A BigData rendszerek használata és jelentősége a körkörös rendszerfejlesztésekben

Dr. Fogarassy Csaba PhD agro, PhD business

Szent István Egyetem

Gödöllő

Digitális technológiák alkalmazása
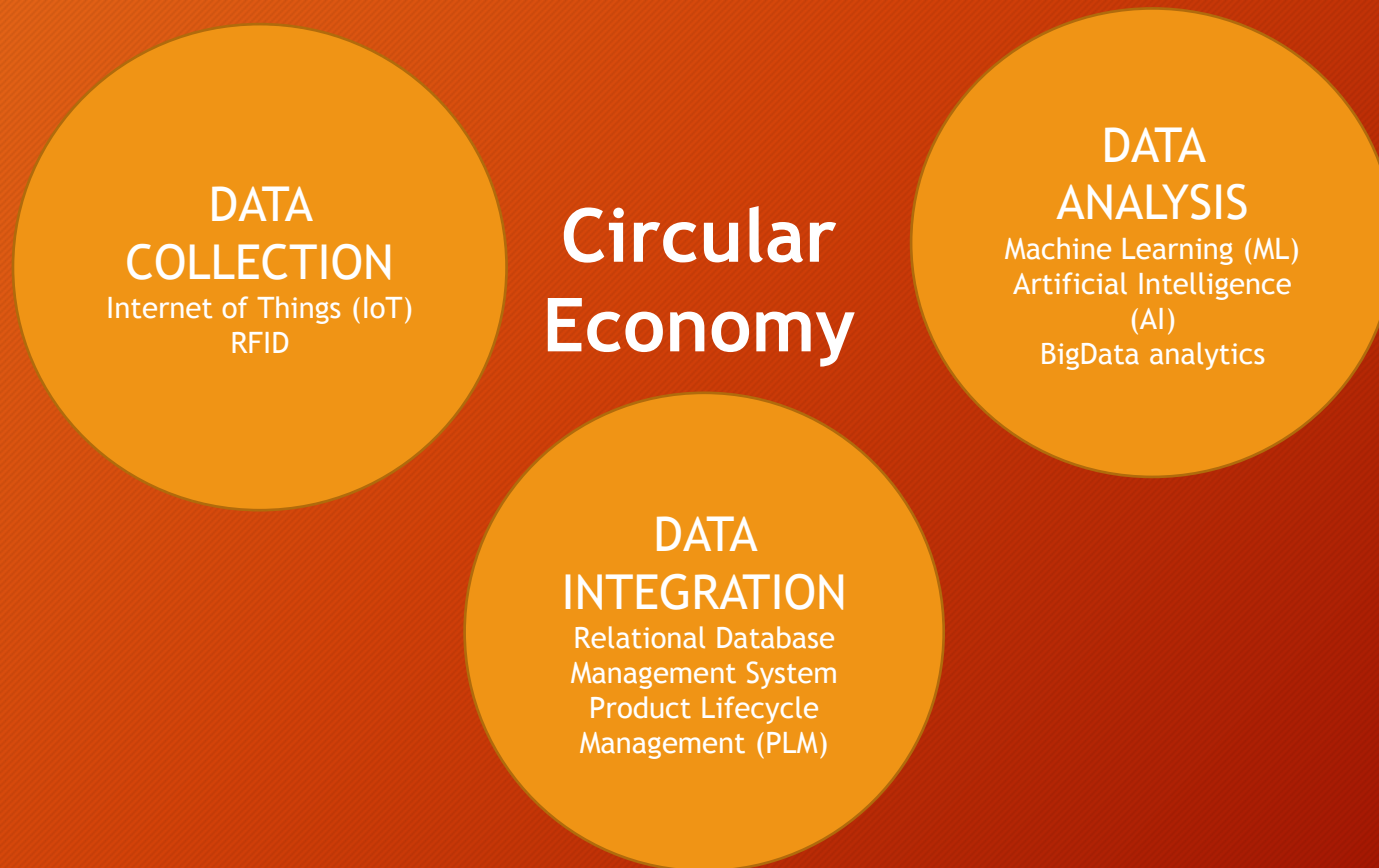
- DATA COLLECTION

- DATA INTEGRATION

- DATA ANALYSIS

Körkörös gazdaság /CIRCULAR ECONOMY

DATA COLLECTION
Internet of Things (IoT)
RFID

Circular Economy

DATA ANALYSIS
Machine Learning (ML)
Artificial Intelligence (AI)
BigData analytics

DATA INTEGRATION
Relational Database Management System
Product Lifecycle Management (PLM)

Data COLLECTION

DATA
COLLECTION
Internet of Things (IoT)
RFID

- **RFID** (Radio Frequency IDentification) help track material flows to enable value recovery through the implementation of Re-strategies such as Reuse, Repair and Remanufacture.

- RFID facilitate the transition to closed-loop systems – REVERSE LOGISTIC.

- Networked RFID systems help connect products tagged with an RFID chip to an information network, providing complete information about the product's life cycle to all networked partners.

- **IoT** can collect information generated by sensors to connect stakeholders across the value chain.

- IoT can help describe Circular Economy models as dynamic feedback control loops and IoT provides a fundamental basis for evaluating the consequences if the actions of various stakeholders throughout the life of the physical products.

Data INTEGRATION

DATA INTEGRATION
Relational Database Management System
Product Lifecycle Management (PLM)

- **RDBMS (relációsadatbázis-kezelő rendszer)** and data handling systems support the goals of Circular Economy, as they integrate the wealth of information produced by heterogeneous data collection systems such as IoT, ERP and CRM systems.

- **Product Lifecycle Management (PLM) systems**: information management systems that can integrate data, processes, business systems and, ultimately, people in an extended enterprise. PLM systems support the transition to the Circular Economy, as they help integrate information across multiple life cycles and across various stakeholders in the value chain

Data ANALYSIS

DATA ANALYSIS
Machine Learning (ML)
Artificial Intelligence (AI)
BigData analytics

- **Machine learning:** practice based on algorithms that can learn from data without relying on rules-based programming.

- Machine learning can be applied in the context of Circular Economy to support process and system optimization based on the huge amount of data.

- **Artificial Intelligence (AI)** tools and techniques for designing intelligent enterprise systems leverages the next era of computing theory and applications towards circular.

- **Big Data analytics** is seen as a viable approach to make use of information from various systems of record such as sensors and IoT, to enable better decision making.

PRODUCT TRANSFORMATION

PLM

- Not all products can be reconditioned in their entirety but most products have certain components that carry a high value. Not just products, but often materials themselves have an embedded energy component that makes them even move valuable then their virgin source. With the right design and remanufacturing capabilities, they can be put together to form new products.

THIS IS PRODUCT TRANSFORMATION!.

- **For BMW, it can mean a 50% cost saving for customers buying remanufactured parts as compared to new ones.** You get exactly the same quality specifications as a new BMW part subject to the same 24-month warranty. **They are using RFID to the product identification.**

COLLABORATIVE CONSUMPTION

Social media EXCHANGE PLATFORMS

are rapidly transforming industries by **collaborative** consumption.

AIRBNB (the online service that matches people seeking vacation rentals with hosts who have space) now has over **200,000 LISTINGS IN 26,000 CITIES.** Check out ThredUP the next time you need new clothes for your kids, you can browse like-new clothing at significant reductions from families whose children have outgrown their old clothes.

AI

You can use Earnings Estimator

thredUP is the easiest way to shop and sell high-quality secondhand clothes.

www.dreamhomebasedwork.com

CONCLUSIONS

- One notable example is the use of **RFIDs**, which can contain valuable information on how the product was utilized by the customer. As this information can be used to estimate the quality level (s) of the return, the increased transparency and efficiency can facilitate the integration of return flows into the forward flows

- **Big Data** can be used to calibrate the simulation, optimization and dynamic models, thus leading to higher recovery rates.

- The **Value proposition of data** integration systems in the context of Circular Economy is not exactly clear, i.e. we do not know the best ways how to use the data to support transition to less linear and more circular business models.

Thank you for your attention!

Source: The emergent role of digital technologies in the Circular Economy: A review

Aris Pagoropoulosa*, Daniela C. A. Pigossoa, Tim C. McAloonea

The 9th CIRP IPSS Conference: Circular Perspectives on Product/Service-Systems 2017