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# to the world in 2041

**The Next Vision and Environment Scan  
for the Future of the Marine Institute**

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## ASSESSING THE OCEANS ECONOMY

The oceans economy, as broadly defined by the OECD, includes both the activities of ocean-based industries and the assets, goods, and services provided by marine ecosystems. It therefore necessarily involves both the use and exploitation and stewardship of ocean resources.

There has been a great sense of excitement about the Oceans Economy over the past few years, in particular the estimates that the Global Oceans Economy will be worth \$3 trillion by 2030. In truth, however, while the Oceans Economy is large and growing, it is not actually a high-growth sector. In fact, economic projections have it growing at 3.5 percent over the next decade—slightly less than the projected growth rates for the global economy as a whole over the same period. As a corollary, what this means is that, as in the global economy as a whole, growth rates in the Oceans Economy will be faster in developing countries than in developed ones.

Another fact to recognize about the Oceans Economy is that it has fairly distinct public and private sectors. Transportation and the exploitation of mineral and biological resources is almost exclusively private sector, whereas issues around environmental analysis and protection are largely public sector (or, like marine safety, paid for by the private sector based on rules and regulations laid down by governments). It is therefore worth tempering expectations about the growth of the local Oceans Economy if, as is the case for the Marine Institute, part of one's oceans portfolio is tied heavily to the public sector component of the economy. The private sector portion of the Oceans Economy will grow at whatever speed the broader economy will allow; the public sector will move at whatever speed political fashion and fiscal constraints will permit. To the extent that governments are fiscally constrained, especially in Atlantic Canada, there is no reason to think that the Oceans Economy is a growth economy at all.

A global examination of the Oceans Economy shows not all of its constituent sectors are moving ahead at similar rates. Only a few sub-components are rising at levels above overall global growth rates. These are, specifically: OFFSHORE WIND,

MARINE AQUACULTURE, FISH PROCESSING, and PORT ACTIVITIES. In theory, it would make sense for the Marine Institute to focus specifically in these growth areas. However, demand for all of these is not equally spread around the world. The local demand for training and education in fish processing remains unclear, and most of the global growth is expected to take place in Asia; hence, this is likely should not be a major priority area for the Institute.

The other three areas, though, are much more promising. Offshore wind is unlikely to take off as a domestic industry in Newfoundland and Labrador given the current reality in the province's domestic energy situation and the difficulty in transporting such energy to larger markets. However, with the industry mainly based in other Atlantic countries (America and the EU), it is easy to see how industrial testing at least might be lured to Newfoundland and Labrador, or, alternately, that the Institute's scientists could easily bring their experience to bear in other Atlantic locales. The port management and marine aquaculture fields are less concentrated in the Atlantic (in both cases, the biggest part is happening in Asia or other developing countries), but there is still a significant local market. For port management in particular, a significant market exists for short training programs which can be packaged at low cost and delivered anywhere around the globe, thus creating new revenue streams for MI.

## ASSESSING THE PROVINCIAL ECONOMY

The Marine Institute is both a resource- and capital-intensive institution. Its continued success as a leader in oceans-related training, education, and research relies on stable and consistent funding. Thus, in any environmental scan of the organisation's future, it is necessary to consider the financial implications of its ambitions.

The immediate focus of this scan of the Marine Institute's future operating environment is the institution's two primary sources of funding—the provincial government and industry—and what the future holds for them.

To begin, the scan examines the state of the oil and gas industry in Newfoundland and Labrador because its health underpins the health of both the provincial treasury and the province's economy. The government's strategic plan, *THE WAY FORWARD*, identifies doubling oil and gas production, which already accounts for 25 percent of the province's GDP, as one of the key elements of its economic vision for the future of Newfoundland and Labrador. However, while the renewed Atlantic Accord provides the government with some breathing space financially, the price of oil needs to remain high for Newfoundland and Labrador's oil and gas industries to be commercially viable.

The International Energy Agency's latest predictions suggest a great deal of uncertainty about the demand for oil in the coming years: its *WORLD ENERGY OUTLOOK 2018* publication offers at least two competing scenarios for the future of global energy demands. First, the **New Policies Scenario** implies slowing growth in demand for hydrocarbons, but nevertheless suggests a rise in demand of about seven million barrels per day by 2025 with a concomitant rise in price to close to \$90 per barrel. However, the **Sustainable Growth Scenario** envisions that determined action by various actors leads to oil demand peaking by 2020 and declining thereafter, leading to a significantly lower price.

It is also possible that oil prices may trend lower if there is a significant fall in demand for other reasons. For instance, there are substantial and well-founded

fears that China's long boom is, albeit slowly, coming to an end; maintaining commodity prices in the face of such a shift may prove to be challenging. In light of this, barring a major global crisis of sorts, the price of oil and other extractable commodities can be expected to stay within its current range over the course of the next five to six years, which is to say that the government and industry can anticipate that the price of a barrel of oil will range from \$60 to \$90. This would be high enough to maintain an oil and gas production industry in Newfoundland and Labrador, but it is not necessarily high enough to see it expand in the ambitious way as described by the government in *THE WAY FORWARD*.

From the government's perspective, this could be good news: if oil stays towards the upper-end of this price range, there will likely be enough room to stabilise the provincial finances, especially with the added support of the Atlantic Accord.

Unfortunately, there seems little prospect that the province's economy will experience positive rebound following stabilisation; oil prices will put a floor on economic activity, and the limited diversity in Newfoundland and Labrador's economy suggests there is little prospect in the medium-term (within the next 5 to 10 years, for example) of other sectors helping it to take-off again. The restart at Voisey's Bay, the expansion of fish processing, particularly in Placentia Bay, and other ventures are likely to support the economy, but none represent the tinder necessary to spark a take-off.

Another, and arguably the most important, limiting factor for economic growth is the province's demographic situation. Figure 1 illustrates how the youth population (0 to 18 years old) in Newfoundland and Labrador has shrunk in the past decade. The oldest age group (17- and 18-year-olds), who would currently be starting their postsecondary studies, has shrunk by almost 20 percent since 2008.

Table 1: Change in population by age in NL, 2008 to 2018<sup>1</sup>

<i>Age</i>	<i>Change in population (2008 to 2018)</i>
0	-8.16%
1	-5.22%
2	-5.25%
3	-3.12%
4	-1.85%
5	-5.84%
6	-5.01%
7	-0.12%
8	-0.34%
9	1.42%
10	-1.37%
11	-6.48%
12	-8.73%
13	-11.76%
14	-11.83%
15	-13.34%
16	-14.80%
17	-19.18%
18	-19.53%

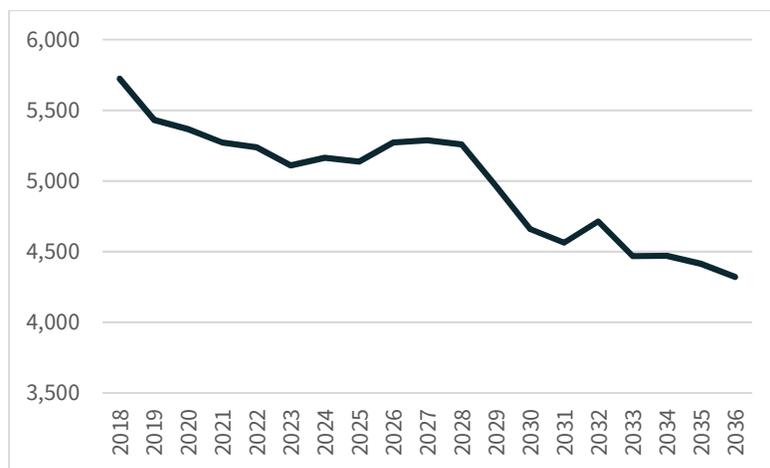
Importantly, Table 1 indicates that higher education institutions in the province, particularly Memorial, which relies heavily on local students<sup>2</sup>, face some serious enrollment challenges in the next five years, after which demographic numbers

<sup>1</sup> Source: Statistics Canada

<sup>2</sup> 67 percent of students at Memorial University are from Newfoundland and Labrador. Source: MUN, *Memorial University of Newfoundland – Fact Book 2018*, Table 12, “Distribution of Full-time and Part-time Student Enrolments by Postal Code – Fall 2018”. [https://www.mun.ca/ciap/Analysis/Factbook/2018/Table12\\_FactBook2018.pdf](https://www.mun.ca/ciap/Analysis/Factbook/2018/Table12_FactBook2018.pdf)

appear to improve until the end of the decade. Additional limiting factors to enrolment-generated revenues, such as the current restrictions on tuition fees, will require the Marine Institute to be creative in the way it manages both its enrolment numbers and its finances.

*Figure 1: Projected population of 18-year-olds in NL, 2018 to 2036<sup>3</sup>*



However, the greatest danger for the Marine Institute and for the province will be in the second half of the institution's journey to 2041. The projected number of 18-year-olds is expected to decrease almost 10 percent over the next decade. From 2030 onwards, the number of 18-year-olds in the province is expected to decline swiftly and considerably, dropping almost 20 percent from 2028 to 2036. This will pose significant risks to the Institute's enrolment numbers as well as to the human capital potential for Newfoundland and Labrador.

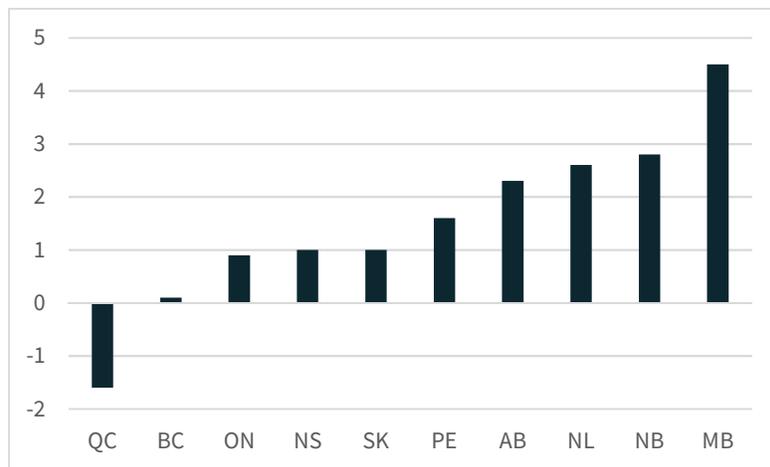
Demographic concerns will inescapably affect the province's capacity to not only generate revenue, but to subsequently fund its public higher education institutions. Although the Marine Institute has made efforts to diversify its income streams, the government grant still constitutes a substantial source of revenues

<sup>3</sup> Source: Statistics Canada, *Table 17-01-0005-01*.

for the institution, which does not look to change drastically in the near future. The reliance on the provincial treasury for almost half of its money places the Institute in a precarious position.

Perhaps more concerning is the federal Parliamentary Budget Officer’s fiscal gap estimates, which suggest that “current fiscal policy is not sustainable over the long term” at a provincial level.<sup>4</sup> Figure 2 highlights this particular challenge for Newfoundland and Labrador, which according to the Parliamentary Budget Officer needs to make program changes equivalent to almost 3 percent of its GDP in order to maintain its debt-to-GDP ratio at current levels. This would require a either revenue increases or spending reductions worth \$870 million.

Figure 2: Provincial fiscal gap estimates by province, 2018<sup>5</sup>



<sup>4</sup> The PBO identifies fiscal gaps as the rate at which a government must reduce spending or increase revenues, relative to GDP, in order to maintain its debt-to-GDP ratio at current levels.

<sup>5</sup> Source: Office of the Parliamentary Budget Officer, *Fiscal Sustainability Report 2018*.

[https://www.pbo-dpb.gc.ca/web/default/files/Documents/Reports/2018/FSR%20Sept%202018/FSR\\_2018\\_25SEP2018\\_EN\\_2.pdf](https://www.pbo-dpb.gc.ca/web/default/files/Documents/Reports/2018/FSR%20Sept%202018/FSR_2018_25SEP2018_EN_2.pdf)

It is also hard to ignore the significant export deficiency in Newfoundland and Labrador with respect to other provinces in Canada. Of the six major national regional cities<sup>6</sup>, St John's ranks last in terms of exporting businesses. At only 190 exporters (of the 310 in total in the province), the city contains only one-third of the exporters found in Halifax. Across the country, only Prince Edward Island (242) has fewer exporters than Newfoundland and Labrador, which accounts for only 13 percent of all exporters in Atlantic Canada and less than one percent in the country. In short, one of the province's major economic challenges ahead will be its ability to get its product to market overseas.<sup>7</sup>

In sum, the likeliest economic scenario at this moment is one in which economic activity in Newfoundland and Labrador settles at slightly above the 2018 levels for the next decade. While the economy may be slightly more balanced than it has been for some time, demographic change will continue to act as a not insignificant drag on the economy as-a-whole. Given these factors, one solution in the future may be a considerable and concerted effort to focus energies on improving Newfoundland and Labrador's ability to export goods and services to the global market.

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<sup>6</sup> St John's, Halifax, Montreal, Toronto, Calgary, and Vancouver (census metropolitan area as defined by Statistics Canada).

<sup>7</sup> Source: Statistics Canada, Tables 71-607-X, "Trade in Goods by Exporter and Importer Characteristics: Interactive Tool".

## ASSESSING THE INSTITUTE'S FUTURE

Consultations with members of the Marine Institute community, its partners in industry, and those in government was largely grouped around four axes:

*The Marine Institute's reputation and place within either the global oceans economy or in the provincial postsecondary landscape;*

*The need for Marine Institute to engage with the effects of climate change on the oceans, such as in the green economy and renewable resources, and in the Arctic;*

*The need to establish a more integrated and inclusive research culture that balances the basic, fundamental research that will underpin much of the future and ongoing applied research for which the Marine Institute is world-renowned; and*

*The role of data collection, analysis, and management in the future of the global oceans economy and the implications for the Marine Institute's research and development operations and its academic endeavours.*

### ON THE INSTITUTE'S REPUTATION AND PLACE

The Marine Institute has a special relationship with the people of Newfoundland and Labrador, and has taken its mission to support province's economic development very seriously. As a result, the institution has established a lot of cachet with the government, which recognises the value of the Institute to both the province's economy and its education system. Respondents to HESA's interviews and survey noted that the Marine Institute "is truly an institute of Newfoundland" and that its "unique location in Newfoundland and Labrador is a strength."

However, a consistent message from the overwhelming majority of respondents in industry, and from those with industry experience within the institution, was

that the Marine Institute is “the best kept secret in Newfoundland [and Labrador].” The concern for industry is that the Institute “is not as high profile as we like to think it is, or that we believe it necessarily should be”. Indeed, the feeling that the Marine Institute’s international presence may not “be nearly as strong as other institutions” seems pertinent (though it is unclear to which specific comparator institutions industry members may be referring). Partners in various marine industries based in the province noted that the Institute’s lack of profile was problematic. They suggested that Newfoundland and Labrador suffers from a lack of recognition, which is particularly noticeable when international partners are unaware of the Marine Institute.

Despite the Institute’s presence in most coastal regions around the world, some respondents believe that the institution “is known when it wants to be and to whom it wants”. Further, there is no clear understanding within industry on what *world oceans institute*<sup>8</sup> means: some understand it as the Marine Institute competing on a global scale against other top institutions in oceans-related sectors.

One respondent stated that the Marine Institute should have a more substantive international presence, “but we need to do more bragging to get there. We aren’t good enough at that.” Several other respondents noted that the capacity to speak globally at international forums beyond select academic or association circles is important for the Institute’s leadership within the global oceans economy. It must, “Go out there and keep talking and being loud.”

In one respect, the Marine Institute has a distinct competitive advantage: its comprehensiveness. Regardless of sector, the Institute’s industry partners resoundingly believe that, “No one has the full range of activities that [the Marine Institute] has.” However, many industry partners indicated their familiarity with the Institute’s operations outside their field of work was significantly limited, stating that, “[The Marine Institute] may be unique, but it is not necessarily well known in terms of the *breadth* of its offerings”. While the entirety of the organisation’s

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<sup>8</sup> The phrase, “a world oceans institute”, was a key message stemming from Vision 2020. It has been praised for helping the Institute community appropriately judge its ambitions, but has also been criticized for its vagueness.

capabilities may not be well publicised, it is clear that people do recognise that the Institute possess that range of capabilities. As one respondent noted, “Right now is there anything that it doesn’t do?”

Work remains to be done to deconstruct the siloing effect that has developed within the institution. The challenges of siloing is reflected in perceptions of the Institute within industry. Respondents noted that the institution’s “strength in being involved in many and diverse projects and research is also a weakness in that even [Marine Institute] folks don’t know what is happening across the Institute.” This echoed comments that the institution will “need to make sure that its Schools and [research centres] are working together in order to be proficient at speaking across the breadth of the oceans economy”, especially to position both itself and Newfoundland and Labrador’s oceans-related firms as significant players in the Oceans Supercluster.

To address these concerns, respondents noted that the Marine Institute’s priority with respect to its reputation and place within the global oceans economy should be to grow and heighten the institution’s profile: “We should be the people to take science to sea”, for Memorial, for the province, for Atlantic Canada, and for the entire continental eastern seaboard.

Others noted that eastern Canada does not have the at-sea capabilities to conduct scientific research without the Marine Institute and the people involved in its at-sea operations. In other words, the institution “has to be the place to go” for all things ocean-related—a repository for oceans-related learning and research. Even if the Institute were to fall short of its Vision 2020 ambitions of becoming a world-class institution, members of the Marine Institute community and industry believed that the institution must at least be *Canada’s* oceans institute.

Though it may be a stretch to undertake “a strategic effort [...] to make the political case for [the Marine Institute to be] a National Marine Centre”, the sentiment that respondents wanted more recognition for MI and its work in the country was evident. In other words, it must be the institution that brings the oceans to Canada and Canada to oceans around the world.

### **ON THE INSTITUTE'S ENGAGEMENT WITH CLIMATE CHANGE**

The effects of climate change, especially in and around the Arctic region, will increasingly be a topic of interest and concern for industries working in the global oceans economy.

From the perspective of an institution of higher education, one respondent indicated that “a marine institute [in the 21<sup>st</sup> century] should be more focused on climate change impacts and mitigation.” This type of response constituted one of three broad fields of commentary with respect to climate change. In addition to the call to action for more mitigation, resilience, and adaption-related work, responses in this area were also grouped in either a general call for more geographic-specific expertise, particularly in the Arctic regions, or more toward divestment of activities and consulting operations out of fossil fuel industries and into the renewable energies sectors.

On the Arctic question, the Marine Institute is uniquely positioned given Memorial's 10-year memorandum of understanding with the Nunavut Arctic College to play an instrumental role in establishing and maintaining a repository of learning about the future of oceans, including in Arctic waters. Similarly, the Institute's experience in working both in the South China Sea and in the Caribbean suggests that it could also enhance its expertise in climate change mitigation and adaption by small-island states.

One respondent noted that the Marine Institute's leadership in the marine industries is incumbent upon how much the institution engages in climate change research because, “None of the industry people are climate change experts and they are all going to look to [the Marine Institute] for advice.” Another suggested an even more “explicit focus on climate change and [to develop] a climate change training centre” at the Institute. Others observed that while companies may compete against one another for certain pockets of expertise, climate change science and research is a common weakness of industry partners but a perceived strength of the Marine Institute.

That said, there is room to grow for Institute in this area; multiple respondents wondered, “Why is [the Marine Institute] not doing more in tidal and wave energy? Why are they not leaders in that technology” and that “[the Marine Institute] needs people who can take the institution to thinking bigger than the next client” because “Sustainability is what it’s all about—and the old guard forget that often, but they would not have a livelihood without it.”

### **ON THE INSTITUTE’S RESEARCH ENTERPRISE**

The central tension of the Marine Institute’s evolving research profile continues to be a pertinent issue for the institution. Vision 2020’s assessment details this evolution and its challenges. While it continues to realign and repurpose its research enterprise—no small feat—the Marine Institute’s expertise remains primarily in the industrial relations aspect of research and development. In doing so, the Institute can continue to maintain its excellence in applied research (and grow these capabilities through innovative public-private models such as industry-funded research chairs) and continue working toward becoming the leading fundamental research facility in targeted fields within the global oceans economy, such as in sustainability and the Arctic.

Institute employees observed that “we house some of the best traditional and industry response researchers in the world specialising in the oceans economy”, and that an important aspect of the Marine Institute “is our focus on industrial relevance and sustainable solutions.”

The importance of industrial and applied research to companies working in the marine industries was repeatedly emphasised. It is clear that industry values both its close ties to the Marine Institute and the contract work conducted by the Institute’s researchers and technicians on behalf of companies. While industry partners were not necessarily opposed to the Institute’s ongoing efforts to reprofile its research enterprise, many noted that work remained on the Marine Institute’s part to explain the implications and effects of TRL 1-3 research for industry and its TRL 4-6 demands. They suggested that such explanations should be done

in town hall style settings, during which some of the broader strokes of the Marine Institute’s vision for its future are also shared. Understanding of this balance is perhaps most evident in the fisheries sector.

The introduction of further graduate programs is an important element of the institution’s evolving research enterprise. As one respondent commented, “Basic Science research, often informing applied research, is becoming an increased expectation of [the Marine Institute] as the number of graduate programs grow.” Another added that the Institute is, “on the precipice of offering a full slate of PhD programs”, moving ahead with its desire to offer a doctoral program in all three of their academic Schools. It is evident to industry partners that the number of doctoral students and doctoral programs on offer will increase.

There is consensus in the Marine Institute community (both on- and off-campus) that the extent to which the Institute can carve a space for itself in the national graduate education landscape will be a determinant of success by mid-century. In a recent report prepared to identify areas of opportunity for Memorial’s Harlow campus, it was reported that two of the top three master’s-level programs at Memorial with the greatest traction overseas are Marine Institute programs. In other words, the next vision presents a prime opportunity for the Institute to not only introduce itself to the national graduate education landscape, but to reinvent how it delivers blended learning modules at the master’s level. Certainly, some members of the community believe that the Institute “could be world [leaders]” in specific fields, such as in fisheries stock assessment, while others have pointed to the growing demand in more shore-based capabilities and jobs such as in port management and maritime planning.

### **ON THE INSTITUTE’S APPROACH TO DATA AND DIGITISATION**

An undercurrent theme that will affect all aspects of the Marine Institute’s business is the anticipated growth in both the procurement and use of simulators. While this may not require any change in the technical requirements for the certification of students and faculty, the proliferation of simulators will likely result

in two major changes for the Institute's operations: firstly on its physical infrastructure (for example, fire exercises at facilities in Stephenville and Foxtrap may be carried out with propane simulators in the future) and secondly on the professional development of its faculty, who will require upskilling in order to run the simulators used for training students.

The overall response to questions of data and digitisation is the belief that the science behind much of the training and academic formation done at the Marine Institute is not likely to change. This was consistent across the different sectors in which the Institute works. However, changes in the technologies that drive that science will be the major source of innovation in the next two decades. As such, the Institute should be viewing technology as a facilitator for the science needed to be at the forefront of education and research for the global oceans economy.

Respondents noted that, “while we need to maintain traditional hands-on training to students, graduates leaving [the Marine Institute] will also need more training in coding, troubleshooting, [and] data collection, cleaning and analysis.” That no one else, certainly in Canada, is teaching—or trying to understand—the technology that will determine advancements in the next fifteen to twenty years presents the Institute with an opportunity to stand out on a world stage.

To do so, however, will require more technology-heavy training across all the Institute's programs. As such, the pursuit of traditional academic staff (doctorates, for example) will need to be balanced with investments into technical staff and their skills to maintain the capacity to address technical and technological questions.

The Marine Institute should also anticipate that it will be admitting and training students for higher technical capabilities. While sector- or trade-specific capabilities, such as those required in engineering, will also be more advanced in twenty years, the technical know-how to make the engineering work with high-end technology will also be a key skillset required for graduates of the Marine Institute. Such “hands on ability to assess, troubleshoot and repair leading-edge technologies” as well as an ability “to assess both sides of a challenge or disruption to

current norms and to deliver a well-founded report to their employer” are quickly becoming essential skillsets for graduates of higher education.

Some respondents also noted that the Institute has been very dependent on federal funding, as well as some private investments, for the infrastructure that underpins the institution’s key capabilities (e.g., the flume tank and simulators). Such concerns underlined the fact that “[the Marine Institute] will need to find ways to remain at the leading edge of a capital-intensive ecosystem.”

This perceived dependence has prompted three responses: first, how does the provincial government perceive the Marine Institute and are the investments made into the institution reflective of that perception; secondly, does the federal government understand the role and place of the Marine Institute within the Canadian postsecondary landscape and within the national oceans economy; and thirdly, given that monies required to sustain a technology- and infrastructure-heavy educational institutions tend to be federal, what are the implications of the Institute’s dependence on federal investments.

The Institute has to take full advantage of the monies and opportunities made possible by the advent of the Oceans Supercluster; the cyclical nature of federal investments indicates that a pool of money for both research and capital this substantial (e.g., OFI and SIF) may not be replicated for a while. Industry partners and faculty in certain fields are well aware of the predicament that the global oceans economy is a government-driven economy. As one respondent noted, “Certain projects heavily rely on government funding and you have to wonder where that money is going to come from in the future.” Indeed, much of the work and investments in the short- to medium-term future of the oceans will be in data collection and analysis, rather than in resource extraction, the bulk of which historically (and very likely in the future) is driven by government funding rather than private enterprise investments.

Funding concerns aside, the Marine Institute has the opportunity to position itself as the primary research and development facility with industrial connections for the Canadian oceans economy. Considering the expected growth in knowledge and data management, respondents noted that the Institute “needs

to become a knowledge-based organisation and assist others in the marine sector to do the same in order to be successful. We [...] have the expertise throughout the marine sectors and we have experts in the field of knowledge management. Now we need to put it together in an organisational knowledge management strategy and demonstrate to the world how we did it.”

## ASSESSING THE COMPETITION

In many ways, there are no direct competitors for the Marine Institute because of its comprehensiveness. No other academic institution offers the breadth of research, training, and educational expertise that the Institute possesses, and certainly not in as many different oceans-related fields of study.

However, given the Institute's expansive footprint, there are also many different types of competitors for different reasons. These institutions can be analysed in three different categories: as a marine research institution, as a Canadian teaching institution, and as an oceans institution competing for federal funding within multi-stakeholder and -partner initiatives.

### MARINE INSTITUTIONS

Assessing direct competitors for the Institute as a whole poses unique challenges. At a program level, some of the Schools at the Marine Institute seem to know who their direct competitors are. The School of Ocean Technology, for example, lists the World Maritime University, the University of Rhode Island, Cranfield University, the Australian Maritime College at the University of Tasmania, Warash Maritime Academy, the Arctic University of Norway, and SAMK in Finland as competitors who offer various graduate programs of interest to the Marine Institute. The School has also identified other specialities at Kobe University, Lamar University, the Stevens Institute of Technology, or the Stord/Haugesund University College as worth studying.

However, each of these institutions offers a slightly different area of focus; it is difficult to say which institution or even program is directly comparable and how applicable they are given other external contexts such as the institution's cultural or regional demands. It is clear that there is no one institution anywhere in the world that possesses enough of the Marine Institute's individual components to warrant exclusive comparison. As a result, it may be better to cast a wider net and highlight the different structures that contain varying points of similarity

(and contrast) with the Marine Institute. The following institutions are identified primarily because they are marine- or maritime-specific institutions with an academic focus.

*SOUTHAMPTON MARINE AND MARITIME INSTITUTE (SMMI)*: a collaboration between the University of Southampton (a United Kingdom-based Russell Group institution) and Lloyd’s Register with a comparably large academic focus. Though SMMI has fewer vocational and industrial ties than the Marine Institute, its research and teaching capacities could be useful in gauging the Institute’s aspirations in this regard. SMMI’s focus on language as it pertains to the “human use of the sea” may also be instructive in helping the Marine Institute articulate its desire to specialise in the interface between the oceans and technology. Additional aspects worth considering for comparison are SMMI’s global footprint (including its campuses in Malaysia and Singapore) as well as its interdisciplinary knowledge generating activities in partnership with other academic departments such as in the humanities and social sciences.

*ARAB ACADEMY FOR SCIENCE, TECHNOLOGY AND MARITIME TRANSPORT (AASTMT)*: a comparable institute in the way that it identifies as a university specialising in a particular field, in this case transportation, which is not unlike the historical focus of the Marine Institute into maritime studies. AASTMT also operates with high per-student costs to reflect the resource-intensive nature of maritime education, albeit with a vastly different funding structure and cultural context (for starters, AASTMT is funded by multiple public sources that allow it to have several physical sites across the Middle East). AASTMT may be useful for comparison given its ISO certification and similar bachelor’s degrees in maritime transportation, technology, engineering, and management. Their partnerships around the world either through regional accreditation organisations or with individual universities and institutions may also be worth considering as the Marine Institute seeks to expand its global presence and offer more overseas opportunities for its students, staff, and faculty.

*TOKYO UNIVERSITY OF MARINE SCIENCE AND TECHNOLOGY (TUMSAT)*: a well-resourced institution whose predecessors have a long history in the maritime field but whose

modern iteration has chosen to identify as a “dedicated ‘Science and Technology’ university”. It is also guided by a medium-term vision (until 2027) with similar broad strokes to the Marine Institute’s education, research, and internationalisation ambitions. Similarly, “regional” in part (TUMSAT’s focus is more in the Asia Pacific region), TUMSAT is worth considering for its comparable ambitions to drive Japan’s economy through excellence in the oceans and its desire to enhance its research capacity to focus “on practical learning in close partnership with industry”. How the institution seeks to internationalise their campus (TUMSAT uses the term, ‘cosmopolitan’) may also be of use to the Marine Institute.

*WESTERN NORWAY UNIVERSITY OF APPLIED SCIENCES (HVL)*: one of the largest universities in Norway, this school was born out of a merger between several university colleges to create a more applied-focused institution. This particular institution may be of interest to the Marine Institute because of its (smaller) Marine Centre’s relationship to the (larger) university whose own specialty is not in marine studies. However, HVL also offers through the Marine Centre several bachelors and graduate (including a PhD program in nautical operations) programs, which would make them a worthwhile case study for the Marine Institute’s plans for deepened integration into the broader Memorial organisation.

*FORAS NA MORA*: commonly referred to as the Irish Marine Institute, this government agency is responsible for all things marine in Ireland, be that research, technology, or innovation. Structured within the ministry of Agriculture, Food, and the Marine, the organisation is charged with providing the government with “scientific and technical advice [...] to help inform policy and to support the sustainable development of Ireland’s marine resource.” Like the Marine Institute, Foras is chartered with an explicit economic development focus through legislation; however, their mission also provides a clear mandate to “protect the marine environment”. Although Foras is not a teaching institution (the extent of its academic activities is to fund and to partner with academic researchers at universities across Ireland and throughout Europe), it is a natural comparator for the Marine Institute for two reasons: a) because of its knowledge generation responsibilities and capabilities through its research services, and b) because the Marine Institute itself sees Foras as an organisation worthy of comparison.

Foras' research structures are primarily what make it most comparable to the Marine Institute; the Irish agency also operates principally in the fisheries ecosystems, marine monitoring, ocean information technology, and shipping fields. The major difference in this regard is in the type of clientele for these two institutions: while the Marine Institute serves a wide variety of private enterprises in Newfoundland and Labrador, and indeed around the world, who come to the Institute for its research expertise and "practical solutions", this is not the case in Ireland. Rather, Foras' primary client for research services appears to be the Government of Ireland, principally at the ministries of Agriculture, Food, and the Marine and Transport, Tourism, and Sport. "Meeting the needs of decision makers" is an explicit strategic initiative for Foras through their activities. Industry appears to be Foras' smallest group of clientele, focused in the seafood, shipping, and biotechnology sectors.

There are several other parallels between these two institutions: both are marine-focused, island-based, on the edge of larger confederations through whom major sources of research and development funding can be made available. Another primary difference, however, is that Foras is not a teaching institution; while the Marine Institute generates ocean knowledge by educating and training the ocean leaders of *tomorrow*, Foras appears to focus on supporting *today's* leaders within the political and bureaucratic spheres in Ireland. Further, it is entirely government funded and, while it supports academic researchers at higher education institutions across Ireland to compete for international funding (mostly through the European Union), it tends to manage research funding for partners rather than rely on external sources to fund its own research.

The other most obvious difference between the two institutions pertains to capital assets: What Foras lacks in simulators and flume tanks, it compensates by operating two research vessels, while a third (to replace the aging first) was announced in the Irish government's 2019 budget. The different physical capabilities suggests that there may be an opportunity for natural collaborations with respect to capital assets in the future. Discussions at the Marine Institute suggest

that members of the community look to Foras' vessel capacity as the benchmark they wish to emulate.<sup>9</sup>

It also appears that Foras is more advanced in its internal deliberations with respect to information technology and management, which is essential to the data-heavy future of the global oceans economy that organisations like the OECD and members of the Marine Institute community are predicting. In part, the agency's organisational structure necessitates some thinking in this regard: its team most equivalent to the Marine Institute's School of Ocean Technology (and research centres) is its Ocean Science and Information Services. In addition to the ocean technology research for which this team is responsible, it is also in charge of the information technology infrastructure and information management. Furthermore, Foras' Marine Data Centre, which "acts as the one-stop-shop to all data related to marine matters", may serve as a model for the Marine Institute's own data initiatives. This may more easily allow Foras to not just monitor but respond to changes in the ocean and in the climate, one of four strategic focus areas identified in the organisation's five-year (2018-22) corporate plan.<sup>10</sup>

At the heart of Foras' short-term objectives is its ambition to provide foresight intelligence to both government and industry. This is explicit in both its corporate plan and its organisational structure. One of Foras' principle teams is its Policy, Innovation, and Research Support Services unit, which leads "policy and industry foresight that informs policy development and sustainable development". Among other key tasks, the unit supports the Irish government's interdepart-

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<sup>9</sup> It is important to note that while the Marine Institute does indeed wish for a research vessel (such an ambition was explicit in Vision 2020 and further reflected in the *Review of Accomplishments* document), it more importantly stresses the need to be able to provide research opportunities at sea for its researchers and its research partners. The implementation of the next vision's new strategic framework will likely articulate the extent to which the lack of a research vessel constitutes a critical capability gap.

<sup>10</sup> What Foras' corporate plan calls "Strategic Enablers" are somewhat comparable to the foundational and cross-cutting elements of the Marine Institute's new vision's strategic framework, primarily in the areas of human resourcing, infrastructure, and data.

mental Marine Coordination Group and promotes the agency's research capacities to "ensure that Irish marine researchers are aware of relevant national and international developments". One of FNM's programmes is also tasked with the "creation of a multidisciplinary innovation cluster supporting the convergence of ICT and marine sectors". This may be of particular interest to the Marine Institute as it moves to articulate its own contributions to Atlantic Canada's Oceans Supercluster.

### **TEACHING INSTITUTIONS WITH SPECIALITIES**

The Marine Institute has no direct comparators within Canada with respect to oceans-related education. There are certainly other institutions which play in the field of oceanographic and marine sciences (e.g. Dalhousie, Victoria, and the University of Quebec at Rimouski), but none which have the same level of technical or applied education and nor are any of them as focussed on a single topic as the Marine Institute.

When looking more broadly at Canadian postsecondary institutions, the ones which most closely resemble the Marine Institute are the Ontario Agricultural College (OAC) at Guelph and, to some extent, the Northern and Southern Alberta Institutes of Technology (NAIT and SAIT).

The OAC began life in the 1870s as the agricultural department of the University of Toronto, before being taken out of that institution in 1964 to become one of the founding colleges of the University of Guelph (the Ontario Veterinary College, a sister faculty of the OAC, followed a similar trajectory). Despite formally being part of one or another institution, OAC was always seen as the provincial agricultural college with a mandate much broader than a single school or region. In fact, until 1964, the provincial Minister of Agriculture had a direct role in institutional governance, and since 1997, the institution has had control of all college-level agricultural education in the province (taking over college campuses in Ridgetown, Kemptville, and Alfred, though the latter two of which have since closed).

Although for most intents and purposes it acts as a faculty of the University of Guelph, the OAC retains considerable independence and, above all, a massive

self-sustaining research enterprise. It does so mainly, but not exclusively, through an arrangement with the Ontario Ministry of Agriculture, Food and Rural Affairs (OMFARA), with which the University of Guelph periodically signs long-term agreements of up to 10 years to promote discovery and innovation in food and agriculture. Other research centres add smaller research income in the hundreds of thousands or low millions of dollars, but the main OMFARA contract obviates the need for the OAC to spend a great deal of time chasing new contract-derived revenues. The OMFARA deal overall is worth about \$100 million per year to Guelph, or about 12% of total university revenues. 55% of this is research funds which goes directly to OAC/OVC (mostly the former); another \$20 million funds research stations managed by OAC across the province. This means that research income is worth several times more than revenues generated through student fees (about \$14 million) or through base grant from the province through the institutions (\$26 million).

Guelph's OAC (and to a lesser extent OVC) are almost certainly the closest Canadian equivalent to the Marine Institute, in the sense that they are a specialized institute within a larger university with major applied research responsibilities that take up a large portion of the organisation's effort and contributes in a major fashion to the institutional budget. It is different in a few obvious ways as well: given that it is an academic faculty, it is more tightly woven into the fabric of the larger institution than the Marine Institute is at Memorial; it is also substantially more active in basic research, has one major partner which obviates the need to continually hunt for contracts (though they do in fact receive other research income in comparatively small amounts), and is not active in contract training. But this would appear to be as close as it gets.

The only other examples that would make sense in terms of comparisons to the Marine Institute would be those with strong specific ties to a single industry. These are relatively rare in Canada (colleges and university of art and design perhaps excepted). However, two possible examples from this world be 1) the Northern and Southern Alberta Institutes of Technology, both of which have very strong ties to the energy industry and 2) the Justice Institute of British Columbia.

NAIT/SAIT have two obvious parallels to the Marine Institute. The first is that, like the latter, the Alberta institutions straddle the line between college, polytechnic and university, offering everything from certificates to degrees. The second is that they have a very strong focus on industry, with many programs designed specifically to meet the needs of particular sections of the oil and gas industry (in particular pipeline construction and maintenance), and on applied research (both institutions receive \$5 to 10 million a year in research funding). That said, there are a number of ways in which NAIT and SAIT differ substantially from the Marine Institute. The most obvious is that they are not uniquely focussed on Energy in the way that the latter is focussed on the Oceans Economy. Both Alberta schools are also multi-faculty institutions (in addition to the Energy-focused faculties, both have faculties of Business and Health Sciences; SAIT also has faculties of Communications Technology, Transportation, and Hospitality) which serve the entire economy, not just one sector. Second, they are full institutions rather than constituent parts of a larger institution; they are also considerably larger than the Marine Institute, with FTE enrolments in the 12,000 to 15,000 range.

A final institution which bears some similarity is the Justice Institute of British Columbia. In a couple of respects, it is the Marine Institute's closest comparator, especially in terms of size (between 2,000 to 3,000 FTEs); the distribution of its credentials between certificates, diplomas, bachelors, and graduate degrees; and—alone among the comparators—the fact that it has tens of thousands of individuals on campus every year taking short-course professional training/certifications. However, like NAIT/SAIT, it is a standalone affair rather than a part of a larger institution. More significantly, though, is that the Justice Institute has nothing resembling the Marine Institute's research program (income is under \$200,000 per year and all of it is social science-based), and, since it serves a mostly public sector labour market, its connections to the labour market and employers is much less intense and vibrant than those of the Marine Institute.

In short, the Marine Institute shares some specific traits with a number of institutions: size, history, institutional structure, and research intensity with OAC; in-

dustrial research and employment focus with NAIT/SAIT, and size and degree/training profile with the Justice Institute of British Columbia. All of these institutions bear regular study by the Marine Institute, to look at their successes and failures and consider how they relate to the latter's own future.

### **DALHOUSIE UNIVERSITY**

Dalhousie competes, or appears to compete, with the Marine Institute in specific ways that are largely related to geography. Firstly, Dalhousie is a regional consideration: it has leveraged its reputation in Atlantic Canada as the region's largest public research and teaching facility to move into the oceans field. Secondly, its physical location in Halifax positions it more centrally and more accessibly with respect to the rest of Canada and the northeast region of the United States, allowing it to become a hub more easily than St John's.

However, it remains unclear whether Dalhousie's capabilities and capacities specific to oceans are competitive with respect to the Marine Institute. Members of the Marine Institute community noted that they, "don't know what [Dalhousie] does on oceans, but it sure talks a lot about it". In other words, Dalhousie's ability to *communicate* its ambitions within the broader framework of the oceans economy is the Marine Institute's primary preoccupation on this front. Dalhousie's communications "success" can be understood in two ways: internally and externally.

Internally, the Marine Institute does not have the dedicated marketing resources (human or financial) to compete with Dalhousie. While the latter's efforts on the oceans front are supported by the central communications function of the university at-large, it is unclear given the decentralised structure of Memorial's three-campus system that the Marine Institute enjoys the same support from the broader university community. For the Marine Institute to compete on its own, without significant support from Memorial's central communications functions, will require patience as the institution learns to speak across different marketing fields such as basic research, internationalisation, and graduate programming.

Success in this regard is incumbent on the marketing team to adapt quickly, learning new skillsets and acquiring more resources rapidly.

To compound the scale imbalance, while the Marine Institute may have a history of TRL 1-3 research, the intensity and human resource investment of the Institute's TRL 1-3 capacities is recent. As such, the Institute is still learning how to speak this particular language. By comparison, Dalhousie has been playing the part—and speaking the part—of a 'traditional university' for more than one-hundred years. The Marine Institute has developed substantial capacity in its ability to market the institution and its expertise in undergraduate programming, and in this regard does not worry about competition: the Marine Institute is the premier undergraduate learning facility on oceans in Atlantic Canada. However, shifts in market demand for oceans-related training and learning emphasise a need for more graduate-level programs. This is an area in which the Marine Institute itself is unsure that it has sufficient experience to be able to compete with the likes of Dalhousie (and its recently announced graduate program for oceans science and technology).

Externally, the Marine Institute's most pressing competition appears to be both a question of funding and concentration (from and in Halifax). The decision to base parts of the Ocean Frontier Institute and Centre for Ocean Ventures and Entrepreneurship in Halifax has certainly been to Dalhousie's advantage; it has positioned itself at the centre of a microcluster of organisations who seem to have grabbed the attention of the local economy and the Nova Scotia provincial government. Dalhousie's momentum in conjunction with the growing presence of these organisations has caused frustrations within the Marine Institute community, prompting comments like, "Where did [Dalhousie] come from" and "St. John's is not rowing together as a collective; everyone in Halifax is". A couple of members of the Marine Institute community questioned the decision to locate OFI at Dalhousie despite the evident strength of the Marine Institute on oceans-related research.

There is room for the Marine Institute to establish its own sort of microcluster. While COVE offers a single physical space where participants in the oceans economy can congregate and talk about industry developments, no such space exists

in St. John's yet. The Marine Institute could provide that avenue, and even do so in an interdisciplinary manner through leadership within the Cold Ocean and Arctic Science, Technology, and Society (COASTS) initiative at Memorial. Started 3 years ago, COASTS is a university-wide collection of voices and expertise on the cold oceans. Although several of the Marine Institute's key personnel are involved in the project, it remains unclear the extent to which the Institute's expertise is being fully utilised. One potential role for the Marine Institute is in helping the federal and provincial governments understand the importance of the oceans economy and the Institute to Newfoundland and Labrador's industrial and innovation agendas.

## ASSESSING A STRATEGY FOR THE FUTURE

As it looks forward to mid-century and its new vision for the future of the Institute, it is important to note that the Marine Institute has a solid foundation and track record of success with respect to implementing long-term visions. As noted in the report assessing the Institute's progress over the past 15 years, *Vision 2020: The Future of the Marine Institute – Review of Accomplishments*, “of the more than 90 individual action items to be completed by the end of Vision 2020, 85 percent have already been or are on track to be accomplished.” This was particularly evident in priority areas such as students and programs, and in internationalisation and outreach efforts.

Despite this track record, it is also a fair critique of Vision 2020's implementation to observe that the Institute sometimes allowed the urgent (such as and especially short-term financial considerations) to crowd out the more important (such as detailing longer-term strategic plans in key thematic priority areas) elements of the Vision. The first phase of the Institute's new vision's implementation addresses this concern. Indeed, much of the next eighteen months for the Institute will consist of a 'cleaning up' process to ensure that necessary planning projects identified as part of Vision 2020's realisation are completed.

These projects include the establishment of detailed and comprehensive strategies in the following areas: strategic enrolment management, academic planning for lifelong learning and graduate programs, human resource management, financial management, advancement and business development, infrastructure and technology maintenance and renewal, and marketing and communications. Articulating and disseminating these strategies to the Marine Institute community will be the priority for the Institute as it transitions from Vision 2020 to its new vision to the world in 2041.

To support the next vision, the Marine Institute will have a short-term implementation plan of 2 to 3 years. The purpose of this strategic framework is to guide the institution through the next five years of its transition. It will address elements

identified in this environmental scan expected to most heavily influence the Institute's operating environment. In essence, it will provide structure to the Institute's ambitions to position itself as the catalyst for innovation at the heart of Atlantic Canada's oceans economy. The strategic framework will acknowledge that this is the organisation's priority until 2024.

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*“ The Marine Institute’s priority  
for the next five years is to  
transition itself to become the  
catalyst for innovation in Atlantic  
Canada’s oceans economy ”*

**- TO THE WORLD IN 2041**  
*(Strategic Framework)*

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To realise this goal, the Institute will need to establish solid foundations in its people and technology; it will need to enhance its core functions and services: applied academics, knowledge generation, and industrial solutions; and it will need to embrace a holistic approach to the way it realises its implementation plans, taking special consideration of the institution's culture, its ongoing internationalisation efforts, and a purposeful mission-based planning process.

## FOUNDATIONS

At its foundation, the strategic framework will consider importance of both people and technology. These are the two elements fundamental to the future of the Marine Institute as an organisation. The implementation of these elements will occupy the energies of much of the operational support staff and management who contribute to the Institute's success.

For the Marine Institute to deliver excellence in applied oceans education and research, it needs to have the right people from the top right down to the bottom of the organisation. The cohesive and collective commitment to the institution's ambition to become a 'world oceans institute' was critical to the success of Vision 2020. This will need to continue. In the immediate, the Institute will be seized with considerations of succession planning. As the *Review of Accomplishments* report notes, "within the next 48 months, the Institute expects to see much of its management and senior instructors retire, and with them some serious institutional memory and knowledge."

As many as 40 staff in senior positions could retire within the next three years, and the development and implementation of a **leadership succession and replacement process** is paramount for the Institute's smooth transition to the next decade. In addition, a comprehensive human resources management strategy (part of the 'clean up' from Vision 2020) will inform new hiring principles for the next stage in the Institute's evolution.

The execution of a targeted human resources strategy, at the heart of which are the principles of **mission-oriented staffing**, will ensure that hiring is based on the Institute's new vision, its central mission, and its culture. Members of the Marine Institute community have been unequivocal in their insistence that the institution's culture is essential to its success and the maintenance of which is paramount to the realisation of the new vision. This is not an implication that the organisation's culture is in stasis or that retiring employees must be replaced like-for-like; rather, it acknowledges that the successful contributions of the Institute's culture to its progress rely upon a certain degree of consistency.

This is not to say that the Marine Institute's culture cannot evolve. Indeed, over the next two decades, the organisation must evolve to better reflect the industries it serves and the people it trains and educates. Instrumental to the effective realisation of such a goal will be the development of further strategies and concerted efforts to **modernise and diversify the Institute's workforce**. While some progress has been made to this effect over the past decade (see 'Conditions of Success' section in *Review of Accomplishments*), work remains to be done on gender equality and cultural diversity, particularly in senior positions and in the academic complement.

The other foundation component requisite for an institute of applied oceans education and research is technology. Many of the primary objectives with respect to technology will likely be addressed through efforts to articulate infrastructure and information, communications, and technology (ICT) requirements left unfinished from Vision 2020's implementation. The Marine Institute is a technology institute and to continue to be the best in its field, it must continue to have the best equipment for its researchers, teachers, and students.

The most drastic structural change that is proposed in the strategic framework, certainly from a financial perspective, is the institutionalisation of the Marine Institute's budgeting process for infrastructure and technology renewal. Budgets indicate an institution's priorities and as the Marine Institute launches into the next stage of evolution, it must prioritise its technological needs and the support structures that will enable it to respond to changes to those needs over the next 20 years. As such, the framework will demand a **dedicated budget envelope** of up to 10 percent of total operating costs (for which the Institute would be responsible for providing at least half) exclusively for technology and capital infrastructure<sup>11</sup>. This will enable the Institute to undertake maintenance and upgrades

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<sup>11</sup> The framework would envision that of the 10 percent of total operating costs set aside for technology and capital infrastructure, the Marine Institute would be responsible for providing at least 5 percent from its own current budget, and sourcing the additional 5 percent from other funds, such as the provincial and federal governments and from partners in the private sector.

even in years where public funding or research funds may be less generous than anticipated.

A **capital plan** for the Institute's technology and physical infrastructure will guide the expenditure of these funds. The plan will also include a detailed inventory identifying the life expectancy of major assets and the degree to which they are mission critical, as well as medium- and large-scale capital acquisition schedules. It will be managed through a **centralised responsibility function** (though not necessarily a new staff position) to oversee the plan's maintenance and the Institute's adherence to its financial commitments.

### CORE FUNCTIONS

The framework will build three pillars supported by the foundational pieces. These pillars will be, in effect, the essence of the Marine Institute: what it does, who it is, and for what it is globally renowned. Together, they will constitute the unique comprehensiveness of the Marine Institute's core functions and services: knowledge generation, applied academics, and industrial solutions, all under the same roof.

The three pillars must be viewed as interconnected because their relationships feed each other's strengths and ultimately collectively contribute to the Marine Institute's impact. The framework's knowledge generation pillar will speak to the Institute's identity as an academic institution. It will include the building blocks that make up the organisation's intellectual contribution to Newfoundland and Labrador's economy: academics, culture, and future oceans learning essentials.

Within the first five-year period of the next vision's implementation, the strategic framework will provide for the Institute to continue its aggressive pursuit of **graduate programming and research capacity**, including the establishment of a PhD program in each of its three Schools (it currently has a doctoral program for the School of Fisheries) and the recruitment of up to a total of six (6) Research Chairs (several of these are in place). These ambitions are to complement the previously identified priorities to plan for lifelong learning and graduate programming to be conducted as part of the 'clean up' process.

The heart and soul of the Marine Institute is providing practical solutions to the world's oceans-related problems, but the questions being asked of the institution by its partners in industry are increasingly more complex and require a higher level of science. Increased research capacity is integral to the Institute's success. To do so, the Institute will have to address the tension between its newer, more traditionally-academic researchers and those whose expertise are more applied and industry-focused. These issues are well reported in HESA's *Review of Accomplishments*, the Munk School's Warrian report, and in interviews with members of the Marine Institute community. Resolving these outstanding issues that threaten to weaken the bonds of collaborative entrepreneurship within the organisation will be an inescapable objective for the Institute.

As such, the strategic framework will call for the Institute to embark on a well-considered **culture shift with respect to research inclusion**. The purpose of this building block is to develop an approach that acknowledges the collective contribution of practical wisdom to the organisation's unique manner of generating knowledge. This particular building block may present one of the Institute's larger challenges with respect to the new vision: if knowledge generation is at the heart of the Marine Institute's *raison d'être*, then all of its employees, particularly those who work in research and development functions, must be able to see themselves as part of that mission.

The framework will also ask the Institute to define the role that it will and needs to play in the broader discussions about data and digitisation, as well as climate change, in the global oceans economy. Not only will the Institute need to develop strategies that address the anticipated need for a) **data collection, management, and analysis competencies** and b) **climate change adaptation, mitigation, and resilience research** for the global oceans economy, but they will need plans to execute them.

These two themes are cross-cutting and will affect many, if not every, aspect of the Marine Institute's activities and operations over the next twenty years. This particularly applies to the climate change question given the Institute's close cooperation and involvement with the development of the offshore oil and gas in-

dustry in Newfoundland and Labrador. Indeed, the strategic framework will require the Institute to reflect upon whether it can be equally excited to leverage the technical abilities of Newfoundlanders and Labradorians, as it did over a successful decade for the offshore oil and gas sector, in the renewable energy space.

The Marine Institute can respond to climate change in two ways: with respect to the former, the Institute will need to determine in which of the following it wishes to specialise: climate change observation, prediction, or correction. The Institute may well determine that in keeping with its comprehensive nature and the breadth of its programming and capabilities that it has the capacity to specialise in all three options. Similarly, the Institute can also choose to react with internal options, which include: climate change response, institutional policies, or conflict management. These will be elaborated upon in a strategy to be completed as part of the first implementation plan for the next vision.

In determining its future role in addressing the evolutions of data and digitisation, it is worth noting that the Marine Institute is already a significant producer and collector of data as part of its academic and research activities. As information will likely be a valuable commodity of the future, cataloguing current data in the Institute's possession, planning for how to mine proprietary data, and standardising the collection, attribution, and management of data will be the priorities for the Institute in the coming years.

The integration of climate change and data and digitisation into the learning that occurs at the Marine Institute is an important feature of the **curriculum review** that forms the basis of the strategic framework's second pillar on applied academics. In effect, the Marine Institute will undertake a considered rethink of what it means to deliver an applied oceans education in the 21<sup>st</sup> century, which includes cross-cutting technical skills as well as intercultural and human competency (soft skill) development.

As part of the broader discussion on the future of the Institute's academic programming, the strategic framework has also identified the development of a strategy on **international delivery** as a priority. Such planning would evaluate how the Institute can deliver, for example, executive and graduate programming

in Canada (outside Newfoundland and Labrador) and abroad through online and blended learning objectives and innovation.

The final component of the applied academics pillar will highlight the need for the Marine Institute to undergo a concerted effort to **align its credit hour system** with that of the rest of Memorial University for seamless integration and laddering potential. This will address two fundamental issues, the first of which is a recruiting question. Current students identified the incompatibility of the two credit hour systems as a major barrier to their studies (both with respect to laddering and in general) and, more importantly, to their future studies, which is the underlying concern of the second issue: reputation. Although the Marine Institute delicately balances its competing identities as a college, university, polytechnic, industrial research hub, and training facility, the future of the institution is in its ability to participate at the highest levels of the educational hierarchy. Therefore, the potential for a credential from the Marine Institute to transfer to another institution or form the basis for further education will be a significant consideration for the next vision.

Lastly, the strategic framework's third pillar of the Marine Institute's core functions, industrial solutions, is one that arguably best describes the ethos of the organisation. It is through industrial solutions that the Marine Institute defines itself as one of the most important economic assets in Newfoundland and Labrador. However, one of the Marine Institute's primary challenges over the next twenty years will be in ensuring that it is neither too far behind, nor too far ahead, of the technological advancement curve.

A key component of the Institute's response to this particular issue will be in knowing where its industry partners are and where they want to be with respect to the technological frontier. Therefore, the first of two elements critical to the Institute's ambitions to be a catalyst for oceans-related innovation is a **foresight intelligence** capability. The Institute's capacity to track and predict emerging trends in the global oceans economy will pave the way for enhanced entrepreneurship and competitiveness in the province and across the region.

The second element will enable the Institute to position itself at the heart of Atlantic Canada's oceans economy. The Marine Institute needs to be able to sell or

distribute the foresight intelligence that it gathers. Therefore, the effectiveness of that particular capability is dependent upon the Institute's **ability to convene** business and academics working in the oceans economy in order to disseminate information for greater research and collaboration in Newfoundland and Labrador's marine industries.

### MISSION-ORIENTED PLANNING

Capping the framework are the elements central to the institution's management and organisation. They are, in effect, the cross-cutting administrative functions required to effectively articulate the Institute's story and solidify its expanding global footprint. The limiting factors, both demographic and financial, of the Marine Institute's operating environment over the next 20 years necessitate a more global and international outlook. This will affect the Institute's leaders in areas of student recruitment, finance, advancement and business development, marketing and communications, and internationalisation.

The primary economy in which the Marine Institute operates, the oceans economy, is increasingly international in nature; specialists in the South Pacific no longer need to physically be in the South Pacific. In other words, to plan for the future of the Marine Institute is to plan for a global future—for its students, for its industries, for Newfoundland and Labrador. The framework will therefore ask the Institute to continue the expansion of its international footprint while also leading ongoing efforts to diversify the Institute campus life and internationalise its academic programming and research enterprise.

Internationalisation will likely capture the attention and require the energies of the Institute as a whole in the short term. Internationalisation requires the buy-in and engagement of the organisation's senior leadership, therefore the Institute will need to address inconsistencies with the **overall responsibility for internationalisation** within the institution's organisational structure. It will also have to **evaluate the current mandate and/or redefinition of MI International** within the broader Marine Institute community, while also establishing guidelines for the Institute's international consultancy activities.

The Institute's need to continue to diversify its income streams will be supported by the development of a **long-term financial plan**. This plan will be designed to provide a financial guide for institution through the implementation of its planning priorities. Likewise, it will be asked to develop strategies to position the Marine Institute to **attract further investment** and to develop guidelines to support **whole-of-institution business development** opportunities.

Addressing the lack of progress on the alumni file will be a core part of the framework's intentions with respect to the development a **comprehensive strategic advancement plan**. Articulating the Marine Institute's intentions with respect to its graduates will become increasingly important as the profile of its student cohorts evolve, a reality that will be reflected in the framework's call for a **comprehensive strategic enrolment management plan** that includes international students, graduate students, and lifelong learners.

Communicating (and recommunicating) the Institute's ambitions will be an important component of the next vision's success. While the Marine Institute's mission is explicit in the institution's *purpose*, and the next vision will spell out *how* the Institute will fulfil that purpose, the framework will oblige the Institute to determine what it is and wants to be. As such, the framework will acknowledge that the Marine Institute will need to take particular care with the effort and resources that it dedicates to telling its own story.

The *Review of Accomplishments* report reflected frustrations both within the Marine community and among its external partners at the Institute's under-resourcing of its storytelling capacities. To address this, the Institute will need to establish a cohesive and consistent narrative of who the Marine Institute is, what it does, and what it hopes to become. These efforts will include the development and implementation of a comprehensive, sustainable, and measurable marketing plan for local, national, and international audiences; the development of a specific research and development communications plan to support the Marine Institute's innovation initiatives and efforts related to the Oceans Supercluster; and the development of an international communications plan and structure to continuously articulate and provide updates on the priorities as established under the new vision and its supporting strategic framework.