



# Áridos 4.0 - Digitalización en la industria de los áridos

*Implantación usos y Casos de éxito*



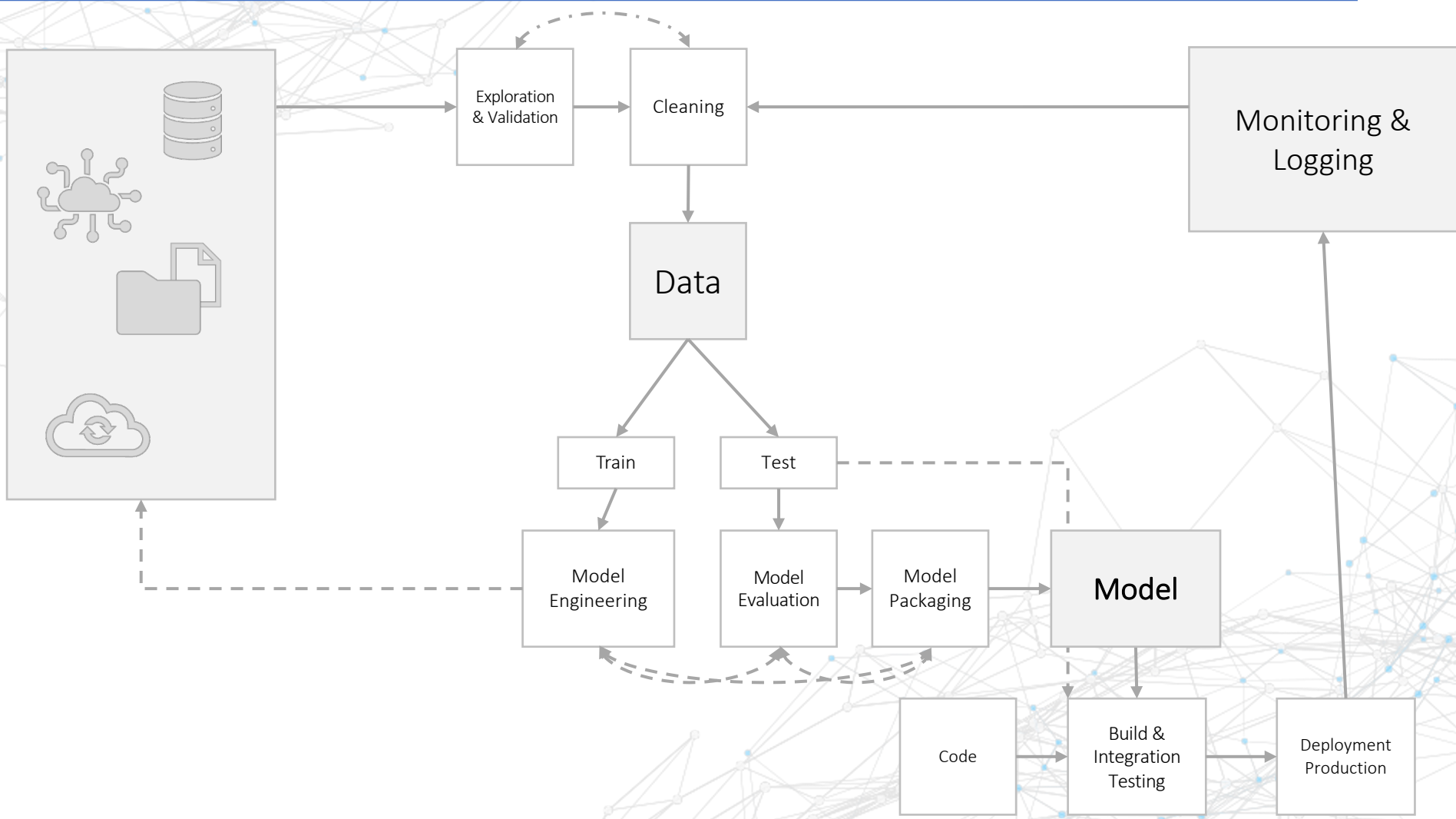
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101003750

# The data in a quarry

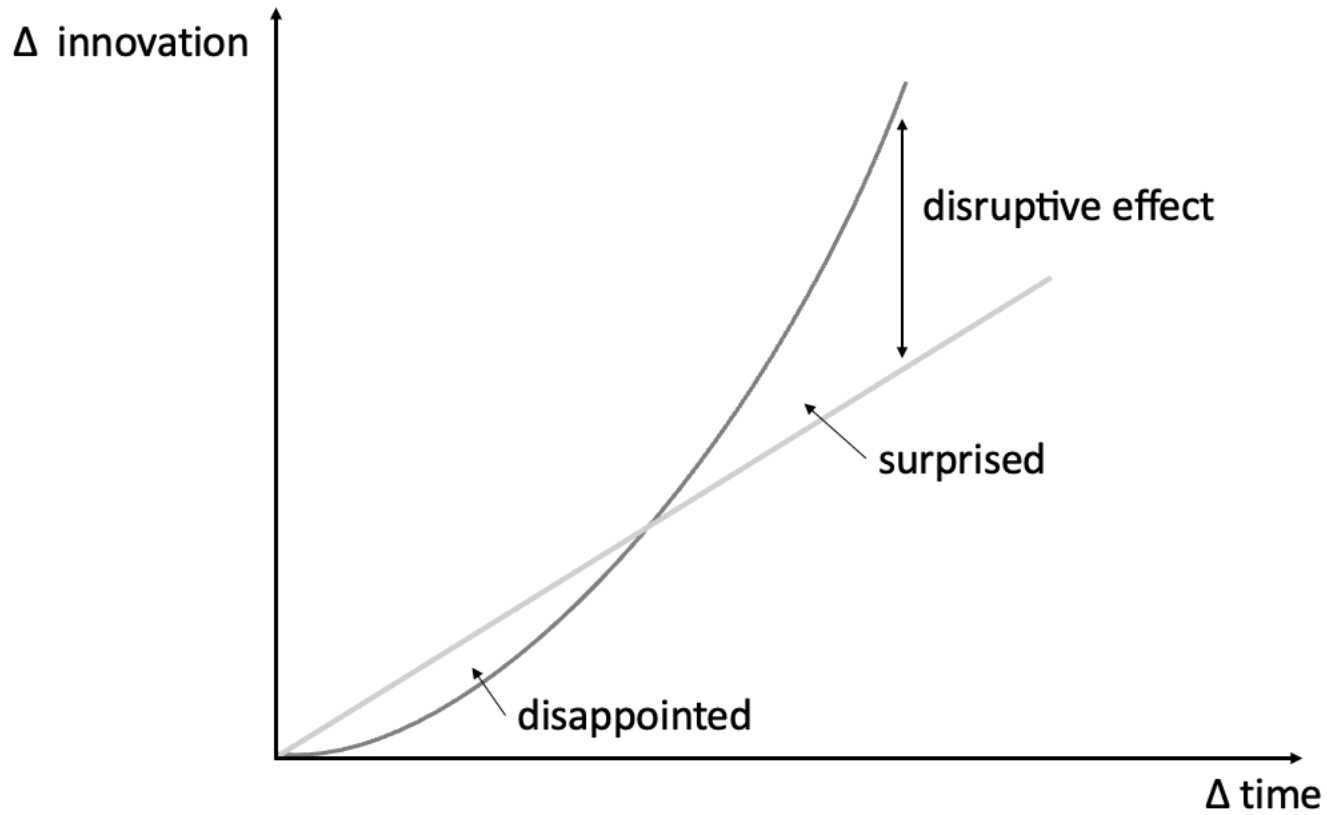
Data tends to be:

- **Discontinuous in time**, many of the activities are sequential, but are not performed continuously
- They have a lot of **noise** associated with them
- **Inconsistent over time**
- When the selected option is initially optimal, **it is no longer optimal over time**
- In many organisations, due to the software used (or the procedures followed to obtain the data), the **data is kept in separate silos**, so that it is not possible to access them

# The data Workflow

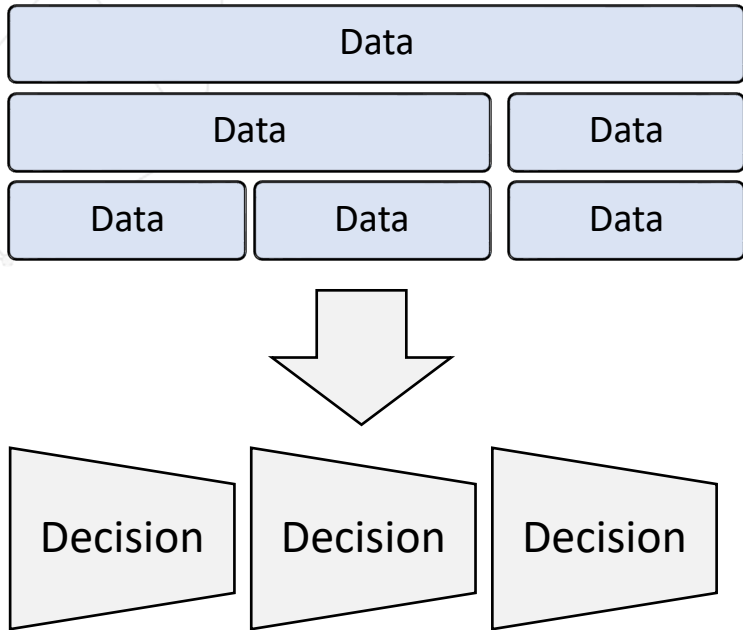


# The life cycle of innovation

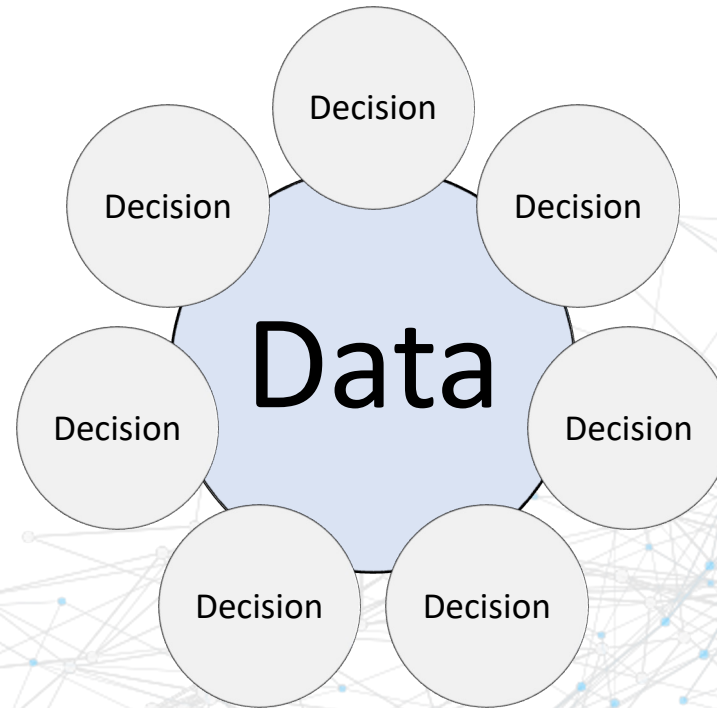


# Data-Driven vs Data-Centric

## Data-Driven



## Data-Centric



# The checklist

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- How are they going to connect or exchange information?
- Do we have the necessary education and training among our workers?
- Do we have the necessary time?
- Are suppliers aware of the working conditions in a quarry?
- What data is available? Do we have historical data? What is the quality of the data?
- Do we take into account new products? Changing specifications? Changes in the rock mass?

# QUARRY TECHNOLOGY MAP

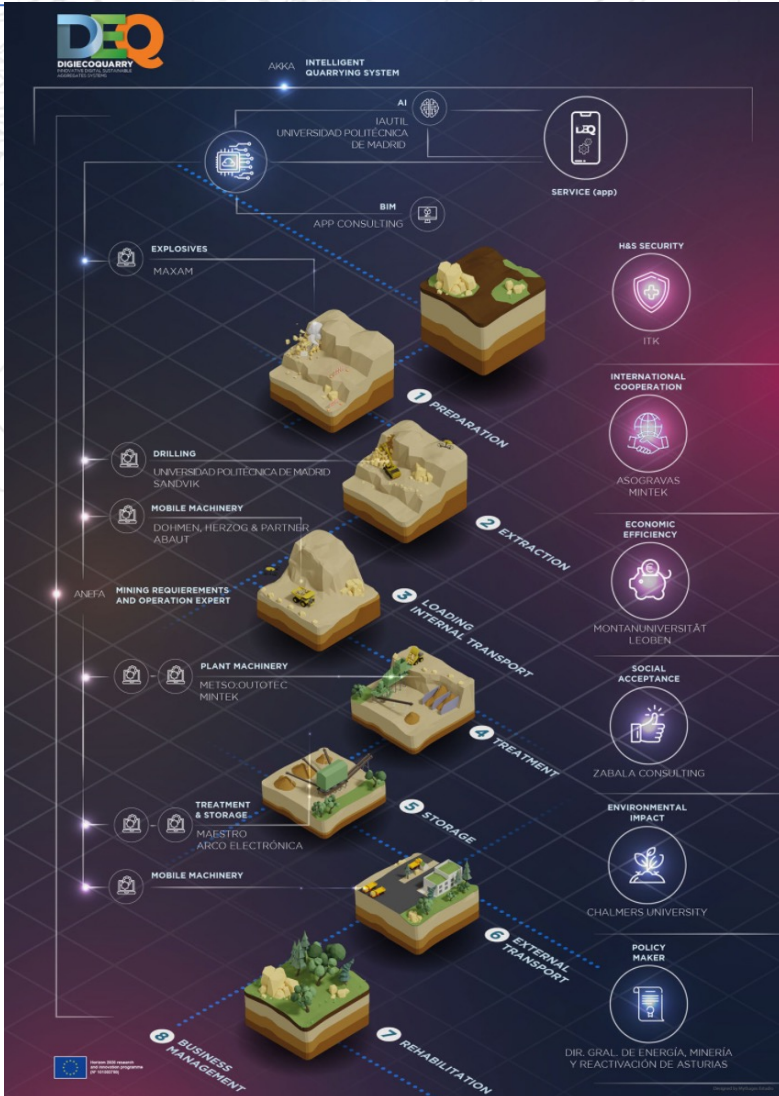
We group technologies into their ability to do the following:

- **Increasing production**, as a measure of quarry efficiency, e.g. tonnes extracted, new areas to be mined
- **Increasing productivity**, as a measure of efficiency, e.g. reducing the time and money used to extract a specific amount of tonnage, reducing the number of hours equipment is idle
- **Increaseing efficiency**, as a distinct measure for productivity, e.g. an increase in efficiency that may not have a direct impact on production, but still adds value to the organisation, such as more efficient rehabilitation.
- **Improving safety**, as a measure to reduce the likelihood and severity of potential causes of harm to people
- **Reducing the risk of human error**, as a measure to reduce the likelihood of errors or mishaps

# 7 value-driven stages

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- Mineral resource management
- Production
- Asset productivity and efficiency
- Profitability and cost control
- Supply chain
- Socio-economic factors
- Health, environment, safety and legislation



The main processes involved:

- **Site preparation:** general information and characterisation of the rock mass
- **Extraction:** clean and safe solutions for aggregate extraction by drilling and blasting
- **Loading and internal transport:** safe loading and transport processes within the quarry
- **Processing plant:** efficient, automated and flexible methodologies for aggregate recovery, increasing the range and yields of recovered materials while reducing the environmental footprint
- **Storage:** both between the quarry and the treatment plant and after the treatment process
- **External transport:** optimised transport routes outside the quarry
- **Rehabilitation:** minimisation of environmental impacts in quarry restoration in terms of efficient management of internal transport from the extraction site and treatment plant to the restoration area
- **Business management:** search for optimised process control by integrating large amounts of data

