



#28co-session SMART FACTORIES

Industrial technologies
combined with information
technologies bring enhanced
efficiency and productivity

March 9th 2017, Barcelona
IQS (Institut Químic de Sarrià)



Organiza:

CO-SOCIETY
EN INFORMATICA

Colabora:



#28co-session

SMART FACTORIES





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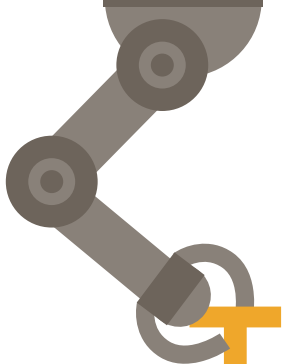


Organiza:

CO-SOCIETY
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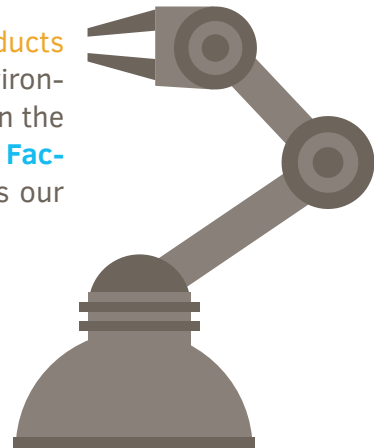




THE STATE OF THE ART IN INDUSTRY 4.0

Contrary to what you might think from reading most media headlines, it's not just the service sector that is being transformed by digitalisation. The digital revolution means that the industry is now facing a new revolution of its own, which some historically consider as the fourth revolution behind mechanisation and the steam engine, the production line and electricity, and automation and the use of computers. This is why we wanted to dedicate this Co-Session to what is happening and is about to happen in industrial innovation and in relation to the so-called Industry 4.0. This new industry consists of intelligent factories in which processes will be managed by cyber-physical systems with markedly lower human intervention.

This is why 75% of European exports today are in fact manufactured products and 80% of innovations from the Old Continent come from industrial environments. These were some of the figures given in the initial presentation on the state of the art of Industry 4.0 by Oriol Pascual, director of the IQS Tech Factory, the Institut Químic de Sarrià centre for entrepreneurship that was our host on this occasion.



THE CONVERGENCE OF THE PHYSICAL AND THE DIGITAL FACTORY

But if there is a company that is most committed to pursuing the idea of turning the concept of Industry 4.0 into reality it is Siemens. Its Electronic Works manufacturing plant in Amberg (EWA) is surely the best place in the world today to take a look at the intelligent factory of the future where the physical and the digital converge. EWA is the most advanced example of the Digital Enterprise Platform that the German corporation wants to make standard within a decade.

This Co-Session was attended by José Díez, who works in the **Siemens** department dedicated to simulation. José provided some figures that prove that the concept of the Smart Factory is somewhat more than just a buzzword for this company: since 2007, the company has invested over 9.5 billion euros in innovation and strategic acquisitions related to Industry 4.0. The sole aim is to bring about the changes in the manufacturing process that Siemens considers necessary to respond to two main tendencies: products with an increasingly short lifecycle, and with more variety, with companies having doubled their number of products and their different variants over the last 15 years.



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It is already a reality,
it is happening,
it is already here.

MAKING SMART FACTORIES A REALITY IN A LARGE INDUSTRIAL GROUP

Although the concept of Industry 4.0 emerged in and has been mainly promoted by Germany, there are already outstanding examples outside its borders. This is the case of the Basque group **Danobat Group**, European leader in machine tool manufacture. This was highlighted by Nerea Aranguren, the head of the Group's technology centre, who was categorical at the start of her presentation: "Industry 4.0 is not a trend. It is already a reality, it is happening, it

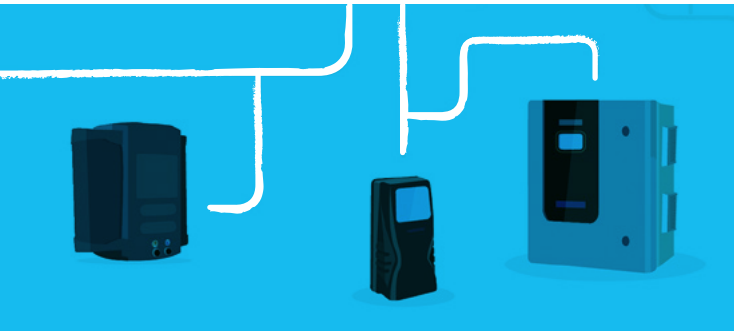
is already here". For example, the Group puts forward a new type of advanced machine tool as the only way to be able to compete with the "middle of the road" machinery from Asian manufacturers.

The freight train maintenance facility that Danobat has set up against all odds in the middle of the vast Australian desert is another example of turnkey solutions. Its location is so remote that the difficulty in finding staff willing to work there has led to the need for a very high level of automation well above the usual. Danobat Group's digital laboratory also works on some of the elements that will be needed to make up the factory of the future, from new human-machine interfaces with levels of usability similar to those which we have become accustomed to with iPhones, to all kinds of intelligent components that will make it possible for machines to not only know what is happening but also what is going to happen.

STARTUPS AS A SOURCE OF INDUSTRIAL INNOVATION

As with so many other disruptive innovations, it will be difficult for the amount of innovation required by the transition to Industry 4.0 to only be generated by companies internally. This is why the number of consolidated companies that implement investment and collaboration programmes with startups is also growing in industrial areas. In this Co-Session, we wanted to hear from one of these examples. Fluidra, Europe's leading group in its niche which offers solutions for water conservation, management and treatment, has been one of the first industrial corporations to concentrate on startups and on a model of corporate venturing to ensure the level of innovation needed.

Xavier Servat, head of the group's startup accelerator, **Fluidra Accelera**, explained the reasoning behind this way of thinking: in their case, it obeys the need to make a transition from factories that are optimised for large series to much more flexible factories that allow them to compete in the Asian market with a longer product list. Xavier defended the group's acceleration model, which opts to support no more than three or four new business projects a year so as to not water down their attention and efforts but instead have a fully hands-on approach with the startups.



Later, two different presentations enlightened us on the experience of other entrepreneurship initiatives that were both set up as spin-offs of the IQS and that have found their opportunity in new manufacturing forms. One was **DrSails**, which manufactures special adhesives for the nautical industry. Its co-founder, Jordi Arbusà, said that starting a manufacturing startup is more complicated than other types of new companies. As well as stock management, there is also the challenge of short-run production or greater reliance on critical suppliers. In the case of DrSails, the initiative found a key success factor in being able to rely on a local industry in need of reinventing itself.

PINPOINTING NEW OPPORTUNITIES IN FUTURE MANUFACTURING

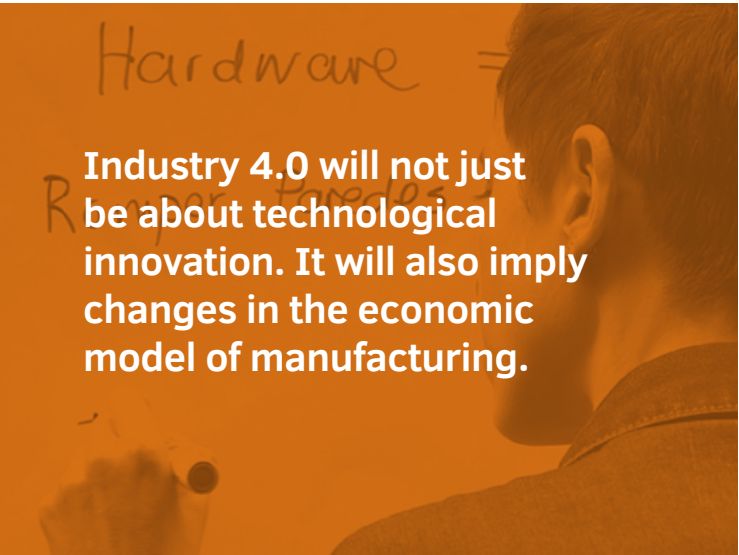


Set up just over 10 years ago, **Flubetech** develops, manufactures and sells hard ceramic coatings used in a range of applications from cutting tools to biomedical parts. The company, which was able to increase its sales substantially thanks to a successful internationalisation process, has introduced the innovative concept of “coating-as-a service”, offering its customers custom design solutions for the ceramic coating of parts and tools.

For the company’s CEO, Carles Colominas, one of the critical factors of the smart factories of the future will be “smart workers”, who will need to focus more on providing services than on the manufacturing itself of the products.



ANALYSING MANUFACTURING OF SMART CONNECTED PRODUCTS



Industry 4.0 will not just be about technological innovation. It will also imply changes in the economic model of manufacturing.

Industry 4.0, however, will not just be about technological innovation. It will also imply changes in the economic model of manufacturing companies and in how they understand the manufacturing business. Carles Cosials offered his expert view on this new industrial paradigm based on his experience in **Integral PLM Experts**, a consulting firm that specialises in improving processes involved in production and product design. For Carles, “monitoring” jobs will be the new norm in factories with increasingly less human intervention. The factory is no longer just a physical manufacturing space, but the place where data is gathered that make possible the gains in efficiency, speed and flexibility promised by Industry 4.0.

The idea of an “outcome economy” will therefore dominate, which turns product lifecycle management into an endless loop of continuous improvement and evolution and allows products to be transformed into “serviproducts” that will be paid for according to their results. If manufacturing improvements have meant reducing deviations over the last 150 years, Industry 4.0 consists of accepting diversity as the norm and with the ideal situation being able to manufacture series of one unit.

The speed of technological change and the difficulty in adapting to it emerged as a general concern.

Those attending this Co-Session were given the chance to have their voice heard and express their opinion through two different activities. All the participants completed a short online questionnaire which gave rapid feedback on different issues related to Industry 4.0. Among other conclusions, the results showed that the possibility of innovating with startups generates particular interest, that CEOs are the main figures behind this innovation, and that the main barrier to it comes from the type of internal culture that still prevails in most organisations and that is reticent to change.

Later on, delegates were also divided into different groups to discuss the results of the questionnaire in greater detail and sketch out a map of opportunities and threats for the future of the industry. The speed of technological change and the difficulty in adapting to it emerged as a general concern. They reached the conclusion that to achieve this adaptation, more progress has to be made in different aspects such as the existence of more connectors to link technologies and demands, fostering the creation of innovation ecosystems with new companies and, ultimately, achieving the ideal of “industrially crafted” products that will be demanded by future markets.



SMART FACTORY: WHAT'S IN IT FOR ME?



THE CHALLENGE OF FUTURE FACTORIES

This was a good time to talk about advances in robotics and the growing social debate on its potential effect on unemployment rates.

Towards the end of the day, the founder of **Co-Society**, Alfons Cornella, gave a presentation on the industry of the future with the twin aim of showing a transversal approach to the issue and, in passing, make some brief points on certain technologies, companies and products that were not touched upon in previous presentations. These included new models for business and market access that make it possible to add sensors and connectivity to products, with companies like GE moving from selling cars to “offering locomotion”, and new industrial practices that permit this convergence between industrial and digital aspects, such as predictive maintenance or remote management.

This was also a good time to talk about advances in robotics and the growing social debate on its potential effect on unemployment rates; how to stimulate vocations in industrial degrees in people who will have to work in the factories of the future; on how Artificial Intelligence could affect industrial processes; on how rapid innovation in 3D printing will change (it is already changing) the way in which products are manufactured today; and about how advances in nanotechnology and nanofabrication open up a new world of products to be made and materials to manufacture them.

RESEARCHERS & STARTUPS OPEN SPACE

There was also time to learn more about some experiences and projects from the organisations that hosted this conference.

Finally, there was also time at this Co-Session to learn more about some experiences and projects from the organisations that hosted this conference: the Institut Químic de Sarrià and its IQS Tech Factory. Projects like **Tractivus**, a startup that has developed a customised tracheal stent in collaboration with the Hospital de Bellvitge, made using a 3D printer and capable of reducing the chance of infection by 95%. And **Press&Reset**, who use an innovative cold pressing and bottling system to produce and distribute fresh juices that retain their vitamins and enzymes for a much longer time than that of the traditional pressing system.

Qrem Regenerative Technology has designed a device that can obtain a regenerating serum from the blood that will allow osteoarthritis to be treated naturally. The company already has one viable product ready to be sold in the form of an easy-to-use appliance that can be used in the specialist's consulting room. **Servocad** works by combining micromechanics, electronics and software to improve existing medical tools. Some of its successes include an innovative clamping and locking system for screws and millimetre nuts. For their part, laboratory researchers at IQS have managed to scale a new production system for high-quality articulated graphene that is still patent-pending.



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