-continuation rate in higher education in the year following entry is 6.5 per cent²⁸, compounded for comparison this would be of the order of 20 per cent.

There are differing views as to whether SMarT is a policy tool worth having in the UK economy – although stakeholders consulted for this study were almost all in favour of some form of continuing investment in training from Government. This is discussed at length in Chapter 7.

Recent developments to SMarT

²⁸ Source: HESA non-continuation rates, www.hesa.ac.uk/index.php?option=com_content&task=view&id=2064&Itemid=141

On 12 December 2010 Parliamentary Under-Secretary of State for Transport (Mike Penning MP) announced a package of measures relating to the maritime industry following the Spending Review. With regards to the SMarT scheme, MCA maintained the programme with £12million allocated for the financial year 2011-12. The majority of this money would be focused on supporting initial training for cadets studying at junior officer level (SMarT 1). MCA estimates that the funding will allow for the training of up to 1,000 new cadets. Mr Penning also confirmed that funding will be available beyond next year for all cadets starting SMarT 1 training in 2011/12, and those already undergoing SMarT1 training, for the duration of their studies to their Officer of the Watch CoC.

In addition, it was confirmed that funding would remain available in 2011-12 for ratings training and for ratings to officer conversion training, as well as some funding to support the first instalment of SMarT 2. However, for the remaining parts of the SMarT programme, including SMarT 2 training beyond the first instalment, the Government confirmed that its position was that, under current circumstances, it is more appropriate that the cost of this additional training should be met in full by employers.

The DfT also noted that it would be considering the continuing rationale for Government support for maritime training and skills development. As a result, no new training providers would be allowed to join SMarT, which also includes joining an existing consortium.

Other support schemes for seafarer training

As well as SMarT there are a number of other schemes for seafarer training in the UK. Two examples are those run by Trinity House and Maritime London.

Figure 4.4.c: Trinity House Merchant Navy Scholarship Scheme

Trinity House is the General Lighthouse Authority (GLA) for England and Wales. Incorporated by Royal Charter in 1514, Trinity House is also a major maritime charity, wholly funded by its endowments. The Corporation spends around £4m each year on its charitable activities including welfare of mariners, education and training (through a scholarship scheme), and the promotion of safety at sea.

The Trinity House Merchant Navy Scholarship Scheme provides financial support for young people seeking careers as officers in the Merchant Navy. Cadets must;

- ⇒ be between 16 and 18 years old with a minimum of 5 GCSEs at Grade C or better, and must have passed the Department of Transport medical examination. They must also be British and permanently resident in the British Isles; and
- ⇒ undertake a three or four year programme split between nautical college and time at sea in a variety of British-managed vessels. Cadets can train as either Deck or Engineer Officers or pursue a Marine Cadetship encompassing both disciplines.

Figure 4.4.d: Maritime London Officer Cadet Scholarship

Maritime London is a promotional body for UK based companies in the maritime cluster. Originally the Lloyd's of London Officer Cadet Scholarship, the Maritime London Officer Cadet Scholarship supports cadet training. All costs excluding accommodation are covered by the scholarship, although a grant of approximately £8,000 is available to help cover costs.

Cadets must:

- ⇒ be older than 16 and be EU nationals, permanently resident in the UK. They must pass basic medical and health tests and hold 5 GCSEs at Grade C or better; and
- ⇒ have completed courses in A-level maths and physics and achieved a pass in either.

4.5 Conclusion

This chapter has provided an overview of the UK maritime sector. The sector, which can be divided in the shipping sector and the onshore maritime cluster, remains a significant

contributor to the UK economy. The UK remains a major shipping centre globally, and its maritime cluster is widely acknowledged as being “best in class”.

One of the factors contributing to the sector’s contribution is a well-regarded training programme for seafarers. This training combines classroom-based learning and a significant element of at-sea experience.

In response to a decline in the maritime skills based, the UK Government introduced SMarT as a mechanism to support and promote seafarer training. The scheme sought to remedy the market failure whereby those companies that financed cadet training did not always capture the full benefit of their investment. Since its introduction, the number of trainee cadets has steadily increased – reaching c. 850 new starters in 2010.

Due to wider macroeconomic pressures, the SMarT scheme is being re-examined in light of the continuing economic requirement for seafarer training in the UK.

5 Key themes emerging from the literature review

The issue of seafarer training has been examined by a number of researchers and policymakers. A wealth of material was produced around the introduction of the tonnage tax in the UK and subsequent research has sought to examine and explain trends in UK seafarer numbers. This chapter summarises the key themes emerging from the literature that will inform the recommendations of the review.

This literature review has covered academic journals, previous reports and specialist and general press articles. It is not an exhaustive review of the literature, rather focusing on key themes arising from it.

5.1 Context

One of the key motivators for the literature on seafarers and seafarer training was the 1998 White Paper, *British Shipping: Charting a new course*.

Figure 5.1.a: Summary of British Shipping: Charting a new course

British Shipping: Charting a new course (1998)

By the 1990s the decline in the maritime skills base had become critical and many argued that this required effective and immediate attention (e.g. Obando-Rojas et al, 1999; Selkou and Roe, 2002). Worries that the decline was having a negative impact on the maritime cluster prompted the government to intervene. The Government sought to bring together maritime stakeholders in order to find a way of reversing the situation. After some deliberation, the government adopted its first ever comprehensive policy for shipping outlined in the government White Paper *British Shipping: Charting a New Course* in 1998.

Under the backing of John Prescott, then Secretary of State for the Environment, Transport and the Regions, the White Paper raised many issues and policy suggestions that still remain highly relevant today. The four central aims of policy identified by the White Paper were increasing skills, encouraging employment, increasing the UK's attractiveness to shipping enterprises and gaining safety and environmental benefits.

The White Paper emphasised the shipping industry as being one of particular importance to the UK. This was based on our dependence on sea transport, the sustainability in terms of the environment shipping offers, the need for maritime skills in offshore industries and for reasons of national security. It would be fair to say that there the industry still holds these potential advantages for the UK.

Similar to the issues faced today, the erosion of the industry in terms of both registered flags in the UK and the skills pool of UK seafarers was attributed to a multitude of factors. Such factors include changes in the pattern of trade, globalisation, low-wage foreign competition and a decline in interest amongst young people in the UK shipping industry. As can be seen in the literature review, many of these factors continue to resonate at least as much, if not more strongly, today.

In terms of policy, several measures were suggested and can be summarised as follows:

- ⇒ increasing skills by aiming to change perceptions, promote training, and facilitating British seafaring employment;
- ⇒ increasing the attractiveness of the UK as a shipping destination through fiscal support and the facilitation of ship registration under the UK flag; and
- ⇒ gaining safety and environmental benefits of shipping.

A number of stakeholders, in responding to this review, have made it clear that they feel *Charting a new course* remains very relevant today.

Following the publication of the White Paper and the introduction of various policy initiatives in the sector, there have been a number of academic studies in this area. As

well as directly responding to the issues raised in the White Paper, this literature has also examined seafaring and maritime issues in the light of wider economic and social trends, such as globalisation, security issues and migration. As well as academic research, during this period, policymakers such as the European Commission have also published position papers on seafaring and the maritime sector.

For the purposes of this review, the key themes found in contemporary literature of the last ten years that are most relevant to seafarer training and SMarT are presented. Much of the literature has not focused on seafarer training and SMarT in isolation, preferring to consider their impact in conjunction with the tonnage tax.

Deloitte and OE have identified the following three key themes arising in the literature:

- ⇒ reasons proposed for the decline in the number of UK seafarers;
- ⇒ the relative attractiveness of onshore work to offshore work; and
- ⇒ the case for having trained seafarers from developed markets.

These issues are discussed in more depth below.

5.2 The decline in the number of UK seafarers

As discussed in the previous chapter, one of the aims of Government support for the maritime sector has been to expand the skills base through the provision of more trained seafarers. This can refer to both officers and ratings. The literature has tended to confirm that too few seafarers are being trained in the UK. For example, Lewarn (2009)²⁹ notes, there is the feeling that annual intakes of ratings have been insufficient to provide for the required maritime skills base.

This is not just a UK-related phenomenon but has also been experienced by much of the EU. The report of the Task Force on Maritime Employment and Competitiveness and Policy Recommendations to the European Commission (June 2011)³⁰ found that there has been a trend increase in the recruitment of non-EU seafarers at the expense of EU ratings. European officer recruitment and retention also remains problematic, though this has been masked due to the use of personnel from the new Member States.

Focusing specifically on the UK, the literature has proposed a number of reasons to explain the decline in seafarer numbers in spite of SMarT. These include:

- ⇒ global competition for seafarers;
- ⇒ unattractiveness of the shipping industry and maritime sector for young people;
- ⇒ retaining existing seafarers; and
- ⇒ A high drop-out rate amongst cadets.

The first reason can be categorised as a demand-side explanation for the decline, whereas the other three reasons can be thought of as supply-side explanations. The literature gives different weight to different factors, with globalisation often being identified as the key cause.

Global competition

One of the main reasons cited for the decline in UK seafarer numbers in the literature relates to global competition. The market for trained seafarers is global – with the existence of the CEC allowing for seafarers not holding a UK COC to work onboard UK ships. As Gekara (2007) notes, the reason behind the decline in UK seafarers could be as

²⁹ Lewarn, B. (2009), *A review of some solutions to the shortage of maritime skills*, Maritime Transport Policy Centre, AMC

³⁰ *Report of the Task Force on Maritime Employment and Competitiveness and Policy. Recommendations to the European Commission* (June 2011)

simple as shipping companies choosing to employ non-EU seafarers over UK and EU seafarers for cost reasons. Evidence of this can be found in the UK unions backing for an amendment to the Employment Bill of 2008 which highlighted that issue that the national minimum wage was not being applied to foreign seafarers³¹.

According to a 2005 BIMCO/ISF Manpower Survey, only 25 per cent of the global supply of seafarers came from the developed world/OECD whilst the rest was made up of seafarers from Eastern Europe, Africa, Latin America, the Far East and the Indian Subcontinent.

This trend is supported in the analysis of Pettit, Gardner et al (2004)³² who assert that as the shipping industry has adapted to the global labour market, the UK has increasingly employed foreign seafarers. This has in turn led to a significant decrease in the number of UK nationals training as seafarer cadets. It is suggested that the use of foreign crews by British ship-owners reduces the training potential by reducing the number of training sponsors.

Effectively shipping companies are only incentivised to invest fully in training and career development if they themselves have a long term interest and commitment to the host country. Anecdotal evidence cited suggests firms with such commitment in the UK are few and far between and therefore the priority is to employ cheap labour which is in greater abundance from the emerging markets.

Reflecting the influence of globalisation on the market for UK seafarers, the policy implication drawn by the literature is that targeted attention needs to be given to the demand side of the market. While SMarT is designed to improve the training and recruitment of seafarers, Gekara (2008) cautions that such a policy will not achieve its full potential if there is a lack of demand from shipping companies. If UK officers are more expensive in comparison to their foreign counterparts, unless there is a clear quality premium, shipping companies will face incentives to employ non-UK seafarers. Thus, there potentially exists a tension between employers who wish to reduce costs by employing cheap foreign seafarers and the Government, who wish to boost growth in the national skills base.

Attracting young people and retaining existing seafarers

The literature notes that in recent years, the shipping industry, and the maritime sector more generally, has struggled to attract young people from the UK. The impact of this phenomenon is that as older seafarers transition to becoming ex-seafarers (either by moving onshore or retiring), they are not replaced by younger seafarers from the UK.

Both economic and sociological explanations have been offered to account for this lack of supply of UK seafarers. One of the most cited reasons is ignorance of seafaring as a career by young people and the decline in the cost of travel. A recent EC report³³ argues that, unlike in the past, the falling cost of global travel coupled with shorter time spent onshore when in port has meant seafaring is no longer the only way for young people to see the world.

In surveys conducted by Gekara (2008)³⁴, many human resource managers of shipping companies reported concerns that the level of interest in seafaring careers among the youth in the UK has declined to the point where British society can no longer adequately

³¹ See www.rmt.org.uk/Templates/Internal.asp?NodeID=113977

³² Pettit, S. J., Gardner, B. M., Marlow, P. B., Naim, M. M., and Nair, R. 2004. Ex- Seafarers Shore Based Employment: The Current UK Situation. *Marine Policy*, 29, pp. 521 – 531.

³³ *Report of the Task Force on Maritime Employment and Competitiveness and Policy Recommendations to the European Commission (June 2011)*

³⁴ *Globalisation, State Strategies and the Shipping Labour Market. The UK's Response to Declining Seafaring Skills*, Gekara (2008)

supply merchant navy officers. This is perhaps somewhat surprising given the relatively favourable pay conditions compared to other professions.

However, the view that there is low awareness of seafaring is not uncontested. Many training colleges surveyed by Gekara disagreed with the assertion that interest in the sector had declined significantly.

Attracting the next generation of seafarers is recognised as a challenge by the authorities. The EU has identified the maritime sector as an area it wishes to encourage and remain strong in for a combination of economic, environmental and national interests. A 2009 communication to the European Parliament³⁵ outlined a number of potential measures to address declining numbers of new entrants. Furthermore, the 2011 Task Force group³⁶ recognised some additional key components that are likely to be successful in attracting and retaining Europeans to maritime employment, specifically related to the topic of this review, namely human capital improvements.

Retaining existing seafarers

Another reason cited for declining numbers of UK seafarers are the low levels of retention amongst experienced seafarers. One explanation for this are the relatively low wages paid to seafarers relative to comparable sectors – although this may be more a matter of perception rather than actual differences. As discussed in the previous chapter, mean average wage levels of officers (albeit from a small sample) compare favourably with other sectors.

According to a 2007/8 survey³⁷ of current seafarers at sea, the majority of respondents did not feel they received a fair wage for what they did. This can have two effects. Firstly, it may motivate existing seafarers to leave the shipping sector and either move to an onshore role or another sector entirely, which in turn can reduce incentives for shipping companies to train UK seafarers and instead encourage them to look abroad. Secondly, it can dissuade potential entrants. The reasons cited as to why the wage is not perceived as fair cover factors such as the time spent away from family/friends, lack of internet access and often a tough environment.

It is important to capture this nuance as a potential explanation of the difference between perceptions of wages and actual levels of wages compared to other industries. The literature suggests that it is not simply a matter of seafarers believing their wage is inadequate per se, but rather that it is not high enough given the factors described. The isolation from land, friends and family combine to often create very stressful working conditions which, in turn, produce an environment in which seafarers believe they should be compensated more than they are.

High cadet drop-out rate³⁸

Despite the introduction of measures to arrest the decline in seafarer numbers, much of the literature reports total numbers continuing to decline. One of the reasons for this, as stated in a number of EC reports, is the drop-out rate of trainee cadets. This suggests that while the number of cadets beginning officer training has increased (potentially driven by SMarT in the UK), the actual number of cadets completing the training is far fewer. Various explanations have been given for this. Gekara (2006) points to a decline in the

³⁵ *Communication from the commission to the European Parliament, the council, the European economic and social committee and the committee of the regions* (2009)

³⁶ *Report of the Task Force on Maritime Employment and Competitiveness and Policy. Recommendations to the European Commission* (June 2011)

³⁷ *Life at Sea Survey 2007/2008. Seafarer Salaries & Employment Benefits Survey Report*, Shiptalk (2008)

³⁸ It should be noted that the discussion of drop-out rates is based largely on qualitative evidence – there are no statistics available on cadet drop-out rates in the literature, beyond those collected in the online survey conducted as part of this review.

academic and/or physical capacity of applicants as a reason behind the decline and higher dropout rates. A related factor is a perception that cadets are too young when starting on the course – as mentioned by training providers cited in Gekara (2008) above.

However, as a counter, Gekara also reports that cadets themselves put high drop-out rates down to poor support (both financial and emotional) when confronted with the course content, the tough life at sea, a lack of adequate facilities in colleges, inadequate on-board training, abusive and insensitive senior officers during sea-time and inappropriate deployment of cadets while training at sea. Further, some cited career and future opportunity anxieties as a reason for dropping out. Recent surveys by Nautilus International also point to a similar story³⁹.

Gould (2011)⁴⁰ also found corroborating evidence relating to concerns amongst cadets over securing employment upon completion of their training. From interview and questionnaire data gathered over the period 2004-5, Gould found that cadets felt let down on two fronts in regards to a lack of opportunity after qualifying. Firstly, they felt that they had been led to believe that there would be a strong demand for their skills which no longer appeared to be the case and secondly, there was a perception that the MTO as part of the tonnage tax had caused companies to take on cadets whom they had no intention of offering a job to post qualification.

5.3 The relative attractiveness of onshore work to offshore work

As discussed in the preceding section, the literature identifies perceived low wages relative to other sectors (in particular the maritime cluster) as a factor explaining the decline in trained seafarers working offshore – seafarers are attracted onshore due to the high wages and a better lifestyle. The higher wages available in the maritime cluster reflects the demand for highly skilled ex-seafarers.

A 2003 study commissioned by the DfT⁴¹ examined the importance attached by employers in the maritime cluster on having prospective employees having professional seafaring experience. The study examined trends in recruitment advertisements placed by employers in the maritime cluster. The study charted the requirement that prospective employees be ex-seafarers as either “absolutely essential” or “advantageous”. The study classed “absolutely essential” as meaning a prospective onshore employer would only consider applicants who had professional seafaring experience. “Advantageous” was defined as a situation where seafaring qualifications and/or experience were not necessarily required but would be seen as an advantage.

The study found that since 1996, there had been a trend by employers in the maritime cluster to reclassify their demands for ex-seafarers from “absolutely essential” to “advantageous”. Depending on Lloyd’s Register assumptions, it was found that between c.7,000-10,000 jobs in the maritime cluster in 2003 were categorised by employers as ones in which it was “essential” to be an ex-seafarer. This compares to a figure of c.12,000 in the 1996 study. A 2007 OE study suggested that employers in the maritime cluster preferred ex-seafarers for around 16,000 shore-based jobs (and for half of these, seafaring experience was deemed essential).

However, the DfT study cautioned interpreting this finding as indicative of a reduction in demand for ex-seafarers. This was because prospective onshore employers could be adjusting their requirements in response to a reduced number of seafarers in aggregate, due to a decline in new cadets.

³⁹ See *Cadet Survey 2010*, Nautilus International.

⁴⁰ Gould, E. (2011), *Personalities, Policies, and the Training of Officer Cadets*, SIRC Symposium, Cardiff University

⁴¹ Gardner, B.M., Marlow, P.B., Naim, M.M., Nair, R.V. and Pettit, S.J. (2003): *The UK economy’s requirements for people with experience of working at sea*, Commissioned by the Department for Transport, the Chamber of Shipping and the Marine Society

5.4 The case for trained seafarers from developed markets

The final major theme to emerge from the literature review has been the debate around whether it matters that the UK has a pool of trained seafarers and ex-seafarers. Indeed, some commentators have highlighted the increasing wage differential between UK and non-EU seafarers as indicative that seafaring should be treated as a “developing country occupation” (Gekara 2008)⁴². Glen (2008) explains this in a more formal way through a statistical analysis that finds a positive rank correlation between the proportion of certified officers aged more than 40 and the rank order of GDP per capita. The inference being that seafaring as an occupation is one in which the national supply of seafarers will reduce as incomes rise, as the opportunity cost of a seafaring career rises.

However, the literature finds that while maritime companies are keen to reduce labour costs, there remains significant interest in employing from “home” markets. Gekara (2008) found that recruitment managers hire on skills and qualifications rather than nationalities (as a proxy for cost). His research shows companies continuing to train and recruit a large number of British seafarers into highly specialised and technical roles, particularly in the oil, gas and shipping sectors. The main reason given was the confidence placed by these companies in the UK seafarer training programme, certification procedures and proven track record of British seafarers.

Related to this, one hypothesis outlined in the literature is that increasingly companies are demanding highly skilled seafarers and ex-seafarers to deliver safe and high quality services to clients. This hypothesis implies that it may not automatically follow that the demand for UK seafarers declines in the face of lower-wage competition from the developing world, as companies will still require the skills that UK seafarers possess over and above their rivals from developing markets. In some cases, this preference will manifest itself in shortages for highly qualified seafarers.

Leggate (2004)⁴³ supports this hypothesis. The argument put across is that there is not a shortage of seafarers per se given the large numbers available from developed countries. However, the issue is that there is a shortage of “quality seafarers”. Once again this emphasises the continuing demand for UK seafarers, for whom nationality is a proxy for high quality.

Others such as Brownrigg et al. (2001)⁴⁴ have argued that the reason certain key sectors of the UK shipping industry hold a “comparative advantage in the world market” is due to the advantage of having a high presence of skilled UK seafarers and ex-seafarers. This advantage, they claim, is “due to a combination of factors, including their use of English ... their management expertise, marketing skills and many years’ experience in the industry”. Further, they highlight that the same comparative advantage holds for on-shore activities including insurance, legal services and banking.

Related to the demand for British trained seafarers, is their ability to adapt easily to onshore roles. British ex-seafarers are prominent across the entire maritime sector. Traditionally, the City of London has used experienced seafarers as subject matter experts in industries such as insurance. Therefore, it can be argued that there is a derived demand for seafarers from the city.

5.5 Conclusion

To summarise, the literature has highlighted the decline in the number of UK seafarers over the last decade – a decline the introduction of SMarT and other policy measures have not fully arrested.

⁴² ‘Are there jobs for all in the shipping industry?’, The SIRC column, Gekara (2008).

⁴³ Leggate, H. *The future shortage of seafarers: will it become a reality?* (2004)

⁴⁴ Brownrigg, M., Dawe, G., Mann, M., and Weston, P. (2001): *Developments in UK Shipping: the Tonnage Tax*, *Maritime Policy and Management* 28(3): 213 – 223.

There are different views as to the reasons behind the decline, ranging from increasing globalisation, a decline in the relative attractiveness of the maritime sector and poorer quality entrants. However, the literature also argues that despite these trends there remains demand for UK seafarers, particularly in areas where greater technical expertise is needed.

Chapter 7 presents the views of stakeholders on these key themes. In some cases, these views coincide with the literature, whilst in other cases, as one might expect, stakeholder views differ. However, before this, Chapter 6 explores how other countries provide support for seafarer training.

6 International comparison

If the shipping industry is viewed as strategically important to an economy, it often follows that some sort of government intervention is regarded as important in maintaining a country's share of global shipping. Certainly, this has been the route followed by European countries such as Holland and Norway and increasingly Asian and African countries.

This chapter provides a brief comparison of seafarer training in other countries and the support available to shipping companies from other countries. It seeks to place the UK experience in a broader context and highlight the similarities and differences with its shipping support regime and those of other countries, as well as highlighting the increasingly competitive global environment for maritime services.

6.1 Comparisons with traditional European rivals

Collectively, the European maritime sector is a significant contributor to economic activity across the EU/EEA. At a recent ECSA workshop⁴⁵, it was estimated that the shipping sector directly provides nearly half a million jobs at sea and a further 126,000 onshore. It is estimated that in total around 3 million people work in the European maritime cluster.

However, there is anxiety at the European level that whilst many of the largest shipping companies globally are European, they employ relatively few European nationals. Of the estimated 470,000 jobs at sea, around 165,000 are held by EU/EEA nationals. Accordingly, a number of campaigns have been initiated to counter this trend. As has been discussed in a number of pan-European reports, a number of European countries now have well-established training programmes and associated support schemes for new seafarers and also provide further support to the shipping sector in the form of tonnage taxes. The issue of promoting European seafaring and the maritime cluster remains a live issue for individual countries and the European Union.

Below, the training structures of Denmark and Holland are outlined in detail. These are traditional rivals to the UK, with both of these countries hosting developed maritime clusters and shipping sectors.

Denmark

Denmark has a well established maritime sector consisting of both a developed shipping sector and a maritime cluster (known as "Det Blå Danmark"). Shipping has become Denmark's second most important export sector, with an aggregate turnover estimated to be more than 100 billion DKK⁴⁶ and in 2002 around 4 per cent of the workforce was involved in the maritime cluster.

The training programme for ratings and officers is a combination of desk-based learning and vocational learning.

- ⇒ **Ratings** begin training after a minimum of nine years of primary and secondary education and complete a six-month basic course, followed by six months at sea and then another six months at school. Further qualifications are available with more sea time to become "ships assistants". A longer version of this programme applies for those students wishing to become "ships mechanics".
- ⇒ **Officers** begin training after a minimum of 12 years of primary and secondary education and follow a two-part programme. The first part lasts 4.5 years and is a sandwich course consisting of college and sea time and leads to the cadet becoming a junior officer. The second part lasts 1.5 to 2 years and commences

⁴⁵ ECSA Workshop 28th September 2010 report on the project on enhancing recruitment and training in the maritime sector in Europe.

⁴⁶ Source: www.danishshipping.com/danishshipping/

after the junior officer has been at sea a year. This part allows the junior to specialise as Master Mariner or a Chief Engineer (or both).

ECSA notes⁴⁷ a large number of seafarers return to the maritime cluster when they come back onshore. Traditionally, ex-seafarers can be found in logistics, insurance, ports, cargo handling, surveying, education and administration, and sales.

The Consolidated Act on maritime training programme⁴⁸ authorises the Danish Maritime Authority (DMA) to subsidise half of the operational expenditure for approved training institutions in Denmark. The Act also allows for the DMA to lay down regulations to reimburse shipowners' expenses for wages, board and travel in connection with the employment of staff completing a seafarer training programme. The Order on subsidies for work-experience placements on ships⁴⁹ calculates this subsidy as DKK 20,000 per three-month actual duration of service, noting that the seafarer must serve in a supernumerary capacity. Certain eligibility conditions apply.

It should be noted that until recently, it was the DMA that was responsible for the construction and operation of Danish ships, the control of foreign ships in Danish ports and for the training of seafarers. However, following a recent general election in Denmark, the DMA is no longer responsible for the training of seafarers. The future of seafarer training in the country is yet to be finalised.

In addition to supporting seafarer training, Denmark also supports its shipping sector through a tonnage tax.

Holland

Holland has a long maritime tradition stemming from its strategic geographic location. It has an established maritime cluster and shipping sector. In 2005, the direct production value of the maritime cluster was estimated at approximately €30 billion. In 2006, around 187,000 people were either directly or indirectly employed by the maritime sector⁵⁰.

Students in Holland enter the maritime education system after a minimum of 12 years of primary and secondary education – either at the age of 16 (entering into intermediate vocational education (MBO)) or at the age of 17 (entering into the higher vocational system (HBO)).

The intermediate vocational route takes four years and the higher vocational route takes three years. After completion of the HBO, the student receives a BSc qualification, and under both routes they can achieve their first CoC. After a further two to four years, with further study, officers may be awarded their CoC as Master/Chief Engineer.

ECSA notes that most Dutch officers are relatively young and return to shore after five years at sea.

In contrast to Denmark and the UK, Holland's maritime industry exhibits less direct government involvement in the training of seafarers. Instead, seafarer training is coordinated through foundations and private institutions. One such institution is the Dutch Maritime Network, an independent foundation made up of prominent persons from various maritime industry sectors. The foundation is active in the maritime labour market education. This is accompanied by various private institutions that offer

⁴⁷ In *The Mapping of career paths in the maritime industries*.

⁴⁸ Consolidated Act no 207 of 4 March 2011 issued by the Danish Maritime Authority, www.dma.dk/SiteCollectionDocuments/SOF/Uddannelsesplaner/LBK-207-04032011-maritime%20uddannelser.pdf.

⁴⁹ DMA Order no 131 of 23 February 2009, www.dma.dk/SiteCollectionDocuments/Legislation/Orders/2009/BEK-131-23022009-tilskud%20til%20praktikplads.pdf.

⁵⁰ Source: *The economic significance of maritime clusters: lessons Learned from European Empirical Research*, The Danish Shipowners' Association, July 2010

individuals a range from bachelor degrees, post graduate degrees and short intensive courses in maritime. However, by offering a student financing scheme, the Dutch Government does indirectly fund individuals who study maritime courses at university (both the bachelors and post graduate degrees).

Table 6.1.a below summarises the differences and similarities between training regimes in the UK, Denmark and Holland.

Table 6.1.a: Comparison of training regimes in the UK, Denmark and Holland

Country	Seafarer training regimes	Government support
UK	<p>The current training structure for both Ratings and Officers maintains the basic apprenticeship format, with shipping companies playing a significant role in the training of cadets. Cadets receive an academic qualification and a professional one (CoC).</p> <ul style="list-style-type: none"> Officers - achieve the STCW Officer of the Watch (OOW) certification, qualifying the seafarers as Junior Officers Ratings - undertake training, coupled with sea-time, to obtain a Navigational Watch Rating certificate – giving them the rank of Ordinary Seaman 	SMarT provides up to £20,000 (50 per cent of actual training costs) per cadet for the duration of the training programme
Denmark	<p>The training programme for ratings and officers is a combination of desk-based learning and vocational learning.</p> <ul style="list-style-type: none"> Officers - follow a two-part programme. Allows the junior to become either a junior officer, Master Mariner or a Chief Engineer Ratings - complete a six-month course, followed by six months at sea and then another six months at school. Further qualifications are available to students 	Subsidises DKK 20,000 per three-month actual duration of service plus support for training institutions
Holland	<p>Students in Holland enter the maritime education system after a minimum of 12 years of primary and secondary education</p> <ul style="list-style-type: none"> There are two routes into seafaring; <ul style="list-style-type: none"> Intermediate vocational education (MBO) taking four years The higher vocational system (HBO) taking three years <p>After completion of the HBO, the student receives a BSc qualification, and under both routes they can achieve their first CoC.</p>	No direct support, although indirect support through student finance schemes

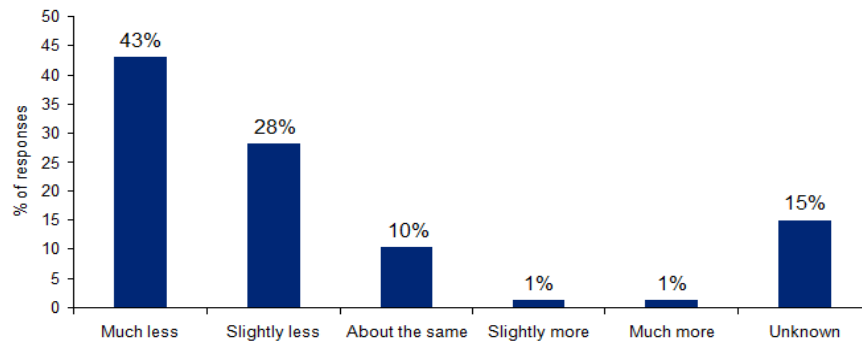
Source: Deloitte analysis

Other support for the shipping sector and maritime clusters in Europe

As well as support for training of seafarers, a number of European countries (both inside and outside of the EU) have in place tonnage tax regimes to attract shipping companies to register in their jurisdictions.

When asked about the level of support received from the UK Government to the maritime sector vis-à-vis other European Governments, most respondents to the online survey felt the UK Government was less generous in its support than other European Governments, although those offering better support were not mentioned.

Figure 6.1.a: Survey respondents' view on whether they receive more or less support from the UK Government compared to other European countries



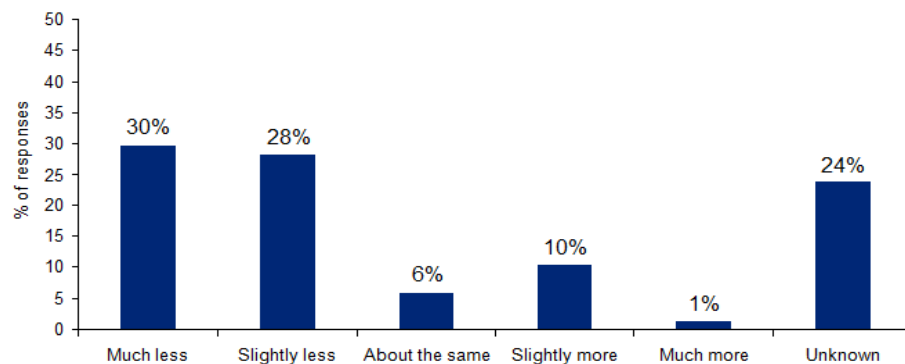
Source: Deloitte / Oxford Economics survey

Over 70 per cent of respondents in the maritime sector felt they received more support from other European Governments as compared to the UK Government. Respondents did not specify the nature of the support, although anecdotally this is thought to include greater support to shipping companies to take on board more cadets.

6.2 Comparison with emerging rivals

Traditionally, the main rivals to the UK maritime sector have been other European maritime centres such as Holland and Denmark. However, in recent years, countries further afield have been taking active steps to establish their own maritime clusters and also develop already existing shipping sectors. When shipping companies and companies in the maritime sector were asked in the online survey to compare the level of support they received from non-European Governments, respondents felt they received more from these countries than from the UK. However, whilst current support from non-European countries for shipping and maritime clusters was greater than in the UK, it was less than what was provided by European governments.

Figure 6.2.a: Survey respondents' view on whether they receive more or less support from the UK Government compared to non-European countries



Source: Deloitte / Oxford Economics survey

Given widespread expectations that Asian countries will be aggressively expanding their own maritime sectors, it may be the case that in the short-term, more support is made available for seafarer training to attract companies to register in these countries.

Indeed, recent observations by the Asian Shipowners Forum in May 2011, whose committee on seafarers noted that increasingly there is active cooperation between governments, training institutions and shipowners in Asia on the training and employment of seafarers. A number of initiatives have been launched to attract new recruits to the sector (see below).

This could have three potential implications for the UK and other traditional maritime nations:

- ⇒ given the global nature of labour markets for seafarers and ex-seafarers, countries that are able to offer more attractive remuneration packages will be able to develop high quality workforces without necessarily needing to invest in their own training programmes (a global “free rider” issue);
- ⇒ related to the previous point, the pool of seafarers that shipping companies will be able to recruit from will increase as more countries develop comparable training programmes⁵¹; and
- ⇒ given the footloose nature of the shipping industry and elements of the maritime cluster, countries that offer incentives to relocate will be able to quickly establish a significant maritime sector.

However, it should be stressed that changes to the maritime sector are not zero-sum. Countries’ maritime sectors can expand and prosper without necessarily harming their rivals – especially if the overall size of the sector is increasing with renewed economic growth and trade activity. Further, global labour mobility will only be effective in practice if shipping companies are confident that all countries’ seafarers adhere to common basic minimum standards. The risk of not meeting basic minimum standards is that seafarer qualifications from a particular country are no longer recognised or thought credible⁵².

In the following sub-section, training programmes and other developments in Singapore and the Far East are discussed.

Singapore

The maritime industry employs over 150,000 workers which contributes over 7 per cent of Singapore’s GDP⁵³. There are total 43,000 seafarers of over 100 nationalities working on board Singapore flagged ships, however, less than 400 are reported to hold Singaporean nationality.

Singaporean ships have also faced a problem of retention. Many qualified Indonesian senior officers have been lured away by the higher wages on the deep-sea international commercial fleet.

In 2011, The Certificate of Competency (Special Limits) programme was introduced by Singapore’s Maritime and Port Authority (MPA) in collaboration with the National Trades Union Congress’ (NTUC), the Employment and Employability Institute (e2i) and the Singapore Workforce Development Agency (WDA). The programme is aimed at two issues in particular. The Government wants to expand the pool of seafaring expertise among its citizens and permanent residents (PRs), as few Singaporeans serve on the country’s large national-flag deep-sea fleet. The hope is that this will appear attractive to young people who want to serve at sea but are wary of spending long periods of time away from home.

The programme seeks to assist potential recruits in securing placements with employers before training commences. The MPA believes the 21-month training programme offers both theoretical and practical exposure and will cover hands-on training for practical seamanship, boat-handling and survival techniques. It is organised into three phases: pre-sea induction; on-the-job training; and an exam preparatory course. The aim of the programme, developed in close consultation with the Singapore Shipping Association

⁵¹ A Nautilus International survey carried out in 2010 found 30 per cent of ships had over 6 different nationalities on board compared with 13 per cent in 2001 (source: *A Nautilus International survey of seafarers’ living and working conditions*).

⁵² This has been the case recently with the EU threatening to ban Filipino workers from EU registered ships, following a report by the European Maritime Safety Agency which raised concerns about the level and quality of training for Filipino seafarers.

⁵³ Source: *Chairman’s Report to the 20th ASF*, Bali, Indonesia 24th May 2011

(SSA) and the Singapore Maritime Officers' Union, is to train 60 recruits over the next two years.

Trainees start as deck cadets on board vessels operating within port limits. After obtaining the CoC (Special Limits) certificate, they can work on board bunker tankers as chief mate (special limits). After 2-3 years of sea time and with continued good performance, a chief mate can attend further upgrading courses and take examinations to qualify as master (special limits). The MPA, e2i, WDA and SSA's affiliated bunkering companies will contribute more than S\$2.3M (US\$1.8M) to cover S\$19,000/ trainee course fees and provide allowances for the candidates. Recruitment began in February 2011.

The figure below summarises the differences and similarities between training regimes in the UK and Singapore.

Table 6.2a: Comparison of training regimes in the UK and Singapore

Country	Seafarer training regimes	Government support
UK	<p>The current training structure for both Ratings and Officers maintains the basic apprenticeship format, with shipping companies playing a significant role in the training of cadets. Cadets receive both an academic and professional qualification (CoC).</p> <ul style="list-style-type: none"> • Officers - achieve the STCW 95 Officer of the Watch (OOW) certification, qualifying the seafarers as Junior Officers • Ratings - undertake training, coupled with sea-time, to obtain a Navigational Watch Rating certificate – giving them the rank of Ordinary Seaman 	<p>SMarT provides up to £20,000 (50 per cent of actual training costs) per cadet for the duration of the training programme</p>
Singapore	<p>The Government wants to expand the pool of seafaring expertise among its citizens and permanent residents through offering a CoC programme.</p> <ul style="list-style-type: none"> • The 21-month training programme offers both theoretical and practical exposure and will cover hands-on training for practical seamanship, boat-handling and survival techniques • It is organised into three phases: pre-sea induction; on-the-job training; and an exam preparatory course • After obtaining the CoC certificate, they can work on board bunker tankers as chief mate • After 2-3 years of sea time, a chief mate can attend further upgrading courses and take examinations to qualify as master 	<p>MPA, e2i, WDA and SSA's affiliated bunkering companies subsidise the S\$19,000 (100 per cent) trainee course fees and provide additional allowances for the candidates</p>

Source: Deloitte analysis

Other recent developments in seafarer training in Asia

The following is a non-exhaustive list of relevant initiatives/developments occurring around seafarer training in Asia.

- ⇒ **China:** the demand for qualified seafarers continues to increase, which has led to wage inflation. In response, maritime training and education institutions are actively improving the quality of training to comply with international standards.
- ⇒ **Hong Kong:** in response to low numbers of Hong Kong seafarers, the HKSOA launched a programme in 2002 to increase cadet numbers. The programme is reported as achieving almost 100 per cent retention with 136 cadets employed (compared to a total of 147 Hong Kong seafarers working on ocean-going ships).

Cadets receive HK\$5,000 a month from the Government and the cost of developing training facilities has been subsidised.

- ⇒ **Japan:** following a long-term decline in the number of Japanese seafarers, a taskforce was established in 2008 to promote the profession. Initiatives agreed include greater cooperation between maritime training institutes and an international training projection for Asian students.
- ⇒ **Taiwan:** the Ministry of Education has approved a budget for building dedicated training ships for students of maritime universities. The cost of studying in maritime vocational schools remains free.

It is clear that a number of Asian countries are taking active steps to expand and deepen their shipping sectors and maritime clusters.

6.3 Experience of historic rivals

This section briefly considers the historic experience of the United States and Australia. Both countries had significant maritime clusters that have subsequently declined, although in the case of Australia, steps are being taken to reverse this decline.

United States

The United States shipping industry represents a number of coastal maritime clusters that deal with a large proportion of the country's import and export trade by sea. South Louisiana, Texas, New York and California are the main four shipping clusters in the country.

The case of New York is particularly instructive. New York experienced rapid growth from the late 19th century through to the 20th century, most noticeably in a post-war boom period in the mid 20th century. However, a "rapid and drastic abandonment" of New York's waterfront arose during the late 1960s. This appears to be mainly as a result of the development of containerisation technology. The port's slow reaction to technical and economic innovations saw it lose its competitive edge to ports in Newark and New Jersey, losing not just the shipping companies but also the associated activity.

A further, and more drastic, impact on the shipping industry in the United States as a whole was witnessed following the introduction in 1986 of the Tax Reform Act. This Act repealed the provision which had allowed US shipping companies to exempt foreign income from its operations for the purposes of taxation, making the United States the only country to tax such income. The results were dramatic – from 1988 to 1999 the number of US-owned, foreign-flagged ships as a percentage of the world merchant fleet dropped from 5.6% to 2.9 per cent.⁵⁴

Despite a change in tax laws in 2004, the lack of new expertise both at sea and ashore during the 1990s is making recovery difficult.

Australia

Australia is regarded as one of the most important players within the global maritime industry and is estimated to handle c.10% of all global seaborne trade. However, over the past 16 years, Australia has experienced deterioration in the performance of its maritime sector with the number of Australian flagged ships falling from 55 in 1996 to 22 this year.

Those 22 Australian ships that service Australian ports are on average, 20 years old, around eight years older than the world average. Also, the domestic seafarer workforce is ageing, with half of the seafarers older than 45.

⁵⁴ Tax Analysts Viewpoints – September 10, 2007
http://fpgdc.com/images/Kies_ShippingArticle.pdf

Illustratively, the recent advertisement for an Australian Port Master here in the UK demonstrated the shortage of Australian ex-seafarers to work in Australian ports.

In response to the decline in its maritime sector, Australia has launched *Stronger Shipping for a Stronger Economy*. This will be implemented in July 2012 and seeks to increase the Australian shipping sector's global competitiveness. The policy contains four elements:

- ⇒ tax reforms to remove barriers to investment in Australian shipping and to foster the global competitiveness of the shipping industry;
- ⇒ a strengthened and simplified regulatory framework with a transparent licensing regime supported by clearly stated objectives;
- ⇒ the establishment of an Australian International Shipping Register (AISR) to encourage Australian companies to participate in the international trades; and
- ⇒ establishment of a Maritime Workforce Development Forum to progress key maritime skills and training priorities.

The policy will mean that Australian resident companies with Australian registered vessels will pay no company tax, with qualifying income from shipping and royalty withholding tax also exempted. The depreciation rate will also be cut from 20 years to 10 years with the hope of accelerating fleet renewal. Rollover relief will also be offered and tax offsets will be available to Australian employers of resident seafarers who work in international trade.

The new register, the Australian International Shipping Register (AISR), is designed to attract new tonnage to the country. The AISR will offer some exemptions from employment legislation, including the Fair Work Act, when trading internationally.

Ship-owners will be required to comply with the International Labour Organisation's Maritime Labour Convention and other treaties. A further pre-requisite is that entrants will need to employ at least two Australian seafarers per ship, preferably the master and the chief engineer. Moreover, the Fair Work Act will still apply on voyages between domestic ports.

6.4 Conclusion

This chapter has presented international examples of seafarer training programmes. Some of these share common features with the UK model – combining elements of classroom-based learning and at-sea training. However, unlike other countries' training schemes, the UK seafarer training programme allows newly qualified officers to immediately enter into a defined profession.

Nearly all countries offer some form of support for seafarer training in conjunction with a tonnage tax and there is fierce competition to attract shipping companies registering. Increasingly, traditional centres of shipping and established maritime clusters will face competition from Asian countries, both in terms of "poaching" talent from European and developing their own pool of highly qualified seafarers. The examples of New York and, until recently, Australia, demonstrate that shipping centres and maritime clusters cannot afford to stand still and must continue to maintain and develop a skills base or risk losing their comparative advantages.

7 Stakeholder Consultation

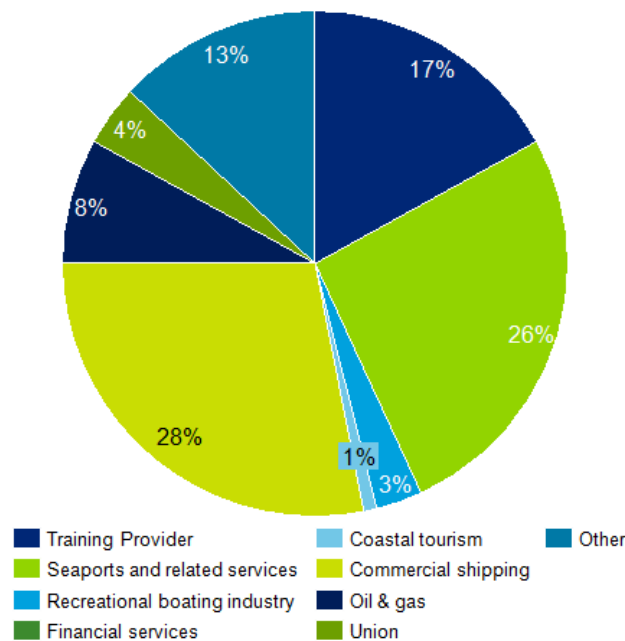
As part of the evidence gathering phase of this review, Deloitte and OE have conducted a three-pronged approach to collecting data:

- ⇒ detailed one-to-one discussions with Panel members;
- ⇒ facilitating an industry workshop for 16 stakeholder organisations to discuss the issues; and
- ⇒ hosting an online survey seeking stakeholder views and data – the link to the survey being sent to readers of *London Matters* and the members of various stakeholder organisations.

This chapter summarises the views of stakeholders – it does not seek to record verbatim all stakeholder comments received. The views presented are aggregated and are not attributable to individual stakeholders consulted.

It should be noted that survey results presented are based on a response rate of 114 responses from a range of companies in the shipping sector and maritime cluster.

Figure 7.0a: Profile of online survey respondents



Source: Deloitte / OE survey. Total respondents = 114.

Whilst this represents a cross-section of opinion across the industry, the results should be treated with caution and should not be considered a completely representative sample. As the above figure notes, no respondents identified themselves as being in the “financial services” sector – however, respondents categorising themselves as “other” in some cases specified themselves as being involved in insurance⁵⁵. Further, not all respondents completed all questions and for certain questions, the number of answers received was too small to be considered robust. Lastly, given respondents answered the survey questions in the context of a review on the future of SMaRT it should be expected that their answers may be biased in a particular direction – Deloitte and OE have not attempted to “cleanse” the data for biases.

⁵⁵ Respondents also identified themselves as fishing companies, crew management, local authorities, inland waterways and tourism.

Accordingly, the quantitative survey results, whilst indicative, should be treated with care and the context they were collected in considered.

7.1 The UK maritime sector

Stakeholders emphasised that even within the shipping sectors and maritime cluster there is a diversity of economic activities. The skills trained seafarers have are applicable across a range of areas – for example, within the shipping sector, seafarers can be found in survey and exploration as well as freight and tourism.

Stakeholders listed a number of reasons why they believed the maritime sector was different to other sectors.

- ⇒ **Critical role:** the maritime sector transports over 90 per cent of the UK's visible imports and exports – without it, trade would be impossible.
- ⇒ **Greater mobility:** compared to other sectors, participants in the maritime cluster, and shipping sector in particular, were identified as being very mobile with few barriers to entry into most markets. This mobility manifested itself most visibly in two senses: global labour mobility and the ease with which a flag can be changed in a very short time period. Compared to other industries, a shipping company was said to be able to move its operations very quickly – potentially overnight in some cases.
- ⇒ **Nature of training:** the lead-in time necessary for a newly-recruited trainee to become an officer is longer than many other industries. Typically this can take between eight and nine years of highly specialised training that must conform to international standards as set out in the STCW convention. Further, a period of service at sea is compulsory. However, it should be noted that unlike many other professions, at present, cadets are said to finish training/qualifying almost debt free.

7.2 Demand and supply of seafarers and ex-seafarers

Changes in the number of UK seafarers

Stakeholders agreed with the contention that there has been a decline in the number of UK seafarers. It was argued that the number of UK seafarers had been in decline since the late 1970s – a trend which was accelerated in the 1980s. Stakeholders identified three reasons for this decline:

- ⇒ **a reduction in demand caused by containerisation** which enabled the use of fewer ships that could sail with smaller sized crews compared to traditional cargo vessels;
- ⇒ **the effect of globalisation** which put pressure on the British shipping industry to make efficiency savings and seek cheaper labour from overseas; and
- ⇒ **the effects of a global recession** that meant shipping companies had over-capacity and were not replacing seafarers who left the sector.

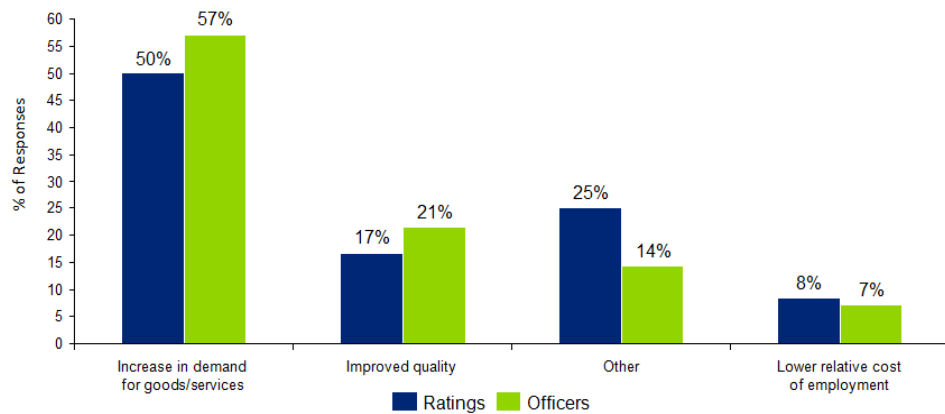
The ability of shipping companies to recruit globally was facilitated by the coming into force of STCW which set common standards of competency for seafarers all over the world. Stakeholders argued that these common standards gave a competitive advantage to officers from developing countries, who are trained to these standards in order to perform the jobs required of them at sea at considerably lower cost than those from developed countries. Stakeholders concurred with the literature that there is now a ready source of non-UK seafarers (officers and ratings) for companies to draw upon, some of whom will be cheaper to employ than UK seafarers. The notion of a “race to the bottom” was mentioned referring to downward pressure on wages.

A cumulative effect of these trends, argued by stakeholders, was that many companies that had previously been active trainers of seafarers ceased or reduced their training programmes⁵⁶.

Current demand trends for UK seafarers

Stakeholders recognised that there had been a decline in the number of UK seafarers beginning in the 1970s. They argued that the legacy of declining numbers of UK seafarers was being felt today. They noted that seaborne trade has now recovered to 2008 levels and, given that the growth in ships’ capacities is increasingly constrained by the size of ports, the demand for numbers of ships is increasing (as evidenced by rising orders in Asia) which, in turn, is increasing the demand for skilled seafarers. That the demand for seafarers is a function of increased global trade is also confirmed in the survey results.

Figure 7.2a: Drivers of increased seafarer recruitment



Source: Deloitte / OE survey

Of those respondents answering “other”, some of the most common responses were that companies would recruit more seafarers if training costs were lower, if the quality of new cadets were higher and if there were more onboard training berths.

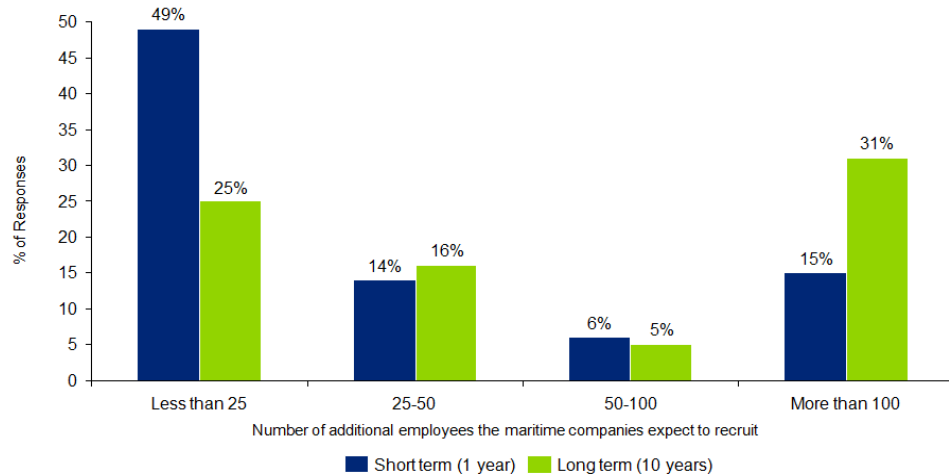
Stakeholders reported that there is now said to be a worldwide shortage of officers (especially technical officers). This mis-match between demand and supply has had an inflationary effect on salaries – both for seafarers and ex-seafarers working in the maritime cluster.

However, it should be noted that the online survey reported that, of the shipping companies surveyed, half said that, *ceteris paribus*, they plan to hire less than 25 people over the next 12 months suggesting that the shortage perhaps only applies to certain specialist roles or that in the short term, companies remain cautious. It is also interesting to note that survey responses indicated a limited reduction in headcount across the maritime sector as a result of the recent global recession with 60 per cent of respondents reporting no reduction at all and a further 25 per cent reporting a reduction of only between 0 and 10 per cent of headcount staff. An explanation for this might be that shipping companies, like other businesses in the recession, chose not to reduce headcount but rather revise working patterns, such as giving seafarers longer breaks between voyages or asking them to take wage cuts.

Nonetheless, when asked about intentions to recruit over the next decade, survey respondents were more optimistic.

⁵⁶ However, some stakeholders did acknowledge that the maritime sector was not unique in respect to declining employment numbers – the manufacturing sector had seen similar trends in employment numbers and has a similar labour force profile in terms of age structure.

Figure 7.2b: Expected recruitment levels over the next twelve months and decade per company

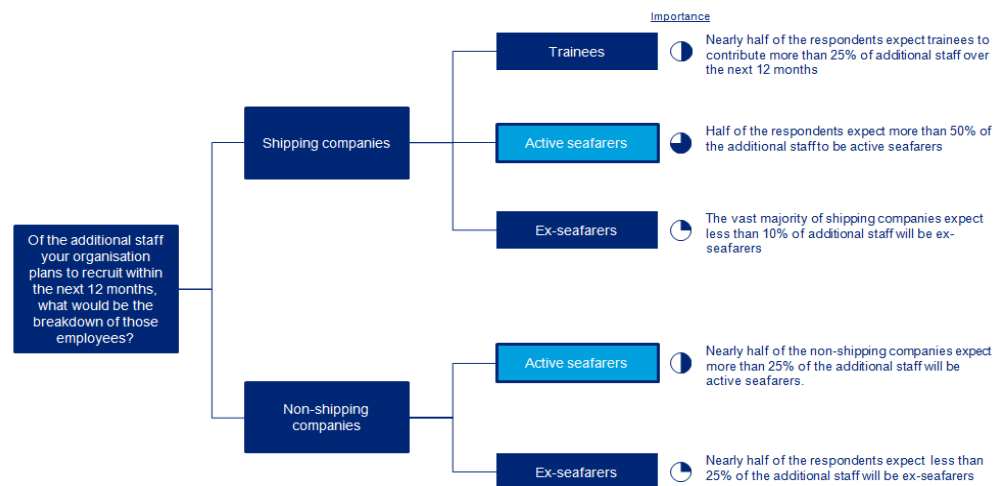


Source: Deloitte / OE survey

Over a third of respondents expected their company over the next decade to recruit 50 or more staff into the maritime sector, with 31 per cent predicting an increase in excess of 100 new staff. Of course, it should be noted that not all of these will be UK nationals and many of these staff will not represent additionality – they may simply be replacing leaving staff.

Figure 7.2c below summarises respondents' views on the types of staff they expect to employ over the next 12 months.

Figure 7.2c: Demand for seafarers over the next 12 months



Source: Deloitte / Oxford Economics survey

Within the shipping sector, the bulk of new employees are expected to be active seafarers (either officers or ratings). However, trainees are expected to make up of 25 per cent of new staff for around half of respondents in the shipping sector. In terms of the maritime cluster (non-shipping companies), nearly half of the respondents expected more than 25 per cent of their additional staff to be active seafarers, i.e. seafarers drawn directly from the shipping sector (as opposed to ex-seafarers already working in the maritime cluster).

The effect of the maritime cluster on seafarer numbers

Stakeholders also recognised the pull of the maritime cluster on active seafarers. They noted that the decline in active seafarers reflected strong demand for ex-seafarers in

onshore maritime cluster activities such as finance, law and the technology sector drawing upon the pool of active seafarers in the shipping sector. The strong demand for highly skilled seafarers was reflected in wage increases for superintendents for whom there is a lack of supply.

The demand for seafarers by the maritime cluster was also confirmed in the stakeholder survey.

Stakeholders suggested that the average time being spent at sea was given as between 7 – 10 years, though it was possible to be at sea for one's entire career. Some stakeholders contended that UK seafarers were more likely to move back onshore earlier compared to other nationalities. Stakeholders acknowledge the existence of a "free rider" issue, referring to those shipping companies who spent significant resource to train cadets not fully benefiting from their investment because these cadets left to go work for other shipping companies or other companies in the maritime cluster.

The supply of UK seafarers

In terms of supply, stakeholders also recognised that the maritime sector had struggled in recent years to attract young people. Historically, shipping had difficulty in recruiting from outside of families and communities with a shipping legacy. In recent years, considerable resource has been dedicated to increase awareness of the sector and broaden the recruitment pool.

However, a number of challenges remain. These include the young being deterred from entering the profession due to there being no history of going to sea in the family, seafaring apprenticeships not being recognised by BIS for this industry and a reluctance to be away from family and friends and a lack of access to social media networks to keep in contact with them. Stakeholders reported that young people are no longer attracted by the idea of "seeing the world" given quick turnaround times. The industry has also suffered from negative press and other issues such as piracy recently.

Conversely, some stakeholders expressed the view that given the current economic climate, interest in the maritime sector and cadet training could increase given that 96 per cent of cadets go on to jobs at sea (as found in a MCA survey) and that (currently) the cost of training is largely met by employers and the Government.

Also on the supply side, it was suggested that the low number of training places was constraining the number of new cadets undertaking seafaring training.

7.3 Experiences of SMarT and other training schemes

The importance of seafarer training to the wider maritime sector

Stakeholders made a number of arguments for why seafarer training, and by implication support measures such as SMarT, is crucial in maintaining the UK maritime sector's competitiveness. They noted that having a pool of trained seafarers was a key contributor to the UK maritime cluster's strengths. It was stated that, in general, maritime clusters' strengths were based on shipbuilding and/or strong skill bases. The UK has the latter – losing this would jeopardise its position as a maritime centre of excellence and risk losing the wider cluster. Stakeholders pointed to the example of New York, which used to be a global shipping centre, but once investment in training and other facets ceased this precipitated a relative decline to a point where it has a relatively small global profile today.

Having trained seafarers was suggested as "the single most important factor for the industry in the long-term". Stakeholders pointed to data which showed that personnel with professional seagoing qualifications and experience are considered essential or highly preferable for around 16,000 shore-based jobs in the UK. Around 95 per cent of respondents to the online survey deemed it either vital or highly desirable that the roles currently performed by ex-seafarers were filled by those who had previously been at sea.

Looking to the future, new sectors such as off-shore renewable energy were identified as requiring a ready supply of trained seafarers.

The benefits of SMarT and take-up by companies

Stakeholders were more positive than the literature over the benefits and influence of SMarT. The impact of the SMarT scheme was said to have been highly significant in reducing the costs of training companies for seafarers and, thereby, enabling the numbers in training to be increased. Together with positive effects on the fleet of the tonnage tax, SMarT was claimed to be responsible for the rise in the number of officer trainees recruited from around 450 in the late 1990s to around 900 today⁵⁷. In 1998⁵⁸, it was projected that there would be between 6,000 and 9,000 certificated UK officers by 2012 (depending on the retirement age assumption) – the actual figure is closer to 13,000. Some stakeholder quotes on the benefits and effectiveness of SMarT from the online survey are reproduced below.

Figure 7.3a: Stakeholder quotes on SMarT

“In a declining industry it has helped to keep up the level of trained British seafarers to not only serve on British vessels but also to provide trained people for marine related industry such as surveyors, pilots, insurance and ports.”

“The support has encouraged ship owners to train young seafarers and whilst only a small proportion remain at sea beyond about 8 to 10 years, the vast majority eventually feed into shore-based positions where their experience and expertise ensures UK owned/based companies continue to be considered world class.”

“It has encouraged and enabled many shipping companies to stimulate a training culture, which in turn is helping to provide newly qualified junior officers in line with the identified needs of the industry.”

“The investment made through SMarT has been vital for the continuation of a strong British Merchant Navy, which continues to contribute significantly to the economy of the United Kingdom. It has given thousands of men and women the opportunity to pursue a career both at sea and on shore, benefitting the country immensely in trade and revenue.”

“SMarT has not benefitted the inland and coastal waters passenger vessel industry at all and it is a flaw in process.”

“[It] forms a token payment for the high costs of training a deck officer which helps the less dedicated shipping officers to start training.”

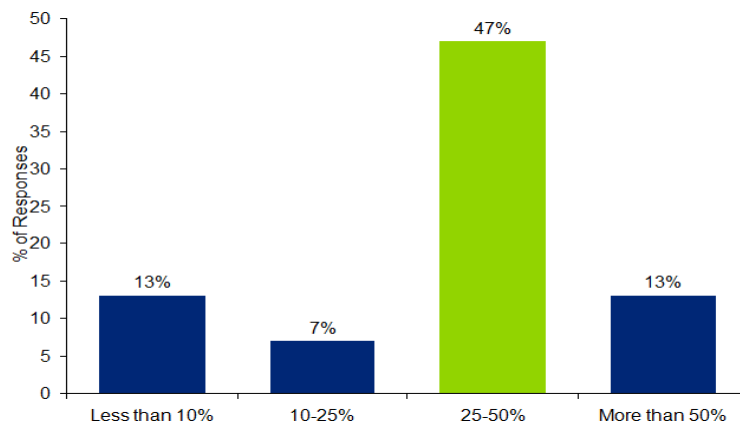
Source: Deloitte / OE survey

Responses by shipping companies to the online survey showed that over half of them received government support for all of their cadet training via SMarT. For these trainees, shipping companies reported that SMarT contributed between 25 and 50 per cent of the total cost of training cadets. Nearly all SMarT trainees were said to be British nationals.

⁵⁷ Industry and Government figures

⁵⁸ *United Kingdom Seafarers Analysis 1997*, London Guildhall University, Centre for International Transport Management, 1998

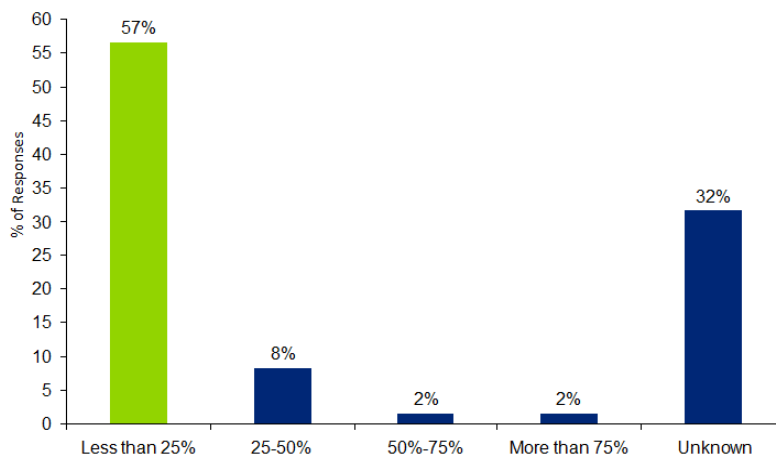
Figure 7.3.b: Proportion of trainee costs covered by SMarT



Source: Deloitte / OE survey

When asked whether ex-seafarers working for companies in the maritime cluster had gained their CoC under SMarT, the majority of respondents answered in the negative.

Figure 7.3.c: Proportion of ex-seafarers staff working at companies in the maritime cluster who have trained under SMarT



Source: Deloitte / OE survey

However, this result is likely to reflect the fact that SMarT has only been in existence for around a decade and many ex-seafarers will have been trained before it was implemented.

SMarT funding was also deemed to be crucial for specialist training colleges. By having British trainees using SMarT to get their CoC, training colleges are able to attract further foreign students studying for their CoC – a source of export earnings for the UK. In the absence of SMarT, such colleges risk losing a major funding stream and be forced to close which could mean that this source of UK export earnings dries up.

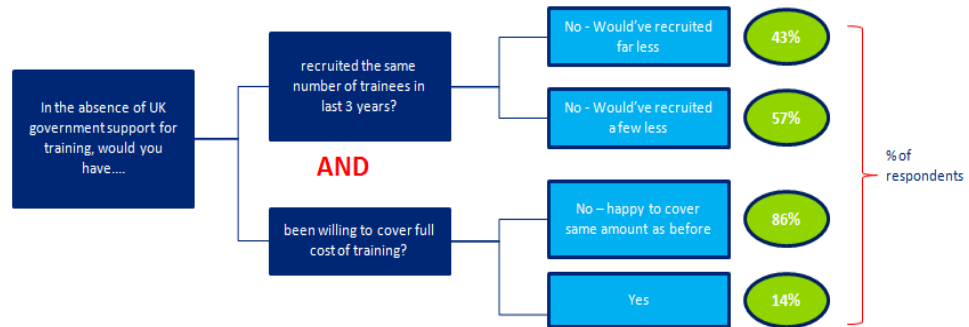
The counterfactual

When asked about recruitment plans in the absence of SMarT (the “counterfactual”), survey respondents suggested that fewer trainees would have been recruited and that companies would have been unwilling to shoulder the full cost of the training⁵⁹.

⁵⁹ These results should be treated with care and the context under which they were collected (as part of a review examining the future of SMarT) be accounted for.

Figure 7.3d summarises respondents' stated courses of action in respect to training if SMarT had not existed in respect to recruitment numbers and how training costs would have been met.

Figure 7.3.d: Cadet recruitment in the absence of SMarT



Source: Deloitte / OE survey

Some stakeholders argued that if there was no SMarT support, training of cadets would still occur in similar numbers but there would be conditions around it and companies would seek to tailor the training more towards their own requirements rather than that of the wider sector, potentially reducing benefits to organisations employing ex-seafarers.

However, as pointed out during the course of the study, training programmes are developed by the MCA and the MNTB. Shipping companies are not able to tailor them to their own needs. The syllabus of training programmes would not change if there was no SMarT funding.

Other stakeholders contended that if SMarT funding were withdrawn, this would lead to an increase in the marginal cost of training, which would inevitably force companies involved in training to scale back the number of new personnel that they recruited. This effect would be felt immediately.

However, in the longer term, the reductions could be even more serious. These stakeholders also questioned whether shipping companies would still remain in the tonnage tax scheme if the lack of SMarT funding meant it became uneconomic to fulfil training obligations.

Some stakeholder quotes on what would happen in the absence of SMarT are reproduced below.

Figure 7.3.e: Stakeholder quotes on SMarT

“Many overseas companies want to train in the UK because of the quality and reputation, but could be put off by the cost and lack of support.”

“Annual recruitment of UK officer cadets will inevitably decline if SMarT funding is discontinued, probably by between 30% and 50% on current numbers. Many shipping companies can easily compare the cost of training per officer by nationality, and SMarT helps to maintain a relatively competitive balance for UK officer cadets. Without it some companies will move towards nationalities then costing less than UK officers to train to first certification.”

“A reduction of SMarT funding is of concern to us as it will introduce additional costs to our business in an already difficult and challenging financial climate. This would lead to a potential reduction in training of seafarers, which in turn would lead to a lack of qualified officers for the industry.”

“With the planned changes in University and College funding in 2012, if the funding for seafarers is withdrawn then smaller companies will no longer be able to take on UK cadets and this will have a hugely negative impact on the UK Maritime Industry”

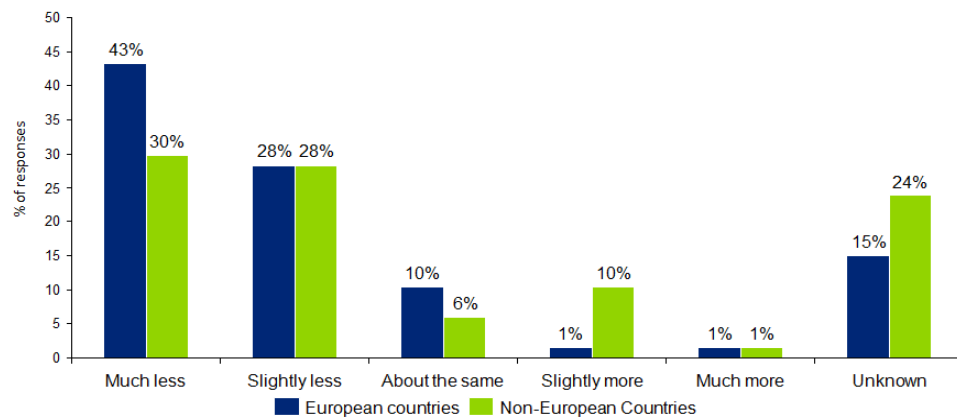
“As shipping companies are not the final end-user for many ex-seafarers it requires government to intervene to ensure adequate numbers are trained.”

Source: Deloitte / OE survey

Comparison with other countries

A number of stakeholders commented that training costs for shipping companies were lower in other EU countries compared to the UK – despite SMarT support. They reported that in the UK, the Government contributed up to 50 per cent of the cost as compared to 75 per cent in Denmark and 80 per cent in Holland. More generally, as discussed in Chapter 5, most respondents to the survey felt the UK offers less support to the maritime industry than its rivals.

Figure 7.3.f: Comparing support for the maritime sector in the UK with European and non-European counterparts



Source: Deloitte / OE survey

A further point of comparison mentioned was that the Danish and Dutch were said to front-load their training as part of tertiary/further education.⁶⁰ As a result, the UK training programme is regarded as superior to other European schemes, though not by a great deal – and it has to work to maintain its comparative advantage. Indeed, it was noted that in Holland, many students do not go out to work at sea all, preferring instead to go straight into the maritime cluster.

7.4 The case for having UK seafarers and ex-seafarers over other nationalities

It was noted by some stakeholders that the concept of “demand for UK seafarers” is not altogether straightforward. It could refer to demand for UK-trained seafarers or UK-national seafarers. Results from the online survey suggest that for around half of all shipping companies, cadets being trained under SMarT are all British nationals, and for the others, British nationals constituted the bulk of SMarT trainees. This suggests UK-trained seafarers and UK-national seafarers can largely be thought of as synonymous.

This notwithstanding, stakeholders argued that typically, companies do not actively recruit for a particular nationality, suggesting that there was no such thing as “demand for UK seafarers”. Further, it was noted that companies tend to be indifferent as to ratings’ nationality.

However, this observation notwithstanding, other stakeholders did highlight a number of reasons why they believed shipping companies and companies in the maritime sector do prefer to employ UK officer seafarers and ex-seafarers over other nationalities. Reasons included:

- ⇒ UK seafarers have fewer visa restrictions and are more geographically mobile than other nationalities;
- ⇒ UK seafarers and ex-seafarers are more willing to relocate;

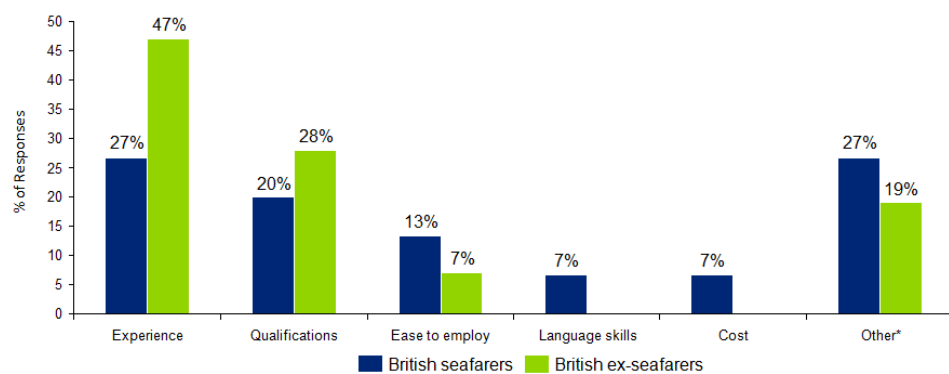
⁶⁰ See Chapter 6 for a more detailed comparison of the respective support mechanisms for seafarer training.

- ⇒ on average, UK seafarers are better trained and have better skills than many other nationalities; and
- ⇒ they have the advantage of English as a first language.

This was further corroborated by stakeholders who highlighted that UK officers are not only preferred by UK shipping companies, they are in demand throughout the world. The explanation given for this was the high quality of their training and the structure of seafarer training in the UK makes an important contribution. Stakeholders noted that the fact that trainees are sponsored by potential employers from the beginning of their training gives their companies a stake in their progress and enables them to be imbued with company culture from the outset. The quality of UK training is said to be respected around the world with large numbers of foreign nationals come to train at UK colleges to obtain British certificates.

These reasons coincide with answers given in the online survey.

Figure 7.4.a: Reasons for preferring British seafarers and ex-seafarers



Source: Deloitte / OE survey

The most popular reasons for preferring UK seafarers and ex-seafarers to non-UK seafarers and ex-seafarers were experience and qualifications – particularly in the case of ex-seafarers working in the maritime cluster. Where respondents answered “other”, they tended to emphasise that the advantage of hiring British staff was a combination of “experience” and “ease of employment”, as well as cultural awareness of British working conditions.

Over 70 per cent of respondents expressed a preference for recruiting officers with a CoC rather than being indifferent between officers with a CoC and CEC. The inference from this is that UK officers are preferred to non-UK officers.

These results capture current preferences. Some stakeholders noted that such preferences may not always last, citing the observation that some shipping companies are now increasingly preferring non-UK junior officers for cost reason, meaning the real preference is for experienced UK seafarers.

7.5 Alternatives to SMarT

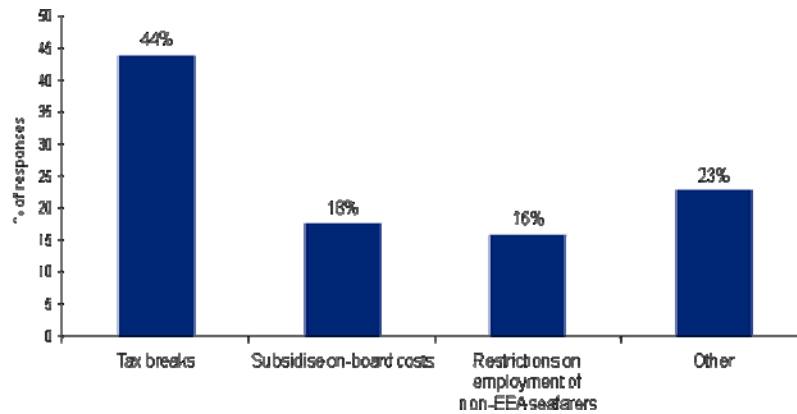
Stakeholders were asked what might replace SMarT if it were to be ended. In replying to this question, stakeholders drew attention to the fact that changes to seafarer training cannot be viewed in isolation. As well as considering the larger backdrop of maritime issues, seafarer training also needs to be considered in light of changed funding arrangements for apprenticeship schemes and new funding arrangements/charging structures for universities and Further Education colleges. College funding for officer training courses under Government apprenticeship schemes is not a viable option, as officer trainees are not employed on board ship but are supernumerary.

Stakeholders also recognised that when considering the alternatives to SMarT, the free rider issue must also be addressed. There was said to be a clear balance to be struck on

equitable contributions from all beneficiaries (which include Government), without jeopardising an industry which is clearly open to the effects of strong international competition.

When presented with alternatives, respondents identified tax breaks as the most popular alternative to SMarT support for seafarer training.

Figure 7.5.a: Alternatives to SMarT



Source: Deloitte / OE survey

The most popular “other” response was either subsidising tuition fees or making them free.

7.6 Conclusion

This chapter has summarised stakeholder responses on the issue of seafarer training in the UK. The responses echo the conclusions from the literature review, in that:

- ⇒ the maritime sector differs from other sectors due to the highly mobile nature of companies and length of training;
- ⇒ the market for seafarers and ex-seafarers is global;
- ⇒ for a number of years, there was a consistent decline in the number of UK seafarers; and
- ⇒ the UK sector cannot afford to stand still – it faces growing threats from a number of established and emerging shipping and maritime clusters.

It is clear, from stakeholder responses, that SMarT is widely perceived as being an effective mechanism in promoting the competitiveness of the UK maritime sector, although some stakeholders did query its relevance to certain maritime activities. Responses suggest it has been instrumental in raising cadet numbers against a counterfactual and ensuring there is a ready supply of trained seafarers that can work at sea and then return to the maritime cluster, which in turn maintains the UK’s position as a centre of maritime excellence.

8 Seafarer demand and supply forecasts

This chapter summarises OE's projections for the demand for seafarers and ex-seafarers by the UK maritime sector over the next decade, and for the supply of those individuals. Based on this analysis, OE and Deloitte are able to express a potential supply shortfall for UK seafarers in numerical terms, showing this to be potentially significant in the case of Deck and Engine Officers in the shipping sector and in the sectors employing ex-seafarers (the maritime cluster).

The chapter is structured as follows:

- ⇒ recent trends and the starting point for demand and supply;
- ⇒ demand in the shipping sector over the decade ahead;
- ⇒ seafarer supply and the shipping industry "skills gap";
- ⇒ ex-seafarers across the wider UK maritime sector;
- ⇒ overview of demand and supply in the "central projection";
- ⇒ alternative demand and supply assumptions; and
- ⇒ concluding comments on the potential role for foreign seafarers.

Only a summary of the projections is set out in this chapter. Detailed numbers and a much more in-depth description of the methodology can be found in annexe B.

8.1 Recent trends and the starting point for demand and supply

Estimates of the number of officers and ratings, split by nationality and category of responsibility, can be made using a combination of survey data from the UK Chamber of Shipping and statistics on UK certificated officers reported by the Department for Transport. Table.8.1a provides a summary while greater detail is set out in annexe B.

It can be seen that employment in the UK shipping industry increased significantly over the six year period, helped by a robust increase in the proportion of non-UK staff employed. But as the detail in the annexe shows, numbers of UK deck and engine officers are estimated to have grown at only a modest pace.

Table 8.1a: Estimated officers and ratings employed in the UK shipping industry

	2004	2010	Average annual % change
Deck officers	8,847	13,952	7.9
Deck ratings	9,403	15,170	8.3
Engine officers	7,980	12,240	7.4
Engine ratings	4,136	6,289	7.2
Technical / general ratings	605	1,313	13.8
Total "deck & engine"	30,971	48,964	7.9
Technical officers	2,244	3,830	9.3
Hotel & catering officers	6,186	4,742	-4.3
Hotel & catering ratings	24,529	40,498	8.7
Total other	32,959	49,070	6.9
Overall total	63,930	98,034	7.4

	2004	2010	Average annual % change
Non-UK personnel as %:			
Deck & engine officers	29.9	57.3	
Deck & engine ratings ¹	44.1	73.4	
Other (uncertificated) officers	67.0	69.3	
Other ratings	69.3	75.9	
¹ Including technical / general.			

Source: Oxford Economics estimates based on UK Chamber of Shipping and DfT data

The actual employment figures estimated above are unlikely to be a reflection of both the demand for and supply of seafarers to serve in the UK shipping in a given year. Rather, it would be better to assume, in very broad terms, that⁶¹:

- ⇒ when the global economy is operating close to or above “full economic capacity”, then actual employment in a typical industry will be constrained by – and will therefore be broadly equal to – supply, while the true demand for manpower would be somewhat higher; and
- ⇒ when the global economy is operating below its “full economic capacity”, as in the recent past, then actual employment in a typical industry will be constrained by – and so broadly equal to – demand, with supply somewhat higher.

Looking specifically at the UK shipping sector, the evidence is tentatively consistent with there recently having been a small degree of excess supply in terms of UK seafarers (see annexe). Reflecting this, it is assumed that actual employment in 2010 was equal to demand, and that a degree of excess supply existed. More specifically, this excess supply is assumed to have been 3.8 per cent of actual employment of UK nationals in that year, equivalent to some 1.2 per cent of all UK and non-UK officers and ratings working in the sector.

8.2 Demand in the shipping sector over the decade ahead

In principle, developments in the demand for seafarers will depend on a range of factors, by far the most important of which is world trade in goods. That is partly because trade at the global level is a driver of UK shipping activity in its own right, and partly because it is a key determinant of UK-specific trade, which is also obviously important for the country’s shipping industry. However, reflecting the latter point, where the trend in UK trade diverges from that in global trade, the trend in UK shipping activity would also diverge (though to a lesser extent) from that suggested by the trend in total global trade alone. The trend in employment in the UK shipping industry will also tend to diverge from the trend in industry activity, reflecting changes in productivity over time.

More specifically, for the purposes of this report it is assumed that a simple relationship holds between the trend in global trade in goods and the trend in the demand for seafarer employees in the UK shipping sector, whereby the latter grows by three percentage points per annum less than the former. That allows for:

- ⇒ a shortfall of around one percentage point reflecting the fact that UK trade tends to grow more slowly than global trade, due in large part to the effect of fast-growing trade within the Asia-Pacific and other “emerging” regions. Over the 15

⁶¹ In practice it is possible for both “excess demand” and “excess supply” to exist in a given industry at the same time, due to skill mismatches or physical location issues. The assumption made here, that employment at any given time is equal to either demand or supply, is therefore a simplifying one. But it is not one considered to be unreasonable for the purpose at hand. It is also possible for a particular industry to be suffering from a shortage of supply, even where the global labour market as a whole is experiencing excess supply.

years to 2008, global trade in goods grew on average by 6.7 per cent a year and UK trade (imports plus exports) by 5.2 per cent a year – a differential of 1.5 percentage points (see chart). And going forward, OE’s macroeconomic forecast suggests that that differential will tend to be wider, at above two points on average, as UK import volumes grow less rapidly than over the 1993–2008 period. The shortfall of one percentage point allows for the fact that UK shipping activity depends in part on UK-specific trade, and in part directly on global trade.

⇒ a further shortfall of around two percentage points reflecting a tendency for UK employment to grow more slowly than UK output. Across the UK private non-financial services sector as a whole, employment grew by 1.7 per cent per annum on average over the 15 years to 2008, compared with 4.2 per cent per annum for output – a differential of 2.5 points. For shipping specifically, Oxford Economics has previously estimated value added output per worker for the period 2004–09 (see chart), finding this to have been somewhat erratic over that time with a sharp drop in 2009 as the trend in activity was hit by the recession. However, comparing the average of 2007 and 2008 with 2004, the data are consistent with annual productivity growth in the region of 2¼–2½ per cent, i.e. broadly in line with the longer term trend for the private non-financial services sector as a whole. Going forward though, the gap is expected to be slightly narrower than in the past, as the scope for productivity gains associated with the shift to larger ships becomes more limited in the face of more binding infrastructure constraints (port facilities, canal width and depth etc).

Figure 8.2.a: Trends in global and UK trade

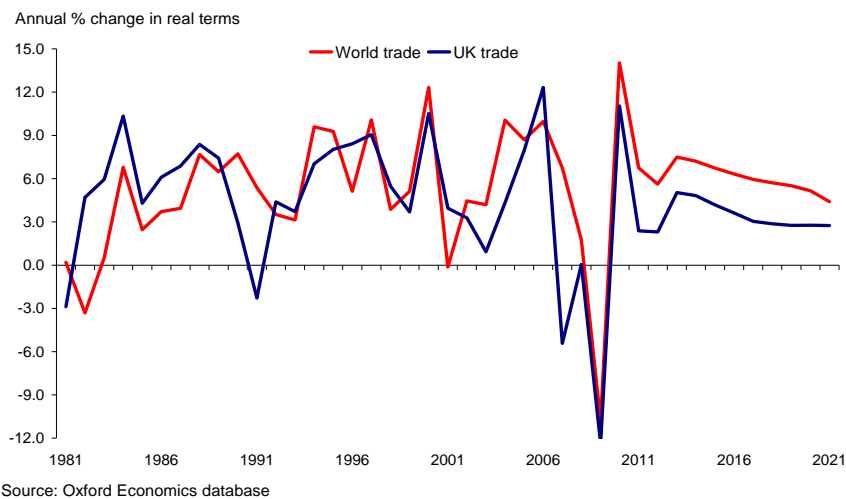
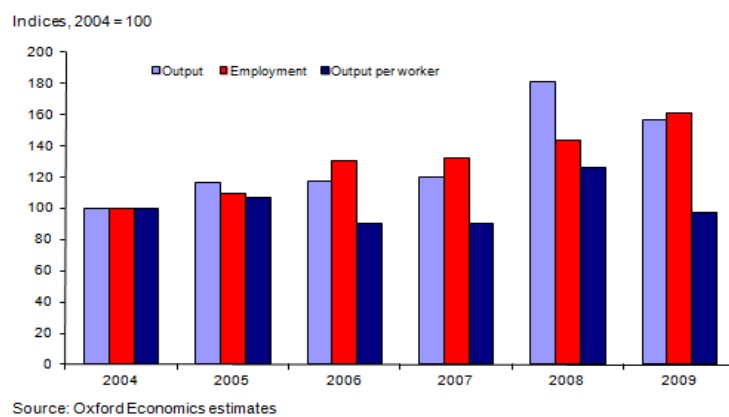


Figure 8.2.b: Output, employment and productivity in the UK shipping sector



The Deloitte / OE survey asked how employment would change in the event of a 10 per cent rise in world trade. Excluding “unknowns” and with each firm’s answer weighted according to their employment size band, 46 per cent of companies whose main activity was “commercial shipping” said that they would leave employment unchanged, while the remaining 54 per cent said that they would increase it but by less than 10 per cent⁶². That is consistent with the assumption that UK shipping employment would tend to increase in future if global trade grew, but at a clearly more moderate pace.

As global trade in goods is indeed set to increase over the next decade on OE’s central forecast, by some 6 per cent per annum on average, an increase on average of 3 per cent per annum is therefore projected in UK shipping sector employment demand. On the assumption that the pattern of demand for the various categories of officers and ratings remains in line with that in 2010, the demand projections are summarised in the table below. (Year-by-year detail is provided in the annex.)

Table 8.2a: Projected demand for officers and ratings (UK and overseas)

	Deck & engine			Other		Overall total
	Officers	Ratings	Total	Officers	Ratings	
2010	26,192	22,772	48,964	8,572	40,498	98,034
2011	27,167	23,620	50,786	8,891	42,005	101,682
2016	32,514	28,269	60,783	10,641	50,273	121,697
2021	36,512	31,745	68,256	11,950	56,454	136,660

Source: OE assumptions and modelling.

This simple modelling does of course involve a range of other implicit assumptions, namely that:

- ⇒ “Structural” factors potentially affecting trends in the UK’s share of global shipping activity – i.e. influences on “competitiveness” such as comparative tax systems, regulations, relative wages and other employment costs, training systems and skills, infrastructure quality, security factors, etc – are unchanged.
- ⇒ Demand for passenger ship services moves in line with that for goods transportation, as seems reasonable on the grounds that trade in goods and passenger transport demand are ultimately both driven by trends in global economic activity and income.
- ⇒ The pattern of trade at the global level does not shift in such a way as to alter the assumed relationship between global trade and UK shipping activity.

A fuller model would of course attempt to incorporate changes in all of the above factors, and possibly some others, based in large part on relationships found to have held in the past. However, in this particular case such an approach would be unlikely to yield any better result.

- ⇒ A consistent set of data on UK shipping industry employment is only available back to 2002, which is really an insufficient run of time for accurate estimation.
- ⇒ In any case the shift to the new “tonnage tax” regime renders the past somewhat irrelevant. It means that the pre-2000 period may not provide a good model for the underlying relationships that exist today. But neither would the

⁶² On an unweighted basis 50 per cent of commercial shipping firms giving a definitive reply said that employment would be left unchanged and 50 per cent that it would be increased by less than 10 per cent. Amongst all respondents to this question – including some whose main activity is “recreational boating” – 54 per cent of the unweighted sample said that employment would be left unchanged and 46 per cent that it would be increased by less than 10 per cent.

immediate post-2000 period, as a fair proportion of the strong jobs growth seen in that era could in principle be a “one-off” increase in the level of employment in response to the change in the tax regime, rather than a reflection of the more “normal” relationship between the rates of change in employment and in those of its key ongoing drivers.

8.3 Seafarer supply and the shipping industry “skills gap”

On the supply-side, the key assumptions made in OE’s “central” projection are as follows:

- ⇒ For UK officers of all kinds, an outflow from the labour supply of 6 per cent per annum up to age 61, with an outflow of 34 per cent above that, up to an assumed cut-off point at age 70.
- ⇒ For UK ratings of all kinds, an outflow from the labour supply of 6¼ per cent per annum up to age 61, with an outflow of 26 per cent above that, up to an assumed cut-off point at age 70.
- ⇒ For UK deck and engine officers, an assumption that some 800 per year will commence training, with an annual drop-out rate of 8 per cent during the four-year training period, and a subsequent leaving rate from the industry of 6 per cent per annum.
- ⇒ A few additional UK rating-to-officer conversions each year.
- ⇒ A split in officer trainees between the “deck” and “engine” categories in line with that in recent years – i.e. somewhat more deck than engine.
- ⇒ Further annual inflows of UK nationals as follows: 185 technical officers, 195 catering officers, 200 deck ratings, 10 engine ratings, 45 general ratings and 955 catering ratings.
- ⇒ Annual growth in the supply (i.e. stock) of non-UK officers and ratings of 5 per annum per annum across all categories.

Much greater detail is included in the annexe, while a summary of the resulting “skills gaps” is presented further below, after consideration of the employment of ex-seafarers by the wider maritime sector.

8.4 Ex-seafarers across the wider UK maritime sector

OE estimated the number of ex-seafarers demanded and supplied across the wider UK maritime sector for the period 2008-11, by combining some of the findings of the study carried out by Gardner et al seven years ago⁶³ with some results from the Deloitte / OE survey – as described in the annex. Demand was then projected forward on the basis of the associated sector employment forecasts found on OE’s global macroeconomic and industry models, with the results summarised in Table 8.4a and also set out in more detail in the annexe.

Unlike in the shipping sector, it is assumed that supply shortages were still apparent even in the aftermath of the recession (although these were less intense than they would have been in the absence of that downturn), reflecting the earlier finding that in 2003 some 13 per cent of “ex-seafarer jobs” were filled by non-seafarers. Thus, actual employment in 2011 is taken as the starting point for supply rather than demand, with demand somewhat higher. (Demand in this case is taken to be the number of jobs for which an ex-seafarer is regarded by the employer as preferable, with supply being the number of jobs actually filled by an ex-seafarer rather than a non-seafarer.)

⁶³ “The UK economy’s requirements for people with experience of working at sea”, BM Gardner et al, Cardiff University, for the DfT, Chamber of Shipping and Marine Society, January 2004.

Table 8.4a: The demand for ex-seafarers by the UK maritime cluster

	Oil & gas	Marine equipment & IT	Marine engineering	Shipping, ports, towage etc, ship brokers & agents	Insurance & ship finance	Consultants, surveyors, lawyers, classification societies	Training providers & public bodies, etc	Total
2011	1,306	2,207	288	6,339	497	4,116	2,522	17,275
2016	1,132	1,970	286	6,876	515	5,034	2,441	18,254
2021	977	1,749	264	7,018	517	5,398	2,493	18,418

Source: Oxford Economics

Developments in the supply of ex-seafarers meanwhile are based on:

- ⇒ An assumption that UK deck and engine officers and ratings leaving active seafarer roles with shipping companies, up to the age of 50, become available to work in ex-seafarer positions in the UK – excluding those who have worked for fewer than four years.
- ⇒ A modest allowance for additional ex-Royal Navy and commercial fishing personnel.
- ⇒ A comparatively modest outflow rate from the sector of 4.5 per cent per annum (covering both retirement and pre-retirement leavers).
- ⇒ An assumption that the inflow of foreign ex-seafarers to the sector moves in a constant proportion (17 per cent) to that of UK ex-merchant navy seafarers (with these individuals assumed to have all served in the UK shipping sector).

Table 8.4b shows that on these assumptions the supply of UK ex-seafarers to the maritime sector declines gradually over the years ahead. Even taking into account foreign ex-seafarers, skills shortages are due to persist in this sector over the coming decade, as shown in the next section.

Table 8.4b: Projected demand and supply of ex-seafarers going forward

	Total demand for ex-seafarers by UK industry	Supply of UK ex-seafarers to UK industry	Supply of foreign ex-seafarers (from UK shipping sector) to UK industry
2011	17,275	14,090	2,140
2016	18,254	14,181	2,145
2021	18,418	14,586	2,206

Source: Oxford Economics

Respondents to the Deloitte / OE survey suggested that they expected to recruit a number of active seafarers equivalent to 42 per cent of their existing stock of ex-seafarers over the next decade, plus a further number of ex-seafarers equivalent to 19 per cent of that stock⁶⁴. If respondents are interpreting this question as referring to new recruits in total, rather than net growth in employment after accounting for people leaving, then on

⁶⁴ Estimates based on questions about total employment in maritime areas, the proportion of present employees who are ex-seafarers, and planned recruitment of active and ex-seafarers over the next decade. Note that a quite significant proportion of ex-seafarer (as opposed to active seafarer) recruits would be from within the UK sector, rather than being net additions to UK employment of ex-seafarers.

this basis employment of ex-seafarers would edge down slightly over the decade – broadly in line with OE’s expectation of supply as estimated above, rather than demand as estimated on the basis of the wider UK economic outlook. This in turn would be consistent with employers of ex-seafarers recognising the likely constraints on employment of those personnel as a result of potential ongoing supply shortages.

8.5 Overview of supply and demand: central forecast

Table 8.5a brings all of this together, showing that, overall, supply and demand should be very broadly in balance between now and 2021. However, in the case of UK deck and engine officers specifically – i.e. the group for which maritime training is most pertinent – a shortage is expected to develop over the years ahead peaking at over 4,000 in 2019 and remaining at above 3,500 in 2021. That last figure is the equivalent of 10 per cent of total projected demand for deck and engine officers in that year.

A shortage is also expected to build in the immediate future the case of UK deck and engine ratings, peaking at over 1,250 in 2016 – equivalent to 5 per cent of total demand in that year – although this shortfall should subsequently ease with the gap having been eliminated by 2021. And in the case of UK ex-seafarers employed in the maritime cluster, a shortage is also projected, peaking in 2017 at almost 2,000 (equivalent to 11 per cent of total demand in that year) and remaining above 1,600 (10 per cent) in 2021.

Table 8.5a: Projections for seafarer and ex-seafarer numbers

Deck and engine officers at sea						
	Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand
2010	26,192	11,621	14,571	14,998	-428	-2
2011	27,167	11,236	15,931	15,748	182	1
2016	32,514	9,076	23,438	20,099	3,339	10
2021	36,512	7,299	29,213	25,652	3,561	10
Deck and engine ratings at sea						
	Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand
2010	22,772	6,292	16,481	16,712	-231	-1
2011	23,620	5,911	17,708	17,548	161	1
2016	28,269	4,600	23,669	22,396	1,273	5
2021	31,745	3,968	27,777	28,583	-806	-3
Total deck and engine officers and ratings at sea						
	Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand
2010	48,964	17,913	31,051	31,711	-659	-1
2011	50,786	17,147	33,639	33,296	343	1
2016	60,783	13,676	47,107	42,495	4,612	8
2021	68,256	11,266	56,990	54,236	2,754	4

Table 8.5b: Projections for seafarer and ex-seafarer numbers cont.

Ex-seafarers in the wider maritime sector						
	Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand
2010	17,354	13,990	3,364	2,125	1,239	7
2011	17,275	14,090	3,185	2,140	1,045	6
2016	18,254	14,181	4,073	2,145	1,929	11
2021	18,418	14,586	3,832	2,206	1,626	9
Other officers at sea						
	Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand
2010	8,572	4,687	3,885	4,058	-172	-2
2011	8,891	4,676	4,215	4,261	-45	-1
2016	10,641	4,756	5,885	5,438	447	4
2021	11,950	4,893	7,057	6,940	117	1
Other ratings at sea						
	Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand
2010	40,498	10,134	30,364	30,737	-373	-1
2011	42,005	10,267	31,738	32,274	-535	-1
2016	50,273	10,960	39,313	41,190	-1,877	-4
2021	56,454	11,612	44,842	52,570	-7,728	-14

Source: Oxford Economics assumptions and modelling

Table 8.5c: Projections for seafarer and ex-seafarer numbers summary

Overall total						
	Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand
2010	115,389	46,724	68,665	68,630	35	0
2011	118,958	46,179	72,778	71,970	808	1
2016	139,952	43,573	96,379	91,268	5,111	4
2021	155,078	42,358	112,720	115,952	-3,231	-2

Source: Oxford Economics assumptions and modelling

8.6 Alternative demand and supply assumptions

The projections set out above are consistent with Oxford Economics' latest "central" forecast – that is, the outlook seen as the single most likely scenario to develop over the years ahead, recognising that there is scope for these expectations to be surprised on both the "upside" and downside". But as well as producing a regularly-updated "central" projection, OE also produces alternative scenarios looking out over a five-year horizon which – although viewed as outside risks – are recognised as being genuine possibilities.

At present the situation is rather unusual in that the risks around the central forecast are very much skewed to the downside. At the time of writing, the situation is even more

uncertain because of developments surrounding Italian and Greek sovereign debt, and the whole future of the Eurozone, but at the time that the alternative scenarios were finalised in October, OE put the probabilities as follows:

- ⇒ Oxford Economics' central forecast: 45 per cent.
- ⇒ "Eurozone financial contagion" (or "European disorderly default"), in which Greek sovereign debt restructuring occurs without key safeguards – such as how to protect the banks and the position of countries such as Portugal and Ireland – with the resulting intensification of pressure to cut budget deficits at an even faster pace, and a more general tightening in credit conditions also affecting the private sector: 20 per cent.
- ⇒ "China hard landing", in which a commercial property crash and weakness in the country's key overseas export markets lead to banking sector stress, falling share and property prices and investment cutbacks there – with knock-on depressing effects through the wider Asian supply chain and beyond: 10 per cent.
- ⇒ "US recession", in which political deadlock leads to fiscal policy paralysis and a cautious approach by companies to investment, with unemployment in the country continuing to rise – and weaker demand trends again affecting growth prospects to some extent around the globe: 10 per cent.
- ⇒ "Corporate reawakening", the only "upside scenario" in which business investment expenditure exceeds present expectations, helped by the fact that the non-financial corporate sector as a whole is in a strongly positive cash position in most parts of the globe, driving a virtuous circle in which consumer confidence and spending are also driven upwards: 10 per cent.

As all of these scenarios have an impact on trade at the global level, with UK-specific trade also surprising in the same direction, all of them would have a material impact on the outlook for UK shipping employment over the next two to four years – and to some extent beyond that. This is illustrated in the charts below, which cover three groups of seafarers at sea only (i.e. excluding employment of ex-seafarers): the overall total for officers and ratings; officers and ratings in the deck and engine categories; and deck and engine officers.

Figure 8.6a: Alternative demand scenarios: all officers and ratings at sea

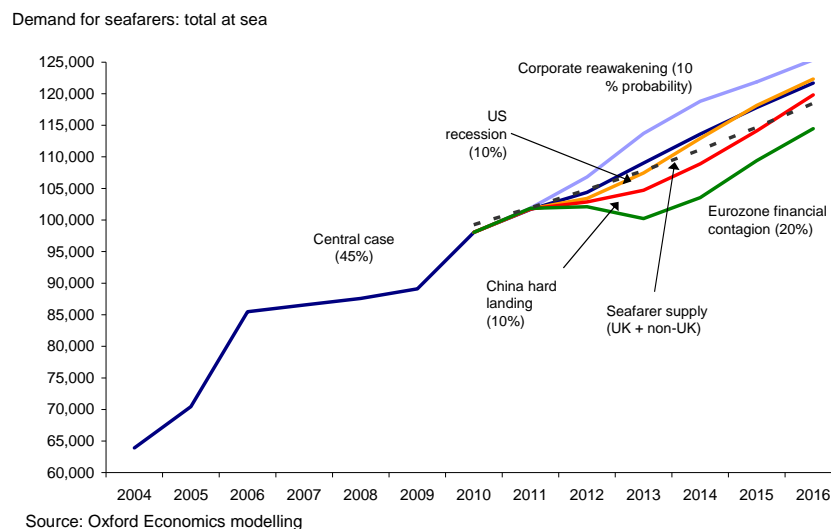


Figure 8.6b: Alternative demand scenarios: deck and engine officers and ratings

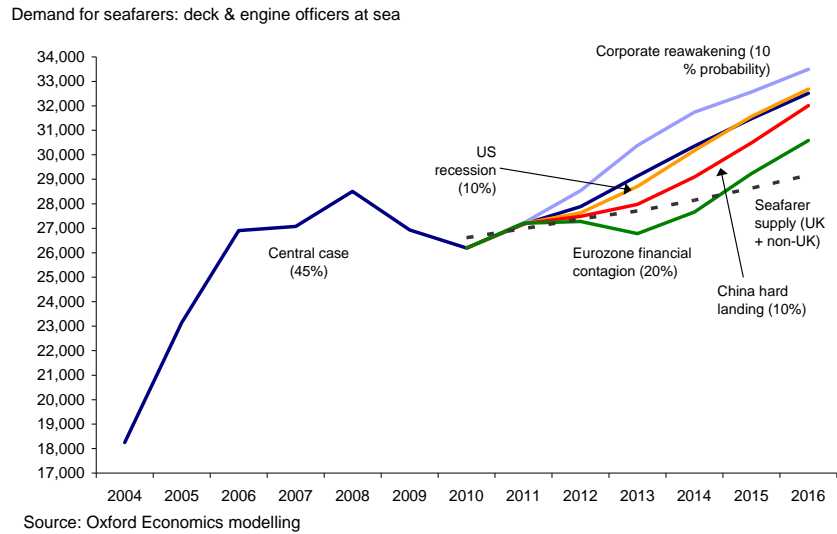
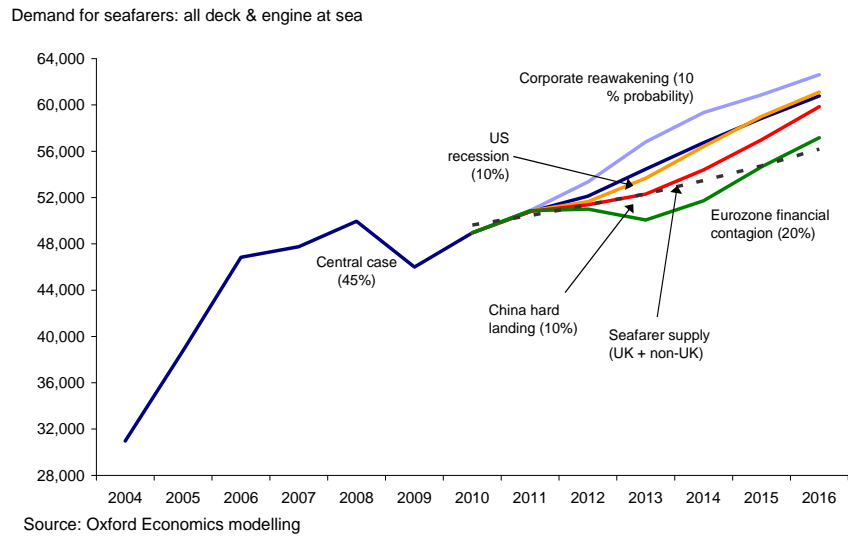


Figure 8.6c: Alternative demand scenarios: deck and engine officers



It can be seen that, although the differences in the various potential paths for demand are clearly significant, most do not much alter the fundamental picture of a fairly significant supply shortage in the case of deck and engine seafarers – and officers in particular – by the middle of the decade. In the most extreme case, that of “Eurozone financial contagion”, the impact is to contain the “gap” through to 2015, though only of course as part of a costly scenario of weak economic growth, rising unemployment and intensified public finance difficulties.

Looking at deck and engine officers specifically, by 2016 the supply shortages in percentage terms are projected as follows: corporate reawakening 13 per cent; central case 11 per cent; US recession 10 per cent; China hard landing 9 per cent; Eurozone financial contagion 5 per cent.

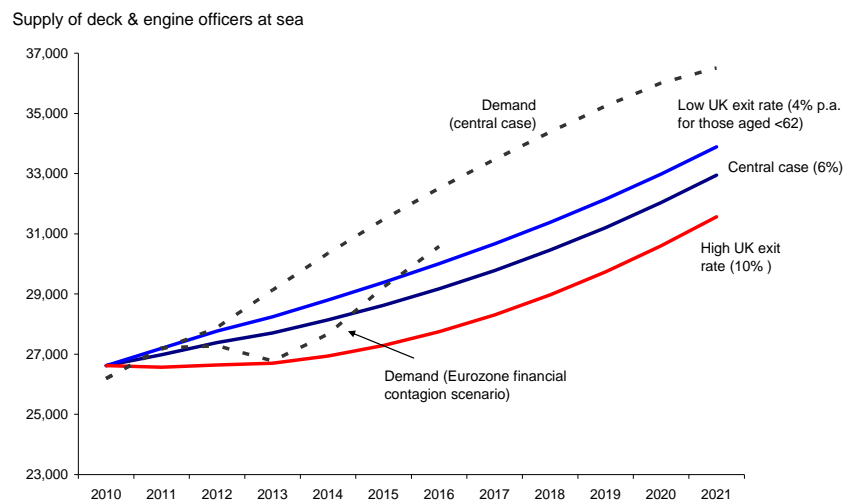
In general, the alternative scenarios considered above affect trade around the globe, with comparatively modest differences in how the pattern of trade develops – notwithstanding the different geographical origins of the various downside scenarios. It is of course possible to imagine further alternative scenarios in which a clearer degree of

“decoupling” took place between regions of the globe. If for example growth stalled across the “advanced” economies while the “emerging world” nevertheless managed somehow to enjoy the kind of robust growth now envisaged on the “central” projection, then UK-specific trade – and therefore, though to a lesser extent, UK seafarer demand – would be more adversely affected than suggested by developments in the path of global trade alone. However, in the more likely alternative scenarios developed by Oxford Economics, adverse developments in the Eurozone would have a clearly negative impact on countries such as China; the knock-on impact would by no means be focused solely on countries located in the same region such as the UK.

It should also be noted that the above deck and engine officer supply shortage projections are based on an assumption that the path of seafarer supply is unresponsive to these alternative developments. But in practice that need not be the case. With demand weakness at a macroeconomic level resulting in lower employment and higher unemployment, then some past seafarers and potential seafarers who might otherwise choose to work elsewhere could make themselves available to the shipping industry. However, it is unlikely that this effect would be sufficient to make the training of additional new officers that much less necessary or desirable, especially given the likelihood of any such recessionary conditions gradually receding over the second half of the decade if not before.

It is also worth considering what the projections would look like under alternative assumptions about seafarer supply. The charts below focus on two potentially key variables: the rate at which those below retirement age leave the shipping sector; and rate of growth in the supply of non-UK seafarers to the UK industry.

Figure 8.6d: Alternative supply assumptions: industry exit rates



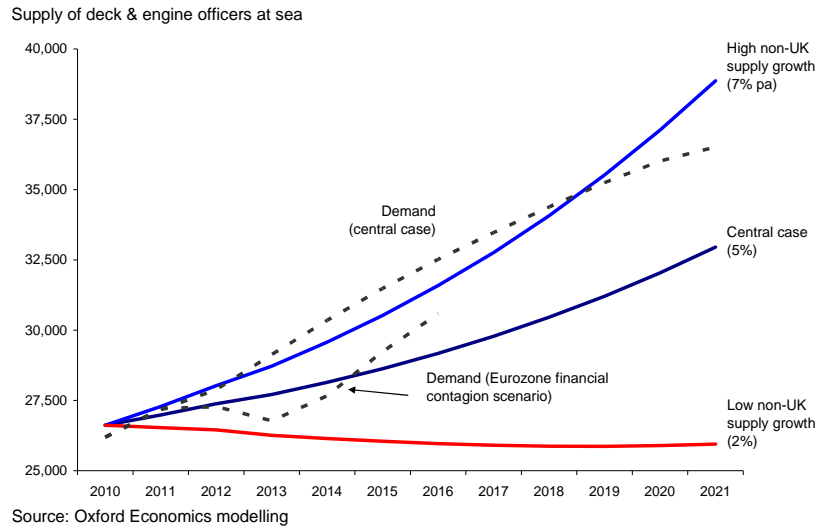
Source: Oxford Economics modelling

Firstly, it can be seen that the central projection is fairly robust to different assumptions about the rate at which UK seafarers leave the industry: the picture varies clearly but not dramatically if a comparatively high rate of 10 per cent per annum is assumed, or a comparatively low rate of 4 per cent per annum, rather than the 6 per cent assumed in the central case (for officers aged below 62). Specifically, the supply shortfall for deck and engine officers is 14 per cent in the first case and 7 per cent in the second, rather than the central 10 per cent.

By contrast, the “headline” supply shortfall is much more dramatically affected by variations in the assumption about the supply of non-UK officers. The 2021 shortfall figure of 10 per cent of total for deck and engine officers at sea reflects the assumption that the supply of non-UK officers to the UK shipping industry grows at a steady rate of 5 per cent per annum, above others’ projections of the overall supply of seafarers at the global level but still well below the rate of growth achieved in recent years. However, if that supply

were to grow by only 2 per cent over the period, in line with global supply overall, the shortage would reach 29 per cent. By contrast, if the rate of growth in this supply were stepped up to 7 per cent per annum, then broad balance would be maintained throughout the next decade, with a degree of excess supply seen after around 2020.

Figure 8.6e: Alternative supply assumptions: non-UK nationals



8.7 The potential role for foreign seafarers

Given the above findings, one policy option suggesting itself at first sight would be to seek to step up the rate of growth in supply by making the UK industry even more attractive to seafarers trained overseas, as an alternative to maintaining or increasing the resources spent on the training of UK officers. However, as suggested elsewhere in this report, such a policy would have distinct downsides. UK shipping companies do appear to have a preference for UK nationals, with 73 per cent of respondents to the Deloitte/OE survey in this sector saying that they would prefer to recruit an officer with a Certificate of Competence over one with a Certificate of Equivalent Competency, and significant proportions citing qualifications, experience and ease of employment as making them inclined to wish to employ a British seafarer.

As Table 8.7a shows, the proportion of deck and engine officers at sea who are non-UK nationals has increased from just under 30 per cent in 2004 to just over 57 per cent in 2010, and on the central scenario would reach almost 78 per cent by 2021. Even on the low non-UK supply growth assumption of 2 per cent per annum this ratio would rise over the next decade to reach almost 72 per cent, while on the high supply growth scenario (7 per cent per annum) it would reach at least 80 per cent – quite possibly more, dependent on the distribution of the excess supply that would exist in that case.

Table 8.7a: The proportion of non-UK officers under alternative scenarios

Employment of deck and engine officers at sea				
	Total	UK	Non-UK	Non-UK %
2004	16,827	11,788	5,039	29.9
2010	26,192	11,193	14,998	57.3
Central scenario (5% non-UK supply growth)				
2021	32,951	7,299	25,652	77.9
Low scenario (2% non-UK supply growth)				
2021	25,947	7,299	18,649	71.9

Employment of deck and engine officers at sea				
High scenario (7% supply growth)				
2021 supply	38,868	7,299	31,570	81.2
Of which: excess	2,356		2,356	
2021 employment ¹ :	36,512	7,299	29,213	80.0
¹ Assuming that excess supply is borne entirely by non-UK officers. At the other extreme the non-UK proportion could be as high as 86.5%.				

8.8 Assuming SMaRT discontinuation

For comparison table 8.8a shows the difference between the central scenario, assuming a continuation of SMaRT and a situation where SMaRT is discontinued and a minimum 200 cadets go through the system.

Table 8.8a: The difference between central scenario and SMaRT discontinuation for deck and engine officers and ex-seafarers.

	Total demand for deck and engine officers at sea	Supply of UK deck and engine officers to UK industry	Supply of foreign ex-seafarers (from UK shipping sector) to UK industry	Implied Gap
2021 - SMART	36,500	7,300	25,700	3,500
2021 - NO SMART	36,500	5,400	25,700	5,400
Difference		1,900		-1,900
	Total demand for ex-seafarers by UK industry	Supply of UK ex-seafarers to UK industry	Supply of foreign ex-seafarers (from UK shipping sector) to UK industry	Implied Gap
2021 - SMART	18,400	14,600	2,100	1,700
2021 - NO SMART	18,400	13,900	2,100	2,400
Difference		700		-700

Under this extreme scenario it can be seen that the training gaps are higher than the central case. By 2021 by another 1,900 in the case of deck and engine officers and 700 ex-seafarers above and beyond the significant demand gaps in the central scenario.

8.9 Conclusion

This chapter has set out OE's projections for the demand and supply of UK seafarers and ex-seafarers. The most pertinent findings are that:

- ⇒ In the case of UK deck and engine officers, a shortage is expected to develop over the years ahead peaking at over 4,000 in 2019 and remaining at above 3,500 in 2021. That last figure is the equivalent of 10 per cent of total projected demand for deck and engine officers in that year.

- ⇒ Shortages are also expected in the case of UK deck and engine ratings in the years immediately ahead, and throughout the next decade in the supply of UK ex-seafarers to the maritime cluster.
- ⇒ A shortage of deck and engine officers at sea would exist even on alternative economic scenarios in which global trade, and therefore UK seafarer demand, grow more slowly, except that in the “worst case” scenario of “Eurozone financial contagion” the emergence of the gap is delayed until 2016.
- ⇒ These shortages would be even greater if SMarT were discontinued and not replaced.

The projected shortfall in UK deck and engine officers is however dependent on key modelling assumptions, namely that relative wages remain unchanged and that the supply of non-UK labour rises by 5 per cent per annum. In practice, market forces could be expected to result in the gap being filled one way or another – through relative wages being pushed upwards, or by a faster rate of growth in the supply of non-UK labour, or some combination of the two.

The existence of the potential gap nevertheless suggests that the sector is set to face difficulties in future – difficulties which would be made worse if the flow of new UK officer cadets in training were not maintained at its recent pace. It is important to note here that if the gap were filled by an even greater increase in the supply of non-UK officers, then those officers would by 2021 account for at least 80 per cent of total deck and engine officers employed by the UK shipping sector. Yet the evidence suggests that UK shipping companies have a preference for UK officers, on objective grounds such as qualifications, experience and ease of employment.

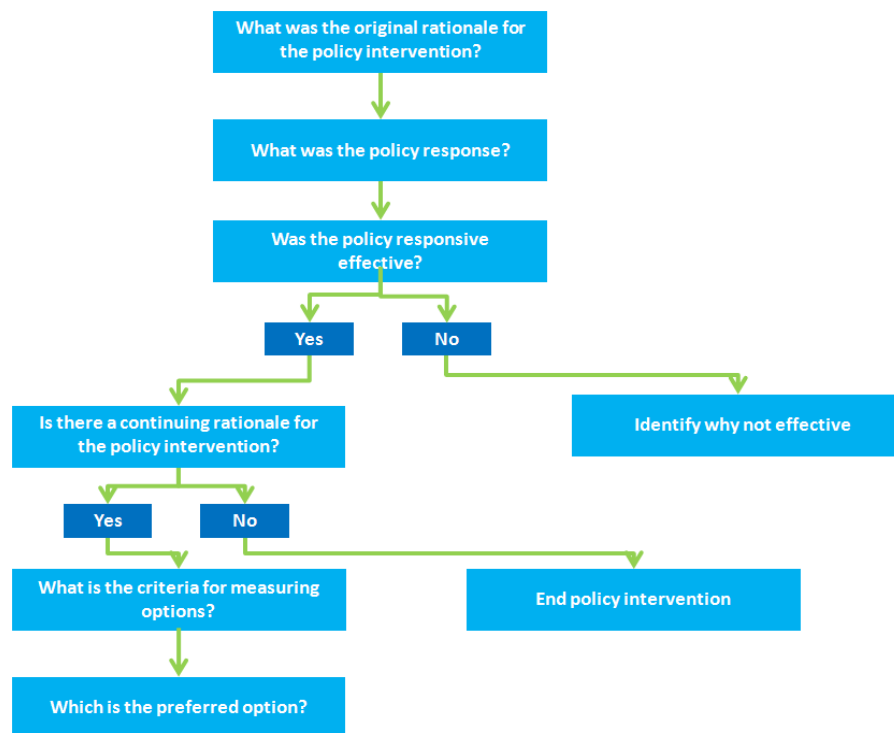
9 The rationale for continued support for seafarer training in the UK

This chapter synthesises previous chapters to analyse whether there is a continuing need to support seafarer training in the UK. It begins by outlining the historic rationale for why support for seafarer training was required in the UK and whether SMaT has met this requirement.

The chapter then considers, using the forecasts from the previous chapter, whether there will be a continued need for policy support for seafarer training over the next decade. The next chapter sets out a number of options for seafarer training and a set of criteria to consider them against. These options are informed by comparisons from other sectors' support mechanisms for training.

The process followed is summarised below:

Figure 9.0a: Decision tree for recommended seafarer training options



It should be noted that a full evaluation of SMaT is beyond the scope of this review. However, in order to consider what options might be appropriate to support seafarer training in the future (if necessary), it is important to understand, in broad terms, the performance of SMaT to date, in order to inform future policy options.

The review's final recommendations are placed in Chapter 10.

9.1 The original rationale for the policy intervention

The original rationale for the policy intervention, as set out in *Charting a new course* in 1998, was to arrest the decline in the UK maritime skills base (manifested in declining numbers of new cadets) which was consequently having a negative impact on the

maritime cluster. The decline in the number of UK seafarers had the potential to ultimately reduce the overall competitiveness of the UK maritime cluster, negatively affecting employment and economic activity. Given the strategic importance of the sector (due to the UK's dependence on sea trade), increasing the skills base, encouraging employment and increasing the UK's attractiveness to shipping companies were all seen as key policy aims to maintain the sector.

Economic theory

These policy objectives can also be explained in terms of economic theory. Economic theory sets out certain conditions whereby it is efficient for the government to intervene in a market to produce a more optimal outcome than market forces alone would have reached – instances of what are known as “market failures”. The term market failure refers to a situation where the operation of a free market does not result in an optimal allocation of resources. In economics there are a number of instances of market failure, with the so-called “free rider” issue being the most relevant in the case of seafarer training today.

Thus, the rationale for government intervention in seafarer training can be explained by the nature of seafarer training. The UK seafarer training model contains both classroom-based learning and an at-sea element. This latter element necessitates the participation of shipping companies in the training of cadets – they must accommodate cadets in a supernumerary capacity onboard as part of their officer training. Hence, shipping companies will incur the cost of accommodating cadets onboard for a specified period, during which they will also have to dedicate resource to training them, without any associated monetary return (at least in the short-term). Accommodating cadets in a supernumerary capacity will only be worthwhile for shipping companies if they are able to subsequently retain these cadets for a period afterwards to recoup their investment through the value generated by the cadets as they work for the shipping company

However, a free-rider market failure occurs in seafarer training in the UK because cadets are not obligated to work for the shipping company that sponsored their original training – neither are they obligated to work in the maritime sector at all. It should also be noted that neither is the shipping company obligated to provide employment at the end of the training.

If the newly qualified officer cadets choose not to work for the shipping company they trained with, the company that does recruit them will be able to enjoy the benefit of the increased skills and knowledge without having to contribute their fair share to the cost of this “common resource” – in essence, they will “free ride” on shipping companies' contributions.

Thus, if there is a significant probability that cadets will not work for the sponsoring shipping company (either by going to a rival company, moving to the maritime cluster or leaving the sector entirely), the original shipping company itself will not have any incentive to train the cadet (at least in the absence of financial or other assistance).

This can ultimately create a vicious circle, whereby shipping companies are disincentivised to take on new trainees for fear of losing them to rivals, which in turn means cadets will find it harder to complete their training if the number of shipping companies willing to accommodate them on board in a supernumerary capacity declines.

The ultimate effects of the free rider issue in the maritime sector are shown below.

Figure 9.1.a: The free rider issue in the maritime sector



Economic theory posits a number of solutions to address the free-rider problem. Some examples of market-based and government policy interventions include:

- ⇒ changing the incentives of the parties directly involved in shipping in order to modify their behaviour to perform an action voluntarily (perhaps by creating a mechanism that allows them to capture the full benefits of their investment);
- ⇒ changing the incentives of the free riders to so that they become more inclined to contribute to the cost of the common resource (perhaps through excluding them from other services unless they contribute to the cost);
- ⇒ creating regulatory or contractual obligations on all parties to perform certain actions and contribute to costs of training (perhaps through an industry wide levy);
- ⇒ creating new social norms that cause all parties to contribute to the cost of the common resource (perhaps risking adverse publicity if they do not contribute); and
- ⇒ the Government imposing a tax or raising funds to provide the under-provided service itself (either through directly providing training facilities or subsidising private providers).

In the case of seafarer training, in the UK the free rider issue has been addressed through SMaT – Government subsidising the training of cadets by providing financial support to training providers (mainly shipping companies). This thereby creates incentives for shipping companies to continue to take on cadets as their “exposure” to financial loss from cadets not working for them upon completion of training is reduced through Government support⁶⁵.

⁶⁵ It could also be argue that there is also a second market failure – that of, a lack of supply of new cadets. As discussed above, the literature notes the supply of young people into seafaring has not been sufficient due to an

9.2 Was the policy intervention effective?

Where possible quantitative and qualitative data have been collected in order to assess the performance of SMarT to date in meeting its objectives.

Whilst this does not represent a full policy evaluation, it is important, in order to consider what options might be appropriate to support seafarer training in the future (if necessary), to understand the performance of SMarT to date.

Counterfactual

To recall, the principle objective of SMarT was to support merchant navy training to facilitate an adequate supply of UK maritime expertise to meet the nation's economic and strategic requirements, by assisting organisations providing merchant navy training. Thus, the principle metric for evaluating SMarT is the number of British seafarers trained and whether the numbers trained have been adequate in supporting economic and strategic requirements.

The policy will have been deemed successful if it has increased the numbers of British seafarers, who in turn have contributed (and will continue to contribute in coming years) to the UK shipping industry, wider maritime sector, and by association the UK's economic wellbeing.

In evaluating any policy, one must consider the counterfactual, i.e. what would have happened in the absence of the policy. Figure 9.2a below considers what a stylised counterfactual might look like for SMarT (final column).

Figure 9.2.a: Potential counterfactual for SMarT – The Difference between SMarT & Tonnage Tax Induced Supply

Year	Total number of trainees under tonnage tax	Total number of new cadets under SMarT	Difference between trainees under tonnage tax and SMarT
2000/01	91	469	378
2001/02	435	449	14
2002/03	627	557	-70
2003/04	486	662	176
2004/05	476	555	79
2005/06	532	571	39
2006/07	658	685	27
2007/08	1001	854	-147
2008/09	603	925	322
2009/10	649	754	105
2010/11	654	853	199

Source: DfT, Deloitte analysis

The actual impact of SMarT in 2009 is not the simple difference between the 450 cadet trainees in 1998 and 925 cadet trainees in 2009 (before and after the introduction of SMarT). This is because it is highly likely that in the absence of SMarT, the number of new cadets being trained would not have remained static at 450 each year.

The number of cadets will have been influenced greatly by other factors including the introduction of the tonnage tax in 2000 – which itself includes an obligation that

unawareness of the profession and it being relatively unattractive. This particular market failure has been tackled by initiatives by the industry to improve perceptions of the profession and make it a more attractive career for young people. Such initiatives are outside the scope of this review.

participating companies must train at least one officer trainee for each 15 officer posts in existence on the vessels that it operates.

Our consultations show that the industry firmly believes that SMarT has been effective in increasing the number of cadets and therefore trained UK seafarers from 2000 levels.

Our best estimate is that in 2010 c. 200 additional cadets were introduced into the industry as a result of SMarT funding beyond the 650 funded by SMarT but as a result of tonnage tax requirements.

Further, data is not readily available on the number of new cadets starting that are attributable to other support schemes funded by Trinity House, Maritime London and others. The impact of these will also mean the gap between SMarT and the counterfactual is smaller.

Value for Money

With 200 additional seafarers entering service each year the returns to UK plc in terms of the productivity differential with the wider UK economy (c. £14,500 per annum in today's prices) over 20 years is of the order of £58 million. Against costs to Government of £12 million per annum this represents a cost: benefit ratio of 4.8. When accounting for the £18 million contribution of shipping companies, a total cost of £30 million per annum reduces this benefit: cost ratio to 1.9.

Value for Money calculations are outlined in more details in section 10.3, where current SMarT is contrasted with future options for training funding for seafarers in the UK.

Qualitative discussion

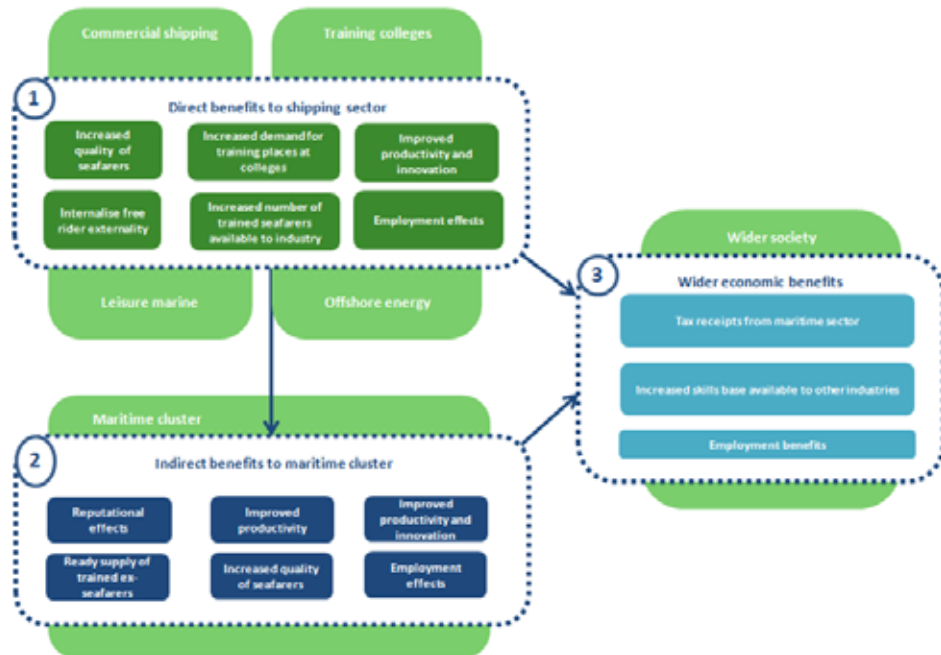
Stakeholders provided a number of qualitative observations as to the benefits of SMarT relative to the counterfactual of there being no government support for seafarer training. These observations included:

- ⇒ the existence of government finance for seafarer training had acted as a signal globally that the UK was committed to supporting its maritime sector and attracted more companies to the shipping sector and maritime cluster;
- ⇒ had created incentives for shipping companies to pay greater attention to human capital, thereby increasing productivity overall and economic activity;
- ⇒ had provided a steady stream of cadets for navy training colleges allowing them to expand and attract non-UK students, which in turn raised export earnings; and
- ⇒ increased the UK technical skills base.

A number of stakeholders argued that at approximately £12 million, SMarT represented very good value for money, given the overall contribution of the maritime sector exceeding £26 billion annually. As noted above, Deloitte and OE have not made any attempt to verify the causal linkages between SMarT and overall levels of economic activity.

Figure 9.2b below summarises the benefits of SMaT as reported by stakeholders and the literature.

Figure 9.2.b: SMaT linkages across the maritime sector



Source: Deloitte analysis

As the figure illustrates, the impact of SMaT is felt not only in the shipping sector, but also the adjacent maritime cluster and, ultimately, the wider economy. Stakeholders argued that the size of the impact was significant.

Summary

In summary, while it is not possible to reach a definitive conclusion on SMaT’s outputs and effectiveness relative to the counterfactual, a review of the available evidence does suggest it has had a positive impact, of the order of 200 cadets per annum.

9.3 Is there a continuing rationale for policy intervention?

Chapter 8 set out projections for the demand and supply of UK and non-UK seafarers and ex-seafarers over the decade ahead. This showed how a shortage is expected to develop in the supply of UK deck and engine officers, peaking at over 4,000 in 2019 and remaining at above 3,500 in 2021 – this last figure being the equivalent of 10 per cent of total projected demand for deck and engine officers in that year.

In addition, shortages are expected in the case of UK deck and engine ratings in the years immediately ahead, peaking at over 1,250 in 2016 – equivalent to 5 per cent of total demand – but with this gap subsequently eliminated by 2021. The supply of UK ex-seafarers to the maritime cluster meanwhile is expected to fall short of demand throughout the next decade, peaking at almost 2,000 in 2017 and remaining above 1,600 – equivalent to 9 per cent of total demand – in 2021.

The area that will suffer most from this shortfall ultimately will be the maritime cluster which relies on a constant stream of trained ex-seafarers.

The projected shortage of deck and engine officers at sea exists even on alternative economic scenarios in which global trade, and therefore UK seafarer demand, grow more slowly – such as under OE’s “China hard landing” or “US recession” alternative scenarios. Only in the “worst case” scenario of “Eurozone financial contagion” is the gap kept at bay for a while – though even then not beyond 2015. The projected shortfall in UK deck and

engine officers is however dependent on key modelling assumptions, namely that relative wages remain unchanged and that the supply of non-UK labour rises by 5 per cent per annum. In practice, market forces could be expected to result in the gap being filled one way or another.

In particular, it might in principle be possible to fill the gap through an even faster rate of growth in the supply of foreign officers – in fact a rate of 7 per cent per annum would be sufficient to achieve a small degree of excess supply by 2015. However, in that case non-UK officers would by 2021 account for at least 80 per cent of total deck and engine officers employed by the UK shipping sector. That would almost certainly be a “second best” solution as UK and foreign officers are not seen as perfect substitutes: evidence from the Deloitte/OE survey suggests that UK shipping companies have a preference for UK officers on objective grounds such as qualifications, experience and ease of employment.

Table 9.3a: Projections for seafarer and ex-seafarer numbers

Deck and engine officers at sea						
	Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand
2011	27,167	11,236	15,931	15,748	182	1
2019 ¹	35,249	7,942	27,307	23,238	4,040	11
2021	36,512	7,299	29,213	25,652	3,561	10
Deck and engine ratings at sea						
	Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand
2011	23,620	5,911	17,708	17,548	161	1
2016 ¹	28,269	4,600	23,669	22,396	1,273	5
2021	31,745	3,968	27,777	28,583	-806	-3
Ex-seafarers in the wider maritime sector						
	Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand
2011	17,275	14,090	3,185	2,140	1,045	6
2017 ¹	18,370	14,254	4,116	2,155	1,961	11
2021	18,418	14,586	3,832	2,206	1,626	9

¹ These years mark the peak in the projected supply shortage in each case.

Source: Oxford Economics assumptions and modelling

Assessment of ongoing requirement to support seafarer training

The forecasts constructed by OE suggest that there will be a gap between the demand for and supply of certain types of trained seafarer and ex-seafarer by the UK shipping industry and maritime cluster over the decade ahead. In the case of deck and engine officers, then on the assumption that the supply of non-UK officers grew at 5 per cent per annum, the supply of UK officers would fall short of demand by just over 4,000 by 2019, with that shortfall remaining over 3,500 in 2021 – this last figure being the equivalent of 10 per cent of total demand for deck and engine officers in that year. Shortages are also projected in the supply of ex-seafarers to the maritime cluster, and, prior to 2020, in the supply of deck and engine ratings.

In principle this gap could simply be filled by seeking to attract extra non-UK labour. However, this study has also found that UK and non-UK officers are not perfect substitutes, and that consequently the shortages identified ought to be regarded not just as shortages of officers in total, but as shortages of UK officers.

In other markets, economic theory would predict that the gap would, over time, close as higher demand will lead to increased wages for seafarers and ex-seafarers, which in turn would incentivise more students to train as seafarers, increasing supply.

However, as discussed above, this may not occur in the case of seafaring due to the nature of the UK training programme. The at-sea component of training will mean that even if there is an increase in the number of students wishing to complete cadet training, unless shipping companies are prepared to accommodate these increased numbers the total supply of trained seafarers will not increase. The market failure will persist.

Indeed, whilst shipping companies may continue to hold a preference for UK seafarers, increasingly they may be willing to turn to second-best solutions through recruiting overseas. The fall in the number of trained UK seafarer / ex-seafarers as a proportion of the total workforce could have wider detrimental effects on the productivity and competitiveness of the UK maritime sector.

On this basis, it is possible to conclude:

- ⇒ a gap is set to develop between demand and supply for trained UK seafarers, peaking in the 2016-2019 period but by 2021 remaining at over 3,500 in the case of deck and engine officers at sea and at over 1,600 in the case of ex-seafarers (mainly ex-officers) in the maritime cluster. Those shortfalls are equivalent to 10 per cent and 9 per cent, respectively, of total projected demand in those sectors;
- ⇒ the whole gap for UK seafarers is unlikely to be filled by market forces alone;
- ⇒ rather, shipping companies are likely to react to a shortfall in supply of UK seafarers by turning to second-best solutions in the form of non-UK officers and technical ratings;
- ⇒ accordingly, the market failure for trained UK seafarers persists and requires policy attention.

In contrast, the OE forecasts suggest there will not be an equivalent mis-match between demand and supply for UK general rating. This is likely to be due to there being fewer differences in quality between UK ratings and non-UK ratings. In contrast, there will remain a lesser degree of substitutability between UK officers and non-UK officers.

9.4 Comparison from other sectors

Before discussing options to address the free rider issue in seafarer training, it is instructive to consider how training is provided in other sectors. The free rider issue associated with training is not confined to the maritime sector. It occurs in a number of other industries where there is a minimum general skills requirement for workers. Prior to mapping out potential options for addressing the aforementioned market failure in seafarer training, it is instructive to consider how other such industries address the training needs of their employees.

It should be noted that this information is taken from public sources and is current at the time of writing. Given wider macroeconomic trends, current training arrangements in many sectors may no longer be viable in its current form and may be revised in the future.

The construction sector

The construction sector is an example of an industry-wide solution to the free rider issue, under which the costs of the common resource are more equally shared by all who benefit.

The Sector Skills Council (SCC) and Construction Industry Training Board (CITB) work with the construction industry, to deliver a safe, professional and fully qualified UK construction workforce. Together, the parties have established CITB-ConstructionSkills, an organisation that is responsible for providing training and apprenticeship schemes which others cannot provide. The apprenticeship scheme in the industry is highly rated, with completion rates exceeding the national average for apprenticeship completion rates by around 10 per cent - last year, 77 per cent of construction apprentices completed their framework⁶⁶.

CITB-ConstructionSkills provides a combination of college education and hands-on experience (through an apprenticeship or work experience) to over 30,000 individuals⁶⁷. To offer these services, it set up the National Construction College (a group of eight colleges across Great Britain) to deliver high quality specialist training to apprentices together with consolidating and developing the skills of people already employed in the industry. The National Construction College offers two types of apprenticeships to students; a traditional apprenticeship and a specialist apprenticeship.

Traditional apprenticeships combine study at college with experience on-site over a two to three year period. As part of the apprenticeship, students will achieve a NVQ or SVQ qualification. Employers are able to claim a CITB-ConstructionSkills grant of up to £9,000 to support a student through a three year apprenticeship.

Specialist apprenticeships have been designed in conjunction with trade associations and independent training groups in order to serve those sectors and employers that cannot access apprenticeships through local colleges or training providers. Access to the programme is open to learners of all ages and, where in scope and eligible, the apprenticeships attract a CITB-ConstructionSkills grant. Typically the duration of the specialist apprenticeships is 24 months with content delivered by industry experts and supported by CITB-ConstructionSkills' own staff.

There are no formal entry requirements needed for candidates to enrol onto an apprenticeship course at the National Construction College. Although, according to bconstructive.com (part of CITB-ConstructionSkills), "It would be helpful to have Standard Grades in Maths and English, technology subjects or a Skills for Work Construction Crafts qualification so that you can do the necessary calculations, measurements and theory"⁶⁸.

The National Construction College receives funding support from a pool of a government bodies (both national and European), trade associations and corporate sources. CITB-ConstructionSkills collect an annual levy from all liable companies in the industry and distribute grants to employers.

All employers who are registered with and in-scope to, CITB-ConstructionSkills can claim grants, even those who do not pay the levy. As a general rule it is the smaller firms who train most new entrants. The larger companies can then benefit by hiring these skilled workers later in their career. Without these grants, it is argued that these small firms would be unable to afford to train any operatives and the industry as a whole would suffer.

In addition to the National Construction College, CITB-ConstructionSkills founded the National Skills Academy for Construction, a concept that is tailored to helping companies and contractors to get the right skills on site. This is an employer-led initiative but works closely with local councils to match job opportunities with available workers.

⁶⁶ Source: CITB-Construction Skills

⁶⁷ Source: The 2012 National Construction College Course Programme, National Construction College, www.cskills.org/uploads/NCC_Course_Programme_2012_tcm17-27536.pdf

⁶⁸ Source: Bconstructive.com

As the National Skills Academy for Construction programme expands, regional partnerships have been established in all nine English regions, the programme works across a range of construction projects such as major regeneration and development projects, refurbishment and maintenance projects, civil engineering and house building. A recent accomplishment of the National Skills Academy for Construction was the development of the 2012 Olympic Games Park⁶⁹. This project included commitments across three main skills areas – new entrants, existing construction workers and lifelong learning, thereby exhibiting training and development opportunities to the entire workforce population of the construction industry.

The accountancy profession

The accountancy sector is an example of a profession where both the employee and the employer benefit from training from day one. Unlike cadets, trainee accountants are directly employed by accountancy firms and do not serve in a supernumerary capacity. Whilst the accountancy firm typically pays for the training of new entrants to receive an industry-wide qualification, there is only a limited free rider issue in that the firm is able to recoup its investment as soon as the training commences and often there are contractual requirements that mean newly qualified accountants must remain at the firm for a specified period or repay the cost of training.

The accountancy profession remains a popular graduate career with estimates suggesting that around 10 per cent of all graduates enter the profession⁷⁰. In The Times Top 100 Graduate Employers, 2011-12, the top four accountancy firms were ranked within the top 10 graduate employers⁷¹.

There are three organisations of Chartered Accountants in the UK; the Institute of Chartered Accountants in England & Wales (ICAER or ACA), the Institute of Chartered Accountants of Scotland (ICAS) and Chartered Accountants of Ireland (CAI).

To become a Chartered Accountant, students must complete a training agreement with one of many authorised employers. The training agreement lasts for three to five years (although most students complete within three years) and consists of a number of examinations and a period of technical work experience. E.g., to become ACA qualified, a student must pass 15 exams (across two levels; professional and advanced) and complete the technical work experience requirement of 450 days.

During a student's three years of training, their authorised employer pays both the teaching and examination fees as well as a core salary for each student (c£23,000⁷²). Although not explicitly acknowledged it is likely that most firms pay a reduced wage during the 'training contract' to reflect the cost of training – and in this respect the cost of the training is borne by some combination of the firm in question and the employee.

The army

The army is an example of an exception - where employees (soldiers) are unlikely to spend their entire working life in the sector and require general training to allow them to continue a professional career after leaving the army. In this case, the army funds the cost of the training meaning that the free rider persists as other employers benefit from soldiers being trained without having to contribute to the cost. However, there are a number of wider social reasons why the army continues to fund this training.

In order to become a professional soldier, a young person must complete basic training. On joining the Armed Forces, all personnel immediately enrol onto a fully-funded training

⁶⁹ 2012 Olympic Games Park Case Study can be found on the National Skills Academy for Construction website, <http://construction.nacademy.co.uk/>

⁷⁰ Source: Graduate Recruitment Bureau, www.grb.uk.com/industry_profiles.0.html

⁷¹ Source: The Times Top 100 Graduate Employers, 2011-12, <http://top100graduateemployers.com/employers>

⁷² Source: www.prospects.ac.uk/assets/assets/documents/wdgd_2010.pdf

scheme depending on their entry route. All Standard Entry (soldiers over 17) infantry training is conducted by the Initial Training Group (ITG). The School of Infantry at the Infantry Training Centre (ITC) Catterick conducts Phase One training for all infanteers on the six month Combat Infantryman's Course (CIC). The remainder of the Standard Entry soldiers are trained at the various locations that make up the ITG. Junior soldiers (between 16 and 17) are trained at either the Army Foundation College in Harrogate or the Army Technical Foundation College in Winchester.

Phases Two and Three of soldier training are more “general”, in the sense the skills learnt are applicable beyond the army. This training can come in many forms from fixing attack helicopters to building bridges. These phases of training are implemented at different locations across the UK that offer full accommodation and training resources to the soldiers.

Further, during army training, there is an opportunity for soldiers to enrol onto a fully-funded apprenticeship scheme. The army is reported to have the largest apprenticeship programme in the country, with about 75 per cent of new soldiers taking part and over 5,500 completing their training each year⁷³. Each apprenticeship fits in with military training and is closely related to a soldier’s army role, so as well as becoming a better soldier, they are working towards a qualification that will be valued by civilian employers.

On departure from the army, soldiers and officers can receive a resettlement package to help, including advice to help them to prepare for, and find, suitable civilian employment. They can also study for civilian qualifications whilst in the army, with the opportunity to claim 80 per cent of the fees from either the Standard Learning Credit (SLC) Scheme or the Enhanced Learning Credit (ELC) Scheme depending on the qualification.

The teaching profession

The teaching profession is an example of a profession that yields significant social benefits, but the cost of training is largely borne by students, except in certain cases where there are shortages.

To work as a teacher in state-maintained schools in England and Wales, prospective teachers must have professional qualified teacher status (QTS). To be awarded QTS by the General Teaching Council for England (GTC) a student must undertake a two year training period.

Firstly, prospective teachers must complete a period of training, such as a one-year professional or Postgraduate Certificate in Education (PGCE) course, which recommends you for QTS. This is known as initial teacher training (ITT). Most UK universities offer PGCE courses within their prospectus. Within a PGCE course, students pass QTS skills tests in literacy, numeracy and information and communications technology (ICT) which are mandatory to be awarded QTS.

Once a student has completed their PGCE course, they must complete a period of induction, known as the newly qualified teacher (NQT) year. This is an individual’s first year of employment as a teacher in a school. NQTs are encouraged to start their induction as soon as possible after gaining QTS, but there is no set time limit for completing induction.

Whilst studying on a PGCE course, like all university courses, all students are eligible to receive financial support from the government through a loan. Student loans can cover an individual’s tuition fees and maintenance (living) costs. The individual has say over the size of their loan, but it could range anywhere between £3,375 (tuition fees) to £8,325

⁷³ Source: Ministry of Defence, www.army.mod.uk/training_education/education/22344.aspx

(tuition fee loan and maintenance loan)⁷⁴. The fee loan and loan for living costs will not have to be repaid until a student is in employment and earning over £15,000 a year.

Non-repayable bursaries are available for trainee teachers on full and part-time primary and secondary PGCE courses, however, the supply of these bursaries are limited to certain subject areas or financially disadvantaged students.

9.5 Criteria for assessing alternatives

In order to evaluate alternative remedies for the ongoing market failure in seafarer training, Deloitte and OE have generated an arbitrary scoring methodology to rank each of the remedies. Collectively, the criteria determine whether each option represents value-for-money in both the short- and long-term. This are summarised overleaf.

Figure 9.6a: Evaluation criteria

Criteria	Description	Scoring (5 = best, 1 = worst)	Weighting
1	The cost of the remedy to Government	1 – 5	25%
2	Effectiveness	1 – 5	25%
3	Long-run sustainability	1 – 5	15%
4	Acceptability	1 – 5	15%
5	Ease of implementation	1 – 5	15%
6	Efficiency	1 – 5	5%

Given the current fiscal climate, a key criterion will be the financial cost of any particular remedy. This will include not just the cost of any subsidy/support mechanism (in terms of government support) or the cost of establishing new infrastructure/systems (for a market-based solution), but also ongoing costs such as administration and dispute resolution. For example, it may be the case that a particular remedy has long start-up costs, but high variable costs meaning that the more successful the scheme becomes the greater the cost implication.

The second key criterion relates to effectiveness. Whilst in theory there are a number of solutions to the free rider issues, in practice these can fall short due to market conditions or unintended consequences. It is thus important to consider how each potential remedy will be applied in practice and whether they are applicable to seafarer training given the unique features of the maritime sector discussed earlier.

⁷⁴ Source: Warwick University, www2.warwick.ac.uk/services/academicoffice/funding/postgrad/ftpgce-2011/#Fees

Related to the question of effectiveness is whether or not the remedy will support the UK maritime cluster through ensuring a steady supply of highly trained UK ex-seafarers.

Long-run sustainability or viability refers to whether the remedy will continue to be effective beyond its initial implementation. It may be the case that the remedy adopts a “big bang” approach, resolving the free rider issue once and for all upon implementation. However, if this is not the case, then it is important to consider its long-term effectiveness.

The acceptability of each remedy to stakeholders is important as without their support, the remedy may not be successfully implemented or incentives might be misaligned leading to the remedy being ineffective. One key feature affecting acceptability is where the cost of the remedy falls. As discussed above, participants in the maritime sector are highly footloose, meaning that an ill-thought out remedy might deter companies from residing in the UK.

Ease of implementation refers to how quickly and effectively the remedy can be put into practice - this will have an impact on the existing SMarT. For example, if the remedy requires significant lead-in time, it may necessary to have transitional arrangements from SMarT to the new scheme. In contrast, if the new remedy is easy to implement, transitional arrangements may not be necessary.

Efficiency considers the remedy for seafarer training in the context of other policy programmes. Given constrained resources, the opportunity cost of addressing the free rider issue in seafarer training may mean another market failure is left unaddressed. A full analysis of the opportunity cost is outside the scope of this review, and the weighting has been adjusted accordingly.

9.6 Conclusion

This chapter has reviewed the ongoing market failure in seafarer training in the UK. The free rider issue, whereby shipping companies are unable to retain the benefits of their investment in cadet training, will continue to persist. Coupled with forecasts that suggest that there will be a gap between demand and supply for UK officers, this implies there may be an ongoing need to intervene in this market by government unless viable market-based solutions can be found.

In summary, this review suggests that SMarT has been effective in encouraging an increase in the supply of UK maritime expertise to meet the nation’s economic and strategy requirements, by assisting organisations providing merchant navy training. This is based on both qualitative and quantitative evidence.

In considering options for the future, criteria have been established that ultimately considers whether each option represents value-for-money. The following chapter presents a range of options to address the market failure and reaches a final recommendation.

10 Recommendations

This chapter presents Deloitte’s and OE’s final recommendations on options for seafarer training in the UK.

It should be noted that in presenting these recommendations, it has been assumed that no decision has yet been taken as to the form and nature of any future support for UK seafarer training and that all options remain under consideration, including the continuation of SMarT in either in present, or a modified, form.

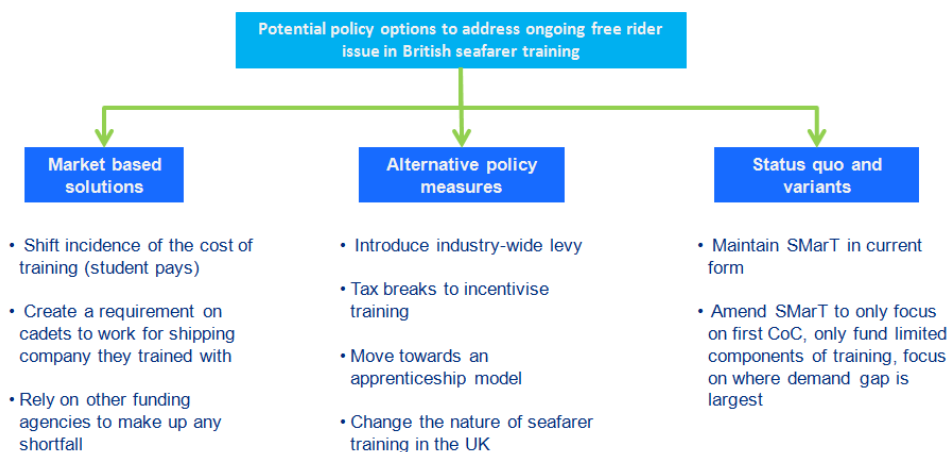
10.1 Options

Each of the options outlined below are predicated on the following assumptions which have been made taking into account the evidence received and analysis conducted.

- ⇒ Shipping companies have a preference for UK-trained seafarers.
- ⇒ Companies in the maritime cluster have an even stronger preference for UK-trained ex-seafarers.
- ⇒ By 2021, there will be gap between demand for and supply of UK-trained seafarers that, if left unfilled, will lead to a decline in available number of ex-seafarers for the maritime cluster reducing its competitiveness and contribution to UK PLC.

On the basis there would appear to be three categories of options. These are summarised below.

Figure 10.1a: Option tree



Based on a review of the primary and secondary evidence, Deloitte and OE have identified the following potential remedies for the ongoing free rider issue in seafarer training:

- ⇒ **Market based solutions:** focusing on ways to create incentives for shipping companies to continue to finance training in the absence of Government support;
- ⇒ **Alternative policy measures:** establishing new mechanisms to support and stimulate seafarer training in the UK
- ⇒ **Status quo:** retaining SMarT in either its original form or a modified form; and

Not all of these options are mutually exclusive and some can be combined.

Deloitte and OE have not considered any transitional arrangements that might be necessary in moving from the existing SMarT arrangements to new arrangements – these were outside the scope of this review.

What follows is a preliminary assessment of each of these options against the specified criteria in order to identify the most effective option(s) to address the market failure. The recommendations made without a detailed financial cost-benefit analysis of each option being considered in light of one-in-one-out regulatory assessments and compliance with State aid guidelines.

Market based solutions

Market based solutions entail the complete removal of Government support for seafarer training in the UK via SMarT. As discussed in earlier chapters, simply leaving the issue to market forces is unlikely to address the market failure unless certain changes to company incentives and market structures are made. Such changes to incentives and market structures might include:

- ⇒ creating a requirement for cadets to work for the shipping company they served in a supernumerary capacity with;
- ⇒ greater reliance on other existing funding schemes for training; or
- ⇒ requiring individual students to bear the full cost of training.

As discussed in earlier chapters, the source of the free rider issue is shipping companies being unable to recover their investment on cadet training if the cadets choose not to work for them. One potential option might therefore be to create a requirement that cadets must serve a minimum period of employment with the shipping company they served in supernumerary capacity with upon completion of their first CoC, subject to the shipping company wishing to employ them. In doing so, the shipping company now has a greater incentive to train new cadets, in the knowledge they will be able to recover their investment.

For this option to be effective, requires shipping companies to have a preference for UK seafarers and be willing to take on cadets. If shipping companies are not inclined to take on new trainees, preferring instead to recruit experienced seafarers from the UK or elsewhere, a requirement for cadets to work for shipping companies may only have a marginal impact. Indeed, the net impact may be close to zero if a large proportion of cadets already go on to work for the shipping company they served with in a supernumerary capacity – 73 per cent of shipping companies responding to the online survey reported that more than 75 per cent of trainees who completed their first CoC with them also went on to employment with their organisation upon completion

Another market-based option may be to rely more on existing non-SMarT funding schemes for UK seafarer training. As discussed in Chapter 4, there exist other funding schemes for UK seafarer training, such as Trinity House and Maritime London. While these schemes cannot be relied upon to completely fill the gap left by the end of SMarT, if they are able to raise additional funds they may be able to mitigate the demand/supply gap or assist in managing the transition to a new scheme. Additional funds could theoretically be raised by voluntary industry contributions.

Realistically, based on the literature review and stakeholder consultation, the long-term viability of replacing SMarT with increased funding from these alternative sponsors is thought to be unlikely given current fiscal constraints. To maintain SMarT at its original levels would require at least £12 million to be raised on an annual basis.

A third market-based option would be to bring support for seafarer training into line with other forms of tertiary funding. Currently the cost of seafarer training is split between the Government and shipping companies. One potential way of addressing the free rider issue would be to shift the entire burden of funding training costs onto students, so that students are responsible for funding both classroom based learning and at-sea learning.

This may be justified if it can be demonstrated that, over the course of a working life time, the total private benefits of seafarer training, measured in terms of increased earning potential, outweigh the cost of training.

Such a shift could be facilitated by giving cadets access to student loans and grants. The extent of the fees charged could be means tested and grants could be made available to selected students.

However, as the recent changes to fees for English undergraduates has shown, such a move is likely to be controversial and may act to dissuade prospective students who are debt-averse, especially in an uncertain environment. Further, the up-front cost of financing any loan scheme would need to be borne by taxpayers and may never fully be recovered if cadets fail to earn enough over a working life or move overseas/become non domiciles.

Alternative policy measures by Government

Outside of SMarT, there are a number of other potential mechanisms that Government could implement to continue to support seafarer training and / or addressing the free rider issue:

- ⇒ imposing an obligation on shipping companies to train UK seafarers;
- ⇒ introducing an industry-wide levy and grant system to fund seafarer training;
- ⇒ introducing tax breaks for training;
- ⇒ moving towards an apprenticeship-based model for UK seafarer training; and
- ⇒ fundamentally revising the structure of UK seafarer training.

An obligation to force shipping companies to recruit and train British and EEA cadets could be imposed by new legislation or new regulations or by amending existing legislation. For example, the tonnage tax currently requires shipping companies to recruit one cadet for every 15 officer posts on the vessels they operate or make a cash contribution to the Maritime Training Trust in respect of each training place which it is unable to offer. One option to increase cadet numbers could be to increase the training requirement in the tonnage tax, perhaps to two or three officer posts. The exact number would depend on a more detailed analysis of how many cadets are currently being trained due to tonnage tax obligations.

However, such legislative changes may have unintended consequences such as creating new disincentives to locate in the UK. Further, any new legislative requirements would need to be consistent with wider policy (e.g. one-in-one-out), the cost of any new administrative burdens and need to be constantly revised to ensure shipping companies were not being forced to train cadets in excess of demand.

A second policy alternative is the introduction of an industry-wide levy that is applicable to all companies that benefit from seafarers and ex-seafarers. This would mean all companies that benefit from seafarer training in the UK make a contribution to its cost. Whether or not this is effective would depend on:

- ⇒ it's being able to identify all companies that benefit from UK seafarer training;
- ⇒ the levy having widespread industry-acceptance, i.e. companies do not leave the UK in response to the levy; and
- ⇒ the cost of administering the levy being proportionate.

As a guide, CITB-ConstructionSkills reports that the levy in the construction industry raised around £80 million in 2009 with the cost of administration (collection and grant processing) being less than 2 per cent⁷⁵.

Another way of potentially addressing the market failure is to incentivise shipping companies to continue to train cadets through giving them tax breaks (in addition to tax concessions under the tonnage tax) if they train a certain number of cadets each year. However, the feasibility of such tax breaks will depend on whether the policy can be shown to be tax-neutral, i.e. the lost revenue is recovered elsewhere. Further, such a policy would need to conform to State aid guidelines.

Currently UK seafarer training comprises of classroom-based learning and an at-sea component. The free rider issue arises from the at-sea component which necessitates the involvement of shipping companies giving cadets berths. Thus, one option to address the free rider issue could be to remove the compulsory at-sea training component, which in turn removes the free rider issue for shipping companies. This would make UK seafarer training akin to the Dutch scheme. However, one negative consequence would almost certainly be a reduction in quality and a reduction in the UK's competitive advantage.

Alternatively, the UK seafarer training programme could be revised to become fully vocational (at-sea). By becoming fully vocational would allow seafarer training to be in a position to access funding for apprenticeships (assuming there was enough funding available for this). Again, whether or not this is desirable will depend on the impact on overall seafarer training quality.

It may also be the case that the current seafarer training programme could be re-classified so as to qualify as an apprenticeship. This could potentially give shipping companies access to other funding sources – though these sources are finite and there is no guarantee that the shortfall arising from the cancellation of SMarT could be made up from apprenticeship funding. Further, the move to an apprenticeship model will only be successful from a policy perspective if shipping companies do choose to recruit British trainees rather than experienced UK and non-UK seafarers. Deloitte and OE are aware that whether or not seafarer training can be classified as an apprenticeship is under ongoing discussion.

The status quo and variants

On one reading, maintaining the status quo entails continuing SMarT in its original form, i.e. having all 5 levels of SMarT and funding in excess of £12 million p.a. For this to be a viable option, this form of SMarT would need to demonstrate ongoing value for money.

On another reading, in the current fiscal climate, maintaining SMarT in its current form and level of funding may not be tenable. A revised form of SMarT could involve:

- ⇒ targeting financial support for seafarer training in those areas where the economic need is greatest, e.g. officer training;
- ⇒ greater co-operation with other UK institutions involved in training (seafarer and otherwise) to exploit synergies and economies of scale;
- ⇒ shifting the cost burden of certain elements of seafarer training away from Government, for example only supporting shipping companies to cover the cost of supernumerary cadets but not supporting cadets' tuition fees and living expenses; or
- ⇒ reducing or capping the amount of funding available under SMarT.

For the purposes of evaluation, all variants are considered.

⁷⁵ See CITB-Construction Skills Annual Report and Accounts 2010, www.cskills.org/uploads/citb-cskills-report-accounts-2010_tcm17-25723.pdf

10.2 Long-list Option evaluation

The matrix overleaf evaluates each option from the long-list (and option variant) against the following criteria:

- ⇒ **The cost of the remedy to Government:** The (broad-brush) financial cost of the remedy.
- ⇒ **Effectiveness:** The extent to which remedies are likely to be effective in eliminating the market failure.
- ⇒ **Long-run sustainability:** Whether this remedy is likely to be viable in the long run (10 years)
- ⇒ **Acceptability:** Who bears the financial cost of the remedy and whether it will command industry-wide support.
- ⇒ **Ease of implementation:** How quickly the remedy could be implemented and the extent to which it does not disrupt existing schemes.
- ⇒ **Efficiency:** Whether this remedy might represent the best use of resources.

While this scoring is subjective, it is based on Deloitte's and OE's understanding of the sector, wider macroeconomic issues and experience in other sectors and acts as a useful diagnostic tool rather than a definitive conclusion on each option.

This allows the filtering for a deeper analysis on more realistic options in section 10.3.

Table 10.2.a: Option evaluation

Option	Comments	Scoring						Overall (max score = 5)	
		Cost of remedy to Gov't	Effectiveness	Long-run sustainability	Acceptability	Ease of implementation	Efficiency		
1	Market based solutions								
1a.	Creating a requirement for cadets to work for the shipping company they served in a supernumerary capacity with	Net impact may be low if few shipping companies respond by increasing cadet recruitment.	2	2	2	2	2	2	2.0
1b.	Greater reliance on other existing funding schemes for training	Size of other schemes unlikely to be large enough to compensate for loss of SMarT.	3	1	1	2	2	2	1.9
1c.	Requiring individual students to bear the full cost of training	The cost to individual students of seafarer training may be much larger than alternative degree courses due to its length and complexity. May worsen image of seafaring as a potential career for young people. Sea-time training still required.	2	2	3	2	2	3	2.2
2	Alternative policy measures by Government								
2a.	Imposing an obligation on shipping companies to train UK seafarers	May have unintended consequences of deterring shipping companies.	2	2	1	1	2	2	1.7

Option	Comments	Scoring						Overall (max score = 5)	
		Cost of remedy to Gov't	Effectiveness	Long-run sustainability	Acceptability	Ease of implementation	Efficiency		
2b.	Introducing an industry-wide levy and grant system to fund seafarer training	May cause certain companies to re-locate. May be administrative complex.	2	3	3	1	2	4	2.4
2c.	Introducing tax breaks for training	Unlikely to be viable in current fiscal environment.	0	2	2	1	2	2	1.8
2d.	Moving towards an apprenticeship-based model for UK seafarer training	While may open access to new funding schemes, unlikely to fully replace SMarT.	2	3	3	3	2	3	2.6
2e.	Fundamentally revising the structure of UK seafarer training	Changing the training programme to focus on either classroom learning or at-sea learning is likely to reduce overall quality of training.	2	1	1	1	2	1	1.4
3	Revised support for UK seafarer training								
3a.	2010 SMarT	Unlikely to be sustainable under current fiscal constraints. Uncertainty as to how good value-for-money the current scheme offers.	1	2	1	4	3	2	2.1
3b.	2011 SMarT	Would require constant dialogue with industry to ensure SMarT focuses on those areas where need is greatest. Any changes to SMarT, such as only financing certain components of training, would need to be carefully considered for	2	3	3	4	3	3	2.9

Option		Comments	Scoring					Overall (max score = 5)	
			Cost of remedy to Gov't	Effectiveness	Long-run sustainability	Acceptability	Ease of implementation		Efficiency
		wider effects and unintended consequences.							

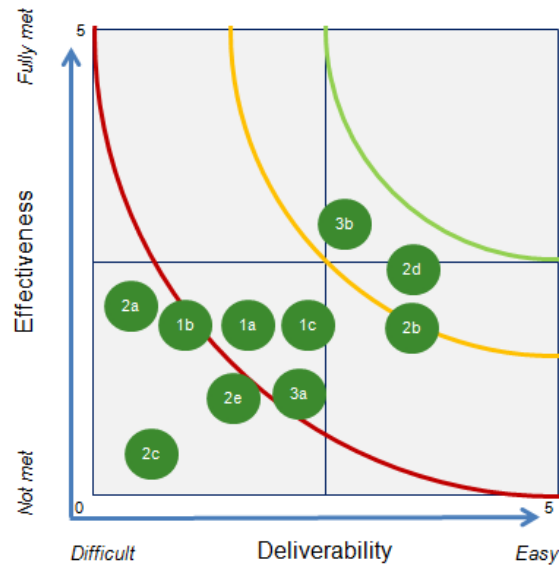
Source: Deloitte analysis

10.3 Options Analysis

The Long List Summary

The figure below summarises the different options along the simplified axes of effectiveness (including long-term sustainability) and deliverability (in terms of cost, ease of implementation and acceptability).

Figure 10.3a: Summary of options – Long List



Key:

- 1a – creating a requirement for cadets to work for the shipping company they served with in a supernumerary capacity with
- 1b – greater reliance on other existing funding schemes for training
- 1c – requiring individual students to bear the full cost of training
- 2a – imposing an obligation on shipping companies to train UK seafarers
- 2b – introducing an industry-wide levy and grant system to fund seafarer training
- 2c – introducing tax breaks for training
- 2d – moving towards an apprenticeship-based model for UK seafarer training
- 2e – fundamentally revising the structure of UK seafarer training
- 3a – 2010 SMaT
- 3b – 2011 SMaT

Note: the positioning of the option bubbles is approximate and illustrative

Based on Deloitte’s and OE’s understanding of the sector, individually, none of the identified options is clearly in the upper right quadrant and scores highly on both effectiveness and deliverability.

Nonetheless, the closest options to this are 2011 SMaT (i.e. the current provision), an industry-wide levy and grant system, an apprenticeship based model, 2010 SMaT, and requiring students to fund the cost of training.

These five options have been shortlisted and are analysed in greater depth below, with respect to benefits, costs and value for money.

At the opposite end of the scale, given the current fiscal situation and HM Treasury’s position on tax receipts, changes to the tax regime for training purposes are unlikely to be deliverable in practice.

The Short List

The analysis below considers each of the five options in terms of total costs, costs to Government, benefits and thus benefit: cost ratios as a means of comparing each option.

Benefit assumptions

A simple means of calculating the economic benefit of a seafarer, and also ex-seafarers, trained through SMarT is to assess the productivity differential between the average worker in the maritime sector and the UK productivity average for all workers.

By this method, for each year in work a SMarT beneficiary generates approximately £14,500 in additional output relative to the output of a UK worker displaying average productivity (see footnote three in table overleaf for further details).

By isolating the net effects of SMarT in terms of numbers of cadets trained, it is possible to calculate the net benefits to the UK economy over a working life (assuming that this productivity differential holds and a working life in this respect averages 20 years – above the 8-10 years spent at sea but less than a standard working life of over 40 years)

These are used to give an indication of benefits arising from SMarT and, in conjunction with costs, and indication of Value for Money for the independent panel and Shipping Minister to base subsequent analysis and decisions on.

Results are presented overleaf.

Figure 10.3b: Analysis of short-listed options

Option	(A) Estimated total option cost per annum (to all parties) (£m) ¹	(B) Of which, estimated total cost to Government (£m)	(C) Estimated total cadets p.a.	(D) Estimated 'additional' cadets p.a. ²	(E) Estimated total cost per total cadet through the system: including tonnage tax (£)	(F) Estimated total cost per additional 'job' (£)	(G) Assumed total benefit based on 20-year Maritime productivity differential (£m) ³	(H) Total Benefit:Cost Ratio (G) / (A)	(I) Government Benefit:Cost Ratio (G) / (B)	Comments
Student bears full cost of training	27.0 - 31.0	14.5	650.0	0	44,600	-	-	0	0	Costs include direct costs to students in terms of tuition fees (£12k total per student over two years as a lower bound and £18k as upper bound), costs to Government of set-up & monitoring within existing system (£1m) and collection (£13.5m - which will be borne by Government in terms of non-collection @ 30%), as well as uplift contribution from shipping companies (as £18m per today). Assumes fewer cadets due to self financing, such that intake is pure tonnage tax related - zero SMarT means privately funded.
Industry levy	32.0	8.0	850.0	200	37,600	160,000	58	1.8	7.2	Assumes Govt contributes half of SMarT per today (£6m). Remainder of required amount (£30m) coming from Shipping Companies and third parties (i.e. £24m) - split to be determined. Administration, start up and monitoring costs could be significant as would need to continually identify and monitor eligible firms, a difficult task - assumed £2m and borne by Government in first instance (cost to Government £8m)
Modified SMarT	30.0	12.0	850.0	200	35,300	150,000	58	1.9	4.8	Per existing SMarT, Government continues to provide £12m with an £18m contribution towards the training from shipping companies.
Original SMarT	37.5	15.0	950.0	300	39,500	125,000	87	2.3	5.8	Where Government contributes £15m and Shipping Companies provide £22.5m to encourage greater numbers of additional cadets into the system to reduce the demand gap for UK seafarers - assumed 300 'additional' cadets per annum rather than 200 under current SMarT.
Apprenticeship model	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	Subject to EC clearance and outwith scope

¹ It is necessary to think of the cost to all parties, separately from the cost to Government. As Government contributions amounted to c. 40% of total, the ready reckoner of 2.5 is used to gross up to total costs for SMarT or equivalents.

² i.e. above the 650 cadets attributable to tonnage tax

³ In 2009 GVA per worker was £57,900 (comprising ports £56,170, shipping £52,360 and maritime business services £132,900). For comparison GVA per worker across the whole UK economy in that year was £43,410.

Source: Deloitte analysis

Student bearing full cost of training

The costs of this option are likely to be significant, both in terms of what students are required to pay as well as potential costs to Government arising from non-collection – as many seafarers are at sea and, as result non-domiciled, for extended periods, they are not subject to the tax system and collection through PAYE might not be feasible.

However, the main issue relating to this funding option is the move from a position of ‘zero’ cost to students (adjustments to subsequent wage payments notwithstanding) to full costs to students. This is likely to make a career as a seafarer much less enticing and as such, relative to the other policy options available, the benefit to cost ratio is likely to be significantly lower than other options. This approach is therefore likely to exacerbate the demand and supply gap of UK seafarers discussed in chapter eight.

Levy and grant system

This would involve the identification of participants and collection of grant contributions that would then be paid to shipping companies and other organisations providing seafarer training. As costs are shared more widely than in the status quo, the benefit to cost ratio for Government’s initial outlay is high.

A modified SMarT and an industry-levy are not mutually exclusive. As well as a levy and grant system in isolation, it would be entirely feasible to modify the components of SMarT and introduce an element of industry funding alongside Government funding.

However, it should be noted that research suggests that the introduction of a new levy (regardless of size and purpose) could work to deter shipping companies and other maritime companies from locating in the UK. Further, in some instances a levy could offset benefits from the tonnage tax and could not be introduced in isolation.

In summary, a levy would likely make for a more agreeable distribution of costs across the wider maritime sector and solve the free-rider issue, although we note it may not be a popular choice amongst stakeholders and identification, monitoring and collection costs could be high.

SMarT

The benefits from current SMarT provision has been estimated at £58 million against a cost of £30 million (£12 million of which comes from Government). Accordingly the benefit: cost ratio for Government inputs is higher than the total benefit: cost ratio.

Increased provision (per the 2010 original SMarT funding) would lead to greater benefits and higher benefit: cost ratios. This is because the calculated benefits to each additional UK trained seafarer are greater than the associated costs. Without considering the fiscal environment, the optimal policy solution would be train UK seafarers to the point where total demand for UK seafarers is fulfilled and gaps are zero.

Apprenticeship scheme

We have not considered this option as part of our study, but note that it is also likely to be a feasible option.

Discussions over apprenticeship programmes for (i) ratings; and (ii) cadets are ongoing between the sector, DfT and BIS. Progress has been made but several issues still need to be resolved. At this stage, no clarification over the funds available for such programmes has been made.

10.4 Conclusion and next steps

The analysis in this report has shown that there is a demand for UK trained seafarers at officer level and for ex-seafarers (mainly officers) in on-shore roles in the wider economy. The analysis also shows that, if current conditions persist, that there is likely to be significant gap between the supply of and demand for UK trained seafarers by 2021.

Given that seafarers contribute significantly to the UK economy, and that SMarT has had a positive upward effect on the number of trained cadets (c. 200 per annum above tonnage tax induced training), additional training is likely to be beneficial to the UK economy.

Moreover, jobs that could otherwise be taken by competent overseas labour are more likely to be taken by UK citizens – an important consideration in terms of generating employment growth in the UK per current policy imperatives.

If the current fiscal situation was stronger, the argument for increased Government funding of SMarT (or similar) would also be stronger – each seafarer trained is likely to be net-beneficial to the UK economy.

However, given the current situation, and the analysis above, Deloitte and Oxford Economics feel that the three main options open to Government are:

- **A continuation of SMarT** – which could feature an increase in funding back to 2010 levels or a more targeted programme towards officers (given substitutability at ratings level) based on 2011 funding levels – each would help fill some of the gap outlined in this study.
- **The introduction of a levy and grant system** – under which shipping companies, Government **and** third party beneficiaries all pay a more equitable share of training costs, presuming associated issues can be overcome; and
- **An apprenticeship model** – if separate discussions on this with BIS and UK Government, apprenticeships could be used to provide the training required for UK seafarers.

These views represent Deloitte and Oxford Economics conclusions on the basis of the available evidence and within the remit of the study.

We recognise that opinion may differ amongst stakeholders and the panel reviewing this document, but understand that they will bring their own experience to bear on the recommendation to the Minister of Shipping.

Annexe A - Bibliography

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Annexe B – Detail of the demand and supply forecasts

12.1 Estimating UK shipping industry employment in the recent past

As a first step, OE sought to establish the present number of officers and ratings working in the UK shipping industry – that is, the shipping sector broadly comprising those firms whose activities are counted as contributing to UK GDP – and recent trends.

The key source for these estimates is the annual survey carried out by the UK Chamber of Shipping, allowing separate identification of employees of the companies covered in terms of officer or rating status, work category, and whether they are UK or non-UK nationals. The figures set out in Table 12.1a are taken straight from the survey dataset, except that the small number of individuals categorised in 2010 as “nationality unknown” have been allocated between “UK” and “non-UK” in proportion to the known nationalities.

Table 12.1a: Employment in the UK Chamber of Shipping manpower surveys

		2004	2005	2006	2007	2008	2009	2010
UK officers	Deck	3,640	3,868	3,683	3,642	3,810	4,192	4,457
	Engine	3,294	3,870	3,415	3,313	3,292	3,738	3,883
	Technical	886	676	749	765	890	1,103	1,466
	Catering/hotel/other	1,388	1,651	1,713	993	1,870	2,048	1,898
NON UK officers	Deck	1,564	2,597	3,733	4,150	5,015	4,768	5,938
	Engine	1,400	2,301	3,474	3,670	4,950	4,597	5,237
	Technical	434	254	540	820	955	1,159	1,388
	Catering/hotel/other	2,251	1,058	1,168	1,275	1,073	1,120	1,635
UK ratings	Deck	3,479	3,614	3,459	3,206	3,273	3,914	3,494
	Engine	989	818	832	699	731	769	700
	Technical/gen purpose	184	224	276	291	447	338	321
	Catering/hotel/other	4,425	4,149	5,185	4,119	4,876	5,379	7,273
NON UK ratings	Deck	2,052	3,535	4,952	4,929	5,968	6,125	7,809
	Engine	1,444	1,832	3,206	3,122	3,743	3,651	3,986
	Technical/gen purpose	172	143	519	1,065	430	347	657
	Catering/hotel/other	10,004	10,856	13,383	14,859	14,188	19,601	22,901
Total		37,606	41,446	50,287	50,918	55,511	62,849	73,043

Source: UK Chamber of Shipping Manpower Surveys. (2010 “unknown nationality” reallocated by OE.)

However, the Chamber’s manpower surveys are not fully comprehensive, and coverage may vary from one year to the next. In particular, it appears highly likely that the survey has becoming progressively more representative of the UK shipping sector as a whole in the most recent years. That is suggested by the fact that numbers of UK deck and engine officers in the survey increased by 20 per cent between 2007 and 2010, whereas the DfT’s estimates of UK certificated officers active at sea⁷⁶ show a 7 per cent fall over the same period.

⁷⁶ These data are based on numbers of UK officers holding valid certificates of competency, plus assumptions made about retirement ages and the proportion not currently at sea. The DfT series covers UK nationals working outside

In previous work on the UK shipping industry, Oxford Economics scaled up the figures found in the Chamber's survey by a fixed factor of 1.7, based on the factors used by the National Statistics Office to derive sector turnover from other Chamber of Shipping survey results. However, while that scaling-up factor has been retained in this exercise for the years 2004-07, for 2008-2010 a progressively smaller scaling-up factor is used, calculated to ensure that the series for UK certificated officers working in the UK industry falls in the most recent years by almost as much as the DfT "active at sea" series⁷⁷. As this procedure reflects a view that the Chamber's survey has become progressively more representative, the same, progressively lower scaling up factors are applied to all categories of seafarer, not just to UK certified (deck and engine) officers.

More specifically, the grossing-up factors used are 1.58 for 2008, 1.42 for 2009 and 1.34 for 2010. Table 12.1b sets out the resulting estimates for officers and ratings working in the UK shipping industry. It can be seen that even constraining the estimates in the way described above, the total number of seafarers in the UK shipping industry (excluding trainees) amounted to some 98,000 in 2010 – marking a 10 per cent annual increase following three years of comparatively subdued growth as the global recession took its toll. On average, this employment is shown to have grown at an annual rate of 7.4 per cent between 2004 and 2010. Over the same period the volume⁷⁸ of global trade in goods grew by 4.7 per cent a year and that of UK trade in goods by 1.9 per cent per annum.

Table 12.1b: Estimated officers and ratings employed in the UK shipping industry

		2004	2005	2006	2007	2008	2009	2010
UK officers	Deck	6,189	6,576	6,261	6,191	6,011	5,943	5,982
	Engine	5,600	6,579	5,806	5,632	5,194	5,299	5,211
	Technical	1,506	1,149	1,273	1,301	1,404	1,564	1,967
	Catering/hotel/other	2,360	2,806	2,912	1,688	2,950	2,903	2,548
NON UK officers	Deck	2,659	4,415	6,346	7,055	7,913	6,760	7,969
	Engine	2,380	3,912	5,906	6,239	7,810	6,517	7,029
	Technical	738	432	918	1,394	1,507	1,643	1,864
	Catering/hotel/other	3,827	1,799	1,986	2,168	1,693	1,588	2,194
UK ratings	Deck	5,914	6,144	5,880	5,450	5,164	5,549	4,689
	Engine	1,681	1,391	1,414	1,188	1,153	1,090	940
	Technical/gen purpose	313	381	469	495	705	479	431
	Catering/hotel/other	7,522	7,054	8,815	7,002	7,693	7,626	9,761
NON UK ratings	Deck	3,488	6,010	8,418	8,379	9,416	8,683	10,481
	Engine	2,455	3,114	5,450	5,307	5,906	5,176	5,350
	Technical/gen purpose	292	243	882	1,811	678	492	881
	Catering/hotel/other	17,007	18,455	22,751	25,260	22,386	27,788	30,737
Total		63,930	70,458	85,488	86,561	87,585	89,101	98,034

Source: OE estimates based on UK Chamber of Shipping and DfT data

of the UK industry as well as those in it, but it is highly unlikely that this could explain the apparent divergence between trends in the Chambers and DfT series.

⁷⁷ The OE estimate falls by slightly less than the DfT series on the grounds that the average retirement age is likely to have been on a mildly upward trend, in line with the wider UK pattern of increased labour market participation amongst older workers. A further implicit assumption is that the proportion of UK officers active at sea but outside of the UK industry has remained constant.

⁷⁸ "Volume" here means the inflation-adjusted money value.

12.2 Estimating the starting point for demand and supply projections

Five pieces of evidence come together to suggest – albeit tentatively – that there has recently been a small degree of excess supply in terms of UK seafarers:

- ⇒ Respondents to the Deloitte / Oxford Economics survey report job losses in the wake of the recent recession, as summarised in Table 12.2a. While the majority of companies avoided job losses, a minority were forced to make significant job cuts. Overall, the results appear consistent with job losses in the shipping sector of 6-7 per cent of pre-recession levels. That in turn is suggestive of at least some redundancies amongst seafarers – including UK seafarers – despite indications from the Chamber of Shipping manpower surveys that overall seafarer employment has continued to expand on a net basis.
- ⇒ In addition, supply conditions facing shipping companies might be further helped temporarily, in principle, by job losses in other parts of the maritime sector – possibly in the order of 5 per cent of pre-recession levels based on the Deloitte / OE survey. These redundant individuals would probably include a number with past seafaring experience capable of returning to the shipping industry.
- ⇒ The ONS Annual Survey of Hours and earnings (ASHE) points to a 4.7 per cent drop in average hours worked per employee in the water transport services industry⁷⁹ between 2009 and 2010.
- ⇒ The ONS Labour Force Survey (LFS)⁸⁰ shows that, of those individuals reporting in 2010 that they had been working in the water transport services industry a year earlier, around 4 per cent were now unemployed and available for work. That is up from corresponding figures of 2.5 per cent and 2.8 per cent respectively in the 2008 and 2009 surveys.
- ⇒ The same LFS also points to a comparatively high proportion of individuals becoming “economically inactive” (e.g. becoming retired or students), having left the water transport services industry within the previous year. Here, the figure of 9.2 per cent compares with zero in 2008 and 3.4 per cent in 2009. Although those individuals were by definition then unavailable for work in the immediate future, some might still be considered part of the potentially-available pool of industry workers.

Table 12.2a: Estimated maritime job losses in the wake of the recession

% of total respondents, excluding blanks and “unknown”	Total sample ¹	Shipping companies	Other sectors employing ex-seafarers
No reduction	64	69	64
Reduced by 0-10%	27	19	29
Reduced by 10-20%	3	6	2
Reduced by more than 20%	5	6	5
Total	100	100	100
Estimated jobs lost as % of initial level ²	-5.8	-6.5	-5.0

¹ Total includes commercial fishing businesses which are excluded from the “shipping” and “ex-seafarer” categories.

² Based on the mid-point in each range and weighted by approximate numbers employed in maritime-related activities in each business

⁷⁹ This includes employees of all types, not just seafarers, and extends to include inland water transport services as well as sea and coastal water transport services.

⁸⁰ The LFS figures should be treated with a particularly large degree of caution due to the comparatively low sample size in the case of this industry.

Source: Deloitte / OE survey and OE derived estimates

Table 12.2b: Position of people working in the water transport industry a year ago

% of those working in water transport services a year ago	2008	2009	2010
Still working in the sector today	90.1	87.9	82.8
Seeking work or likely to seek work soon	2.5	4.0	4.0
Not seeking work but not retired	0.0	3.4	6.2
Working in other industries	7.4	4.7	4.1
Retired	0.0	0.0	3.0

¹ ILO unemployed, students seeking work but not available just yet, others likely to seek work soon. ² Other students but also some others (e.g. those not available for work due to family commitments).

Source: ONS Labour Force Surveys

Reflecting this, it is assumed that actual employment in 2010 was equal to demand, and that a degree of excess supply existed. More specifically, the level of excess supply is put for these purposes at some 3.8 per cent of 2010 actual employment of UK nationals – derived from the 4.0 per cent of UK residents working in the water transport industry a year earlier but subsequently becoming unemployed and available for work. That equates to some 1.2 per cent of all UK and non-UK officers and ratings working in the UK industry.

12.3 Projecting demand over the coming decade

Table 12.3a below sets out detailed year-by-year projections for seafarer demand.

To estimate the supply of UK seafarers to the UK shipping industry, the starting point was again the UK Chamber of Shipping manpower survey, which provides data on the officers and ratings in the different categories by age. Taking the data for 2010, grossing this up to industry-wide supply (employed plus assumed unemployed), and projecting forward year-by-year through to 2021 on the basis of assumptions about outflows from the shipping sector, developments over time in the existing stock of employees (i.e. those already in the industry as of 2010) can be tracked.

Table 12.3a: Projected demand for officers and ratings (UK and overseas)

Overall demand	Deck		Engine		General	All deck & engine	Technical	Hotel/catering/other		All other	Total
	Officer	Rating	Officer	Rating	Rating		Officer	Officer	Rating		
2010	13,952	15,170	12,240	6,289	1,313	48,964	3,830	4,742	40,498	49,070	98,034
2011	14,471	15,735	12,696	6,523	1,361	50,786	3,973	4,918	42,005	50,896	101,682
2012	14,853	16,151	13,031	6,696	1,397	52,128	4,078	5,048	43,115	52,241	104,370
2013	15,517	16,872	13,614	6,995	1,460	54,457	4,260	5,274	45,041	54,575	109,032
2014	16,168	17,580	14,185	7,288	1,521	56,741	4,439	5,495	46,930	56,864	113,606
2015	16,766	18,231	14,710	7,558	1,577	58,843	4,603	5,698	48,669	58,970	117,813
2016	17,319	18,832	15,195	7,807	1,629	60,783	4,755	5,886	50,273	60,915	121,697
2017	17,829	19,386	15,642	8,037	1,677	62,571	4,895	6,060	51,752	62,707	125,278
2018	18,314	19,913	16,067	8,256	1,723	64,273	5,028	6,224	53,160	64,412	128,686
2019	18,776	20,416	16,473	8,464	1,767	65,895	5,155	6,381	54,502	66,038	131,933
2020	19,181	20,856	16,828	8,647	1,805	67,316	5,266	6,519	55,677	67,462	134,778
2021	19,449	21,147	17,063	8,767	1,830	68,256	5,340	6,610	56,454	68,404	136,660

Source: OE assumptions and modelling

Table 12.3b: Estimates of industry leavers and joiners between 2007 and 2008

UK officers in sample	Total in 2007	Movers in next year	O/w within sample	Estimated within shipping	Industry leavers	Leavers as %
Age group						
62+	91	31	0	0	31	34.1
50-61	1,134	246	16	91	155	13.7
35-49	861	203	18	102	101	11.7
20-34	635	188	15	85	103	16.2
Total	2,721	668	49	278	390	14.3
20-49	1,496	391	33	187	204	13.6
20-61	2,630	637	49	278	359	13.6
UK ratings in sample	Total in 2007	Movers in next year	O/w within sample	Estimated within shipping	Industry leavers	Leavers as %
Age group						
62+	119	31	0	0	31	26.1
50-61	1,079	186	3	12	174	16.1
35-49	1,511	200	12	47	153	10.1
17-34	1,107	307	17	67	240	21.7
Total	3,816	724	32	126	598	15.7
17-49	2,618	507	29	115	392	15.0
17-61	3,697	693	32	126	567	15.3

Source: OE analysis of the UK Chamber of Shipping 2007 and 2008 Manpower surveys

Table 12.3b above – provides one guide to outflows from the industry. On average over the three years shown, 6.4 per cent of individuals working in the industry a year earlier had retired or were working in another sector, with a further 3.2 per cent “inactive” but not retired – this last group including e.g. students and those with family commitments, who might or might not have left the sector on a permanent basis. However, these figures are not specific to seafaring officers and ratings, and are in any case derived from a very low sample size.

A further clue is provided by the detail of the Chamber of Shipping manpower surveys. Oxford Economics was able to match up a sample of 20 companies responding to both the 2007 and 2008 surveys, covering some 2,700 UK officers and 3,700 ratings, representing around a fifth of the entire industry. Using information on dates of birth enables an estimate the number of individuals leaving companies in the sample between mid-2007 and mid-2008, as well as those staying in the same company and those joining the industry. Further matching of dates of birth then enables an estimate of the number moving from one firm to another within the sample. And from there it is possible to scale up to get an estimate of those moving within the UK shipping as a whole, in turn enabling an estimate of those assumed to have left the industry.

The results are shown in the tables below. In the case of those below the “standard” industry retirement age of 62, some 13.6 per cent of officers and 15.3 per cent of ratings are estimated to have left the industry during that 12 month period (a period in which global trade was still growing at a reasonable pace), while above retirement age 34 per cent of officers and 26 per cent of ratings leave each year.

The figures for those below retirement age, however, will include many with the potential to return to the shipping industry in future, rather than those leaving to retire or work permanently in another sector.

Looking at those joining companies in the sample meanwhile, excluding those assumed to have moved within the UK shipping sector and scaling up to the sector as a whole, it can be estimated that some 1,650 UK officers joined the industry between mid-2007 and mid-2008. However, DfT data sources show that only 600 or so officer cadets per annum had started training in the few years prior to 2008, which is believed to be consistent with some 450 completing their courses each year and becoming newly available to the industry. Scaling up that flow to include non-certificated officers coming in from other walks of life, in proportion to the officer stock, is suggestive of some 550 officers in total being new to the industry at that time. That is consistent with some 1,100 officers joining the industry in 2008 having previous experience, equivalent to 7.4 per cent of the total stock of officers, or 7.7 per cent of the stock of officers of pre-retirement age.

Taking the “true” pre-retirement outflow from the industry as the difference between the 13.6 per cent estimated to leave employment the industry in a given year, and this 7.7 per cent estimate of “industry re-joiners”, yields a pre-retirement outflow for officers of 6 per cent per annum. Scaling the proportions for ratings on the same basis suggests a 6¼ per cent per annum pre-retirement outflow rate for that group.

Consequently the following assumptions are employed, which are not that far different from those used in previous studies.

- ⇒ For UK officers, an outflow from the labour supply of 6 per cent per annum up to age 61, with an outflow of 34 per cent above that, up to an assumed cut-off point at age 70.
- ⇒ For UK ratings, an outflow from the labour supply of 6¼ per cent per annum up to age 61, with an outflow of 26 per cent above that, up to an assumed cut-off point at age 70.

The table below shows the resulting supply of UK officers and ratings before taking into account new recruits coming on stream.

Table 12.3c: Supply of UK officers and ratings before any new recruits

	Deck		Engine		General	All deck & engine	Tech	Hotel/catering/other		All other	Total
	Officer	Rating	Officer	Rating	Rating		Officer	Officer	Rating		
2010	6,211	4,868	5,410	976	448	17,913	2,042	2,645	10,134	14,821	32,734
2011	5,645	4,370	4,915	877	410	16,216	1,869	2,427	9,312	13,607	29,823
2012	5,134	3,911	4,465	787	375	14,672	1,711	2,228	8,555	12,494	27,166
2013	4,665	3,501	4,049	706	342	13,263	1,565	2,049	7,860	11,474	24,736
2014	4,234	3,137	3,664	633	311	11,979	1,430	1,887	7,223	10,539	22,519
2015	3,839	2,818	3,308	569	282	10,814	1,305	1,739	6,643	9,687	20,501
2016	3,473	2,540	2,978	511	255	9,757	1,189	1,604	6,114	8,906	18,663
2017	3,136	2,292	2,673	459	230	8,789	1,081	1,479	5,630	8,189	16,979
2018	2,824	2,066	2,393	413	207	7,903	980	1,360	5,182	7,521	15,424
2019	2,539	1,859	2,139	371	186	7,093	885	1,248	4,767	6,900	13,994
2020	2,278	1,668	1,908	332	168	6,354	798	1,144	4,382	6,324	12,678
2021	2,041	1,495	1,699	296	150	5,681	719	1,048	4,023	5,789	11,471

Source: DfT Transport Statistics Bulletin 2010, OE assumptions and modelling

Having estimated the rate at which the existing stock of seafarers would gradually dwindle over time in the absence of any new recruits, the next step is to look at additions.

In the case of deck and engine officers, this is based on actual numbers of officer cadets starting training in recent years, together with an assumption that going forward some 800 per year will commence training – slightly below the average of recent years and in line with the assumption made by the DfT in its projections for certified UK officer

numbers. Further assumptions are a drop-out rate of 8 per cent during the four-year training period, and a subsequent leaving rate from the industry of 6 per cent per annum in line with that for the existing stock of UK officers under retirement age. A few additional rating-to-officer conversions are allowed for on the basis of numbers available for some recent years. The split in officer trainees between the “deck” and “engine” categories is assumed to be in line with that in recent years – i.e. somewhat more deck than engine. Some details of the resulting workings are set out in Table 12.3d and Table 12.3e.

Table 12.3d: Trainee officer numbers

		Officer cadets				Officer conversions			
		Deck		Engine (including dual purpose)		Deck		Engine (including dual purpose)	
Training starts (financial year)	Year finish training (four years)	Start	Finish (8% pa dropout)	Start	Finish (8% pa dropout)	Start	Finish (8% total dropout)	Start	Finish (8% total dropout)
2007/08	2011	475	340	404	289	35	32	20	14
2008/09	2012	522	374	366	262	24	22	13	9
2009/10	2013	407	292	320	229	23	21	13	9
2010/11	2014	445	319	355	254	22	20	12	9
2011/12	2015	445	319	355	254	22	20	12	9
2012/13	2016	445	319	355	254	22	20	12	9
2013/14	2017	445	319	355	254	22	20	12	9
2014/15	2018	445	319	355	254	22	20	12	9
2015/16	2019	445	319	355	254	22	20	12	9
2016/17	2020	445	319	355	254	22	20	12	9
2017/18	2021	445	319	355	254	22	20	12	9

Source: OE assumptions and modelling

Table 12.3e: Supply of UK deck and engine officers

	Stock of officers before new recruits post-2010		Annual addition to supply		Net cumulative addition to supply with 6% pa wastage rate		Overall UK supply	
	Deck officers	Engine officers	Deck officers	Engine officers	Deck officers	Engine officers	Deck officers	Engine officers
2010	6,211	5,410					6,211	5,410
2011	5,645	4,915	372	304	372	304	6,018	5,218
2012	5,134	4,465	396	272	718	534	5,852	4,999
2013	4,665	4,049	313	239	933	700	5,598	4,748
2014	4,234	3,664	339	263	1,145	868	5,379	4,531
2015	3,839	3,308	339	263	1,328	1,013	5,167	4,320
2016	3,473	2,978	339	263	1,487	1,138	4,960	4,116
2017	3,136	2,673	339	263	1,624	1,246	4,759	3,919
2018	2,824	2,393	339	263	1,742	1,339	4,566	3,733
2019	2,539	2,139	339	263	1,844	1,420	4,383	3,559
2020	2,278	1,908	339	263	1,932	1,490	4,210	3,398
2021	2,041	1,699	339	263	2,008	1,550	4,049	3,249

Source: OE assumptions and modelling

Estimating new industry UK recruits in the non-certified officer and ratings categories requires more assumptions as they do not typically go through formal and well-recorded training systems along the lines for certified officers set out above. For these purposes estimates of the annual number of new recruits of UK nationals over the period 2004-10 were made on the basis of the assumptions about outflows due to retirement and other industry leavers reported above.

For all categories except one, these assumptions yielded sensible-looking results. The one exception was the comparatively small engine ratings group, where it is assumed that that a minimal number of 10 per annum come on stream, in line with the average number of trainee engine ratings in 2004-07⁸¹.

Table 12.3f: UK non-certified officers and ratings: assumed annual additions

Officers		Ratings			
Tech	Catering	Deck	Engine	General	Catering
185	195	200	10	45	955

Source: OE assumptions, based partly on trends in supply in the recent past

The table below sets out the overall impact on supply, where net new recruits are calculated on the basis of a subsequent 6 per cent per annum dropout rate for officers and 6¼ per cent for ratings (i.e. it is assumed that only a negligible number of new recruits within the decade ahead reach retirement age by 2021).

Table 12.3g: Projected supply of UK non-certificated officers and ratings

	UK supply without new recruits					
	Officers		Ratings			
	Tech	Catering	Deck	Engine	General	Catering
2010	2,042	2,645	4,868	976	448	10,134
2011	1,869	2,427	4,370	877	410	9,312
2012	1,711	2,228	3,911	787	375	8,555
2013	1,565	2,049	3,501	706	342	7,860
2014	1,430	1,887	3,137	633	311	7,223
2015	1,305	1,739	2,818	569	282	6,643
2016	1,189	1,604	2,540	511	255	6,114
2017	1,081	1,479	2,292	459	230	5,630
2018	980	1,360	2,066	413	207	5,182
2019	885	1,248	1,859	371	186	4,767
2020	798	1,144	1,668	332	168	4,382
2021	719	1,048	1,495	296	150	4,023

⁸¹ Source: DfT Transport Statistics Bulletin. More generally, only limited data is available on numbers of trainee ratings as opposed to officer cadets.

Table 12.3g: Projected supply of UK non-certificated officers and ratings cont.

	Net new UK recruits					
	Officers		Ratings			
	Tech	Catering	Deck	Engine	General	Catering
2010						
2011	185	195	200	10	45	955
2012	359	378	387	19	87	1,846
2013	522	551	560	28	126	2,676
2014	676	713	723	36	163	3,450
2015	820	865	874	44	197	4,172
2016	956	1,008	1,015	51	228	4,846
2017	1,084	1,142	1,146	57	258	5,474
2018	1,204	1,269	1,269	63	286	6,059
2019	1,317	1,388	1,383	69	311	6,605
2020	1,423	1,500	1,490	74	335	7,114
2021	1,522	1,605	1,589	79	358	7,589
	Overall UK supply					
	Officers		Ratings			
	Tech	Catering	Deck	Engine	General	Catering
2010	2,042	2,645	4,868	976	448	10,134
2011	2,054	2,622	4,570	887	455	10,267
2012	2,070	2,606	4,297	807	462	10,400
2013	2,087	2,600	4,061	734	468	10,536
2014	2,106	2,600	3,860	669	474	10,673
2015	2,125	2,604	3,691	612	478	10,815
2016	2,145	2,612	3,555	562	483	10,960
2017	2,165	2,621	3,438	517	487	11,104
2018	2,183	2,628	3,335	476	492	11,241
2019	2,202	2,636	3,242	440	498	11,373
2020	2,221	2,643	3,158	407	503	11,497
2021	2,241	2,652	3,085	376	508	11,612

Source: OE assumptions and modelling

12.4 Adding non-UK supply to arrive at the shipping industry “skills gap”

Finally, to close out the model in the case of the shipping industry an assumption about the supply of non-UK seafarers to the UK industry is needed. At the worldwide level, the total supply of seafarers at is projected by industry experts to grow at a rate of broadly 2 per cent per annum over the decade ahead⁸². However, in the recent past employment of foreign seafarers in the UK industry has grown at a very rapid pace – by around 12½ per cent per annum overall, with both officers and rating ranks sharing in this growth.

OE does not see such rates of growth being sustainable going forward, but given this recent history it seems reasonable to assume that non-UK supply of seafarers to the UK industry will continue to grow by more than overall supply at the global level, and have assumed an annual rate of 5 per cent growth for the purposes of the “central” estimates.

⁸² “Manpower 2020 Update”, BIMCO / ISF / DMU / Warwick Institute for Employment Research.

The final numbers are set out in tables further below, after a consideration of ex-seafarer employment across the wider maritime sector.

12.5 Employment of ex-seafarers across the wider UK maritime sector

The best starting point for estimates of the present and future employment of ex-seafarers across the wider UK maritime sector remains the study carried out by Gardner et al seven years ago⁸³. However, in this report a slightly wider view of maritime employment is taken, most notably to include the oil and gas industry and a greater number of training providers.

Estimates of numbers of ex-seafarers demanded and actually employed in the wider maritime sector in recent years, based on combining the Gardner study with responses to the Deloitte / OE survey, are set out in the tables below. These estimates have been produced by:

- ⇒ Splitting the Gardner et al projections for the demand for ex-seafarers in 2008 and 2013 into six sectors aligned with those of respondents to the new Deloitte / OE survey, interpolating projected demand in the interim years with the assumption of constant growth rates, and estimating associated supply in each category based on a 13.5 per cent supply shortfall throughout. That is based on the Gardner finding that, in 2003, 13.5 per cent of jobs that employers would have preferred to have filled with an ex-seafarer were in fact filled by non-seafarer, and that study's expectation that supply shortfalls along those lines would persist throughout the following decade if demand developments turned out as then expected.

Table 12.5a: Demand and supply based on Gardner et al's 2003 study

	2008	2009	2010	2011	2012	2013
Projected demand¹						
Oil & gas	-	-	-	-	-	-
Training providers	300	294	288	282	277	271
Ports and related services ²	2,690	2,715	2,740	2,765	2,791	2,817
Miscellaneous ³ & insurance	1,758	1,767	1,776	1,785	1,794	1,803
Shipping companies ⁴	3,552	3,595	3,638	3,682	3,727	3,772
Other	7,789	7,858	7,927	7,997	8,068	8,139
Total	16,089	16,229	16,370	16,513	16,657	16,802
Projected supply⁵						
Oil & gas	-	-	-	-	-	-
Training providers	259	254	249	244	239	234
Ports and related services	2,326	2,347	2,369	2,391	2,413	2,436
Miscellaneous & insurance	1,520	1,528	1,535	1,543	1,551	1,559
Shipping companies	3,071	3,108	3,146	3,184	3,222	3,261
Other	6,735	6,794	6,854	6,915	6,976	7,037
Total	13,911	14,032	14,154	14,278	14,402	14,527

1 Figures for 2008 and 2013 are straight from the Gardner et al study; those for interim years are interpolated based on constant growth rates. 2 "Port services", "terminal operators" and "ports". 3 Public bodies, trade associations and similar. 4 "Federated" and "non-fed ship owners" and "ship and crew management". 5 Based on a constant 13.5% supply shortfall relative to demand, in line with the percentage of relevant jobs found by Gardner et al to be filled by non-seafarers in 2003.

⁸³ "The UK economy's requirements for people with experience of working at sea", BM Gardner et al, Cardiff University, for the DfT, Chamber of Shipping and Marine Society, January 2004.

Source: "The UK economy's requirement for people with experience of working at sea 2003", BM Gardner et al, Cardiff University, for the DfT, Chamber of Shipping and Marine Society, January 2004; Oxford Economics assumptions and modelling.

- ⇒ Making the assumption that ex-seafarer employment in 2011 is still constrained by a shortage of supply, so that ex-seafarer job numbers still indicate supply rather than demand. This reflects a judgment that the fall-off in demand during and following the recession would not have been sufficient to completely eliminate the previous 13.5 per cent supply shortfall, even if (as is also assumed) supply had continued to grow in line with prior expectations.
- ⇒ Re-estimating supply in 2011 by combining the figures derived from the Gardner study with some new estimates of ex-seafarer employment based on the Deloitte / OE survey. The supply figures derived from Gardner et al are taken to be correct in the case of four out of the six sectors, but those for "oil and gas" and "training providers" are scaled up from the survey findings, based on the scaling-up factor found to apply in the case of "ports and related services".
- ⇒ Re-estimating supply for 2008-10 on the basis of the new estimated levels for 2011 and the previously-estimated supply growth paths. And re-estimating "would-be" demand for 2008-11 – i.e. how demand would have developed in the absence of the recession – simply by re-scaling the supply figures to reflect the assumed "would-be" supply shortfall of 13.5 per cent throughout.

Table 12.5b: The 2003 demand and supply projections re-scaled

	Ex-seafarer jobs of respondents to the Deloitte / OE survey ¹	Supply re-estimated ²			
	2011	2008	2009	2010	2011
Oil & gas	818	1,131	1,139	1,147	1,155
Training providers	739	1,108	1,086	1,064	1,042
Ports & related services	1,694	2,326	2,347	2,369	2,391
Miscellaneous & insurance	82	1,520	1,528	1,535	1,543
Shipping companies	-	3,071	3,108	3,146	3,184
Other	-	6,735	6,794	6,854	6,915
Total	3,332	15,890	16,002	16,115	16,230
		"Would-be demand" re-estimated ³			
		2008	2009	2010	2011
Oil & gas		1,308	1,317	1,326	1,336
Training providers		1,281	1,256	1,230	1,206
Ports & related services		2,690	2,715	2,740	2,765
Miscellaneous & insurance		1,758	1,767	1,776	1,785
Shipping companies		3,552	3,595	3,638	3,682
Other		7,789	7,858	7,927	7,997
Total		18,378	18,507	18,638	18,771

¹ Estimates based on questions concerning total employment and the percentage of jobs filled by ex-seafarers. ² Sectors in line with supply as derived from Gardner et al, except for "oil & gas" and "training providers" which are scaled up from the survey respondents' figures in line with 'ports & related services'. For 2008-10 the figures for 'training providers' are scaled up from the Gardner-derived figure in line with the implicit factor for 2011, while those for oil & gas are based on growth in line with the total of the other sectors. ³ I.e. an assumption about what demand would have been in the absence of the global recession, arrived at simply by scaling up each sector to reflect the assumed "would-be" 13.5% supply shortfall. Source: Oxford Economics estimates based on the Deloitte / OE survey and the Gardner et al 2003 study.

- ⇒ Producing estimates for actual demand in 2011, by assuming that demand for ex-seafarers was equal to estimated “would-be demand” in 2008, but has since fallen in line with total employment amongst employers of ex-seafarers. For each sector the decline in demand between 2008 and 2011 is based on a re-weighted average of the percentage of total jobs lost in the recession, based on results from the Deloitte / OE survey, with the weights used for this purpose reflecting employment of ex-seafarers only (except for shipping where the weights used relate to estimated total employment).
- ⇒ Interpolating demand in 2009 and 2010 using the year-by-year pattern of employment across the UK economy as a whole.
- ⇒ Assuming that the proportion of foreign ex-seafarers remained at around 13 per cent of all employed ex-seafarers, as found by Gardner et al to apply in 2003.

Table 12.5c: The recent evolution of actual demand and supply for ex-seafarers

	Re-weighted % change in all jobs due to the recession ¹	Demand re-estimated ²			
	2011	2008	2009	2010	2011
Oil & gas	-0.1	1,308	1,307	1,306	1,306
Training providers	-1.1	1,281	1,272	1,269	1,268
Ports & related services	-13.5	2,690	2,448	2,352	2,326
Miscellaneous & insurance	-1.3	1,758	1,742	1,736	1,734
Shipping companies	-6.5	3,552	3,398	3,336	3,320
Other	-	7,789	7,478	7,355	7,322
Total demand	-	18,378	17,645	17,354	17,275
Jobs filled by non-seafarers		2,488	1,644	1,239	1,045
Supply ³		15,890	16,002	16,115	16,230
Of which: foreign ex-seafarers ⁴		2,095	2,110	2,125	2,140
UK ex-seafarers		13,795	13,892	13,990	14,090
<i>Supply shortfall as % demand</i>		<i>13.5</i>	<i>9.3</i>	<i>7.1</i>	<i>6.0</i>

¹ Estimates based on responses to the Deloitte / OE survey, but with the results in each sector re-weighted according to the number of ex-seafarers employed in each firm (except for shipping where the results are simply weighted together according to total employment). ² 2008 figure set equal to “would-be demand” in previous table. 2011 figure applies the re-weighted % change in jobs to the 2008 level. 2009 and 2010 interpolated based on the year-by-year pattern of jobs losses across the UK economy as a whole. ³ In line with the prior expectation, i.e. assumed not to have been affected by the recession. ⁴ Assumed to have been a constant 13% of total ex-seafarer employment. Source: Oxford Economics estimates based on the Deloitte / OE survey and the Gardner et al 2003 study.

12.6 Projecting demand and supply for ex-seafarers through to 2021

Going forward, the demand for ex-seafarers is projected by using a sector-based weighted average of OE’s macroeconomic and industry-level forecasts for employment, the results of which are set out in Table 12.6a.

Developments in UK supply meanwhile are based an assumption that UK deck and engine officers and ratings leaving active seafarer roles with shipping companies, up to the age of 50, become available to work in ex-seafarer positions in the UK. However, an adjustment is made to exclude those working in active seafaring roles for fewer than four years, with a further adjustment made to allow for ex-Royal Navy and commercial fishing personnel. As the table shows, even using a comparatively modest outflow rate of 4.5 per cent (covering both retirement and pre-retirement leavers, in line with the finding used in

Gardner et al), this is insufficient to prevent the supply of UK ex-seafarers declining gradually over the years ahead.

Table 12.6a: Projected demand for UK ex-seafarers going forward

	Oil & gas	Marine equipment & IT	Marine engineering	Shipping, ports, towage etc, ship brokers & agents	Insurance & ship finance	Consultants, surveyors, lawyers, classification societies	Training providers & public bodies, etc	Total	Annual % change
2011	1,306	2,207	288	6,339	497	4,116	2,522	17,275	
2012	1,264	2,156	289	6,395	498	4,201	2,480	17,284	0.0
2013	1,232	2,112	292	6,491	506	4,412	2,449	17,494	1.2
2014	1,199	2,067	292	6,628	512	4,644	2,436	17,779	1.6
2015	1,165	2,018	290	6,766	515	4,867	2,437	18,059	1.6
2016	1,132	1,970	286	6,876	515	5,034	2,441	18,254	1.1
2017	1,100	1,923	282	6,951	515	5,152	2,447	18,370	0.6
2018	1,069	1,878	277	6,991	516	5,236	2,457	18,424	0.3
2019	1,041	1,834	273	7,005	517	5,286	2,471	18,425	0.0
2020	1,010	1,791	268	7,013	517	5,340	2,483	18,423	0.0
2021	977	1,749	264	7,018	517	5,398	2,493	18,418	0.0

Source: Oxford Economics

Table 12.6b: Projected demand and supply of UK ex-seafarers going forward

	UK deck & engine officers & ratings age <50 leaving the shipping sector								Total demand for ex-seafarers by UK industry
	Employed in UK shipping sector in 2010		Subsequent recruits		Total	Adjusted total ¹ (= inflow of UK ex-seafarers to UK sector)	Outflow from sector	Supply of UK ex-seafarers to UK industry	
	Officers	Ratings	Officers	Ratings					
2010								13,990	17,354
2011								14,090	17,275
2012	267	135	170	30	603	590	634	14,046	17,284
2013	251	126	222	43	642	624	632	14,038	17,494
2014	236	117	274	56	683	657	632	14,063	17,779
2015	222	109	318	68	717	686	633	14,116	18,059
2016	200	98	357	79	734	700	635	14,181	18,254
2017	180	87	390	90	748	711	638	14,254	18,370
2018	162	78	419	100	759	720	641	14,332	18,424
2019	145	69	444	109	768	728	645	14,415	18,425
2020	130	62	465	118	775	734	649	14,500	18,423
2021	116	55	484	126	781	738	652	14,586	18,418

¹ Reduced by 17% to allow for those leaving seafaring roles within three years, then increased by 90 per annum to allow for recruitment of ex-Royal navy and ex-commercial fishing personnel.

Source: Oxford Economics assumptions and modelling.

Finally, it is assumed that the supply of foreign ex-seafarers to UK industry is similarly determined by deck and ratings leaving the UK shipping industry, with the inflow at around 17 per cent of the inflow of UK non-Royal Navy ex-seafarers – in line with the ex-seafarer stock in recent years – and the outflow at 4.5 per cent per annum.

Table 12.6c: Projected supply of non-UK ex-seafarers

	Inflow	Outflow	Supply
2010			2,125
2011			2,140
2012	86	96	2,130
2013	92	96	2,126
2014	98	96	2,129
2015	103	96	2,136
2016	105	96	2,145
2017	107	97	2,155
2018	109	97	2,167
2019	110	98	2,179
2020	111	98	2,192
2021	112	99	2,206

Source: Oxford Economics assumptions and modelling.

12.7 Overview of supply and demand: central forecast

Finally, Table 12.7a sets out Oxford Economics' central projections for demand and supply – and the resulting supply shortfalls and excesses – in detail.

Table 12.7a: Projections for seafarer and ex-seafarer numbers: detail

	Deck											
	Officers						Ratings					
	Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand	Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand
2010	13,952	6,211	7,741	7,969	-229	-2	15,170	4,868	10,302	10,481	-179	-1
2011	14,471	6,018	8,453	8,368	85	1	15,735	4,570	11,165	11,005	160	1
2012	14,853	5,852	9,002	8,786	216	1	16,151	4,297	11,853	11,555	298	2
2013	15,517	5,598	9,919	9,225	694	4	16,872	4,061	12,811	12,133	678	4
2014	16,168	5,379	10,788	9,687	1,102	7	17,580	3,860	13,720	12,740	980	6
2015	16,766	5,167	11,599	10,171	1,428	9	18,231	3,691	14,540	13,377	1,163	6
2016	17,319	4,960	12,359	10,680	1,680	10	18,832	3,555	15,277	14,046	1,231	7
2017	17,829	4,759	13,069	11,214	1,856	10	19,386	3,438	15,948	14,748	1,200	6
2018	18,314	4,566	13,748	11,774	1,973	11	19,913	3,335	16,578	15,485	1,093	5
2019	18,776	4,383	14,393	12,363	2,030	11	20,416	3,242	17,174	16,260	914	4
2020	19,181	4,210	14,971	12,981	1,990	10	20,856	3,158	17,698	17,073	626	3
2021	19,449	4,049	15,399	13,630	1,769	9	21,147	3,085	18,063	17,926	137	1

	Engine											
	Officers						Ratings					
	Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand	Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand
2010	12,240	5,410	6,830	7,029	-199	-2	6,289	976	5,314	5,350	-36	-1
2011	12,696	5,218	7,478	7,381	97	1	6,523	887	5,637	5,617	20	0
2012	13,031	4,999	8,032	7,750	283	2	6,696	807	5,889	5,898	-9	0
2013	13,614	4,748	8,865	8,137	728	5	6,995	734	6,261	6,193	68	1
2014	14,185	4,531	9,653	8,544	1,109	8	7,288	669	6,619	6,502	116	2
2015	14,710	4,320	10,389	8,971	1,418	10	7,558	612	6,946	6,828	118	2
2016	15,195	4,116	11,079	9,420	1,659	11	7,807	562	7,246	7,169	77	1
2017	15,642	3,919	11,723	9,891	1,832	12	8,037	517	7,520	7,527	-7	0
2018	16,067	3,733	12,335	10,385	1,949	12	8,256	476	7,780	7,904	-124	-2
2019	16,473	3,559	12,914	10,905	2,009	12	8,464	440	8,024	8,299	-275	-3
2020	16,828	3,398	13,430	11,450	1,980	12	8,647	407	8,240	8,714	-474	-5
2021	17,063	3,249	13,814	12,022	1,792	11	8,767	376	8,392	9,150	-758	-9

	General purpose						Total deck and engine: seafarers active at sea					
	Ratings						Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand
	Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand						
2010	1,313	448	865	881	-16	-1	48,964	17,913	31,051	31,711	-659	-1
2011	1,361	455	907	925	-19	-1	50,786	17,147	33,639	33,296	343	1
2012	1,397	462	935	972	-37	-3	52,128	16,417	35,712	34,961	751	1
2013	1,460	468	991	1,020	-29	-2	54,457	15,610	38,847	36,709	2,138	4
2014	1,521	474	1,048	1,071	-24	-2	56,741	14,913	41,828	38,544	3,284	6
2015	1,577	478	1,099	1,125	-26	-2	58,843	14,269	44,573	40,472	4,102	7
2016	1,629	483	1,147	1,181	-35	-2	60,783	13,676	47,107	42,495	4,612	8
2017	1,677	487	1,190	1,240	-50	-3	62,571	13,120	49,451	44,620	4,831	8
2018	1,723	492	1,231	1,302	-72	-4	64,273	12,603	51,671	46,851	4,820	7
2019	1,767	498	1,269	1,367	-99	-6	65,895	12,121	53,774	49,193	4,581	7
2020	1,805	503	1,302	1,436	-134	-7	67,316	11,676	55,641	51,653	3,988	6
2021	1,830	508	1,322	1,508	-185	-10	68,256	11,266	56,990	54,236	2,754	4

	Maritime-related employment of ex-seafarers						Total deck and engine: all maritime employment of seafarers and ex-seafarers					
	Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand	Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand
2010	17,354	13,990	3,364	2,125	1,239	7	66,319	31,903	34,416	33,836	580	1
2011	17,275	14,090	3,185	2,140	1,045	6	68,061	31,237	36,824	35,436	1,388	2
2012	17,284	14,046	3,237	2,130	1,107	6	69,412	30,463	38,949	37,091	1,858	3
2013	17,494	14,038	3,456	2,126	1,329	8	71,951	29,648	42,303	38,835	3,468	5
2014	17,779	14,063	3,716	2,129	1,587	9	74,521	28,977	45,544	40,673	4,871	7
2015	18,059	14,116	3,943	2,136	1,807	10	76,902	28,386	48,516	42,607	5,909	8
2016	18,254	14,181	4,073	2,145	1,929	11	79,037	27,856	51,181	44,640	6,541	8
2017	18,370	14,254	4,116	2,155	1,961	11	80,941	27,374	53,567	46,775	6,792	8
2018	18,424	14,332	4,092	2,167	1,925	10	82,697	26,935	55,763	49,018	6,745	8
2019	18,425	14,415	4,010	2,179	1,831	10	84,321	26,536	57,785	51,373	6,412	8
2020	18,423	14,500	3,923	2,192	1,731	9	85,739	26,175	59,564	53,845	5,718	7
2021	18,418	14,586	3,832	2,206	1,626	9	86,674	25,852	60,822	56,441	4,380	5

	Hotel, catering and other											
	Officers						Ratings					
	Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand	Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand
2010	4,742	2,645	2,097	2,194	-97	-2	40,498	10,134	30,364	30,737	-373	-1
2011	4,918	2,622	2,297	2,304	-7	0	42,005	10,267	31,738	32,274	-535	-1
2012	5,048	2,606	2,442	2,419	23	0	43,115	10,400	32,715	33,887	-1,173	-3
2013	5,274	2,600	2,674	2,540	134	3	45,041	10,536	34,505	35,582	-1,076	-2
2014	5,495	2,600	2,895	2,667	228	4	46,930	10,673	36,257	37,361	-1,103	-2
2015	5,698	2,604	3,094	2,800	294	5	48,669	10,815	37,854	39,229	-1,375	-3
2016	5,886	2,612	3,275	2,940	334	6	50,273	10,960	39,313	41,190	-1,877	-4
2017	6,060	2,621	3,439	3,087	351	6	51,752	11,104	40,648	43,250	-2,601	-5
2018	6,224	2,628	3,596	3,242	354	6	53,160	11,241	41,919	45,412	-3,493	-7
2019	6,381	2,636	3,746	3,404	342	5	54,502	11,373	43,129	47,683	-4,554	-8
2020	6,519	2,643	3,876	3,574	302	5	55,677	11,497	44,180	50,067	-5,887	-11
2021	6,610	2,652	3,958	3,753	205	3	56,454	11,612	44,842	52,570	-7,728	-14

	Technical						Total non-deck and engine active at sea					
	Officers						Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand
	Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand						
2010	3,830	2,042	1,788	1,864	-75	-2	49,070	14,821	34,249	34,794	-545	-1
2011	3,973	2,054	1,919	1,957	-38	-1	50,896	14,942	35,954	36,534	-580	-1
2012	4,078	2,070	2,008	2,055	-47	-1	52,241	15,077	37,165	38,361	-1,196	-2
2013	4,260	2,087	2,173	2,157	16	0	54,575	15,223	39,352	40,279	-926	-2
2014	4,439	2,106	2,333	2,265	68	2	56,864	15,378	41,486	42,293	-807	-1
2015	4,603	2,125	2,478	2,378	100	2	58,970	15,544	43,426	44,407	-981	-2
2016	4,755	2,145	2,610	2,497	113	2	60,915	15,716	45,198	46,628	-1,430	-2
2017	4,895	2,165	2,730	2,622	108	2	62,707	15,890	46,817	48,959	-2,142	-3
2018	5,028	2,183	2,845	2,753	91	2	64,412	16,053	48,360	51,407	-3,048	-5
2019	5,155	2,202	2,953	2,891	62	1	66,038	16,210	49,828	53,978	-4,150	-6
2020	5,266	2,221	3,045	3,035	10	0	67,462	16,361	51,101	56,676	-5,575	-8
2021	5,340	2,241	3,099	3,187	-88	-2	68,404	16,505	51,899	59,510	-7,612	-11

	Overall total: seafarers active at sea						Overall total: all maritime employment of seafarers and ex-seafarers					
	Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand	Total demand	UK supply	Non-UK required	Non-UK supply	Supply shortfall	Shortfall as % of demand
2010	98,034	32,734	65,301	66,505	-1,204	-1	115,389	46,724	68,665	68,630	35	0
2011	101,682	32,090	69,593	69,830	-237	0	118,958	46,179	72,778	71,970	808	1
2012	104,370	31,494	72,876	73,322	-445	0	121,654	45,540	76,114	75,452	662	1
2013	109,032	30,833	78,199	76,988	1,212	1	126,526	44,870	81,655	79,114	2,541	2
2014	113,606	30,292	83,314	80,837	2,477	2	131,385	44,355	87,030	82,966	4,064	3
2015	117,813	29,814	88,000	84,879	3,121	3	135,873	43,930	91,943	87,015	4,928	4
2016	121,697	29,392	92,306	89,123	3,183	3	139,952	43,573	96,379	91,268	5,111	4
2017	125,278	29,010	96,268	93,579	2,689	2	143,647	43,263	100,384	95,734	4,650	3
2018	128,686	28,655	100,030	98,258	1,772	1	147,110	42,988	104,122	100,425	3,697	3
2019	131,933	28,331	103,602	103,171	431	0	150,359	42,746	107,613	105,350	2,262	2
2020	134,778	28,036	106,742	108,330	-1,588	-1	153,201	42,536	110,665	110,522	143	0
2021	136,660	27,772	108,889	113,746	-4,857	-4	155,078	42,358	112,720	115,952	-3,231	-2