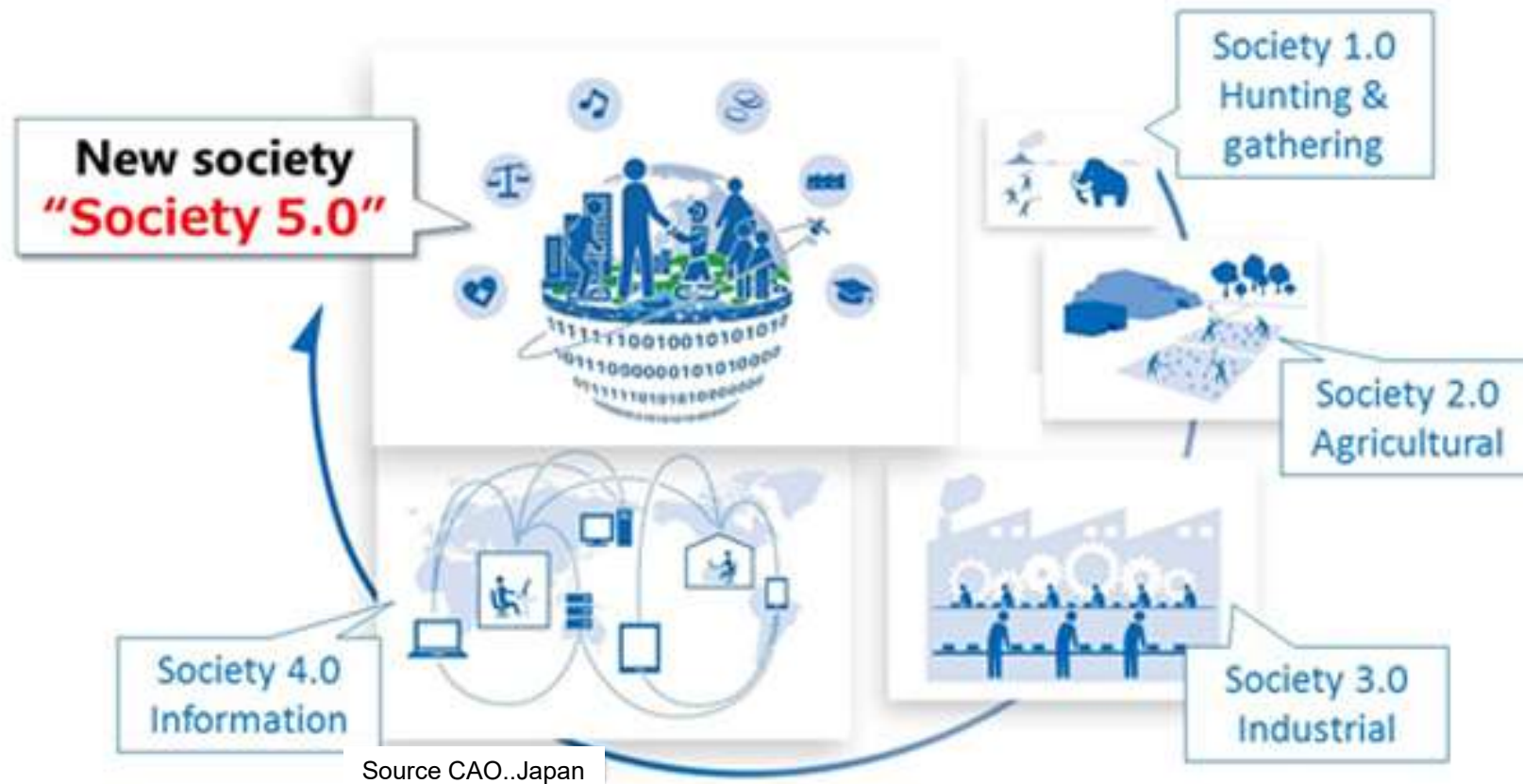# Sustainable Integration through Blockchain Technology

Ordieres-Meré J. (U.P.M.)
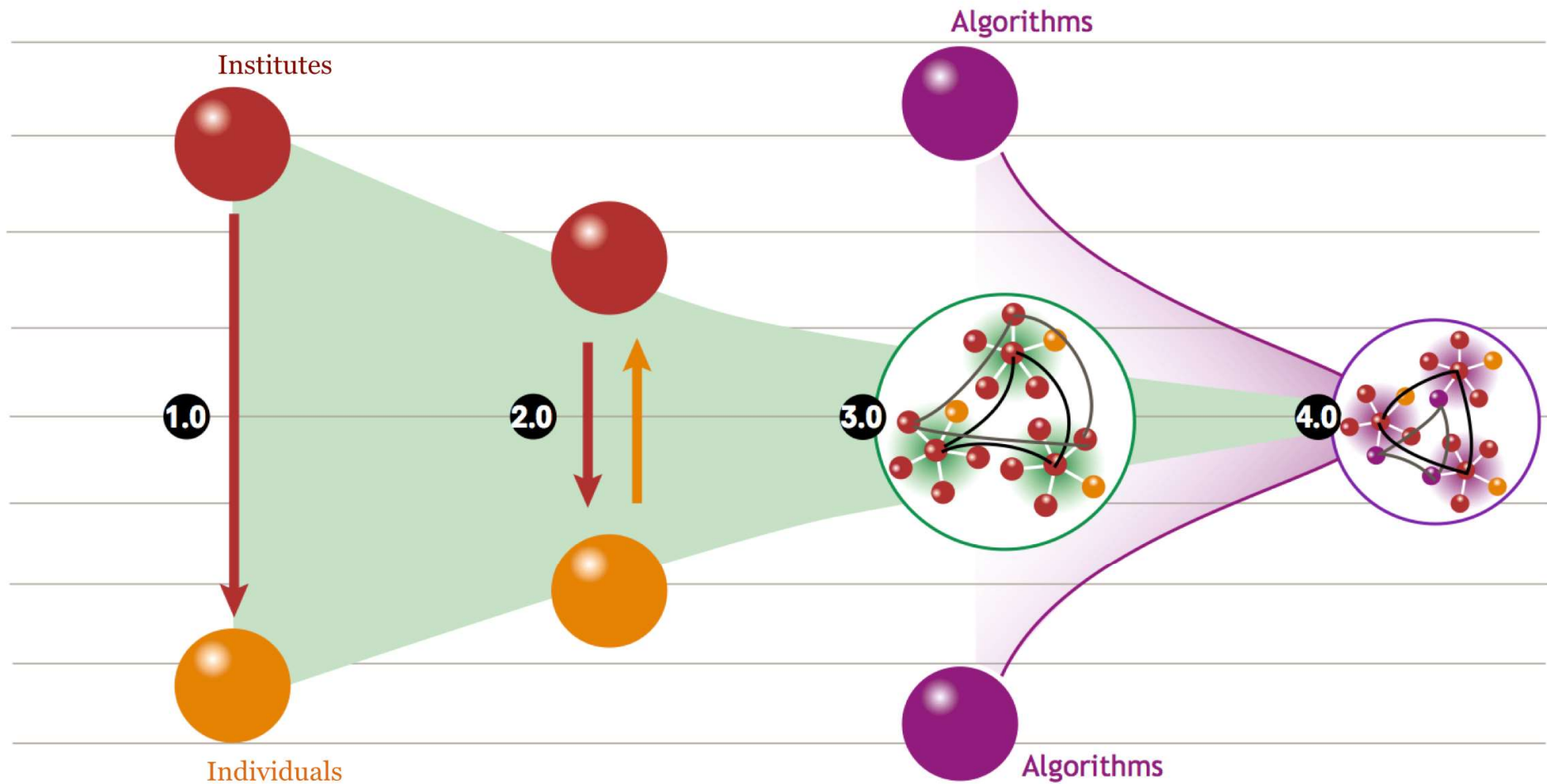
Sustainable Integration through Blockchain Technology

I 4.0 => Society 5.0:

Source CAO..Japan

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Web Models:
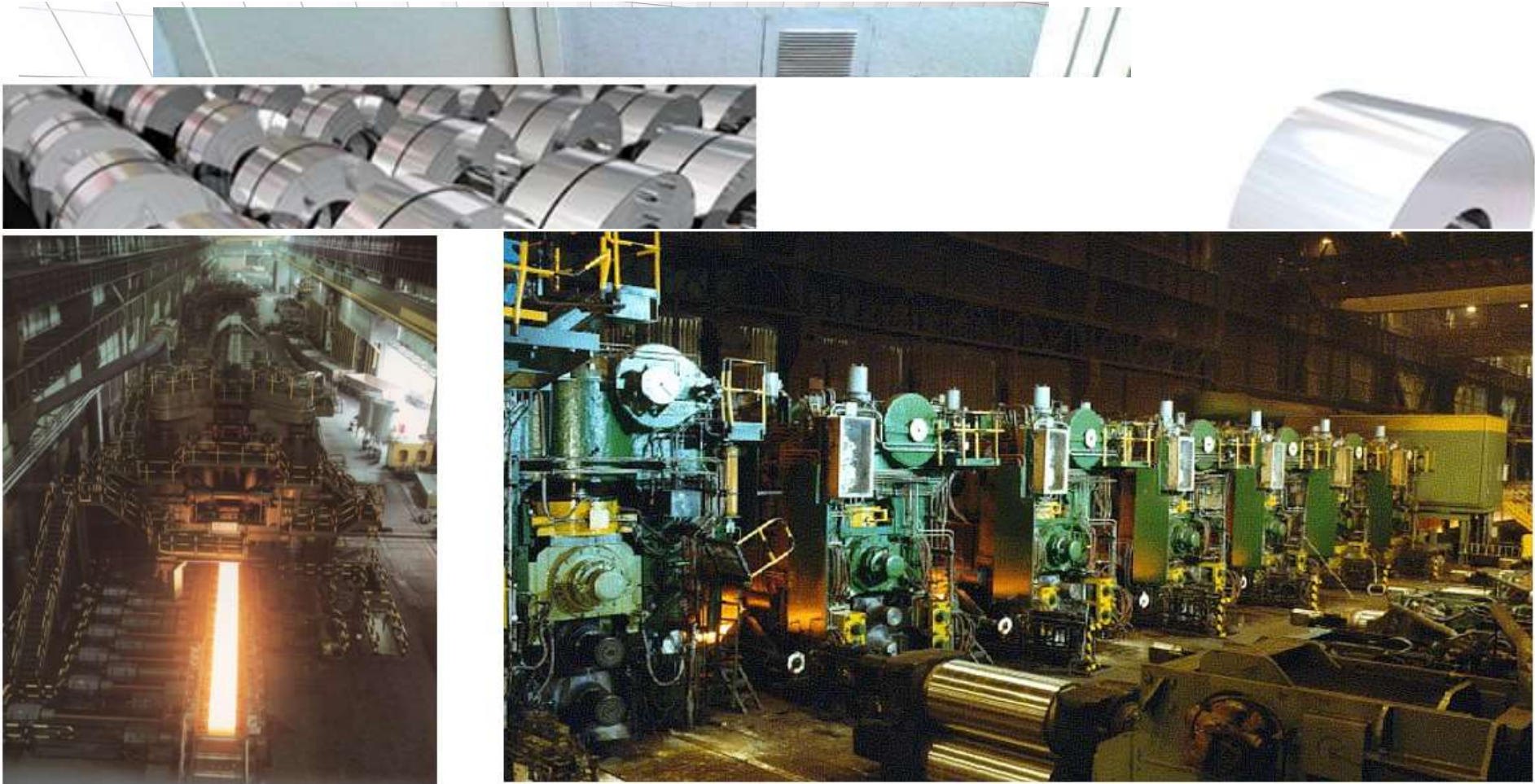

Algorithms

Institutes

Algorithms

Individuals

Marco Derksen, Sander Duivestein & Ronald van den Hoff

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Industrial example:

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Industrial example:

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Society 5.0:

Current paradigm: *BIG DATA*

Difficulties: *Monetization*

Majority of data remains locked in what is called 'Data Silos'. Data silos do not, or at best very rarely, share its data outside its own closed environment. <u>This leads to enormous quantities of wasted data, often over 99% is lost to the void</u>, (source: McKinsey 2015)


Open Data

Opportunities: *IOT*

By 2025 it is projected that around 95% of all data will be generated by IoT devices in real-time (source: IDC 2017)

Limitation: *Trustworthiness*

Lack of ensured authenticity and audit trails of data. Before adoption of DLT, data were susceptible to various attacks. Data is only as valuable as it is valid. In short, if the data input is garbage, the output will also be garbage (GIGO).
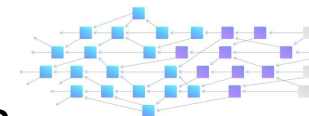
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Society 5.0:

Need: *To develop new business models to change society*

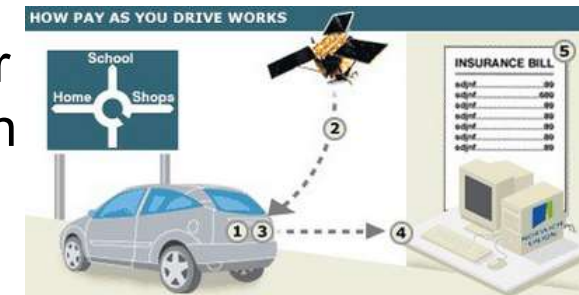How do you know about the qualifications of your doctor ?
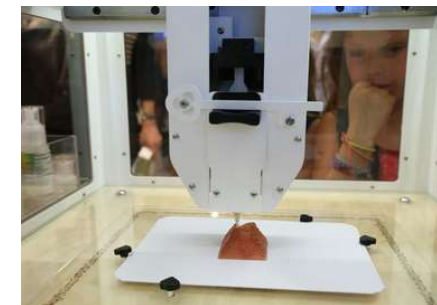*Are her diplomas true or false ?*

Why to relay on averages for yearly based car insurance model, avoiding how and how much you drive?
Does your insurance fit with you?

Why not to modify existing products to better accommodate the functionalities?
Cocreation based on needs?

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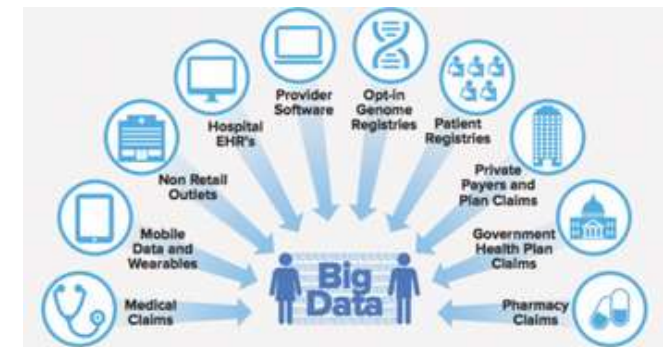
Society 5.0:

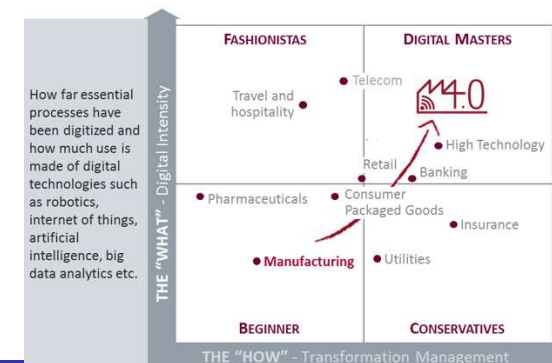Need: *An effective Digital Transformation of business & e-gov*

How many efforts can be reallocated?
Productivity increases?

What unknown opportunities will become available ?
Health rule disambiguation?

How organizational design needs to reconfigure for better alignment?
New organizational models with higher flexibility and re-configurability are needed

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Society 5.0:

Social Example with business implications: ET disease

Activity-aware essential tremor evaluation using deep learning method based on acceleration data

Xiaochen Zheng, Alba Vieira, Sergio Labrador Marcos, Yolanda Aladro, Joaquín Ordieres-Meré

DOI: https://doi.org/10.1016/j.parkreldis.2018.08.001

Publication stage: In Press Corrected Proof

Published online: August 8, 2018

Full-Text HTML | PDF | Supplemental Materials
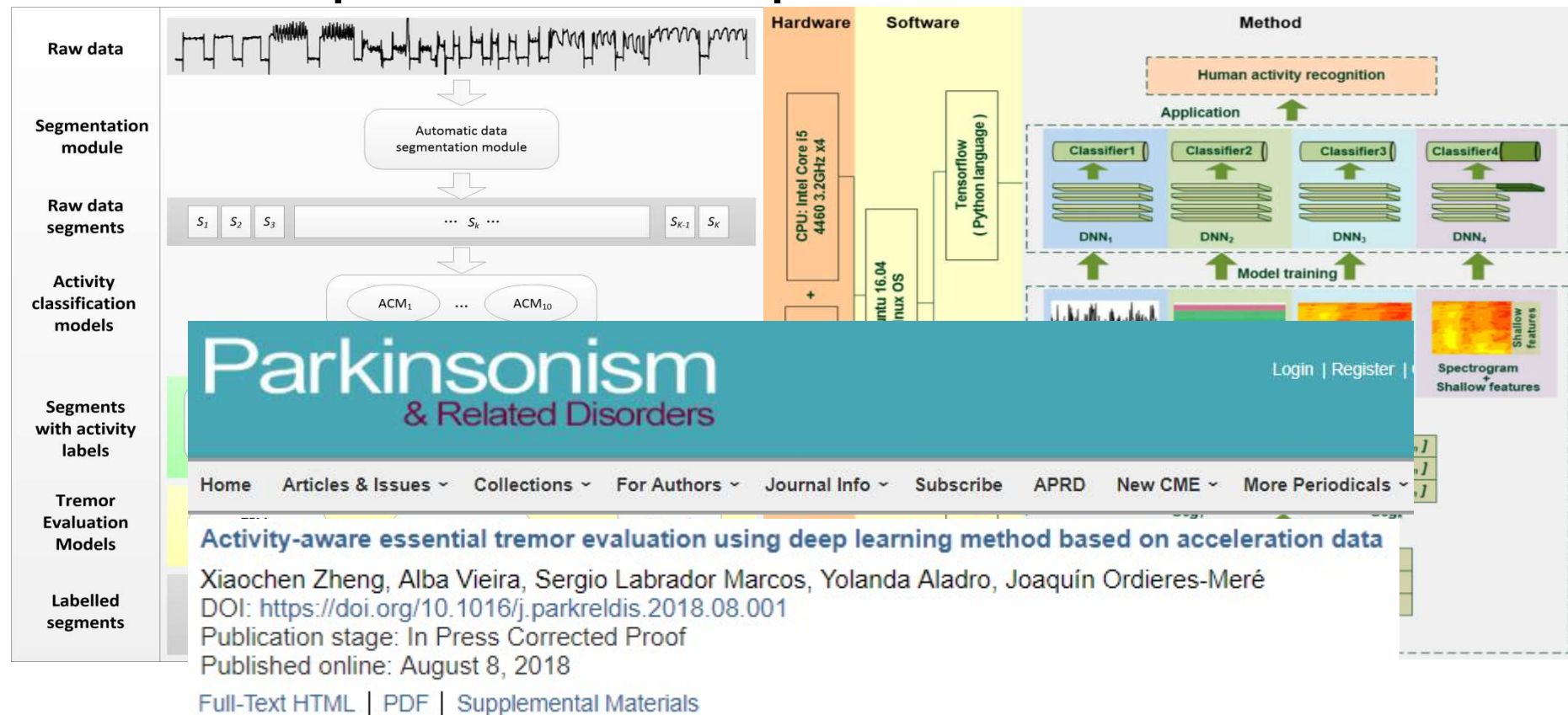
Business Dimension: **THROUGHPUT increased by 300%**

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Small steps towards Society 5.0:

De Sanctis, I., Ordieres Meré, J., & Ciarapica, F. E. (2018). Resilience for lean organizational network. *International Journal of Production Research*, 1-20.

Villalba-Diez, J., & Ordieres-Meré, J. B. (2016). Strategic Lean Organizational Design: Towards Lean World-Small World Configurations through Discrete Dynamic Organizational Motifs. *Mathematical Problems in Engineering*.

Villalba-Díez, J., & Ordieres-Meré, J. (2015). Improving manufacturing operational performance by standardizing process management'. *Transactions on Engineering Management, 62*(3), 351-360.

Xiaochen Zheng, Meiqing Wang and Joaquín Ordieres-Meré, (2018) Comparison of Data Preprocessing Approaches for Applying Deep Learning to Human Activity Recognition in the Context of Industry 4.0. *Sensors, 18(7), 2146; https://doi.org/10.3390/s180721466*.

Saralegui, U., Antón, M. Á., & Ordieres-Meré, J. (2017, October). An IoT− based system that aids learning from human behavior: A potential application for the care of the elderly. In *MATEC Web of Conferences*. EDP SCIENCES

Zheng, X., Vieira Campos, A., Ordieres-Meré, J., Balseiro, J., Labrador Marcos, S., & Aladro, Y. (2017). Continuous monitoring of essential tremor using a portable system based on smartwatch. *Frontiers in neurology, 8*, 96.

Gong, B., & Ordieres-Meré, J. (2016). Prediction of daily maximum ozone threshold exceedances by preprocessing and ensemble artificial intelligence techniques: Case study of Hong Kong. *Environmental Modelling & Software, 84*, 290-303.

Shrouf, F., Gong, B., & Ordieres-Meré, J. (2017). Multi-level awareness of energy used in production processes. *Journal of cleaner production, 142*, 2570-2585.

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Transparency is a <u>must</u> for Society 5.0:

The killer application:
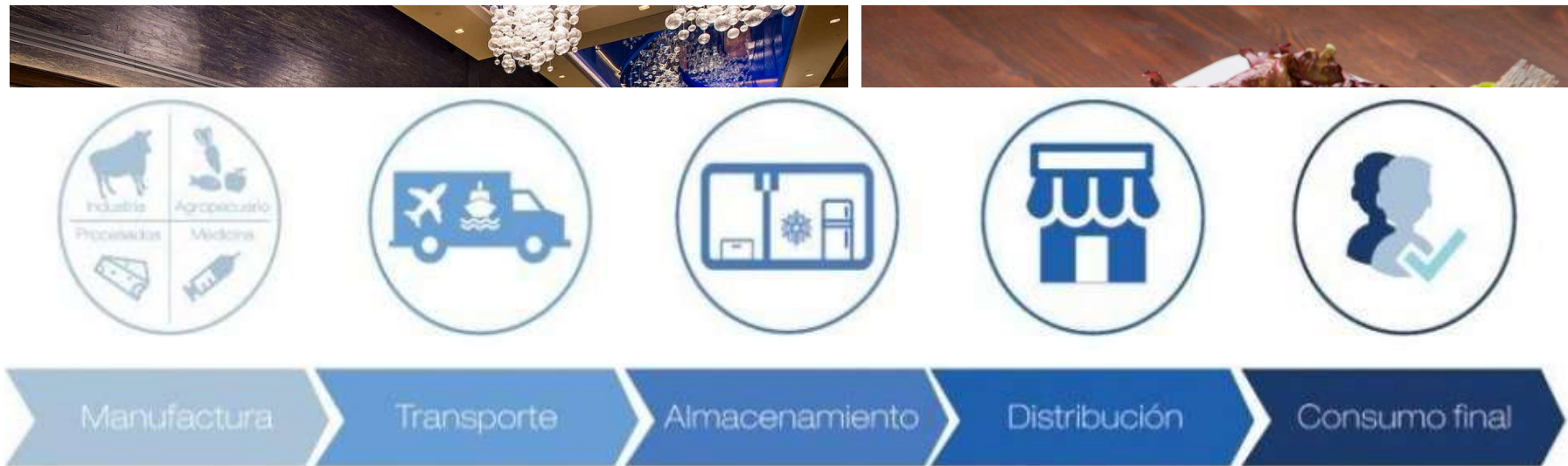
Food safety risk isn't in freezing, but in thawing.

Safety really depends on how long the power was off, how warm it got in the freezer – and how certain you are that you know the answers to those questions.

Sustainable Integration through Blockchain Technology

Transparency is a <u>must</u> for Society 5.0:

This is much more than about tools, but it's also about technology & tools.
IoTA enables decentralization, low or non cost transactions, high scalability, extended data capable messages.

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Society 5.0: Tools & more …

The impact of the increased level of transparency can positively impact in business, gov., and society will be unbelievable but, new concepts, business models, organizational designs are needed.
We need to work them out, contributing to transform reality.

Feel free to visit our GitHub repo:
https://github.com/rromanss23/Store-Sensor-Data-in-BigchainDB-MariaDB-and-Publish-Statistic-Summary-to-IOTA-s-Tangle

https://**github.com**/rromanss23/Store-Sensor-Data-in-BigchainDB-MariaDB-and-Publish-Statistic-Summary-to-IOTA-s-Tangle

Uploading-sensor-data-to-IOTA-tangle

Overview:

This is the repository of my end of dregree project wich consist in the following:

- Collecting data from a sense HAT attached to a Raspberry Pi 3 B+
- Publish data via MQTT to a Linux machine where there is installed a light weight IOTA wallet, and runs three listening clients
  - The first one stores data in a MySQLdb data base
  - The second on computes temporal data summary and publish it to the IOTA tangle
  - The third one stores data in BigchainDB

The aim of this project is to implement the increasingly demanded technology of the Internet of Things (IoT) with blockchain technologies, and build a completely dezentralized sensor system. For this porpouse I have chosen the cryptocurrency IOTA as it provides a fast, secure, free and decentralized way of storing and publishing data and BigchainDB as decentralized database that will took up the place of MySQLdb.

How to Use the Code:

1°) Run pubsensordata.py in your Raspberry Pi:

It will collect sensor data from the Sense Hat and publish it via MQTT. You need to put your specific credentials, IP addresses and the Publish topics. You can also select which parameters to sense by changing the state of the settings from True to False. You can also adjust the frequency of the data's collection in the variable DELAY.

Sustainable Integration through Blockchain Technology

Thank you very much for your attention

非常感谢您的关注

Joaquin Ordieres
j.ordieres@upm.es