

Preface

„[Sein] Kampf um Klarheit und Übersicht hat ungemein dazu beigetragen, die Probleme, Methoden und Resultate der Wissenschaft in vielen Köpfen lebendig werden zu lassen.“¹

¹ “[His] struggle for clarity and a comprehensive view has contributed immensely to bring the problems, methods and results of science into life.”

Albert Einstein on the 70th birthday of Arnold Berliner. Die Naturwissenschaften (The Science of Nature), Vol.20/51, Springer, Berlin (1932).

Globalization, rapid developments in information technology, fast process- and product innovations, changing market requirements (e.g. environmental policies, increasing energy- and raw material costs) as well as global challenges, as the growing world population and the intensive use of limited resources, determine the surrounding conditions of producing companies in the 21st century. The comprehension for the resulting complex structures of social, political, economic, technical, ecological and organizational coherences increases with growing insights gained from natural sciences and technology.

“Sustainable development” describes a way of how the needs of today’s generations can be satisfied without interfering with the possibilities of future generations. In order to follow this path, “ecological” change processes have to take place in society and economy. “Sustainable economies” require innovative products and processes and a life-cycle-oriented way of thinking and acting or rather a way of thinking and acting in terms of systems, i.e. in value chains and -networks embedded in the natural environment. Only by this means the shifting of problems can be avoided and integrated solutions can be created. This way of thinking and acting does not end with the customer, but proceeds up to the disposal of products and handling of materials and products and/or product parts in life cycles. Decisions on the planning and design of products and processes also have to be made in an integrated manner. This means that technical, economic and ecological aspects have to be integrated into one approach. This should be accomplished under a “cradle-to-cradle” view – from the raw materials extraction up to end-of-life. This view should take into account not only the manufactured products but also the equipment and auxiliary materials which are necessary for production (e.g. machine tools, cooling lubricants).

For this year’s conference we chose the theme “Glocalized Solutions for Sustainability in Manufacturing”. The term “glocalization” is a combination of the words “globalization” and “localization”. It was invented to describe a product or service design developed and distributed globally and also adapted specifically to each locality or culture it is marketed in. However, “Glocalized Solutions for Sustainability in Manufacturing” do not only involve products or services that are changed for a local market by simple substitution or the omitting of functions. We want to address products and services that ensure a high standard of living everywhere. Resources required for manufacturing and use of such products are limited and not evenly distributed in the world. Locally available resources, local capabilities as well as local constraints have to be drivers for product- and process innovations.

Thus, “Best of Local” is a starting point for glocalized solutions. This means for example that the availability of fuels based on biomass is a starting point for engine development in Brazil, whereas solar energy is going to be the most important energy source for future electric vehicles in countries of the earth’s sun belt (up to 35 degrees north and south of the equator). While water-based cooling lubricants are developed in Germany, technical animal fats and used edible fats are the basis for the production of cooling lubricants in Spain. Dandelion is used for the production of rubber; thus, car tires develop from renewable resources. The crushed hard shells of fruit stones (e.g. cherry stones) serve as filling material for polymers or are used as technical abrasives for the cleaning of surfaces. Locally accumulating waste streams are locally processed into new products. Thus, old PET bottles are not only recycled into world cup soccer shirts, but also into laptop bags. However, the use of resources is always linked to the environmental impact over all stages of a product life cycle from material extraction, transport and manufacturing to usage and to the end-of-life. Even if a local scope for design is always linked to global impacts, it has the potential to reduce the impact to an ecologically compatible minimum. Future glocalized engineering solutions will have the potential to address global challenges by providing products, services and processes that take into account local capabilities and constraints to achieve an economically, socially and environmentally sustainable society in a global perspective.

The CIRP International Conference on Life Cycle Engineering is a platform for this wide and complex field. It will require the efforts of all of us to bring the problems, methods and results of Life Cycle Engineering into life.



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