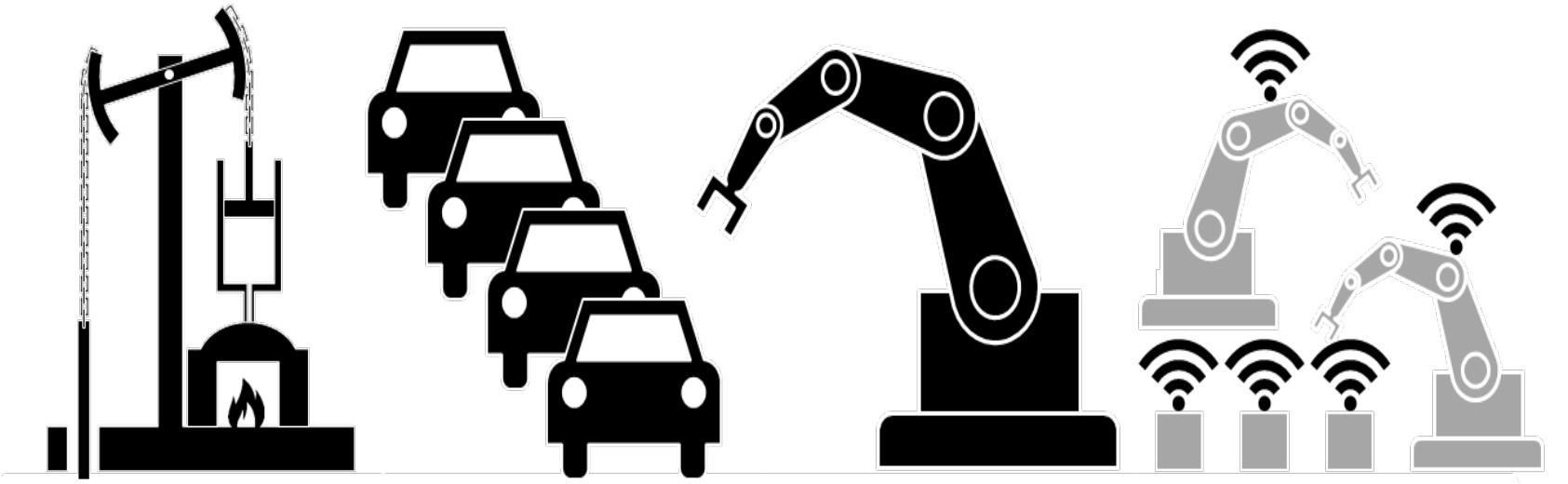
OPEX & INDUSTRY 4.0

Part 1

Prof. Alberto PORTIOLI STAUDACHER
Dipartimento Ing. Gestionale
Politecnico di Milano
Dep. Management, Economics and Industrial Engineering
Direttore Lean Excellence Center
alberto.portioli@polimi.it

Fourth Industrial Revolutions



1st	2nd	3rd	4th
1760/1840	1870/1930	1970	2011
Mechanization, water power, steam power	Mass production, assembly line, electricity	Computer and automation	Cyber Physical Systems

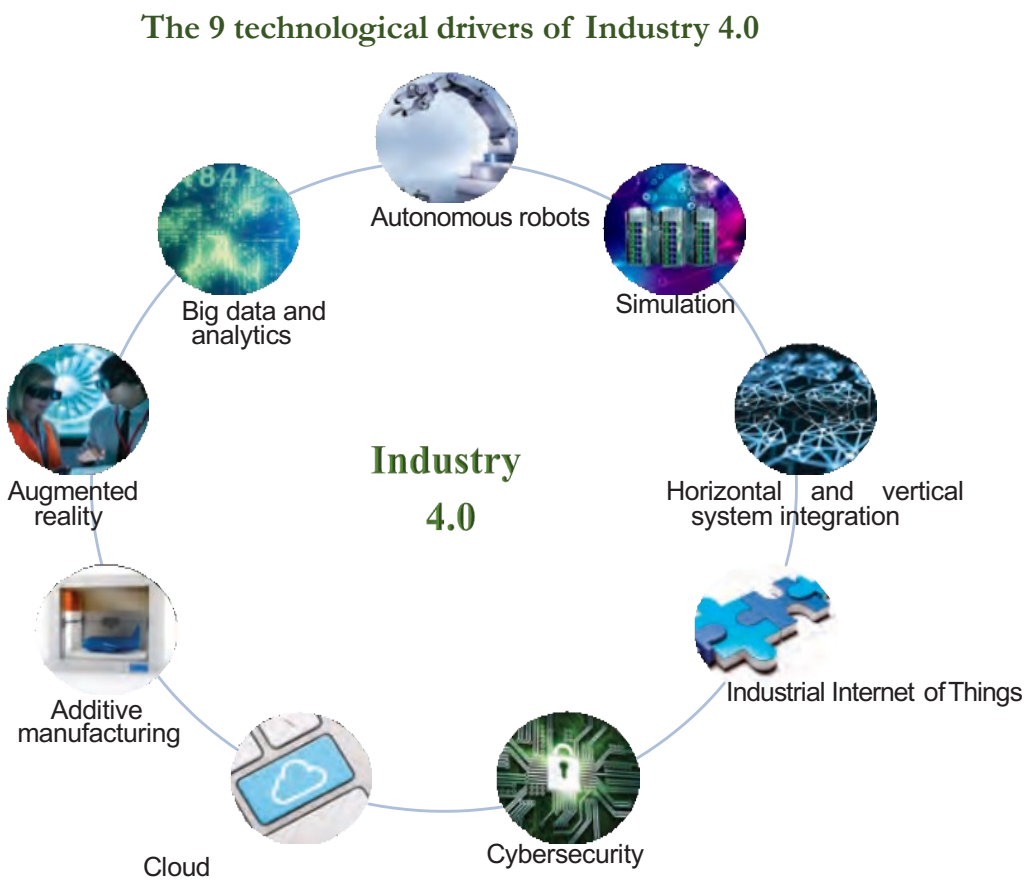
http://www.emc-consultants.it/industria-4-0-una-rivoluzione-gia-iniziata/

Industry 4.0 ?

What does it mean?

What is it about?

BCG – 2015



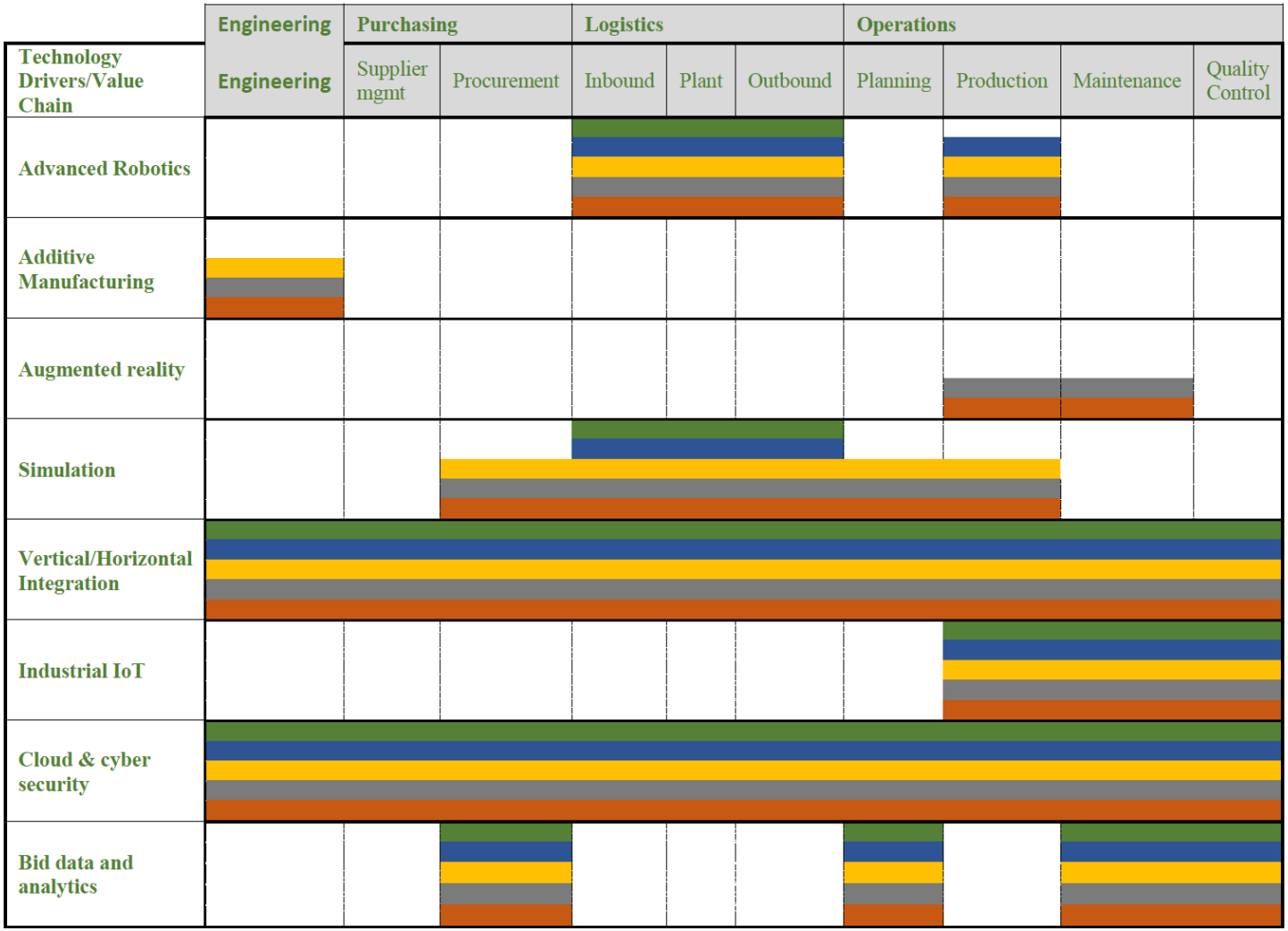
Industry 4.0 consists in the industrial application of **9 main technological drivers.**

None of the 9 drivers is new for manufacturing world.

Each of these drivers carry significant benefits both in terms of productivity and of profitability.

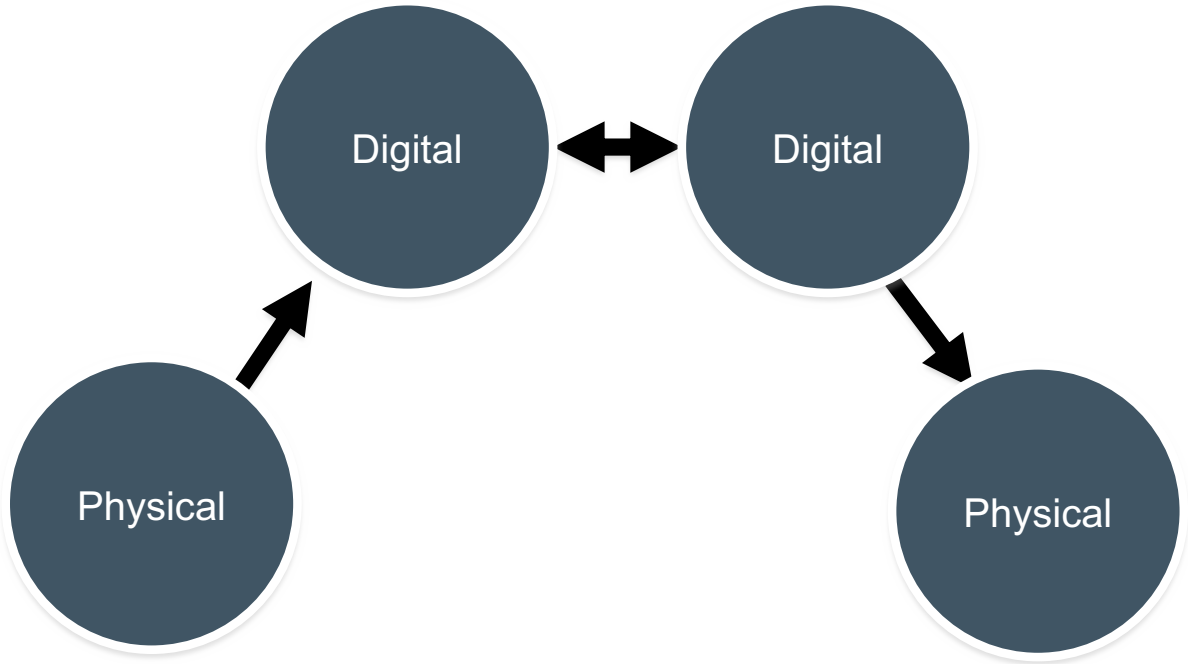
Greater benefits can be achieved using them in an integrated way.

Example of a possible use

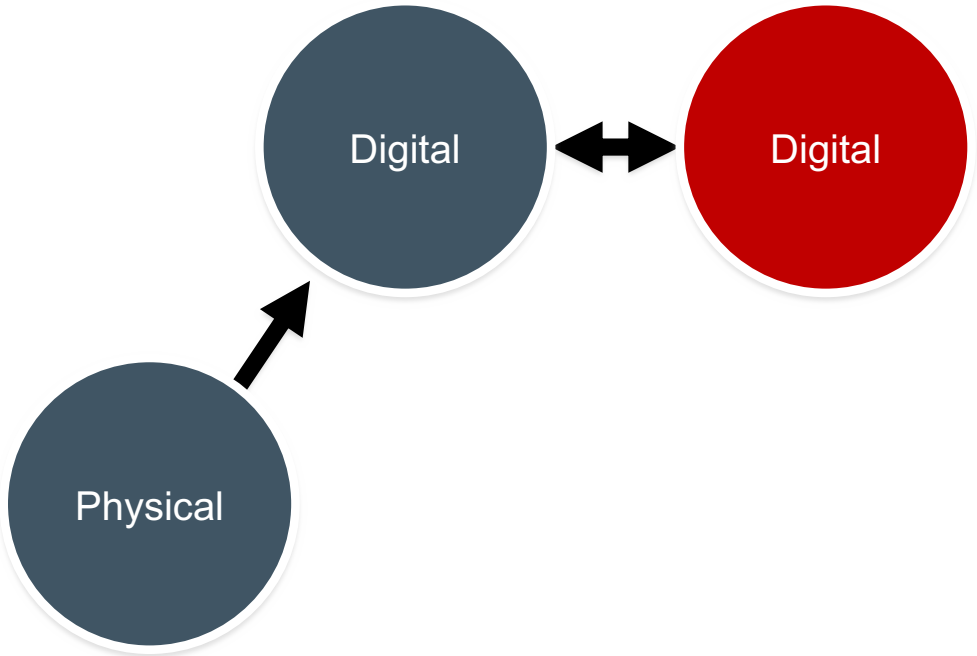


Data flow: analogical

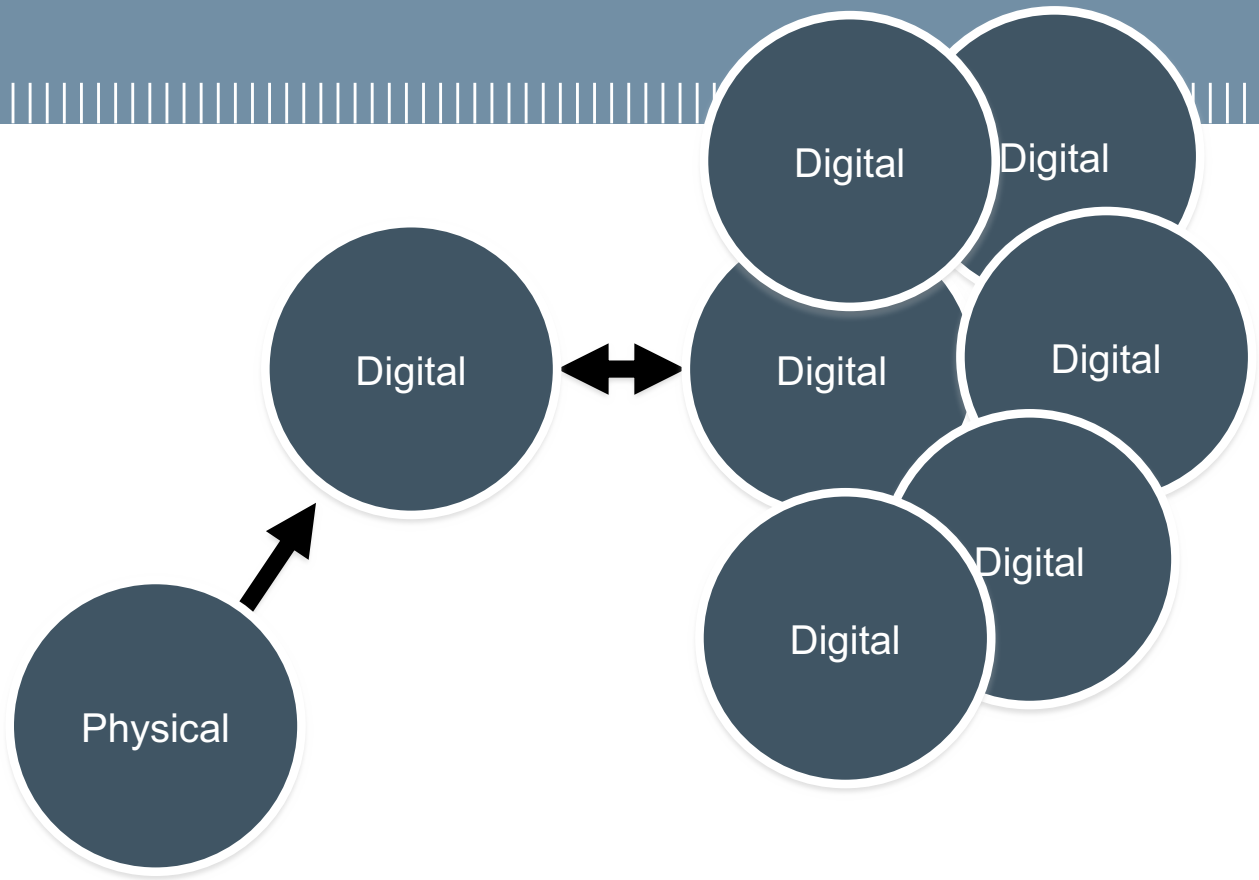
New Data flow



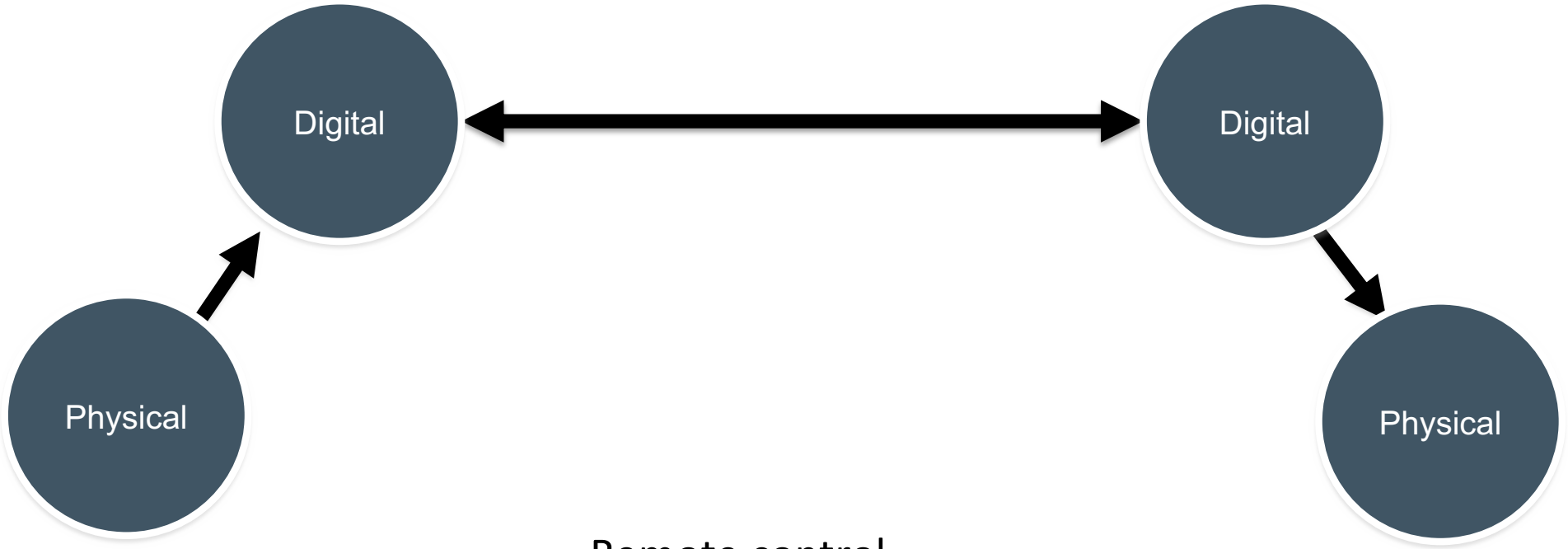
Rule changing: easier to modify



Rule changing: inexpensive to duplicate



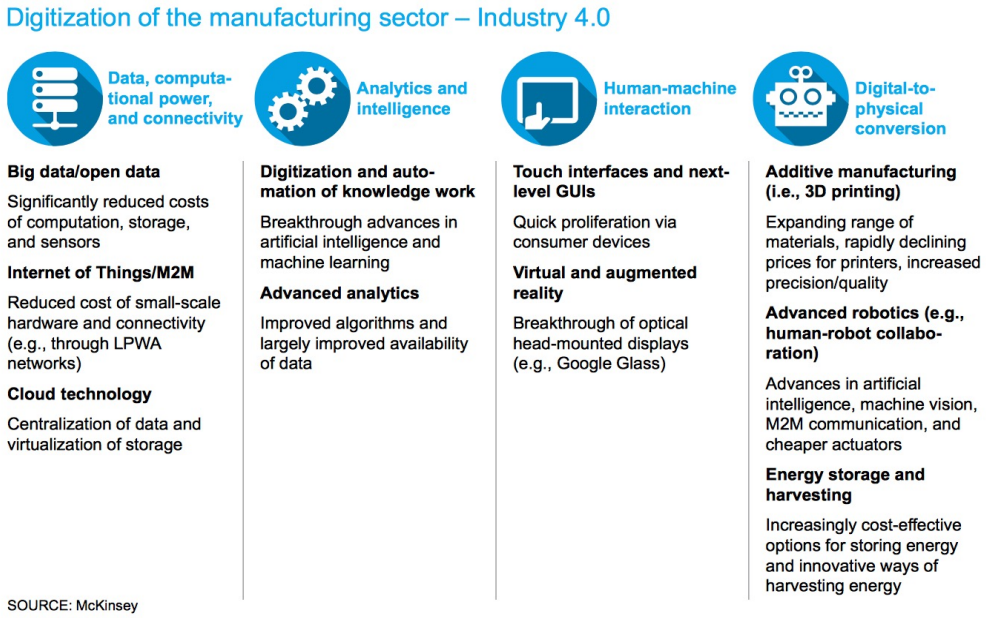
Rule changing: inexpensive to move



Remote control
Remote diagnosis
Distance is no longer an issue

McKinsey – 2015

A number of disruptive technologies will enable digitization of the manufacturing sector



Fil rouge of Industry 4.0 is represented by **digital availability of information**, as the main and fundamental enabling factor of the fourth industrial revolution.

The four clusters can be seen as main **directions** that development should follow

Understanding Industry 4.0: Moore's Law

Complexity for minimum component cost [computational power of printed circuits per dollar cost] has increased at a rate of roughly a factor of two per year….. There is no reason to beleave it will not remain constant for at least 10 years

(Gordon More, 1965)

Today it is common to take 18 months as doubling period for general computing power

Our mind faces difficulties with non-linear relations

Viral videos

If everyone sends a message to 10 friends, always different…
How many steps are required to reach the whole world popolation?

What if you send it to 100 friends?

Our mind faces difficulties with non-linear relations
The game of Chess and the Emperor

1996

Accelerated Strategic Computing Initiative (ASCI) Red

First computer to exceed 1 teraflops

$55 million to be developed

Big as a tennis court

800 Kw

2005

Cost of a 1 teraflop computer

Dimension

Energy consumption

2005

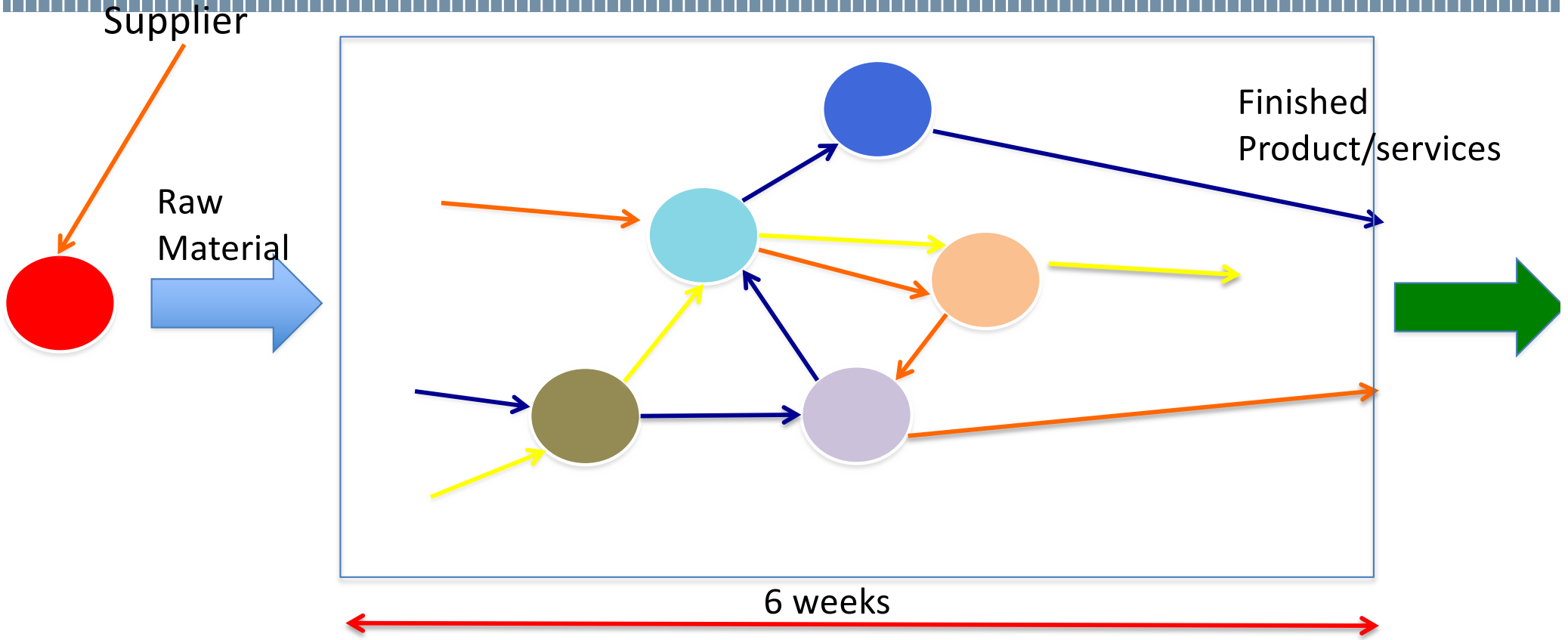
1 teraflops

0,1 mq

140 w

PLAYSTATION

Case study: AdEC advanced electronics company



Competence centers are identified by different colors
Long reponse time; unreliable due dates; no idea of the advancement staus of customer orders
Frequent delay in suppliers delivery of purchase orders

Assignment

Which investiment in INDUSTRY 4.0 technologies would you do to improve AdEC performances. With particular focus on:

- Delivery speed
- Delivery reliability
- Supply Chain efficiency (coordination with the supplier)

Why?

POLITECNICO
MILANO 1863