29. Introduction to Part V

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Our lives and livelihoods face profound threats from unmanaged or badly managed climate change; for many they are existential. The science is clear that the potential magnitude of the risks we face is immense and that we must act with great urgency and across the whole economy. The next two decades will be decisive for climate change. If we delay, the consequences could be devastating and many of the changes will be irreversible.

Our current paths of growth and development are unsustainable. Yet we also have in our hands an immense opportunity: we can now see how to embark on a path of strong, sustainable, resilient and inclusive growth that could both drive and be driven by the transition to the zero-carbon economy.

There is real momentum as countries, sectors and technologies change, but we are not moving anywhere near fast enough. Essential to the acceleration we need is the power of ideas and the forces of entrepreneurship. Private individuals and enterprises are a crucial source of initiative and creativity. They generate new ideas, show what is possible and can inspire. The policies and institutions within which they work are vital to their incentives and their ability to achieve.

This part of the book brings these dynamics to life. Their coming together also provides us with an opportunity to identify the common threads, both in terms of the underpinnings of success and the barriers hindering progress, that can help us understand how their potential contributions can be fostered. Their differences too help us understand how creativity can bloom or be discouraged. The examples cover an extraordinary range and all are in areas of activity of particular relevance to the major challenges of managing climate change and other fundamental environmental issues. They range from rural electricity to urban transport, from drip irrigation to mangroves, from managing migration to managing a transition from mining, and from changing an oil and natural gas company to a wind company, to changing a company from chemicals to biodegradable plastics. They demonstrate in an inspiring way what can be achieved. In this short introduction, we highlight just a few of the cases to illustrate their range and creativity.

Responding to the climate and biodiversity crises in a manner commensurate to the challenges will entail many large-scale changes: our future must be very

different from our past. Steering, encouraging and managing the necessary transitions will require strong leadership – the kind of leadership exhibited by Mayor Jean François Caron in transforming Loos-en-Gohelle from a mining town into a model of sustainability; or that displayed by chemical scientist Catia Bastioli in growing the company Novamont into a leader in the new market of biodegradable bioplastics.

The examples of effective entrepreneurship with real impact conveyed in this chapter also demonstrate the multiple levels at which strong leadership will be necessary – from grassroots actors, like the trailblazing Iranian farmer who was an early adopter of water-saving drip irrigation, through to multinational companies, like wind power developer Oersted. In stark contrast to his neighbouring farmers and the dam-building engineering firms across Iran, whose disregard for the country's continuing drought has served only to accelerate the encroachment of actual desertification, the lone Iranian farmer is now the only one of his peers who can survive on today's meagre water supplies. He is reaping the rewards of the far-sighted investment he made in a relatively expensive drip irrigation system years ago. This farmer epitomizes important characteristics required from all leaders at the heart of the zero-carbon transition: enlightened vision, strength of conviction, purposeful action. At the other end of the scale, Oersted serves customers in Denmark, Germany, the Netherlands, the UK, Taiwan and the US East Coast, with its 7.5 GW offshore wind power capacity, which equates to around one-quarter of the world's total. But it is not long ago that Oersted existed as Denmark's government-owned oil and gas company, DONG. The company's transformation depended on a decisive push made in 2008 by then CEO (2001–12) Anders Eldrup, in what was, again, an act of strong leadership.

Innovative ideas and actors can arise in response to the specificities of local conditions and local problems. A clear example is Husk Power Systems, where local resources – an abundance of underutilized rice husks and untapped human potential – are being combined to tackle a local problem: very low access to electricity. Similarly, Mangroves for the Future (MFF), an organization that now has projects across South and Southeast Asia, arose from the observations and analyses made by Amat Samsuri in his local district of Probolinggo, East Java. Having spent his childhood in a coastal village, Samsuri's personal experiences led him to recognize the many services provided by mangroves. These include locations for fish breeding, protection from storm surges, and the flourishing of wildlife and biodiversity, in some cases with tourism potential, as well as carbon capture. What began as small-scale experimentation with mangrove cultivation expanded into a venture supported by MFF, which now has around 400 coastal ecosystem projects aimed at mangrove forests, restoration and resilience building.

Collaboration emerges as an important means to facilitate and accelerate the proliferation of new ideas. This is being leveraged by Slow Food, in their development of the Terra Madre network. The international reach of Slow Food's network, alongside its ability to attract media and political attention, underpins the very purpose of the Terra Madre network. The idea is to gather and share knowledge, ideas and experiences so as to promote a system of good, clean and fair food. Collaboration is also the foundational principle bringing together a coalition of companies aiming to drive change in the business models of the agrifood industry. The coalition will begin by meeting at the 2021 UN Convention on Biological Diversity to devise a set of performance indicators, which they expect will aid efforts to rediversify product portfolios, as well as the raw materials they source from.

However, regardless of their ingenuity, even the very best ideas will have to overcome barriers to implementation. These studies highlight a range of such obstructions, from psychological barriers to individual action, to political barriers in agroecological innovation. In some cases, solutions already prevail – the innovative electric urban transport services that are changing the habits and preferences of millions of people in Southeast Asian cities, for example. While in other cases, recognizing the obstacle to be overcome, like the market forces working in opposition to the deployment of carbon capture and storage (CCS) technologies, or identifying advances that need to be made, like increasing the energy storage capacity of supercapacitors to allow for them to replace batteries in electric vehicles, is a valuable first step.

We also see that the social and political context matters greatly. Embedding the introduction of solar cookstoves within a wider 'socio-system' is recognized as a critical component of successful programmes across the world. In the refugee camps of Chad, Uganda and Nepal, a well-considered strategy for solar cookstove introduction has allowed for the full potential of this transformative technology to be realized, whereas the same cannot be said for refugee camps in Burkina Faso and India. The circular nature of the relationship between cooking technologies and social issues, including education and livelihoods, means that the appropriateness of a given technology is strongly influenced by the social and cultural context. It follows that the success of any programme to introduce a new technology hinges critically on the tailoring of its approach to these aspects of the receiving community. At the other end of the market, Elon Musk's Tesla is pursuing an innovative business strategy that exploits a social aspect of the wider context. The first Tesla models – the Tesla Roadster and the Tesla Model S – were targeted at buyers for whom the novelty and environmental friendliness of an electric vehicle exerts more influence than does price sensitivity. The proceeds of these ventures can then be used to fund mass-market vehicles, such as the Model 3 and Model Y.

Nevertheless, even proven solutions can fall foul to political opposition, as exemplified by the collapse of the Riace experiment under the anti-immigration legislation imposed by the Salvini-dominated Italian government. Riace, in Southern Italy, had been left in a state of abandonment and disrepair following an outflow of people in the mid-twentieth century. That was, until Mayor Mimmo Lucano began to actively support the settlement of migrants and refugees in the small municipality, reviving the local culture through cross-fertilization. However, Lucano met strong opposition, in particular from a Salvini-dominated government, which was anti-immigration to the extent that it introduced legislation making the favouring of illegal immigration a criminal offence. Eventually, the government's removal of financial provisions to Riace created conditions that forced many resettled migrants to leave for other destinations. Managing migration will be an important element in managing climate change and this experience carries both positive and negative lessons.

The entrepreneurship shown in these examples provides a case for optimism. It demonstrates that individuals and communities can recognize the dangers we face and the destruction we can cause if incentives are distorted, perspectives are narrow, and horizons are short. And individuals and teams can act as creative entrepreneurs in finding different ways of doing things, which are cleaner, more productive and more far-sighted. They show that change really is possible and the future that it can foster would be profoundly attractive. Yet, the examples are also frustrating in that, notwithstanding the extraordinary creativity they demonstrate, we have not yet as a world been able to unleash a response on the scale and urgency we need. However, a precondition to successful action is to recognize the problem and to demonstrate that there really are effective responses. In that, the entrepreneurs have been outstanding leaders.