Editorial

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1 Introduction

In the early times, the idea of industrial ecology was launched as a mean of linking valuable technical innovations to larger biotical systems, to control the interaction of industrial systems with the biosphere (Lowe and Evans, 1995). Afterward came the concept of 'green' and 'clean' in its different declensions, to represent a goal setting for the approaches to manufacturing. According to Marksberry and Jawahir (2008) sustainable manufacturing was the natural extension of lean- and green-manufacturing. Sustainable production is then the development of manufacturing industry's ability to underpin society's need, not only to create wealth but to do so in a way which will support sustainable economic development (O'Brien, 1999). From these now descends easily the definition of sustainable development and manufacturing as "the integration of processes, decision making and the environmental concerns of an active industrial system that seeks to achieve economic growth, without destroying precious resources or the environment" (Khoo et al., 2001).

Sustainability has been appealed sometime as a revolutionary concept of the 21st century. Sustain-ability assumed only recently a different meaning of the old verb 'to sustain' deriving from Middle English "To keep in being; ... to keep or maintain at the proper level or standard; to preserve the status of" (Tainter, 2006). The swiftness of changes in our lives induced by scientific discoveries is hopefully responsible for the new consciousness finiteness of our world, the surrounding environment which permeates our lives.

In this light, the sustainability concept surely concerns the degree of freedom to determine our own right to life, satisfying at the same time the expectations of living standards as far as possible. Now we are facing with the effect of these three last centuries dominated by such a though of infinity – or, to better say, by the deterministic infinite conception of the cosmos induced by Western scientific thought (Hathaway and Boff, 2009) – that still continues to justify the distortion of consumerism. Sustainability concern can turn to be a form of rebellion or a solution to the present economical world crisis, that reflects in different forms on our social life: we all are perceiving the loss of our vital reference points, of those standards made of traditions, of unchanging environments, of cyclical seasons.

The concern for sustainability from a scientific point of view involves a new multi-disciplinary and multi-scale culture, embracing all the three pillars of the triple bottom-line (economy, environment and society). At the same time sustainability urges to

embrace a systemic view, by considering, at a global scale, the effect on the environment of small-scale manufacturing choices, by taking into account the totality of stakeholders. This powerful concept is leading our mind toward a 'wide screen' systemic way-of-thinking, a multifaceted point of view that may radically change also the old way of conceiving manufacturing.

Talking about sustainability for a specific sector thus requires a careful definition of the scenario, of all the stakeholders and their key-roles concerning the product related to that sector, of the expected functions of those products that satisfies customer's expectations and needs. For the automotive sector the sustainability concept may result sometime misleading if not referred to the whole life-cycle of the private or public mobility needs: the manufacturing activities concerned in the production of transportation devices, the use of these systems up to their end-of-life. The function required to the automotive products is mobility, with specific features according to the stakeholders: say, process time of transportation as well as customisation (e.g., comfort, availability, etc.).

Without this context viewpoint, it is hard to define the true meaning of sustainability in the automotive sector. Stakeholders for the automotive sector are either the end-users – as a general category of people requesting mobility- and the rest of the world that might suffer from the satisfaction of these mobility needs. This point may help to explain the emerging trend of interest for those 'smart' solutions, with particular concern to those areas of the world that highly affect the impact on mobility represented by cities, agglomerate of thousands of people sharing very narrow spaces.

Several scientific research areas might be involved in this debate. Information Technologies reveal to be an effective mean to find rational solutions, as in the recent past has been proved in a variety of researches. The sustainable question might thus become not simply to reduce the impact of transportation means by adopting more sustainable fuels, but simply to rethink the whole organisation of transportation as well as the habits of freedom of moments vs. optimal solutions aimed at optimising resource utilisation. The matter then, for sustainable vehicles, is not simply – even though really impactful – to optimise pollution or to technically manage the driving profiles (the use), but also to challenge the culture or even the profound meanings of our actions (the ontological part of the issue). The transformation of 3R into 6R methodology (from recycle, reduce, reuse adding recover, redesign and remanufacturing) requires a considerable amount of innovation and thus is much more challenging (Jawahir and Dillon, 2007).

2 The contents of this special issue

This special issue attempts to address this challenging topic as a simple collection of contributions from the exciting experience of the SEEP2010 conference on 'Sustainable Energy and Environmental Protection' held in Bari, Italy in July 2010. It summarises those original scientific contributions collected there on relevant outcomes closer to the automotive sector. The challenge there put is synthesises by the original motto created to trace a possible sustainable vision for the future in manufacturing: *innovation in tradition*. This meaning to rediscover those wisdoms of our ancestors but without losing the outcomes of science and technology reached so far, to rejoin past and future congruently. Without denying all the discoveries and knowledge accumulated – it would be also impossible, indeed – simply to contextualise into our world the sense of finiteness

(O'Brien, 1999), not simply changing the face of a never-ending consumerism. This is, obviously, a serious challenge for this special issue, aimed at providing some hints to this open debate on this really wide, mostly unexplored domain. The few contributions presented almost fall under the motto's umbrella, trying to bring wisdom in the use of mobility as well as in manufacturing. These belong mainly to the three areas before recalled and – only partially – represents the research scenario on sustainability in automotive domain; namely: manufacturing, use, pollution and knowledge sharing (IT).

The work from Vedaraman et al. is in the line with a number of scientific works related to bioenergy which is a renewable form of energy made from plant-derived organic matter, collectively termed 'biomass'. Biomass-based energy sources are potentially carbon dioxide neutral and recycle the same carbon atoms, which is a up-to-date research topics in the automotive sector.

The contribution from Ciccarese et al. presents a solution based on the information and communication technologies that could play a very important role in order to optimise the energy management of conventional, hybrid and electrical vehicles. The authors propose a system which allows to predict future speed profile on board of a vehicle by gathering status messages that surrounding vehicles and/or the infrastructure broadcast and by inputting them to a vehicular traffic simulator used as a predictor. The product service system field of research gives a number of interesting hints in this direction.

The article from Millo et al. describes the effects of using neat biodiesel on a modern small displacement passenger car diesel engine, highlighting the need for a specific adjusted electronic control unit (ECU) calibration for biodiesel. This is another very interesting topic which represents a potential transition toward a more sustainable private mobility, but with few changes with respect to the current situation.

Finally, the article from Dassisti and Giovannini addresses the manufacturing sustainability topic, which has been only recently addressed in the automotive sector as a part of the problem of sustainable mobility. The LCA vision in manufacturing, in fact, is quite a new point of view in the sustainable debate, as this introduce new and much more challenging problems to cope with. Artificial intelligence approaches might be a very effective support of knowledge management to drive sound decision on manufacturing.

As a final remark, a true challenge for the scientific community in the times to come can be to open a comprehensive space where to discuss systematically these topics, so as to create a systemic convergence on the fuzzy concept of sustainability, as proved by the fragmented picture resulting from the scientific efforts devoted so far under the 'sustainability' umbrella.

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