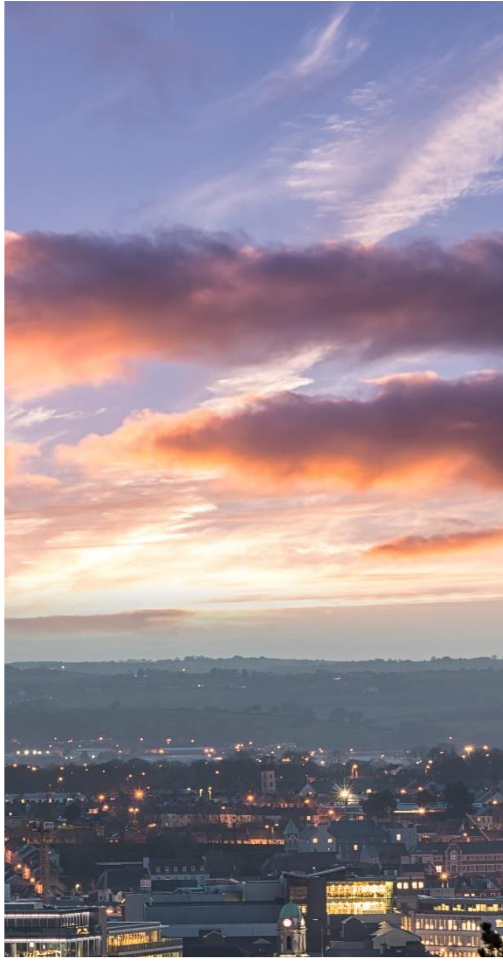
Cork's International Shipping and Services Centre

Exploring the Economic Opportunity and Ireland / Cork's Value Proposition



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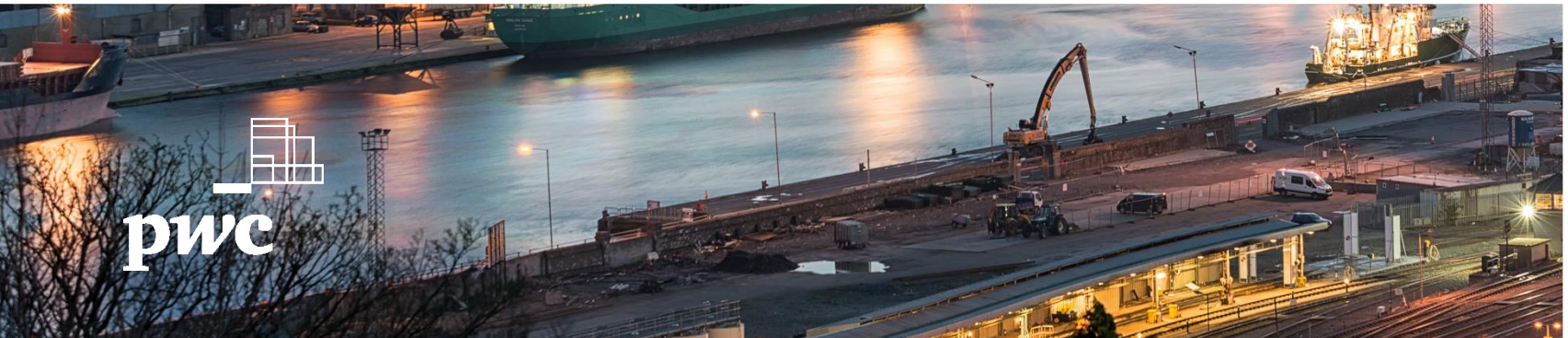

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Table of contents

This report, at the request of the members of the International Shipping and Services Centre, explores the opportunity for the development of an ISSC in Cork.

Members of the ISSC include:

BAM
Boland Developments
CBRE
Clarendon Properties
Cork Chamber
Cork City Council
KPMG
IDA
IMDO
Irish Mainport Holdings
Irish Navy
ISIF
JCD Group
Marina Commercial Park
McCarthy Developments
PwC
O'Callaghan Properties
Port of Cork
RDJ
Ronayne Shipping
Tower Developments
Cork County Council

01

Key Findings

The vision for Cork's ISSC is to be recognised as a global centre of excellence providing integrated shipping services to national and international companies.

This will be achieved by attracting global companies and also extending Ireland's existing enterprise sectors such as Finance, ICT, Energy and others into a range of new marine-related markets, to enable Ireland to reach its full growth potential.

The Opportunity

Ireland's 'blue economy' is outperforming the general economy. The available data indicates that the Irish marine sector remains largely underdeveloped with Ireland's ocean economy contributing approximately 1% of Ireland's GDP, a much lower proportion than in most other maritime countries. Ireland's relative under-performance in the ocean economy suggests there is significant opportunity for growth for the maritime sector as a whole.

Ireland's proposed International Shipping and Services Centre (ISSC) covers a broad range of services, including, but not limited to **Maritime Business Services, Shipping and Supply Chain Services and Marine Technology and Innovation Services.**
The proposed ISSC has the potential to create a hub and cluster in which these mutually supportive activities take place.

The establishment of an ISSC will enable Ireland to build upon and add value to its existing ecosystem of expertise across Shipping Services, Financial Services, Professional Services, Knowledge and Innovation Services, ICT, etc. Should Ireland be as successful as the identified benchmarks, the **potential Direct Economic Impact** of the **ISSC's Maritime Business Services element** on employment in Ireland is estimated to be in the range of **830-1,300 FTEs** against a current number of 342 FTEs or an additional 490-960 FTEs.

Ireland has become the global technology hub of choice when it comes to attracting the strategic business activities of ICT companies. Utilizing its existing ICT expertise and ecosystem, Ireland can place itself at the forefront of marine technological innovations. The potential **Direct Economic Impact** of the **ISSC's Technology and Innovation Services element** on employment in Ireland is estimated to be **1,970 FTEs** against a current number of 1,149 FTEs or an additional 820 FTEs.

The proposed ISSC is supportive of the objectives of Government policy and in particular Project Ireland 2040. Cork already performs well as a major urban centre in Ireland and the City has positioned itself as an emerging medium-sized European centre of growth and innovation. As acknowledged in Project Ireland 2040, building on this potential is critical to further enhancing Ireland's metropolitan profile**. The proposed ISSC furthers the potential for success.**

ISSC – Projected employment creation potential

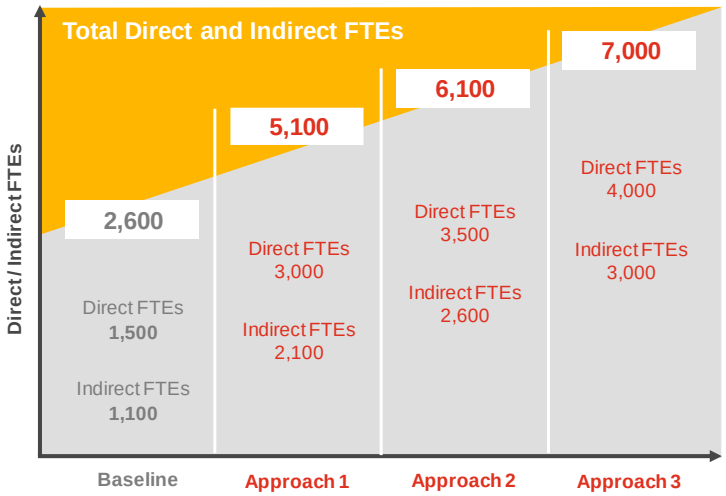
Baseline: A review of the existing employment across Maritime Business Services and Marine Technology and Innovation Services, as detailed in this report, indicates a baseline of 2,600 FTEs (1,500 Direct FTEs and 1,100 Indirect FTEs).

Research is required to baseline employment in Shipping and Supply Chain Services and to forecast future employment growth.

Projected employment creation potential: An analysis of the Maritime Business Service and Technology and Innovation sectors, as detailed in this report, indicates that the proposed ISSC could support between 5,100 FTEs (3,000 Direct and 2,100 Indirect) and 7,000 FTEs (4,000 Direct and 3,000 Indirect) by 2030.

These figures have been considered by the members of the ISSC and an overall range of 5,100 FTEs (+ 2,500 FTEs) to 7,000 FTEs (+4,400 FTEs) is considered achievable. As a centre of excellence, Cork would look to attract the majority of these FTEs.

Estimated employment potential of the proposed ISSC



The ISSC will be successful in attracting companies because…

Ireland's Value Proposition and Cork's added Value Proposition

As an FDI location, Ireland is tried and tested…

Ireland offers a stable, supportive and fast growing economy. Ireland has shown itself to be the right place at the right time and a leading location benchmarked against global competitiveness indicators.

Importantly, Ireland has a favourable tax regime reflecting a 12.5% corporate tax rate combined with a tonnage tax regime, accelerated tax depreciation for long life assets and a wide high quality tax treaty network. Also, Ireland has a highly skilled workforce.

From a maritime perspective, investors are looking to FDI type indicators which reflect both attractiveness and competitiveness...

Against competing locations in Europe including the UK, Norway, Germany and further afield in Singapore and Hong Kong Ireland scores well across a range of indicators.

Brexit provides a real opportunity…

Already, a number of insurers have moved their operations to Ireland. The British Banking Authority envisages 1/3rd of UK financial services jobs migrating to 27 EU member states.

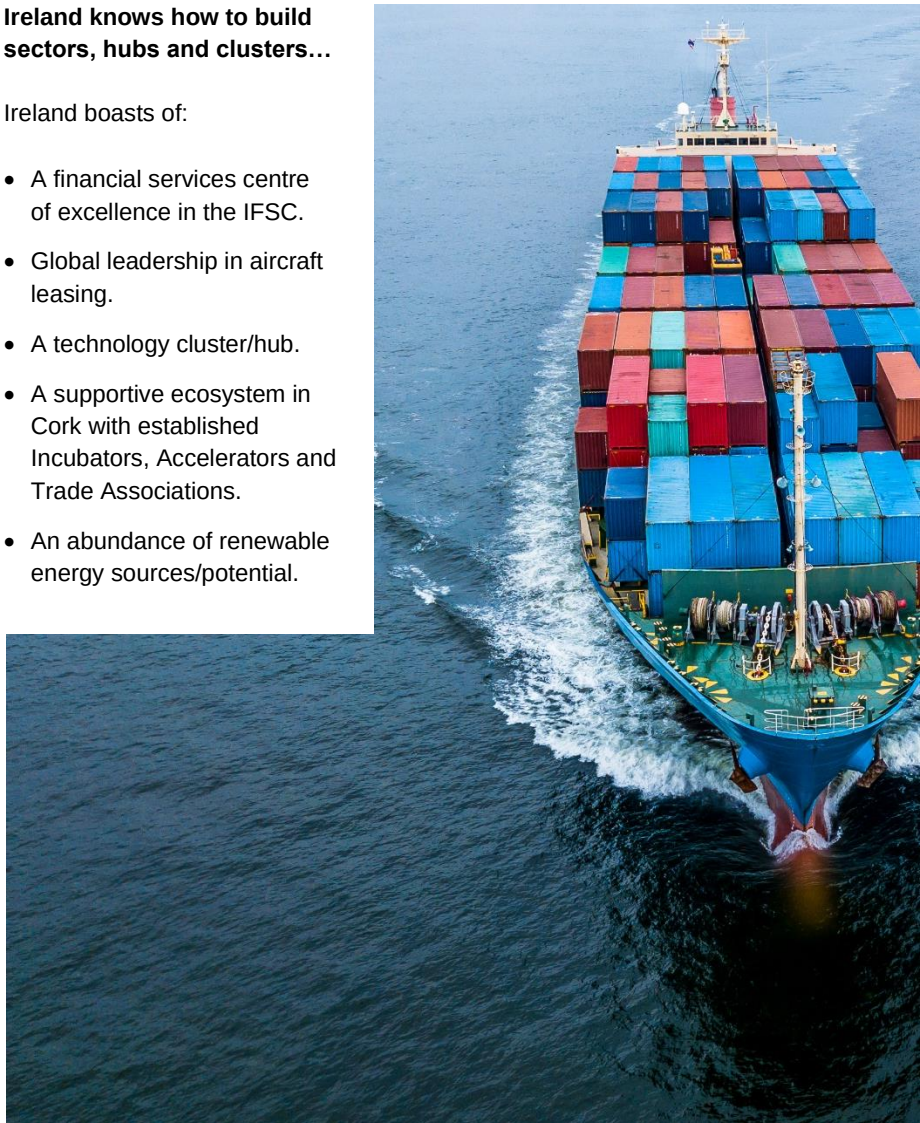
Cork's particular advantages…

- A long maritime history.
- A city and county on the rise – identified by the government and in national plans as strategic and to benefit from infrastructure funding.
- A strong FDI track record.
- Strong talent pool with 35,000 third level students with supporting research culture and strengths.
- Favourable employer costs, both in terms of salary and office accommodation costs.
- Significant cost of living and quality of life advantages.
- A connected city from a physical and communications perspective.

Ireland knows how to build sectors, hubs and clusters…

Ireland boasts of:

- A financial services centre of excellence in the IFSC.
- Global leadership in aircraft leasing.
- A technology cluster/hub.
- A supportive ecosystem in Cork with established Incubators, Accelerators and Trade Associations.
- An abundance of renewable energy sources/potential.



02

International Shipping and Services Centre

The vision for Cork's ISSC is to be recognised as a global centre of excellence providing integrated shipping services to national and international companies.

This will be achieved by attracting global companies and also extending Ireland's existing enterprise sectors such as Finance, ICT, Energy and others into a range of new marine-related markets, to enable Ireland to reach its full growth potential.

Ireland as a location for International Shipping Services…

Defining the ISSC

Industrial clustering is particularly pronounced in the maritime industry where markets are global and resources are mobile. Maritime companies have become more willing to move activities to the most attractive locations and take advantage of localization advantages in different countries.

Ireland's proposed International Shipping and Services Centre (ISSC) covers a broad range of services, which may include:

The proposed ISSC has the potential to…

- Create a hub in which these mutually supportive activities take place.
- Encourage shipping companies and ancillary shipping service providers to move their operations to Ireland, bringing high-paid, high value jobs with them.
- Lift Ireland's international standing and reputation as a maritime nation.
- Raise the profile of Cork as a centre of maritime services; by encouraging companies to reside in the same geographic area and possibly the same building, which would create a visible presence.
- Increase the awareness of the investment potential that exists in Ireland's ocean economy and shipping services generally.
- Complement the success Ireland has had as a financial services centre of excellence and an international aviation hub.
- Present synergistic opportunities for the maritime sector and other sectors such as ICT.
- Help to ensure Ireland realises the targets set in the Harnessing Our Ocean Wealth strategy published by the Irish government in 2012.
- Allow Ireland to compete with other international maritime centres such as London, Hamburg and Singapore.

Support for the ISSC

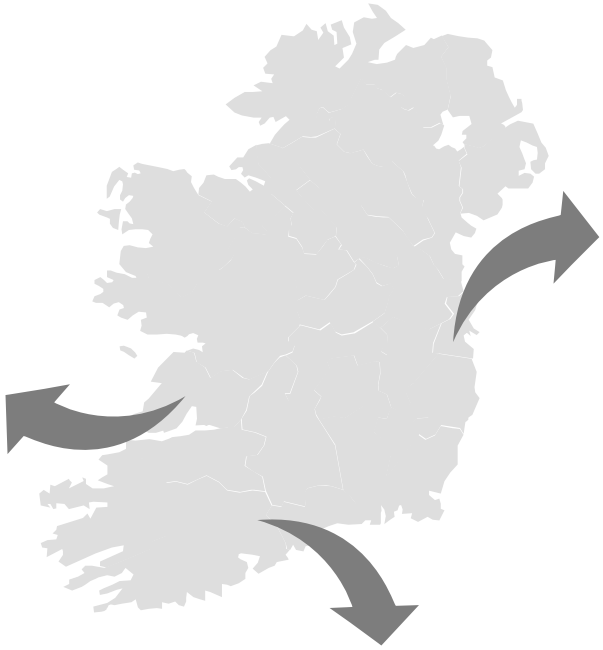
The ISSC is supported by state development agencies, such as the Irish Maritime Development Office, the Industrial Development Authority and Enterprise Ireland, and is welcomed by the Irish Government as a flagship project that will position Ireland as a hub for international shipping services. From a Cork Inc. perspective, the ISSC has strong local support from the Port of Cork, Cork City Council, Cork County Council, NMCI and Cork Chamber, amongst others.

Ireland's existing marine landscape…

The establishment of an ISSC will enable Ireland to build upon and add value to its existing ecosystem of expertise across Shipping Services, Financial Services, Professional Services, Knowledge and Innovation Services, ICT, etc. Below we present an illustrative snap shot of some of the maritime orientated companies already based in Ireland…

Shipping & Supply Chain Services

Ardmore Shipping
Irish Mainport Holdings
Leeside Shipping Ltd
DSG Doyle Shipping Group
d'Amico
Maersk
Arklow Shipping
Samskip
Jenkinson Logistics
Celtic Shipping Agencies
Irish Ferries
Stena Line
P&O Ferries
Brittany Ferries
CLdN
Seatruck



Marine Technology & Innovation Services

SEMRU
NCSR National Centre for Sensor Research
MaREI Centre for Marine and Renewable Energy
LiR National Ocean Test Facility
Marine Institute
imerc
Johnson Controls tyco
Tyndall National Institute
intel
Microsoft
Cyber Ireland
Insight Centre for Data Analytics
ICS
SAP
DELL EMC
Nimbus Research Centre
Nautilus Data Technologies
Siemens

Maritime Business Services

pwc
Arthur Cox
J.P.Morgan
Dillon Eustace
Standard Club
KPMG
North
Moore Stephens
Danske Bank
Barclays
Aon Empower Results
Campbell Johnston Clark Marine Law
Zurich
Aviva
Allianz
Standard Chartered
AIG
HSBC
Bank of America Merrill Lynch
citibank
NMCI

03

The Opportunity

What is the opportunity for Ireland?

03a

Identifying the Opportunity

Ireland's ocean economy is worth an estimated €5.7 billion in turnover…

Ireland's 'blue economy' is outperforming the general economy…

World Ocean Economy

Recent research on the ocean economy provides an overall frame of reference as to the potential size of the ocean economy. Within this, sits the maritime sector and related services.

The OECD's flagship report on The Ocean Economy in 2030 estimates that the ocean's economy's value in 2010 was USD 1.5 trillion or 2.5% of the world gross value added. By 2030, on a "business as usual" basis the contribution of the ocean economy could more than double to over USD 3 trillion, supporting close to 40 million full-time jobs.

Ireland's Ocean Economy

The Socio-Economic Research Unit (Semru) in NUIG has sized the 2016 value of Ireland's Ocean Economy as follows:

Table 1: The Irish Ocean Economy – Key Figures 2016

Key figures *Direct Impact*	**Total**	**Established Industries (including shipping & maritime transport)**	**Emerging Industries (including marine commerce)**
Gross value added	€1.8bn	€1,638.1m	€157.48m
% GDP	0.94%		
Turnover	€5.7bn	€5,329.47m	€383.02m
Employment (FTEs)	30,176	28,231	1,945

Source: Semru, Ireland's Ocean Economy 2016
Note: Gross values added (GVA) is a measure of economic output.

The turnover of the ocean economy was estimated at €5.7 billion. The direct economic gross value was worth €1.8 billion or approximately 0.9% of GDP with employment of 30,000 FTEs. The indirect GVA generated from ocean related activity in Ireland in 2016 was estimated at €1.57 billion, with a total GVA (direct and indirect) of €3.37 billion, which represents 1.7% of GDP.

The **Established Marine Industries** in 2016 had a turnover of €5.3 billion and provided employment of 28,231 FTEs. This sector includes shipping and maritime transport, tourism and leisure in marine and coastal areas, international cruise, sea fisheries, marine aquaculture, seafood processing, oil and gas exploration and production, marine manufacturing, construction and engineering and marine retail services.

The **Emerging Marine Industries** in 2016 had a turnover of €383 million and provided employment to 1,945 FTEs representing 7% of the turnover and 6% of employment in Ireland's ocean economy. Emerging industries refer to those that are still at a relatively early stage of development or growth, and are primarily R&D intensive and/or use the latest innovative technology in their pursuit of economic growth. Ireland's ocean economy includes a number of emerging industries with growth potential. It includes advanced marine technology products and services, marine commerce, marine biotechnology and bio-products and marine renewable energy.

Semru has noted that **Ireland's 'blue economy' is outperforming the general economy** - estimates suggest that GVA growth rates in Ireland's ocean economy for the 2014-2016 period are approximately 20%, which is above the recently released growth trends from the CSO that show an increase of 9% in Ireland's GDP for the same period.

Ireland's ocean economy contributes approximately 1% of Ireland's GDP, a much lower proportion than in most other maritime countries...

International Comparison

Although direct comparisons between Ireland's ocean economy and those of other countries are difficult, the available data indicates that the Irish marine sector remains largely underdeveloped. International data compiled by Semru shows that ocean economy contributes approximately 1% of Ireland's GDP, a much lower proportion than in most other maritime countries.

Table 2: International Comparison – Ocean Economy*

Country	Year	Direct Ocean GDP (€ billions)	% National GDP	% National Employment
USA	2013	262.28	2.2%	2.2%
Canada	2006	12.42	1.2%	1.1%
Iceland	2010	0.88	10.2%	5.1%
South Korea	2014	30.35	3.0%	2.8%
China	2016	571	5.8%	4.7%
United Kingdom	2006	67.62	4.2%	3.0%
New Zealand	2013	2.48	1.9%	1.3%
France	2013	35.5	1.7%	1.7%
Ireland	2016	1.8	0.9%	1.5%
Australia	2014	28.52	2.7%	2.1%
Average			3.4%	2.6%
Range			0.9% - 10.2%	1.1% - 5.1%

Source: Semru, Ireland's Ocean Economy 2016

* The reader is referred to the source report, as the definitions used are not always directly comparable.

What do we mean by Ireland's Ocean Wealth?

Ireland's coastline, inshore and offshore waters…

- Contain some of the largest and most valuable fisheries resource in Europe.
- Are the western gateway for shipping to Europe's busiest seaports.
- Are an ideal location for finfish, shellfish and seaweed aquaculture.
- Are among the richest and most accessible renewable energy (wind, wave and tidal) resources in the world.
- Contain significant oil and gas resource potential as evidenced by recent discoveries and ongoing research.
- Provides opportunities to develop new products and services.
- Offer spectacular tourism and leisure opportunities and a rich maritime culture and heritage.
- Support a rich and diverse range of ecosystems, habitats and species and unique land and seascapes.
- Contribute to our citizen's wellbeing, health and quality of life.

Source: Harnessing Our Ocean Wealth, An Integrated Marine Plan for Ireland, 2012

Ireland's relative under-performance in the ocean economy suggests there is significant opportunity for growth

Maritime Business Services

Our research has focused on those cities and countries, identified through research and discussion, which Ireland must seek to emulate if it is to be recognised. Key countries (and cities) include:

Table 3: Benchmark Countries

Country	City
Germany	Hamburg
Ireland	Cork
Norway	Oslo
Netherlands	Rotterdam
Singapore	Singapore
United Kingdom	London
Hong Kong SAR, China	Hong Kong

Source: PwC

Data presented in Table 4 overleaf for the selected benchmark countries indicates that at both a maritime and maritime business services level, there is a significant opportunity. The maritime sector in Singapore accounts for 7% of GDP. This compares with 0.9% of GDP for Ireland's ocean economy. While separate data is not available for maritime services, Singapore is recognised as a leader in the provision of professional services and of finance to the maritime industry.

The maritime business services definition in the UK and Hong Kong based on our source material is broadly similar to the Irish view of business services, which could be part of any Shipping Services Centre. As noted in the definition of services, the IMDO has defined the services sector broadly and also includes shipping companies, national and international.

Interesting Statistics

Over 90,000 commercial vessels operate globally and need to be served.

90% of world trade goes by sea.

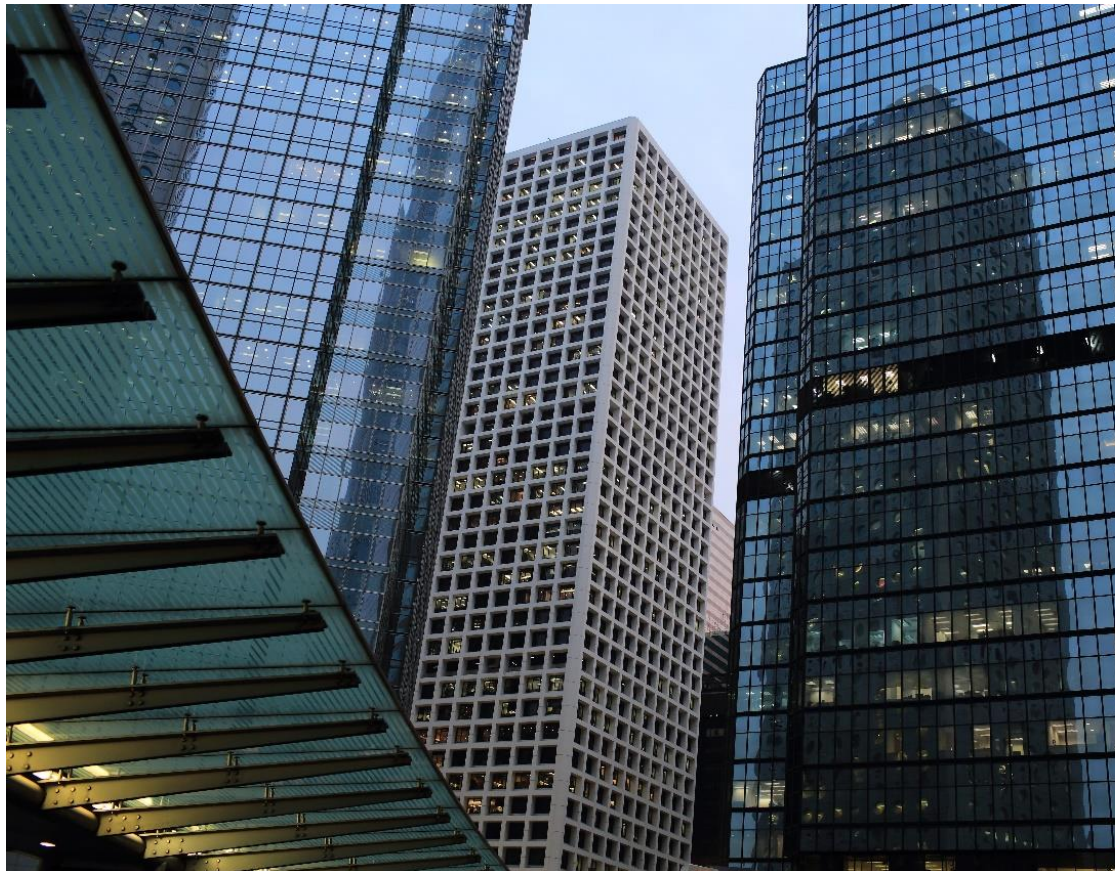


Table 4: Maritime Sector and Maritime Business Services – how does Ireland compare?

Country	Ireland		United Kingdom		Norway		Hong Kong		Singapore	Netherland
Sector	**Ocean Economy**	**Maritime Commerce**	**Maritime Sector**	**Maritime Business Services**	**Maritime Industry**	**Services**	**Maritime and Port Industry**	**Maritime Business Services**	**Maritime Industry**	**Maritime Cluster**
Year	2016	2016	2015	2015	2016	2016	2016	2016	2016	2015
Population (OECD, GovHK Singstat) (m)	4.6		63.7		5.1		7.4		5.6	17.08 (2016)
Direct										
Turnover (bn.)	€5.71	€0.14	€54.59	€6.14	€5.81	€1.57				
GVA (bn.)	€1.80	€0.42	€19.79	£2.73	€1.79	€0.30	€3.13	€0.43		€18.7
Employment	30,000	342	185,700	11,500	14,900	3,313	85,720	4,080	170,000	165,000
% GDP	0.9%		c. 0.9%				1.2%		7%	3.5%

Source:

- Ireland - Ireland's Ocean Economy, Semru 2016
- United Kingdom - The economic contribution of the UK Maritime sector, A report for Maritime UK, Cebr 2015
- Norway - GCE BLUE MARITIME 2017 - GLOBAL PERFORMANCE BENCHMARK, Menon Economics
- Hong Kong SAR - Study on the Economic Contribution of Maritime and Port Industry in 2016, Transport and Housing Bureau and
- GovHK website, accessed August 2018
- Singapore - Maritime Singapore website and Department of Statistics Singapore website, accessed August 2018
- Netherlands - THE NETHERLANDS Home to leading maritime companies, Ministry of Infrastructure and the Environment 2015

Note: All non-Euro currencies have been converted to Euro using time appropriate historic rates from XE.com

Direct employment refers to those employed by the maritime sector and maritime services sector itself. Enterprises in other sectors supply services to the companies in the sector which generate employment in these supplying companies. This employment is described as indirect employment.

GVA measures the contribution to the economy and can also be broken down into direct and indirect.

The UK government has made technological innovation a key element of its newly published Maritime 2050 Strategy which indicates an opportunity for Ireland in the technology space

Marine Technology and Innovation Services

The UK Government's Maritime 2050 Strategy, published in January 2019, sets out a number of strategic ambitions for the UK's Maritime sector with one of the key themes being technological innovation:

Maritime 2050 will strengthen our reputation for maritime innovation, maximising benefits to the UK from new maritime technology through our world leading universities, maritime small and medium enterprises (SMEs) and global companies.

The UK's Maritime 2050 Strategy recognises the economic potential of maritime innovations and it makes clear that the UK is seeking a leading role in emerging maritime technology.

As an established global technology and innovation hub, Ireland is well placed to be an early mover in maritime technological innovation. With the global economy set to double in value to €3trn by 2030 (OECD), a clear opportunity exists for Ireland to leverage its existing capabilities in ICT, knowledge and innovation and ensure it capitalises on this economic opportunity.

03b

Sizing the Opportunity

Estimating the potential direct economic impact of the ISSC on employment…

Estimating the potential direct economic impact of the ISSC on employment…

Approach taken in this report

The potential Direct Economic Impact of the ISSC on employment is explored in this section using a number of approaches as listed below.

1. Analysis of the 3 service areas as shown across estimating, based on available data, the overall direct and indirect employment impact.

2. Using existing research from the 2015 report by the Expert Group on Future Skills Needs.

3. A macro calculation based on an expected share of the Harvesting Our Ocean Wealth (HOOW) target to increase the value of Ireland's ocean economy from 0.9% to 2.4% of GDP by 2030.

Maritime Business Services

Approach 1

Maritime Business Services in Ireland

The Maritime Business Services industry comprises a variety of high-value activities, including but not limited to, shipbroking, legal, insurance, consultancy, accountancy and financial services. Ireland is a highly sought after location for the delivery of global Business Services, capable of providing the business services and expertise required by shipping companies to successfully compete in international markets.

The definition of Maritime Business Services set out in this report seeks to capture the full range of business activities required by shipping companies and is largely aligned with the Cebr UK definition of Maritime Business Services. However, there is limited economic data available for this sector in Ireland. This report relies on the most recent Semru available data for Marine Commerce.

Marine Commerce, as defined by Semru, refers to legal services, financial services, insurance and ship surveying. In this sector companies provide services across a range of marine categories, primarily, shipping and maritime transport, tourism and leisure, fisheries and aquaculture as well as offshore energy. The majority of these companies are large international firms, who have marine-related divisions. It should be noted that this definition is narrower than the definition of Maritime Business Services set out in this report.

An estimate of the potential Direct Economic Impact of Maritime Business Services in Ireland

The turnover generated by Marine Commerce in 2016 was €141 million. GVA for the same period was €42 million in the same period, while employment increased by 6% to 342 FTE over the period 2014 to 2016.

The UK and Hong Kong have been selected as benchmarks to estimate the potential Direct Economic Impact of Maritime Business Services in Ireland. Both are well developed in Maritime Business Services, one close to home and one in the large Asian Pacific market and for which we have data. The potential Direct Economic Impact of Maritime Business Services sold to these shipping companies in indicative terms is estimated as follows:

Table 6: Estimating the potential Direct Economic Impact of Maritime Business Services in Ireland

Direct Impact	Employ. (FTEs/%)	Source
Ireland's Ocean Economy (2016)	30,176	Semru, NUIG
Ireland's Maritime Sector as a % of Ireland's Ocean Economy (2016) (Note 1)	x 28%	Semru, NUIG
Irish Maritime Sector	= 8,450	
Using the UK as a benchmark…		
UK MBS as a % of UK's Maritime Sector (Note 2)	x 10.3%	Cebr Report, 2017
Potential Direct Economic Impact of Irish MBS - Method 1	= 870	PwC estimate
Potential Direct Economic Impact of Irish MBS - Method 2 - See Note 3	790	PwC estimate
Average of the two UK estimates	830	Average
Using Hong Kong as a benchmark…		
Potential Direct Employment from Irish MBS - Method 2 - See Note 3	1,300 **	PwC estimate

* Estimated Employment numbers have been rounded to the nearest ten.
** The original figure of 2,330 has been adapted to exclude the impact of shipbuilding and repair

Notes:
(1) Ireland's Maritime Sector is taken to include 'Maritime Transport Services' and 'Other Sectors' as defined in the Semru report. It excludes 'Tourism & Leisure in Marine & Coastal' and 'Seafood'.
(2) Maritime Business Services is defined in the Cebr report (UK) as including: Shipbroking and other miscellaneous transport services; Maritime insurance, finance and legal services; Ship surveying and classification; Maritime Education; Maritime Consultancy and Maritime Accountancy.
(3) Applies the proportion of total employment in the relevant comparator country working in Maritime Business Services to Irish employment.

Approach 1

Traditionally, the United Kingdom has been very successful in the maritime industry albeit London is no longer leading the way as a maritime capital (ranked 5th overall by Menon Economics, 2017). Other cities such as Hong Kong and Singapore have come to the fore. Employment estimates for Maritime Business Services based on UK indicators range from 790 to 870 service employment FTEs or an average of 830. An estimate of 1,300 FTEs was calculated using Hong Kong employment data. Hong Kong has been particularly successful and indicates at the upper end, what has been achieved.

A look at the potential Indirect Economic Impact of Maritime Business Services in Ireland

Further indirect economic benefits could also result as shown in Table 7 below. The indirect impact is calculated by applying Semru's GVA Maritime Commerce multiplier of 1.44 to the direct FTE numbers e.g. applying the multiplier to 342 FTEs (direct) gives an estimate of 492 FTEs, which includes both direct and indirect FTEs.

Applying the Semru Maritime Commerce multiplier to our estimated direct employment figures of 830-1,300, the total direct and indirect potential for the Maritime Business Services is estimated to be between 1,200-1,870 FTEs.

It is worth noting that Maritime Business Services jobs are higher value than other jobs in the sector. A study by the Cebr for Maritime UK published in September 2017, "The economic contribution of the Maritime sector in Scotland", estimated that direct GVA per employee for maritime business service is £164,740 or 80% higher than the average for the Scottish maritime sector.

Table 7: Potential Direct and Indirect Economic Impact of Maritime Business Services in Ireland

	Direct Employ. (FTEs)	Indirect Employ. (FTEs)	Total Employ. (FTEs)	Source
Actual Size of Ireland's Maritime Commerce Sector (2016)	342	150	490	Direct – Semru Indirect – PwC estimate
Potential Direct Economic Impact of Irish MBS – per UK average benchmark estimate	830	370	1,200	PwC estimate
Potential Direct Economic Impact of Irish MBS – per Hong Kong benchmark estimate	1,300	570	1,870	PwC estimate

Note: Estimated Employment numbers have been rounded to the nearest ten.

Shipping and Supply Chain Services

Approach 1

Shipping and Supply Chain Services in Ireland

Ireland is already home to a number of international shipping & logistics companies…

One of the world's leading maritime transport groups, d'Amico's core business is the management and operation of dry cargo vessels and clean product tankers and the provision of international shipping services. d'Amico established offices in Ireland in 2004 and have quadrupled in size since their initial set up, running commercial and financial functions from Ireland.

Cork-based Ardmore Shipping Corporation ("Ardmore") commenced operations in 2010 and is engaged in the ownership and operation of product and chemical tankers in worldwide trade. Ardmore provides shipping services to customers through voyage charters, commercial pools and time charters.

Doyle Shipping Group (DSG) is a leading shipping and logistics company providing a range of marine services including stevedoring, ships agency, chartering, project cargo, terminal management, warehousing, forwarding, ship repair, tug hire and passenger ferries.

Established in Dublin in 1975, Jenkinson Logistics serve customers ranging from small Irish companies to MNC's and their services range from moving a pallet across the Irish Sea to more complex solutions involving movement by Air, Ocean and Road, advice on regulatory requirements and provision of clear, concise reporting.

The location of ship ownership and management in Ireland not only brings significant direct benefits to the economy but it also supports a wide network of Irish maritime business.

For the purposes of this report, "Shipping and Supply Chain Services" is taken to include ship ownership and management services, ship agency and chartering services, and fulfilment logistics services.

Robust baseline economic data (e.g. employment or gross value added) is not published or available for this sector. Therefore, it has not been possible to estimate the current and potential direct economic impact of Shipping and Supply Chain Services.

As a result, the overall employment estimate for the ISSC based on approach 1 in this report will underestimate current employment and potentially future employment too.

Marine Technology and Innovation Services

Approach 1

Marine Technology and Innovation Services in Ireland

The application of technology is seen in many sectors, including marine. According to the Global Marine Technology Trends 2030 report released by Lloyd's Register, the marine technology of 2030 will combine developments from multiple scientific disciplines in ways that could transform the design, construction and operation of commercial ships through the integration of people, software and hardware.

Ireland has become the global technology hub of choice when it comes to attracting the strategic business activities of ICT companies. Utilizing its existing ICT expertise and ecosystem, Ireland can place itself at the forefront of marine technology. As highlighted in the National Marine Research & Innovation Strategy 2017–2021, Ireland's existing capabilities in ICT and engineering provide a solid foundation for marine technology markets in areas such as sensors, platforms, advanced materials, subsea communications, robotics, computer vision, simulation, observation, forecasting, informatics and modelling. By encouraging interaction between disciplines, the marine sector can benefit from Ireland's wider ICT / Innovation talent pool and infrastructure.

Similarly, Ireland has exemplary natural resources of offshore wind, tidal and wave energy that can be harnessed as clean sustainable and secure energy, meeting Europe's energy and climate change goals. However, beyond energy creation, greater enterprise and FDI opportunities exist for Ireland in the knowledge intensive, scientific and engineering sectors needed to harness these resources. (1)

An estimate of the potential Direct Economic Impact of Marine Technology and Innovation Services in Ireland

There is very limited economic data available on Marine Technology and Innovation Services. For the purposes of this report, the Semru defined Emerging Marine Industries of "Marine Advanced Technology Products and Services" and "Marine Renewable Energy" have been used to identify a potential baseline.

Advanced Marine Technology Products and Services (AMTPS)

The advanced marine technology products and services sector builds on Ireland's existing marine information and communication technology (ICT), science and engineering base developing new knowledge based products and services for global marine markets. It is an emerging sector consisting of over 150 small and medium sized enterprises (SMEs) and a number of multinational companies (MNCs) with core capabilities in diverse areas such as advanced sensing and communications, data management and informatics, marine robotics and artificial intelligence and materials science. These technologies support activity in a number of marine sectors such as oil and gas, shipping and maritime transport, fisheries and aquaculture and maritime safety, security and surveillance. They also underpin development in emerging sectors such as marine renewable energy, marine environmental monitoring and resource management.

The turnover generated by this sector in 2016 was €140 million, representing an increase in activity of 96% over the 5 year period between 2012 and 2016. Gross value added (GVA) which is an income indicator also increased by 57% to €61 million in the same period, while employment increased by 65% to 695 FTEs (Semru, Ireland's Ocean Economy, 2017).

Marine Renewable Energy (MRE)

The marine renewable energy sector in Ireland encompasses the generation of power from offshore wind and the development of technologies and energy devices utilising wave and tidal resources. The wave and tidal sectors are still mainly in the developmental stages globally, while the offshore wind sector is seeing considerable progress taking place at a European and global level.

The turnover generated by the sector in 2016 was €59 million, representing an increase in activity of 273% between 2012 and 2016. GVA increased by an estimated 340% to €38 million, while employment increased to 454 FTEs, an increase of 85% in the five year period from 2012-2016 (Semru, Ireland's Ocean Economy, 2017).

Combined, the direct employment in MRE and AMTPS in 2016 was 1,149 FTEs.

(1) Towards a Marine Research & Innovation Strategy 2021, Consultation Document

Semru notes the considerable growth potential in both AMTPS and MRE. If the AMTPS sector were to achieve the 2012-2016 recorded growth rate of 65% over the next 5-10 year period, this would equate to an increase in direct employment of 452 FTEs, increasing the overall total to 1,147 FTEs.

The 2017 Ireland's Ocean Economy Report developed by SEMRU provides a useful baseline for the current levels of employment in the marine renewable energy sector.

A recent Irish Ports Offshore Renewable Energy Services report (IPORES), projects an additional 370 direct FTEs within the area of operation and maintenance of offshore and renewable energy projects by 2030 in their baseline scenario.

Taking the SEMRU baseline figure of 454 FTEs and the recent IPORES baseline projections suggests a baseline increase to 824 FTEs by 2030.

Approach 1

Table 8: Estimating the potential Direct Economic Impact of Marine Technology and Innovation Services in Ireland

	Assumed baseline	Estimated Direct Employ. FTEs by 2030	Additionality
AMTPS	695	1,147	452
MRE	454	824	370
Total	**1,149**	**1,970***	**820***

* Rounded to the nearest 10.

A look at the potential Indirect Economic Impact of Marine Technology and Innovation Services in Ireland

Further indirect economic benefits would also result for this sector as estimated in Table 9 across. Applying the available Semru GVA multipliers for both the AMTPS and MRE sectors to our previously estimated direct employment figure of 1,971, the total direct and indirect potential for Maritime Technology and Innovation Services in Ireland is estimated to be c. 3,600 FTEs.

Approach 1

Table 9: Estimating the potential Indirect Economic Impact of Marine Technology and Innovation Services in Ireland

	Baseline			Estimate		
	Direct Employ. (FTEs)	Indirect Employ. (FTEs)	Direct & Indirect Employ. (FTEs)	Direct Employ. (FTEs)	Indirect Employ. (FTEs)	Direct & Indirect Employ. (FTEs)
AMTPS	695 [1]	716 [2]	**1,410***	1,147	1,183 [2]	2,330*
MRE	454 [1]	241 [3]	**700***	824	436 [3]	1,260*
Total	**1,149**	**957**	**2,110***	**1,971**	**1,620***	**3,590***

* Employment numbers have been rounded to the nearest ten.

1. Direct - SEMRU
2. Total Direct and Indirect is Direct FTE multiplied by 2.03 (Semru GVA multiplier for AMTPS)
3. Total Direct and Indirect is Direct FTE multiplied by 1.53 (Semru GVA multiplier for MRE)

Summary of Approach 1

Estimated Direct and Indirect Economic Impact of the ISSC

To summarise, having considered the service areas in which the proposed ISSC will operate, and notwithstanding the limitations of the available data and the extrapolation approach taken, it is estimated that an **additional 2,500 direct and indirect FTEs,** (particularly if Ireland performs as well as the benchmarks in the Maritime Business Services space) could be created on top of the **2,600 direct and indirect FTEs currently supported** nationally in the two pillars identified.

While it has not been possible to quantify the third pillar, this provides further support to the overall employment estimate as employment will also result in the third pillar, which has not been included in the overall estimate.

Cork as the centre of excellence (ISSC) would be well placed to deliver a high proportion of the additional jobs and also on any geographic relocation of services.

Overall, there is potential for approximately 5,100 direct and indirect jobs – 2,500 additional FTEs and 2,600 existing FTEs.

We recommend that research is conducted to baseline employment in Shipping and Supply Chain Services and to forecast future employment growth. Research is also required to refine employment growth projections in Marine Technology and Innovation Services.

Estimates provided in this report rely on existing baseline data. It is the case that Ireland and the ISSC plan to develop in new maritime technology and innovation areas as set out in this report. Growth in new areas will, a priori, be greater than historic growth applying to more traditional sectors. Also, we have not included any baseline data for Shipping and Supply Chain Services. Given the above, it is likely that overall estimated employment figures opposite underestimate the potential on offer here.

Table 10: Estimated breakdown of FTEs in the ISSC over the next 5-10 years

	Direct (FTEs)			Total Direct & Indirect (FTEs)		
	Assumed Baseline	**Potential Economic Impact (Estimate)**	**Additional FTEs supported**	**Assumed Baseline**	**Potential Economic Impact (Estimate)**	**Additional FTEs supported**
Maritime Business Services	342	830-1,300	490-960	490	1,200-1,870	710-1,380
Marine Technology and Innovation	1,149	1,970	820	2,110	3,590	1,480
Total (excluding Shipping & Supply Chain Services)	**c.1,500**	**c.3,000**	**c.1,500**	**c.2,600**	**c.5,100**	**c.2,500**

Other employment estimates

Approach 2: Existing Research

The Expert Group on Future Skills Needs (EGFSN) prepared a report "A Study of the Current and Future Skills Requirements of the Marine/Maritime Economy to 2020", April 2015, with employment estimates for the ISSC, as shown in Table 11. It is worth noting that the employment estimates below were based on the ISSC being established in Dublin, pre-dated Brexit and did consider or reflect on all possibilities arising in the new economy such as remote shipping and automation.

Table 11: Anticipated breakdown of jobs in the ISSC

Organisation Type	% of jobs	No. of jobs
Shipping companies	79	2,765
Other service companies	21	735
Total	**100**	**3,500**

Source: IMDO: Skills, Training & Educational Needs

Indirect employment would also arise under Approach 2. Applying the weighted average multiplier from Approach 1 of 1.75 equates to 2,600 indirect FTEs resulting in an estimated total of 6,100 direct and indirect FTEs.

Approach 3: A macro estimate based on the HOOW overarching target

Harnessing Our Ocean Wealth (HOOW) – An Integrated Marine Plan for Ireland, published in July 2012, set out an overarching target to increase the value of Ireland's ocean economy from 0.9% to 2.4% of GDP by 2030. Offering an alternative perspective, if the proposed ISSC were to get its share of the ocean economy targeted growth, and using the growth levels which would see the current percent of 0.9% grow to 2.4% of GDP as an indicator of potential employment growth for the ISSC, the current direct employment of c.1,500 would grow to 4,000.

Similarly, indirect employment would also arise under Approach 3. Applying the weighted average multiplier from Approach 1 again of 1.75 equates to 3,000 indirect FTEs resulting in a projected total of 7,000 direct and indirect FTEs.

Overall summary of employment potential of ISSC

Overall summary of employment potential of ISSC

Baseline

A review of the existing employment across Maritime Business Services and Marine Technology and Innovation Services, as detailed in this report, indicates a baseline of 2,600 FTEs (1,500 Direct FTEs and 1,100 Indirect FTEs).

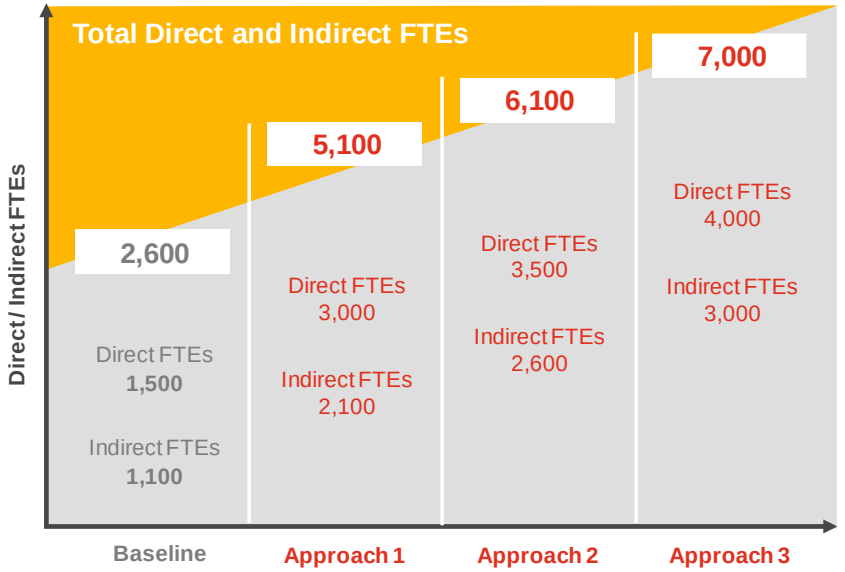
Research is required to baseline employment in Shipping and Supply Chain Services and to forecast future employment growth.

Projected employment creation potential

An analysis of the Maritime Business Service and Technology and Innovation sectors, as detailed in this report, indicates that the proposed ISSC could support between 5,100 FTEs (3,000 Direct and 2,100 Indirect) and 7,000 FTEs (4,000 Direct and 3,000 Indirect) by 2030.

These figures have been considered by the members of the ISSC and an overall range of 5,100 FTEs (+ 2,500 FTEs) to 7,000 FTEs (+4,400 FTEs) is considered achievable. As a centre of excellence, Cork would look to attract the majority of these FTEs.

Estimated employment potential of the proposed ISSC



04

The Value Proposition

Why will companies be attracted to Ireland / Cork?

04a

Ireland's Value Proposition

Ireland's opportunity to create an ISSC is grounded in the existing well established advantages which can transcend specific industries…

An excellent business climate...

Ireland, Right Place, Right Time

Ireland is a key global centre for international business and is a tried and tested location for foreign direct investment (FDI). Ireland's policy framework promotes an open and competitive business environment and the certainty of the corporate tax rate (12.5%) provides confidence to investors. A young, talented and adaptable domestic workforce, supported by the increasing international talent currently being attracted to Ireland, helps to ensure a continued supply of high-quality labour for companies.

Ireland is No. 1 in the world for:

No. 1 Labour productivity	No. 1 Attracting & retaining people	No. 1 Investment incentives
No. 1 Flexibility and adaptability of people	No. 1 Attitude towards globalisation	No. 1 National culture

Source: IMD Global Competitiveness Yearbook 2017

Tried and tested

The success of FDI is reflected in the large number of multinational corporations, who have established significant operations here. Ireland is home to many of the world's leading high-performance companies including Intel, Twitter, Pfizer, Citi, Huawei, Takeda, Fujitsu, Novartis and Trend Micro. The country is also positioning itself to become a world leader in the Internet of Things, Big Data, ICT Skills, Energy Efficiency, Health Innovation and Cloud Computing.

- 17/20 top global software companies
- 14/15 top medical tech companies
- 20/25 top financial services companies
- 10/10 top pharma companies
- 8/10 top industrial automation companies

Source: IDA Ireland

Business Environment

Ireland is a stable and fast-growing economy:

- ✓ The fastest growing economy in the Eurozone for the last four years (2014-2017).
- ✓ The second most competitive economy in the EU.
- ✓ The sixth most competitive in the world.

Source: IDA, IMD Global Competitiveness Yearbook 2017

A look through the maritime lens…

A recognised publication "The Leading Maritime Capitals of the World 2017" by Menon Economics produced the following rankings in its assessment of the maritime capitals of the world:

Table 12: The Leading Maritime Capitals of the World 2017, Menon Economics.

Rank	Shipping	Finance & Law	Attractiveness & Competitiveness	Overall Ranking
1	Singapore	London	Singapore	Singapore
2	Hamburg	Singapore	Oslo	Hamburg
3	Athens	New York	Copenhagen	Oslo
4	London	Tokyo	Hamburg	Shanghai
5	Honk Kong	Shanghai	Dubai	London

Menon Economics based their assessment of the "attractiveness and competitiveness" on a range of factors:

Table 13: "Attractiveness & competitiveness" Key Indicators.

Attractiveness & Competitiveness	Key Indicators	
World Bank	Ease of Doing Business	Burden of Custom Procedure Index
Transparency International	Corruption index	
Cornell University, INSEAD and The World Intellectual Property Organisation	Global Innovation Index	
Global Property Guide and Number	Price of 120 square metres apartment in City Centre	
Labour costs (additional to Menon Economics and suggested by PwC)	Average Hourly Labour Costs	Average Monthly Nominal Wage

Ireland's ranking based on the above indicators, as compared to key maritime competitors is presented in Table 14.

This comparison suggests Ireland is well positioned to compete with the main maritime locations. The average hourly labour costs compares favourably with competing European locations. Wages costs are also broadly similar in Singapore, albeit not in Hong Kong.

Table 14: "Attractiveness & competitiveness" Key Indicators – How does Ireland compare?

Country	Burden of customs procedure (Note 1)	Ease of Doing Business (Note 2)	Corruption Index (Note 3)	Global Innovation Index (Note 4)	Price of 120 Sq. m. apartment in City Centre (capital city prices) (Note 5)	Average hourly labour cost (2017) (Note 6)	Monthly nominal wage (2015) (Note 7)
Germany	5.3 (6)	20	12	9	€5,907	€34.00	€2,722
Ireland	5.4 (5)	17	19	10	€5,953	€30.97	€3,037
Norway	5.2 (7)	8	3 (Joint)	19	€8,281	€51.00	€4,858 (43,400 NOK)
Netherlands	5.8 (3)	32	8 (Joint)	2	€6,902	€34.77	€2,405
Singapore	6.3 (1)	2	6 (Joint)	5	€11,581 ($13,748)	-	€3,209 (4,892 SGD)
United Kingdom	5.5 (4)	7	8 (Joint)	4	€20,190	€25.68	€3,016 (£2,202)
Hong Kong SAR	6.0 (2)	5	13	14	€24,569		€1,606 (13,807 HKD)

Notes:

(1) World Bank 2018. Ranking within the group of 7 countries. World Development World Economic Forum (1=extremely inefficient to 7=extremely efficient).

(2) Word Bank "Doing Business Report" 2018. Data – June 2017 (190 countries considered)

(3) Corruption Perception Index 2017 - Transparency International (180 countries considered)

(4) Global Innovation Index 2018 (126 countries considered)

(5) Global Property Guide. Numbe0 – Ireland (Dublin) and Hong Kong - price per square metre in City Centre.

(6) Eurostat 2017. Provisional data.

(7) ILO 2016-17. OFX: NOK to EUR (yearly average), HKD to EUR (yearly average). Statista GBP to EUR (yearly average).

A favourable maritime tax regime...

Ireland's Favourable Shipping Tax Regime

Ireland boasts a very attractive tax regime for shipping operations known as the tonnage tax regime. It is designed to ensure that shipping businesses based in Ireland pay tax on a nominal profit which is based on the tonnage of a vessel as opposed to on actual profit generated by the business. When the tonnage tax regime is combined with Ireland's low corporate tax rate of 12.5%, the result is an extremely low effective rate of tax for shipping businesses located in Ireland. Maintenance of the Government's tonnage tax for shipping makes Ireland "very attractive" for business, said d'Amico chairman Paolo d'Amico (Source: Irish Times 2009).

Ireland's tonnage tax regime compares well with the tonnage tax regimes of UK, Netherlands, Germany, Norway, Denmark, Greece, Japan and US. In particular the following areas are what make the Irish regime attractive:

- The Irish tonnage tax is a nominal tax based on the tonnage of the vessel. Aligned with Ireland's corporate tax rate, the Irish tonnage tax is calculated at 12.5%.This results in a very low effective rate of tax.
- The Irish tonnage tax regime is flag blind. The Irish tonnage tax regime does not require a vessel to be placed on the Irish register of ships.
- There is no obligation to provide training berths under the Irish tonnage tax regime.
- There is an extremely wide definition of 'relevant shipping income' which is exempt from regular taxation and covered by the tonnage tax regime. Income from ship management services is also included in Ireland's regime but is excluded in other regimes. There is a broad difference in qualifying activities in the regimes with Ireland at the more favourable end of the spectrum.
- Under the Irish tonnage tax regime there is normally no exit charge where a company leaves the regime by ceasing to carry on shipping operations within the jurisdiction.

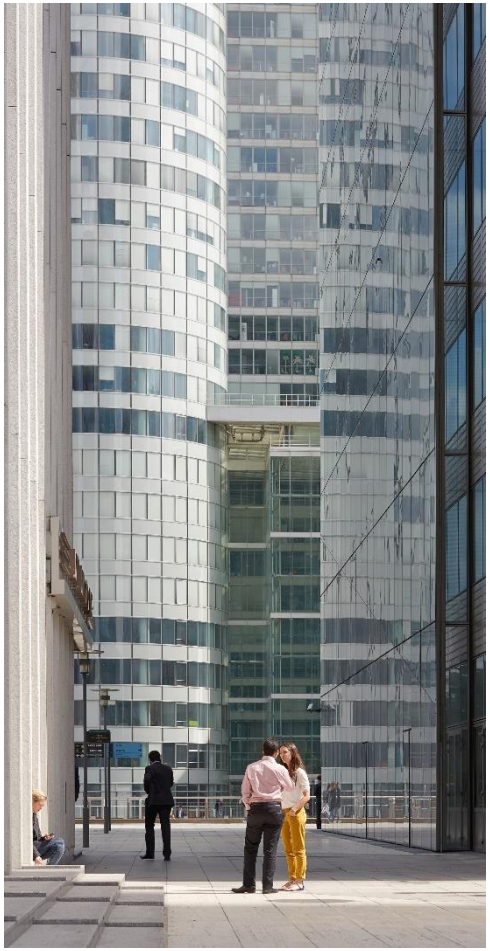
The other advantages of locating a shipping business in Ireland are:

- A standard tax rate of 12.5% on (non-tonnage tax) trading activities.
- Efficient finance and operating leasing operations possible, with accelerated tax depreciation over 8 years.
- Onshore pooling of tax credits on foreign dividends.
- Wide and high quality treaty network with exemptions for rentals from charter of ships typical.
- Broad domestic based exemptions from withholding taxes facilitating tax efficient inbound and outbound flows of capital and income.
- Attractive R&D regime and other OECD approved tax based incentives for innovation and development activities.
- Tax regime stability in the context of uncertainty for UK companies due to Brexit.

English Law is the preferred jurisdiction worldwide for commercial and shipping contracts. Ireland operates to the same common law as the UK. Much Irish legislation stems from either UK statutes or European Union directives or regulations.

Source: Irish Tonnage Tax Report, PwC

A favourable tax & funding regime...



Ireland's Other Favourable Tax Incentives

Ireland has been successful in attracting Pharmaceutical, Medical Technology and Biopharmaceutical manufacturing enterprises to Cork. It has done so through offering them a range of incentives such as:

- A 10 year rates moratorium on all accommodation.
- A Double Deduction of rental expenses from taxable income for qualifying tenant companies.
- Capital allowances of up to 100% for owner occupiers in the first year of trading.
- Certain capital allowances for commercial leasing.
- 100% write off of new equipment purchased by a company.
- A commitment from the State (ISIF) to assist in the provision of infrastructure to the Docklands areas to make development within them viable.

Ireland's Funding & Assistance Opportunities

The IDA has a number of funding options available to prospective FDI. The size of the grant will be dependent on the size of the company. Grants include:

- **Training Grants:** Available across the country to develop the competitive capabilities of companies already located in Ireland.
- **Research, Development & Innovation:** Companies can avail of financial incentives to carry out in-house R&D projects and collaborative projects with third-level institutes and industrial partners. There is also a 25% tax credit available for companies engaging in R&D.
- **Business Asset Grant:** IDA Ireland's Business Asset Grant supports client companies to replace old equipment with new or acquire new technology upgrades. The purpose is to help clients increase their capacity and capability to deliver to new and existing markets.
- **Competitiveness Benchmark:** A tool to measure a company's performance against national and international competition; providing a springboard to improve competitiveness.
- **International Marketing Programme:** Assistance with international marketing expertise.

A highly skilled workforce...

Ireland, a Global Centre for Talent

- Ireland has one of the most educated workforces in the world. The share of 25-34 year olds in Ireland with a third level qualification is 52%, compared to an OECD average of 43%.
- Ireland has the youngest population in Europe with one third under 25 years of age and almost half the population under the age of 34.
- Ireland's population is forecast to increase by almost one million people to 5.75 million in 2040.

Source: OECD Education at a Glance, CSO Census 2016, ESRI/National Planning Framework 2040

Ireland's education system ranks in **the top ten globally for…**

Quality of the Education System	University Education that meets the needs of a competitive economy
Knowledge transfer between universities and companies	

Source: WEF Global Competitiveness Report 2016-2017, IMD Competitiveness Yearbook 2017

Labour Costs

- Irish labour costs have grown at an average of less than 2% annually over the last five years. Hourly labour costs in Ireland are mid-range in Europe and below the Eurozone average.

Source: Facts about Ireland, Nov. 2018, IDA

A Measurement of Third Level Marine Education & Training in Ireland

Ireland's third level education institutions offer a range of marine and marine-related undergraduate and postgraduate courses.
This would include the National Maritime College of Ireland in Cork.
There were approximately 42 - 44 marine related courses provided in the 2012 – 2015 period. The courses can be classified as:

- 23% fully marine.
- 9% partially marine (two or more marine modules).
- 68% marine element (one marine module).
- 24 undergraduate courses.
- 20 postgraduate courses.

The aggregate total turnover for the marine education and training sector in Ireland in the 2014-2015 period was €11.5 million.

Source: Measuring Marine Education and Training in Ireland, Semru Report Series, May 2016

"CIT stands ready to support this initiative, in start-up and development phase, through the provision of bespoke maritime and shipping focused programmes of training, education and research across the full spectrum of business, finance and science."

Dr. Barry O'Connor, President, Cork Institute of Technology

A Financial Services Centre of Excellence…

Building on the success of Ireland's IFSC

The ISSC has a role model in the IFSC and would also complement it given some of the ISSC's services. This year the IFSC celebrates its 31st year as one of the world's leading financial services centres. The IFSC is globally recognised as a leading location for a range of internationally traded financial services, including banking, asset financing, fund management, corporate treasury management, investment management, custody and administration and specialised insurance operations.

The centre is host to half of the world's top 50 banks and to half of the top 20 insurance companies. Merrill Lynch, Sumitomo Bank, ABN Amro, Citibank, AIG, JP Morgan (Chase), Commerzbank, BNP Paribas and EMRO are just some of the big-name operations that have chosen to locate in the area. A sophisticated support network, including shared services centres, software development, and legal and accountancy companies, has also developed around the IFSC.

The IFSC – Key Facts & Figures

500+ firms	Average salary of **€60,100**	Total Direct Employment of over **38,000+**
Indigenous firms employ almost **6,000**	Firms from **20+ countries** operating throughout Ireland	Accounts for **10%** of multi-national employment in Ireland
Contributes **7.4%** of Irish GDP	Contributes approximately **€2.1bn** to the Irish Exchequer	

Source: IFSC website

The relationship between the maritime financial services sector and a financial services cluster is essential in terms of accessing capital and new financial products. Ireland's finance professionals are well-placed to serve the different requirements of this industry.

Ireland is home to:

80% of the world's top 25 financial services companies	Source: PwC Asia Matters
17 of the top 20 global banks	Source: IDA
11 of the top 15 global insurers	Source: IDA

A global leader in aircraft leasing…

The move toward leasing

Global trends in recent years have shown a decline in the amount of bank lending to shipping industries. Bank portfolios to the shipping industry declined almost 10% in the year to 31st December 2016. One of the reasons given in Petrofin's global bank review of 2017 for the decline in bank exposures is the increase in new vessels being financed by way of leasing. With the increasing prevalence of leasing within the ship finance sector, Ireland's track record in the leasing sector ensures it is well positioned to service the leasing needs of the shipping industry.

A Global Leader in Aircraft Leasing

Ireland has a proven reputation as a centre of excellence in the aircraft leasing business. Over the past 35 years, Ireland has played a major role in the financing and leasing of aircraft and aircraft engines to airlines globally. This expertise is transferable to ship leasing and financing transactions.

Key Facts & Figures

8 of the top 10 Global Aviation Lessors based in Ireland (1)	**60%+** share of the global leasing market (1)	**4,970** FTE jobs supported annually in the Irish economy (2)	**$111 Million** Payroll related taxes to the Irish economy (2)

Source: IDA (1), PwC 2018 Taking Flight Report (2)

Specific Tax Benefits

Aircraft lessors can avail of a number of tax benefits, including:

- Ireland's 12.5% corporate tax rate
- Significant double tax treaty network
- 8 year write-off period of capital spend for tax purposes compared with a 20-25 year economic life
- More than 80% of Ireland's double tax treaties can provide zero withholding tax on inbound lease rentals.

Source: PwC Asia Matters

A global technology hub...

A Global Technology Hub

Ireland has become the global technology hub of choice when it comes to attracting the strategic business activities of ICT companies:

- Ireland is the second largest exporter of computer and IT services in the world.
- Global leaders such as Intel, HP, IBM, Dell EMC, Microsoft and Apple have long-established operations in Ireland.
- They have been joined by newer leading-edge giants such as Google, Facebook, LinkedIn, Amazon, PayPal, Mastercard, eBay and Twitter.
- A number of multi-national companies have also established their innovation labs here in Ireland e.g. DELL EMC, Mastercard, Citibank, etc.
- Dublin is Europe's leading hub of innovative games companies with Big Fish, EA, Havok, DemonWare, PopCap, Zynga, Riot Games and Jolt all having a significant presence here.
- The sector accounts for more than €50 billion of exports from Ireland per annum.

Source: Adapted from Enterprise Ireland

Key Facts & Figures

8 of the top 10 Global Software Companies are based in Ireland

9 of the top 10 US Technology Companies are based in Ireland

4 of the top 5 IT Service Companies are based in Ireland

Source: IDA

"Marinising" our existing Technology Cluster

Harnessing Our Ocean Wealth and the subsequent Development Task Force report outlined a strategy to "marinise" our existing ICT sector to leverage additional opportunities in marine-related markets. This is directly aligned with the recommendations in **Enterprise 2025** in relation to realising untapped potential of sectors that present opportunity for growth.

As highlighted in the National Marine Research & Innovation Strategy 2017–2021, Ireland's existing capabilities in ICT and engineering provide a solid foundation for marine technology markets in areas such as sensors, platforms, advanced materials, subsea communications, robotics, computer vision, simulation, observation, forecasting, informatics and modelling. Clusters of activity and world-class infrastructure have emerged through existing investments.

For example:

- Through extensive investment by the Irish government, Ireland has now recognised world-class expertise in areas of software engineering (i.e. the LERO SFI Research Centre) and data analytics (i.e. the INSIGHT SFI Research Centre) – two underpinning areas for Marine-ICT.
- Another example, where Ireland has significant expertise, is in the area of future networks and communications (i.e. the CONNECT SFI Research Centre), which underpin the 'Internet of Things' and are directly relevant to distributed marine sensor networks.
- Ocean observation and sea bed mapping is a field where Ireland has an established research community.

Utilising its existing expertise in ICT, Ireland can place itself at the forefront of marine technology.

Source: OOW Development Taskforce: Inputs to the DTF Report

An abundance of renewable energy sources…

Realising Ireland's marine renewable energy potential

Offshore Renewables is an emerging sector, which has seen dramatic growth globally over the decade. Ireland possesses one of the richest offshore wind and wave energy climates in the world. Because of its location at the Atlantic edge of the EU, Ireland has more offshore energy potential than most other countries in Europe. The conditions are suitable for the development of the full range of current offshore renewable energy technologies.

The EU has set binding targets for Member States to reduce greenhouse gas (GHG) emissions by 20% by 2020. In addition, Ireland is committed to produce from renewable sources at least 16% of all energy consumed by 2020. As we look towards 2050, the EU ambition is to transition to a low carbon economy, with a target to achieve GHG emissions reduction of 80% - 95% below 1990 levels. Offshore renewable energy will be "**critical**" if Ireland is to meet its climate targets.

EU 2020 energy savings targets…		**EU 2050 ambition…**
20% cut in GHG emissions (from 1990 levels)	**16%** National consumption from renewable energy	**80 - 95%** cut in GHG emissions (from 1990 levels)

Ireland's territorial waters present major opportunities in the blue economy and offshore renewable energy sectors, which would support our transition to a zero carbon economy. The potential for commercialising ocean energy is huge. The International Energy Agency estimates that by 2050 ocean energy could have 337 GW of installed capacity globally, saving 1 billion tonnes of CO_2 emissions and generating 1.2 million direct jobs. In Europe alone, the industry expects to install up to 100GW of projects by 2050, providing around 10% of the EU's electricity. Ireland is in an excellent location to trial and test this emerging technology and to be at the forefront of innovation in this sector.

Ireland has developed a World Leading Research Centre in Marine Renewables

The Marine Renewable Energy (MaREI) Research Centre is a cluster of key university and industrial partners dedicated to solving the scientific, technical and socio-economic challenges involved in harnessing Marine Renewable Energy (MRE). MaREI focuses on technological breakthroughs, delivered through cutting-edge science and engineering research, and aims to secure Ireland's position as a global leader in Marine Renewable Energy research.

"We're building marine research infrastructure that will support and promote the development of the technology we need to harness that energy. We're in an ideal position to become a leader in the development of ocean energy technology."

Marine Institute Ireland

An established research infrastructure...

Ireland has invested in world leading research centres with significant expertise in the key areas of technology that will underpin new growth opportunities and business models in shipping, shipping services and global supply chains. A vast number of these centres are either headquartered in Cork or have significant portions of their activity located in Cork. A selection of these centres are outlined opposite along with the area of expertise. A number of these have developed specific activities in key areas of relevance including maritime technologies, offshore renewable energy and fintech. All of these centres are industry facing and are partnering with a number of Irish based global multi-national companies.

Internet of Things

- IPIC- Irish Photonic Integration Centre
- CONNECT SFI Research Centre - The Centre for Future Networks and Communications
- MCCI – Microelectronic Circuits Centre Ireland
- Tyndall National Institute
- CCAN – Collaborative Centre for Applied Nanotechnology
- AMBER – Advanced Materials and Bioengineering Research
- Water Institute @DCU
- INSIGHT SFI Research Centre for Data Analytics
- Applied IoT technology gateway cluster
- MaREI - Marine and Renewable Energy Ireland
- Halpin (NMCI) – National Maritime College of Ireland

Data Analytics/Cyber Security

- LERO SFI Research Centre
- INSIGHT SFI Research Centre
- CONNECT SFI Research Centre
- MaREI
- CeADAR - Centre for Applied Data Analytics
- ICHEC - Irish Centre for High-End Computing
- GR3C (Regtech)

Smart Materials

- AMBER
- ICOMP - Irish Composites Centre
- Water Institute @DCU
- MaREI

Artificial Intelligence

- Applied IoT technology gateway cluster
- ADAPT Centre
- LERO SFI Research Centre
- INSIGHT SFI Research Centre
- SFI Confirm

3-D Printing and Additive Manufacturing

- CONFIRM SFI Research Centre
- I-Form
- AMBER

Blockchain

- LERO SFI Research Centre
- CONFIRM SFI Research Centre
- ADAPT Centre
- INSIGHT SFI Research Centre

Robotics and autonomy

- MaREI
- CONFIRM SFI Research Centre
- LERO SFI Research Centre

Augmented Reality/ Virtual Reality

- ADAPT Centre
- CONFIRM SFI Research Centre
- Applied IoT technology gateway cluster

Key: Cork
Ireland

An attractive alternative location post-Brexit

Brexit offers Ireland opportunities as well as threats

The opportunities afforded by Brexit are often overlooked due to the prevailing view that Brexit poses unprecedented challenges to Irish businesses. It is true that Brexit brings uncertainty to the business environment and presents uniquely significant and unprecedented challenges for Ireland, given the extent of the inter-connectedness of our people and economies. However, setting aside the uncertainty that comes with Brexit, the opportunities for businesses in Ireland are becoming clearer:

- Ireland is a fully committed member of the EU and the Eurozone, and businesses that operate here retain all the benefits that come with membership of both.
- Ireland remains an attractive place to do business. Membership of the EU and an English-speaking workforce will continue to be important factors in attracting foreign direct investment post-Brexit.
- Traditionally, London has been the largest financial services centre in the EU, with financial services firms from across the globe establishing operations in the city. However, the decision of the UK to leave the EU has resulted in many of these foreign financial institutions re-examining how their European business is structured. Unless the UK remains a member of the European Economic Area (EEA) or negotiates a similar relationship agreement, they will become a "third party" under EU legislation and financial service providers who are based in the UK will no longer be able to rely on a "passport" to provide services across the EU. This is proving to be a key factor driving foreign financial institutions to look at moving their European operations to another EU member state. Ireland is viewed as a favoured destination for financial firms based in Britain that want to retain "passporting" rights, which allow them to do business within the EU, along with cities such as Frankfurt and Paris.
- Similarly, whilst London has long been established as a global leader in ship insurance, the UK's decision to leave the EU has caused insurers to look at how they can best continue to serve the EU market once the UK's exit is complete.

Many have already chosen Ireland

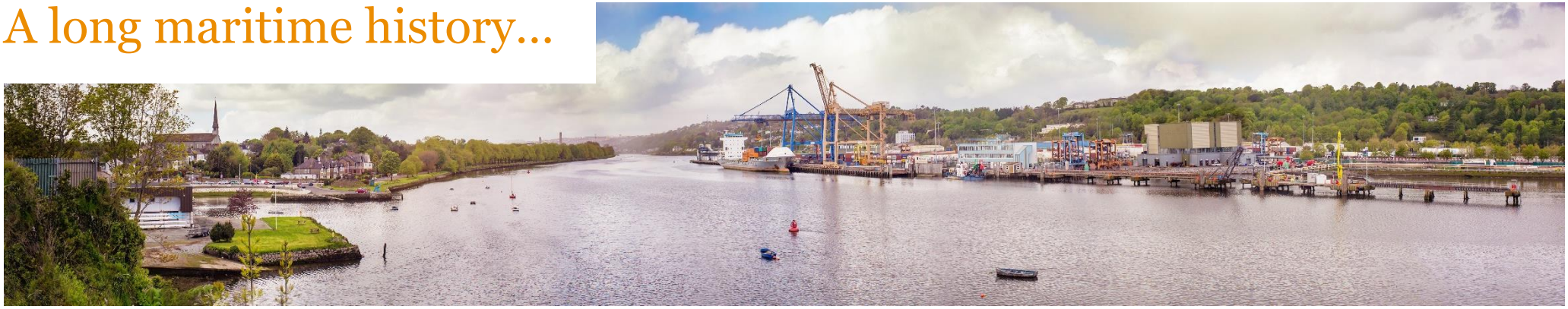
- In May 2017, JP Morgan Chase bought a landmark office building in Dublin large enough for 1,000 staff, doubling its workforce in Ireland.
- In July 2017, British firm Barclays decided to relocate to Dublin to preserve its access to the EU, setting up its European Hub in the city centre. Bank of America Meryl Lynch is also moving its EU headquarters from London to Dublin post Brexit.
- Many insurers have similarly chosen to move their operations to Dublin, including Beazley, Chaucer, Standard Club and North P&I Club.
- According to the British Banking Authority, one-third of the UK's financial services workforce (87,499 jobs) will migrate to the 27 EU member states over the next few years. Given the attractiveness of Ireland for foreign direct investment, it is likely that a growing number of firms will choose to relocate here.

04b

Cork's Value Proposition

In addition to the many benefits "Ireland Inc." has to offer, Cork has some distinct advantages and further benefits for companies considering locating in Ireland for International Shipping Services…

A long maritime history…



Cork's Maritime History

The international marketing proposition of Cork as an ISSC hub is bolstered by the region's strong maritime history…

- Cork Harbour is one of the **largest natural harbours** in the world. The harbour has been a working port, and a strategic defensive hub, for centuries, and it has been a significant employment hub in Ireland since the early 1900s.
- The Port of Cork (Tier 1) is the key seaport in the south of Ireland and is one of only two Irish ports which service the requirements of all six shipping modes. It is a core port on the European Ten-T network.
- Port of Cork has recently commenced work on the **€80 million** Cork Container Development in Ringaskiddy. The new Terminal will initially offer a **360 metre quay with 13 metre depth alongside** and will enable larger ships to berth in Ringaskiddy. The development also includes the construction of a **13.5 hectare terminal** and associated buildings as well as two ship to shore gantry cranes and container handling equipment. The N28 road from Cork to Ringaskiddy is to be improved to aid access.
- Cork is home to the **National Maritime College of Ireland** (NMCI); the country's designated centre for the education and training of personnel for the Merchant Marine. The college offers a comprehensive range of training and education courses.
- The Port of Cork is home to Ireland's only dedicated cruise berth. Plans are underway to a build a new cruise line terminal at the Deepwater Quay in Cobh by 2020 at an estimated cost up to **€15m**.
- On the leisure side, the Royal Cork Yacht Club founded in 1720 is a claimant to the title of the world's oldest yacht club and holds every second year, Ireland's largest international sailing regatta.
- The Navy is based at Haulbowline in Ringaskiddy.
- Enterprise Ireland's National Manager for the Marine and Renewable Energy Research, Development and Innovation Centre (MAREI) is based in Cork and leads UCC's new incubation hub for marine sector start-ups.

Port of Cork cruise business 2018

94 cruise liners to visit the Port of Cork in 2018	**188,844** passengers

"The Port of Cork's redevelopment at Ringaskiddy is a key growth enabler for both Cork city and region as well as the national economy and will enable the Port to deliver more efficient container handling facilities, replacing the existing container terminal at Tivoli, and securing the Cork Container Terminal as an international gateway for trade well into the future."

Chairman of the Port of Cork

A city and county on the rise…

Strategic fit

The establishment of an ISSC in Cork supports the objectives of the Government's **Project Ireland 2040** Strategy and the **Cork 2050** submission. Project Ireland 2040 identifies Cork as a main city and sets out ambitious growth targets for Cork to grow by at least 50%, including 125,000 additional people in Cork City and Suburbs. It positions Cork to play an increasingly important national role to ensure a more balanced and sustainable pattern of growth going forward. Project Ireland 2040 also recognises the importance of Ireland's marine sector:

"As an island nation with sovereign rights over one of the largest marine areas in Europe with a sea: land ratio of 10:1, Ireland's economy, culture and society is inextricably linked to the sea. Our marine environment is a national asset that yields multiple commercial and non-commercial benefits…"

Project Ireland 2040

Cork 2050 highlights Cork's physical and environmental capacity to accommodate significant economic and spatial change and the potential to play a leading role in delivering balanced national socio-economic growth for Ireland. This includes land area in the North and South Docklands.

The Port of Cork's move to Ringaskiddy has helped to provide even greater capacity for the Docklands development, particularly on the South Docklands. The recently published **Cork Metropolitan Area Transport Strategy 2040** has also included a Light Rail Transit which would service the Docklands.

The strategic ambitions set out in the **Regional Enterprise Plan to 2020 South-West** include leveraging the opportunities offered through business clustering to drive enterprise performance and resilience in the South West; and supporting growth in the region's marine and maritime sector.

Ireland for Finance, the Department of Finance's recent strategy for the development of Ireland's international financial services sector to 2025, recommends that a feasibility study into the establishment of an ISSC be completed. This action is also supported by Cork Chamber's Financial Services Forum.

City Revitalization

The Cork City Centre Strategy (2014) sets out clear aims to revitalize the City Centre through improvement and development. A series of major new developments are underway…

€700 million is currently being invested by private & public sector organisations	**30+** new sites are in development or in the pipeline for development	**1 million sq. ft.** office space coming on stream in the next 18 months

Source: Cork Chamber

Cork's Light Rail Transit

Source: Cork Metropolitan Area Draft Transport Strategy 2040

"Cork City Council is very supportive of this proposal to locate the ISSC in Cork city. The city is currently experiencing unprecedented significant rapid growth with new large scale office developments nearing completion and more in the pipeline in the coming years driven by market demand particularly in the tech and cybersecurity sector. For example, in the fintech sector, Clearstream are due to occupy the newly completed first phase of O'Callaghan Properties' Navigation Quarter in the near future. Cork is clearly an attractive location for FDI reflected in these large FDI companies locating in a growing city centre which offers significant value and access to international professional services. It also offers a fantastic quality of life for highly talented staff when compared to other city locations in Ireland and around Europe. Cork, as the designated second city within the National Planning Framework's Project Ireland 2040, is primed to accommodate this fantastic opportunity. "

Cork City Council

Internationally competitive

Cork has significant comparative advantages in terms of key assets and capacity, differentiating itself in the national context, and competing with similar Metropolitan Areas in Europe and globally.

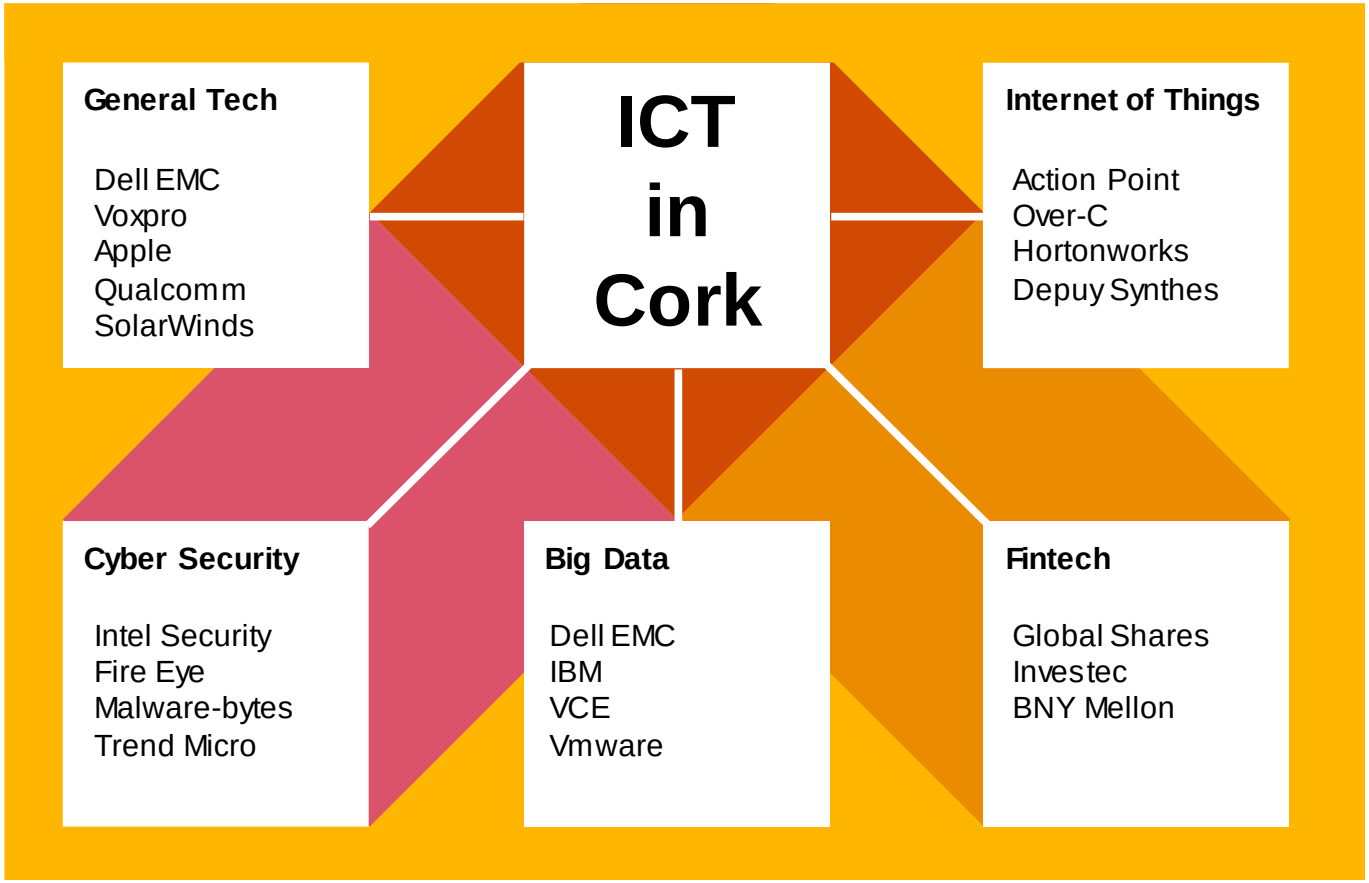
Cork is…

One of Europe's Top 10 Small European Cities of the future	Best small city in Europe for business friendliness
One of Europe's Top 25 European Cities of the future and ahead of Copenhagen, Hamburg and Geneva	

Source: Financial Times fDi European Cities and Regions of the future 2018/19

Technology Cork's track record in attracting FDI companies including the emergence of an exciting technology cluster

It is recognised that technology companies like to locate in clusters which helps in delivering and attracting talent. The following clusters have emerged in Cork. See also Appendix 1 for start-up/recent companies in the marine technology space.



Source: www.businesscork.ie Sep 2018

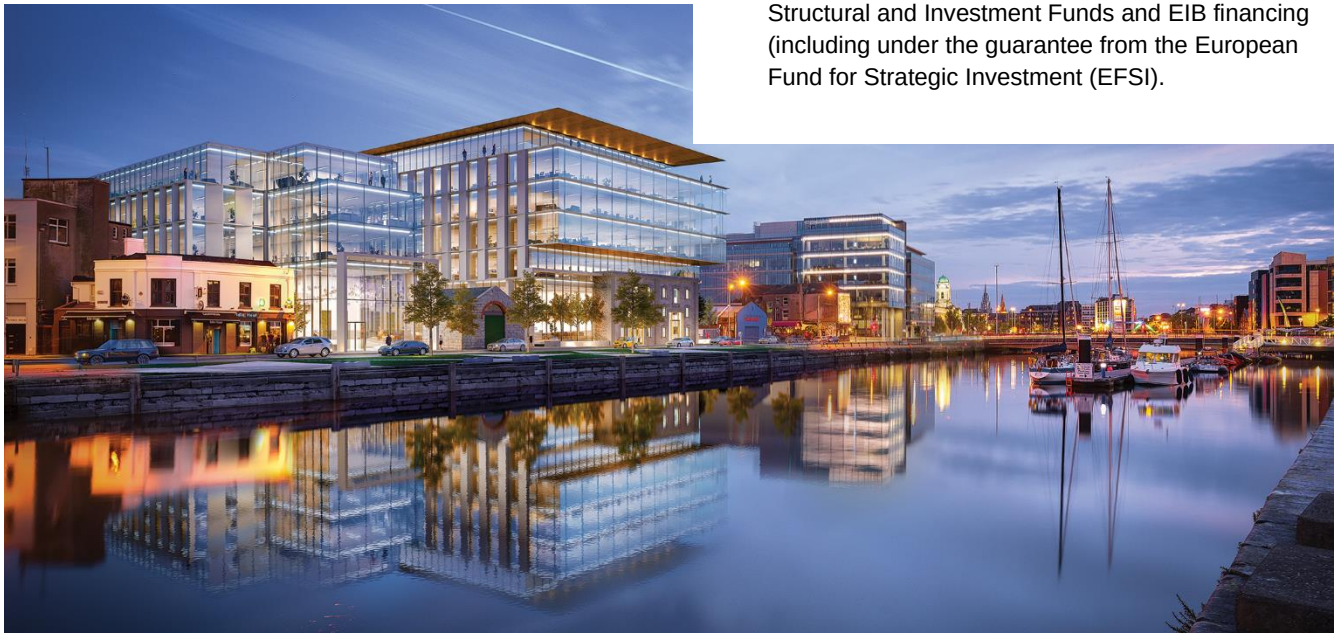
"With Cork set to become the fastest growing region under the Project 2040 plan, it is a place of opportunity and promise, particularly in ICT. In the last 5 years employment in the Cork's Tech Sector has risen substantially, making it the largest source of foreign direct investment in the region. In total, there are currently over 300 ICT related companies employing more than 29,000 people in the region and the outlook for further growth in 2019 and beyond is very positive. We recently surveyed our own members and found that a staggering 83% are forecasting employment growth in the next 3 years."

Caroline O'Driscoll
Chairperson of it@cork

National investment / funding

As commercial office development is currently ongoing in Cork, there is no likely immediate shortfall in commercial property for business. **Also, the overall funding environment is largely supportive and the timing is opportune from two perspectives**:

1. Project Ireland 2040, National Development Plan, 2018—2027, provides for an Urban Regeneration and Development Fund of €2 billion. This fund is earmarked to support the co-development of the National Planning Framework's growth enablers for five main cities and other large urban centres. A specific example cited to receive support under the Fund is the development of the Cork Docklands (City Docks and Tivoli and associated mobility and bridge access).



2. Also relevant is URBIS, a dedicated urban investment advisory platform within the European Investment Advisory Hub (EIAH) to provide advisory support to urban authorities to facilitate, accelerate and unlock urban investment projects, programmes and platforms. Initially, URBIS will consist of the following three modules:

   - ✓ Increased awareness raising of existing instruments, programmes, services;
   - ✓ Tailor-made technical and financial advice to cities; and
   - ✓ Exploring innovative financing approaches for city investments - advice on the application (and combined use) of different financing opportunities, including, where appropriate the European Structural and Investment Funds and EIB financing (including under the guarantee from the European Fund for Strategic Investment (EFSI).

The EIB will support private companies, typically projects over €25m, and has a specific focus on urban and regional development. Preferential rates are available.

Source: Why Cork Why Now? PwC Report for JCD and OCP, 2016

"O'Callaghan Properties fully support the establishment of an International Shipping and Services Centre in Cork. We believe Cork is the ideal location for the ISSC, not only because of its rich maritime history, but also due to the large pool of university graduates and human resources readily available to support international shipping companies, daily access to global transport hubs, an excellent quality of life as well as being the only English speaking gateway to the European Union"

Brian O'Callaghan
O'Callaghan Properties'

Other comparative advantages benefiting Cork city and county…

Overall Employer Costs

An illustrative analysis of the cost of operating a 20,000 sq. ft. office with 200 employees in Cork versus Dublin shows a saving of **14%** or €18.5m in favour of Cork over a 10 year lease period. (2)

Office Rental

Office rental in Cork is **less than half the costs** of other European city regions and in plentiful supply with in excess of 1 million sq. ft. of office space coming on-stream in the next 18 months. (1)

Cost of Living and Quality of Life

There are significant cost and other savings to employees, principally cheaper rent (30% plus)/property purchase costs, lower childcare costs (10%+ lower) and less time spent travelling to work and less congestion e.g. 60% of people get to work in 30 minutes or less. (2,3)

Tier-1 Connectivity

- USA-UK 100 Gbit/s fibre network via Cork
- Planned new sub-sea cable connecting Cork to mainland Europe via France
- New 10MW colocation data centre development. (4)

Salary Costs

Employers save significantly through lower salary rates in Cork. The average salary for 30 selected roles is **10%** lower in Cork by comparison to Dublin. (2)

Airport

National aviation policy supports Cork as a tourism and business gateway.

Back office services

Cork has a number of back office service providers such as BNY Mellon, Clearstream, Hedge Fund and Citco.
The provision of back office/transactions services to the shipping sector reflects the type of transactional work undertaken in other sectors in Cork.

150 Overseas Companies

Over 150 FDI companies are located in Cork employing 32,000 people, with more than 60 overseas tech companies having chosen Cork as their European home; amongst them Apple, Dell, IBM, Intel and EMC. (2,3) There is a strong and developing technology cluster.

Research Excellence

Cork offers nationally and internationally significant marine-related specialisms and research & development entities. These include: the Irish Marine Energy Cluster (IMERC); the Centre for Marine & Renewable Energy (MaREI); Tyndall's International Energy Research Centre (IERC); the National Maritime College of Ireland (NMCI); the Lir National Ocean Test Facility; and Energy Cork. This ecosystem offers world class marine technology research and testing infrastructure focussed on enabling commercial development of these technologies, including marine-based energy generation. (4)

Proposed natural gas hub

Texas-based liquefied natural gas (LNG) company NextDecade is planning to develop an LNG import terminal at the Port of Cork.

The company announced it had signed a memorandum of understanding with the Port of Cork to "advance a joint development opportunity in Ireland for a new floating storage and regasification unit and associated LNG-import terminal infrastructure". (5)

Port of Cork stated that the plan to produce such a large gas supply station in Cork Harbour will be a huge boost for the Cork and Ireland's economy, while securing an energy supply into the future. (6)

Skills and talent availability

- Cork has **35,000 third level students** with University College Cork and Cork Institute of Technology providing highly skilled, industry ready graduates. (1)
- Cork is home to Ireland's **largest undergraduate business school**. (3)
- International students from **100+ countries**. (1)
- Within approx. 100km radius of Cork, employers can access graduates from **4 other third-level institutes**. (1)
- 50% of the population of Cork is under 35 years of age. (1)
- Cork is home to the National Maritime College of Ireland.

"The establishment of an International Shipping and Services Centre in Cork would represent a very positive development for the City, the Southwest region and Ireland. The opportunities for the National Maritime College of Ireland and Cork Institute of Technology of which NMCI is a constituent College, to engage with companies offering service activities that are the engine of the global maritime industry would be hugely beneficial. The presence of the ISSC in Cork would greatly support and further enable NMCI and CIT to remain at the cutting edge of maritime education, training and innovation on the World stage."

Cormac Gebruers
Head of College, National Maritime College of Ireland

Sources:
(1) Connecting Cork, 2018
(2) PwC, Why Cork Why Now? Report for JCD and OCP, 2016
(3) Cork Chamber, 2018
(4) Cork 2050
(5) Irish Times, July 2017
(6) Irish Examiner, July 2017

Organisations currently operating in the Port of Cork…

Shipping Clients

The Port of Cork is already home to some well-known clients including:

- Maersk
- Doyle Shipping Group
- Leeside Shipping, agents for BG Freight Line
- Brittany Ferries
- Celtic Shipping Agencies Ltd
- Eucon Shipping & Transport
- Grimaldi EuroMed / Ocean & General
- Hamilton Shipping (Port Services) Limited
- Mainport Holdings Group
- Samskip
- X-Press Container Lines/ Doyle Shipping Group

Freight Forwarders

It also has a number of Freight Forwarding options:

- Titan
- KWE
- TNT
- National Seaways Freight Ltd
- Trackdata
- Expeditors
- IPS
- Atlantic Pacific
- Shipping Solutions
- TECA
- Jenkinson Logistics
- O' Connell Transport
- Allied Forwarding
- Hamilton Shipping

Appendices

1. **Recent marine company activity in Cork…**
2. **A supportive ecosystem in Cork…**
3. **Maritime Business Services Case Studies**

Appendix 1 – Recent marine company activity in Cork...

Exceedence

Exceedence, a spin-out company from University College Cork, has developed a software package that offers insights into the viability of projects within the renewable energy industry sector. By providing a detailed analysis of technical and financial project metrics, their tool creates an opportunity for project developers, investors, consultants as well as device developers & supply chain professionals to improve project planning and optimisation across wind, offshore wind, wave and tidal platforms. The company was co-founded by Dr Raymond Alcorn and John Keating to commercialise technology licenced from UCC in 2015. Enterprise Ireland supported the initial technology development through the Commercialisation Fund and Exceedence has also benefited from the support of the Sustainable Energy Authority of Ireland and from the Local Enterprise Office in Cork City. Since developing the desktop prototype of the software at University College Cork, the team has grown significantly in size and the company has progressively expanded into new offices. Apart from the ongoing relationship with the originating university and active participation in community projects organised by UCC, the company closely collaborates with other research-performing organisations across Ireland and internationally.

8West

8 West is an ISO 27001 certified, award-winning, full service, enterprise software development company with over 220 professionals and a 20 year history of innovation and on-time delivery. 8 West has developed SafeTrx, the world's leading maritime search and rescue mobile application with over 750,000 recorded hours of use around the world. Designed in close co-operation with Coast Guard and Sea Rescue organisations, SafeTrx is a proven maritime safety platform that helps reduce the risk of maritime accidents and the loss of human lives at sea. SafeTrx operates by connecting the app to marine rescue centres via a highly secure web based monitoring console that displays positional information on SafeTrx apps in their area. If a boater is overdue, the SafeTrx system will trigger an alarm process, alerting rescue staff. And if the boater runs into rough water, harsh weather, or another dangerous situation, they need only press a button on the app to alert the rescue coordination centre. That contact gives the rescue coordinators the craft's precise location and coordinates for rescue, details of the vessel, and the number of people on board—in a scenario where every minute counts.

Safehaven

Established in 1998 SAFEHAVEN MARINE are builders of Professional FRP Pilot vessels, Patrol boats, Workboats and Naval / Military Interceptors in sizes from 11m up to 18m. Safehaven have built and supplied over 110 vessels to 25 countries worldwide since being established in 1998 and an unprecedented 30+ pilot vessels supplied to ports in the last 7 years. Safehaven's vessels are chosen by Ports exposed to big ocean waves and tidal races, and where the pilot boat must operate in all weather conditions (up to force 8-9) and in over 8m wave heights. As well as pilot boats Safehaven have a range of Patrol boats for civilian and naval roles, Search & Rescue craft as well as hydrographic research catamarans, Safehaven specialize in custom builds of a highly specific nature. Safehaven Marine have experience in the Military Naval sector having supplied 4 catamarans to the Polish Navy and Patrol boats to Asia and manufacture the unique 'high speed low RCS Interceptor Barracuda.

Cork- based Safehaven Marine – "attempting a trans-Atlantic world record"

Safehaven Marine's ambition is to set a new UIM approved World Record for the North American continent to Ireland in 2019. They have developed a new model to add to their extensive range of commercial, private and naval craft: 'XSV20'. DELL, 8West and Navarino are providing the vessels electronic capabilities.

This is a great example of maritime and technology collaboration in Cork.

Dare Technology

Dare Technology are a marine technology development and consultancy company, based in Ringaskiddy, whose focus is on the reduction of vessel emissions in the commercial marine sector. Through a combination of renewable energy and energy efficiency technology, their aim is to reduce fuel consumption and hence carbon emissions on vessels. This provides vessel owners / operators with a significant opportunity to reduce operational costs and achieve a competitive advantage. Experienced in marine renewable energy testing and deployments, the company also provide consultancy services in these areas to progress new technology through from concept to offshore deployment using industry best practice.

Resolute Marine Limited

Resolute Marine Limited is developing a technology that harnesses ocean wave energy to produce fresh water in off-grid areas of the world and thus provide relief from the harmful economic and social effects of water scarcity. Resolute's goal is to improve access to water for coastal populations and agricultural operations in developing countries and islands and to displace the diesel-powered systems that are in common use worldwide. In support of Resolute's mission, the Marine Institute of Ireland recently awarded the company an Industry-Led Award to finalize the design and prepare for the manufacture of a key sub- system.

Resolute is a subsidiary of Resolute Marine Energy, Inc. (U.S.), a former tenant at the "Entrepreneurship" in Ringaskiddy, and currently has three employees based in Ireland.

Dublin Offshore Consultants Ltd.

Dublin Offshore Consultants (DOC), with a presence in Dublin and Cork, are an engineering firm supporting project developers, product development and research in the maritime space in Ireland and internationally. DOC have operational, design and commercial experience in the marine market. DOC provide support from Ringaskiddy to deliver technology and commercial growth while creating export opportunities from a Cork based service provider. DOC have recently delivered testing and development of a maritime transport device using the wave research facility in Ringaskiddy for a Cork based technology developer, and are involved in growing client businesses in the Cork region.

Appendix 2 – A supportive ecosystem in Cork...

Incubators/Physical Space

The Entrepreneur Ship

The Entrepreneur Ship is a national marine incubation centre that supports innovation emerging from the Centre of Marine and Renewable Energy (MaREI) and marine innovation nationally.

ESA Space Solutions Centre

This initiative supports entrepreneurs with innovative ideas for using space technology to develop new products and services in a non-space environment.

Rubicon

Located on the CIT Campus, Rubicon's focus is to develop Ireland's next generation of start-ups, who have the potential to develop and employ more than one person.

Verifish

Verifish assists all elements of the supply chain through the use of software and advisory services.

Keelvar

UCC spinout from what is now known as insight – optimisation software and feeds into the fulfilment, supply chain, logistics piece.

Accelerator Programmes

Cork BIC – International Security Accelerator

This world class security accelerator was established in Cork to invest in early stage disruptive companies in the security industry including cybersecurity, internet of things (IOT), blockchain, AI, health and bioinformatives, defence, critical infrastructure, financial services and logistics.

Gateway UCC and the Sprint Accelerator programme.

Gateway UCC's mission is to support the development of successful knowledge-based indigenous companies arising from UCC's research, transforming knowledge into commercial success and providing the critical linkage between the university and enterprise.

Hatch Accelerator Programme

Cork (UCC) played host to one of the world's first accelerator programme focused on the aquaculture industry seeking to find, develop and scale talented and disruptive start-ups. Cork was one of the three locations chosen for the accelerator along with Norway and Singapore.

Trade Associations

Cyber Ireland

IDA Ireland is supporting the establishment of a National Cyber Security Cluster in Ireland, which is hosted at Cork Institute of Technology.

IT @Cork

IT@cork is a leading not for profit independent organisation representing the technology sector in the south of Ireland. The organisation includes IT professionals and executives from indigenous and multinational companies as well as entrepreneurs and employees from the public sector, academia, legal and financial services.

Appendix 3 – Maritime Business Services Case Studies

UK Maritime Business Services

UK – A Global Leader in Maritime Business Services

The UK is a leading centre worldwide in the supply of a broad range of professional and business services (specifically finance and law) to the international maritime community, that are largely concentrated in London.

Maritime Insurance, Financial and **Legal activities** dominate the business turnover generated by the industry, with 80% of industry turnover in 2015. Geographic zone incentives may also be available – see opposite.

Key Facts & Figures

£4.5 billion Contribution to the UK economy (1)	**11,500** People employed in the UK, mostly in highly skilled, highly paid jobs (1)	**35%** Of global marine insurance premiums (1)
60% Of Protection and Indemnity (P&I) insurance (1)	**25%** Of maritime legal partners practice in the UK (2)	**26%** Of global shipbroking revenue (2)
80% Of sales coming from outside the UK (2)		

(1) The economic contribution of the UK Maritime Business Services industry, Cebr 2017
(2) The UK's Global Maritime Professional Services: Contribution and Trends, PwC 2016

Competitive advantages

The UK has a number of advantages as a hub for maritime services:

- ✓ Concentration of skills and expertise.
- ✓ Strong maritime education institutions.
- ✓ The cluster effect.
- ✓ English Law is the preferred jurisdiction worldwide for commercial and shipping contracts.
- ✓ Contribution of other Maritime institutions to the cluster - the International Maritime Organisation (IMO), Baltic Exchange, Lloyd's of London and the Institute of Chartered Shipbrokers.
- ✓ Stable business environment.
- ✓ London's attractiveness as a place to live and visit.

Source: The UK's Global Maritime Professional Services

Example: Tax Incentives used to develop Liverpool docklands (Mersey Waters Enterprise Zone)

Enterprise Zones were reintroduced in 2012 in the UK to encourage economic growth and investment. Businesses locating themselves in Enterprise Zones could access a number of tax incentives which included:

1) *Business Rate Relief:* Up to 100% business rate discount worth up to £275,000 per business over a 5-year period. To qualify, a business must already be located in the zone or have moved in before 1st April 2018. Rate relief lasts for five years and is subject to state aid limits. Consideration for this relief will be given to:

1. Businesses moving into the Mersey Waters Enterprise Zone.
2. Existing businesses expanding in the Mersey Waters Enterprise Zone that create additional jobs and growth which supports the aims and objectives of the zone.

OR

2) *Enhanced Capital Allowances (ECA):* 100% Capital Allowances for Mersey Waters Enterprise Zone to businesses making large investments in plant and machinery, making it one of the most competitive Enterprise Zones in the UK. Capital allowances allow businesses to write down the costs of qualifying plant and machinery assets against their taxable income.

Hong Kong's maritime and port industry

Overview

The maritime and port industry contributed HK$ 28,270 million to Hong Kong's gross domestic product (GDP) in 2016. This represented 1.2% of the overall output of the economy.

The maritime and port industry employed 85,720 persons. This accounted for 2.3% of the total employment in Hong Kong. Among the industry's total employment, port and related, shipping and maritime business services accounted for 51%, 44% and 5%, respectively.

Source: Study on the Economic Contribution of Maritime and Port Industry in 2016, Transport and Housing Bureau, June 2018

Some Key Facts & Figures

- World's freest economy with services accounting for more than **90%** of GDP.
- **5th** in the world in terms of container throughput in 2017.
- According to World Trade Organization (WTO), **7th** largest exporter of merchandise trade and the world's **15th** largest exporter of commercial services in 2017.
- FDI - **2nd** largest investor and host, after the United States, in 2017.
- Stock Kong's stock market ranked the **3rd** largest in Asia and the **6th** largest in the world in terms of market capitalisation (end 2017).
- **3rd** leading global financial centre, only after London and New York, according to the Global Financial Centre Index.
- International Airport is the world's **1st** (busiest) airport for international cargoes since 2011.

Source: HKTDC Research, 17 July 2018

Hong Kong is the world's fifth-largest port in terms of total containers shipped, down from fourth in 2014. It lags Singapore and three mainland Chinese ports: Shanghai, Shenzhen and Ningbo-Zhoushan. Guangzhou is not far behind.

Despite this, Hong Kong has decided as part of a review that it cannot compete with its shipping rivals and is turning its attention to maritime services as a way to strengthen its position as a key seaport trading centre.

The government said it will focus on "high value-added maritime services" in areas such as ship leasing and insurance, and offer ongoing support to the city as a dispute resolution centre for the global industry".

Source: South China Morning Post, October 10, 2018

The International Union of Marine Insurance (IUMI) opened a new hub in Hong Kong in 2016, marking the first time the 142-year-old organization has established a permanent presence outside Europe. "The Union's move on the one hand recognizes the increasing importance of Asia in the marine insurance industry, and on the other highlights Hong Kong's position as a prominent industry player in Asia," said Anthony Cheung Bing Leung, Hong Kong Secretary for Transport and Housing.

Source: Insurance Business Asia, 16 October 2016

Singapore's International Maritime Centre

The successful growth of Singapore's maritime sector…

Singapore has grown successfully as an international maritime centre over the past few decades. Maritime Singapore contributes about **7% of Singapore's Gross Domestic Product** and generates more than **170,000 jobs**. This has been founded on many factors, including:

Strategic geographic port location	Good rule of law
Good infrastructure	Government support

The outcome has been a large number of shipping companies setting up in Singapore and stimulating demand for an entire ecosystem of maritime-related businesses such as broking, insurance, finance, legal and arbitration, surveying, ship repair and conversion.

According to the Maritime and Port Authority of Singapore:

"*Since 1986, Singapore has been the busiest port in the world in terms of shipping tonnage, with an annual average of 140,000 vessel calls. It is the focal point for some 200 shipping lines with links to more than 600 ports in over 120 countries worldwide. Global connectivity is the key to Singapore's success as a world-leading hub for container transshipment, with over 30 million TEU handled in 2015*".

This combines with a wide range of marine business services and a pro business environment as recognised in the many international surveys (see also Table 12). Tax on corporate income is imposed at a flat rate of 17%. Additionally, there are favourable tax rates for shipping, for example, an approved Supporting Shipping Services (MSI-SSS) award allows a company to enjoy a 10% concessionary tax rate on incremental income derived from the provision of approved shipping-related support services such as ship broking, forward freight agreement trading, ship management, ship agency, freight forwarding, logistics services and qualifying corporate services. Qualifying companies in maritime leasing may also avail of an exemption or concessionary rate.

Singapore is regarded as Asia's gateway for global leaders in ship financing, ship broking, risk management and marine insurance. With a strategic location, sophisticated port facilities and shipyards, Singapore has become an International Maritime Centre and shipping hub where shipping, commerce and logistics work together.

Singapore's success does not solely come from its Maritime economy. 14.8% of its GDP last year was accounted for by its business services, while 17.6% came from Wholesale and Retail Trade. 19.2% came from manufacturing and along with 4.3% for construction and 1.3% for utilities.

Source: Department of Statistics, Singapore

Table A1: Growth in International Shipping Groups and Maritime Service Providers in Singapore since 2000.

Sectors	2000	2017
International Shipping Groups	20+	140+
Banks offering Ship Financing	15	20+
International Group of Protection & Indemnity (IG P&I) Clubs	2	8
Lloyd's Asia Service Companies	2	20
Law Firms with Maritime Practice	15	30+
Leading Shipbroking Firms	10	20+

Source: International Maritime Centre 2030 Strategic Review

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