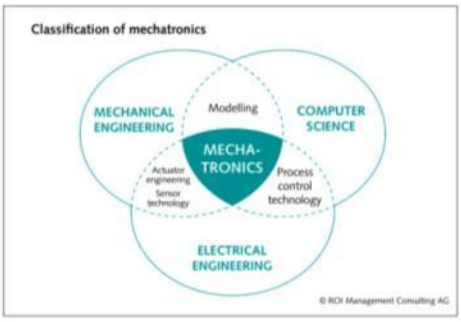
Analysis of the machinery and plant engineering sector by ROI Management Consulting AG

Weak point: mechatronics – machinery and plant engineering companies are giving away millions in potential in R&D and production

Munich, 28 May 2013 – German machinery and plant engineering companies are falling short of their potential when it comes to integrating electronic hardware and software components in product development. Sector analyses undertaken by ROI Management Consulting AG demonstrate that integrated mechatronic manufacturing concepts can boost efficiency in the value chain. However, many engineering businesses still rely on traditional processes in research and development (R&D) – thereby neglecting cost reduction potential running into millions.



It is in the last ten years that a number of innovative hardware and software solutions have emerged that are having a huge influence on development and production processes, and yet while the automotive and electronics industries have adapted to match the pace of this trend, traditional machinery and plant engineering in some cases lags years behind. As a result, the sector is coming under increasing pressure in terms of costs and competition. An integrated mechatronic approach can achieve significant improvements here. However it requires comprehensive changes to processes in development and production.

Overcoming inflexible departmental thinking

Mechatronic concepts are being applied more and more frequently in industry. They systematically combine process steps from mechanical engineering, electrical engineering and IT across development, production and process design. The reason for this is, first, the fall in the costs of high-performance processors and complex sensor technology that are available as components for serial production. Second, the dynamic speed of hardware and software development is now influencing production cycles in other industries. For example, the electronic components of a driver assistance system for a luxury-segment vehicle can already be found in the next generation of medium and small cars.

The reason for this is primarily the efficient and integrated product development processes in the automotive industry. "On average, more than 30 per cent of the costs of a car nowadays are due to electronics," says Professor Werner, chief representative of ROI Management Consulting AG. "Car designers and construction engineers therefore work together with electronics engineers and IT specialists from a very early stage of product development since changes become more expensive the closer a vehicle approaches the start of production. However, the machinery and plant engineering sector is still very far from such a simultaneous, mechatronic

approach. This can become a serious problem even for many established businesses in the next 5-10 since technology push is already putting the market under a great deal of pressure."

At the same time, most machinery and plant engineering companies are already familiar with the approach – the difficulties lie in its implementation. The main cause for this is the sequentially structured nature of traditional processes. Engineers develop a machine or a component and only then pass their ideas on to electronics and software engineers in a second step. This leaves a great deal of potential unused. "Mechanical engineering companies with a mechatronic approach are at least 20 per cent faster in developing an idea from the initial sketches to the product ready to go into production than competitors without such an approach," says Professor Bick.

Improvements can also be achieved in quality planning. Early interdisciplinary collaboration identifies and solves problems early on. This method reduces the error rate and the number of product tests, which, according to analyses conducted by management consultants ROI, can generate further potential savings in product costs. A savings potential running into millions can be realised in this way even with small order volumes.

Using mechatronic approaches successfully

Best practice projects managed by ROI in the machinery and plant engineering fields show that the following key factors are decisive for the success of projects:

- *Early integration of mechanical engineering questions with hardware and software aspects*

The central factor for success is to think and act in terms of mechatronic systems from the very beginning of development. As a first step in product development the overall architecture of a product should be drafted and a decision reached on how the required functions are to be realised. This guarantees that companies find the overall best solution – whether mechanical or software-dependent – for the function concerned, which shortens delivery times and reduces production costs.

- *Analysis of value chain structures from different perspectives*

All functions involved in development and production must analyse the value chain structure and develop proposals for improvement at an early stage. This applies particularly to widely differentiated product portfolios with high costs attributable to complexity. This allows a precise analysis of which "variant drivers" cause internal/technical complexity. These can then be divided up into components with strong and weak sales, thus quickly revealing potential.

- *Activation of partners along the value chain*

Interdisciplinary collaboration need not be restricted to one's own company. Those responsible for production in partner companies and suppliers are good sources of ideas for R&D, particularly in companies operating internationally, since they are for example more familiar with the preferences and changes in regional markets.

Printable images can be found at
http://www.roi-international.com/en/unternehmensberatung-muenchen/news-presse/press/bildarchiv.html

About ROI:

ROI With more than 1,000 successful projects, ROI Management Consulting AG is one of the most prominent specialists in planning, building and controlling global value chains. ROI supports global players and renowned family-run companies, in particular in the integration and optimisation of development, production and logistics, in supply chain management and in the company-wide implementation of lean-management principles.
With its projects that are clearly focused on implementation, ROI has received many important awards. The company employs more than 80 people in its offices in Munich, Beijing, Prague, Vienna and Zurich, and is represented globally with partner offices in Italy, France, Great Britain, Thailand and the United States.

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