

Highlight Profile Spain

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

Strong integration in EU initiatives and collaboration on a European level is driving Industrie 4.0 in Spain. Several strategies and activities exist in autonomous communities but **steering and consolidation on national level is still lacking.** Recently launched strategy ▶ *Industria Conectada 4.0* should fill this gap and improve coordination on a national level. Spain was hit seriously by financial crisis and its economy is still struggling, **thus strengthening the production industry by implementing Industrie 4.0 technologies in factories as well as by developing own technological competences is the main objective of Industrie 4.0 strategies.** The **economy is dominated** and characterized by **very small SMEs** and is **lacking in large companies.** As a consequence overall private R&D investments are very low. Economically strong regions like the Basque country have a profound technological basis, high innovation level and are actively pushing digitalization, but most CPPS components and sensors are imported, while domestic suppliers are focused on specialized solutions for niche markets. Research institutes with strong competences in relevant research areas are available, but **technology transfer to industry is sometimes lacking.** Especially for **SME's the early access to cutting edge technologies is difficult.**

Highlights



Highlight Region
Basque
Company

Basque Country is an industrial and academic hot spot for Industrie 4.0 activities in Spain. The technological basis is profound **and industry is keeping pace with international technological progress,** by adopting new technologies. Development and implementation of **Industrie 4.0** applications and technologies **is technology-centered.** Gaining competitive advantage in production industries by using cutting edge technologies is therefore the main conception of the Basque approach of Industrie 4.0 or Smart Manufacturing. Consequently **technology is understood in a broader sense and not centered on digitalization and cyber physical products.** A weak point is the insufficient capability of developing and implementing successful new business models, services and other non-technological innovations. **Education level is high-class and the education system is flexible.** Several high-class private universities enable fast and flexible adaption of education programs according to the changing qualification demand of Industrie 4.0.

Map



Industrie 4.0 in Spain

Drivers/Challenges	<div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p style="text-align: center; color: #0070C0;">Drivers</p> <ul style="list-style-type: none"> ▪ Reindustrialization efforts demand increasing efficiency in production to stay or become competitive. ▪ Despite current high unemployment rates, demographic change requires increasing productivity and tools for explicit knowledge management in midterm. ▪ Participation in Vanguard Initiative (Asturias, Catalunya, Basque Country, and Navarra) pushes regional clusters and cluster networks by focusing on regional strengths. Funded pilots and large scale demonstrators can boost Industrie 4.0 implementation. </div> <div style="width: 48%;"> <p style="text-align: center; color: #0070C0;">Challenges</p> <ul style="list-style-type: none"> ▪ Small size of companies hinders the influence regarding standards and the access to global markets. ▪ Still weak domestic market requires an early orientation to global markets for companies. ▪ Lacking market pull for smart solutions in production environment reduces willingness to invest in the development of Industrie 4.0 technologies. </div> </div>
Key Stakeholder	<ul style="list-style-type: none"> ▪ Ministry of Industry, Energy and Tourism ▪ Government of the Basque Autonomous Community ▪ MANU-KET - Spanish Technological Platform for Advanced Manufacturing ▪ Telefonica – Leading Spanish broadband and telecommunication provider, offering several IoT and M2M solutions for all company sizes and participant of the Industria Conectada 4.0 initiative ▪ Indra - One of the leading Spanish information technology and defense systems companies and participant of the Industria Conectada 4.0 initiative ▪ Santander Group – largest bank in Spain and participant of the Industria Conectada 4.0 initiative ▪ TECNALIA - largest private Research, Development and Innovation (R&D&I) group in Spain
Key Approaches	<p>Industria Conectada 4.0 Spanish strategy for the promotion of Industrie 4.0 initiated by the Ministry of Industry, Energy and Tourism in cooperation with Telefonica, Indra and Santander. The strategy focuses not just on the optimization and digitalization of production but focuses also products, processes and business models. Besides approaches for the implementation of Industrie 4.0, initiatives for the financing of such projects are explicitly also included.</p> <p>Basque Advanced Manufacturing Strategy 2020 Strategy of the Basque government to strengthen the position and competitiveness of Basque companies by using and developing advanced manufacturing technologies.</p> <p>Basque Industry 4.0 Initiative of the Basque government to promote the technology transfer between technology providers and manufacturing industry.</p> <p>Industria Digitala Program to promote the implementation of IKT in SMEs from the industrial sector initiated by the Basque government.</p> <p>Lankidetza Digitala Funding program of the Basque government for projects initiated by associations or professionals.</p> <p>MDI 4.0 – Diagnosis and Impact Model for Industry 4.0 Initiative of TECNALIA to identify gaps of industrial companies within the Industry 4.0 strategy and to identify relevant opportunities of improvement.</p> <p>Vanguard Initiative – New growth through smart specialisation EU-driven initiative of regional specialization. Catalonia and the Basque Country take part in manufacturing-related pilots on efficient and sustainable manufacturing, and advanced manufacturing for energy applications.</p>

Regional Highlight: Basque Country



Corporate and Flexibility

Clusters are seen as the engines of Spanish business innovation. Spanish industry is dominated by family owned and very small SMEs. To reach a critical mass and to improve their competitiveness SMEs are forced to collaborate. Clusters are seen as a possible platform therefore. The Basque country was pioneer in forming and promoting cluster associations in Spain. Today there are nine Basque industry clusters in whose frame most relevant industrial activity is performed. Besides several companies of a certain industry, clusters normally include also local research institutes and universities. **They are seen as very important for the innovation progress of Basque SMEs as resources are limited and technological starting point is often too low for development and implementation of Industrie 4.0 applications and technologies.** Collaborative projects between the members of these clusters enable larger research projects and help to increase the competitiveness of local industries. The clusters' importance is also recognized by the Spanish government and **thus their establishment and advancement is supported by national and local initiatives.** Nevertheless the collaboration within clusters as well as cross-cluster collaboration has still a broad room for improvement.



Training & Qualification

The education standard on university level as well as on professional training level is high-class in the Basque country. Besides public universities there are also private technical universities with high reputation. Especially these **private universities are able to adopt quickly and flexible to adjustments in the educational content and offer.** Although the availability of combined degrees (e.g. Industrial Engineering and ICT) is overall sufficient, **a stronger collaboration between faculties (interdisciplinarity) is desirable.** The **number of qualified graduates in mechanical engineering (academic and non-academic) is sufficient,** whereas in ICT a **lack of qualified graduates could arise in the midterm.** **Cooperation** between universities and companies exists **but is mainly dominated by externally written theses.** To increase the share of practical experience during education as well as to increase the knowledge transfer to industry, **closer cooperation is desirable.** Despite improvement, **language skills are still improvable** and thus English as corporate language is still very rare. While working abroad is common for Spanish talents, recruitment of international talents is very difficult for companies.



Importance of Production«

The manufacturing industry is essential for Basque economy. Due to the lasting financial crisis, the importance of manufacturing industry is even still increasing, while also **its reputation and image among the Basque population improved.** Jobs in the manufacturing sector are recognized as secure and more resistant in times of economic crisis and **thus the attractiveness to work in the industrial sector increased for young people in the last years.** **Technical and engineering degrees or qualifications enjoy a quite high reputation.** Thus a combination of an engineering degree and a MBA is relatively common on the management level of Basque companies. In production industries **a shift of employees' tasks and responsibilities is noticeable.** The degree of autonomy of employees is increasing and **jobs are changing from monotonous to more creative tasks.**

Overview

 Technology	<p>Spain is lacking in strong and big leading companies in production as well as in IT industries. Thus technological level in Spain is very heterogeneous, on a regional as well as on a corporate level. While factories of large companies are mainly state of the art, SMEs and especially micro firms, representing the majority of Spanish companies, are equipped on a much lower technological level. As they are due to their size not able to establish their own standards globally domestic companies prefer the use of open standards. The overall innovation level of Spain as well as the technical and scientific specialization in relevant subjects as ICT and production technologies is rather moderate. Awareness for security is increasing but still on a low level as use of e.g. cloud services is still very limited in companies.</p>
 People Overview	<p>Due to the economic crisis unemployment-rate is still very high in Spain. A youth unemployment rate of nearly 50 % leads to a high availability of qualified graduates, but also results in a loss of talents to the international labor market and strong difficulties for domestic companies to acquire international talents. As a consequence of the economic crisis, production industry is regaining attractiveness, due to more secure employment. Domestic markets are still weak resulting in extremely high export rates. Thus companies itself and the further development of Industrie 4.0 technologies are strongly dependent on the performance and development of key export markets EU and the U.S.</p>
 Organization	<p>The Spanish industry is dominated by family owned SMEs and companies are mainly characterized by hierarchical structures. To reach a critical mass and to improve their competitiveness, most SMEs are organized in local industry clusters. Clusters support their members e.g. in internationalization projects or in R&D. The number of resulting cooperation and alliances could still be increased. Despite high export-rates, internationalization of Spanish companies, especially of SMEs, is relatively low. English language skills and the implementation level of English as a corporate language, as well as the share of international board members in domestic companies are low. Due to very limited personnel as well as financial resources of SMEs, own and independent R&D activities are very difficult to realize. Cooperation between small firms and large companies or research institutes, could be a solution therefore, but are limited.</p>
 Business Environment	<p>Spain's governmental strategies focus on restrengthening industry and economy. Industrie 4.0 is therefore seen as a possible factor of success. Separate strategies for different autonomous regions leads to a high risk for duplication and can hamper the implementation on a national level even if regional clusters of excellence, like the Basque Country with its strong economy, can also push the development of Industrie 4.0. Recently, however, an integrated national initiative, ►Industria Conectada 4.0, was launched. Besides national programs, Spain is very active and successfully participating in E.U. programs in Industrie 4.0 related areas and thus pushing this topic on a European level. Financing of Spanish companies is mostly based on traditional instruments like bank or private credit and banks are still very restrictive in granting loans. Especially for intangibles and new business models Spain is lacking in stable and solid financial frames. Besides the missing pioneering spirit, the environment for start-ups could also be improved. Availability of venture capital is low and further support e.g. by business angels is mostly missing. Especially in the field of production industries individual entrepreneurship is almost inexistent. Public funding of R&D activities is on an European level but due to high share of very small companies, the overall private investments are insufficient.</p>