UNIVERSITÀ
POLITECNICA
DELLE MARCHE

Facoltà di Ingegneria

Sostenibilità sociale: abilitatore della produttività di fabbrica

9 Febbraio 2018

Context
Industry 4.0 technologies

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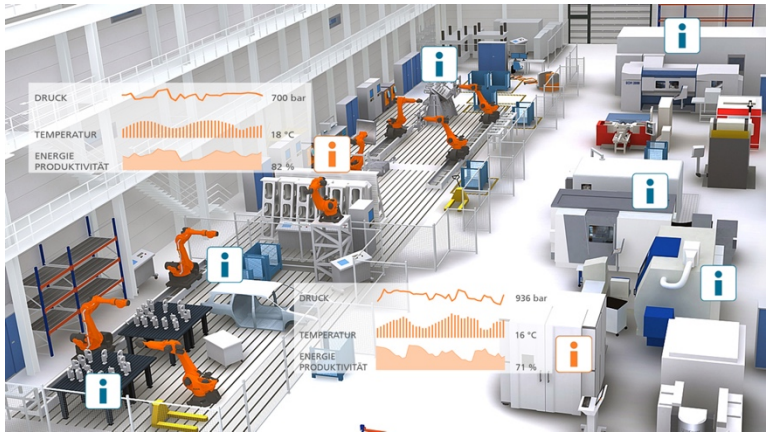
OPPORTUNITIES:

- Digital Technology to improve productivity
- New skills required
- New working places and modalities
- New job opportunities while eliminating some job families

M. Lorenz et al., 2015



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TARGET:

reducing costs, productivity increase, resources efficiency, and high quality

WHAT ABOUT HUMAN ASPECTS?

Context
Made in Italy and Marche region

REGIONE MARCHE

Wich is the role of Industry 4.0 in manufacturing?

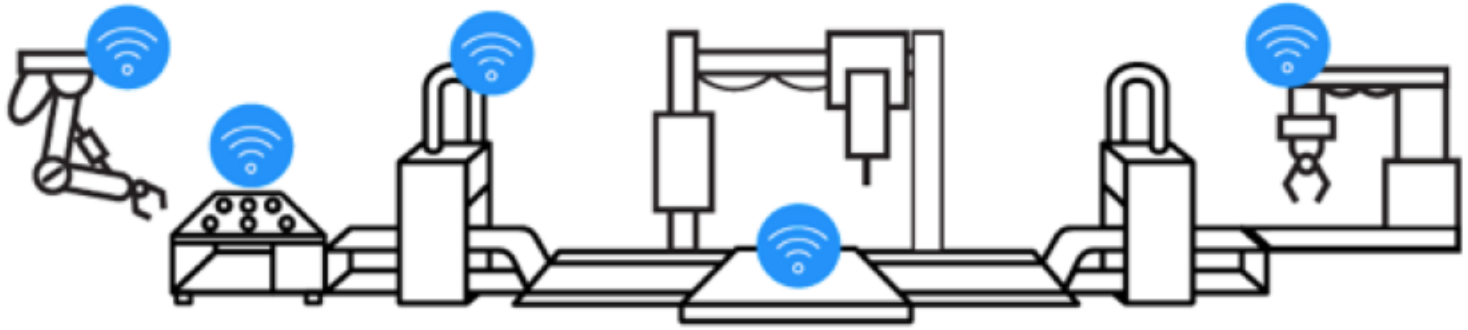
Find the data!

Main themes:

- Aging workers
- Specialization
- Added value of humans
- Human 4.0 KPI

Main goal

Developing sustainable manufacturing in the era of IoT: a methodology to achieve sustainability in connected factories



The research

Social Assessment in manufacturing system

Optimize operations

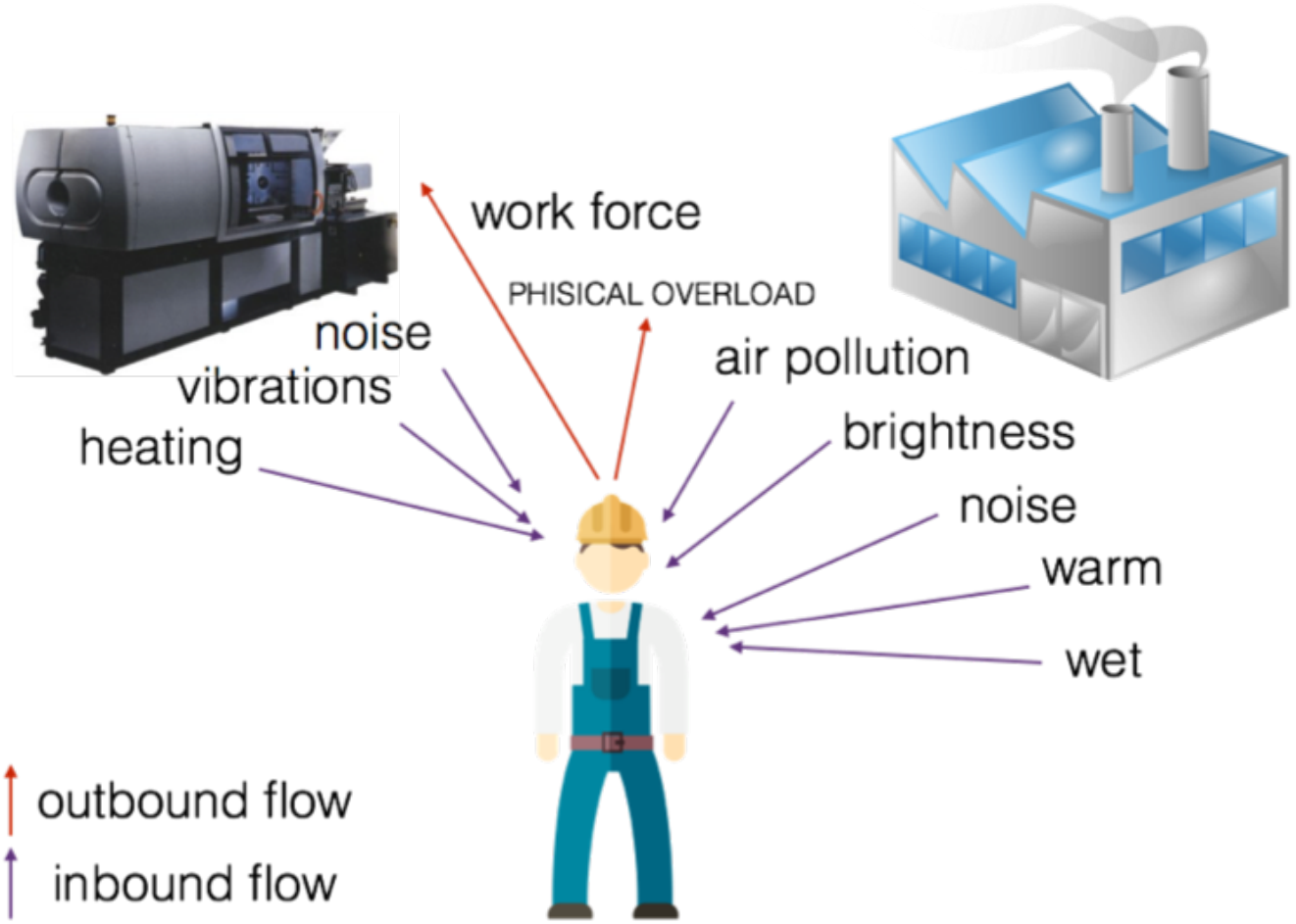
Optimize environment

Toward 4.0 sustainable manufacturing systems:

Improving workers condition = improving productivity

Social Assessment in manufacturing system

Identify flows



all the flows need to be monitored - **SOCIALLY SUSTAINABLE MANUFACTURING SYSTEM**

- Flows that should affect social sustainability
- **How to measure those flows?**

4.0 technologies to monitor plant

Social Assessment in manufacturing system

The framework

A framework to collect social related data on a shop floor

Analysis aimed at understanding social relapses of the production system

Sensors on humans

- Smart trackers
- Heart rate monitors
- …

Sensors on operations

- Microphones
- Accelerometers
- …

Sensors on shop floor

- Thermometers
- Cameras
- …

eurosuole

Painting line vs carousel

Line:
2 Shifts, 2 Operators

Carousel:
Single Shift, 2 Operators

Monitored parameters:

ENVIRONMENT
- Air temperature
- Noise
- Pollution

HUMANS
- Heart rate
- Posture
- Mental Load
- Respiratory Rate

Workers Acceptance

The analysis has increased the relation between board and workers [WIN-WIN]

ANALYSIS PERMITTED TO:

- Identify Critical operations for workers (in terms of fatigue and workload)
- Identify Limits of plant layout (wrong postures or long transfer)
- ***Real time monitoring of operator wellness***
- Identify Environmental plant defects

ECONOMIC RELAPSES:

- Wellness improvement = productivity improvement
- Reduction of work risks **and related COSTS**
- Define an healthy environment to reduce disease

FUTURE WORKS:

- Data correlation
- Development of a software tool to reduce time of analysis

Contatti

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