

Closing Key Note: Magnesium metal Ready for industry 4.0?

Martin Tauber, IMA European Chairman
Birmingham, 23.10.2018

Closing Key Note guide

76 years International Magnesium Association



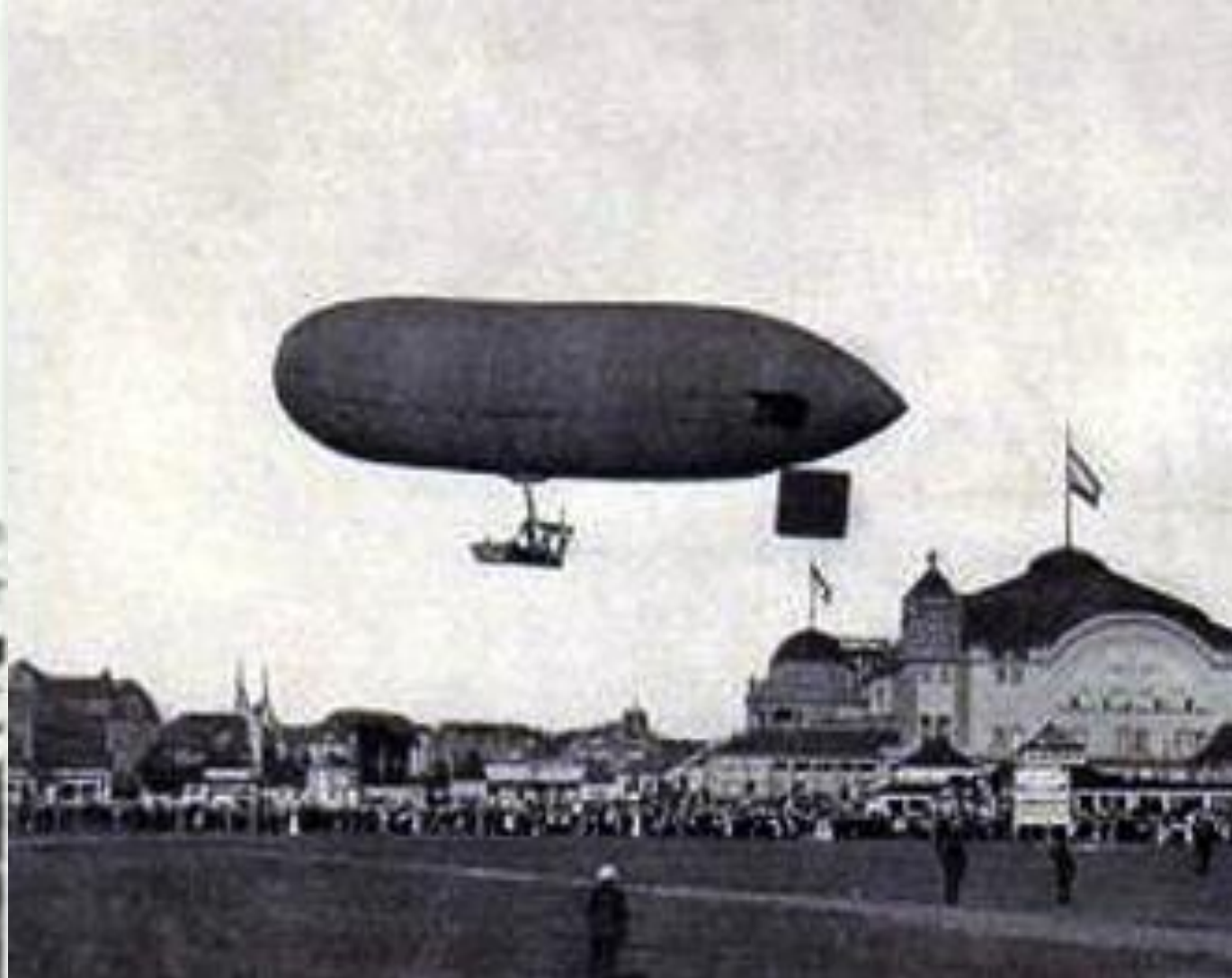
Magnesium market



Ready for Industry 4.0?



Magnesium fully part of industry 1.0 and 2.0



B36 bomber carried Mg sheet, forgings, castings



Ban interrupted use in civil aircrafts



- Boeing 727 had 1200 magnesium part nos. including leading & trailing edge flaps, control surfaces, actuators, door frames, wheels, engine gear boxes, power generation components, structural items (not primary), and others.
- 1,832 Boeing 727 were built between 1962 and 1984
- International Air Transport Association (IATA) – Applications limited to non-structural parts due to problems with corrosion.
- SAE AS8049 Revision C Draft agreed re-wording: Magnesium alloys ~~shall not be used~~ may be used in aircraft seat construction provided they are tested to and meet the flammability performance requirements in FAA Fire Safety Branch document: Aircraft Materials Fire Test Handbook – DOT/FAA/AR-00/12 , Chapter 25 - Oil Burner Flammability Test for Magnesium Alloy Seat Structure

Security of supply for defence raw materials



Volkswagen pioneered the use in mass cars



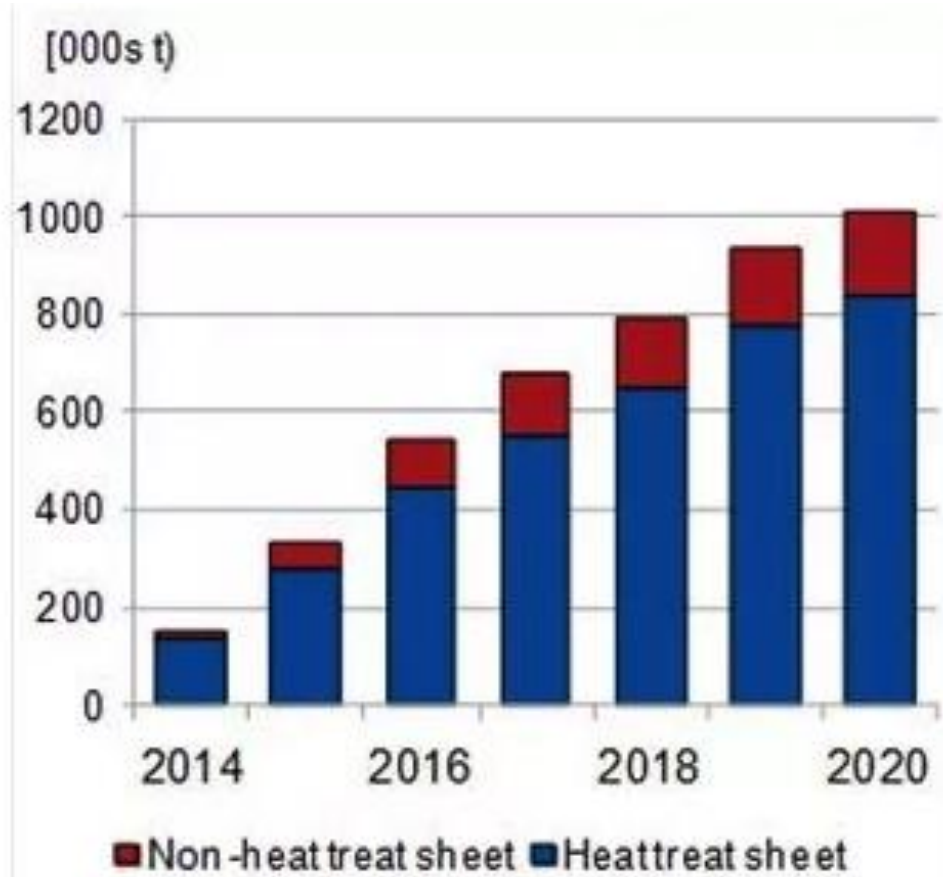
IMA needs to follow globalisation



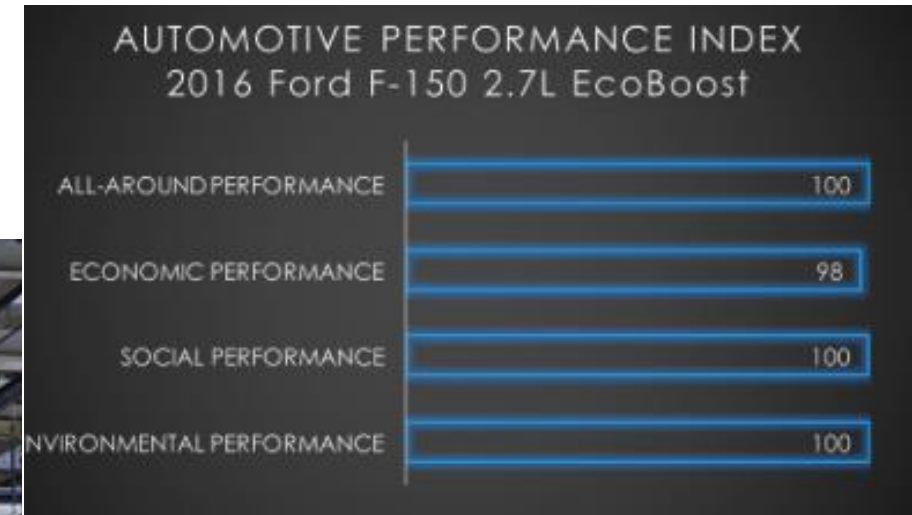
Global voice of magnesium, founded in 1943, the mission of the International Magnesium Association (IMA) is to promote the use of the metal magnesium in material selection and encourage innovative applications of the versatile metal. IMA's members consist of primary producers of the metal, recyclers, foundries, fabricators, end-users and suppliers.

http://www.intlmag.org/page/about_ima

Step-change Al automotive sheet:



Step-change AI automotive sheet:



The need to fit!

FROM INDUSTRY 1.0 TO INDUSTRY 4.0

1.0

Water- and steam-powered mechanical manufacturing



1800

2.0

Electrically-powered mass production and division of labour



1900

3.0

Electronics and IT, further automation of manufacturing



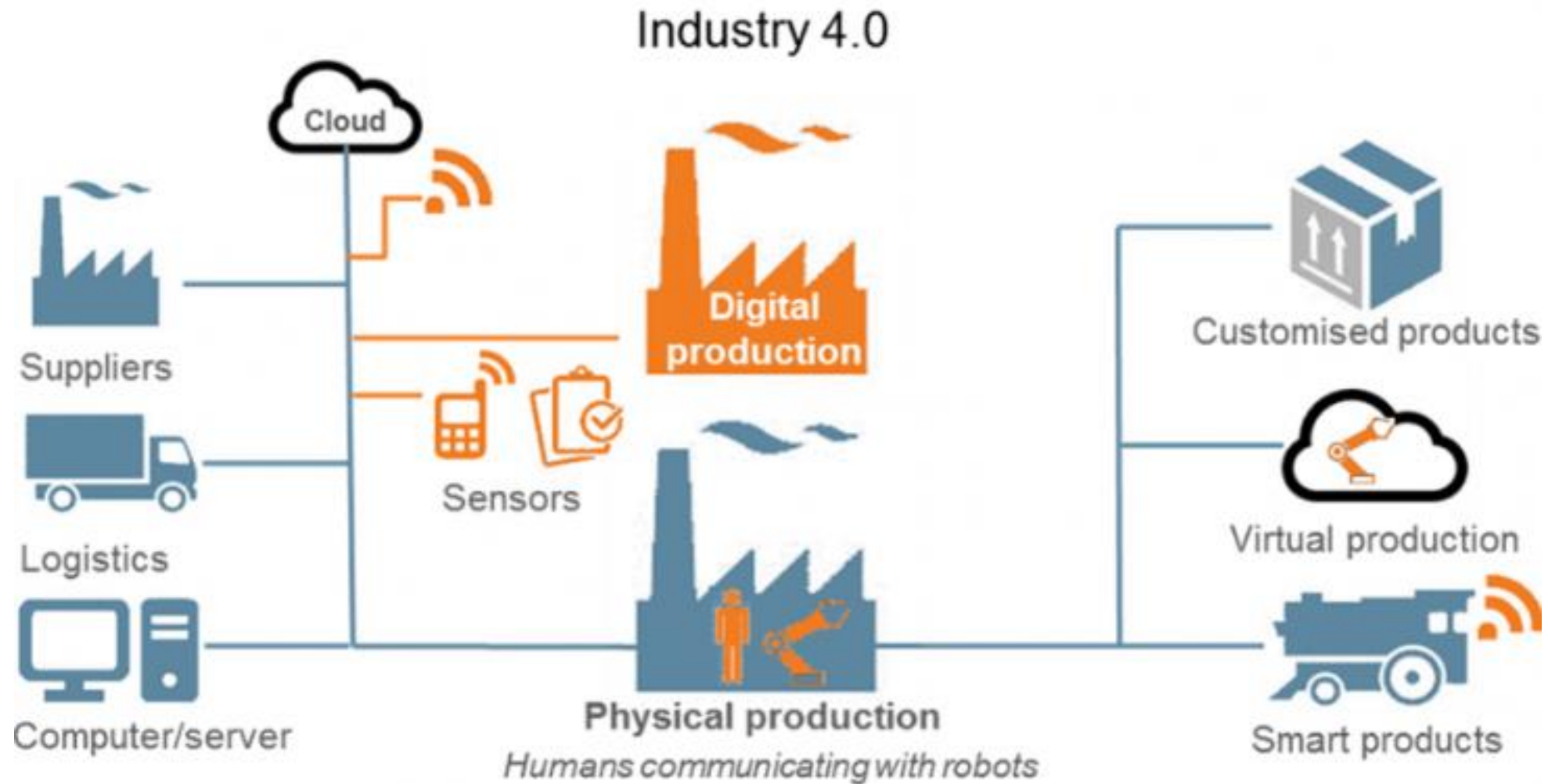
2000

4.0

Cyber-physical systems



Magnesium - The issue is the value chain!



Forbes study: The super intelligent supply chain



IoT integration enhanced supply chains:

Product origination. Supply chains can be complex, and often, raw materials and partially completed products don't come directly from the original suppliers themselves. With the help of IoT, partners as well as customers can gain deeper insights into the makeup of products built and purchased.

Raw material supply chain contracts in focus



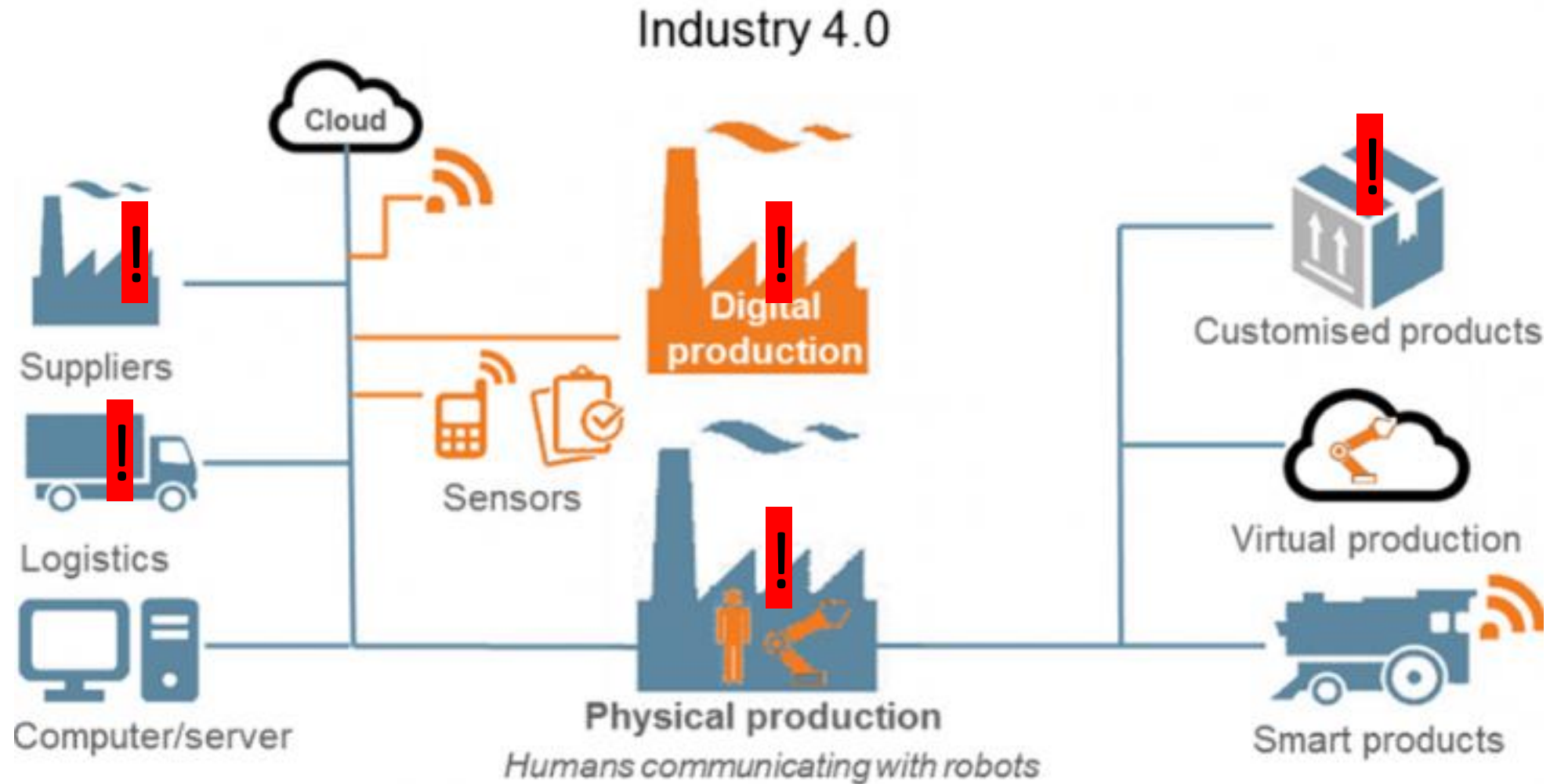
REUTERS

**Volkswagen's talks with cobalt producers
end without deal**

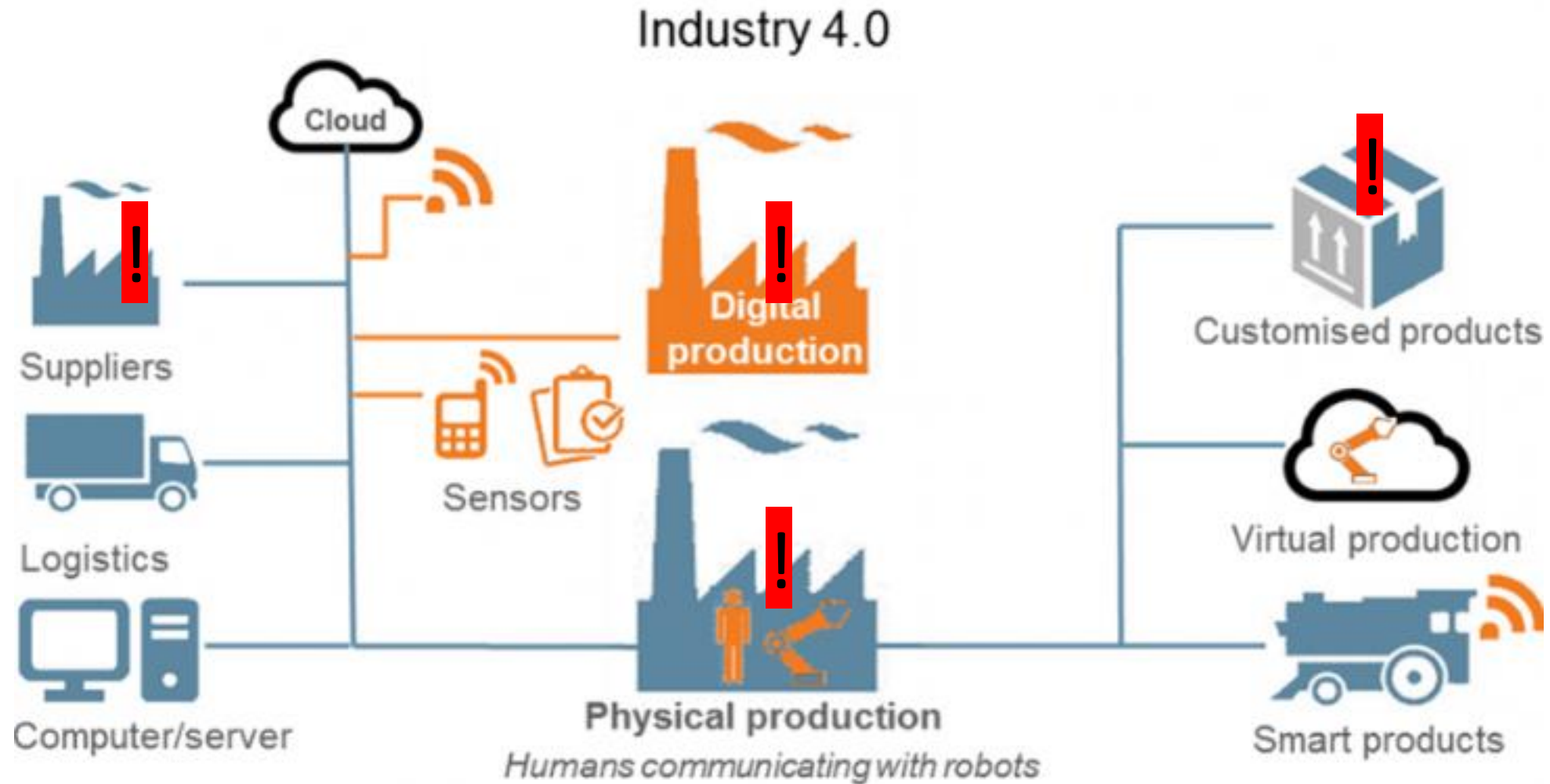
Bloomberg

**Chinese Lithium Giant Agrees Three-Year
Pact to Supply Tesla**

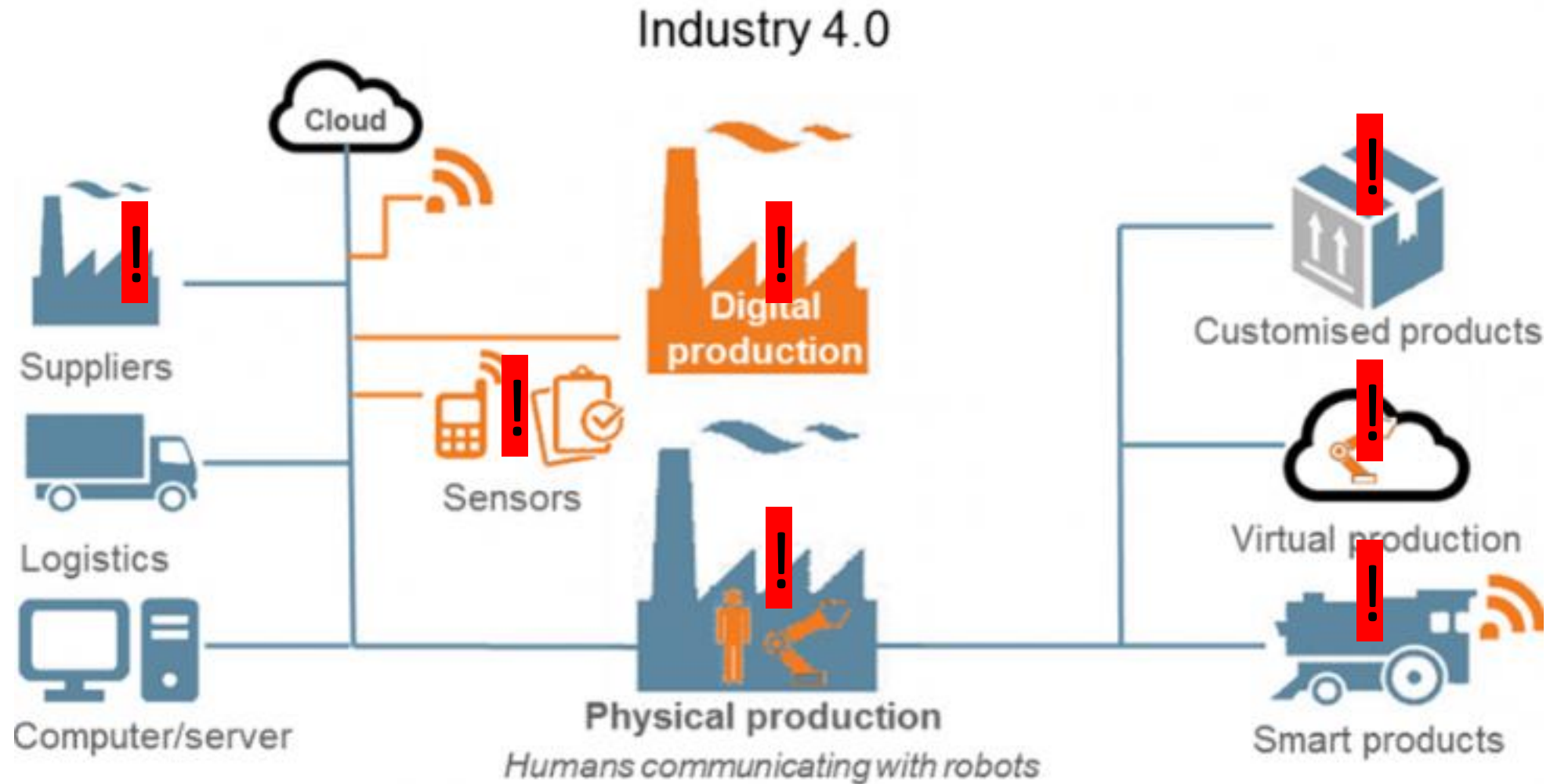
Mg package: CO2 reduction



Mg package: Raw material policy



Mg package: Magnesium properties



Mg package: Magnesium properties

- Strong
- Light
- Versatile
- Creep resistant
- Sustainable

