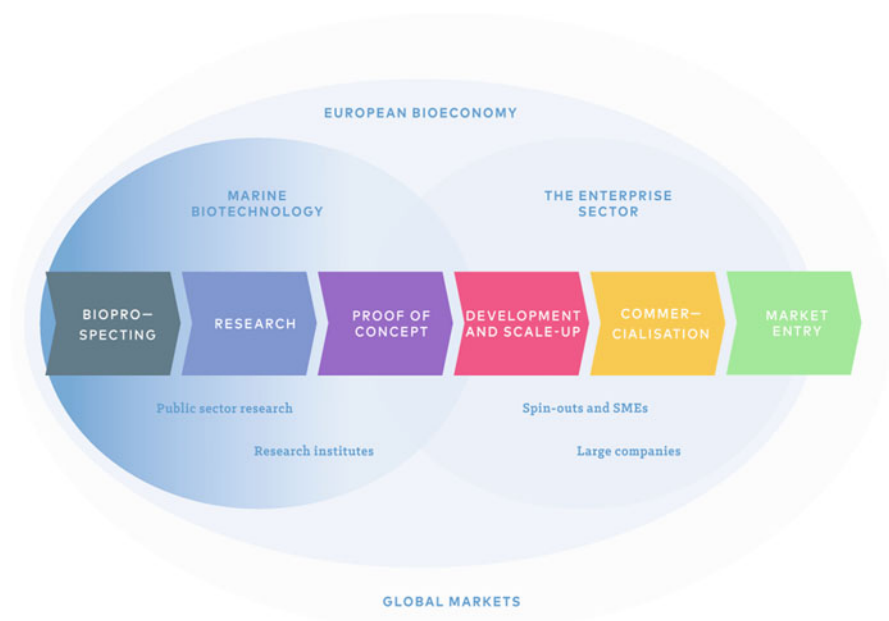


# Foreword

Marine biotechnology (MBT) gives different associations and meanings depending on where you are in a value chain and what your aims are. To approach this area in a coherent manner, MBT should be understood by the enabling role biotechnology has in making it possible to realize value creation from marine, biological resources. For defining MBT, the OECD has recommended to use their generic definition of biotechnology by introducing “marine” in the text, and this has been the ERA-NET Marine Biotechnology project’s (2013–2017) common ground for the development of this area. Then it applies to and involves all stakeholders from basic science to developers of industrial products and services. However, to a limited degree, MBT is a separate business sector in its own right. This concept is illustrated in Fig. 1, showing that the application of biotechnology early in the value chain enables innovations for industries within diverse sectors like pharma, food, nutraceuticals, cosmeceuticals and process industries to develop products and services. The book chapters illustrate this principle well, highlighting the importance of basic applications of the biotechnology toolbox and infrastructure to enable different industrial sectors to develop products and values from marine bioresources. This also applies to the farming of fish and shellfish where MBT has a significant role in breeding, health, feeding and environmental matters.

The book describes how the marine environment has delivered, and is expected to deliver, biological molecules and principles that can only be discovered from this unique biosphere. Economic estimates have been made on how MBT will contribute to societal matters, and it is evident that utilization of the marine biological resources and principles through the application of biotechnology will contribute substantially to the development of the emerging circular bioeconomy.

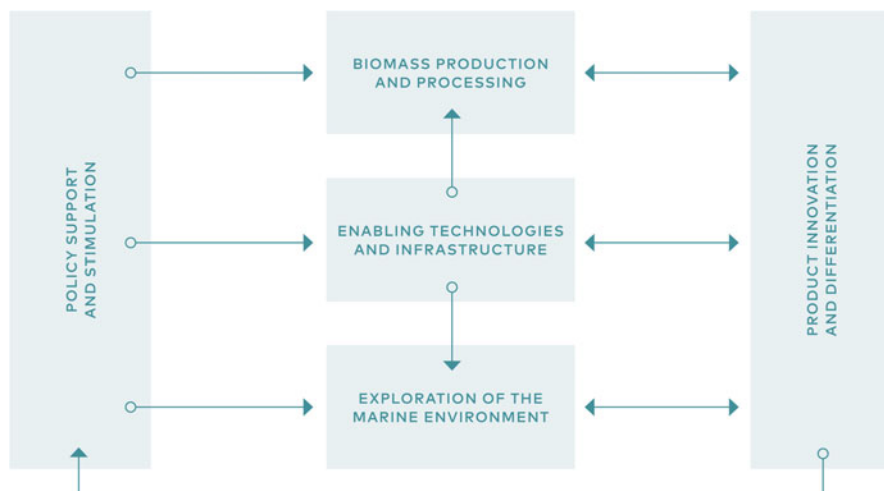


**Fig. 1** The contribution of marine biotechnology to business areas along the value chain (Hurst et al. 2016)

The *Marine Biotechnology Strategic Research and Innovation Roadmap*, published by the ERA-NET MBT project in September 2016<sup>1</sup>, emphasized the need to continuously develop the biotechnology toolbox and infrastructure in a broad sense to be able to work efficiently and sustainably with exploration of marine bioresources. In addition to the technology development, there is a need to sustainably produce and process marine biomass within a frame of political support, as well as product innovations and differentiations as illustrated in Fig. 2.

Taken together, the book pulls these aspects well together in a coherent way, emphasizing the need to continue to develop MBT as an enabler for the discovery of valuable and innovative marine products and services to be refined in their respective value chains. The legacy from the ERA-NET MBT project is taken further in a new European ERA-NET project developing the Blue Bioeconomy. It is a pleasure to observe that regional involvement, industrial engagement as well as open science

<sup>1</sup>Hurst D, Børresen T, Almesjö L, De Raedemaecker F, Bergseth S (2016) Marine biotechnology strategic research and innovation roadmap: insights to the future direction of European marine biotechnology. Marine Biotechnology ERA-NET, Oostende



**Fig. 2** The five thematic areas of the MBT roadmap and their interconnections (Hurst et al. 2016)

and data management incorporating all stakeholders through workshops and conferences will secure increased literacy and developments based on marine biological resources with value for our societies.

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