

Preface

*"In anything at all, perfection is attained not when there is no longer anything to add, but when there is no longer anything to take away".
(Antoine de Saint Exupery)*

Profound changes have already occurred in manufacturing within the last decades and the competitive environment for manufacturing will again be significantly different in the next 10 or 15 years. Major developments will occur in a number of different areas of manufacturing such as organisation, collaboration and globalisations resulting in Distributed Manufacturing in many cases. Distributed Manufacturing was originally focused on manufacturing architecture and control within single plants; later it was extended to the virtual manufacture of products and the networked organisation and includes all issues surrounding industrial networks. Key driving forces may be seen in all developments and trends in the fields of information and communication technology (ICT).

The gap between manufacturing automation and social actors' communication should be overcome.

This book represents a synthesis of selected key outcomes from the projects plant automation based on distributed systems (PABADIS) and PABADIS, based product oriented manufacturing systems for re-configurable enterprises (PABADIS'PROMISE), funded by the European Commission. The work on these projects was done through international collaboration over 8 years involving leading researchers as well as leading companies and renowned institutions in manufacturing systems control, embedded systems and network organisation world wide. The results have been consolidated with engineering communities and standardisation bodies.

The volume seeks to anticipate broadly emerging manufacturing structures and the respective information and communication technologies for organisations, their leaders and ICT strategists as well as researchers and technologists facing the challenges of their enterprises' geographical dispersion and network partners' dependencies. To this end, theoretical and application-oriented contributions have been included with a view to achieving the optimum breadth and depth of the relevant subject matter.

The book begins with an overview of methods and systems appropriate for concurrent product development in distributed structures. As many multisite companies and enterprise networks face competition in local contexts while having to keep the enterprises' advantages of common platforms and standards, co-evolution thinking has been chosen as a suitable new theoretical background and idea generator to cope with this growing challenge. The next part discusses new concepts

of manufacturing management and novel ICT applications which may be unfamiliar to readers and challenge the status quo. As ICT advances are evidently occurring more rapidly at the machinery and equipment level with the respective execution systems, the next large next is devoted to multi-agent systems (MAS) as the central part of the project. The final part, outlining the most recent project results, links the world of agents to products and flexible manufacturing technologies, leading back to the first part and giving substantial clues to further developments as well as hot research topics.

More and more enterprises are faced with the huge, and thus far unseen, challenges of doing manufacturing efficiently in collaborative networks and distributed structures, and operating beyond the consolidated state of the art. For their support and to provide insight into recent developments and emerging concepts, this volume presents a number of ideas, concepts and solution approaches that, when combined in the right way, gives considerable help in responding to those challenges.

Stuttgart, May 2009

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<http://www.springer.com/978-1-84882-706-6>

Distributed Manufacturing
Paradigm, Concepts, Solutions and Examples
Kühnle, H. (Ed.)
2010, XIX, 191 p., Hardcover
ISBN: 978-1-84882-706-6