



# GE's "Brilliant factory"

Assomineraria Workshop - Trasformazione digitale: Opportunità e strumenti

Milano 30 Novembre 2018

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## From Nuovo Pignone to BHGE



120 countries



~70,000+ employees

2 headquarters (Houston & London)



\$23 Billion Combined revenue 2016



4 Product Companies

Listed on NYSE



November 30, 2018

The first and only fullstream company

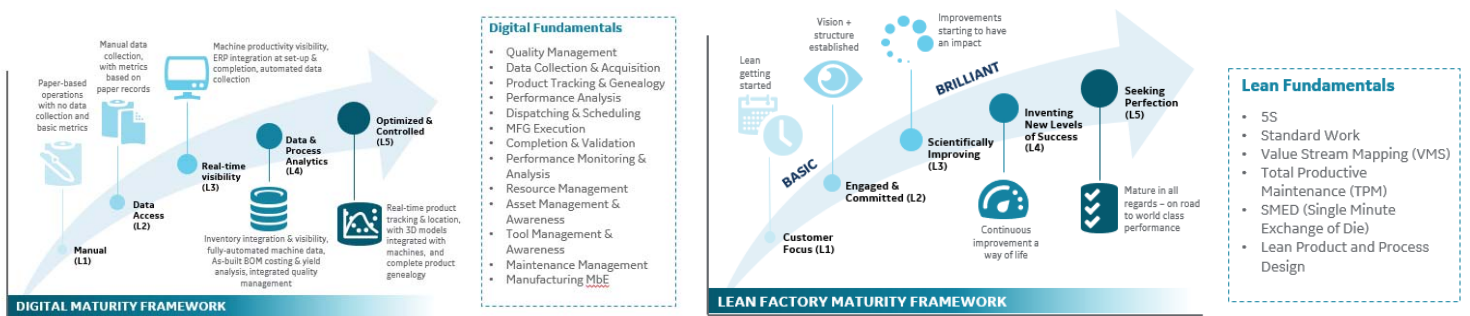
# The digital revolution



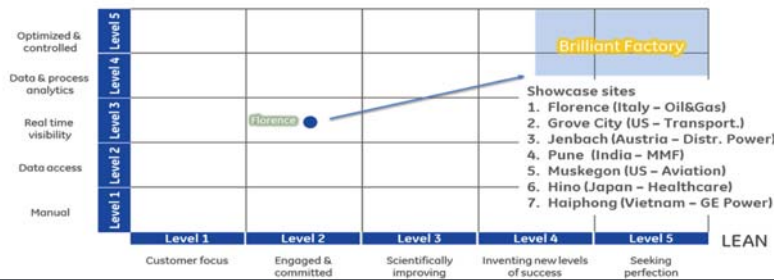
## Additive MFG

VIRTUAL MANUFACTURING	SENSOR ENABLED	FACTORY + SUPPLY CHAIN OPTIMIZATION
Bridge information gap between engineering & manufacturing via digital tools	Enable higher uptime & quality at each individual manufacturing machine tool	Increase throughput & inventory turns by enhancing data visibility at factory level
<p>↓ Cycle</p> <p>↓ Cost</p> <ul style="list-style-type: none"> <li>▪ MBE ...Bill of Process &amp; Part Program in PLM/MES</li> <li>▪ Electronic Work Instruction</li> </ul>	<p>↑ VCP</p> <p>↓ Downtime</p> <ul style="list-style-type: none"> <li>▪ Connect shop machines</li> <li>▪ KPI Metrics &amp; Analytics</li> <li>▪ Condition Based Maintenance</li> <li>▪ Smart Facility Solutions</li> </ul>	<p>↑ OTD</p> <p>↓ Cycle</p> <ul style="list-style-type: none"> <li>▪ Quality management: Statistical Process Control &amp; Digital Gauges</li> <li>▪ Automation &amp; Additive</li> <li>▪ Manufacturing Execution System</li> </ul>

# Brilliant MFG Journey



### DIGITAL



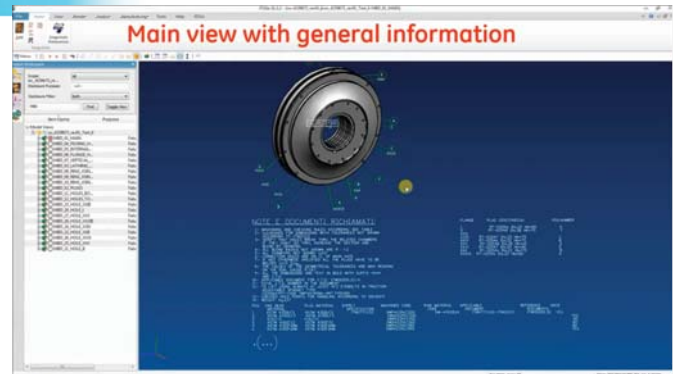
# Digital Thread & Model Based Enterprise

Digitizing within and connecting data across all systems and functions

a **Digital Thread** to improve efficiency, productivity and quality ... remove **hidden waste** in data manipulation across functions.

## HOW?

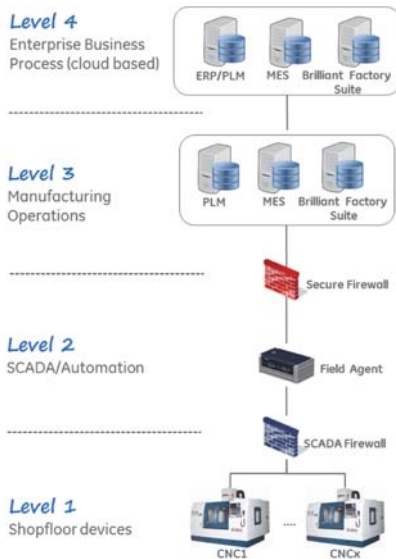
- **Unique** BoM... Engineering & Manufacturing
  - Annotated **3D Models** as the Master of Product Definition ... database for downstream re-use
  - Item **classification**
- ... foundation for the creation of a new Industrial Environment: **Digital Twin** of assets to predict, measure & optimize performance



# Machine Performance & Visual Management



## Brilliant Factory Blueprint



## Visualization examples

### 1 Machine monitoring



Used to view alerts & actions to reduce downtime and MTBF/MTTR

### 2 Shop line visualizations

#### Pegging Rotor Assembly



#### CONWIP report



### 3 Condition based maintenance



Used to view machine deviation from standard performance to reduce number of failures

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