ADD N°09

ARGON JOURNAL OF IDEAS

- PROCUREMENT
- R&D AND INNOVATION
- PRODUCTION AND MAINTENANCE
- SUPPLY CHAIN AND LOGISTICS
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Supply Chain 4.0: a Big Bang?

ARGON CONSULTING

SUPPLY CHAIN 4.0: A BIG BANG?

There is currently a lot of media hype about IoT, blockchain and data science so we felt it would be useful to discuss the incremental or disruptive nature of the transformations that these technologies will actually have on a supply chain that is already well equipped with information systems.

Is it necessary to make massive investments in these new technologies? What for? Starting with what? Does the survival of a company depend on it?

Obviously, this issue does not claim to have all the answers. In any case, the right answer is specific and varies according to the sector and company.

We do want to shed light on two elements: a vision of what Supply Chain 4.0 could be and particularly the reality of what Supply Chain 4.0 consists of. We have tested these examples before sharing them with you. As a matter of fact, we invented some of them and have already implemented them with some of our clients. Examples include monitoring manufacturing flows or tracking sea containers.

As usual, we have interviewed some of you and asked if digital technologies represent an opportunity for you, and how you would rank it in your current priorities and projects.

We also asked industrialists to share their vision and the return on investment they have experienced in their operations. Pascal Zammit, Supply Chain Director for Michelin Group presents the projects that have already been implemented in Michelin's supply chain and shares his vision for the future. Alexandre Falck, CEO of Les Mousquetaires Group, with 3,500 retail outlets, will explain his investment plan for Supply Chain 4.0 targeted at improving customer experience and inventory optimisation. Ludovic Le Moan, Founding President of Sigfox, will point out that, for manufacturers, the key to the Internet of Things resides in the value of the extracted data.

I hope you find this issue stimulating and insightful, and that it provides you with a fresh look at your operations.

Fabrice Bonneau
Managing Partner
ARGON CONSULTING

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DIGITAL AND SUPPLY CHAIN: WHAT IS THE REALITY?

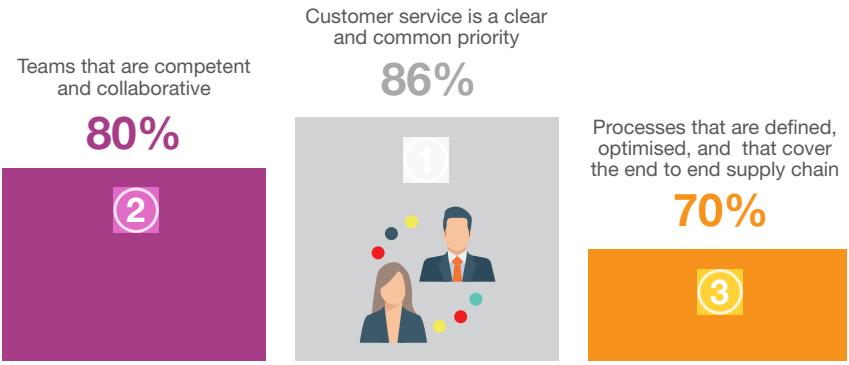
Digitalising a supply chain is certainly a way to improve performance. But to what extent? Where do you start and what should be expected from digitalisation? We asked 201 business leaders of medium-sized to large companies in all manufacturing sectors, retail, distribution and services.
Here are the key learnings.

1. Supply chain performance is first and foremost related to the implementation of the fundamentals, not the development of digital projects

55% of people surveyed name digital technologies as a business performance factor, but they only rank 10th after, for example, prioritisation of customer service, teams, and the quality of processes.

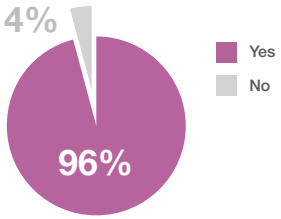
In other words, digital technologies are a driver for innovation, a way to move ahead faster and better but they are not a universal problem-solver. Before anything else, the fundamentals need to be well implemented.

WHICH SUPPLY CHAIN FUNDAMENTALS HAVE
THE BIGGEST IMPACT ON BUSINESS PERFORMANCE



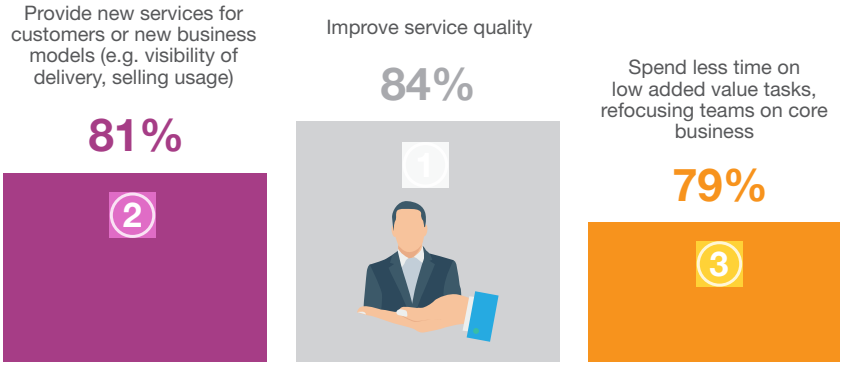
2. But all survey participants nevertheless acknowledge that digital technologies represent an opportunity for improvement in supply chain operations in the coming years

DIGITAL TECHNOLOGIES ARE AN IMPROVEMENT FACTOR FOR SUPPLY CHAINS

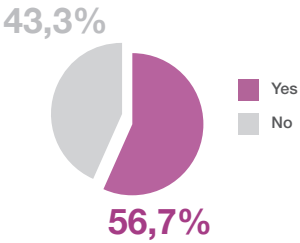


96% of people surveyed identify digital technologies as a factor that can improve their supply chain's performance, particularly by improving customer service, creating new services and enabling teams to focus on high value-added tasks. In fact, according to the companies surveyed, the first contribution of digital technology is human; serving customers and co-workers.

DIGITAL INNOVATIONS FIRST HAVE AN IMPACT ON CUSTOMER SERVICE



3. Digital innovation: many initiatives and far more intentions

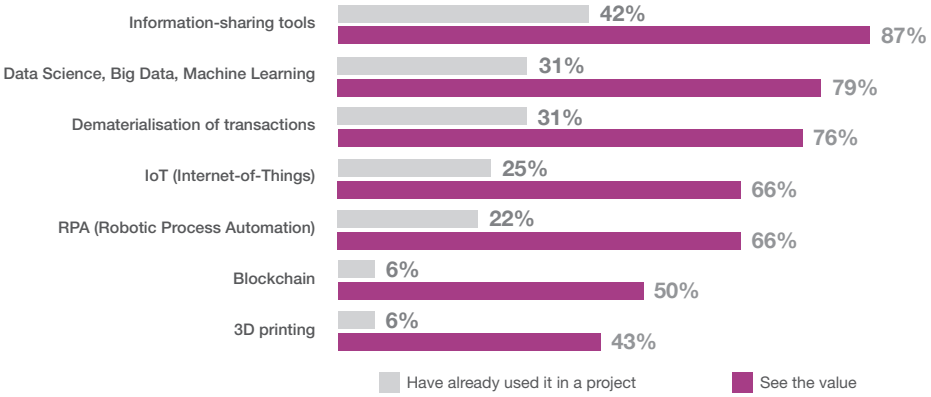


Have you already launched digital innovation initiatives?

56.7% of people surveyed say they have already launched initiatives relating to digital innovation, particularly concerning information-sharing tools, dematerialisation of transactions and data science. That said, there is quite a large gap between those who are interested in these technologies and those who have actually integrated them into projects. This means that new digital projects such as blockchains have

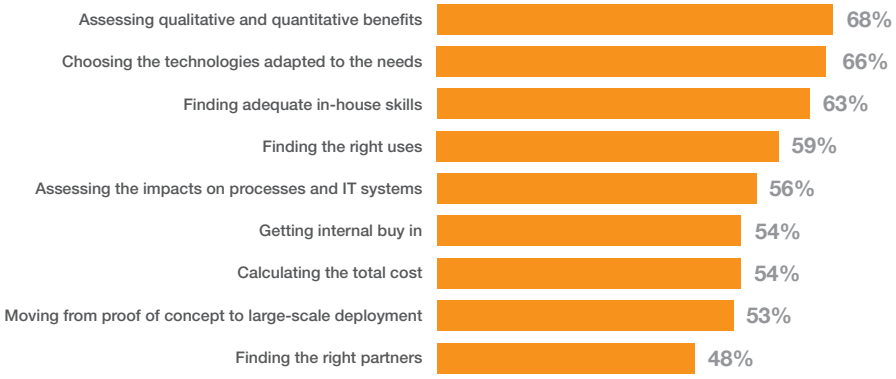
strong growth potential, where 50% of the people surveyed see the value but only 6% have actually launched a project.

LEVEL OF INTEREST FOR DIGITAL INNOVATIONS IN SUPPLY CHAIN COMPARED TO HOW MUCH THEY'RE REALLY USED IN PROJECTS



4. The implementation of internal digital projects faces many challenges

KEY CHALLENGES WHEN IMPLEMENTING DIGITAL PROJECTS



Implementing digital tools requires identifying the uses and associated technologies and having a proof of concept before any possible deployment.

There are several points worth noting:

- Making the appropriate choice in technologies/uses: companies can be overwhelmed by numerous solution providers, making it hard to see clearly and choose the right solution. It is essential to have an effective understanding of the various business processes and the technologies required to identify the potential uses and benefits.

- Launching a pilot project: the next challenge is to find the people with adequate competencies both in business expertise and technological know-how to launch one or several pilot projects to demonstrate the proof of concept.

- Deploying: assessing the benefits, the impact on processes and information system(s), presenting the business case and getting internal buy-in. Digital projects, as any other project, must prove their added value.

To conclude, digital innovations are becoming more and more vital for supply chains. In the coming articles, we strive to identify the opportunities and present the benefits.

DIGITAL INNOVATIONS AND THE EMPOWERMENT OF CUSTOMER SERVICE

Michelin is the world number two tyre manufacturer. The company has completely rethought its supply chain. By investing in new technologies and empowering its teams, the tyre specialist has designed a logistics service that can support its activities worldwide. Pascal Zammit, Supply Chain Director for the group, shares his views on the outcome and prospects of this in-depth change.

Michelin is dedicated to the continuous improvement of its supply chain and today it is held up as a model for operational logistics. What is your assessment of investments that were made ?

Michelin has been a pioneer by investing in its supply chain as early as 2000 to improve the overall management of its business. We developed a Sales & Operations Planning process in each of our group's operating units.

Pascal Zammit

Group Supply Chain Director
Michelin

We also rethought operational management with daily deliveries to our warehouses and weekly factory scheduling. There were multiple objectives: improving customer service, reducing costs and enhancing performance.

As years went by, markets became more complex, volatile and uncertain. Our teams gradually adapted our business model to this increasing complexity but the consequence was that our supply chain had become increasingly difficult to manage in the field. In order to deal with contingencies, we had to accept compromises on service, inventory and costs, sometimes to the detriment of customers.

Digital levers help us focus on the "bare necessities", putting aside unnecessary complexity

How did you improve your supply chain?

We simplified our supply chain model and gave our field teams more leeway and autonomy to react to contingencies and situations not covered by the model.

Empowering means empowering everyone. The objective of each of the supply chain teams that are close to customers is to coordinate all of the stakeholders (salesforce, warehouse and factory managers, credit managers) to find a solution to an unforeseen issue. A transverse team can count on the support of its regional team (Europe, USA-Canada, China etc.) that oversees the operational standards of that region (inventory level, productivity etc.). As a last resort, it is possible to take the issue up to group level to propose changes in one of the principles that structure our supply chain.

The group can then decide to adapt or not its operating framework to meet this demand.

We start from a customer's concrete problem or request and we mobilise the whole of our expertise at all levels of the company. It is a truly efficient response to contingencies and market uncertainties. Our customers' concerns are at the heart of each team's reflections.

We reinforce our collective responsibility towards the satisfaction of our customers but also our employees who feel supported at all levels. Moreover, the different jobs in the supply chain become more attractive as the supply chain develops a more important, vital role in the system.

To support this, we are developing a new generation of omnichannel information systems integrating CRM[1] and supply chain in real time and interconnecting all of the stakeholders from customer to factory, at both local and global levels.

The IoT improves flow traceability, notably for sea shipping, we can trace containers in real time anywhere on the planet

(1) Customer Relationship Management

How do digital levers help you improve your supply chain?

Digital levers open up new horizons. They help us focus on the “bare necessities”, putting aside unnecessary complexity. At Michelin, we call that “simplixification”. The IoT improves flow traceability, notably for sea shipping, we can trace containers in real time anywhere on the planet. There are many advantages: inventory downsizing for our customers, cost optimisation, maximum traceability, enhancement of customer experience and contingency management.

Thanks to Big Data and predictive analysis, we get sales forecasts that are more accurate, more precise and more reactive

Then, thanks to Big Data and predictive analysis, we get sales forecasts that are more accurate, more precise and more reactive. And, lastly, artificial intelligence facilitates the work of the scheduling managers as our JDA software can anticipate inventory shortages. The result is that we have a constantly improving service level with no extra complexity in the modelling.

What are the next challenges for the supply chain?

The first one concerns urban logistics, making city centre deliveries with a lower carbon footprint. To solve this challenging equation, industrial managers need to interconnect to their global and local ecosystems through a targeted partnership policy. The second one is to bring the industry and the end-user closer together. That requires an end-user supply chain that can generate a striking and positive customer experience while integrating a host of supply chain stakeholders. The third and last challenge will probably be the automation of logistics operations to make them more efficient, better performing and especially more user friendly.

THE **FOUR PILLARS** OF **SUPPLY CHAIN 4.0**

#IoT, #MachineLearning, #BigData, #Blockchain, #RPA… What is behind these buzzwords? Can they really improve supply chain management?
Data has always had a key role in supply chain performance. Demand, inventory, lead times, and WIP are key performance drivers. Digital innovations allow companies to reach a new level of data management, with four clear areas of use.

Supply Chain 4.0 has four characteristics, each relating to an aspect of data processing:

- **Connected**

The Internet of Things technology allows data to be extracted in a simple and cost-effective way. This data enriches the information already available and eliminates the opaque areas of the supply chain such as long, non-mastered flows (e.g. sea shipping flows) and external storage areas. The benefits here are improved visibility, reduced lead time, better management and enhanced customer service.

- **Predictive**

Big data, machine learning and data science enable data to be better utilised for more accurate forecasts. It is therefore possible to obtain more precise sales forecasts and the required product range in retail outlets thanks to a more detailed knowledge of customer behaviours. It also allows better anticipation of shortages and quality levels in production to enhance the reliability of product supply.

- **Secured**

Blockchain technology enables secure data and flows, particularly in large-scale, de-centralised ecosystems without trust as a pre-requisite. The benefits are around product traceability, securing transactions and flows as well as disintermediation in complex eco-systems.

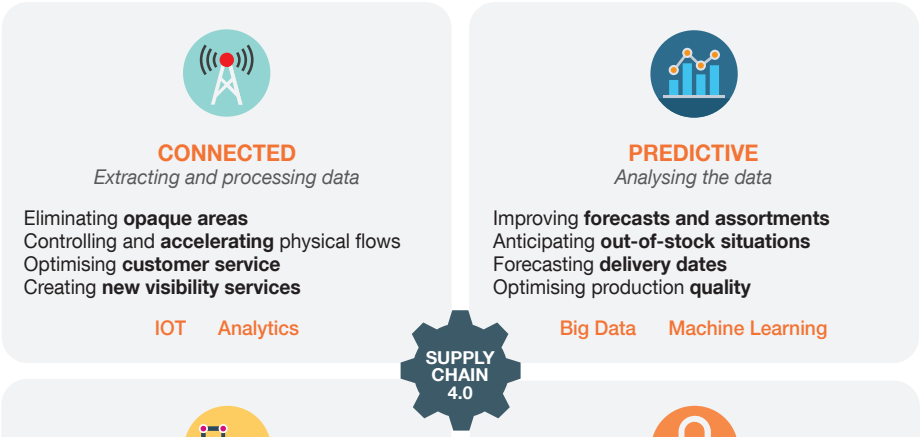
• Automated

Robotic Process Automation allows the automation of data processing and repetitive tasks. The benefits are higher productivity, fewer errors, and allowing teams to focus on added value tasks.

Another type of automation is also possible with Warehouse 4.0 technology, based (among other things) on an optimised processing of orders and storage. The gains are efficiency, agility and the improvement of work conditions.

These four areas are described in this issue of ADD and the articles follow this sequence.

THE FOUR PILLARS OF A CONNECTED SUPPLY CHAIN



IOT AND SUPPLY CHAIN: PUTTING AN END TO OPAQUE FLOWS

Pierre-Fabrice Storino, Partner, Argon Consulting

The digital revolution is under way! By 2020, 20 billion objects will be connected. Data provided by the IoT will enable real-time monitoring of flows, the reduction of lead time and costs, and the development of new services. It will mark a new era for the connected supply chain. But just what is the Internet of Things?

A new paradigm

The 'big bang' anticipated from connected objects results from several factors that create a new paradigm:

- New communication networks allow the connection of new objects at a low cost and do away with the constraint of battery life.

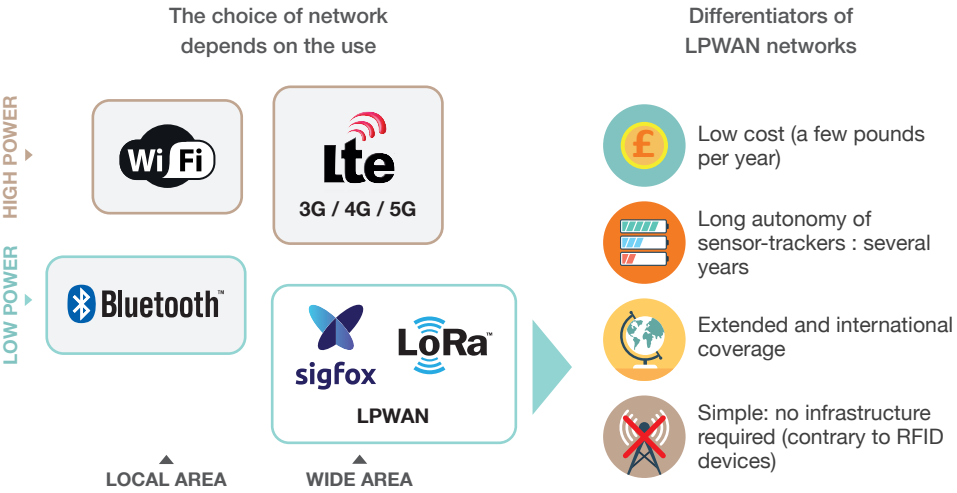
- Data science allows the processing of data with almost no volume limitation and the extraction of value.

- Scale effects feed the virtuous circle of cost reduction / volume increase.

The IoT can be considered as a technology that extracts data from billions of objects. These new interactions with the world open the door to new uses and new business models. But the situation of IoT in 2018 is comparable to the Internet twenty years ago, the potential seems limitless but only a small part of its potential applications has been identified to date.

THE NEW COMMUNICATION NETWORKS FOR IOT

(LPWAN = Low Power Wide Area Network)



New communication networks for the IoT

One of the key factors for the development of the IoT is the deployment of LPWAN networks (Low Power Wide Area Network). These networks complement the array of existing communication technologies and offer a new connectivity option with characteristics suitable for objects: a cost of a few pounds per year, sensor-tracker autonomy of a few years, international coverage and ultra-simple (no need for the customer to install infrastructure).

The principle one should remember is that a connected sensor-tracker almost never listens to the network and outputs very small quantities of data. That is ideal for the intermittent transmission of a position or temperature, but it is totally inappropriate for voice or video transmission.

There are two main operational networks: Sigfox and LoRa. The choice depends on what it will be used for:

- Sigfox is a French start-up founded in 2009. It deploys a global network and has positioned itself as ultra-simple. It currently operates in 45 countries and offers multizone functions. To date, Sigfox is the only option for international supply chain applications.

- LoRa is a technology supported by Semtech and deployed by incumbent operators through national networks. The coverage of this network can be broadened by a private network and the throughput rate can be varied. It is consequently adapted to national applications focused on controlled sites.

The range of IoT networks is far from being static. Beyond the competition between Sigfox and LoRa, new networks such as NB-IoT and 5G will be on the market in the coming years. These major 'tectonic movements' in the field of telecommunications should be taken into account when designing IoT solutions; to make the right choice of solutions one should take an agnostic ("don't know yet, no firm beliefs") position as regards network technology.

An IoT solution allows data to be extracted, stored and processed to make it directly usable by the customer

The network is only one of the three building blocks of an IoT solution. The two other building blocks are:

- **The connected sensor-tracker:** it measures key data (position, movement, temperature etc.) and outputs this data according to a predetermined protocol.
- **The IoT platform:** it collects the data output by the sensors via the network, stores them, analyses and combines them with external information (customer IS or external databases) then provides the data in a format that is directly usable by the customer.

IoT vs RFID ?

RFID technology (radio-frequency identification) allows individual tracking of goods with tags costing a few pence. Its use is however restricted to dedicated areas where costly detection devices can be installed, and it does not allow tracking in a supply chain that has intermediate non-interfaced systems.

In comparison, IoT offers three extra value drivers:

- **Sends a status:** IoT sensor-trackers are active. They measure and transmit a local status.

THE BUILDING BLOCKS OF AN IOT SOLUTION

A CONNECTED SENSOR-TRACKER	AN LPWAN NETWORK	AN IOT PLATFORM TO COLLECT AND ANALYSE DATA
		
Measures data (location, temperature, movement…) Transmits on the network Is autonomous for several years	Sigfox or LoRA	Collects, stores, analyses and compiles data in a format directly usable by customer Agnostic to technology

- **Works everywhere:** transmission of IoT data is made via network bases. Thus, their use is not limited to dedicated areas and does not require investing in detection devices.

- **Allows end-to-end tracking:** IoT is not constrained by multiple intermediaries and systems.

IOT VS. RFID:
A FUNCTIONAL COMPARISON

	Lever	IoT	RFID
1	ENABLES INDIVIDUAL TRACKING	✓	✓
2	SENDS A STATUS	✓	✗
3	WORKS EVERYWHERE	✓	✗
4	ENABLES END-TO-END TRACKING	✓	✗

The end of opaque flows in the supply chain?

Sensor-trackers placed on goods, containers or components being assembled in production offer new value drivers in the supply chain. One of the main drivers is that there are no longer opaque flows. An opaque flow is a flow where the supply chain teams are blind. Whether related to production or distribution, this type of flow involves external stakeholders (subcontractors, suppliers, carriers) that are not connected to one sole information system. This results in flows that are generally long, hard to track and impair scheduling, having a negative impact on supply chain agility.

The performance of a supply chain resides, among other things, in the control of flows throughout the chain. The IoT offers enhanced, reliable visibility in real time for opaque flows and allows companies to aim for perfect control of end to end physical flows.

Three types of opaque flows have been identified:

1. **Intercontinental sea-shipping flows.** This major case is detailed in the sidebar. A pioneering IoT solution has been deployed at Michelin for the tracking of sea containers.

2. **Production flows involving subcontractors or suppliers.** This case is detailed in the next article: “Moving towards better customer service thanks to manufacturing flows that are controlled and managed globally”.

3. **The tracking of a fleet of equipment such as sustainable packaging or high added value tools.** A concrete example of this is sustainable packaging used in the automotive industry. Tier-1 suppliers are required to supply their parts to OEMs in sustainable packaging. This implies that their availability is critical but their supply chain management is difficult if there is no reliable information about their location. A fleet can comprise tens of thousands of parts over many sites. In the process, there are return loops, cleaning and maintenance operations. The IoT solution provides real-time visibility on the location of all of the elements of the fleet and therefore provides significant gains: improving availability, accelerating flows, reducing fleet size and scheduling maintenance operations according to real use.

As a conclusion: IoT offers new value drivers in the supply chain. Each situation will require a specific business case to confirm the investment is justified. But opaque flows are a real opportunity to use IoT technology, with it ranking as a high priority.

A concrete example: intercontinental sea-shipping flows (the solution deployed by Michelin)

A concrete example of opaque flow concerns sea-shipping. During one sole shipment, a container is handled 200 times by 20 different stakeholders: forwarder, carrier by land, port handling team, customs, shipping company, ship owner, insurer etc. Supply chain teams often complain that it is hard to have real-time visibility about shipments and that they have no reliable guarantees on shipping conditions.

A solution is for shippers to place IoT sensor-trackers inside a container. These trackers allow the location of the container from its initial warehouse to transit ports and finally to its destination warehouse. The trackers can also detect unloading from the ship at arrival and follow the transport conditions.

This solution helps to optimise the level of service to customers. It offers:

- **Lead time reduction.** The unloading of the container at the port can be detected so the logistics operations required at the destination port (customs and collecting) can be sped up by a few days. The analysis of the data collected also allows the identification of the best roads and to optimise lead time even more. This leads to inventory reduction and greater agility.

- **Alerts on delays and improved scheduling.** The shippers can monitor advances and delays vs. the initial schedule. Alerts allow corrective actions (premium shipment) and better management of priorities between customers. When this is combined with a simple or sophisticated predictive approach, a more precise expected arrival date can be obtained, and this improves scheduling.

- **New service offer to customers.** In the case of direct delivery, the shippers can design, for example, new services around delivery visibility.

- **Guarantee on carriage conditions.**

The main asset of the IoT solution is independence from the transport companies. The company can track any chosen flows and launch improvement initiatives with its service providers.

MOVING TOWARDS BETTER CUSTOMER SERVICE THANKS TO MANUFACTURING FLOWS THAT ARE CONTROLLED AND MANAGED GLOBALLY

Thierry Lucas, Partner, Argon Consulting
Pierre-Fabrice Storino, Partner, Argon Consulting

In the last few years, most companies have started moving towards customer-focused factories. As customer demand is ever more volatile, it is necessary to go further and make manufacturing facilities more agile. One of the keys to this approach relates to industrial flows - controlled, faster and managed at a global level.

Digital innovations bring new improvement drivers for customer service. It is now possible to control manufacturing physical flows thanks to the IoT and to manage them globally by using industrial supply chain control tower “intelligent tools”.

Roadblocks to customer service in complex environments

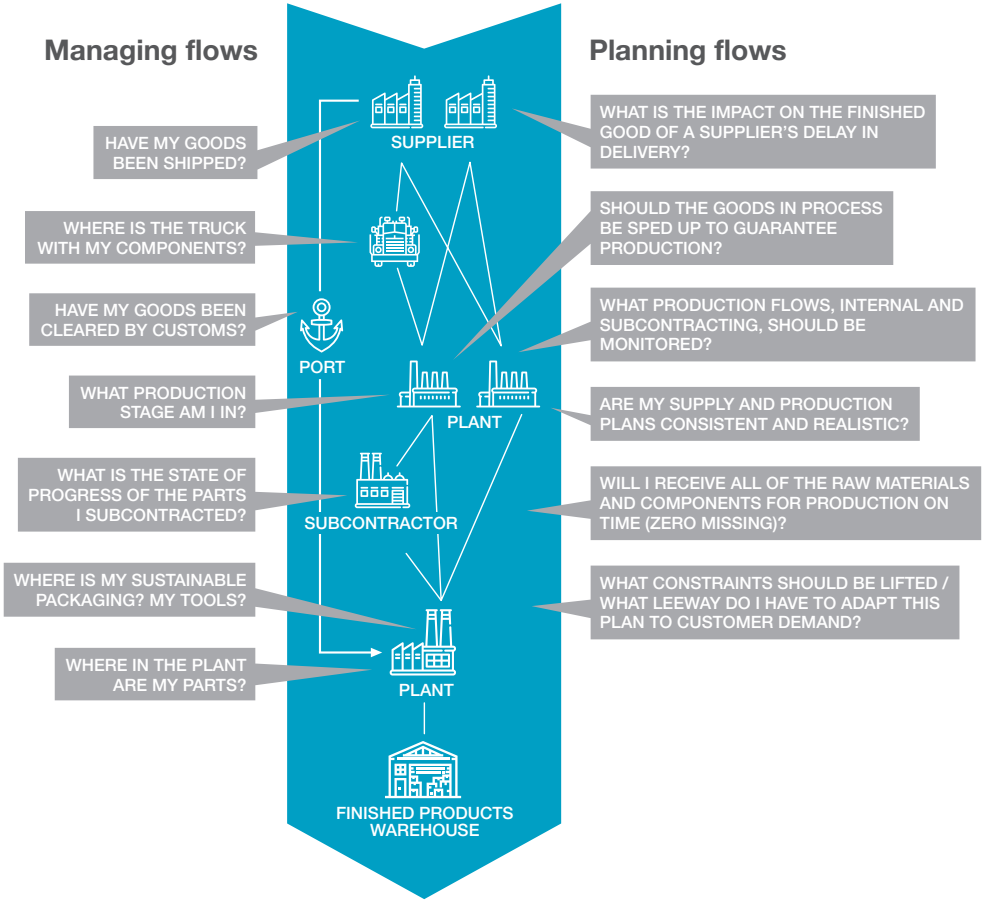
Enhancing customer service is one of the major aims of manufacturing excellence. There are two types of objectives:

- Respecting commitments and giving visibility on expected delivery dates.
- Offering a better response to demand by being more agile.

These objectives are particularly difficult to meet in complex industrial environments consisting of broad and multi-level bills of materials, numerous suppliers and subcontractors spread throughout the world that aren’t interconnected and long lead times.

Supply chain teams generally suffer from the opacity of certain steps in the flow and report difficulties in identifying, prioritising and processing in a consistent way the pain points of scheduling the upstream chain (diagram 1).

DIAGRAM 1: WHAT HINDERS CUSTOMER SERVICE IN A COMPLEX UPSTREAM SUPPLY CHAIN



IoT allows the control of manufacturing physical flows

The first issues concern the difficulty of tracking flows in opaque areas involving external stakeholders who are not necessarily interconnected.

One solution consists in using IoT sensor-trackers to monitor physical flows in opaque areas. The tracker placed directly on the product or the packaging allows the monitoring of the physical progress of the production flow. The main added value in this solution is in the fine-tuned analysis of the collected data (location, motion detection and opening of boxes) giving insight into the production status for each part.

Some ongoing experiments in industry confirm the validity of this approach. The IoT solution does lead to a significant improvement in the control of physical flows:

- Real-time visibility of physical flows generated by external/internal stakeholders and less time spent on manual flow tracking.

- Capacity to measure accurately the lead time break down, allowing the identification of waiting time and the launch of collaborative time reduction actions (IoT-based value stream mapping).

One of the key issues is the choice of tracking unit on which the sensor-tracker is based. The choice needs to take into account physical and economic criteria. When a part is large and of high value, it is logical to choose an individual sensor-tracker placed directly on the part or the dedicated packaging. In the case of parts of lower value or smaller size, the usual choice will be to place a sensor-tracker on larger containers (box or pallet) and to opt for a sampling approach.

The advantages of IoT are twofold. The process presents little intrusiveness for factory teams and the solution is plug-and-play, meaning it does not require specific infrastructure such as antennae or detection devices.

In the end, IoT strengthens the control of physical flows in the critical steps. It completes and increases the reliability of the information in the ERP by contributing a supplementary, differentiating approach.

A supply chain control tower that enables global management of manufacturing flows

Complete knowledge of the information coming from the ERP and fine-tuned by the IoT is often not enough. In complex supply chains (multisite, multi-entity, multi-level of bills of materials, long cycles, volatile demand etc.) knowing the information is one thing but identifying the pain points and knowing where and how to act is another.

The Argon Supply Control Tower “intelligent tool” answers, for example, this problem. Based on new ritualised management modes, it acts as a complement to the ERP and scheduling tool used. It is a method that is both simple and visual for the operational teams. It allows the identification and execution of actions that will maximise the satisfaction of customer demand:

- A global dashboard visualises in a simple form the forecasted customer service level and detects the pain points (diagram 2.1).

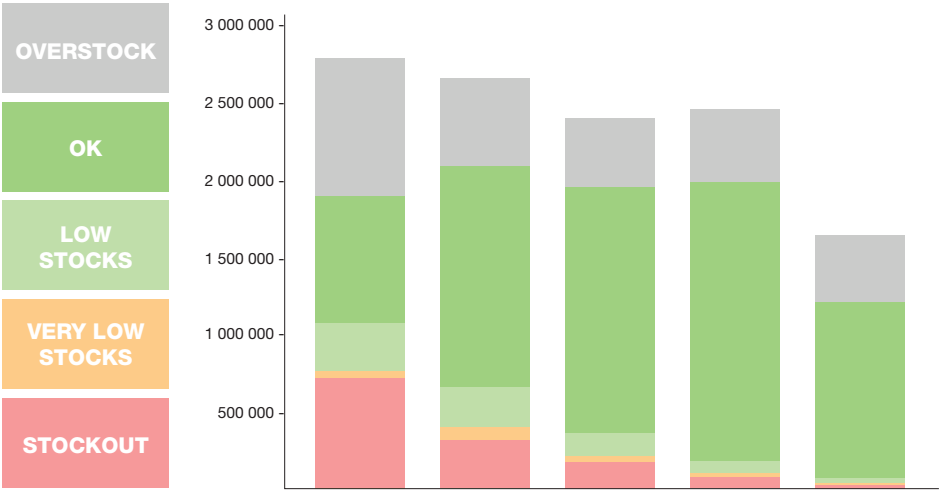
- Work priorities of the operational teams are determined on the basis of the value of their impact on customer service and are spread throughout the chain.

- Schedulers process in priority order the families of products that erode customer service level. To facilitate their work, they have direct visibility on:

  - Their leeway to follow customer demand.

  - The constraints (procurement, scheduling, quality etc.) that hamper agility.

DIAGRAM 2.1: A PROJECTED OVERALL VIEW OF INVENTORY SHORTAGE RISK DUE TO CONSTRAINED RAW MATERIAL AND COMPONENT AVAILABILITY



- The MRP[1] flaws that need to be corrected.

- In the same way, procurement officers start with the purchase orders that would have the greatest impact on customer service at the other end of the chain if they were not reworked or secured.

- A visual reporting system allows management to direct the teams and check the consistency of each person's actions (diagram 2.2).

A dream comes true

Let's consider the management of a manufacturing flow with the following characteristics:

- The status of the components at supplier and subcontractor level is known (in which case the IoT data will then enrich the transactional information of the ERP), even if these external stakeholders are not interfaced with the ERP.

- The logistics flows are tracked and accelerated thanks to a more precise knowledge of the waiting time.

- The management of all links in the manufacturing chain is truly collaborative and driven by customer demand.

- The scheduling is realistic and gives everyone a binding view of the forecasted availability of orders.

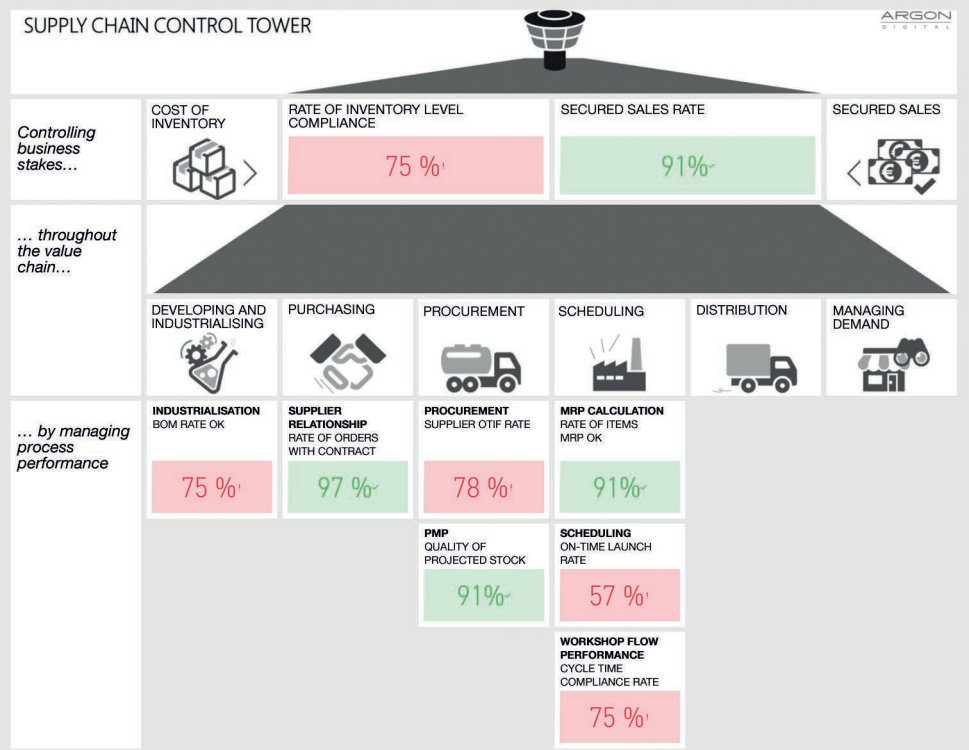
Several concrete implementations in the field show that this situation is now becoming a reality:

- Airbus uses IoT to manage its manufacturing flows and its sustainable packaging.

- IoT solutions are used to measure supplier lead times in aeronautics for example and

(1) Material Requirement Planning

DIAGRAM 2.2: A DIGITAL SCOREBOARD ENABLES PERFORMANCE CONTROL THROUGHOUT THE SUPPLY CHAIN



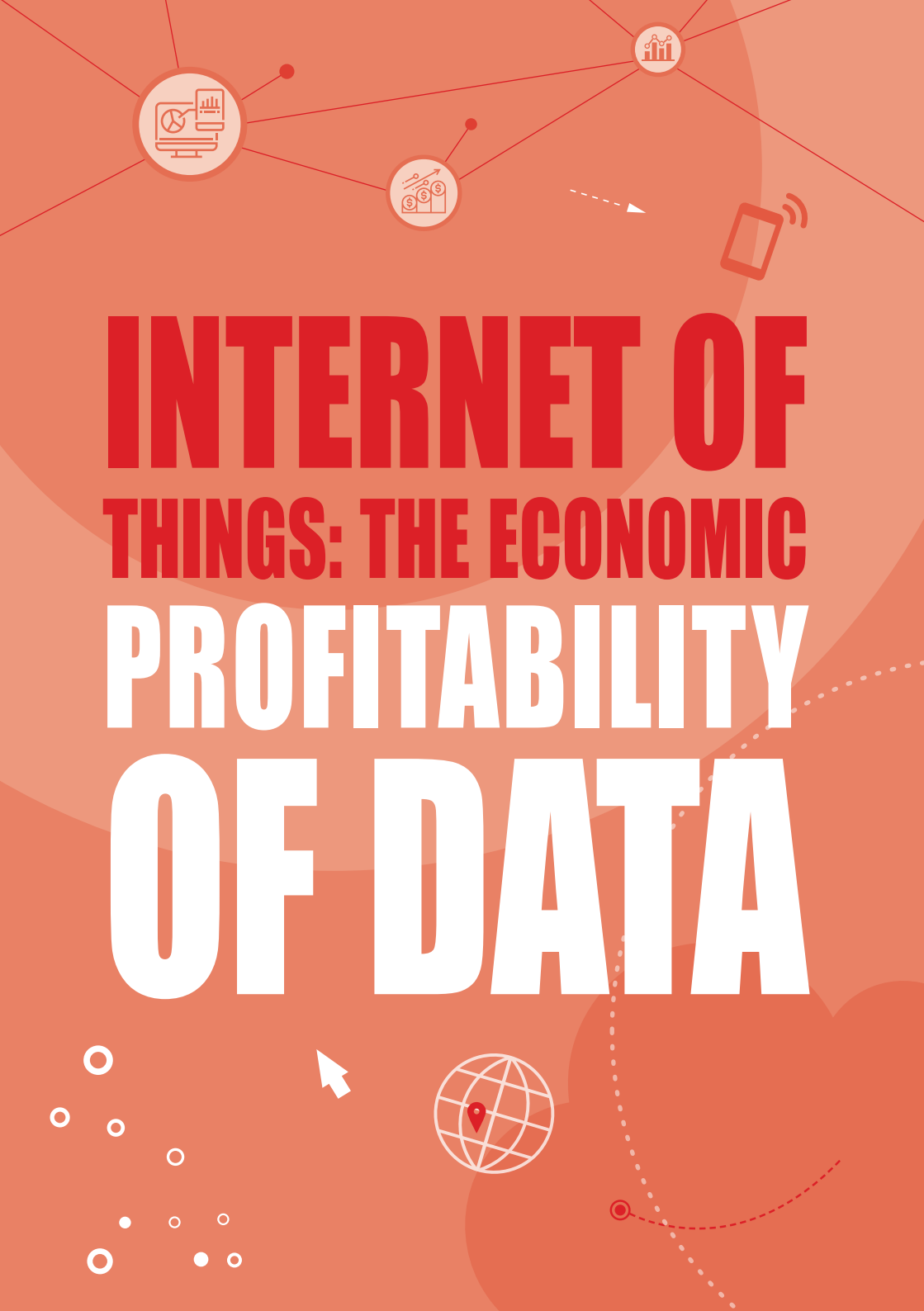
shorten them.

- The supply chain control tower is used in aeronautics, the luxury industry, perfumes and cosmetics to optimise customer service and increase agility.

All of these innovative elements together have generated substantially enhanced supply chain performance in numerous fields such as aeronautics, perfumes and cosmetics, luxury goods, capital goods and industrial supplies:

- Inventory and WIP: - 30 to 35%
- Missing parts: - 80%
- Customer service rate: + 15 to 20%

In the end, the 'intelligent tools' of the supply chain control tower together with IoT solutions dedicated to the control of physical flows offer new levers that revolutionise the management of manufacturing supply chains and reach a new milestone in the enhancement of customer service.


INTERNET OF
THINGS: THE ECONOMIC
PROFITABILITY
OF DATA

“What is at stake with IoT is the economic profitability of data.”

For the Internet of Things to be a source of economic opportunities, the equation is quite simple: the cost of extracting and analysing data must be lower than the value it provides. Ludovic Le Moan, founder and CEO of Sigfox, a French company specialising in IoT communication networks, explains how this works.

What are the economics of IoT?

IoT today is a bit like oil a hundred years ago, a resource both immense and poorly exploited. And this resource is all the more promising because it is closely linked to another honey pot: data. But up to now all companies did was to extract data and store it on servers. And that generates no value.

Ludovic Le Moan

Founder and CEO
Sigfox

For data to be a source of economic opportunities, the equation is quite simple: the cost of extracting and analysing data must be lower than their intrinsic value. I am aware of the many debates on the technologies that have been developed, the connected objects in themselves and the networks that provide information. True, all that is important but, in my opinion, the real opportunity of IoT lies much more in the economic profitability of data.

IoT: a resource both immense and poorly exploited

How do you measure the profitability of data?

It is quite easy to calculate the extraction cost; just add the development costs, the depreciation of the objects and the connection costs. On the other hand, it is far more complex to assess a piece of data's value, what it brings to the company. And that is why Sigfox is working on the creation of a new job – data economist, and developing an algorithm that takes into account the most complex environments such as smart cities, asset tracking (logistics and supply chain), smart agriculture etc. The whole problem lies in identifying and evaluating the variables.

Let's take the example of household waste collection. Launching an optimisation approach for the cost of collection and the organisation of the rounds means developing sensor-trackers that can integrate various parameters including the hourly rate of the teams, fuel cost, tyre wear, CO2 emissions, traffic conditions and so on. Once the cost of collecting the data has been calculated and their value assessed, the analysis is quite simple: if extracting and analysing the data costs less than the incremental savings… welcome smart city! If not, forget it.

What outlook does IoT give to the stakeholders of a supply chain?

Manufacturers need to be as close as possible to the field and their customers to reduce time to market and transportation costs.

If it becomes possible to improve real-time geolocation of products thanks to the power of data associated to big data and artificial intelligence, then it will be a real revolution for this sector. This data will enable trucks, trains and planes to take the shortest routes and that means additional income. That is when real value will be created.

For data to be a source of economic opportunities, the equation is quite simple: the cost of extracting and analysing data must be lower than their intrinsic value

The aim is to reduce the cost of any tracking data in order to be able to track all flows

What are the roadblocks to expanding the tracking of containers and parcels?

Once again, it's a question of extraction costs of geolocation data. At present, only high-value containers are being tracked. The aim is to reduce the cost of tracking any data in order to be able to track all flows. The logistics market is ready for this change and there is demand but not at any cost. Sigfox is working on lowering the tracking costs and that could lead to new, breakthrough economic models as we have seen with Uber or Airbnb models.

It is often said that France and Europe are at the forefront of IoT. What do you think about this?

It's true that France and Europe are running ahead. There is scientific leadership based on our engineering skills and our expertise. But there is a risk that this advantage will erode if substantial resources are not quickly mobilised to develop good business models. Other foreign players could catch up with us and take risks that hit winners in areas where we don't dare to. Competition is fierce and we must be ambitious.

Sigfox set itself the goal to deploy an LPWAN global network to connect objects. Its energy-efficient, wide area network enables these connected objects to be fully autonomous over a period of several years. It is equally adapted to low-cost trackers and stands out by being easy to use; no SIM card and no special infrastructure needed.

DIGITAL FOR RETAIL

CUSTOMER SERVICE

“By leveraging quality and service, we are defending a less profitable business model.”

To respond to new customer habits and customers that are increasingly connected, Les Mousquetaires Group, with its nearly 3,500 retail outlets in Europe (including Intermarché, Netto, Bricomarché and Bricorama) is investing in new technologies. Its aims: enhancing the customer experience, deploying new payment solutions and reinventing its inventory management.

The distribution sector is changing. What are the stakes?

The first challenge is in leaving mass distribution. Ever larger and impersonal stores are no longer suited to the customers’ needs. They are looking for places that better meet their expectations.

Alexandre Falck

Managing Director
Les Mousquetaires Group

They have a high level of information and they are paying growing attention to the quality and origin of products. The second challenge lies in our capacity to offer the best possible customer experience in our sales outlets in order to respond to e-commerce competition. This is vital because the proximity of a store, once the first choice criterion, is no longer what makes the difference in the era of the internet and home deliveries.

How does Les Mousquetaires Group intend to tackle these challenges?

We are definitely banking on service and product quality. That implies developing business models like grocery click and collect retail, which are less profitable than self-service. In the same way, giving preference to 'made in France' products or favouring animal welfare increases costs. But this evolution is absolutely necessary to stay in the race as the distribution sector is going through significant changes.

Thanks to smartphone apps, customers will be able to know the origin of each product and its supply chain

Thanks to big data and artificial intelligence, it is becoming possible to gain better knowledge of the buying habits of customers in a given area and refine the choice of products in a store

How can new technologies enhance customer experience and operational excellence?

The first significant improvement concerns traceability. Thanks to smartphone apps, customers will be able to know the origin of each product and its supply chain. The second one concerns payment solutions by smartphone solutions, already deployed in Apple or Amazon stores, we are presently considering. They solve the checkout payment issue which is both a cost centre (one third of payroll costs for a store) and a source of time loss and stress for customers. The third improvement concerns inventory management. Thanks to big data and artificial intelligence, it is becoming possible to gain better knowledge of the buying habits of customers in a given area and refine the choice of products in a store. These are all areas our group is working on.

Could you give us an insight into your initiatives?

Our initiatives are focused on enhancing customer experience in our stores and each sector deserves to be treated according to its specificities. For home improvement or household goods, the digital store provides a real opportunity. Thanks to tablets or internet kiosks, the customer has access to an extended range of products, customised advice and complementary services such as, for example, designing a kitchen. In the food retail sector, we intend to evolve our location strategy by opening stores in urban areas. This corresponds to a multichannel rationale.

How do you foster a spirit of innovation in a group of 140,000 people?

We count on the dynamism of our members. We encourage individual initiatives: we know they can lead to great innovations. We have created an innovation platform that works like a technology intelligence unit at global level. In addition, we are shareholders in the CapAgro investment fund, European leader in food tech, green tech and organic tech. This enables us to build partnerships with very promising start-ups.

We have also developed close ties with companies working on customer knowledge and supplier relationships. We conduct many tests on collaborative delivery and last-mile management. Lastly, for our household equipment stores, we keep an eye on handyman platforms that connect private individuals looking for services such as the assembly of a piece of furniture or domestic tasks.

What kind of resistance can you meet?

Our group operates on a cooperative model. Consequently, each store manager is called upon to co-fund investments in a field that he/she knows little about: technology. And these contributions to investments are liable to erode her/his store's profitability. So we have to explain why these investments are absolutely necessary, as they will strengthen customer loyalty and contribute to gaining market share. We are also thinking about ways to change our internal operating rules and make them evolve so they are in line with today's world. And that is the very subject of the Mousquetaires world conference that we have just launched.

Thanks to tablets or internet kiosks, the customer has access to an extended range of products, customised advice and complementary services

THE POWER OF DATA SCIENCE

Samuel Demont, Senior Manager, Argon Consulting

Data science has transformed marketing, sales, CRM[1] or maintenance over the past ten years. But the potentially massive applications in the field of supply chain are far less known and are not being used to their full potential.

Data science enables machines to understand a context based on varied data and to learn from the lessons of the past in order to make the best decision when faced with a new situation. It consists in reproducing the human decision process via an algorithm including both rational reasoning (understanding the context) and instinct (based on experience).

Here we detail three examples of using data science in supply chain.

1 - Demand forecast: predictive models based on machine learning using external factors

Forecasting is the first step in scheduling. Even though the concept of using big data and data science in forecasting seems obvious, there are still few industries that have demonstrated these technologies' potential and actually started using them in their manufacturing processes.

The first difference between the usual forecasting models and machine learning is that the latter, in addition to using predictive models and combining them, decides by itself which model is best and to do so it uses its experience. Each model is weighted on an ongoing basis and this weighting can be challenged at each forecast update.

(1) Customer Relationship Management

Machine learning can also take into account a large amount of heterogeneous and incomplete data: external influence data (weather conditions, local events, demography), badly structured internal data (past or future calendar of promotional activities), data relative to competitors and sectoral and supplier data and so on.

This data and the correlations made with past results enable the refinement of the forecasts and the enhancement of their quality on a short-term reactive basis, as well as their constant readjustment (every 15 minutes) to the point of designing a real-time forecast. As this demand benefits from a better model, it is also possible to automatically include predictive models for situations, for example to detect that an item is on promotion, in phase in / phase out, out of stock, and consequently adapt the forecast demand. Lastly, these models ensure high consistency between the macro- and micro-forecasts as the data from one of them can feed into the other one (for example when the trends aggregated per family or time meshing are given as input for finer modelisation).

USING MACHINE LEARNING FOR FORECASTS IMPROVES THE QUALITY OF SHORT-TERM FORECASTS BY 10 TO 30%

A few concrete examples:

- Forecast the order volume per time slot to anticipate and adjust the means deployed.
- Anticipate out-of-stock situations.
- E-commerce: postpone cut-off time because you anticipate order picking on fast moving items.

2 - Dynamic assortment or how to make better use of sales areas and working capital requirement

E-commerce enables real-time customisation of the customer offer. The e-merchant knows how to use outlet location, profile, order history etc. to adapt the contents of the customer proposal. But it is far more difficult for the store manager to be as agile! Dynamic assortment consists in using data science to determine the optimised range of goods for each outlet and constantly adapt it.

This approach optimises both sales (by having the most appropriate items in stock at all times) and working capital requirement (by reducing the amount of slow-moving items in the store).

Of course if it were possible to put in the same room a team including the merchandising manager, the store manager and his/her assistants, plus the CRM manager and the logistics manager, all having the correct information and statistics, then that team would be able to define the ideal range for any given time. We should then ask ourselves the following questions. How can I industrialise this collective intelligence to optimise at network level and for all item families? How can I repeat this effort several times per season to take into account the evolution of stocks, trends and market?

The existing approaches have their limits. The cluster approach is too generic and does not take into account local specificities. The 100% manual approach, where the range is defined ('hand-picked') by the store manager does not make use of collective knowledge (competition, same-stores, external factors etc.).

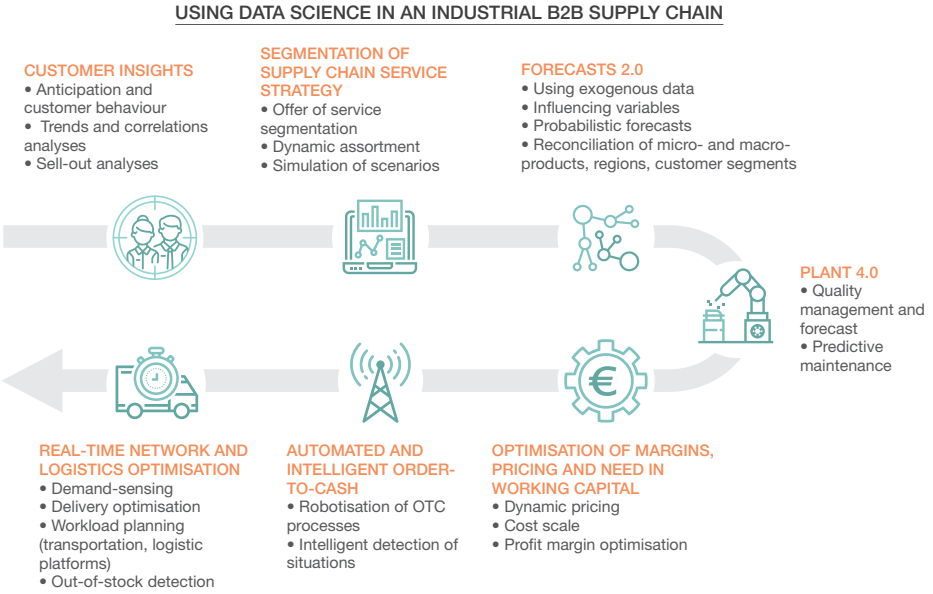
In dynamic assortment, the whole idea is to make a machine understand the following constraints:

- The desired product range for a store
- The rules of merchandising
- The demand forecast

… as inputs for the computation of the optimised range.

This approach is particularly suited to the following sectors:

- Luxury goods: the algorithm optimises the next replenishment, analyses and takes into account whether customers rank highly the importance of having an item in stock or not, as this will vary according to consumer profiles and from one sales outlet to another.
- Mass-market retailing: this is a sector where manual processing is particularly difficult because of the large number of sales outlets. Machine learning is especially suited for dynamic assortments because of the geographic specificities and the large variety of external data.



For the time being, the machine is not better than the human being but it allows the processing of a greater amount of data far more quickly and, particularly, it integrates and considers data that was previously not shared. The skill resides in assessing when human processing remains efficient (and possibly even faster) and when it is preferable to use automatic algorithms.

3 - Quality in production: setting a production chain to optimise quality

Feedback on the use of machine learning in a production chain stresses three points:

- Machine learning models generate results that are more consistent and accurate than the existing statistical models

- The machine learning approach considers more input parameters than statistical models

- The use of advanced data visualisation allows the identification of non-intuitive correlations

Taking the example of steel coil production: the use of data science enables the prediction of the most probable quality level of a coil before the end of the production cycle. If the algorithm detects that the desired quality level is not reachable, it recommends to the operator to modify the parameters to aim for a lower level of quality, thus saving unnecessary production costs. It also analyses the history of the production parameters to determine the optimal and the most cost-effective configurations to reach the targeted quality level.

In conclusion, the areas where data science can be used in operations are becoming more numerous and mature. We can furthermore observe that added value is just as much based on enriching the data as the performance of predictive algorithms.

In situations where the number of operational issues can be anticipated by cross-checking and sharing the right information, and where errors can be avoided by learning from the past (and even, if possible, by monitoring each order), then it is highly probable that data science can provide concrete solutions and it is important to start exploring where it can be used.

Solutions then need to be tailored to perform optimally because data and processes are specific to each company. To be relevant, a data science solution must be fully adapted to a given context and of course integrated in the decision-making processes.

THE FIVE KEYS TO SUCCESS
WHEN USING DATA SCIENCE IN OPERATIONS

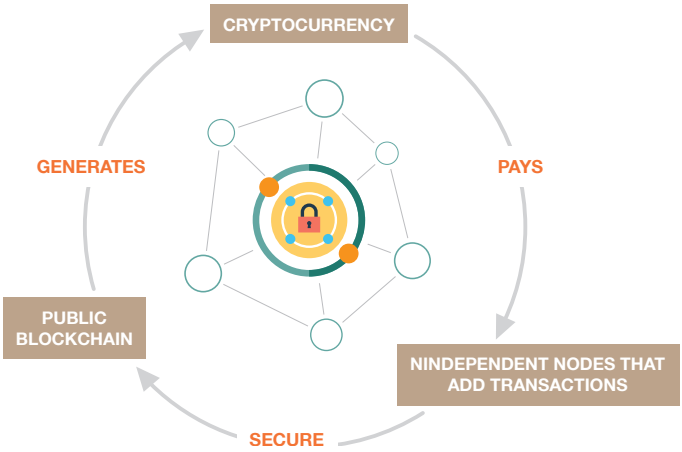
BLOCKCHAIN: A NEW DEAL FOR TRACEABILITY?

Pierre-Fabrice Storino, Partner, Argon Consulting
Fabrice Bonneau, Managing Partner, Argon Consulting

The concept of blockchain was little known a few years ago. Only some months ago, it was still far removed from the concerns of most manufacturers. And then an unexpected development, as happens nowadays, placed it high on the agendas of operations managers. Numerous initiatives have been announced in a variety of fields: food chain traceability, sea-shipping flow transaction management, liability shift on physical flows, certification of precious raw materials and many more.

We therefore considered that it was essential to dedicate time to the understanding of this highly complex technology, its potential value for the supply chain and the key questions relative to its use.

HOW PUBLIC BLOCKCHAINS ARE SECURED



The bare essentials of the technology

In short, a blockchain allows multiple stakeholders to do business together without needing a trusted party (bank, lawyer, notary) or a centralised architecture (data centres, interfaced information systems).

Blockchains known as 'public blockchains' (the best known is associated with bitcoin but it is not the only one) are based on a simple principle; a digital ledger records all transactions and this register is transparent, tamper-proof, shared and accessible to all stakeholders.

Beyond the cryptography technologies used in the recording of transactions, the blockchain revolution resides in the synchronisation mechanism and the securing of recordings between all stakeholders ('consensus mechanism'). The combination of all of these elements make the transactions tamper-proof, one of the key assets of a blockchain. We will not go into detail on this mechanism (of which there are several variants) but it is important to understand that it requires a financial commitment towards the network nodes that take part in the securing of the blockchain, possibly including the deployment of computing power. That means remuneration in the form of cryptocurrency.

So public blockchains and cryptocurrency are intertwined even if the final use has nothing to do with financial transactions. In other words, there is no magic pill, neutral trusted parties, albeit virtual and decentralised, must receive compensation.

Industrialists may find drawbacks in some of the characteristics of public blockchains: the use of cryptocurrency (presently quite volatile), time and cost of transactions, no control over the technologies used by the

community of developers. To avoid these drawbacks, private blockchains have been created such as Corda or IBM's Hyperledger. They make use of all or part of the technology but leave aside the fundamental philosophy, which was to have a fully open architecture where the trusted parties were replaced by neutral digital players that are paid. In the case of private blockchains, members of the consortium directly vested in the use of the blockchain will be in charge of the nodes of the network.

Examples of use: trust and efficiency in multi-partner exchanges

Even more than with other digital technologies (IoT, data science) it is necessary to be cautious with seemingly good ideas when looking for applications of blockchain technology in the supply chain. Most multi-partner transaction record needs can simply be addressed by traditional shared databases. The interest of the blockchain seems to reside in four main cases:

Case n°1:

There is a need to digitalise the transactions between numerous partners and these transactions are governed by predefined rules or contracts. In this case the objectives, apart from securing the data, are particularly around performance and cost efficiency. The blockchain, though not indispensable, can be the best choice, in particular thanks to the use of 'smart contracts'. The often complex administrative flows needed in the running of a supply chain, and more particularly intercontinental flows, are part of this category. Instead of having 200 paper documents that need to be approved by 30 different stakeholders, all of these documents can be digitalised and registered in a ledger

ONE EXAMPLE: DIGITALISATION OF INTERNATIONAL TRADE

shared by all of the stakeholders of the network who use their electronic signature to validate the documents.

Case n°2:

A blockchain is particularly interesting for traceability. This can range from food traceability (to certify the origin of the ingredients and identify the batches in case of contamination) and the traceability of the origin of raw materials to the authenticity certification of luxury goods such as diamonds. It is clear that a blockchain can reconcile a large number of stakeholders so as to provide certified information to the final customer. It has now been proven that there are technical solutions to share and certify information, in particular via the blockchain, but there are key questions on carrying out this approach successfully: defining / agreeing on the standards per type of industry, ensuring use by the final customer, developing strong links between the information flow and the physical reality.

Case n°3:

In some cases, a blockchain can be used to transfer the liability of a material asset. The physical transaction (e.g. passing sustainable aeronautics packaging from one stakeholder to another) can include an agreement of accountability registered in the blockchain (consequently unchangeable and date-stamped), useful in case of loss and allowing a clear, overall view of one's inventory at all times.

Case n°4:

More generally, a blockchain can centralise commercial transactions between several stakeholders who are hesitant to trust each other. It plays the role of a trusted third-party and allows the construction of a more transparent competition. It authenticates customer reviews, certifies the availability of a product and records the exchange of information (e.g. blocked space on the basis of order forecasts).

Public vs. private blockchain: a strategic choice depending on the situation

Many purists consider that private blockchains should not be referred to as blockchains and the term DLT (Distributed Ledger Technology) is more and more often used to qualify them.

Private blockchains do not have the specific features that characterise this breakthrough technology: decentralisation, end of trusted third-parties, very high security and resistance to censorship. For example, they need to identify each member of the network and set preliminary rules (access conditions, write authorisation, read authorisation).

There is however one strong argument in their favour, particularly in the case of B2B applications, they are not dependent upon cryptocurrency. Creating a supply chain using Bitcoin or Ether or other cryptocurrencies is a risk that few manufacturers or even consortia are ready to take.

PUBLIC VS. PRIVATE BLOCKCHAIN COMPARISON

	PUBLIC BLOCKCHAIN	PRIVATE BLOCKCHAIN
Principle	Shared network, accessible and modifiable by all	Network with restrictions on access and/or modification
Operation	Blocks validated by independent and anonymous nodes according to a secured consensus mechanism	Blocks validated by known, authorised and designated stakeholders
Remuneration	Nodes remunerated in cryptocurrency	No direct remuneration but common interest of the stakeholders: traceability, cost reduction, time saving
Security	Information generated by consensus mechanism is authentic and unchangeable	Not necessarily sought: inherent to pre-existing trust between stakeholders
Limits	Risks mainly related to volatility of cryptocurrency or opacity of decentralised governance	Changing the basic principle of the way a blockchain works: no specific additional security

Some start-ups, including Ownest, offer to reduce that risk while still using public blockchains. These start-ups are specialised in the transfer of liability on physical flows and they propose application layers in SaaS mode solution, giving the possibility to optimise the use of several public blockchains in a transparent manner for the user. They then cover the risk of cryptocurrency value fluctuations and thus justify their margin on the cost of the transaction.

To sum up, private blockchains appear to be better adapted to cases 1 and 4 (often B2B) and are more modular and performing than public blockchains.

Cases 2 and 3 should logically lead to the use of public blockchains to guarantee the absence of third-party conflicts of interest, but that is not necessarily the case today.

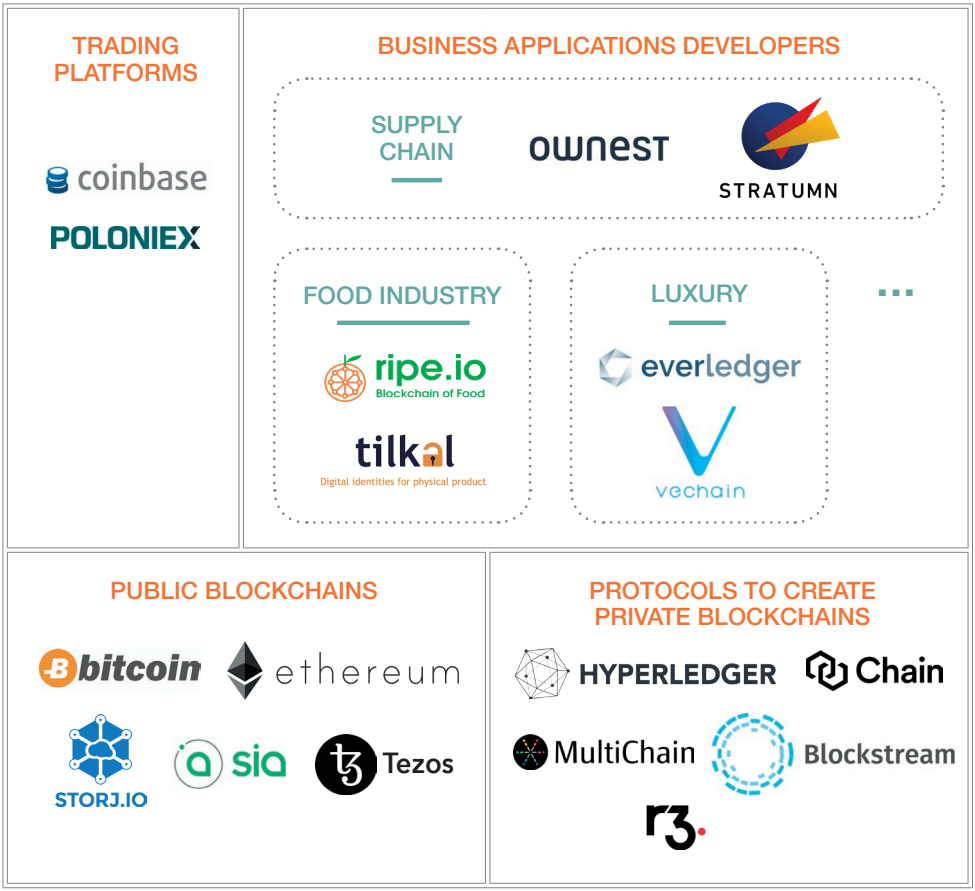
It will of course be possible to challenge this reasoning when, similar to what happened with the internet, an efficient and sustainable public blockchain (possibly originating from a private blockchain) imposes itself on the market and becomes the standard for all exchanges.

Interface with the physical flow: a key issue for using blockchain in the supply chain

The strength of a blockchain lies in the certification of data. Any inclusion in a blockchain is time-stamped, signed and impossible to modify.

This makes it an excellent tool for audit trails and ensures the liability of each supply chain stakeholder.

THE ECOSYSTEM SURROUNDING THE BLOCKCHAIN: MULTIPLE STAKEHOLDERS WITH VARIOUS POSITIONINGS



On the other hand, a blockchain cannot by itself prove that a given piece of data is correct. When it is necessary to ensure that the recorded data corresponds to reality, the interface between the physical and digital is critical. Several ways are possible to ensure consistency between the two. This could include tamper-proof IoT trackers combined with artificial intelligence for automatically entered data, or accountability of the signatory or the remuneration of virtuous behaviour in the case of manual entries.

Blockchain or IoT: competition or complementarity?

Several experiments on using a blockchain in the management of physical flows have been carried out over the past months. The principle

consists of recording in the blockchain the transaction, i.e. the transfer of one or several physical objects from one stakeholder to another (most often a manufacturer and a carrier). The transaction is recorded 'manually' by use of a smartphone app. The main objective is to record with indisputable evidence who has the liability for the object at any given time as this information is essential in case of loss or deterioration of the object. One example is the monitoring of roll flows (sustainable packaging) in mass-market retailing.

IoT trackers were tested at the same period for the same situation with the same type of packaging.

More generally, either one of these technologies can be used for the tracking of assets such as, for example, mobile industrial equipment.

These similar cases lead to an obvious question: is it necessary to choose between blockchain and IoT?

These two technologies actually serve two complementary uses:

- IoT locates other useful data (movement, temperature, shock etc.) and possibly captures them, thus addressing the 'what' and 'where'.

- A blockchain will identify who was liable for the tracked asset at any given time, this being certified in real time and permanently. This addresses the 'who'. We do note however that it is possible to determine asset movement through the blockchain timestamps.

Associating both technologies allows the combination of both uses and records the IoT data (including location, temperature and shock) and certifies them.

Let's take a simple example. Thousands of pieces of industrial equipment move between the suppliers of an automotive OEM. Combining both technologies would enable not only real-time inventory of the equipment but also the tracking and recording of their conditions of use, a boon in case of litigation further to deterioration.

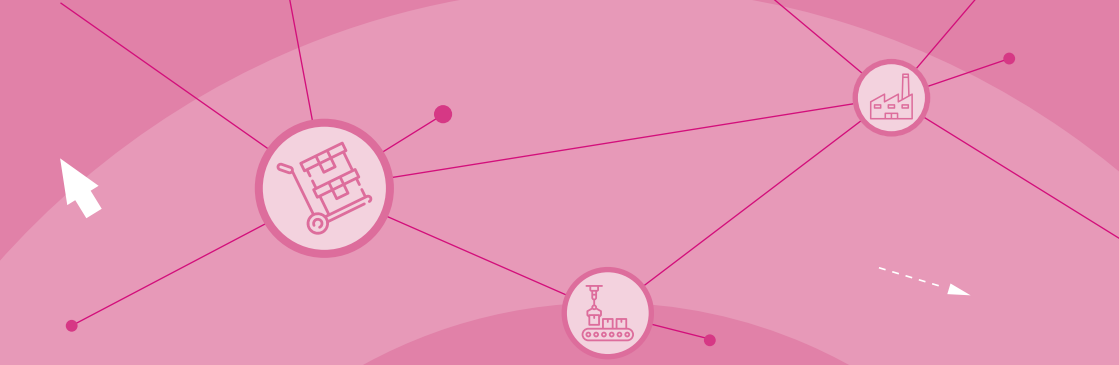
It is true that blockchain generated a lot of buzz over the past months. However its operational use is still in a very early, exploratory phase with very few applications that can be industralised.

Caution is therefore highly recommended before deciding on any substantial investment.

We feel there are two key recommendations:

- Conduct a quick exploratory phase focused on the uses and ask yourself from the start the key questions mentioned above.

- Involve all of the future blockchain stakeholders as soon as possible. As the consortium configuration is inherent to B2B blockchains, it is reasonable to think that the major stakeholders in the standardisation sector, such as GS1 and Odette, will include a large share of the cases of use in the coming years.



WAREHOUSE 4.0: DISSECTING A REVOLUTION IN LOGISTICS

Nicolas Gellé, Partner, Argon Consulting

The growth of e-commerce (a global leap of 30% in 2017)[1] and the evolution of buying habits of ever more connected customers are driving major stakeholders in mass distribution and logistics to review their work methods. They are rethinking warehouse operations to enhance performance. Automation is often the forerunner to the design of warehousing 4.0; increasingly sophisticated, adaptive or turnkey.

Automation is gradually developing in every sector of the economy. It is in step with the customers' buying habits and expectations, demanding constantly higher reactivity and continually shorter delivery time. According to an international survey of 3,500 consumers conducted by MetaPack[2], speed of delivery is a priority for 86% of the interviewees. In line with the ongoing digital transformation, automation is a must.

Why should a warehouse be automated? The decision is more often based on a will to enhance performance. The first reason given is often the reduction of operating costs. But there are other reasons. One major opportunity is the ability to adapt to new ordering behaviours. As a result

(1) « Futur du e-commerce en PGC-FLS ou FMCG » - Kantar Worldpanel - 2017
(2) « 2016 State of e-Commerce Delivery » - MetaPack

of product customisation and the will to control cash flow, logistics flows are increasingly fractionated while the number of references and one-item deliveries are increasing. This has a negative impact on productivity in a conventional logistics environment. And that is particularly the case for e-commerce. Automated warehouses, with higher area density and more efficient ways of working, meet these challenges. They also overcome some of the operating limits of a conventional warehouse: reaching a critical threshold for manpower on a site, lack of qualified labour or the need to adapt to labour regulations.

Reasons other than financial also incentivise warehouse automation and have a significant influence on its design. The first is the aim of improving the quality of service and delivering on the promise to the customer. This is done by enhancing the reliability of order picking and inventory or increasing the instant processing capacity. A Warehouse 4.0 is also a technology showcase for a company.

Automation is also a means to reduce painful work conditions, occupational accidents, muscular and skeletar disorders by improving safety and ergonomics in jobs that require constant and repetitive handling of heavy loads.

Automation *a la carte*

The trend towards automation has prevailed for some years and the current context is particularly favourable to its development. Automation technologies are now achieving a certain maturity and the solutions offered by equipment suppliers are increasingly robust and reliable. Among other things, they enable a modular approach with equipment tailored to the logistics activity (receiving, storage, picking, shipping) or the shape of the products. This marks the advent of tailored, 'a la carte' automation.

The offers and business activities of equipment manufacturers is evolving. Instead of simply supplying equipment they are becoming true solution integrators. They are in a capacity to offer and deploy made-to-measure solutions, made up of tailored automated modules integrated to the information system. They can also base themselves on tried and tested, effective implementation methods. Thanks to dynamic simulation software, they identify the risks of bottlenecks and they test the robustness of the solution considered, notably with physical tests in plants.

These solutions are all the more positive as clients increasingly tend to invest in mature automation solutions for the benefit of their logistics providers who are more often hesitant because of the financial risk inherent in such an investment (see sidebar).

Although the context is more favourable than ever, the automation of a warehouse remains a complex operation and a costly investment. Its success requires thorough preparation.

Seven key factors for a successful switch to Warehouse 4.0

1. Warrant a consistent, integrated, comprehensive solution: it is necessary to carry out a comprehensive study throughout the company to define the framework and opt for a solution that meets all of the objectives and specific needs.

2. Involve all of your customers upstream of the project to simplify flows and processes, to standardise packaging, to anticipate evolutions of your activities over several years and therefore choose the solution best suited to all of these parameters.

3. Anticipate a medium-term return on investment: no less than five years should be considered for the ROI on this kind of operation with complex solutions.

4. Ensure uninterrupted service solutions in case of major breakdown: plan the maintenance capacities and required degree of reactivity to ensure business continuity.

5. Be aware of the extent of the cultural change: your teams will have to switch from conventional logistics to an industrial environment where flow monitoring, equipment availability management and maintenance management are absolutely vital. Behaviours at work will necessarily change: work will be far more sedentary and will require higher skilled labour. This implies a real capacity to drive change with all teams concerned.

6. Adapt to the emergence of new trades: in a connected industrial world, Warehouse 4.0 will require new business competencies to ensure real-time machine monitoring and their maintenance. Maintenance parameters have changed significantly and require reactive processes, hence the need to train and ensure higher skills for first-level maintenance. Equipment suppliers can ensure the heavy maintenance.

7. Manage IS complexity and criticality: the functioning of a Warehouse 4.0 depends on the digitalisation of the flows and the IT system's level of sophistication so reliability is a key criterion for quality, profitability and business continuity.

Are logistics providers ready for Warehouse 4.0?

All of the transformations described above have a direct impact on the activity of logistics providers and put into question their business model because the ROI of such an investment takes 5 or 6 years and that doesn't match the usual 3 to 4 year service contract. Financial risks are not in line with industrial risks. Furthermore, there is no clear and certain answer concerning the possibility to re-use the same solutions with a new client. Implementing a multi-contract activity or changing clients proves to be complex. Logistics suppliers earned their income so far thanks to the manpower they supplied in the warehouse whereas automation implies less manpower. And this is an inescapable trend for logistics suppliers if they want to stay in line with the evolution of the market.

USING RPA TO REFOCUS TEAMS ON ADDED VALUE TASKS

Julie Rabier, Senior Manager, Argon Consulting

Robotic Process Automation in the supply chain: why and how to engage in an RPA process?

A study[1] carried out by two Oxford University researchers has shown that 47% of American jobs are liable to be replaced by computers or robots. Among the 702 jobs in the study, several supply chain jobs reach a 98% probability of extinction, e.g. transit, sales administration and transport organisation.

Should we expect automation to disrupt the organisation of logistics and supply chain activities in a few years?

What is RPA?

RPA (Robotic Process Automation) consists of virtual assistant softwares (or 'robots') processing computerised administrative operations instead of humans doing it.

(1) « The Future of Employment: How susceptible are jobs to computerisation ? » - Carl Benedikt Frey & Michael Osborne - 2013

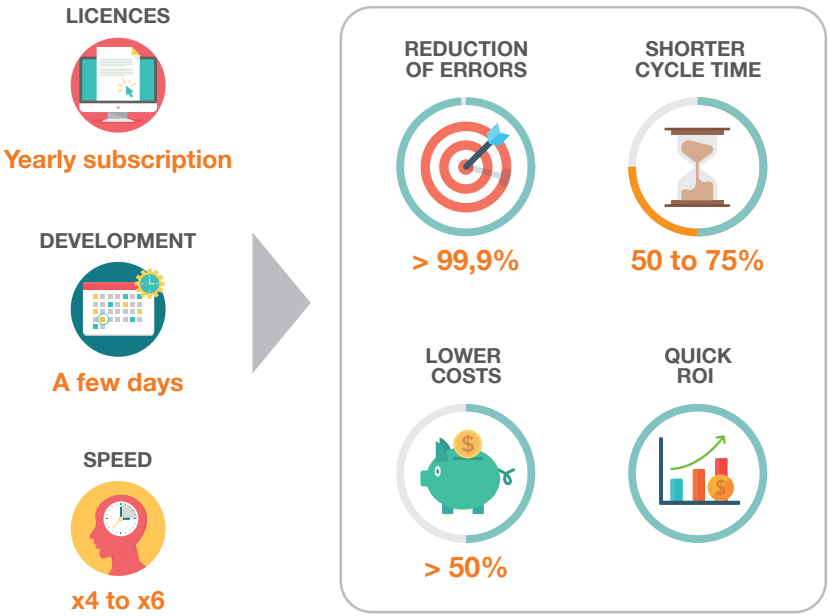
It concerns the automation of high-volume repetitive tasks by using the user interface: the robot operates in a physical or virtual position, under the control of a co-worker, and processes simple operations based on the application of rules: extracting or loading data, copy-pasting, identifying a figure or text in a pdf, calculating, sending e-mail and so on.

It can operate in any kind of system and enables task automation regardless of the environment; internet, ERP or other application solutions.

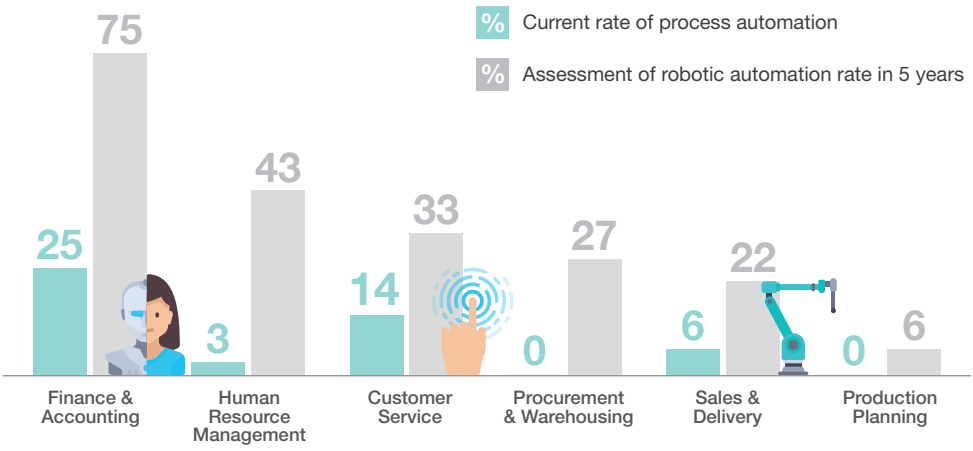
Of course RPA provides greater efficiency but also fewer errors and a shorter cycle time. Gaining in customer experience or even increasing sales are also possible, notably through the robotic automation of the customer front office process. RPA enables teams to spend less time on repetitive activities that do not add value and they can focus on more rewarding tasks.

What's more is that the robotic automation of administrative processes is fast and cost effective. A process can be automated in a few days only, generating savings on operating costs and enhancing the service provided.

THE BENEFITS OF RPA



PRESENT AND FORECASTED ROBOTISATION OF PROCESSES IN COMPANIES



(Study done in 2016)

What applications and what benefits for the supply chain?

According to a study, customer service / sales admin processes are currently the second most automated processes after finance and accounting. They represent an interesting potential for new automation. There are also significant opportunities in logistics processes (supply and storage) and they are little automated to date.

Robotising processes in supply chain and logistics provides opportunities for gains (cost reduction and enhanced service) in many repetitive operations while meeting standardised rules

Processes that are repetitive and standardised (or easily 'standardisable') are best suited for robotic automation. A few examples concerning the supply chain are:

- Order entry/integration for sales and purchasing orders using various tools (supplier tools/internal/customers).

- Order tracking processes (notably in the case of international shipping).

- Purchasing intelligence and sourcing.

- Data management, notably in the case of multiple external repositories (suppliers, data on web interfaces) and internal repositories (purchasing bases, plant, warehouse, stores, subsidiaries).

- Appointment scheduling for delivery to warehouse or plant.

- Invoice checking (received/performed vs. expected).

- Traceability (food, production batches).

- Shipping and customs documents management, notably for import/export (alcohol, Ceveso, registered environmental facilities).

- Benchmarking of competitors' prices and service (delivery times and schedules), notably for e-commerce.

- And so on.

The list is already long and it is not exhaustive. It demonstrates that there are numerous areas where it can be applied in a supply chain, with potentially significant results both in cost reduction and in service enhancement (lower cycle time, fewer errors).

Launching an RPA project

Before launching an RPA project it is first necessary to study the high-volume transactional processes that need a significant number of employees and/or that are characterised by low added value tasks. The degree of standardisation for each process should be determined as well as prioritising the processes to be included in the project. The processes that should be automated first are the highly standardised and repetitive ones. Next come the processes with a standardisation potential and a high volume of tasks enabling a scale impact.

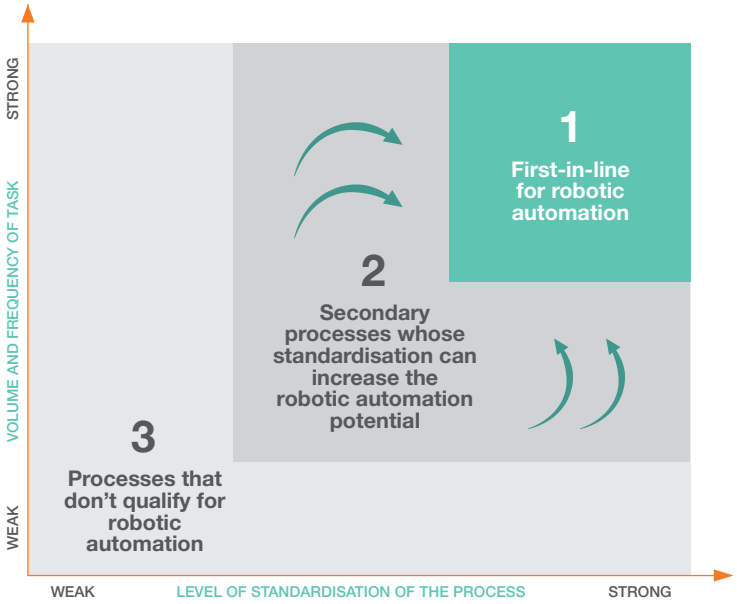
For a good start in an RPA approach, a company should begin with a pilot project in a clearly defined area.

This should be carried out concurrently with an overall study on the identification and assessment of opportunities. This proof of concept or value demonstrator will show on a limited scale the value that the approach can provide. It will nurture the business case and the transformation roadmap that will result from this step of RPA strategy design.

Robotic automation of processes offers a new edge over competition if company practises are changed with a will to make the organisation and staff roles evolve

Lastly, a special effort must be made in the management of the transformation from the very start of the strategy design. RPA disrupts staff working habits. It is necessary to support them throughout the change even if, contrary to what most people may imagine, the RPA initiatives are often greeted with relief by the employees concerned as robotic automation rids them of dissatisfying tasks.

SELECTION OF PROCESSES TO BE ROBOTISED FIRST



The outlook for RPA

Innovation is developing at a dramatic pace. Artificial intelligence and machine learning open up new outlooks for RPA in the years to come, structuring data upstream with an RPA process combined with artificial intelligence, for example, increase the opportunities to use automation.

New digital technologies can be linked, offering new opportunities. Automation is becoming a lever for mass collection of data, providing input for big data type analyses.

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