



IIT KHARAGPUR



NPTEL ONLINE  
CERTIFICATION COURSES

# Industry 4.0: Smart and Connected Business Perspective

**Dr. Sudip Misra**

**Professor**

**Department of Computer Science and Engineering**

**Indian Institute of Technology Kharagpur**

Email: [smisra@sit.iitkgp.ernet.in](mailto:smisra@sit.iitkgp.ernet.in)

Website: <http://cse.iitkgp.ac.in/~smisra/>

Research Lab: [cse.iitkgp.ac.in/~smisra/swan/](http://cse.iitkgp.ac.in/~smisra/swan/)

# Why smart and connected products?

- Connecting the physical objects.
- Sharing the data between physical objects.
- Increasing the resource efficiency.
- Increasing the productivity.

Source: “Industry 4.0:Managing The Digital Transformation”, Springer.

# Benefits of smart and connected products

- Faster.
- Cheaper.
- Better usage of product.
- Improved recall process of product.
- Decreased environmental impact.
- Smart supply chain.

Source: “Why Your Products Must be Smart and Connected ”, TCS.

# Medium of getting smart and connected

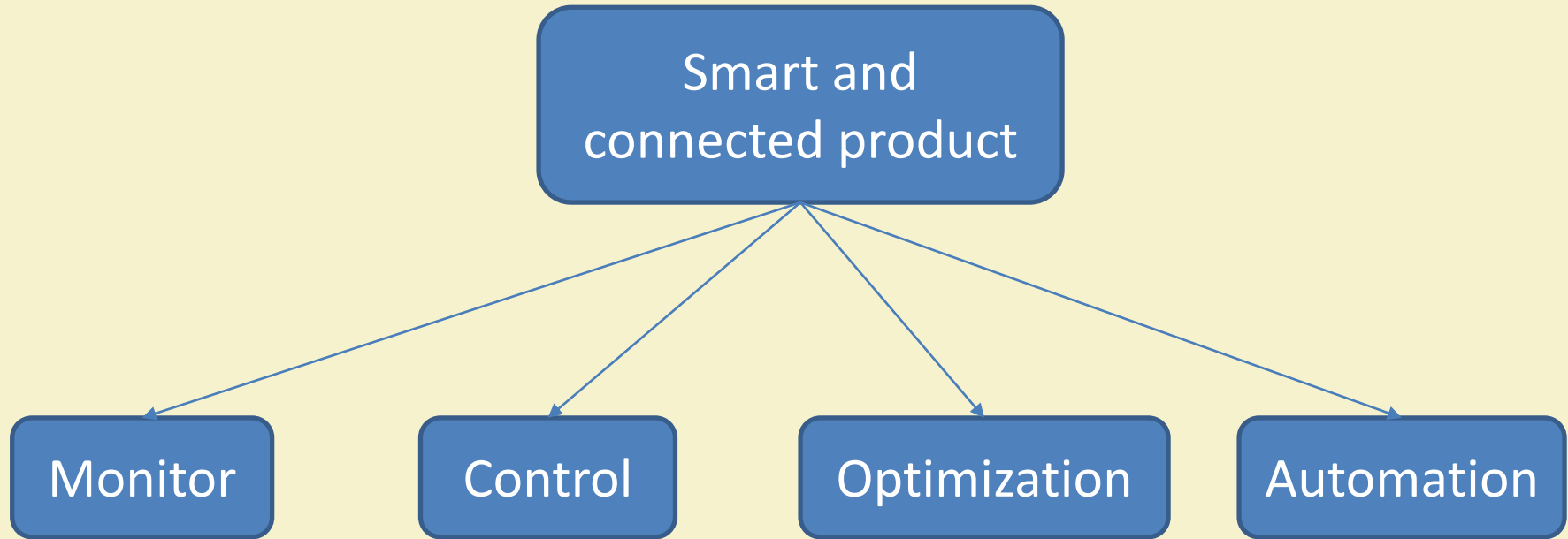
- Embedded Systems.
- Cloud computing.
- Internet of things (IOT).
- Sensors.

**Source:** “Industry 4.0:Managing The Digital Transformation”, Springer.

# Fundamental building blocks

- Customer values.
- Blueprint of profits.
- Key resources.
- Key processes.

# Categorization



# Monitor

## ➤ Resource:

- Sensors.
- External data sources.

## ➤ Effects :

- Health monitoring of products.
- Generating alerts.
- Taking action against the odds.

# Control

- **Resource:**

- Custom software.

- **Effects:**

- Controlling the products.
- Personalization.



# Optimization

## ➤ Resource:

- Optimization algorithms.

## ➤ Effects:

- Enhances the performance.
- Enables remote services.
- Assists in repairing the product.

# Automation

## ➤ Resource:

- Monitor, control, and optimization capabilities.
- Software algorithms.

## ➤ Effect:

- Autonomous performance of products.

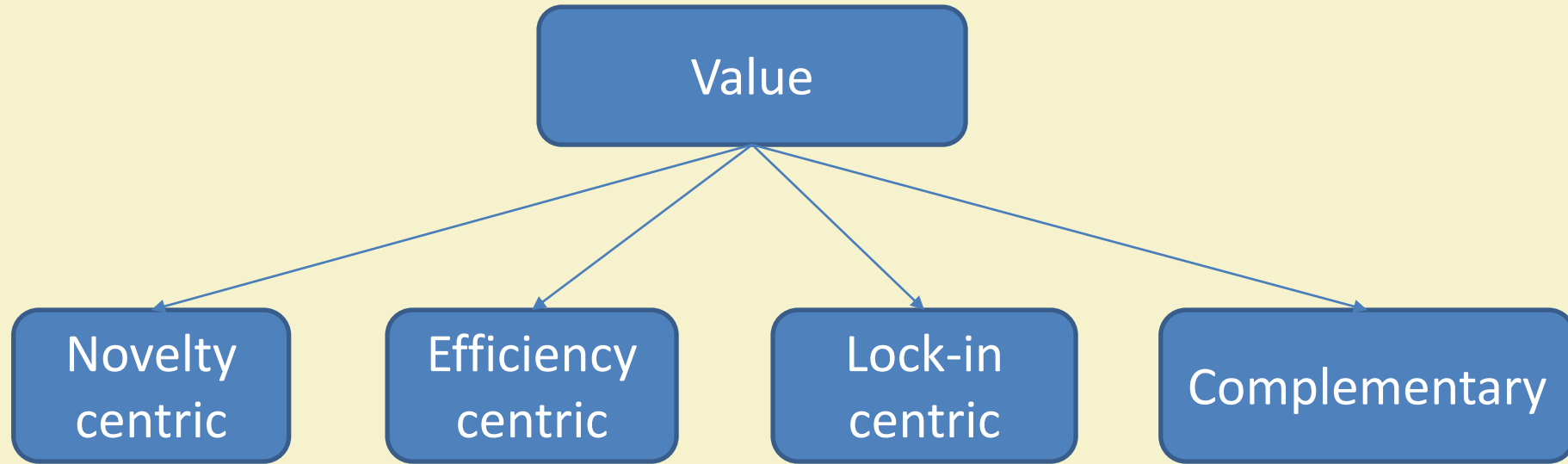
# Why smart business model?

- Make the current process less costly.
- Make the process efficient.
- Meet the expected revenue.

# Key attributes of smart business model

- Value proposition.
- Revenue streams.
- Technologies.

# Value creation in smart business model



# Value centric business model

- New market.
- New services.
- Innovation.

# Efficiency centric business model

Efficiency makes the transaction –

- Faster.
- Simple.
- Transparent.
- Eliminating the errors.

# Lock-in centric business model

- Prevents the customer migration.
- Switching cost.
- Building trust.



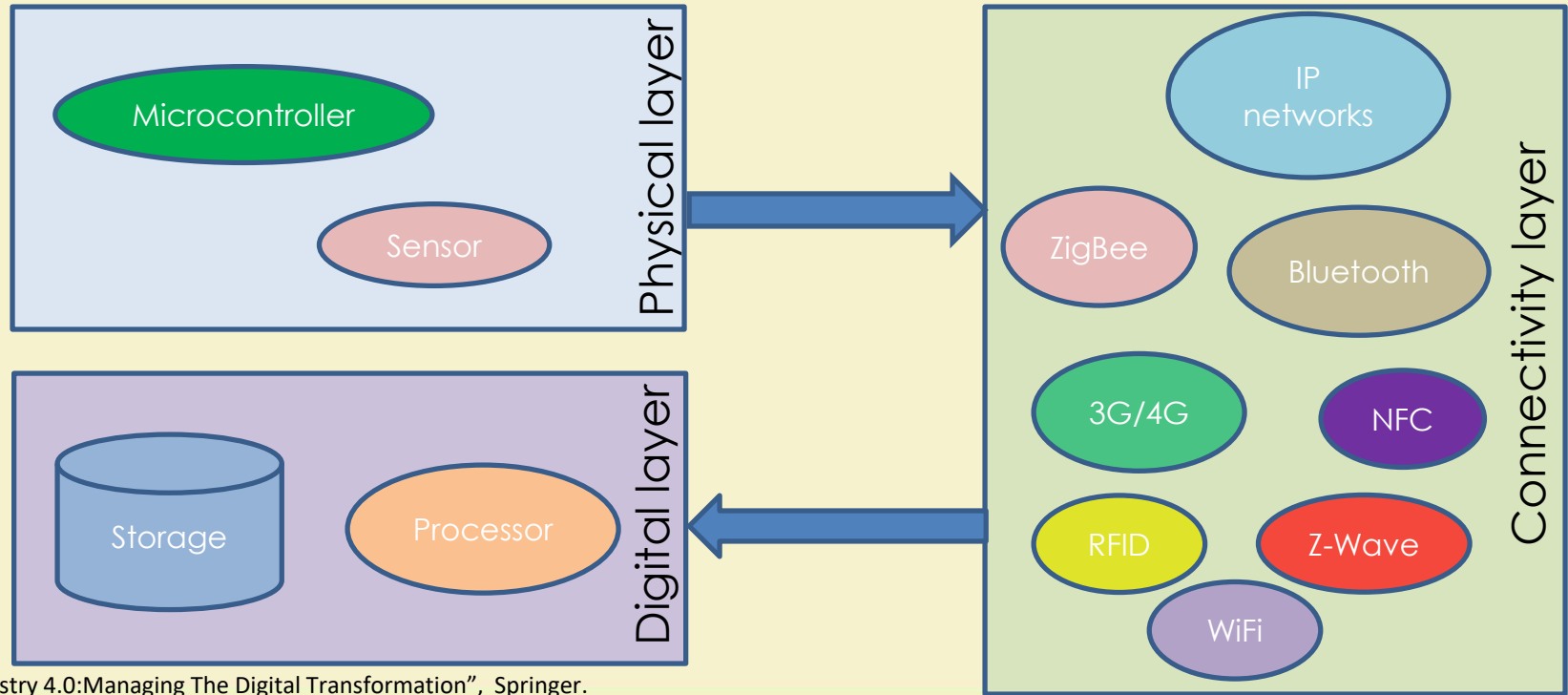
# Complementary business model

- Product and services.
- On-line and off-line assets.
- Technologies.
- Activities.

# Layers and technologies for creating values

- Physical layer.
- Connectivity layer.
- Digital layer.

# Architecture



Source: "Industry 4.0: Managing The Digital Transformation", Springer.

# Physical layer

- Responsible for collecting and acquiring data from object or environment.
- Equipped with micro-controllers and sensors.

# Connectivity layer

- Connects smart devices, servers.
- Equipped with different communication technology including IP networks, ZigBee, NFC, Bluetooth etc.

# Digital layer

- Stores the data.
- Analyzes the data.
- Processes the data

# Examples of smart and connected business model

Product	Value proposition	Revenue streams	Physical layer	Connectivity layer	Digital layer
Amazon's dash button	Lock-in	Low cost	WiFi enabled embedded device	WiFi	Connected through mobile application
Semios	Efficiency	Yearly subscription, 24/7 monitoring and assistance	Sensor for soil moisture, insect, disease, climate monitoring	Cellular connectivity	Mobile application.

Source: "Industry 4.0: Managing The Digital Transformation", Springer.

# References

- [1] Ustundag, A., & Cevikcan, E (2018). Industry 4.0:Managing The Digital Transformation. Springer.
- [2] Chakravarti, S., & Jain, A. (2018). Why Your Product Must be Smart and Connected. Online. URL:  
<http://sites.tcs.com/insights/perspectives/why-your-products-must-be-smart-and-connected>.



# References

[3] Amit, R., & Zott , C. (2001). Value Creation in E-Business. In Strategic Management Journal (pp. 493-520). Wiley Volume 22.

# Thank You!!