Preface

In no small part, this volume has been inspired by Robert R. Locke and J. C. Spender's 2011 book *Confronting Managerialism: How the Business Elite and Their Schools Threw Our Lives Out of Balance*. In discussing the difference between management and managerialism and the role of business schools in promoting the latter, they write:

Managerialism...is a phenomenon associated with membership in a specific group of managers that share specific attributes – a caste. It does not reflect the culture of democratic capitalism with its commitment to collaboration; rather the caste desires to stand apart from society, to become less social and more predatory; to see both markets and businesses as opportunities to plunder, whatever the consequences; to take unforgiving advantage of the errors, misfortunes, and circumstances of others, no matter how they arose.... No aspect of that harm is more pernicious than the role business schools have played in reinforcing the caste's sense of itself and the legitimacy of its predatory instincts done in the name of good management. (Locke and Spender 2011, p. 2)

For many students in engineering and business programs, management roles will be part of their future. Our volume is motivated by the concern that they should be able to critically address such caste-like behavior and values to the extent that they occur in education and practice.

The contributors to this volume thus explore the nexus between engineering and managerialized business. This nexus is complex and multilayered, involving coevolution, tension, and symbiosis. On the one hand, we live in a world that appears to be progressively and relentlessly becoming itself an engineered artifact. More than our roads, buildings, and communications systems are engineered. How we function within our societies is affected and transformed through the activities of engineers and the companies in which they work. In such a world, *thinking about engineering* has become increasingly important and necessary, and yet is challenging and difficult. On the other hand, the majority of the world's population inhabits a world based on an economic model of continuous growth. This economic growth model—an object of critical reflection in itself—provides the historical and current context and the framework in which most engineers work. In this volume, our scope has therefore been expanded to *thinking about engineering and business*, and we locate engineers as actors within the current economic growth ideology.

In our current increasingly engineered society, one ideal of management and controls comes to the fore as the Anthropocene, i.e., the world transformed into an engineered artifact in which human existence is included as well. The human imprint has now become so pervasive and profound that it equals the forces of nature and is thereby turning the Earth into a planetary terra incognita. At the same time, the experience of climate change, which can be associated with the third phase of the Anthropocene, calls for management and control to safeguard planet Earth as a human life supporting system. The Anthropocene therefore raises the question as to how engineering and business together should be considered, given the fact that the current engineering-business *nexus* remains embedded in an economic model of continued growth, whose transformation consequently is called for. It is clear that the transformation deemed necessary to evolve from the current system did not arise as the product of a deliberative choice by individual engineers. This is because it concerns the socioeconomic system as a whole, including our embedded engineering and business practices, rather than a limited set of actors—engineers—within society. The societal and environmental challenges we face are not simple or “tamed” problems, but rather complex or “wicked” problems, and their solution will require interventions at the intersection of technology, business, and society.

With this volume, we want to pick up this thread of reflection on the mutual positioning of engineering, business, and society. Contributors have addressed the connections between engineering and business and the moments of tension between them. They have explored complex relationships between engineering and business from the ideological to the curricular. Professional value systems are identified and compared. Ways of seeing the world through the lens of these value systems are explored, with a focus on how they are embedded in engineering and business cultures. Finally, contributors have explored and posited movements to reshape, reform, and even reject the engineering-business nexus and how these are appearing in engineering education.

The present volume continues efforts in previous publications to explore ways in which scholars from the humanities, social sciences, and engineering can contribute to engineering education. This is approached partly through an appreciation of the multiple contexts within which engineers work and partly through appreciation of the challenges with which engineers, engineering institutions, and engineering education are currently confronted. We provide additional context by examining a number of engineering ideologies and looking at historical case studies that shed light on current realities. How engineers function within the workplace and the practices of those engineers are described in order to extract key attributes of workplace engineers and the tensions they face. We close by examining how the engineering-business nexus is configured within the higher education system. Throughout, we have tried to confront and challenge real developments past and present.

While systems at rest tend to remain at rest, external pressures on engineering education systems have created a movement to innovate engineering programs. Among other responses, the development of hybrid engineering programs has proliferated. In part, this is to meet corporate demands, to respond to national priorities, and thus to provide a more relevant education to engineering students. The novelty of this volume is that our approach to the engineering-business nexus does

not come from a narrow curriculum development need, but rather through examining the broader transformations affecting engineering practice, and therefore, how the splintering and hybridization occurring at a micro (i.e., course or curricular) level is caused by changes in business practice at the macro level.

Contributions to this volume stem from networks that were established in previous collaborative projects, beginning with a 2003 precursor, *Profession, Culture, and Communication: An Interdisciplinary Challenge to Business and Engineering*, edited by Steen Hyldgaard Christensen and Bernard Delahousse and published by the Institute of Business Administration and Technology Press, Herning. This initial collaboration was continued through a series of book projects initiated and coordinated by Steen Hyldgaard Christensen and new partners at the international level, including especially Carl Mitcham, Colorado School of Mines and Renmin University of China, who acted as a key node in the network. Other publications in the series include:

- Steen Hyldgaard Christensen, Bernard Delahousse, Martin Meganck (eds.) (2007), *Philosophy in Engineering*, Academica, Aarhus
- Steen Hyldgaard Christensen, Bernard Delahousse, Martin Meganck (eds.) (2009) *Engineering in Context*, Academica, Aarhus
- Steen Hyldgaard Christensen, Carl Mitcham, Li Bocong, and Yanming An (eds.) (2012), *Engineering, Development and Philosophy: American, Chinese, and European Perspectives*, Springer Science+Business Media B.V.
- Steen Hyldgaard Christensen, Christelle Didier, Andrew Jamison, Martin Meganck, Carl Mitcham, Byron Newberry (eds.) (2015), *International Perspectives on Engineering Education; Engineering Education and Practice in Context, Volume I*, Springer Science+Business Media B.V.
- Steen Hyldgaard Christensen, Christelle Didier, Andrew Jamison, Martin Meganck, Carl Mitcham, Byron Newberry (eds.) (2015), *Engineering Identities, Epistemologies and Values: Engineering Education and Practice in Context. Volume II*, Springer Science+Business Media B.V.

The volume is addressed to both teachers and students in engineering and business disciplines as well as practitioners and educational policy-makers, on political and institutional levels. It is the result of a long writing and editorial process. Hopefully readers will find it worthwhile, particularly as it aims at inspiring us all to do more thinking and rethinking about the engineering-business nexus and to launch further research in this important field.

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