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European engineering: the beating heart of a data-driven economy

Orgalime comments on the Communication “Towards a Thriving Data-Driven Economy” COM (2014) 442

Introduction

Orgalime, the European Engineering Industries Association, speaks for 41 trade federations representing some 130,000 companies in the mechanical, electrical, electronic, metalworking & metal articles industries of 23 European countries. The industry employs some 10 million people in the EU and in 2013 accounted for some €1,700 billion of annual output. The industry not only represents over a quarter of the output of manufactured products but also a third of the manufactured exports of the European Union.

Orgalime believes that data and notably so-called “big data” will play a key role in what we believe are three interlinked European policy areas where the engineering industry can play an overarching role in achieving the present Commission’s key jobs and growth objective: the Digital Single Market, the Single Market for Goods and Services and the Energy Union. How EU and national policymakers deal with the issue will determine whether Europe can successfully move towards a data-driven economy.

Big data: fuel for engineering industry growth

Our industry, which supplies capital goods, systems and services to all sectors of the economy, as well as a range of consumer durables, sees the transition to a data driven economy as essential for our industry’s future growth and competitiveness.

Our companies are developing and providing more and more sensor-equipped machinery, smart production systems and intelligent products, which will make the manufacturing process and its products the biggest sources of data and one of the most promising areas for data analytics. For our industry and for our customers, the benefits of capturing and analysing relevant data are already today offering considerable savings through production and resource efficiency, thereby contributing to the EU’s resource efficiency agenda and to the improvement of working conditions.

For customers, both professional and private, this development is also a core enabler of mass customisation and flexible, adaptive production, reflecting an increasing demand of both industrial users and consumers. The potentials are huge: increased efficiencies through predictive maintenance, shortened lead times, individualised and small-series production will increase competitiveness and can contribute to the reshoring of production sites to Europe. New and better jobs would then be created in Europe. Efficient and effective dealing with big data is the precondition for the digitalisation of industry, which is currently on its way under names such as “Advanced Manufacturing”, “Industrie 4.0” or “Smart Industry”.

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Big data as key enabler in the B2B sector

Despite this huge potential in the B2B-sector, big data has been mainly discussed in relation to the use of private consumer data and the related issues. Of course, big data offers significant potential at the level of customer empowerment, such as in the area of energy consumption and thus competitive energy, but it also offers significant potential for the improvement of the efficiency of production processes and logistics as well as working conditions. We therefore consider the framework conditions under which companies are able to use data to provide efficiency and value added in the B2B sector is equally important. This is also a core industrial policy issue where the Commission should ensure, in accordance with the March 2014 European Council's conclusions, that competitiveness is mainstreamed into this policy area.

Orgalime welcomes the Commission's Communication and, while we are still working on more detailed positions in a number of areas, such as data protection, standardisation, advanced manufacturing etc., we wish to provide the Commission hereafter with our first comments on this issue:

Use of big data offers significant potential for growth and the economic recovery of Europe

Orgalime welcomes that the Commission highlights that the collection and analysis of so-called "big data" is increasingly playing a crucial role in manufacturing and is contributing to the development of our economy through the creation of new business models.

These are being and must continue to be built upon the core strengths of manufacturing companies, where Europe enjoys a considerable competitive advantage in many manufacturing sectors including engineering.

Companies are increasingly investing in sensors to measure all production parameters, in software and in analytics based on the data they gather. This offers enormous productivity gains and makes the engineering industry one of the key drivers of digital industrialisation, leading to investment and the development of new job opportunities.

To benefit from these opportunities in Europe, we need a positive, enabling agenda which will allow manufacturing companies to develop their new product and service offerings and to overcome current shortcomings. It is essential to take into account that the digitalisation of manufacturing, including engineering, is a much more demanding challenge than the currently ongoing digitalisation of media and services, because it involves physical assets and industrial value chains.

Nevertheless, the focus of regulators to date has largely been on the consumer market: the development of a framework for the use of big data by the B2B sector is lagging, while it offers considerable potential for innovation and growth in manufacturing and in the energy sector through the development of a Digital Single Market.

Physical infrastructures must be ready for the data-driven economy

The EU's targets concerning communication infrastructures already outlined in the "Digital Agenda" are a precondition to establish a "thriving data-driven economy" in Europe. Especially, the overdue roll-out of broadband networks is a precondition to make infrastructure apt for a data-driven economy, supporting cloud computing, the internet of things, digital industrialisation and e-infrastructures.

Reliable high-performance communication infrastructures are also a precondition for effective M2M communication and, most essentially, for providing SMEs and mid-cap-companies with equal starting conditions in the digital economy. Taking up the advantages offered by the development of

the digital economy is a core issue for the economic recovery of Europe on which our network is working extensively.

The development of high-speed broadband infrastructures will become even more important as estimates consider that the number of connected devices (such as sensors, machines, etc...) will far outweigh the number of persons connected, namely by a factor of 50:1.

Industrial automation, which is a central technology to the collection of data and therefore the development of Advanced manufacturing / Industrie 4.0 / Smart industry also requires priority access to wireless communication within production facilities and sites: such technologies play a key role in the uptake of digital solutions in manufacturing by enabling rapid and competitive interconnection of sensors, equipment and systems within production facilities and sites. They also play an essential role in the safe management of manufacturing facilities. Orgalime is working on the issue wireless communication in the context of standardisation.

Data and communication security are essential

Only recently, the importance of data security, the protection of data communication against intrusion and defence against cyber-attacks have gained broad public attention.

As a leading technology location, Europe depends on the protection of its know-how. A prerequisite for this is functioning cybersecurity in facilities and systems.

European engineering companies have succeeded in implementing the highest safety standards in the goods, systems and facilities produced by them. In order to achieve the same standards in an interconnected world, where more and more devices are interlinked and the complexity as well as data flows arising from M2M communication increase accordingly, there will be a growing need for reliable and secure communication infrastructures based on common and open standards implemented over the whole value chain.

In fact, data driven business models are not going to take off in Europe if the availability, integrity, authenticity and confidentiality of communication infrastructures are

How Big Data Creates New Business Models and Jobs in Manufacturing – 4 Examples:

Welding process and improved efficiency

The welding equipment and solution of a Finnish manufacturer comprehensively monitors the welding process automatically, recording all necessary parameters of the welding procedure. A real time process and quality control makes the welding process safer by identifying faults at an early stage. The same data allows clients, for example construction companies, to plan buildings more precisely and have an overview of the manufacturing process of individual components along the entire value chain. For them, the need for quality audits are reduced and management of construction sites facilitated. The documentation required, for example by classification bodies in shipbuilding or offshore platforms can be provided automatically by the system. The company has made a successful transformation from a pure manufacturing company to a solution and service provider within ten years.

Resource efficiency in a ski resort

The Austrian skiing resort Mayrhofen has equipped its snow groomers with sensors. In combination with GPS and a detailed, electronic map, this system measures the exact height of the snow coverage when operations are underway on the slopes during the night. This system is interconnected with the operation system of the snow generators. The precise data transmitted allows the ski resort to produce less artificial snow; however, it does so under ideal metrological conditions and precisely at the places where needed. Besides saving on capital through less equipment and a better maintenance schedule, the ski resort managed to save per season up to 25% of the water and electricity previously used for snow production.

compromised. Sufficient capabilities ought to be established in order to strengthen cyber-resilience in Europe.

Only then can manufacturers protect themselves from loss of know-how or intellectual property by piracy, espionage or sabotage and thus benefit from the innovations gained through their investment in R&D.

Orgalime is working further on a position paper on cybersecurity.

“Data ownership” and data protection

As the data issue originally focused on aspects linked to the consumer market, most data ownership rules have logically been developed with a view to protecting individual consumer privacy.

In addition to the protection of personal and consumer data, for the engineering industry it is at least equally important to ensure the protection of business secrets and specifically product, process and systems knowhow. Clear rules and a legal framework for “data ownership” will therefore be needed to create the

trust needed to exploit the potential of big data in a B2B/industrial environment.

While significant potential exists to develop new business models based on using consumer data, for example in the energy field, many of the benefits will accrue within manufacturing companies and between them in a B2B relationship. It is therefore essential to analyse carefully the full potential, the needs and specific requirements for data use in an industrial environment before determining how far to develop data ownership rules in a B2B environment.

A decisive precondition for a digital economy is that companies from all economic sectors – not only those in the currently predominant social media or IT – get, where appropriate, affordable access to data, thereby allowing the development of new service offerings in a competitive market. Examples of areas offering significant potential include the energy and telecoms markets. Moreover, through the development of competitive service offerings, consumers, both private and professional, will be empowered and thereby can hope to get an adequate dividend, for example in the energy sector, in the form of reduced energy bills.

Europe therefore needs an approach which both takes into account the considerable business opportunities offered by big data, with the necessary flexibility, while, at the same time, setting clear and simple rules for the use of individual customer data: consumers need to keep the right to decide whether their individual data may be used or shared. Whether such rules should be determined

Efficiency through predictive maintenance

A Danish producer of wind turbines that exports to more than 70 countries offers its clients a comprehensive service, ranging from planning, construction to operations and maintenance. Every day, the 25 000 turbines installed send their performance and diagnostic data, which allows the producer to precisely plan maintenance and inspection. These may then be carried out during times of lower demand. Wind turbine down-times are reduced considerably.

More eco-efficient farming

Precision farming is increasingly used to ensure optimal growth and quality of crops. Instead of a plain, uniform application of fertilisers, which does not reflect the natural variation of nutrients that are already in the soil, a more advanced method is used: a real-time nitrogen-sensor, installed at the front of the tractor, measures automatically the exact amount of nitrogen in the leaves, be it day or night. Its computer then tells the fertiliser spreader (or sprayer, for liquid fertiliser) at the back of the tractor to deliver the optimal measure. Poor growing areas of crop that require more fertilising will obtain higher quantities of fertiliser, while less fertiliser will be supplied to already well-growing areas of crop. Fertiliser savings of up to 14% and an average productivity increase of up to 6% result in direct benefit to farmers while preserving the environment.

through regulation or through negotiated agreements between industry and consumer protection agencies¹ needs to be further discussed.

Orgalime is updating its position on data protection and working at present on the issue of data ownership.

Enabling international cross-border data flows

Cross-border data flows are essential for European industry and consumers, both for international trade and for companies' daily operations. Our companies work in global value chains and therefore a purely national or regional solution would not be adequate.

Nonetheless, any data exchange has important security implications when sensitive technical information is involved.

While we cannot support the idea of general data localisation requirements, companies should be given the possibility to opt for EU based or local servers and data infrastructures so that their sensitive technical and commercial data can stay exclusively under EU jurisdiction. This is becoming all the more important given the increasing tendency for governments to demand access to information for reasons of national security.

Cloud computing

Cloud computing will be a fundamental tool for the digital economy, especially for SMEs, to which it will deliver costs saving and improved efficiency.

Europe must promote use of cloud, taking the necessary actions on procurement rules and adapting existing legislation to cloud models. Orgalime strongly recommends that the Commission ensures a future-proof implementation of its cloud strategy without prescribing, dictating or promoting a specific business model. It is important to set out the principles and objectives, leaving it up to markets to develop adequate solutions.

The Cloud Code of Conduct currently being developed by industry together with the Commission is a voluntary instrument that will help to restore trust and confidence in these services and harmonise their quality and availability throughout the EU. It is important, as this develops, that it different kinds of cloud services – infrastructure, but also software as a service – remain available.

Regulation and standardisation

Creating an economy that regularly uses big data and develops business models based on big data will no doubt require that certain areas of regulation, such as on data protection, cybersecurity, copyright and trade secrets, are adopted or adapted. Orgalime firmly believes that it is essential to proceed with caution before considering legislation which, if prematurely or poorly drafted and enacted, may severely undermine or even stifle innovation, the possibility of the development of new manufacturing investment and growth in the EU based on big data. Therefore, legislation must be enabling, forward looking and technology neutral.

A significant amount of work will also be required at the level of standardisation in order to facilitate interoperability between machines and systems all along the value chain, the development of the Digital Single Market and operation in global markets as required by European manufacturing, will require that such standards are open standards. Timely and coherent standardisation has repeatedly proved to be an ideal instrument to boost the transformation of the economy. However, standards that are too prescriptive and restrictive in their range of technical solutions, such as the recent standard for wireless applications of automation (EN300328) do give rise to serious issues in the

¹ In our industry for example, one of Orgalime's French members, FIEEC, has negotiated an agreement on the use of consumer data with the CNIL which provides clear rules while ensuring that innovation is not hampered.

context of ensuring the safety of production processes and of operators, as well as for the development of the wireless sensor market: we therefore welcome the Commission's work with us to resolve such issues and look forward to achieving a speedy solution.

Publicly co-funded research, development and innovation

In order to catch up with other economies in the area of internet and data-based development, we are in favour of the EU's support, through co-funding for "lighthouse" initiatives supported by manufacturing industry in areas, such as supercomputing centres of excellence, big data, innovation and "supply chains" based on data.

For a Europe-wide impact across value chains, R&I programmes should have a broad impact and support a high number of companies, as done in the I4MS-scheme. Sector specific initiatives such as lighthouse projects can complement this, but should be justified by substantial spill-over effects and benefits beyond a limited group of company or a sector.

Orgalime therefore welcomes the active support of the Commission for the "Factories of the Future" PPP and similar initiatives, such as the "European PPP on data" and the "5G PPP": the shift through PPPs towards publicly co-funding R&D which is more market driven and supportive of industry needs is, in our view, essential to mainstreaming competitiveness into this policy area.

Conclusions

Manufacturing and engineering technologies in particular are the key drivers of the digitalisation of industry and of the economy as a whole. Our industry provides the answers on a variety of economic and societal challenges, be it future energy systems, better usage of natural resources, better mobility, maintaining high living standards despite an ageing society, Europe's industrial renaissance and consequently the creation of more and better jobs. Big data is already playing a central role in this and will increasingly do so.

We therefore consider that a flexible regulatory framework in Europe, building on our core manufacturing strengths will enable our industry, which is the world leader in many engineering technologies, to fully profit from the opportunities offered by big data in a fast changing technological environment, where rapidly adapting to customers' needs and short innovation cycles are central challenges for companies' development and at times even survival.

Orgalime believes that future discussions on big data must in particular focus on all issues related to the B2B-context and the merging of the physical and the digital worlds. It is in the industrial manufacturing and energy areas where big data has the biggest potential, but is also facing some of its most significant challenges.

We are therefore happy to continuing to work on this core issue to develop in close partnership with both, the EU and national regulators. Orgalime has already issued a position on trade secrets and we aim in the coming months to provide our support the opinion making process on European level with additional positions, focused on key areas such as cybersecurity and data ownership. This approach will turn the concept of a data driven economy into reality and will underpin Europe's economic recovery, notably providing much needed jobs and growth.

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