

PREFACE

As one of the important segments in the national economy, manufacturing sector plays a significant role to ensure that the productions of goods are environmentally friendly as well as able to generate economic growth. It is believed that concurrent engineering, a systematic manufacturing approach that integrates the concurrent design of products and their life-cycle processes able to drive the manufacturing sector's transformation towards a better global sustainability.

Manufacturers often rely on new skills and technologies in order to stay ahead and to remain competitive in this ever challenging world. Their ability to adapt efficiently to evolving demands and requirements are pivotal to their survival in the new global economy. Innovation and creativity are two critical elements that give manufacturers the leading edge. Today, the principle of designing for sustainability is driving the innovation. Sustainability, an emerging concern among manufacturers, recognizes the inter-dependency between the economy, social and the environment. It is essential that each manufacturer considers the total impact of a product during the whole engineering design process. This requires the needs to acquire essential tools and methodology. In the new global economy, products that response well to customers' demands for quality and longer product life and the society requirement for less generated waste will be successful and highly welcomed.

The International Conference on Design and Concurrent Engineering 2014 (iDECON 2014) continues to provide the platform for discussions and exchange of ideas in the design and concurrent engineering after the four successful consecutive conferences: iDECON 2012, iDECON 2010, DECON'08 and DECON'06 conferences. This year conference theme "Emerging Technologies towards Sustainable Manufacturing" is chosen because the global sustainability issues which encompass environmental, social and economic dimensions still remain as the key issue in the current global community.

More than 130 papers have been presented in the two-day conference which gathers participants, keynote and plenary speakers from various countries. It is hoped that this international conference will serve as a good foundation and a starting point for exchange of ideas, knowledge and information between academicians and industrial engineers on issues pertaining to product design and its effect on current demand for global manufacturing sustainability.

FOREWORD BY THE DEPUTY PRIME MINISTER / MINISTER OF EDUCATION



Assalamualaikum wrt. wbt. and *Salam Sejahtera*.

The world population has now reached seven billion inhabitants. This phenomenon is a challenge as well as an opportunity to world. A challenge as to the whole nations needs to provide enough food, shelter, and health. An opportunity to the world as it more services and products needed to support the populations. Manufacturing industries are challenged to produce product not only economically viable, environmentally friendly, safe energy as well as socially accepted. Malaysia as part of the world communities takes a responsibility in developing and sustaining world's welfare. Therefore Malaysia will support and encourage institutions to embrace sustainable approaches at the same time drive their competitiveness in the world market.

Malaysian government has affirmed its commitment in the sustainable economy through planned initiatives to finance and promote sustainability measures under the 10th Malaysia Plan 2011-2015. On Thrust Four: improving the standard and sustainability of quality of life; it stated the quality of life for Malaysians improved through better access to healthcare, public transport, electricity and water. Measures were also taken to create a caring society and promote community well-being. Economic development was based on sustainability principles to ensure that the environment and natural resources are preserved so that growth will not come at a cost to future generations.

The International Conference on Design and Concurrent Engineering 2014 (iDECON 2014) may significantly contribute to the holistic implementation of the national policy on sustainable development, in particular, the manufacturing sector. Therefore, “Emerging Technologies Toward Sustainable Manufacturing”, theme of the conference is very much relevant to the transformation toward best practices of manufacturing processes where innovations of new technologies is encourage to emphasizing sustainable development.

I appreciate the time and effort taken by the iDECON 2014 committee in organizing this important event. It is my sincere hope that this conference can contribute to ideas in consolidating and accelerating the national transformation to support the nation endeavor towards a global sustainable development.

Thank you.

YAB Tan Sri Dato' Haji Muhyiddin Bin Mohd Yassin
Deputy Prime Minister/Minister of Education, Malaysia.

FOREWORD BY THE DEPUTY MINISTER OF SCIENCE, TECHNOLOGY AND INNOVATION



Assalamualaikum wrt.wbt. and *Salam Sejahtera*,

The manufacturing sector plays a significant role in our economy which goes hand in hand with the tourism industry. Our economy is driven by knowledge-based economy, and hence, we rely heavily on the application of sciences and technologies in renewable and sustainable energy. These innovations and technologies are indispensable for our future economy and society as a whole.

The emerging technologies are the current advances and innovation in various fields of manufacturing technology. The fields are inclusive but not limited on design, materials, system & processes, automation, and management (optimization). Moving towards sustainable manufacturing means to address sustainable issues and challenges in manufacturing sectors as well as to assist the transition from a fossil fuel dependant society to a sustainable society. Therefore, developing objective research-based researches and policies within the sustainable manufacturing paradigm has become a significant task among R&D managers and policy makers.

Investment for technological innovation is an inevitable first step for future sustainable energy systems. To meet the goal of sustainable energy development, there is a growing pull of collaborative actions as well as researches to share best practices and adopt policies to facilitate this technology. The planner of the energy research has to grasp a broader coverage of scientific and technological research, and to make effective decisions to invest in promising and emerging technologies especially with the circumstances of limited resources.

It is my hope that this conference will serve as a platform to stimulate discussions and exchange of ideas in the Emerging Technologies towards Sustainable Manufacturing especially in the various fields of manufacturing technology such as nano technology, green technology and etc. It may act as a catalyst in the manufacturing sector, particularly for companies in Malaysia, in embracing a sustainable and greener approach in manufacturing processes. My heartiest congratulations go to UTeM for its continuous efforts in organizing this conference. Last but not least, I hope all participants will have a pleasant conference, and do take the opportunity to visit our wonderful historical and interesting sites in Melaka.

Thank you.

YB Datuk Dr. Abu Bakar Bin Mohamad Diah
Deputy Minister of Science, Technology and Innovation

FOREWORD BY THE VICE CHANCELLOR



Assalamualaikum wrt.wbt. and *Salam Sejahtera*.

In the current global economy which embraces the sustainable approach to production and consumption of goods and services; product design and manufacturing process with less or no consideration of impact to the environment lead to a low market competitiveness of the manufacturing product. It is our belief that the Design and Concurrent Engineering (CE) can provide the right tools and methodology to negate this environmental impact and therefore achieving sustainability in the manufacturing process and product.

UTeM has set Green Technology as one of its research focus areas under the university niche areas in the Advanced Manufacturing Technology. The organization of the International Conference on Design and Concurrent Engineering 2014 (iDECON 2014) once again serves as a testament to the university's commitment in the aforementioned area. The iDECON 2014 also provides the platform for experts in the design and concurrent manufacturing to exchange and generate ideas in manufacturing transformation towards the global sustainability. Furthermore, the conference also aligns with the university's role in driving innovation toward sustainable economy, in accordance with the 10th Malaysia Plan and Malaysia Vision 2020.

I would like to congratulate the Faculty of Manufacturing Engineering, UTeM, for their effort in organizing the iDECON 2014. The past editions of the conferences: DECON'06, DECON'08, iDECON 2010 and iDECON 2012 have been a resounding success and I wish history will repeat itself for this particular conference.

To all speakers, presenters and participants, I thank you all for participating and welcome you to this conference. The success of this conference depends on your participation and contribution in promoting the design and concurrent engineering philosophies and activities as well as fostering closer mutual ties between the academicians, industry and society at large.

All the best to iDECON 2014.

Professor Dr. Shahrin Bin Sahib @ Sahibuddin
Vice Chancellor, Universiti Teknikal Malaysia Melaka

FOREWORD BY THE CHAIRMAN OF iDECON 2014



Assalamualaikum wrt.wbt. and *Salam Sejahtera*,

First and foremost, I would like to extend my warmest welcome to all keynote speakers, paper presenters and participants to the conference. Your contribution in the conference means a lot to the faculty and Universiti Teknikal Malaysia Melaka (UTeM).

The International Conference on Design and Concurrent Engineering (iDECON 2014) is organized by the Faculty of Manufacturing Engineering, UTeM. With "Emerging Technologies towards Sustainable Manufacturing" as its theme, the conference provides a platform for researchers, academicians and industrial practitioners to elaborate on current advances and innovation in various fields of manufacturing technology issues that are pertinent in improving the Malaysian manufacturing industries. The conference provides an avenue for the matching and exchange of ideas between researchers and engineers on the latest sustainable issues and challenges in manufacturing and how to contribute to the transition towards a sustainable society at the present day.

The iDECON 2014 needs a lot of hard works and commitment from the organizing committee. I would like to acknowledge and appreciation to the staff of the Faculty of Manufacturing Engineering for their selfless efforts in planning and executing the tasks for making this conference a reality. Their teamwork and individual sacrifices have contributed a lot towards the success of this conference.

On behalf of the faculty, I would like to thank UTeM for the support and positive comments on the organization of the conference. To the sponsors, paper reviewers and other contributors, your supports are highly appreciated.

All the best to iDECON 2014!

Associate Professor Dr. Mohd. Rizal Bin Salleh
Chairman of iDECON 2014

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