

In this issue

1. Papers in logistics

Pfohl's "Logistics. State of the art"

Logistics facilitate product movement and the coordination of supply and demand. In the supply chain approach, logistics encompass all activities relating to production of material and the underlying information flow between a point of origin and a point of consumption. According to the phase of the product flow from the supplier, across the company, to the customer, there exist several sub-sets of logistics activities, which Pfohl defines and presents: these include *supply*, *production* and *distribution* logistics. Different combinations of product flows or of the legal boundaries where logistics operations are performed permit also the use of terms such as *marketing*, *material* or *waste logistics* and of *intra-* and *inter-enterprise* logistics, respectively.

An analysis of the historical evolution of the management of logistics activities reveals an important change of priorities and an increasing degree of sophistication in co-ordinating the activities in a supply chain, observes Pfohl.

An in-depth understanding of the logistics activities requires an analysis and synthesis of the main logistics concepts and of their underlying components and parameters. According to Pfohl, the main logistics concepts include the *systems*, *process* and *cross-functional* concept. Their adoption implies considering the logistics calculations under the perspective of a unique system (the systems concept), subordinating the design of single segments of the supply chain by that of the whole flow of goods across the whole supply chain (the process concept) and introducing border crossing logistics decisions (the cross functionality concept).

Pfohl concludes by presenting an overview of the research project entitled "world class logistics" which involved an analysis of the success of the best logistics firms world-wide which realise logistics in their companies and in the supply chain. This research project revealed that to the world class logistics model are associated four distinct logistical competencies, namely *positioning*, *integration*, *agility*, and *measurement* and their related capabilities which combined

create a given competency. No firm has actually reached a high degree in all these four essential competencies. It is a combined organisational accumulation of knowledge and skill related to these four competencies within a specific environment which offers to a firm the main advantage over competition, concludes Pfohl.

Leach, Makatsoris and Richards's "Supply chain control: trade-offs and system requirements"

As we move towards the end of this millennium, the major trend is towards increased enterprise networking involving significant changes in business processes to allow better and more flexible organisations which permit to protect and increase individual companies margins in a co-operative way as a *virtual enterprise*. Within this context, the problem of controlling the manufacturing and the supply chain is a key issue to ensure productive flow satisfying customer expectations, long term enterprise viability and satisfaction of companies' owners and shareholders.

One of the key challenges in the management of the supply chain is to balance customer needs (i.e., improved customer service) with the cost of inventory. The inventory should be shared between customers and suppliers in an optimal way and related costs be shared and balanced over all the actors in the whole supply chain. This implies closer control of several issues such as: close monitoring of the internal performance of a company, control of the transport and especially the road transport service providers, establishing and maintaining good relations between the company and its suppliers in order to reduce the risk in the supply flow as well as better control of the demand swings mainly through the establishment of enterprise alliances.

Several trade-offs between conflicting requirements have to be considered in the management of the supply chain as for example: "make or buy"; the trade-off between the variety of goods offered with short lead times and low inventory requirements and a good planning and control of activities along the whole supply chain. Risks inherent to forecasting can be attenuated by closer co-operation with customers which

has to be traded-off against the need to penetrate new markets and diversify the customer base.

Nowadays, the management of the supply chain gained increased attention in the companies but given the great number of unpredictable factors upon which it depends and trade-offs to consider, closer planning and controls are required to assist improvements in customer service and enterprise manufacturing performance. Such planning and controls are based on IT systems which enable intelligent decision making. The way in which such intelligent decision making processes are formulated and organised constitutes one of the major challenges to improved system design. Planning systems of the supply chain should be at least *proactive* (using good capacity models of the whole supply chain and not of individual units only) and include *reactive control* (for addressing any deviations that may arise from an initial plan).

The lack of commercial multi-site planning solutions is addressed by the ESPRIT project 20544 X-CITTIC. The objective of this project is to address planning and control for semiconductor virtual enterprises by providing a flexible and adaptable toolset which can be integrated with existing systems. Such toolset, currently under development, includes both coarse planning possibilities (at the higher business levels) and autonomous shop floor control (at the shopfloor level) with the aim to bridge the gap between these two levels.

Negri's "Tailored logistics services in large multi-site operations"

The role of logistics is fundamental for rationalising manufacturing activities and business-to-business linkages. In the last decade, logistics have gradually become service-driven, proactive, market and customer oriented.

In this context, tailored logistics according to Negri focus on a customised service driven strategy as opposed to a freight shifting and distribution ability. Within tailored logistics, cross-business management is one of the major competitive dominance factors. Such cross business management includes consideration of the *logic of system* (i.e., design and management of the different components of the whole value chain) and of the *logic of network* (i.e., standardisation of the efficiency and quality performance of all the components in the value chain). In tailored logistics, the major driving factors are business global-

isation, improvement of inter-organisation connectivity, increase in effectiveness and efficiency, production differentiation and optionality and reduction of costs.

Quality in tailored logistics can be achieved through synergistic efforts in the system and network design. The definition of a number of appropriate quality indicators allows a better monitoring of the customers' satisfaction level and the evaluation of the industry-logistics interfaces. The measurement of the degree and direction of discrepancy between quality perceived and expected by the customers determines the starting point for defining customer-oriented policies and strategies. According to Negri, any quality improvement in the offered logistics services has to proceed through the evaluation of three main factors, namely *strategy*, *context* and *technology* factors and their interconnections which would help to choose, design operate and manage the most appropriate logistics quality system. Negri concludes by presenting a methodological approach through which the application of the defined quality principles can be implemented. Such an implementation requires to proceed to a careful analysis of factors relating to companies' tangibles (physical facilities), production, organisation and management, economy and finance. Such an analysis provides a set of indicators which permits the assessment of effectiveness, efficiency and quality performances and the evaluation of the effects on manufacturing in relation to quality, costs and serviceability.

2. Papers in Quality

Frehr's "From ISO 9000 to Total Quality Management, a rough road"

Quality within an industrial context – in the design and production of goods or in the provision of services – is recognised as a means to become and remain competitive in a continuously changing environment. Hence, the attention paid by economic actors to implementing quality management approaches and to increasing the quality to price ratio. Governments/public administrations can play a role and provide an environment which is sensitised to quality which is ultimately to the benefit of industry and the customer.

In his paper, Frehr also sees quality as a major element of competitiveness and focuses on Total Quality

Management (TQM) as a strategy to achieve quality. TQM puts customers' satisfaction first and involves everyone in the enterprise – not just those in the production department. TQM needs an overall management commitment and a consistent, all-encompassing management approach. Frehr argues the importance of a precise definition of a quality policy and demonstrates that non-quality most often relates to “non-production” factors and has its origin in management decisions. Consideration should be given to the cost of non-quality rather than the cost of quality.

TQM goes beyond ISO 9000 and, in this context, Frehr refers to the European Quality Award. This Award encourages and is a means to recognise the achievement of excellence by companies in terms of quality management as the key to continuous improvement and, consequently, as the best strategy to improve competitiveness. The Award mechanism relies on self-assessment and provides a strong benchmarking instrument. Steps to implement TQM, possible roadblocks and means to overcome these, are described, pointing again to the important role of management. Of paramount importance in the implementation of TQM is the commitment to ensure adequate financial resources and to invest in human resources.

Mereau and Labbé's “Practices and technology transfer in Quality and Information Technology”

Information Technology (IT) is all-pervasive, is of key importance to almost all industrial sectors and penetrates all activity. IT revolutionises industry and provides – if properly introduced and adopted – a means to create new business opportunities or simply to do current business better. So, IT also has an important role in Quality and more in general in Quality Management as it provides a means to systemise, document, analyse and support business processes. There is scope for novel tools and IT-based methodologies in the quality domain.

Mereau and Labbé's review quality concepts (such as Total Quality Management, Quality Management, Quality Assurance and Quality Control) and illustrate that SMEs are lagging behind in the uptake of quality. The authors then argue that IT can play an important role in a massive introduction and implementation of quality in industry – in SMEs, in particular. The main difficulties, however, relate to the lack of awareness, shortage of a trained workforce and the non-availability of appropriate and customised quality

systems. IT has, on the one hand, led to the development of new quality techniques and, on the other hand, provides a means to encapsulate quality know-how and thereby has the potential to make this know-how readily available. In this context, Mereau and Labbé's review several relevant projects within the EU's IT programme and results emerging from consolidation efforts between these projects. One of these projects, TIQS, is described in full detail in a paper by Mazharsolook.

Finally, future developments are addressed. These include Quality Management in the extended/virtual enterprise and collaborative work in quality between actors of the innovation and value chain. Also, the issue of environmental quality is briefly touched upon.

Hryniewicz's “Statistical process control with the help of international statistical standards”

The use and implementation of standards like the ISO 9000 series – that specifies the elements needed in order to set up and manage quality systems and is applicable to all kinds of products – are by now well accepted. Adherence to ISO 9000 generates confidence in manufacturer capacity and efficiency in providing products in line with pre-established requirements.

Within this general background, Hryniewicz's paper gives an overview of Statistical Process Control (SPC) and its handling within the International Standards Organisation (ISO). Industrial practice in SPC and the role of SPC in quality improvement are described.

Control charts are the basic tools for SPC. There are two sources of process variability – common causes natural to any process and assignable causes that occur randomly causing the process to run out of order and hence lead to quality problems. Control charts indicate when an assignable error occurs. General guidelines on different types of control charts and their characteristics are described and references to relevant standards given (ISO 7873).

Statistical methods are developed within the ISO-TC69. Two standards are currently under development:

- ISO/TR 13425 – Guide for the Selection of Statistical Methods in Standardisation and Specification; and,
- ISO 11462 – Statistical Process Control System Standards.

These provide a useful complement to the ISO 9000 series and the author strongly encourages industry to make use of these standards.

Finally, the results of a Copernicus project on the development of a computer decision support system for the design of statistical process control procedures is presented.

Mazharsolook's "TIQS, a methodology and a tool for deployment, assessment and improvement of company Quality System"

Within the EU's Research and Technological Development Framework Programme (1994–1998), a major share is devoted to Information Technology (IT). The aim of the IT programme is to ensure that Europe takes advantage of IT and, by doing so, contribute to Europe's industrial competitiveness and help shape the emerging "Information Society".

Within the IT programme, two parts are distinguished – the development of enabling technologies and so-called "focused clusters". Within the latter, attention is on Integration in Manufacturing of which Quality Management is an integral part. The TIQS project is one of the projects launched within this context.

The paper is based on the premise that ISO 9000 has a major impact in providing quality awareness to companies but many companies consider quality only occasionally and do not see quality management as an essential ingredient of normal business operations. TIQS therefore provides a comprehensive computer-based support system that focuses on the business process rather than on ISO 9000 and ensures that business performance will be compliant with the ISO 9000 standard.

The TIQS system contains four major modules – Business Enterprise Modelling, Quality System Management Review, Task Manager and Continuous Improvement Plan, and, accordingly, considers four stages of a business quality management system:

- Business Enterprise Modelling – to aid the delineation of the processes, procedures and interfaces that have to be managed by an organisation;
- Quality System Management Review – to ascertain the level of compliance of the management system to the relevant ISO 9000 or other specified model;
- Implementation to establish quality procedures and measure ISO 9000 conformity and business effectiveness; and,

- Continuous improvement planning.

In parallel to the software development, TIQS develops a comprehensive methodology which, together, aim to reduce the bureaucracy and paperwork associated with quality systems.

Mokry's "National and EC-supported quality development initiatives focusing on the EC technical regulation"

As the economies of Central and Eastern Europe integrate in the wider European economy, a number of structural changes in these economies become of significant importance. In this context, Mokry's contribution describes the initiatives undertaken in Hungary since 1988 for supporting the introduction of quality issues in the Hungarian industry.

The first efforts concentrated on the establishment of a set of procedures for preparing, supporting and reshaping the Hungarian industries' quality systems to conform with the ISO 9000 standards. Since then, several initiatives both at national and international level have been launched in the quality field. These include for example:

At national level

Grants offered by the Hungarian National Committee for Technology Development (NCTD) to Hungarian industries and research institutes for supporting their participation in EU funded research actions under the 4th EU Framework Programme.

The establishment (in 1996) of a Hungarian National quality award following the successful PHARE Assurance Programme for Hungary which has been set up in 1990.

At international level

- *Participation of Hungarian organisations in the EUREKA Programme.* Several Hungarian institutes and industries have participated in a number of quality-related EUREKA projects dealing with different aspects of quality such as implementation of automated and cost-effective quality assurance systems in a variety of sectors such as the food sector.
- *Establishment with some EU member states of bilateral agreements on quality issues* such as with France (on ISO 9000 and Total Quality Management – TQM) and Germany (on TQM).

– *Monitoring of EU PHARE Programme funds on Quality*: Since 1990, NCTD is responsible for monitoring EU PHARE funds for Hungary. In this context, a number of programmes for improving and strengthening the quality infrastructure in Hungary have been launched such as a national and a regional quality assurance Programme and the Hungarian national programme on Technology Development and Quality Management – TDQM.

The last PHARE action on quality issues has been launched in 1996 with the aim to reinforce the existing quality initiatives in order to further accelerate the process of alignment of the Hungarian regulations to the EU Directives.

Mokry concludes by presenting the fields where the Hungarian officials will concentrate their priorities in the coming years. These include: further developments within the TDQM programme, increased attention on Environmental management systems based on ISO 14000, improvement of consumer's safety, expansion of ISO 9000 quality assurance systems as well as of TQM methods for SMEs.

3. Papers in Technology Management

Filip, Alexandru and Socol's "Technology management and international cooperation: several success stories"

Innovation is a decisive factor of success for companies to stay competitive at the international level. Restructuring of economies and industry in Central and Eastern European countries and their planned adhesion in the EU provide new challenges and significant opportunities for business collaboration for both Western and Eastern European industry. Filip, Alexandru and Socol have chosen 3 test cases from Romanian experience to show the potentialities and benefits of such collaboration in order to draw some conclusions on important technology management issues.

The first case study deals with the participation of Romania in projects on IT for Renewable Energy Resources. Current participation of Romanian industry and research organisations in almost 20 EU projects in this area and past participation in projects funded under the JOULE Programme permitted Romania to increase awareness and knowledge in related technical themes and to create the necessary background

knowledge and experience for developing a renewable energies industry and national strategy for the future.

The second case study refers to the successful cooperation between an EU industrial company and the Romanian Research Institute ICI in the field of computerised maintenance management systems. The case study highlights the importance of choice of an innovation strategy for a company, and the concrete opportunities that are offered to Western European companies for concluding RTD collaborative agreements with Romanian institutes as part of implementing their innovation strategy.

The third case study focuses on the Research Institute for Informatics – ICI. It highlights how the participation of ICI in a number of collaborative RTD projects and networks funded by the EU have enabled the Institute to reorient its activities from a science-oriented towards an innovation-oriented institute and to reposition itself into a number of emerging research areas. Such participation enabled the institute to maintain its leading position and role in Romania on advanced IT and to significantly contribute to the definition of the Romanian national policy towards societal informatisation.

Kovács, Nacsá and Lepsényi's "Organisation and Technology Management issues of joint European projects in a factory and in a research institute"

The paper describes in detail the experience gained by some Hungarian companies in co-operative projects funded by the EU in the context of the COPERNICUS and PHARE programmes.

The three projects in which the authors are involved deal with off-line programming of robots, quality assurance and software. Kovács, Nacsá and Lepsényi describe the first project in detail emphasising the capabilities of the PROARC system that is developed. The specific requirements of users, in particular SMEs, in the countries of Central and Eastern Europe are considered. The second project, on Quality Assurance, aims at establishing an accredited test laboratory within Knorr-Bremse for internal quality control and as a site to test equipment of Knorr-Bremse's business partners. The third project deals with the detection and handling of stability problems in trucks or buses.

It is clear that, through the projects, individual partners have developed new technology that has led or will lead to significant product improvements. Per-

haps even more importantly, they have learned to co-operate and have established networks drawing in users and thereby improved their competitiveness.

Benefits gained go beyond the individual partners as these are encouraged to disseminate the results especially in the countries of Central and Eastern Europe.