

Preface

Writing a book is always a cooperative work. Even in the case of a sole author, a number of colleagues, collaborators, assistants and often friends and family too are directly or indirectly involved. Writing a book is always a hard job because it requires a deep understanding and a willingness to provide useful information or concepts that will eventually help readers in developing their own projects or give inspiration for new ideas. **Writing a book means sharing ideas and sowing the seeds of new ones.**

Scientific books often gather the work of colleagues based on a specific topic, and this volume collates specifically the accepted papers of the Fourth International Conference on *Sustainable Design and Manufacturing*, SDM 2017. The event was organised and scientifically supervised by the University of Bologna, Italy, in collaboration with KES International, UK. The conference took place in Bologna on the 26–28 April 2017. The papers were submitted to a rigorous peer review before being accepted in order to guarantee the high scientific level of this publication.

The SDM conference is proposed by scientists and academics in collaboration with industrial partners and institutions with the aim of providing an occasion to share knowledge and to discuss and identify new challenges concerning the development and the application of the concept of sustainability, in particular as regards **design and manufacturing**. Industrial production is one of the main engines that drive social welfare and development, employing people and producing goods. The good design and fabrication of any industrial product is then fundamental not only to increase enterprise competitiveness, but also to improve society in general. Nowadays, neither design nor manufacturing can be considered good if they are not sustainable.

The combination between design and manufacturing proposed by this conference is quite unusual as these topics are often discussed in scientific conferences in separate sessions. This old approach considered these two activities sequential, while in the world of today, they are very much integrated and concurrent. This book echoes and embraces this important duality, and readers will find a number of ideas and directions regarding both design and manufacturing.

An **interdisciplinary approach** is necessary in the understanding of sustainability. The three well-known dimensions of sustainability are as follows: environmental, economic and social. Different competences are involved and needed to face sustainable issues and to find new and possible solutions. Any research concerning sustainability involves **different disciplines**, and the importance of **crossing competences** and professions is universally recognised. Scientific events such as the SDM conference, where scholars from different fields and countries can meet and young scientists can experience an interdisciplinary and multidisciplinary surrounding, provide an excellent platform and opportunity for the **cross-fertilisation** of ideas and solutions.

The main topics presented in this volume are as follows: sustainable design, innovation and services; sustainable manufacturing processes and technology; sustainable manufacturing systems and enterprises; decision support for sustainability.

Some articles are also dedicated to the following subjects:

- Business model innovation for sustainable design and manufacturing.
- Resource and energy efficiency for sustainability advances in process industries and business model innovation for sustainable design and manufacturing.
- Sustainability in industrial plant design & management: applications & experiences from practice.
- Sustainability of 3D printing and additive manufacturing.
- Sustainable mobility, solar vehicles and alternative solutions.
- Eco-design through systematic innovation.
- Sustainable materials such as renewable and eco-materials, bio-polymers and composites with natural fibres.
- Sustainable mobility, solar vehicles and alternative solutions.

With the increasing and pressing need for sustainability, the last two topics listed above are becoming ever more important and the attention of the scientific and industrial world towards sustainable materials is growing rapidly. The present challenge in the field of materials science also includes composites, which have introduced important innovation in industrial production but still present limits regarding recycling. At present, they cannot be considered the best solution from the point of view of sustainability, and for this reason, research is intensifying in this field.

Mobility is always an important societal challenge, and our quality of life can only be increased if the adopted solutions are sustainable. Sustainability of solar vehicles and of the numerous technical issues related to them, such as electric batteries and electric engines, is an important field of investigation that has produced relevant advancements.

This volume explores a number of these areas, and many valuable indications and practices are given.

The conference was opened by three significant keynote speakers: **Günther Seliger**, Chair of the GCSM (Global Conference on Sustainable Manufacturing) and Professor at the Department Assembly Technology and Factory Management of the *Technische Universität Berlin*; **I.S. Jawahir**, Director of the Institute for Sustainable Manufacturing at the *University of Kentucky* and Professor of Mechanical Engineering (James F. Hardymon Chair in Manufacturing Systems); **Shahin Rahimifard**, Director of the Centre for Sustainable Manufacturing and Reuse/Recycling Technologies at the *Loughborough University* and Professor of Sustainable Engineering.

The results of their studies have been published in a number of books and scientific papers and represent fundamental scientific literature for any researcher who deals with sustainable design and manufacturing. **Their seeds have been sown in a number of publications and also here.**

We would like to gratefully acknowledge all the researchers who contributed their work to realise this book. We thank the Scientific Committee and its members for their tireless revision of the papers here published and all the colleagues who chaired the sessions of this event. Heartfelt thanks are also extended to the Organising Committee for its fundamental support in making this conference possible, in particular Prof. Robert Howlett, as the Executive Chair of the SDM and as the KES International Executive Chair, and all the KES staff.

A final special thank to Springer, our publisher.

We hope that this conference proceedings book can be a useful publication, providing novel ideas and directions to develop new research concerning the topical issues of sustainability in design and manufacturing.

March 2017

Giampaolo Campana
Barbara Cimatti

Sustainable Design and Manufacturing 2017
Selected papers on Sustainable Design and
Manufacturing

Campana, G.; Howlett, R.J.; Setchi, R.; Cimatti, B. (Eds.)

2017, XXI, 932 p. 370 illus., Hardcover

ISBN: 978-3-319-57077-8