minsait
by Indra

Is your company ready for Industry 4.0?

How to address a necessary change

impact to go

01 Industry 4.0: the great opportunity

Industry 4.0 entails the deep transformation of companies with digital tools to impact the entire value chain: from the design, manufacturing, supply-chain processing to the commercialisation of products.

The Industry 4.0 is a key opportunity to generate value: the economic potential worldwide is estimated to be of 1.2 to 3.7 trillion dollars until 2025[1].

Nevertheless, the attractiveness of this opportunity is offset by the uncertainty surrounding the transformation model, which triggers the question, **is my company truly prepared for Industry 4.0?**

How to identify the starting point?

Before reaching the digital transformation, it is essential to identify the starting point, align the company's efforts with the strategy and firmly consolidate each stage. Therefore, to reach Industry 4.0 we will need to identify the company's stage of development (e.g. "Industry 1.0", "Industry 3.5" etc...). To evaluate the digital maturity of a company, Minsait analyses three dimensions:

- **Type of sector/industry.**
- **Technological maturity.**
- **Organizational-digital maturity.**

1. Type of sector/industry

The nature of the sector is a fundamental aspect when defining the company's digital strategy. We need to have insight into the sector or industry dynamics and the impact on the competitiveness of the following five areas:

- **Product**: relevance, design process and business model and its differentiating features.
- **Labour**: importance of specialisation and its costs in the value proposition.
- **Assets**: cost of the inventory and of critical assets throughout their life cycle. Competitive importance of reliability and asset specialisation.
- **Energy**: Relevance of the energy cost in the P&L account.
- **Supply chain**: the international scope of transactions and the importance of relying on a tight, agile and visible supply chain.

Identifying the company's value proposition is the first step in assessing the starting point and identifying the challenges ahead

[1] McKinsey Global Institute. **Unlocking the potential of the IoT**, [online], June 2015. https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/the-internet-of-things-the-value-of-digitizing-the-physical-world

Minsait. Digital transformation challenges

Food and Beverages

- Understand and **adapt to consumer habits**
- **Consumer-brand** interaction spaces
- **Create new services** that complement the products
- **Flow-through** of business-consumer operations
- **Obtain value of traceability** of the production-delivery process

Automotive

- Enhance the **user experience**
- **Customise** the product
- **Transform** the **business model** by exploiting **connectivity**
- **Reduce** product **lifecycle**
- **Increase functionalities** (connectivity) and improve **safety**
- Reduce the **environmental impact**

Pharmacy

- **Personalize medicines** for each patient
- **Cybersecure** patient **profiles** to enable **interaction**
- **Limit** the capability of **self-diagnosis and medication**
- **Shorten** medicine **development** times
- **Secure and obtain value from traceability** in the productive/distribution process

Illustration 1.

2. Technological maturity

On a second stage, the technological level of excellence of the company is evaluated on a progressive scale, according to the deployment of the following tools:

- **Sensorisation, connectivity and IT systems**
  A deployment of sensors has been made in key links of the value chain of the company, there is connectivity across the system (for its subsequent processing and storage) and deployment of basic IT systems has been made for the operation.
- **Monitoring and Alarms**
  The integration of the sensors with monitoring systems has been made to provide real-time control of production, to compare the actual and estimated production indicators, generate warnings and basic reports.
- **Advanced Analytics**
  There are advancements in the implementation of analytical models capable of learning and taking corrective actions, anticipate failures, etc.

The evaluation of the initial technological maturity is key to prioritize the potential improvement initiatives and their digital tools, so that any increase is solidly supported by a coherent technological architecture.

3. Organizational-digital maturity

This third dimension takes into account two aspects:

- **Digital vision and leadership.**
  Whether or not the senior management understand "digital" as a business opportunity, as an accelerator or just as a passing trend.
- **Digitisation of human resources.**
  Analysis of the "digital skills" of workers, their adaptability and willingness to change.

Only by being aware of the degree of digital leadership of the management and the capacity of the organization is it possible to define technological projects that ensure an impact on the business.

02 How important is the company's current level of digital maturity in Industry 4.0?

Our experience stresses the vital importance of knowing the current technological situation of companies to succeed in Industry 4.0 transformation projects. Therefore, what kind of Industry 4.0 projects are more suitable based on the maturity level of each company?

Although there is no universal answer and the recipe will depend on each company, it is possible to establish some general principles. In the first place, the operational challenges of the company will have to be evaluated in a sectoral context and in the strategy of the company.

With this base, it will be necessary to establish the starting point (maturity) in the dimensions mentioned above in order to define technological projects aligned with the business objectives and the reality of the company.

In this definition of projects, it is highly recommended to concentrate on initiatives with a limited scope (concrete and manageable), with a potential for clear scalability (robust technological approach) and with an expected impact in the short term (visible), which we would call Quick Win projects. Let's see all this with some examples of companies-sector:

Example 1. Low level of maturity

This level usually corresponds to small companies, with little technological culture and investment capacity. For example, in Spain, 62% of the factories lack a clearly defined digital strategy[2]. Let's take the example of a Food and Beverage sector company we analysed previously.

Example 1: Company with a low level of maturity

Company in the Food and Beverages sector

Operational challenges

- **Create new services** that complement the products
- **Flow-through** of business-consumer operations
- **Obtain value in the traceability** of the production-delivery process

Technological maturity

- Sensorisation, connectivity and IT systems
  - **Traditional planning** using spreadsheets
  - **Manual management**
- Monitoring and Warnings
  - Productive **processes** are not monitored
  - **Paper record tracking.** KPI info entered manually into the ERP

Organisation-digital maturity

- Management considers **the company too small** to approach **digital projects**
- **Workers** are "jacks of their trade" and are reluctant to adopt **new tools**

Illustration 2.

Based on the evaluation of its starting point and the operational challenges it faces, a typical quick-win project proposition in the field Industry 4.0 could be:

From a technological standpoint

- Deployment/integration of a basic system of sensors for the monitoring of critical processes.
- IT/OT architecture (and connectivity) plan.
- Paperless plant: digitisation and automation process.

From an organisational standpoint

- Digital assessment: identify the level of maturity, opportunities, their prioritisation and plan.
- Diagnosis and categorisation of digital/change capabilities.

[2] Roland Berger and Siemens. **España 4.0 El reto de la transformación digital de la economía**, [online], May 2016. http://w5.siemens.com/spain/web/es/estudiodigitalizacion/pages/estudio-digitalizacion.aspx

Example 2. Medium level of maturity

This level usually corresponds to medium-sized companies, with basic IT systems but lacking a clearly-defined digital strategy. For example, in Spain, only 13% of the SMEs use electronic information and shares it with their supply chain[3]. An example is the analysis of a company in the automotive sector.

Example 2: Company with a medium level of maturity

Company in the Automotive sector

Operational challenges

- **Customise** the product and **shorten the life cycle**
- **Increase functionalities** (connectivity) and improve **safety**
- Reduce the **environmental impact**

Technological maturity

- Sensorisation, connectivity and IT systems
  - **ERP-based planning and sequencing** based on
  - Semi-automated management of **warehouses with a WMS**
- Monitoring and Warnings
  - The basic equipment has **SCADAs and operation panels**
- Advanced Analytics
  - **KPIs** are managed in each system and **are integrated manually**
  - **There is no single data repository** on which to develop advanced analytical models

Organisation-digital maturity

- Management is aware of the **digital opportunity and has already launched pilot tests**
- The Management are able to **concentrate on business-related matters**
- Different staff profiles and age groups, **changes are frequent and there is potential for adaptation to digital**

Illustration 3.

In this case, knowing that the company is part of a medium level of technological and organizational maturity, an indicative proposal for the *quick win* projects in Industry 4.0 that could be addressed to respond to the operational challenges it faces could consist of:

From a technological standpoint

- Evaluate the need to expand the Operations IT suite: MES and CMMS
- Solution for the b2b visibility of operations, early alarms
- Deployment of a SW-Historian to prioritise analytical models in the Maintenance and Quality areas

From an organisational standpoint

- Digital Transformation Plan: budgets, leadership and PMO, Steerings...
- Definition of roles and drivers for digital change

[3] Roland Berger and Siemens. **España 4.0 El reto de la transformación digital de la economía**, [online], May 2016. http://w5.siemens.com/spain/web/es/estudiodigitalizacion/pages/estudio-digitalizacion.aspx

Example 3. High level of maturity

This level could correspond to medium to large companies with lean automated/dynamic systems that are conducting Industry 4.0 pilot tests.

In our experience, it is difficult to find today a company that meets an advanced level of maturity in all areas of analysis (technological, organizational...) and for the entire company, this situation being more likely in new generation plants (greenfield) or in specific areas (eg design, assembly or storage area). Take in any case for the analysis the example of a company in the pharmaceutical sector.

Example 3: Company with a high maturity level

Company in the pharmaceutical sector

Operational challenges

- **Personalise** the **medicines** for each patient
- **Shorten** the medicine **development** times
- **Secure and obtain value from the traceability** of the productive/distribution process

Technological maturity

- Sensorisation, connectivity and IT systems
  - **Comprehensive SW suite for Operations:** QMS, MES, CMMS, WMS and ERP
  - **SW-** Historic data of production
- Monitoring and Warnings
  - Solution for the **b2b visibility of operations**, early warnings
- Advanced Analytics
  - **Use of advanced analytical** models (in Maintenance and Quality) not 100% integrated with the other systems

Organisation-digital maturity

- The Management sees **digital transformation as an opportunity**
- There is a **culture of Innovation**, the introduction of new processes and technological **leadership is shared in the organization**

Illustration 4.

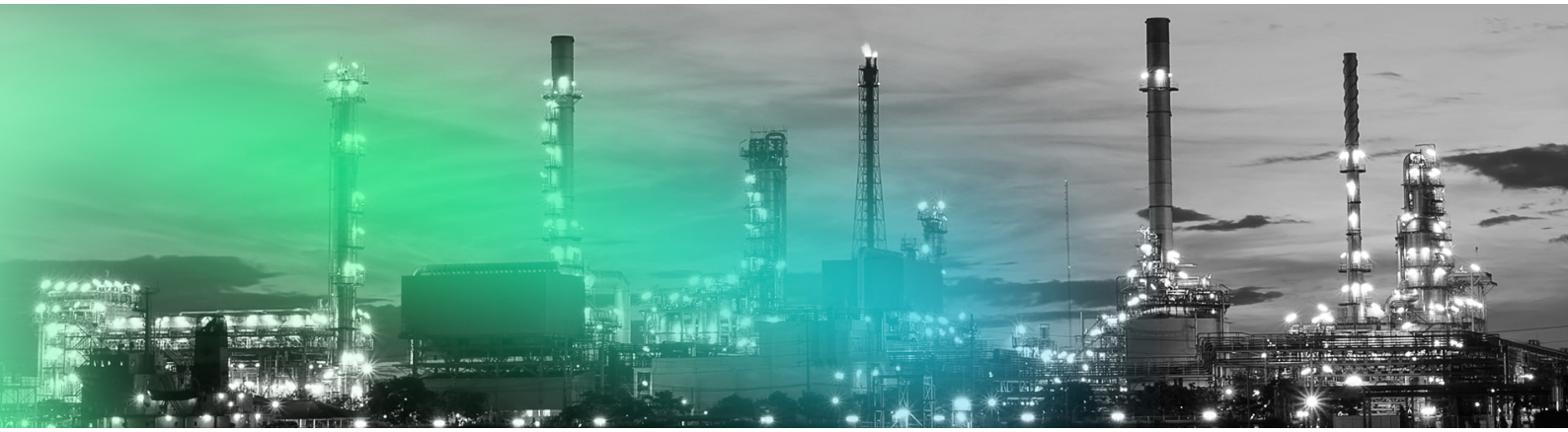
A typical *quick win* project proposition in Industry 4.0 could be:

From a technological standpoint

- IoT platform rollout, integration of the IT/OT worlds and functional expansion
- Integration of analytical models in the corporate IT and focus on impact

From an organisational standpoint

- Innovation and entrepreneurship strategy (internal and external)
- In-depth approach to lean dynamics and introduction of the scrum philosophy



03 Conclusions

The digital revolution is a reality that is affecting all sectors and companies. Change is not an option. Companies must take bold decisions today as regards Industry 4.0 if they want to remain competitive in a complex and accelerated environment.

The knowledge of the starting point of the company is basic to identify the priority projects for the company and on which it is necessary to concentrate the investment.

In this sense, it is necessary to follow a methodological approach that takes into account the competitive context of the company, its digital maturity in terms of technology, organization and processes to identify the most suitable projects with the objectives and characteristics of the company. With this base it is possible to orchestrate a transformation plan where the results are accelerated, sustainability is assured and the impact is maximized.

Minsait, Indra's digital transformation unit, has the capabilities to support in the definition of the digital strategies and deploy the technological solutions companies need to develop towards Industry 4.0.

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