

Industrial data platforms

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Abstract:

The digital transition in industry will entail setting up platforms for capturing data from production, uses and customer feedback. These industrial data platforms will help create new services and overhaul industrial processes. The value of business-to-consumer (B2C) platforms is now evident; and a turning point has been reached in business-to-business (B2B) relations: industrial data platforms will emerge, but several issues must be addressed. Strategically, the benefits of sharing industrial data among firms, subcontractors and customers is to be assessed by taking account of the risks of making data accessible to competitors. These data will be captured in a specific technical context of meaning, security and quality; and they will have to be shared among partners on the platform.

Three of the five largest firms in the world by market capitalization — Apple, Google and Microsoft — rely on platforms, thus on a new business model that has come into general use during the past decade.¹ While several organizations are still asking questions about the inherent value of their industrial data, the firms born out of platforms have demonstrated an unbelievable talent for shaping the markets where they operate and making them grow. They have thus proven capable of outstripping competitors who use classical business models. These newcomers, their business based on their platforms, have succeeded. On the one hand, they understand data and the value of data in their markets; and on the other, they have helped create vast ecosystems of consumers and suppliers. According to the authors of *Platform Revolution*,² this new business model and form of organization is one of the most important changes in our times. In the markets where platforms are successful, this model will, according to this source, durably outperform “pipeline businesses” under condition that it is built on an appropriate organization. In this sense, the actual innovation is the business model with the associated technological platform as its basis. We expect an accelerated introduction of platforms that is going to disrupt industry.

Platforms of industrial data

No doubts remain about the value of platforms in B2C (business-to-customer) relations. Industry now stands at a fork in the road: whether or not to adopt the concept of an ecosystem of confidence as has been orchestrated for B2B data. The heavy investments made by big equipment manufacturers (like Siemens or General Electric) are evidence of their determination to be the first to win shares of this market by relying on Industry 4.0 to help partners both reduce the time for bringing products to the market and become more flexible and efficient.

¹ The author would like to thank Jacques Cremer, professor at Toulouse School of Economy, director of the Digital Chair Jean-Jacques Laffont for his advice. This article has been translated from French by Noal Mellott (Omaha Beach, France). The translation into English has, with the editor's approval, completed a few bibliographical references.

² PARKER G., VAN ALSTYNE M.W. & CHOUDARY S.P. (2016) *Platform Revolution: How Networked Markets are Transforming the Economy and How to Make Them Work for You* (New York: WW Norton & Company).

In industry, the ecosystem created by the consortium BMW, Daimler and Audi around Here Technologies (acquired from Nokia) points in the right direction. Initially set up to obtain mapping data, Here Technologies has expanded to cover all data collected about the cars made by these three firms.

Up till now, digital technology has upended the markets for immaterial goods (finance, the media, music, communications...). Now it is moving into real world operations. The effects of data analytics, the Internet of things (IoT), and autonomous systems are starting to be felt in factories and in the fields of energy, transportation and health. We predict the emergence of firms based on platforms for improving products and services.

Europe missed out on the first wave of data platforms in B2C (business-to-customer) relations. However the opportunities in B2B and Europe's place in industry worldwide are reasons for not missing this second appointment. Given their know-how and access to industrial data, European companies have the duty of taking a lead in this revolution — with public authorities playing a key role by setting regulations for the circulation and sharing of industrial data. The visions of Atos or Siemens show what we can expect from increased cooperation within an industrial ecosystem.³ The open-source movement and networked research are the best way to seize these opportunities, which are, by nature, transitory.

Setting up and running a platform of industrial data requires both a long-term view of each participating firm's data (a form of capital) and an adaptation to the market context so that the number of partners in this ecosystem reaches a critical mass. Around these platforms, value chains will form. The participants will accept to share data on design, operations, uses, maintenance and customer feedback since they know that no party to the ecosystem controls all these data. These data will take on value via analytics and machine learning only if the platform's partners share a global view. Such a data platform is a catalyst for positive externalities (an indirect advantage to a third party from a transaction in which it is not involved) generated by the ecosystem. Just as the existence of two-sided markets explains the surge in B2C platforms,⁴ industrial data platforms will profit from network effects in B2B relations. The data exchanged for making decisions are a resource that generates network effects and creates value.

The life cycle of industrial data

The life cycle of industrial data starts with computer-aided design. Data are then collected on production via automated factories and on uses via connected devices and through customer feedback. In compliance with the rules on privacy (under the EU's General Data Protection Regulation)⁵ and under conditions guaranteeing their security, these data will be fed into applications in data analytics. The monitoring of operations will allow for optimizing them and for predictive maintenance, while prescriptive analytics will help automate some decisions without human intervention. Owing to this knowledge and intelligence, the dormant value of a company's data will be released, and results-driven business models can be implemented. This digital revolution in industry will open the way toward the goals set for Industry 4.0: a shorter time for bringing products to market, increased flexibility and improved efficiency all along the production line.

³ "Journey 2020: Shockwaves in business", <https://ascend.atos.net/journey-2020/> & "Pictures of the future", <https://www.siemens.com/innovation/en/home/pictures-of-the-future/digitalization-and-software.html>.

⁴ ROCHET J.C. & TIROLE J. (2003) "Platform competition in two-sided markets", *Journal of the European Economic Association*, 1(4), pp. 990–1029. Available via <http://www.rchss.sinica.edu.tw/cibs/pdf/RochetTirole3.pdf>.

⁵ The GDPR (General Data Protection Regulation): "Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data". Available via: <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1478961410763&uri=CELEX:32016R0679>.

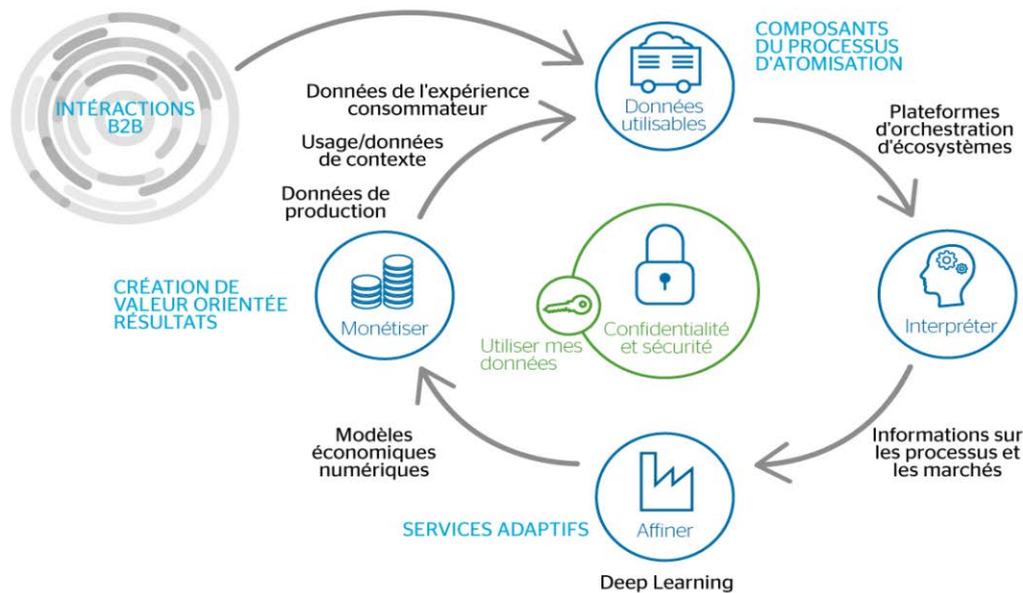


Figure 1: The life cycle of industrial data
 Source: p.14, <https://ascent.atos.net/journey-2020/>

Industrial data platforms and the challenge of “multihoming”

No firm has all data on production, uses and customer feedback. To benefit from this store of data, firms must, therefore, accept to share data with each other. To be effective, relations within this ecosystem must take a contractual form that sets the value of exchanges. In B2C, such a contract takes the form of an agreement about using personal data or receiving advertisements in exchange for a service that is for free or at a reduced cost. The companies, subcontractors and clients in B2B will form a network of innovation that uses the platform to share industrial data via contractual relations limited in time and to specific fields.

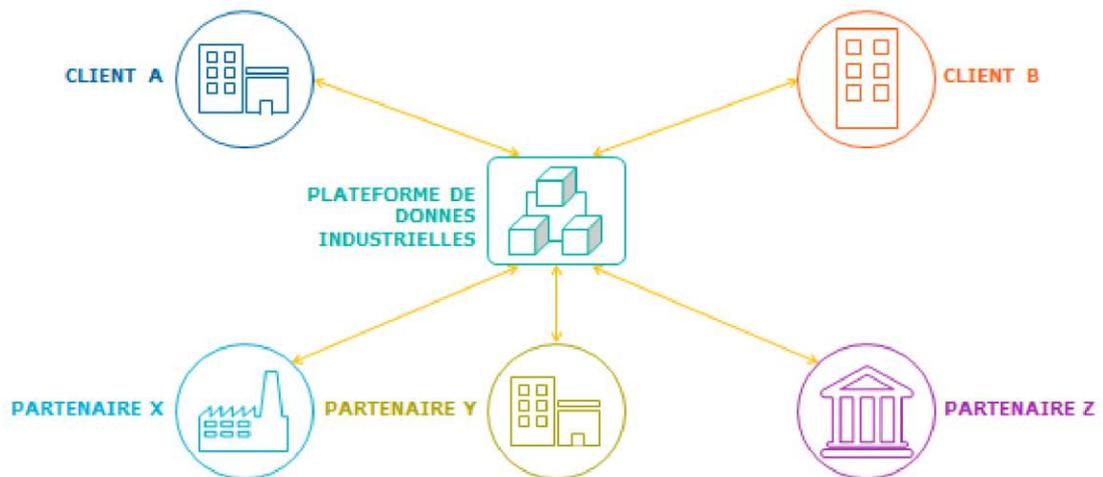


Figure 2: A platform of industrial data
 Source: © Atos

It is very much in the interest of the major suppliers of equipment and services (in industry, telecommunications, transportation, etc.) to set up their own proprietary platforms to which the equipment they sell will be connected. Problems will arise about the devices connected to more than one platform and the sharing, voluntary or not, of incoming data with the other partners on the platform. Economists have called this “multihoming”.

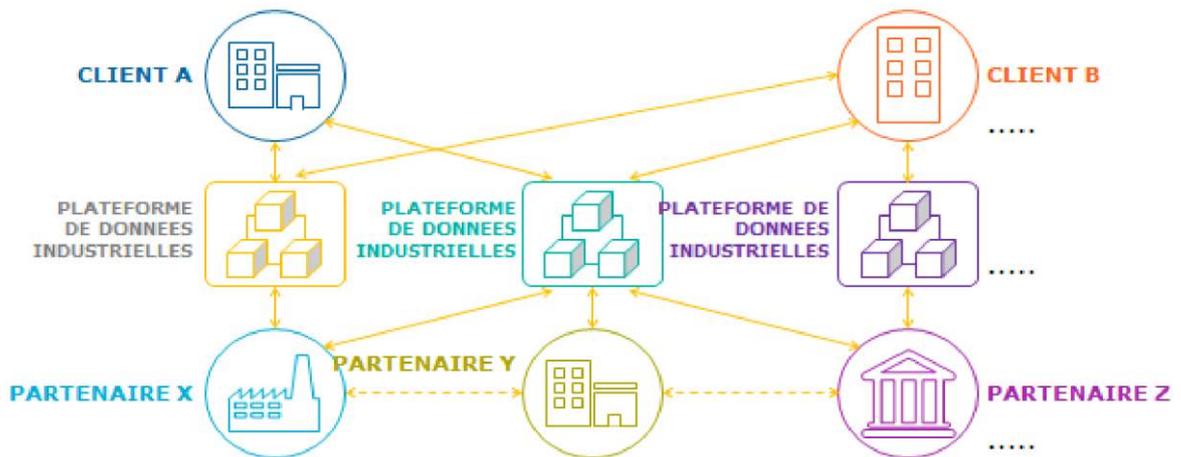


Figure 3: The multihoming dilemma for industrial data platforms
 Source: © Atos

B2B platforms of industrial data

Industry exists to create and exchange value. However the economics of platforms requires a different approach for evaluating their potential. In traditional manufacturing, value is created, above all, through products, and is monetized through the relations between customers and suppliers in what has been called a “pipeline model”.

Under the platform model, emphasis is placed on creating relations between several partners in order to tap the value of their data and facilitate exchanges of data. The more the relations, the higher the potential distribution. This so-called “network effect” is an essential characteristic of platforms: a platform gains value as it gains users. Its size is both the result of its initial success and the driving force for future growth. Momentum generates momentum. Although the platform’s value comes from the network, the potential to monetize this value is not a linear function relating supply and demand. Each participant in the network is seen as both a consumer and supplier of value, while the platform’s potential increases exponentially as a function of the number of connections.

B2B platforms differ significantly from traditional manufacturing because they are centered on exchanging data instead of goods or services. The data are used to obtain information about the context and improve understanding so as to identify the right moments for making decisions. Sharing the tangible value represented by these “moments” over the whole platform has a considerable impact on income. Having recognized this potential, industries as different as Disney, John Deere and Siemens are competing to obtain a share of this additional income by building their own platforms.

When examining the importance of data in the economics of platforms, two dimensions must be brought under consideration: 1) the value attributed to the generator or owner of the data; and 2) the value from sharing data with third parties. In both cases, the value of data depends, directly or indirectly, on the requisite degree of granularity of the data and their interpretation. Let us take as example data about a jet engine’s operational performance. Both kerosene consumption and statistics on vibrations are of value to the parties who design and manufacture the engine, since they want to constantly improve the engine’s quality and safety. These data (related the first dimension of value) can also be used to detect imminent problems that, if not corrected during preventive maintenance, will be of significance. The manufacturer has an interest in sharing know-how (data related to the second dimension) about the engine so as to make preventive maintenance more efficient and minimize the risk of breakdowns, which would take the airplane out of use.

Nonetheless, it is not in the interest of the manufacturer to allow free access to all his data and intellectual property. Industrial data platforms are the occasion for defining the uses of data, the owners of data, the partners for exchanging data and the contracts necessary for managing these exchanges.

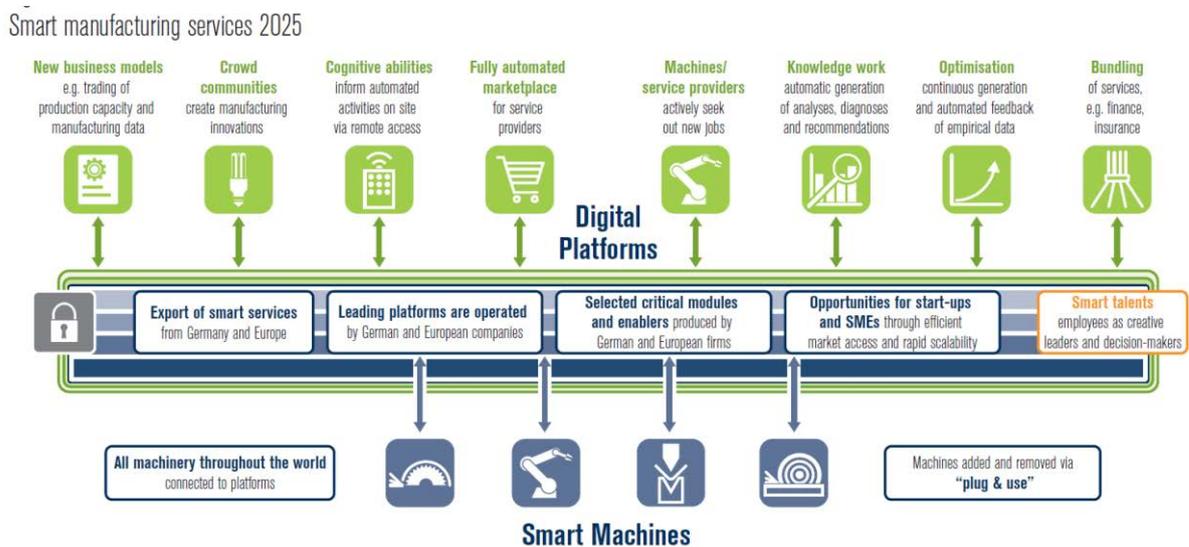


Figure 4: A model of the architecture for industrial data platforms
Source: ©IDSA (April 2017).

The Industrial Data Space Association (IDSA), piloted by the Fraunhofer Institute, brings together a large number of manufacturers. It has proposed an abstract model for an “industrial data space” encompassing various software solutions while concentrating on the concepts, features and processes for creating a network of trust for the use of industrial data: “*The Industrial Data Space is a virtual data space leveraging existing standards and technologies, as well as accepted governance models, to facilitate the secure exchange and easy linkage of data in a trusted business ecosystem. It thereby provides a basis for smart service scenarios and innovative business processes, while at the same time ensuring data sovereignty for the participating data owners.*”⁶ This document provides a global view as well as the specifications of components in this architecture (Connecteur, Broker, Appstore, etc.).

⁶ Page 4 in LOHMAN S. (2017) editor: “Reference architecture model for the industrial data space”, 83p. (Munich, DE: Fraunhofer Institute & Industrial Data Space Association, IDSA). Available via: https://www.fraunhofer.de/content/dam/zv/de/Forschungsfelder/industrial-data-space/Industrial-Data-Space_Reference-Architecture-Model-2017.pdf

Conclusion

Platforms (at first in the media, then in transportation and the hotel business) have upended B2C relations. We are at the very start of the digital revolution in B2B. Platforms have roiled markets, and the impact of data analytics and of the IoT on factories, specifically in the fields of energy, transportation and health, is becoming noticeable.

In a networked world, a large number of devices and machines in factories can be intelligently connected to exchange their data (nearly) in real time. These data can be analyzed and used to optimize industrial processes, to make them more efficient, flexible and resistant to breakdowns or cyberattacks. Industrial data platforms will enable the platform's partners to share their data so as to draw the most benefits from analytics and, eventually, artificial intelligence.

Industry must understand the economics of industrial data platforms lest it skip the chance for helping Europe increase its share in industry worldwide. Europe must do whatever is needed to boost the emergence of these platforms.