

Press Release

Important Findings of the New
International Market, Strategy, and Technology Report

Process Plant Markets 2010

*Development of the global market for plant-related products and services
in the process industries until 2010*

*- Equipment and services -
- Project and operation phases -*

Global market for plant-related products and external services within the process industries grows by 2.7% p.a. between 2000 and 2005, and by 4.5% p.a. between 2005 and 2010.

2000:	USD 553 billion
2005:	USD 631 billion
2010:	USD 786 billion

Markets: Power plants and chemicals are the largest demand sectors; pharmaceuticals is the fastest-growing sector for equipment and services for process industrial plants. Share of equipment tends to keep shrinking.

Countries: North America is the largest market for process plant products and services. In 2000, the USA were the world's top buyer for power plants and the mining, oil and gas, petroindustry and food sectors. Asia-Pacific and Eastern Europe will gain market share at the expense of Western Europe and North America. China as a growth engine for plant construction in Asia.

Trends: In addition to technological competence, operating competence is more and more in demand. Share of electrical works including automation and MES is rising, but importance of mechanical equipment receding. Share of construction works remains stable. Importance of software and external services keeps growing.

LONG-TERM GROWTH FACTORS OF GLOBAL PLANT BUSINESS ARE INTACT; BY 2005 AT THE LATEST, GROWTH EXPECTED TO PICK UP

Plants of the various process industries supply the global economy with the required raw materials, basic materials, semi-finished products, and energy. To make the relevant investments pay, long-term investment decisions and a stable political environment are necessary. Changes in the political and economic environment have, in the medium term, always led to production plant relocations: New plants always tend to move to countries and regions with better growth prospects and, at the same time, a socio-economic and political environment that is as stable and predictable as possible. Countries with high long-term growth rates whose populations share an optimistic view of their own future literally absorb investments from regions with weaker economic growth.

New plants are, however, just one aspect of expenditures in plant-related construction, equipment and services. During its entire economic life of 40–50 years, a plant will be repeatedly upgraded, rationalized, renewed; and adapted and optimized with increasing frequency to keep up with an ever-faster change of plant requirements. For plant and machinery constructors, even in highly developed industrial countries with their generally lower growth rates, this offers varied, promising and continuous market chances.

According to the newly released World Report, "**Process Plant Markets 2010**" by INTECHNO CONSULTING, Basel (Switzerland), the global market for construction materials, equipment and external services for plants within the process industries is expected to grow from USD 553 billion in 2000 to USD 631 billion in 2005 and to USD 786 billion by 2010. This corresponds to an average annual growth rate of 2.7% between 2000 and 2005, and of 4.5% in the period 2005–2010. Growth for the entire decade is 3.6%. These figures are based on an assumed exchange rate of 1 USD = 1 EUR for the entire forecast period. The process industries discussed in this Report comprise the following sectors: mining; oil and gas; stones and earths including glass and ceramics and the various metal-producing industries from smelting to rolling and coating. Furthermore they include the chemical and pharmaceutical industries; the petroindustry; the pulp, paper and cardboard industries; the food industry; and finally, power plants and the environmental sector. The latter comprises drinking water, municipal sewage treatment, solid waste incineration, composting and other environmental plants outside the sectors named above.

In the long term, the basic **growth factors** for plant-related products, systems and services in the various process industries are – in spite of their highly cyclical nature – intact:

- Growing global population and growing aggregated GDP worldwide;
- Worldwide demand for higher quality of life and health;

- Growing demand for higher quality and, at the same time, more varied products;
- Worldwide shifts in the economic and demographic structures of industrial countries and emerging markets;
- Continued globalization and growth of global trade volume; and, finally,
- Global shifts of foreign direct investment to countries with favorable environments.

The market for new process technological plants follows the global investment flows. While the **open market** for plant-related products, systems and services in the various process industries grows from USD 553 billion in 2000 to USD 786 billion in 2010, the **total market** – comprising the **open market (external market for products and services)** and the **closed market (captive/internal services market)** – grows from USD 743 billion in 2000 to probably USD 1 trillion in 2010. In the USD 553 billion spent in 2000 on the open market, the project phase had a share of around USD 411 billion, and the operating phase, USD 142 billion. Until 2010, the open market for plant-related products, systems and external services for the project phase grows to USD 583 billion, which corresponds to a 3,6% average annual growth rate. For the operating phase, on the other hand, a demand of around USD 203 billion is expected for products and external services for the operating phase in 2010. The **core processes'** share was approx. 67% in 2000 and should drop to 65% until 2010.

In this Report, "plant-related products and services" means all construction materials, building and plant equipment, software and services that are relevant over the whole life cycle of all plants projected and/or already installed worldwide. In addition to the engineering and construction of new plants, plant replacements and plant upgrades, all products and services are included that serve maintenance, optimization and adaptation and/or dismantling of abandoned plants.

In addition to large plants, the market figures include small plant projects and all types of investment projects from replacement and rehabilitation investments to retrofit and revamping investments as well as to upgrade and rationalization investments. Moreover, replacements and spare parts are included, as are services for maintenance, support, adaptation and optimization that are relevant for core and secondary/auxiliary processes in all types of plant works.

MARKET DEVELOPMENT BY INDUSTRIAL SECTORS

The new World Report analyzes and forecasts 11 process industries and breaks them down into 130 subsectors, which are in turn analyzed in detail. **Figure 1** shows the world market development for plant construction, equipment and plant-related external services in aggregated application sectors.

The demand for plant-related construction materials, equipment and external services in the **raw materials sector** is expected to grow from USD 90.4 billion in 2000 to approximately USD 126.6 billion in 2010, which represents a 3.4% average annual growth. This sector includes mining (coal, uranium, ores, salts, construction materials) as well as crude oil and gas production. Mining in highly industrialized countries can only be successful with constant rationalization and higher and higher finishing stages. Extraction and transport show a trend towards remote control.

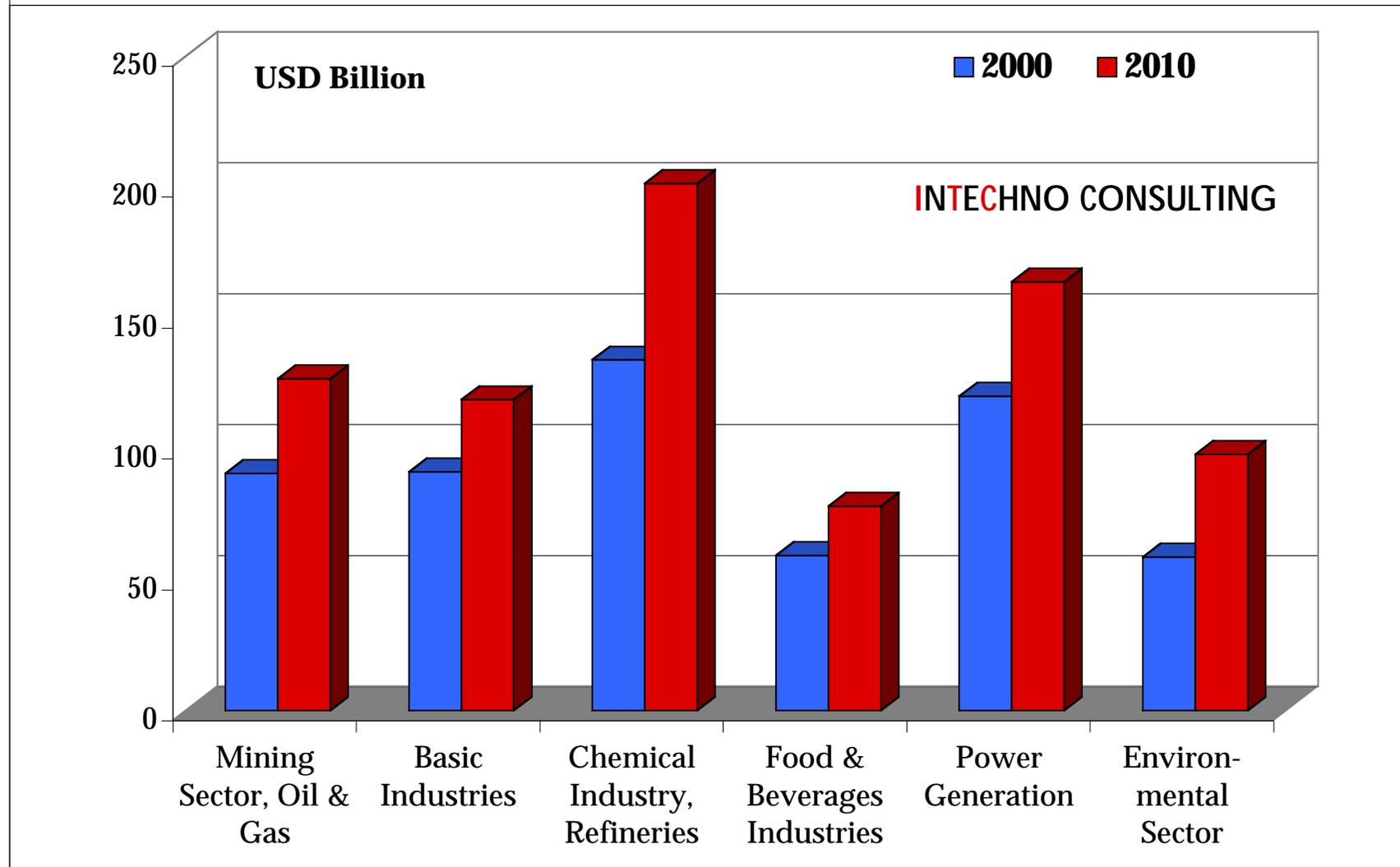
The **primary commodities sector** comprises the construction materials industries, including glass and ceramics; metal production (smelting to rolling technology); and the pulp, cardboard and paper industries. The demand for plant-related construction materials, equipment and external services in this sector rises from USD 91.0 billion in 2000 to around USD 118.6 billion in 2010, which corresponds to an average annual growth rate of 2.7%. Modern process technologies in these industries contribute to further enhance productivity, reduce pollutant emission, improve product quality, and develop plant flexibility.

In the **chemical industry**, increasingly fierce global competition makes for more and more complex plants with high plant efficiency and, at the same time, increasing ecological sustainability. Furthermore, these plants tend to be integrated more and more in the overall logistics concepts and chains of their customers' and suppliers' plants and enterprises. The flexibility and availability of the plants tend to keep growing. With annual growth rates of at least 6.4%, **pharmaceuticals** is the fastest-growing process industry for plant-related construction materials, equipment and external services. The continued growth of the global population, shifts in the demographic structures of the industrialized countries, and the backlog demand in the emerging markets, but also the growing share of generic drugs are just some of the many growth factors for investments in this field. In aggregate, the global market for plant-related products and external services in the chemical, pharmaceutical and refinery industries grows from USD 133.8 billion in 2000 to USD 201.1 billion in 2010.

The **food and beverages industry's** global demand for plant-related products and external services amounted to USD 59.2 billion in 2000. By 2010 this is predicted to reach USD 78 billion. In the fields of breweries and dairies, investments are very capital intensive. In the industrialized countries, the markets are dominated by upgrade and rationalization investments, in the emerging markets, however, by new and expansion investments. The trend is towards still more efficient process and packaging technologies, including complete documentation of the single process parameters and ingredients across all stages of value creation. Tracking and tracing of goods manufactured by batch processes is another issue whose importance is rising. It allows for quick investigation and follow-up measures in case of fault detection and thus contributes to enhance long-term product quality.

The global demand for plant-related products and external services for **power plants**, decentralized power generation and standby plants is expected to rise from

Figure 1: World Market Development for Plant-Related Products and External Services in the Process Industries until 2010 - Segmentation by Industries



USD 120 billion in 2000 to USD 164 billion in 2010, which represents a 3.2% annual average. Note that in the United States, plant equipment demand declines sharply, because high surplus capacities were created in 2000 and 2001. Only by 2010 will the plant equipment demand reach the level of 2000 again. The service market, on the other hand, keeps growing in the United States as well. Globally, there is a strong increase in demand for decentralized power generation, industrial power plants with combined heat and power units and backup power plants.

Between 2000 and 2010, this demand in the **environmental sector** grows from USD 58.6 billion to USD 97.8 billion, reflecting a 5.3% annual average. The main reasons for this growth are: The worldwide demand for drinking, service water (cooling and ultra-pure water) keeps rising; stricter environmental legislation in industrial countries and emerging markets drives the demand for modern sewage plants, solid waste treatment plants and used-air purification equipment.

MARKET DEVELOPMENT BY REGIONS

Figure 2 shows the development of the global market for plant-related products and external services by **regions**. The USD 553 billion spent worldwide in 2000 were divided among the regions as follows:

- **Western Europe:** 21.2%;
- **Eastern Europe:** 6.6%;
- **North America:** 31.4%;
- **South America:** 6.0%;
- **Asia-Pacific:** 28.1%;
- **Rest of the world:** 6.7%.

Until 2010, the share of the region Asia-Pacific will reach 31.6%. In the **highly industrialized countries** with rapidly changing demographic structures, e.g., age pyramid and immigration pressure, enhancing the plants' productivity is a must in order to maintain the standard of living and, at the same time, finance the extensive social security spending. The trend in this area is towards more productive, more efficient, and more flexible plants and, at the same time, increasing availability and environmental sustainability. The processes are becoming less and less resource and emission intensive. Strong growth is seen in upgrade investments and in operation-phase-related services, and for utilities, in outsourcing.

In the **emerging markets**, on the other hand, mastering mass production is the main reason for purchasing capital-intensive plants. However, quality and environmental considerations are gaining importance. In aggregate, the share of "local content" in the value creation of the plant construction markets in these countries is

rising, leaving only a part of the total volume to OEMs and construction firms from the highly industrialized countries.

MARKET DEVELOPMENT BY WORKS CATEGORIES

Figure 3 shows a breakdown of the global market for plant-related products, systems, and services by the various **works categories**. In 2000, around 24.3% of the USD 553 billion demand was for **electrical works** including automation technology and manufacturing execution systems (MES). Around 51.3% of the total demand was for **mechanical works**, 16.7% for **construction**, and approx. 7.7% for **overall plant services** like feasibility studies, conceptual planning, consulting, project management, procurement, financing and outsourcing. Mechanical works include process technological and packaging machinery, conveyors, pumps and compressors as well as piping systems, process storage tanks, and non-control valves with related services, but without any electronic and electrical components like industry controls, sensors, and electric motors.

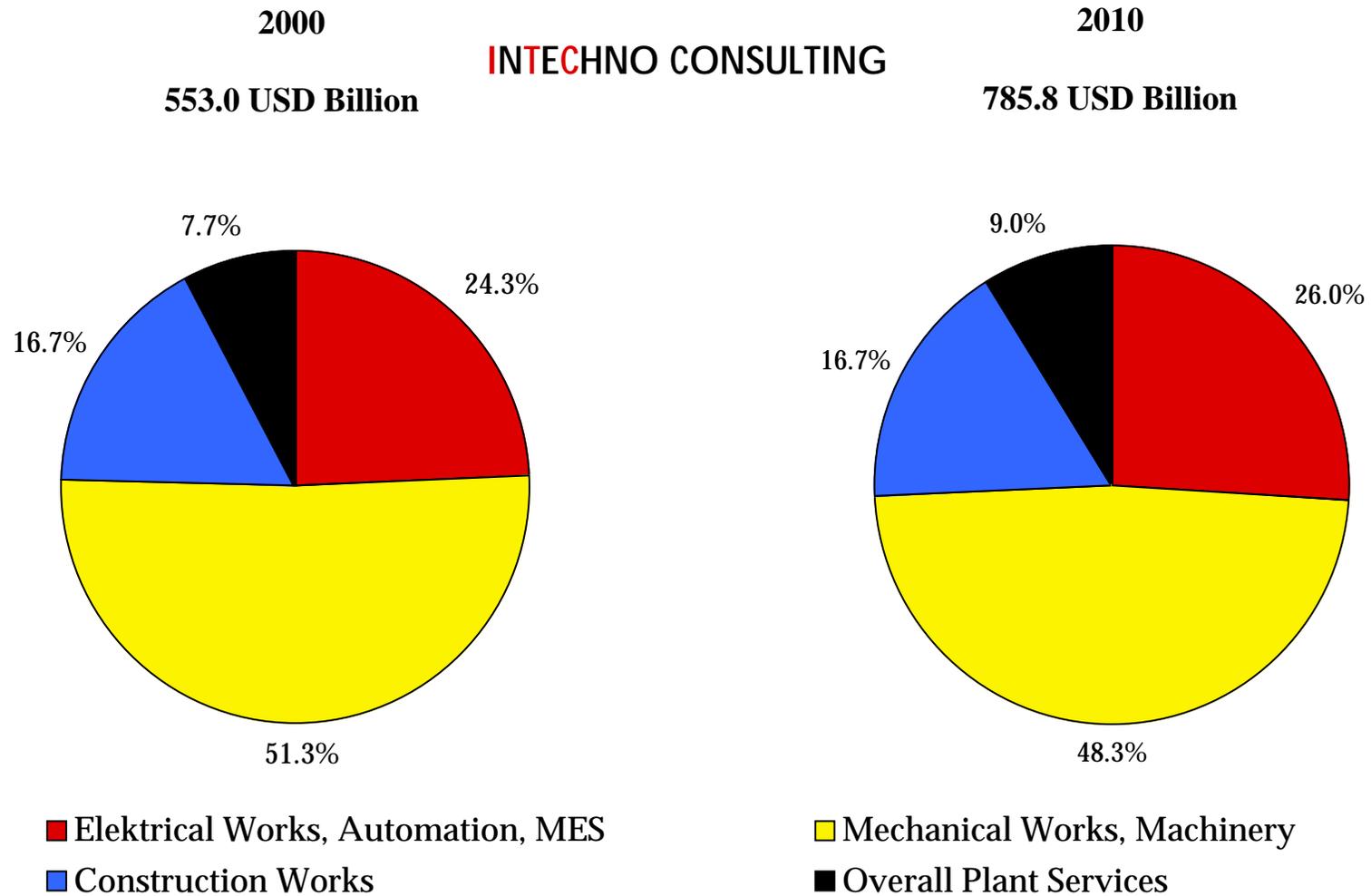
By 2010, the share of electrical works will reach 26.0%, while that of mechanical works will shrink to around 48.3%. The construction sector, on the other hand, remains stable at approx. 16.7%. The share of overall plant construction services is expected to rise to 9.0% until 2010. The fastest growth will be seen in manufacturing execution systems, which are included in electrical works.

MARKET DEVELOPMENT BY PRODUCTS AND EXTERNAL SERVICES

Splitting the total market into products, systems, and external services, the USD 553 billion spent worldwide for plants within the process industries in 2000 comprise 9.5% for construction materials, 52.2% for equipment and software, and 38.3% for external services for the project and operating phases (**Figure 4**). Until 2010, the share of construction materials will recede to 8.7%, and that of equipment, replacements and spare parts, to 48.4%. As opposed to that, the share of external services for all types of works rises to 43.0%.

The share of external **services** relevant for the operating phase (e.g., maintenance, adaptation, support and training, including dismantling and disposal) in the total market for external services comes close to 33%. In particular in times of weak growth, spending for adaptation and modification rises markedly. This can lead to considerable quality improvements, plant optimization, and capacity enhancement.

Figure 3: World Market Development for Plant-Related Products and External Services in the Process Industries until 2010 - Segmentation by Works



TECHNOLOGICAL TRENDS

Modern process technological plants are, in general, highly integrated, and many of them keep getting bigger and more complex. Product differentiation and customer specification in spite of mass production are up and coming. On the other hand, there is a recognizable trend towards small plants offering high flexibility and the possibility to fulfill customer specifications at maximum speed. In the steel business, for instance, so-called boutique mills are coming to the fore: With a total annual capacity of no more than 250,000, they can produce as much as 3,000 different types of special and alloy steels.

The integration of process technological plants in complete logistics chains on one hand, and with the business processes of the firms' headquarters on the other hand confronts plant constructors with new growth opportunities and challenges. The economic life of today's plants depends less and less on wear and tear. Rather, it depends on the ever-quicker change of market conditions and on innovations in competitive technologies.

Intelligence, integrability, quick reactivity and **modularity** are the major future plant trends. The trend towards modular plant design and object-oriented software for plant design makes for engineering cost cuts and faster plant engineering. New **biotechnological processes** confront plant constructors with new challenges, especially in pharmaceuticals and biotech-based fine chemicals production. For existing plants there is a tendency to extend their useful life and to enhance their flexibility.

Finally, machines and plants with communication capabilities enable new types of services with a bundle of possibilities like remote monitoring, remote diagnostics and telemetry, even remote control.

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SUCCESS FACTORS FOR SUPPLIERS OF PLANT-RELATED PRODUCTS AND SERVICES

Given the global surplus capacities in some industries and the tendency to extend the useful life of existing plants, the demand potential for new and replacement plants shrinks or drags out. Plant constructors, OEMs, engineering firms and service providers for process technological plant construction should, therefore, focus more on the upgrade and service business in the future, especially in times of weak demand for complete new or replacement plants.

Upgrade investments and after-sales plant services have a high benefit for the customer, and suppliers can, as a rule, generate good margins in this business. Long-term service contracts, above all, can guarantee more regular incomes. The plant services range from simple maintenance to spare parts management and remote maintenance to asset management. Moreover, they can comprise various support services and all services for plant modification, adaptation and optimization. Such adaptations can become necessary because of changes in market conditions, technological specifications, or in raw/input materials. They can have high leverage effects over several years by substantially enhancing plant availability, capacity and/or efficiency.

Outsourcing services are gaining importance. More and more customers demand a package comprising design, construction, financing and plant operation. Plant competence, therefore, will have to be seen more and more as operating competence, while the importance of strictly technological competence is shrinking. Especially utilities of all types and plant infrastructure offer possibilities for outsourcing services. Operators of process technological plants are ready to pay for after-sales services, if they have – and perceive – a benefit, e.g., higher fail safety and availability of their production facilities.

Other success factors are:

- Based on efficient engineering tools, global and simultaneous engineering across borders to speed up project completion;
- Automated document management to cut administration overhead;
- More efficient tender management, assisted by online negotiations with subcontractors;
- Enhancement of process know-how and process assessment to strengthen overall competence.

In addition to process competence, the ability to offer IT solutions for the entire production process is becoming a key factor. This trend is focused on manufacturing execution systems (MES). These form the information interface between the automation of the production processes and the information systems of the business and/or enterprise processes. To the sophisticated plant constructor, they offer new chances for competence enhancement.

As a consequence of the rising trend towards local content especially in developing countries, risks for the classical plant constructors and general contractors will increase. Competence upgrade must therefore be focused more and more on the ability to effectively monitor and coordinate outside suppliers on a worldwide basis. Thus the large OEMs and turnkey suppliers increasingly take on the role of system integrators. High-performance IT-infrastructure and a systematic knowledge management are absolute musts. More than ever, efficient project management and lean administration are key to plant builders', equipment manufacturers', and service suppliers' entrepreneurial success.