

Policy Brief 2014-05

industriAll European Trade Union demands open standards for the digital integration of manufacturing

A contribution from the manufacturing workers' perspective

Proprietary standards for the digital integration of manufacturing threaten quality jobs in Europe

Recent developments in ICT have now made it possible for each and every item in the factory (machine, instrument, conveyor belt, reactor, valve, and every discrete object or batch being processed), to be individually identified, and therefore to communicate with its environment (CAD/CAM¹ software, processing or testing machines, ERP² software), in order to build completely integrated manufacturing systems. These developments are known as the "**Internet of Things**" (IoT) for **Advanced Manufacturing** (also known as "*Industrie 4.0*" in Germany). Progress in this field critically depends on the availability of a **standard** for the **communication protocol** and for the **data format** used in the transmission, storage and processing of data relevant for integrated manufacturing. Such a standard does not yet exist.

There is a **risk**, however, for workers and firms in the European Mechanical Engineering sector if this standard were to be **proprietary**.

Indeed, if this happened, the firm which owns the corresponding Intellectual Property would be the only firm able to perform the **digital integration** of the complete manufacturing **system**. By having a monopolistic control on the access to the customer, it would not only jeopardise the very notion of open competition that the Commission advocates, but be in a position to **concentrate the value** of the whole supply chain into its hands. It would thereby transform the existing fabric of high-performance, middle-sized firms in the European Mechanical Engineering sector into low-margin subcontractors, unable to invest or innovate – nor to provide good wages or working conditions to their highly qualified work force. Since many of the best-placed actors in the area of ICT for manufacturing to date are US-based, there is a significant risk that this transfer of value-added and of high-quality jobs will be towards the United States of America – and not merely a transfer within Europe³. For industriAll Europe, promoting and securing high-quality jobs in the European Mechanical Engineering sector demands a public policy to avoid the seizure of the market for digital integration of manufacturing by a proprietary communication standard.

¹ Computer-Aided Design / Computer-Aided Manufacturing

² Enterprise Resource Planning, e.g. SAP

³ Major firms from the United States such as General Electric, Cisco, IBM and Intel have actually taken the lead in this discussion, by setting up an "[Industrial Internet Consortium](#)" to discuss common needs and requirements – but leaving open the issue of the actual communication standards to be used.

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industriAll Europe demands that the European Commission mandates an open standard for the digital integration of manufacturing

In industriAll Europe's view, the **standard** for the **communication protocol** and the **data formats** for the **digital integration of manufacturing** under the "Internet of Things" concept must exist and be **open**.

Under such an open standard regime, any firm or stakeholder active in the European Mechanical Engineering sector has had the possibility to contribute to the standard, and is freely able to use the standard, and to integrate its machine or equipment into the network provided by other suppliers, so as to build a complete integrated manufacturing system – and yet preserves sufficient margin to invest, innovate and provide quality jobs to its workers. The standard must thus be a **common infrastructure** (and a common good) for the whole European Mechanical Engineering sector, for all to use (manufacturers of equipment, integrators, users and maintenance operators). If possible, the standard should even be based on Free, *Libre* and Open Source (FLOSS) principles.

In order to achieve this goal, industriAll Europe demands that the European Commission **mandate** the European Standardisation Organisations (ESOs) to develop such an **open** communication protocol and data format for the digital integration of manufacturing under the "Internet of Things" concept, for a given date (e.g. 2020). This mandate is justified because it contributes to the Single Market for industrial products⁴. The very existence of this open standard would significantly enhance the competitive position of European Mechanical Engineering industry. A further policy step could be that its application be made compulsory in the European Union⁵.

The technical requirements on this standard are very stringent:

- it must ensure full **interoperability** between machines and devices from different vendors, which implies a very high level of detail and of quality in the standard: the meaning of each bit must be explicit and unambiguous (or explicitly left for proprietary developments)
- it must ensure **real - time** operation, which means that it must guarantee a maximum delivery time between the date when the data is produced (e.g. by a sensor) and when it is made available for processing at the other end of the data link
- it must operate in hostile **radio** environments
- it must ensure data **security** to prevent remote sabotage of manufacturing processes, or the spying of industrial secrets
- it must guarantee the **Occupational Health & Safety** of all workers involved (installers, users, maintenance staff) – specifically in fully automated environments where machines stop and start automatically
- it must guarantee the **privacy at work** of the workers, and avoid abusive surveillance by employers.

⁴ See the Opinion of the European Economic & Social Committee of 4th June 2014 [n°INT/731 on Industrial Products](#), which advocates that standards are tools of industrial policy, beyond safety and environmental issues.

⁵ under Art. 17 of the [Telecoms Framework Directive of 2002](#).

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This is not, however, breaking completely new ground: real-time, secure communication protocols in harsh environments already exist in the aeronautics, automotive and defence sectors. Therefore, many validated solutions are available to build upon.

This standard should go beyond the current work of the Technical Committee of ETSI⁶ on "[Machine to Machine Communications](#)" (which only addresses long-distance radio communications). It should include data formats suitable for data storage and processing by application software, as well as wired communication and short-range radio communication.

All efforts must be made to involve the most relevant stakeholders in the development of this standard: software developers, manufacturers of machines, network and industrial automation equipment, manufacturers of sensors and actuators, etc. Thereby, the industrial relevance of the standard will be ensured. One means by which to motivate the most appropriate stakeholders to participate would be to make the standard compulsory in the EU – as mentioned above.

In order for the participants from the mechanical engineering sector to be able to contribute actively in the standardisation process of telecommunication protocols with which they are not familiar, a specific **training** session may be necessary. This training session for telecommunications novices should be included in the mandate given to the ESOs, and the costs for this should be shared with (or even borne by) industry associations of the Mechanical Engineering sector.

Mandating this single, potentially mandatory, standard for the networking of manufacturing equipment will send a **strong political signal** to industry. This political signal will not only support the interests of European workers in Mechanical Engineering. It will have the additional collective benefit of **speeding up** the uptake of digital integration of manufacturing, by lifting the hesitation and uncertainties of the market confronted with competing technical solutions⁷. It will thus contribute to the early modernisation and digital integration of the whole European industry.

In order for standard to be developed **fast**, the Commission should support the activities of an **Open Source community** to develop the protocol stacks (i.e. the software that performs the communication) and the application software exploiting the data formats, **in parallel** to the definition of the standard (the legally binding text of which can remain proprietary). This development would be part of the mission of the "[Future Internet](#)" PPP. Thus, the open standard and the underlying software would be simultaneously available at the end of the process, in an agile and parallel engineering process. The participation of this Open Source community in the standardisation process should also be financially supported by the Commission.

⁶ European Telecommunications Standards Institute

⁷ This is a frequent situation in the case of competing standards: classical examples include the war of video formats in the 1970s (VHS / Betamax / V2000), cordless telephony in the 1990s (DECT / CT2), etc.