

Highlight Profile Sweden

Stand: 17. Dezember 2015



Präambel:

Wir schreiben im Folgenden in der maskulinen Form, und zwar ausschließlich wegen der einfacheren Lesbarkeit: Wenn beispielsweise von Mitarbeitern die Rede ist, meinen wir selbstredend auch Mitarbeiterinnen.

Empfohlene Zitierweise:

GAUSEMEIER, J.; KLOCKE, F.: Industrie 4.0 – Internationaler Benchmark, Zukunftsoption und Handlungsempfehlungen für die Produktionsforschung. Paderborn, Aachen, 2016

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Summary

Sweden is a nation of early adaptors and nearly the ideal test market for the implementation of Industrie 4.0 technologies and concepts. Flexible organization structures, an open-minded working culture and a high technology acceptance and affinity enable the implementation of smart manufacturing applications. Concerns about data privacy or continuous monitoring are smaller challenges compared to other European countries. Sweden's economy is one of the most digitally connected economies in the world. Competence and implementation level of automation technologies is very high. First Industrie 4.0 solutions are already implemented in several companies from different industries. Sweden has strong competences in the ICT industry and is good at meeting global market demands, due to its traditional export orientation. In contrast to software or component providers, Sweden is lacking in large system integrators.

Highlights



Corporate Culture & Flexibility

Flexibility is key. Flat hierarchies and flexible working models are common, and enable innovations and creativity. Result-orientation beats process-orientation.



» Pioneering Spirit«

Sweden is Europe's innovation test-market. It is characterized by high technology acceptance and affinity as well as an open-minded working and information culture.



Internationality

Traditionally export-oriented and strong in meeting global demands. An open-minded society and high standard of living makes Sweden attractive for expatriates. Swedes gather a feeling for remote markets by working as expats as well.

Map



Industrie 4.0 in Sweden

Drivers/ Challenges	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <p style="text-align: center;">Drivers</p> <ul style="list-style-type: none"> ▪ Governmental ambitions of reindustrialization demand higher efficiency and automation rate due to increasing productivity and global competition. ▪ Demand for personalized and individualized products (lead to realizing lot size one production at mass production costs). </td> <td style="width: 50%; vertical-align: top;"> <p style="text-align: center;">Challenges</p> <ul style="list-style-type: none"> ▪ Less collaboration between industry and universities leads to low practical experience of engineering graduates </td> </tr> </table>	<p style="text-align: center;">Drivers</p> <ul style="list-style-type: none"> ▪ Governmental ambitions of reindustrialization demand higher efficiency and automation rate due to increasing productivity and global competition. ▪ Demand for personalized and individualized products (lead to realizing lot size one production at mass production costs). 	<p style="text-align: center;">Challenges</p> <ul style="list-style-type: none"> ▪ Less collaboration between industry and universities leads to low practical experience of engineering graduates
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Key Approaches	<p>Produktion2030 Strategic innovation program to increase sustainable production in Sweden coordinated by ►Teknikföretagen.</p> <p>XPRES (Excellence in Production Research) Joint initiative between ►KTH, Mälardalens högskola (MDH) and the ►Swerea Research Group with the objective to form a platform for the development of new smart production technologies.</p> <p>Networked Society ►Ericsson's vision of 50 billion connected devices by 2020. In the Networked Society all aspects of people's lives, the operations of enterprises and society in general are affected by the proliferation of communications.</p> <p>Line information system architecture – LISA Research project with the objective to develop a Line Information System Architecture (LISA) that can be used in industrial production systems in general and in automotive discrete manufacturing specifically. (►Chalmers University, ►KTH, Lund University, Scania, Volvo Cars, LEAX)</p>		

Highlights

 <p>Corporate Culture and Flexibility</p>	<p>Flexibility is key. Swedish companies are characterized by very flat hierarchies. High personal responsibilities and team-oriented organization structures are very common and fit perfect to the Industrie 4.0 idea of decentralized decision making. Swedes are very pragmatic and solving problems by trial-and-error is prevalent. Working in Swedish companies is more result-oriented than process-oriented, which simplifies the implementation of Industrie 4.0 concepts. Flexible working models including e.g. home office are the norm and highly demanded by Swedish employees. In contrast to the »Not-invented-here«-restraints in other countries, Swedish companies are very open for ideas and solution from the outside.</p>
 <p>» Pioneering Spirit «</p>	<p>Sweden is Europe’s ideal innovation test-market. Society is characterized by a high technology acceptance and affinity. The openness to new developments simplifies the implementation of new technologies and processes in companies. Worries of employees regarding data privacy are expected to be no restraint, due to a very open-minded information culture (e.g. Swedish personal identity number: nearly all personal information like the income are connected with this number and visible for everyone). Digitalization of public authorities is already at a very advanced level. Swedish employees are very flexible, including the change of residence. Frequent job changes are common and seen as a possibility to broaden one’s horizon. Failure acceptance and readiness to assume economical risk is high compared to Germany. Swedes have a distinct pioneering spirit and the environment for start-ups, including the access to venture capital, is good. As a consequence, several very successful start-ups from the software-industry, e.g. Skype, SoundCloud or Spotify, were founded in Sweden.</p>
 <p>Internationality</p>	<p>Sweden is in many ways very international. Due to its small domestic market, companies are traditionally very export-oriented. English skills of Swedes are high and English as a corporate language is common. Combined with an open-minded society and work culture as well as a high living standard Sweden is very attractive for international talents. In addition to that there are also many Swedes working abroad for a limited time, due to their local flexibility and open mind. Thus the international experience and understanding of foreign markets in Swedish companies is very high. In combination with its traditional export-orientation this leads to a high ability of Swedish companies to address international markets and meet global demands.</p>

Overview

 Technology	<p>Sweden has a profound technological basis with good competences in production technology and very strong competences in IT. Especially in ► (big) data analytics its position is advantageous due to widespread collection of large data amounts in public areas (e.g. in healthcare) as well as in industries, distinctive competences in relevant research fields (e.g. data analysis, statistics and natural language processing) and several start-ups developing and offering innovative ► big data solutions. The automation rate is high and factories are equipped with modern machines and technologies. Several domestic companies as well as Swedish subsidiaries of international concerns started their own Industrie 4.0 activities or participate in national research projects. First Industrie 4.0 solutions and applications are already implemented in factories. While large companies and international corporations are following a holistic approach for the implementation of Industrie 4.0, SMEs, representing the major share of Swedish companies, think more in single applications on shop-floor-level. Despite some conjoint projects between industry and academia, research is mostly done individually and cooperation is seen as expandable.</p>
 People	<p>Production has a significant importance for the Swedish economy. Manufacturing industry was one of the main engines of growth in Swedish economy in the last years. However, the most important economy sector in Sweden is the IT industry. The education level is very high in Sweden. Technological universities like the ► KTH Royal Institute of Technology or the ► Chalmers University of Technology enjoy good international reputation. Nevertheless, university education is seen as too theoretical and lacking on practical experience. Sweden is very international and open-minded. Society is characterized by high acceptance and affinity of new technologies. Flexible working models are highly demanded by employees and already implemented in most companies. The appreciation of older employees is very high. Team-oriented working models and very flat hierarchies enable a very good cross-generational knowledge-transfer.</p>
 Organization	<p>Swedish companies are characterized by flat hierarchies. Organization structures are very flexible, team-oriented and stand out due to a high personal responsibility. This working culture, named »creative chaos«, was often perceived as negative, but is seen to match to the Industrie 4.0 concept of self-organized, autonomous, flexible, and dynamic systems. Due to a high export-orientation, recruitment of international talents, and a distinct expatriate-culture, Swedish companies as well as Swedish society are very international. The sense for new ► business models and service innovation is high in Sweden. Service and ► business model innovations are perceived as important as technological innovations. Several very successful internet start-ups with innovative ► business models and services (e.g. Spotify, SoundCloud, Skype) were founded in Sweden.</p>
 Business Environment	<p>Sweden's market economy is little regulated and few restraints for innovations by regulations exist. Due to sufficient access to ► venture-capital and the required pioneering mind-set, Sweden has a significant start-up scene. Caused by a very limited domestic market, Swedish companies are traditionally export oriented. In combination with a distinct expatriate-culture and high staff diversity this leads to a special strength in understanding international markets and meeting global demands. Swedish government is aware of the importance of Industrie 4.0, but specific governmental strategies or approaches are currently not published. Swedish government limits its industry policies on a minimum.</p>