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SHIPPING INDISPENSABLE TO THE WORLD

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This year's theme for international shipping is a very important one. We all know that if shipping was removed from the global network, we will see a very rapid wind-back of human development.

I would like to approach this topic from the perspective of higher education and the role of universities in the development of knowledge to support innovation and its application to address wider management issues that will influence shipping and keep it indispensable to the world.

Let us first consider some of the issues that confront universities in the near future, before we turn our attention to industry specific issues.

The first issue is innovation and technological uses emerging in our lives as well as our workplaces. We in the industry-oriented university sector must provide an adequate knowledge infrastructure to recognise emerging and future skills, both managerial and operational, to ensure effective learning. Our industry needs a regular replenishing flow of skilled personnel for the current and projected needs. We must, therefore, develop capability for skills acquisition that responds to the needs of technological change. This approach indicates a path towards research that will prepare us for emerging needs. In an environment of rapid industry growth, as we see in India, the problem is finding suitably qualified academics who are also in demand by the corporate sector. The same applies to equipment that we may need in certain areas of teaching and research. In many instances, this has been done through joint industry-academia research centres, through strategic partnerships, generating research output that can be not only published but commercialised.

The main elements that come together to allow the development of relevant knowledge may be identified as

- Industry – in a consumer and user function
- Government policy frameworks that create an environment that enables effective knowledge development so that new ideas and new technology are fostered and supported for effective use in the global economy
- Relevant education that provides knowledge and skills to make innovation possible.

Universities provide the knowledge infrastructure that first of all supports informed enterprise. This is through our wider education as well as through specialised programmes, acting as provider of the public good that brings together different elements of a knowledge system. In this process, we facilitate technology transfer, engage in research, and provide diagnostic mechanisms to bring in other specialised knowledge, build competence and confidence. Universities have a key role in providing the essential base for interactive and informed non-partisan networking between the different elements that maintain the industry and foster economic growth, both endogenous and exogenous. This growth is nucleus of entrepreneurship that attracts investment and new forms of participation.

How can universities effectively draw upon a range of resources and tailor knowledge to a range of contexts? The quick answer, of course, is to form cross-organisational committees, such as those we already have in academic boards or faculty forums. The ineptitude of these bodies lies in that, like all committees, they tend to get tightly focused on detail and lose sight of strategic objectives. Universities that wish to progress collaborative, integrative and partnership approaches to knowledge development will identify these issues along their way. India has a number of initiatives in place to develop industry-academia networks that include training as well as higher education. Over the last few years, I have been involved with the National Skills Development Corporation in India through my functions as a director of the Australian Transport and Logistics Industry Skills Council, now called Australian Industry Standards.

In Australia, AusIndustry supports Cooperative Research Centres (CRCs) and Cooperative Research Partnerships (CRPs) between industry and research organisations. Similarly, Germany has a system of Collaborative Research Centres that work to a similar aim but the difference is that they bring together teams of researchers from different disciplines.

Let us now consider some of the issues that are before the industry.

First among those is the **growth in the size of ships** and the effects of this growth, particularly in the liner trades. I hasten to add that dry bulk has also seen very large ships coming into the market with Vale-max bulk carriers of 400,000 tons making their appearance more operationally now than in the last few years.

The growth in size of container ships to around 20,000 TEUs (and continuing beyond) will have the usual major cascading effect throughout the trade. Quay side cranes will get bigger and more powerful. There will be new ways of moving containers. Port systems will have to respond in entirely new ways. Recent industrial action in some parts of the world, combined with the growth of container throughput intensity, has led to robotic operations in some ports. Related cargo handling and clearance systems ashore will see big changes, including on the connecting transport networks. The expectations for turning these ships quickly around will also not diminish.

At sea, the safety of these ships and their interaction with other users of the sea has already created a greater focus on maritime spatial planning and implementation regimes. The ships' own operating systems, business planning and risk management as well as insurance and liability regimes, will respond to their growth. Accidents, when they happen, will be costlier than ever before in the history of shipping. However, we don't expect crew sizes to grow. In fact, less will be more as the ship-shore management distance is continuously shrunk by emergent communications systems. As demand on crew performance will increase, so will the impact of any mistakes they make be magnified?

This takes us to the next issue, which is **automation** to operate and service the new needs of the industry, in all its facets – operations, management and monitoring, regulatory compliance and information sharing, updating skills and records, maintenance and HR. As ships and ports become increasingly automated, and use more electronic information interchanges in their operations, the role of the operator becomes ever more critical, far from being diminished. The role of the human in the system will become increasingly more important. The imprimatur for the education system is to prepare the workforce with the skills and knowledge of the implications of high levels of automation and its consequences on their work. This applies equally on board ships as in operations ashore. Automation brings with it its own effects. It can remove fundamental skills, as we have seen in the case of navigation and engine operations, but it demands higher level skills of the operator who will still need to maintain full domain awareness of the operational environment. Automation will require frequent updating of skills as technology develops.

Interaction of shipping with other areas of the economy

Shipping shares its working environment with many other users. Each of these users is covered by their own governance and regulatory structures. However, as the various uses are overlaid on to the same fabric, the ocean, some gaps in coverage emerge, particularly with the emergent uses of the oceans. These include, in addition to the pleasure and military uses, energy production in wind farms, and mining of the oceans for minerals. These can lead to marine spatial use issues. Claims to ocean areas in several parts of the world, including the Arctic, are on the rise. The need for effective governance of fishing on the high seas is gaining prominence, including its human elements of safety, implementation of international protocols, catch monitoring and effective control.

The questions that emerge are: are there any problems with having gaps in some areas? Can we possibly cover everything neatly under a single blanket? Is there any problem with having such gaps from human and environmental perspectives?

In shipping itself, we continue to work with a pattern of prescriptive rules when adjoining industries like aviation have moved to risk based approaches. Should maritime governance move in a similar direction?

Inland shipping, along the rivers, is a strongly emerging sector in India. These will have attendant river ports, connected to other land transport systems and all the operational and commercial systems that come with trade. The flow-on effects are very far reaching.

This brings us to the next large issue - **climate change**— and for us to consider how we can respond to it. Perhaps even more than the commercial and economic changes that we have seen, the effects of climate change are far reaching. Our rivers are flowing, but not as they used to. We still have the rains, but not as we used to. As the seas warm up, fish (those that are left after the ocean trawlers have been over them) are migrating to cooler waters. What is the social contract we have as an industry that connects us with the world, with society? We cannot exist without our environmental baseline. Do we have any role in addressing climate change or is that a role for governments? Are governments likely to seek privatised responses to climate change? Are we ready for the rising sea levels and heightened profile of weather systems? What is the exposure of maritime assets to climate change? There is no doubt that we will have to adapt to climate change but do we have any views on how we will do that socially, economically, and in our labour use policies?

These are some of the key elements that universities will have to keep clearly in focus as we support shipping, the indispensable part of the globalised world. As the reach and demand of our specialised and universal education spreads into new and adjoining sectors of the economy, our responsibilities become larger. The success of our performance is seen in the level of innovation that can occur in the sections of society that we support. The developing and maintaining of knowledge cannot be left to chance. It is a tradable asset of value both socially and commercially.

Let us take a quick look at the concept of innovation: Fundamentally, we can agree that innovation is what leads to growth. Growth can be extensive as well as intensive.

Extensive growth is where we might say we add more factors of production – money, labour and technology – to get more returns. The way the work is conducted remains constant. As we know from economics, each additional factor of production results in a proportionately diminishing return.

Intensive growth is the result of better, innovative, ways of using factors of production. This allows sustainable growth through considered and constant improvement. Suitable knowledge, technology and supportive policy all play a big role in making intensive growth possible.

We can broadly see the effects of both types of growth around us. Extensive growth has been possible when more people and resources are employed to deliver greater output and attract

investment. Fast growth has been achieved by the use of advanced technologies, sometimes those that were being used in other parts of the world.

Innovation is manifested in both extensive and intensive growth. But innovation is not the same as developments in technology. Developments in technology come out of existing knowledge applied to improve current systems. Innovation is new knowledge or ways of doing things. Some developments lead to major long term shifts in our life experience, for example as happened with the advent of mechanised transport, engineering systems, refrigeration and air conditioning, medicine and pharmaceuticals, satellite communications and their applications, and information technology. The effects of these have been far reaching on our lives. But they can take time to develop. Diesel engines in ships have been with us for over 100 years. Containers came into shipping more than 50 years ago. But it took time for them to evolve to the sophisticated multimodal operations we see today.

If we take the example of tankers, the *Zoroaster*, was built in Sweden in 1878. It carried 242 tons of oil. From the original single hull design that this ship had, we see today that tankers have developed greatly in sophistication of construction and operations. Today's Ultra Large Crude Carriers are up to 500,000 tons, double hulled, highly computerised, comfortable to live on and as safe as they can be made for operations. Of course, there have been a few quite spectacular accidents but the industry learnt from them and new legislation, such as the Oil Pollution Act of 1990 in the USA, followed by the 1992 and 2001 amendments to IMO's MARPOL came into effect.

India has an ancient maritime trading history that goes back several thousand years. Historic records and archaeological evidence suggests trade with all of Asia, Greece, Rome, Africa and even Australia, long before the first European fleets, led by Vasco da Gama, orienteered their way around the African continent to its shores.

Shipbuilding, navigation, trade and commerce were all well advanced for many centuries in India, suffering a downturn in the mid-1800s. For all of us in the industry, this is an interesting case study to follow. How did a country that had such success in commerce and trade, shipbuilding and navigation, spreading culture and learning for so many centuries, suddenly lose so many of its skills and abilities?

The scale of developments today in the maritime sector in India, as seen at the India Maritime Summit 2016, is unmatched in scope and amplitude. There are significant hurdles to overcome, including achieving a shift in the profiles of the skills pool. The challenges associated with re-training, up-skilling or attracting skilled workers for a greatly enhanced maritime sector are significant. Its needs are far reaching in skills development at all levels, research and its commercial application, exploring possible government responses and anticipatory actions, and informing them through our knowledge development capabilities. This is an essential role that

universities of known capability must provide through their everyday task of education as well as invited comment on specialised issues.

At this point, I want to sound a caution, which is this: while we expend effort towards making universities relevant to the industry, let's guard against making them retirement places for those coming out of industry to see out the afternoons of their lives. Academics should have senior experience in the industry in addition to being highly qualified. Universities should attract highly capable people from the industry as well as feed capability in the opposite direction, developing a symbiotic and sustainable relationship.

I want to thank you all for your time. I greatly appreciate being given this opportunity and wish you success for today's conference and your very important task in keeping the shipping industry indispensable to the world.