



UK Marine Industries World Export Market Potential

a report for the Foresight Marine Panel

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1 Summary and Conclusions

Summary

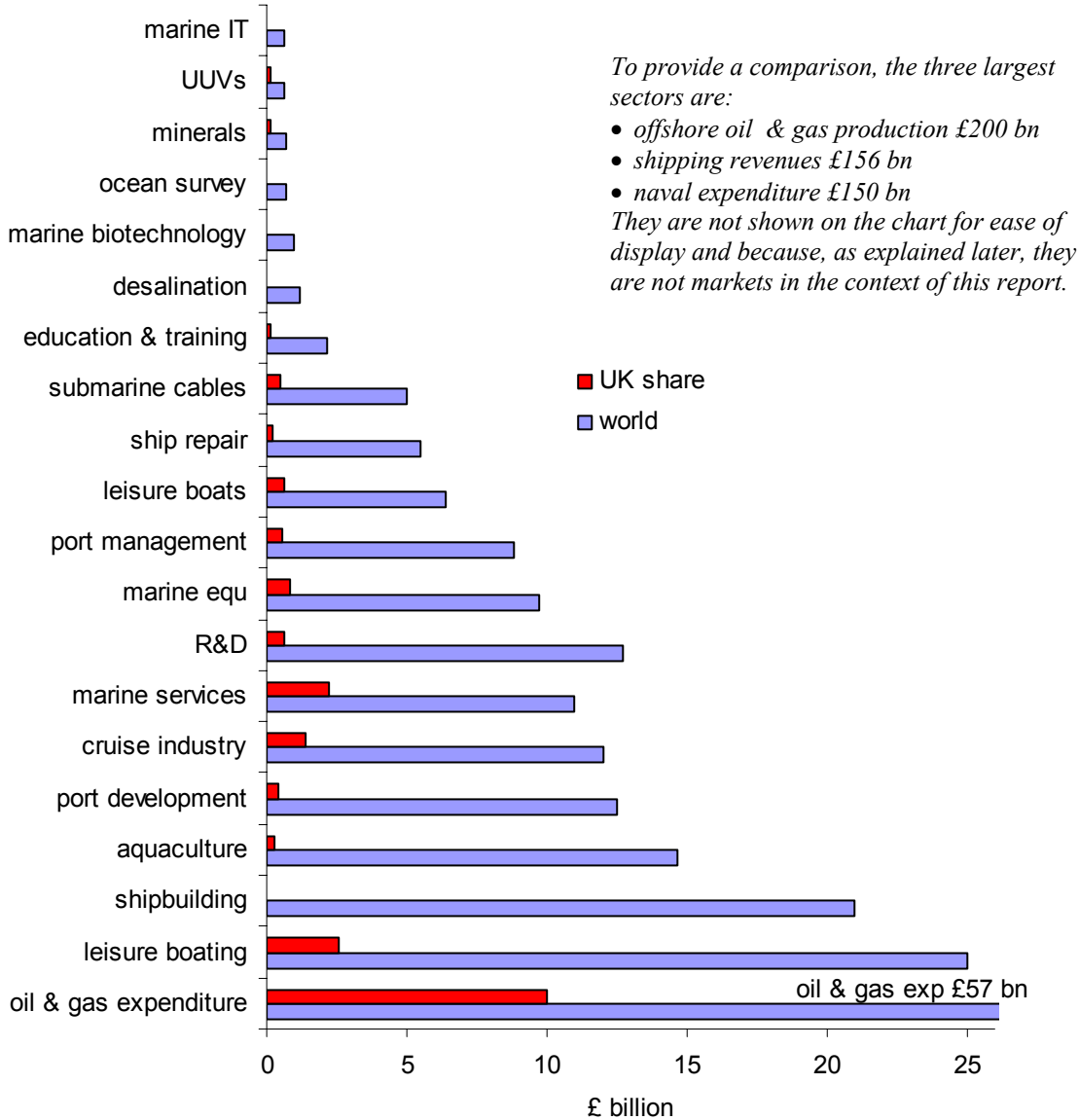


Figure 1-1: Global marine activities by value in 1999

Offshore oil & gas - is arguably the world's, certainly the UK's, most important marine industry. Global production is currently worth some £670 million per day, or possibly over £200 billion in 2000. UK total income from offshore oil & gas production in 1999 was £17.4 billion of which total exports were £8.8 billion. Total global industry expenditure (capex and opex) is estimated at £57 billion in

1999 of which offshore UK accounts for £8.2 billion.

The global market is set for continuing growth. But the only places where major discoveries are likely in future years are in deepwater so subsea and floating production will develop into major sectors.

High levels of expenditure coupled with huge technical challenges has generated some world-class companies in the UK. However, the UK industry in general is now facing a major long-term problem - the large home market is set to decline as offshore fields deplete. UK companies probably win about a 2.5% share of foreign business exporting some £1.4 billion in goods and services per annum. The leading companies have great skills in the growth market sectors such as deepwater and subsea technology, but in reality export activity cannot replace the home market and a major re-orientation of the UK industry is essential for the majority of its participants to have a long-term future.

Defence - since the end of the Cold War world defence expenditure has fallen by 34%. However, there are now signs that capital expenditure is beginning to rise, with likely growth in the construction of new vessels during the next decade. We estimate world naval expenditure at £150 billion per annum to include all personnel, equipment and armaments costs. Some 4,000 vessels are operated worldwide with 158 likely to be ordered in 2000. However, there is only limited potential for export of complete vessels. (1999 UK export orders of equipment and services were about £750 million with no warship content.) Many contracts are in the form of technology transfer and typically the first vessel in a series may be built in the exporting country's yard with following vessels built under licence in the 'importing' country. The UK has the potential to get a good share of the addressable naval defence market.

Shipbuilding - we value the global civil industry at £21 billion in 1999. Over a period of years, the UK share of total world commercial shipbuilding has varied from 0.5 to 1.5% by value, (averaging about 1%). We estimate UK yards' 1999 deliveries at some £100 million, increasing to £334 million in 2003. The largest share, 63% is taken by the Asia Pacific region and the UK cannot compete with their low labour rates and production line shipbuilding.

But the rest of Europe has been much more successful than the UK, achieving a 33% market share by value. The major factors accounting for this include European yards concentration on the high-cost special vessel types such

as cruise liners and offshore vessels, coupled with strong and long-term government support of their industries. This has manifested itself in taxation schemes that encourage investment in locally-built vessels and we note that one of these, a 'tonnage tax', is likely to reach the UK statute book shortly.

Ship repair - the world market is estimated as having a total value of about £5.5 billion. Revenues are expected to fall by about 1.5% between 1998 and 2003 as a result of a high degree of competition in this area. UK revenues are about £200 m which is a 3.6% market share (substantially greater than the UK's share of the newbuild market).

Ship conversion - there has been a change in attitude in the last decade or so towards innovative ship conversion. Most notably this has occurred in the form of FPSO and other oil-related projects. Some tankers are now designed to allow simpler conversion at a later date. The world market has averaged about £650 million in recent years and the UK market share about 11%. Opportunities for major passenger ship conversions are unlikely to arise often but the work of firms such as Cammell Laird in conversions and the successful dry dockings of large high-profile cruise ships in Southampton demonstrates the UK capability. This is a potential which requires long term needs to be resolved. There are also opportunities in converting tankers for use as offshore oil & gas production vessels.

Marine equipment - the total value for the world marine equipment is estimated as £ 9.75 billion. The UK *consumption* of marine equipment is small at around 0.5% and this share varies according to the output from UK civil yards. The *production* of marine equipment from the UK is estimated as £850 million. As UK companies have recently made major overseas acquisitions in this area, the value produced by UK-owned companies is expected to rise significantly. UK-owned companies are now world-market leaders in areas such as propulsion.

Ports - there are currently over 2000 significant ports around the world handling 4.9 billion tons of cargo therefore ports constitute a major global industry. *Port management* is an £8.8 billion market, UK companies' having a

market share of 6% valued at £530 million. *Port development* will continue to constitute a major market - if world marine trade develops at the forecast rate of 4-5%, an annual average expenditure of £8.5 billion will be required. One aspect is containerisation - to handle the predicted worldwide increase in container traffic, the World Bank has forecast the need for 200-300 new container terminals by 2005.

Shipping - the shipping industry carries over 98% by volume of all international cargo, generating revenues we estimate at £156 billion with prospects of growth to £169 billion by 2004. The UK fleet has declined over the years but is one of the most efficient in the world and this is reflected in the UK's higher revenue to fleet size ratio. The UK owns 3% of vessel tonnage but controls 6%. Containerised cargo traffic doubled between 1990-1998 and is now estimated to account for 20% of world maritime cargo. We value the resulting world market for 'intermodal transport' at £51 bn and expect it to grow strongly to £61 bn by 2004.

Marine services - the UK is a leading centre in the provision of a wide range of financial and professional services to international shipping including banking, insurance, shipbroking, legal services, classification and publishing. These 'invisibles' contribute nearly £1 billion to UK overseas earnings. The UK has substantial market shares in marine insurance (20%) and 18% of the shipping loan book. Lloyds Register classifies nearly 20% of the world's fleet. The marine services sector is a substantial employer. The largest UK marine services centre is London, where 13,800 are employed. We estimate a total UK marine services employment of 15,000 and UK earnings of £2.2 billion, representing 20% of a world market of £11 billion. The prospects are still considerable.

Submarine cables - forecasting is difficult as both demand and capacity have rocketed, the growth in this sector being driven by two main factors: the unprecedented demand generated by internet and corporate data traffic, and the infusion of private capital into the submarine telecommunications industry. We estimate the global market for cable manufacture and installation at £5 billion and expect it to grow to £6 billion by 2004. The cable itself is now mainly produced outside the UK, but there is a

growing UK business in some aspects of installation and maintenance.

Cruise industry - this has grown to where it handled 11.2 million passengers in 1999 resulting in a world market of nearly £12 billion. At present there is concern over a short-term overcapacity. However, the market growth potential remains good, perhaps to £15 billion by 2004. The UK has always maintained a significant presence, primarily through Cunard (now part of Carnival of the US) and P&O Cruises, but increasingly through a number of smaller management companies.

Leisure - there are an estimated 34 million boats of all sizes worldwide and deliveries are some 800,000 per annum. The world *leisure boating* industry is valued at £25 billion and the UK part of the industry at £2.6 billion. Boatyard activity is valued at £6.4 billion worldwide of which UK production is £620 million. The UK is a successful player in this area of marine activity with high proportions of its final output being exported. UK exports (1998) were £567 million (of which boats were £235 million) and imports were £208 million. Other leisure activities such as *diving* have also experienced strong growth. Marine leisure has considerable growth prospects and warrants greater attention.

Minerals - quantities of hard minerals are dredged from the seabed in the coastal zones of a number of countries. These range from high value subjects such as gemstone diamonds to low-value aggregates. Other activities such as deep sea mining are outside the timeframe of this report. The value of the existing business is probably some £700 million worldwide, but may grow considerably even if present diamond mining prospects of £333 billion are only partially realised. The UK offshore aggregates dredging industry is worth some £150 million per annum. The Namibian seabed diamond mining machine was provided by a UK-based company, SubSea Offshore.

Offshore renewable energy - although there are a number of concepts under development most attention is focused on wind energy. Currently a tiny industry, offshore wind energy is recognised as one of the key future renewable energy sources. The real opportunities for the UK lie in the medium term 2005-2015. Exper-

tise in offshore structures coupled with a growing industrial base of rotor and turbine manufacture could enable the UK to benefit from the growing demand for renewable energy. It is estimated that by 2010 the world market for renewable energy will be valued at £400 billion of which offshore wind energy could represent up to 5% (£20 billion). Wave, tide and ocean thermal energy are believed to hold significant prospects but in a longer timescale.

Aquaculture - aquaculture provides some 29% of global food fish production forming an industry worth £27.7 billion of which marine aquaculture is valued at £14.7 billion. Recent growth has been of the order of 7-10% per annum and is expected to continue due to restrictions on capture fishing and a growth in the demand for seafood. China is the leading producer, UK output is valued at £250 million. In some areas of the world there are concerns over the environmental impact.

Desalination - the market has been driven by water shortages caused by continuing industrial development, population increases, low annual levels of rainfall and high temperatures. The increase in demand for fresh water could boost the value of the annual market from about £1 billion in 1996 to £1.5 billion by 2004.

Unmanned underwater vehicles - remotely operated underwater vehicles (ROVs) are used for research and military purposes and are essential everyday tools without which many ocean industries such as deepwater oil & gas production would not exist. Manufacture and operations total £600 million and are likely to grow to £900m by 2004. There are a few significant UK-based manufacturers and several operators. There are believed to be commercial prospects for the 'new' technology of AUVs where the UK has a strong research presence but no civil manufacturer.

Ocean survey - is essential for the production of hydrographic charts and safe navigation in ports & harbours, but in practice far more survey is required than is carried out. Survey is used by the extractive industries such as offshore oil & gas to determine the locations and

parameters needed to design offshore installations, routings for pipelines and survey for seabed minerals. We value the 1999 market for survey & positioning at £685 million and expect it to grow to £992 million by 2004. However, the UK share of this market, currently estimated at 14%, is likely to fall to 10% in response to a decline in North Sea offshore activity.

Marine environment - increasing coastal populations and growing concerns on climate change are factors that are leading to increasing expenditure. UK spend on coastal protection was £350 million in 1998/9 and global expenditure on coastal protection is probably of the order of £5 billion although greatly increased expenditure may be required in the future. The water companies of England and Wales have expenditure planned averaging £45 million per annum for 2000-2005 to meet EC Water Quality directives – global spend on marine water quality does not yet meet the costs of marine pollution.

Marine biotechnology - is the use of marine organisms to provide products or services for the benefit of mankind. It does not represent a single industry but it is a broad category of technologies, basic scientific advancements and technological applications across many sectors. Taking a conservative estimate of a few percent of the global biotechnology sector, marine biotechnology has *potential* to develop into a market in the region of £2-2.6 billion per year. The main requirement is financial support at this embryonic stage.

Education and training - in the civil sector this mainly comprises of academic study in Marine Science and Technology (MST), job-specific training mainly for seafarers and safety training for offshore workers. We value the combined global market at £2.18 billion and the UK share at £158 million. The UK E&T sector generates about £20 million in foreign earnings.

R&D - we estimate that the above sectors generate some £12.7 billion of R&D expenditure worldwide, of which £640 million forms the UK R&D 'market'.

SWOT Analysis

UK MARINE INDUSTRY STRENGTHS

- Long maritime traditions
- Major knowledge base
- Offshore oil & gas expertise
- Marine services market leader
- Leisure boat sector market leader
- Strong R&D, education & training sectors

UK MARINE INDUSTRY WEAKNESSES

- Historic lack of Government support
- Lack of a long-term marine strategy
- Fragmentation and lack of coordination of marine industries
- Lack of UK integrated suppliers
- Lack of business data
- UK high cost environment
- Financing difficulties
- Short term thinking
- No 'product champion'

THREATS TO UK MARINE INDUSTRIES

General	<ul style="list-style-type: none"> • Rise of low cost manufacturing locations • Foreign-owned integrated suppliers • Personnel recruitment & retention • Sector cyclicality • Different UK regional policies (e.g. no English enterprise agency)
Offshore oil & gas	<ul style="list-style-type: none"> • Future decline of UK sector reserves and investment • Rise of 'new' regions (e.g. West Africa) • Foreign state oil companies • Lack of major UK contractors
Naval	<ul style="list-style-type: none"> • Strong foreign support of local suppliers
Shipbuilding	<ul style="list-style-type: none"> • Lack of comparable environment to European competitors • Increased presence of S E Asia in special vessel sectors
Marine equipment	<ul style="list-style-type: none"> • Integrated systems supply
Renewable energy	<ul style="list-style-type: none"> • Low oil prices

The above analysis shows that many of the key factors that have impacted on the marine industries in the past have been external macro factors. Of these, the most significant have been the result of the difference of policies towards the marine industries by UK and foreign governments.

OPPORTUNITIES FOR UK MARINE INDUSTRIES

General	<ul style="list-style-type: none"> • Many growth markets • Application of offshore industry skills • Further development of services sectors • Low-volume, high-value, high-tec situations • Technology development and ownership
Offshore oil & gas	<ul style="list-style-type: none"> • Deepwater sector • Subsea production • Floating production • Diversification into other marine sectors
Naval	<ul style="list-style-type: none"> • Knowledge exports
Shipbuilding	<ul style="list-style-type: none"> • Equity participation • Complete ship and through-life services packages • Special vessels sectors • Kit ships • Electric ship
Conversion & repair	<ul style="list-style-type: none"> • Passenger vessels • FPSOs
Marine equipment	<ul style="list-style-type: none"> • Build major integrated suppliers • Marine electronics • Integrated propulsion
Marine IT	<ul style="list-style-type: none"> • New high growth potential sector
Renewable energy	<ul style="list-style-type: none"> • Apply offshore industry skills • Wind power short-term, others long-term
Leisure boating	<ul style="list-style-type: none"> • Develop on market strength • Large yachts (>24m)
Ports	<ul style="list-style-type: none"> • Port management • Port development
Intermodal	<ul style="list-style-type: none"> • Growth market
Education & training	<ul style="list-style-type: none"> • Target key markets • Global implementation of training standards
Submarine cables	<ul style="list-style-type: none"> • Installation & maintenance
Marine services	<ul style="list-style-type: none"> • Target key markets

Despite the strength of the threats, the marine industries offer major opportunities for the UK and exciting prospects for the development of new business sectors.

World Markets and UK Export Values**Table 1-1: World marine market sectors (£ billion 1999) and UK share**

	World Markets			Exports	
	world	UK share	UK %	UK	%
offshore oil & gas production	200.00	17.00	8.5%	4.20	2.2%
oil & gas expenditure	57.00	10.00	17.5%	1.40	2.5%
shipping revenues	156.00	5.20	3.3%	1.65	1.0%
naval expenditure	150.00	4.50	3.0%	0.75	0.5%
submarine telecoms revenues	46.00	4.30	9.3%		
leisure boating revenues	25.00	2.60	10.4%		
shipbuilding	21.00	0.10	0.5%	0.23	1.1%
aquaculture production	14.70	0.25	1.7%	0.14	1.0%
R&D	12.70	0.64	5.0%		
port development	12.50	0.43	3.4%	0.36	2.9%
cruise industry	12.00	1.40	11.7%	0.62	5.2%
marine services	11.00	2.20	20.0%	0.95	8.6%
marine equipment	9.70	0.85	8.8%	0.80	8.2%
port management	8.80	0.53	6.0%	0.46	5.2%
leisure boats	6.40	0.62	9.7%	0.57	8.9%
ship repair	5.50	0.20	3.6%		
submarine cables	5.00	0.50	10.0%	0.40	8.0%
education & training	2.20	0.16	7.3%	0.02	0.9%
desalination	1.20	0.01	1.0%	0.01	1.0%
ocean survey	0.70	0.10	14.3%		
minerals	0.70	0.15	21.4%	0.06	8.9%
UUVs	0.60	0.15	25.0%		
marine IT	0.60	0.08	13.3%		
marine biotechnology	0.50				

Although some market sectors are very large (e.g. naval expenditure) in practice only small parts are accessible as export markets. Offshore oil & gas production refers to the value of the product and in this instance we show separately expenditure by the offshore oil & gas industry. Parts of the table shown blank are ones that do not readily lend themselves to analysis by export value.

Regional Segmentation

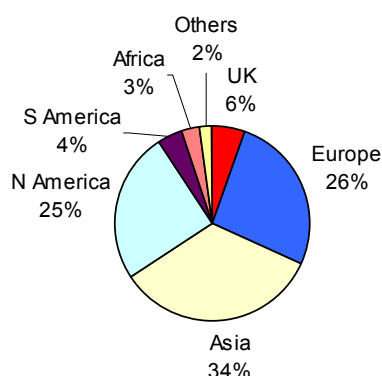


Figure 1-2: £498 billion marine markets by geographic segmentation

Although there is a danger of some double counting, when summed, the marine markets we have identified in this study totalled nearly £500 billion in 1999. The UK forms about 6% of this.

Export markets consist of three major regions; Europe and North America are similar in size forming 25% and 26% of the market. Asia forms the largest region at an estimated 34%, with much of this shipbuilding and shipping activity centred in S E Asia.

However, it is important to recognise that whilst the data relate to the location of expenditure, decisions are often made in other regions. For example, global shipbuilding is centred in S E Asia, but many decision-making owners are in UK/Europe. Although offshore oil activity is global, decision making is often in Europe and the US.

Table 1-2: Marine markets by geographic segmentation (£ billion 1999)

	UK	Europe	Asia	N America	S America	Africa	Others	World
shipping revenues	5.20	58.34	67.39	18.40	4.68	0.93	1.09	156.03
naval expenditure	4.50	30.00	50.00	55.00	4.50	2.00	4.00	150.00
oil & gas expenditure	7.68	7.72	11.71	9.55	8.43	10.73	0.67	56.48
leisure boating revenues	2.60	5.50	0.50	15.00	0.20		1.20	25.00
shipbuilding	0.10	7.10	13.20	0.60	0.04	0.06	0.60	21.70
R&D	0.64	3.00	3.70	5.00	0.20		0.15	12.70
port development	0.43	2.67	5.23	3.90	0.69	0.02	0.06	13.00
cruise industry	1.40	2.74	0.49	7.02		0.00	0.25	11.90
marine services	2.20	3.90	3.40	1.30	0.20			11.00
marine equipment	0.85	3.40	4.40	0.85	0.10		0.10	9.70
port management	0.53	1.68	3.14	2.87	0.38	0.10	0.10	8.80
leisure boats	0.62	1.36	0.02	4.12	0.03		0.25	6.40
ship repair	0.20	2.10	2.40	0.30	0.10	0.10	0.30	5.50
submarine cables	0.50	1.00	0.80	1.50	0.50	0.50	0.20	5.00
education & training	0.16	0.54	0.75	0.50	0.15		0.10	2.20
desalination		0.15				0.05	1.00	1.20
ship conversion	0.07	0.34	0.10	0.08	0.04	0.02	0.00	0.65
UUVs	0.15	0.07	0.10	0.10	0.07	0.05	0.05	0.60
marine IT	0.08	0.18	0.10	0.22	0.01		0.01	0.60
total identified markets	27.91	131.79	167.42	126.31	20.32	14.57	10.13	498.45

note: In this table we exclude oil & gas production, aquaculture production and minerals production as they are values of production, therefore not markets.

Growth Prospects

Table 1-3: Growth prospects by sector

<i>sector</i>	<i>1999 £bn</i>	<i>2004 £bn</i>	<i>Growth £ bn</i>	<i>Growth %</i>
shipping	156.00	169.00	13.00	8%
naval expenditure	150.00	150.00	0.00	0%
oil & gas expenditure	57.00	61.00	4.00	7%
submarine telecoms revenues	46.00	46.00	0.00	0%
leisure boating revenues	25.00	29.00	4.00	16%
shipbuilding	21.66	21.44	-0.20	-1%
aquaculture	14.70	18.00	3.30	22%
R&D	12.70	14.60	1.90	14%
port industry	8.80	12.90	4.10	47%
cruise industry	11.90	15.20	3.30	28%
marine services	10.00	11.00	1.00	10%
marine equipment	9.70	9.60	-0.10	-1%
ship repair	5.50	5.50	0.00	0%
ship conversion	0.65	0.65	0.00	0%
submarine cables	5.00	6.00	1.00	20%
education & training	2.20	2.20	0.00	0%
desalination	1.00	1.20	0.20	20%
renewable energy	0.01	0.20	0.20	1567%
ocean survey	0.70	1.00	0.30	43%
minerals	0.70	2.10	1.40	200%
UUVs	0.60	0.90	0.30	50%
marine IT	0.60	0.90	0.30	50%
marine biotechnology	0.50	1.50	1.00	200%

Marine sectors likely to experience the largest growth over the next five years are:

- marine transportation, (particularly the marine aspects of intermodal transport)
- the ports industries
- the leisure industries including leisure boating and the cruise business
- offshore oil & gas industry
- marine services in its many aspects
- submarine cables
- minerals (specifically offshore diamond extraction)
- marine biotechnology
- UUVs
- marine IT (but from a small base)
- renewable energy (from an even smaller base)

In other sectors, growth will also occur, but in specific aspects of the industry. For example naval expenditure is changing from bluewater to coastal, from personnel to hardware and systems. The value of shipbuilding, marine equipment, ship repair and conversion, may remain broadly similar, but expenditure will change across vessel types and equipment.

It is important to note that the period 2000-2002 is a cyclical low for world shipbuilding deliveries and the figures above obscure the recovery expected to occur in 2003 and 2004.

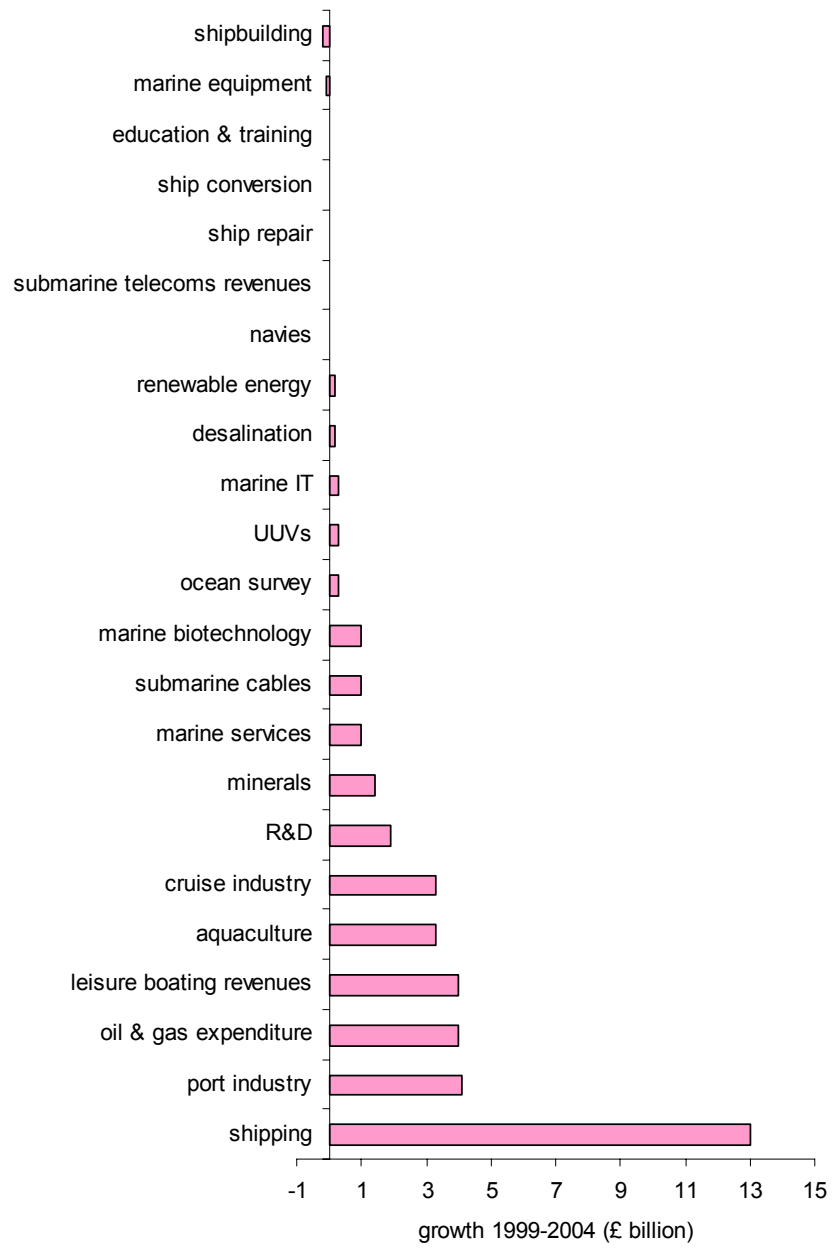
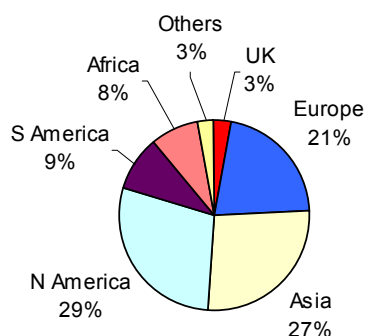


Figure 1-3: Growth prospects by sector 1999-2004 ((£ billion)

Growth Prospects by Region



We expect the strongest growth to occur in the three main regions and significant growth in Africa – mainly from offshore oil expenditure and in S America – in shipping and port development.

As shown in Table 1-4, naval expenditure is a special situation as high growth of £4 billion is expected in the US balanced by a fall in other regions. However, as this serves to over-emphasise N America, it has been removed from Figure 1-4.

Figure 1-4: Growth prospects by region

Table 1-4: Growth prospects by region

	UK	Europe	Asia	N America	S America	Africa	Others	World
shipping revenues	0.20	4.98	3.15	2.78	1.44	0.17	0.25	12.97
oil & gas expenditure	-1.20	-1.24	3.01	0.85	0.30	2.61		4.33
port development	0.31	0.14	1.79	0.34	1.35	0.09	0.10	4.12
leisure boating revenues	0.40	1.00	0.10	2.40			0.10	4.00
cruise industry	0.40	0.81	0.36	1.52	0.00	0.00	0.20	3.30
R&D	0.09	0.46	0.35	1.00		0.00	0.00	1.90
submarine cables	0.20	0.20	0.50	0.10				1.00
marine services	0.20	0.40	0.30	0.10				1.00
leisure boats	0.11	0.21	0.00	0.55			0.03	0.90
port management	0.02	0.10	0.05	0.02			0.01	0.19
naval expenditure	0.20	-1.20	-3.00	4.00				0.00
ship repair								0.00
ship conversion								0.00
education & training	0.02		-0.02					0.00
desalination		0.05				0.01	0.24	0.30
UUVs	0.08	0.03	0.05	0.05	0.04	0.03	0.03	0.30
marine IT	0.05	0.05	0.15	0.03	0.01		0.01	0.30
marine equ	0.15	-0.10	-0.15					-0.10
shipbuilding	0.03	0.22	-0.53	0.02	0.10	-0.04		-0.20
total identified growth	1.26	6.11	6.11	13.76	3.24	2.86	0.96	34.30

note: In this table we exclude oil & gas production, aquaculture production and minerals production as they are values of production, therefore not markets.

Conclusions

1. The marine industries are of considerable importance to the UK economy. The annual contribution to GDP varies between from 3 to 4% (mainly being due to the changes in oil prices). Offshore oil & gas alone has a sales value the same as the aerospace industry (£17 bn). Over the next decade the economic importance of the global marine industries will grow and offer increasing business opportunities in export markets.
2. The UK marine industries are a major employer providing an estimated 423,000 jobs. Even if the 68,800 associated with Royal Navy are excluded, the resulting total of 354,200 is larger than many other 'major' employers such as agriculture (297,000), the combined electricity, gas and water industries (136,000) and the aerospace industry (155,000).
3. Some of the UK's largest marine industries are not the most obvious. Submarine telecoms revenues and the provision of marine services are examples. The marine leisure industries, when combined, are major markets with instances of considerable UK success – leisure boating makes a greater contribution to the UK economy than naval shipbuilding!
4. In practice some of the sectors are far more important than the monetary values indicate – although UK marine graduate education only 'earns' £10 million from foreign students, its power to influence future decision-makers has a value orders of magnitude more.
5. Globalisation of world markets is increasing world trade and hence the demand for the marine industries. The downside is that UK manufacturing must increasingly compete with foreign low-cost locations and a logical result is that more UK companies will sub-contract work to them, reducing the UK marine manufacturing base. Therefore the trend towards use of low-cost locations is not a threat to UK-owned businesses who can adapt and use them, but to UK-based manufacturing jobs. Other work we have carried out clearly shows that marine industry customers in general do not *care* where products are manufactured as long as they meet fitness for purpose, are sold by a reputable supplier who will meet through-life support requirements, and are at the right price.
6. To maintain and grow its market share, the UK marine sector must increasingly rely on low-volume, high-tec, high-value products, revenues from the development and ownership of product designs and fundamental technology (which may be manufactured elsewhere), and the growth of the service industries. It is often within the specialised technical or commercial sectors that the UK has the largest market share and where the major opportunities lie.
7. The international competition for marine markets will increase and, to be successful, UK companies must be able to access the same level of government support that is evident amongst their European neighbours.
8. In order to increase its market share of basic industries such as shipbuilding, UK companies and Government have to work together to enable greater commercial innovation to be employed. Specific opportunities may include builders equity participation in ships, offering a complete logistics service rather than a ship, perhaps 'flatpack' shipbuilding rather than finished vessels, and cooperation between yards for multiple vessel orders.
9. The potential impact of changes to the UK fiscal regime could be considerable. In the Netherlands, a new taxation scheme began in 1996 (similar to ones operating in Germany, Greece and Norway) with the result that in the first three years there was an increase in numbers of ships and total tonnage by nearly 40% and employment by 5,000 to 28,000. A fourfold increase in shipbuilding orders has been reported.
10. A major threat to the UK marine industry is the future decline of its offshore oil &

gas production. The impact on many companies will be considerable and there is no overall programme in place to encourage supply and service companies to diversify into other non-oil industries.

11. Although the UK is a major financial centre, the support available to UK marine sector companies is far below that available to many competitors. The DTI have noted¹ that some countries have much stronger links between government and private financiers, and the US and Japan are notable for being highly effective at funding major projects.
12. Although great amounts of information are generated on the marine sectors, much is vague and inconsistent and it does not stand up to statistical examination, making it unusable for comparative commercial analysis. This severely inhibits overall understanding of the importance of the marine industries and acts as a factor in discouraging investment.
13. Defence expenditure has a major impact on the marine industry, both in direct terms and indirectly by enabling the development of new technologies and specific products. This is particularly the case in the US, where a number of commercial products have spun out of US navy contracts. In addition, US government purchases of products and services from small high-tech companies greatly underwrites their potential to compete in global markets.
14. Skill shortages are likely to become a growing limitation to UK marine business development. Access to top level graduates will become a function of the marine industries' ability to increase the public awareness of its activities and directly, or by implication, the career opportunities they offer.
15. Many of the large capital project sectors, such as oil & gas and submarine telecoms, are increasingly moving towards buying a complete integrated 'package' of the products and services necessary to design, engineer, procure, build and commission a project. The UK is disadvantaged by having few major companies that span whole marine sectors in order to provide these complete 'one-stop-shops'. One facet of this problem is that as small UK marine technology companies grow and seek larger parents they frequently come under the ownership of foreign companies who may not choose to continue their operations in the UK.
16. A further facet of integrated contracts is that the end-users (e.g. oil companies) are increasingly withdrawing from direct involvement in R&D; the main contractors who are now the new 'client' have never seen product development (hence R&D) as their role; and the small high-tech companies at the bottom of the food chain are increasingly starved of direct R&D funding.
17. In the offshore industry, many of the high-tech developments have come from France and Norway due to the patronage of state oil companies who are also noted for their ability to take their national contractors with them into new markets.
18. Many foreign marine organisations choose the UK from which to run their international operations drawing upon the UK's considerable base of marine expertise. For this to grow, the UK has to continue to be 'a good place to do business from', but this demands examination of factors beyond the scope of this report.
19. Our report shows that the UK marine industries, although of great economic importance are highly fragmented, without any single individual speaking on their behalf. The UK marine industries lacks a product champion, someone not only able to raise the profile of the sector in the city, with government and the general public – but also to promote it to young people as an exciting, high-technology, globe-spanning industry, with great future prospects.

¹ *A Review of Design & Engineering Contractors in the Oil & Gas Industry* DTI May 1998