

# Initial Value Assessment

CBI.ATTRACT

**Bernardo Balboni, University of Modena and Reggio Emilia**

**Matteo Vignoli, University of Bologna**

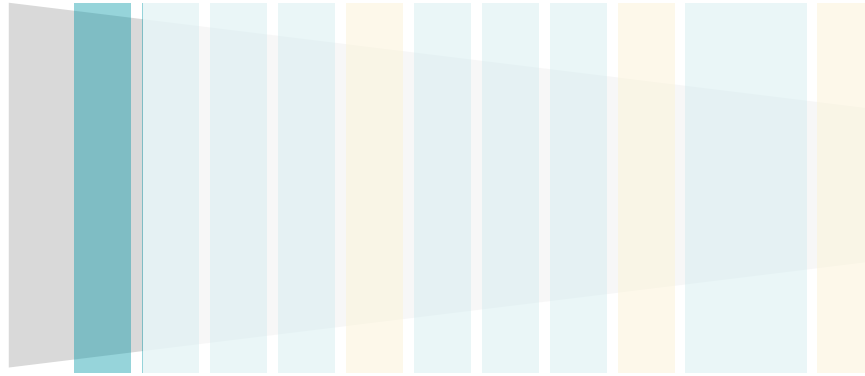
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ALMA MATER STUDIORUM  
UNIVERSITÀ DI BOLOGNA

# 1. Technology understanding



## Technological abilities

gathering precise and reliable data



## Technological activities

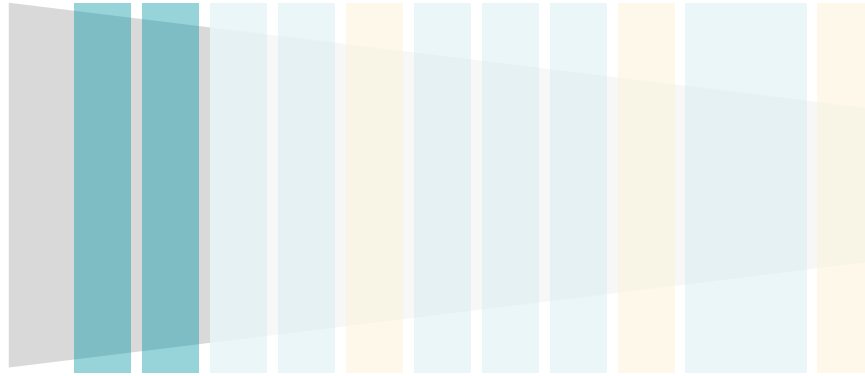
increase safety of critical structures

## Technological functions

self loosening detection



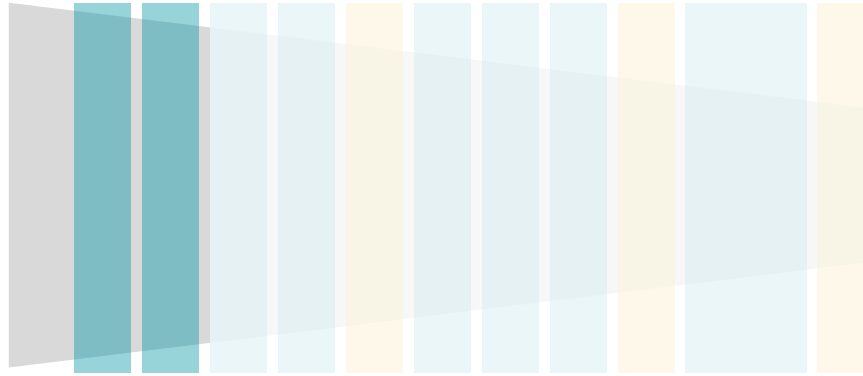
## 2. Input collection



### **Be inspired about the fields of application**

- Sugar GKO interviews
- 1st brainstorming based on Sens-in bolt abilities
- 2nd brainstorming based on Sens-in bolt current functions

## 2. Input collection



### 1st Brainstorming

#### Technological abilities

gathering precise  
and reliable data



#### Technological activities

increase safety of  
critical structures



#### Field of application

pipelines monitoring  
and maintenance

### 2nd Brainstorming

#### Technological functions

vibration



#### Field of application

music instrum.monitoring  
sport, performance  
monitoring

## 2. Input collection

### Technology abilities

gathering precise and reliable data



communicate the structure ongoing status



communicate the fastener ongoing status



automatic data gathering and sending



### Opportunities



replace monitoring procedures based on human senses



increase safety of critical structures



monitoring of places hard to inspect physically



allow real-time response from automatic systems

### Field of application

**bridges\***



roads



amusement park



**energy \*  
pipeline**



drone

**biomedical \*  
plants**



domotic



auton. car

logistic stores



...



\* assumed economic opportunity

### 3. Research

Sense-in bolt can be used to monitor pipeline status



Sense-in bolt can be used to (i) prevent chemical plants pipework flange detachment with a strain gauge sensor in order to measure the axial force of the bolt (ii) do maintenance intervention only when really necessary.

# 3. Research

## Energy Engineering Professor

### From energy pipeline to chemical plants pipework

Inside chemical plants there are many kms of pipes which are called pipework and are useful to move chemical products inside chemical plants.

Pipeworks are made up of many parts, which are connected each other by flanged connections which are joint together through bolts.

## Chemical plants maintenance manager

### Facts

1- High number of chemical and energy plants (2840 chemical companies only in Italy);

2- From 1 to 5 kms of pipes;

3- More than 100 flanged connections for one machinery.

4- In every flanged connection there is a minimum of 4 bolts, up to 28 bolts at the maximum

### experience quotes

*"I've to stop another time my chemical plant if the external maintenance team has not done well his job"*

V. Cozzani (Chemical Engineer)

# Value Statement



We want to use \_\_\_\_\_ *Technology*

to \_\_\_\_\_ *Opportunity*

In the field of \_\_\_\_\_ *Application field*

for \_\_\_\_\_ *User(s)*

who \_\_\_\_\_ *Need(s) / Pain(s)*

*use verbs*

in order to \_\_\_\_\_ *Benefits / Advantages*