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Produktionsautomatisierung

Band 1

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**Product Service Engineering
Limitations & Future Needs for SMES**

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Preface

Vor Ihnen liegt der erste Band einer neuen gemeinsamen Schriftenreihe des International Universities Research Institute (IURI) und des Wrangell-Instituts für Umweltgerechte Produktionsautomatisierung (WIUP). Das WIUP ist ein Aninstitut der Hochschulabteilung Soest und Mitglied der Magarethe von Wrangell Stiftung e.V.

Das IURI wurde als gemeinsames Forschungsinstitut der Ingenieurfachbereiche in Soest gegründet und führt im Rahmen des Joint PhD Programms mit der britischen Partnerhochschule Bolton Institute internationale Promotionsvorhaben durch. Darüber hinaus sind im IURI internationale Gastprofessoren tätig, die neben Lehrveranstaltungen und Workshops gerade auch internationale Forschungsprojekte initiieren.

Der vorliegende Band enthält einen Zwischenbericht zum europäischen Forschungsprojekt INNOPSE – Innovation Studio and Exemplary Development of Product Service Engineering.

Dienstleistungen gewinnen auch gerade im Industriebereich zunehmend an Bedeutung. Der Band fasst deshalb Fallstudien zum Innovationsmanagement in europäischen Unternehmen zusammen.

Neben dem Forschungsteam von IURI und WIUP in Soest sind die Universität Leeds, die Unternehmen bsw in Chemnitz, Otrek in Wroclaw, Oktav in Esztergom, ST Microelectronics in Catania, Innospexion in Hvalsoe und das TEIC auf Kreta beteiligt.

Die erforderliche Durchführung der Studien und dieses Berichts war nur mit Unterstützung aller beteiligten Projektpartner und den Mitarbeitern möglich. Insbesondere dem Soester INNOPSE-Team mit Projektmanager Ralf Biernatzki und dem Projektmitarbeiter René Schmitz sowie Sanja Dogramadzi von der University of Leeds sei herzlich gedankt.

Soest, im Dezember 2003

Berthold Bitzer

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Notation and Abbreviation Index

| | | |
|---------|---|---|
| bsw | = | Bildungswerk der Sächsischen Wirtschaft e.V. |
| CAI | = | Computer Aided Innovation |
| CEO | = | Chief Executive Officer |
| CS | = | Cross Sectional |
| EFQM | = | European Foundation for Quality Management |
| EU | = | European Union |
| FMEA | = | Failure Modes and Effects Analysis |
| IEC | = | International Electrotechnical Commission |
| IM | = | Innovation Management |
| INNOPSE | = | Innovation Studio and Exemplary Developments for Product Service Engineering |
| ISO | = | International Organization for Standardization |
| IT | = | Information Technology |
| KPI | = | Key Product Indicators |
| PSS | = | Product Service System |
| QA | = | Quality Assurance |
| QC | = | Quality Control |
| R&D | = | Research and Development |
| SME(s) | = | Small and Medium sized Enterprise(s) |
| SP | = | Service Product |
| SWOT | = | Strength-Weakness / Opportunities-Threats |
| TEIC | = | Technological Educational Institute Crete |
| TQM | = | Total Quality Management |
| UNIFAT | = | University of Applied Sciences, Division Soest |
| UoL | = | University of Leeds |
| USP | = | Unique Selling (Pro-) Position |
| WIUP | = | Wrangell – Institut für umweltgerechte Produktionsautomatisie- rung |

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Participating Partners

The Innovation Studio and Exemplary Developments for Product Service Engineering (hereafter INNOPSE) consortium embraces partners from a wide spectrum, including a research group from four universities and research institutions and five industrial partners from Germany, the UK, Poland, Hungary, Greece, Italy and Denmark with the University Division Soest as the co-ordinator. This section briefly introduces each partner who contributed to the realisation of the book at hand.

All these partners of the INNOPSE consortium carried out the requisite case and feasibility studies in their countries. The partners were advised to consider companies from their own country, but also from the European neighbourhood. The results of these empirical cross-border investigations build the mainstay of this book, and are presented in a structured and methodological way.

The ***University of Applied Sciences, Division Soest (UNIFAT)*** carried out the project management of the whole cluster. It has research and consultancy experiences in energy technology (i.e., energy management systems, load forecasting), in intelligent systems (i.e., neural networks, agent technology, wavelets), in software engineering for automation tasks (i.e., process automatization with real-time expert systems), and technology transfers to SMEs (i.e., organisation of workshops on innovation management). With respect to the contribution to this book, UNIFAT was active in the development and updates of the questionnaire. Additionally, a server and data base for an online version were installed. UNIFAT contacted more than 200 companies in Germany and conducted case studies on 29 companies. UNIFAT took a major part in the analysis and evaluation of the questionnaire.

The ***Wrangell-Institut für Umweltgerechte Produktionsautomatisierung (WIUP)*** is a research institute at UNIFAT. It was established in 2000 by three professors from three different faculties of the university. Its research focus covers multiple areas of production automatization, especially with emphasis on sustainability. Its core competencies lie in the application of new technologies to minimise the impact of production onto the environment, the development of demonstrators to show turn key solutions, the establishment of close cooperation with SMEs, and the crafting of solutions according to the latter's needs. WIUP actively supported the development of the questionnaire, contacted about 100 companies in Germany, carried out 25 case stud-

ies on these enterprises, and contributed to the analysis and evaluation of the results.

The focus of the INNOPSE partner **University of Leeds (UoL)** is on mechanical engineering research in areas of automotive, vehicle dynamics, biomedical engineering, control and mechatronics, intelligent systems, combustion and engines, Computer aided engineering, fluid mechanics, tribology and robotics. UoL has been involved in many R&D projects in the UK and in the EU. The university contacted about 250 companies for the research project at hand. 25 companies in the UK and 5 in Italy have been thoroughly investigated during the research programme. Additionally, UoL has actively participated in statistical processing of the questionnaire data. Segmentations have been made in respect to the company size, sector and innovation management implementation.

The **Technological Educational Institute Crete (TEIC)** has its core research activities in electrical energy technologies, especially in efficiency optimization techniques, load forecasting, energy management systems, visualisation and control. Additionally the institute is active in research on intelligent systems, energy management operator training, and technology transfers to SME's. Its major contributions to the INNOPSE research programme were crucial inputs to the development and update of the questionnaire. TEIC contacted about 100 companies, and case studies and subsequent analysis were conducted on 20 leading innovation companies in Greece.

The **Bildungswerk der Sächsischen Wirtschaft e.V. (bsw)** was founded in 1990 as a non-profit organisation. It comprises 28 enterprises, 15 employers' associates, and sector organisations. Its main target is the contribution to the structural transition of the Saxon economy. bsw has been involved in manifold EU-funded projects, among others in GROWTH, Leonardo da Vinci, Equal, Adapt and others. Bsw took an active part in the realisation of this book. It helped drafting the questionnaire, conducted case studies on 40 German companies, supported the Polish and Hungarian partners, and participated in the analysis and evaluation of the research results.

The Hungarian INNOPSE Partner **OKTÁV Inc.** is a training institute specialized on training courses on industry, management, economics, human resources, informat-

ics, and medical and social professions participated. Furthermore it runs secondary school education programmes. OKTAV has participated in three previous EU projects on financial aid programmes (i.e., Leonardi da Vinci, Bechabek 2HU, and SZAKI). Its main contributions to the this book have been the efforts of translating the questionnaire and further documents for data collection in Hungary, the undertaking of case studies on 15 companies, and the search for more partners (25).

The Polish INNOPSE partner **OTREK** was founded in 1984. It is a management training centre that has its main activities in training, advisory services, conferences, and international projects. Its participation in international projects include support programmes for SMEs (PHARE), training projects for entrepreneurs (British Know-how Fund Programme for Poland), training for local health politicians in the field of health care management (the World Bank), and assistance to the development of local employment pacts (PHARE 2000). OTREK contacted around 40 companies in Poland and delivered 24 complete questionnaires to the INNOPSE project.

INNOSPEXION is a Danish service provider, manufacturer and developer of inspection technology. INNOSPEXION provides services directed towards, e.g., new materials, novel combinations of materials, and technology screening prior to integration to a production line. Additionally, it manufactures and sells non-destructive inspection systems and parts thereof, based on X-rays, thermography, and laser interferometry imaging. INNOSPEXION contributed to the INNOPSE project by approaching approximately 100 companies, from which 30 have been selected for in-depth analysis.

The French-Italian INNOPSE partner **STMicroelectronics** is a global, independent and leading semiconductor company that designs, develops, and manufactures and markets a broad range of semiconductors integrated circuits and discrete devices used in a wide variety of microelectronic applications, including telecommunication systems, computer systems, consumer products, automotive products, and industrial automation and control systems. The company contributed 12 filled-in questionnaires to the INNOPSE research programme.