Scrum in the Fourth Industrial Revolution

Paolo Sammicheli
Scrum for Hardware - The Book

Discover the SCRUM for HARDWARE pioneers: from Wikispeed to the first Scrum for Hardware Gathering and the Agile Product Charter. The book is divided in two parts: the first one made of stories and the second one with a methodological description.

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Available in Italian and English

http://leanpub.com/Scrum-for-Hardware/
In the new world, it is not the big fish which eats the small fish, it's the fast fish which eats the slow fish.

Klaus Schwab
Founder and Executive Chairman
World Economic Forum
What does this mean?

The Fourth Industrial Revolution
Klaus Schwab
Founder and Executive Chairman, World Economic Forum
Is it a new Revolution?

The elements that experts say will determine the current as the Fourth Industrial Revolution, and not a continuation of the third, are mainly three:

• **Speed.** Unlike the previous industrial revolutions, the current one is evolving at an exponential rate rather than at a linear one. This is due to the interconnection of the world through a dense communication satellite network, the spread of Internet and cost reduction of land and air transport.

• **Width and depth.** Current technologies bring new paradigms and deep changes in economy, society and individuals. The transformation is not just about products or their production process: even key concepts like identity and property are experiencing a crisis.

• **Systemic impact.** The transformations affect a system that extends beyond the boundaries of companies, industries and countries, involving the entire planet.
What are the impacts in term of business for Manufacturing Industries?
Time to market
Demand Variability
“The Winner takes it all”
The 4th Industrial Revolution will be the Revolution of the Complexity

- Paolo Sammicheli
The Cynefin Framework
by Dave Snowden.

- Complex
  - Unknown unknowns
    - Probe-Sense-Respond
    - Emergent Practice
  - Known unknowns
    - Sense-Analyse-Respond
    - Good Practice

- Complicated
  - Known knowns
    - Sense-Categorise-Respond
    - Best Practice

- Chaotic
  - Unknowable unknowns
    - Act-Sense-Respond
    - Novel Practice

- Obvious
  - Known knowns
    - Sense-Categorise-Respond
    - Best Practice

The Cynefin Framework by Dave Snowden.
In January 1993, a gunman murdered seven people in a fast-food restaurant in Palatine, a suburb of Chicago. In his dual roles as an administrative executive and spokesperson for the police department, Deputy Chief Walter Gasior suddenly had to cope with several different situations at once. He had to deal with the grieving families and a frightened community, help direct the operations of an extremely busy police department, and take questions from the media, which inundated the town with reporters and film crews. "There
What can we do?

«Disruption also flows from agile, innovative competitors who, by accessing global digital platforms for research, development, marketing, sales and distribution, can overtake well-established incumbents faster than ever by improving the quality, speed or price at which they deliver value.»
What does this mean?

«Businesses, industries and corporations will face continuous Darwinian pressures and as such, the philosophy of “always in beta” (always evolving) will become more prevalent.»
WEF Center for the Fourth Industrial Revolution

https://www.youtube.com/watch?v=CwBSWOqaM40
Fourth Industrial Revolution

Explore context

Fourth Industrial Revolution
Explore the latest strategic trends, research and analysis

India

India's opportunity and role in shaping the Fourth Industrial Revolution
With more than 50% of its population under the age of 27, India will play a pivotal role in shaping the Fourth Industrial Revolution in a responsible, scalable and inclusive manner.

Artificial Intelligence and Robotics

A Chinese hospital is betting big on AI to treat patients
The Guangzhou Second Provincial Central Hospital has worked artificial intelligence into almost every area in its operations.
Mapping Global Transformations
Mapping Global Transformations
«All these different impacts require companies to rethink their operating models. Accordingly, strategic planning is being challenged by the need for companies to operate faster and with greater agility.»
An Agile Organization is one that is quick in responding to changes in the marketplace or environment.
Agile Organization

From organizations as “machines” ...

... to organizations as “organisms”

Top-down hierarchy

Bureaucracy

Detailed instruction

Silos

Quick changes, flexible resources

Leadership shows direction and enables action

“Boxes and lines” less important, focus on action

Teams built around end-to-end accountability


McKinsey&Company
SCRUM FOR HARDWARE IN THE FOURTH INDUSTRIAL REVOLUTION
FESTO

Founded 1925
18,700 employees
250 subsidiaries
61 countries
Turnover € 2,74 Billion
Scharnhausen Technology Plant


- 4 levels
- 66,000 m² floor space
- Building height 22 m
- 1,200 employees
- 20% electricity from own power generation
- Learning Factory covering 220 m²
SCRUM FOR HARDWARE
SCRUM FOR HARDWARE

- PROCESSES
- PRACTICES
- PRINCIPLES
- VALUES
SCRAM FOR HARDWARE

PROCESSES

Scrum

Scrum at Scale
# Scrum for Hardware

## Practices

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VALUES

LEAN   AGILE   SCRUM

AGILE PRODUCT CHARTER
Case Study

Scrum for Hardware at Scale
Scrum at Scale

The Components of the Scrum@Scale™ Framework

Source: https://www.scrumatscale.com
A fractal is a geometrical object which repeat his own form at different scales, so that zooming a part of it you get a figure similar to the original.

https://wikipedia.org/wiki/Fractal
Context

• Italian Company - IOT sector
• Annual Revenue: 200 Millions Euro
• Around 1000 employees
• Project ongoing - Under NDA
• Internal Staff around 25 people + external suppliers
• Initially estimated for 2,5 years elapsed
• Started with traditional method. After one year they realized the urgent need to change method so they asked me to help them to adopt Scrum
Strategic Vision

• The project started with a LiftOff (as described in Diana Larsen’s book) of two days where we shared the Vision, formed the teams, defined the working agreements and created the backlog with a User Story Mapping.
Initial User Story Map

• Stories where covering all the interactions including Software interfaces (web interface, mobile apps, etc) and Hardware Devices (Switch, Sensors, etc)
Team Level Process

- **Mo**
  - Planning
  - Refinement 0
  - Refinement 1
  - Refinement 2
  - Refinement 3
  - Morning

- **Tu**
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  - Afternoon

- **Mo**
  - Morning
  - Afternoon
Deployment

• Deployment / Review Room
• The different products are installed in several movable panels. They can be taken to the team room during the Sprint for convenience.
• This photo has been taken at the beginning of the development and shows the empty panels and no new products.
Buffet Sprint Planning
Results
Cumulated Yesterday’s Weather

Sprint 8 = 6sp
Sprint 14 = 23sp
Sprint 26 = 55sp

In one Year
x 9.16 faster!

Yesterday’s Weather is the average velocity of the last 3 Sprints
«The fascination for Industrie 4.0 is twofold. First, for the first time an industrial revolution is predicted a-priori, not observed ex-post. This provides various opportunities for companies and research institutes to actively shape the future. Second, the economic impact of this industrial revolution is supposed to be huge.»

(Hermann, Pentek, Otto, 2015, p.2
Design Principles for Industrie 4.0 Scenarios: A Literature Review)
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