

Boao Review

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Reining in the Bull Market

A stock market listing should not only eliminate economic bottle-necks, but also deliver rapid capital appreciation as well the solid foundations for future growth. The regulatory authorities must achieve a sustainable level of market climb, while companies need to deliver stronger results to justify their rising valuations.

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Industry **4.0** The Industrial Big Change A German Perspective on a Global Challenge

By August-Wilhelm Scheer



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The Industry 4.0 age definitely has begun, which implies deep changes in the drivers of business management for industrial companies. The new features of success will be individualization, decentralization, self-direction, service orientation and transparency.

New information technologies led by the Internet of Things are impacting all significant functions of industrial companies and are leading to new business models with new products, services and business processes. The question is, who will qualify as a successful early mover and pioneer for such profound changes? In this context one should not only look at the opportunities provided by new technologies but also consider and evaluate the readiness of economic entities to leverage the arising opportunities.

Leading edges of new German technologies

Germany, for example, is in a good starting place for the digitalization of industrial companies. The automotive, electrical, chemical and mechanical engineering industries, along with their suppliers, are innovative and preparing themselves for the Big Change. This implies dramatic changes in three relevant process areas, namely those of the factory, of product development and of logistics. However, they can't start from scratch and must consider the backgrounds of their existing business. Products made by mechanical engineers last for many years and, for the most part, manufacturers

have committed themselves to offering spare parts and maintenance services for many years to come; this can hinder major changes to the product offering. In direct comparison, countries which are just beginning to build their industrial bases can invest in new Industry 4.0 technologies without regard to the past, thereby providing themselves with a competitive advantage. The introduction of new technologies such as 3-D printing, for example, increases the development speed of new products through the faster development of prototypes.

Large industrial companies in Germany have their own substantial IT departments which support product development and the automation of the manufacturing process. Many companies are now hiving off their IT departments as companies in their own right in order to enable the sale of their know-how also to other industrial enterprises or to provide platforms for 'smart' services for third parties. This can further stimulate the implementation of Industry 4.0.. Thanks to new technologies customers can issue orders, change them or cancel them, through many different channels such as standard computers, laptops or smart phones. All channels must be usable by each other. A client's ease of access to its supplier, together with individualization, leads to an increase in change requests and therefore to

4.0

higher demands on flexibility during the whole order processing, manufacturing and product development. The client can wish a change in its original product definition practically just moments before the start of the manufacturing process. The challenge for innovative companies is to directly meet and satisfy these needs.

A particular strength in Germany is also its industrial supply base with companies that manufacture machines for other industrial companies. These companies already possess a high degree of expertise in automation technologies and work together with international hardware and software manufacturers. They already implement new I4.0 technologies in their factories such as the so-called Cyber Physical Systems (CPS). These are software intensive production systems connected to the internet and able to communicate with each other as well as with intelligent materials. The high flexibility of CPS makes possible the strong individualization of the manufacturing process as the process changeover of the system takes place with no loss of time and therefore also with no costs. For this reason the manufacture of quantities with lot size 1 is possible at the cost of mass production. Additionally, these companies already make use of the cost-effective storability of mass data in the production process, price reductions in storage devices and new “in memory” database technologies being the enabler. Sensors measure the condition of machines, materials and production peripherals in real time. Analytical evaluation processes then use actual conditions to trigger immediate actions and beyond this give indications of expected future system behavior. I would assume, that especially those companies which manufacture machines are very close to the vision of a real time self-directing, extremely de-

centralized factory — a smart factory.

Risks in the development of new technology

Nonetheless, we constantly have to face the danger of losing our leading position in I 4.0, as several branches in other countries and on other continents like Asia, have equally identified the I 4.0 concept as a path to growth. I am convinced that one decisive element in the development of German industry will be the so called “Mittelstand” which implies medium-sized and often family-owned companies. They represent the backbone of German economics; they have proved to be flexible and proactive when it comes to changes in the markets. But with I 4.0, they have to face and accept a complete change in system. Only if these companies commit themselves to this through innovation and adopt industry 4.0 processes, we can be successful in our pioneering task and thus stabilize the basis for economic welfare in our country.

Another risk for Germany can be found in its dependence on collaboration with international hardware and software manufacturers which means that it is not always up to date with the latest developments and cannot influence further development in real time and according to specific needs. I am glad that the federal government has identified the respective problems and is therefore attempting to build new competencies through a targeted support program for the research and foundation of new start-up companies.

The Industry 4.0 age definitely has begun and implies deep changes in the drivers of business management for industrial companies. The new features of success will be individualization, decentralization, self-direction, service orientation and transparency. 