Industrial Digital Transformation

Accelerate digital transformation with business optimization, AI, and Industry 4.0

Shyam Varan Nath | Ann Dunkin | Mahesh Chowdhary | Nital Patel

Chapter 1

Images

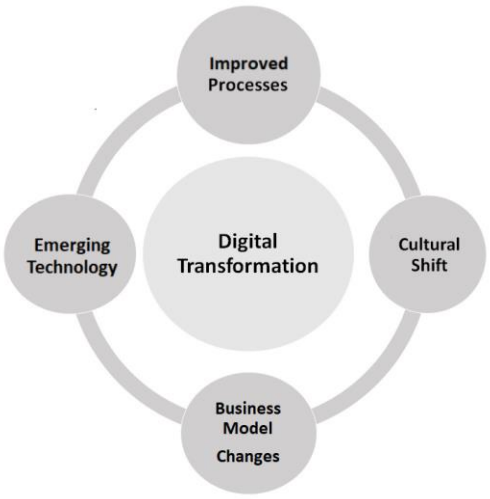

Figure 1.1 – Digital transformation

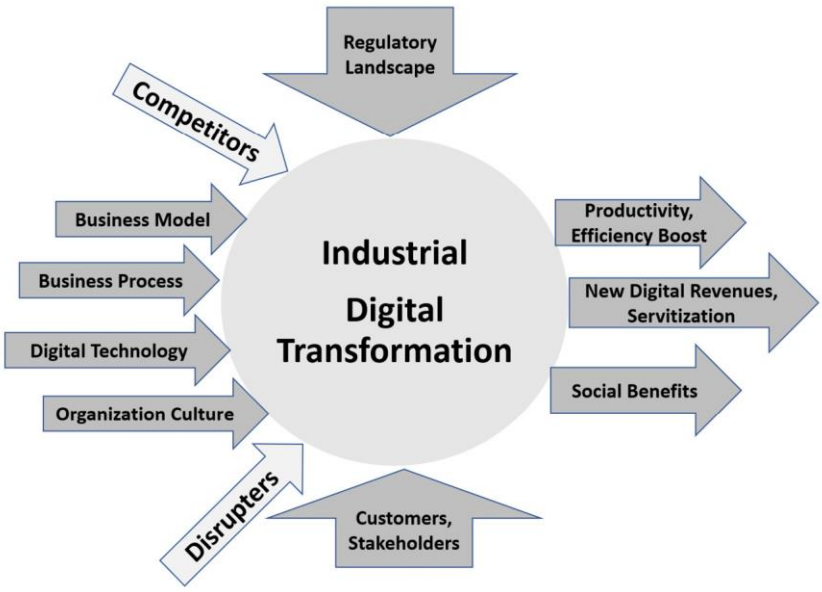

Figure 1.2 – Industrial digital transformation forces

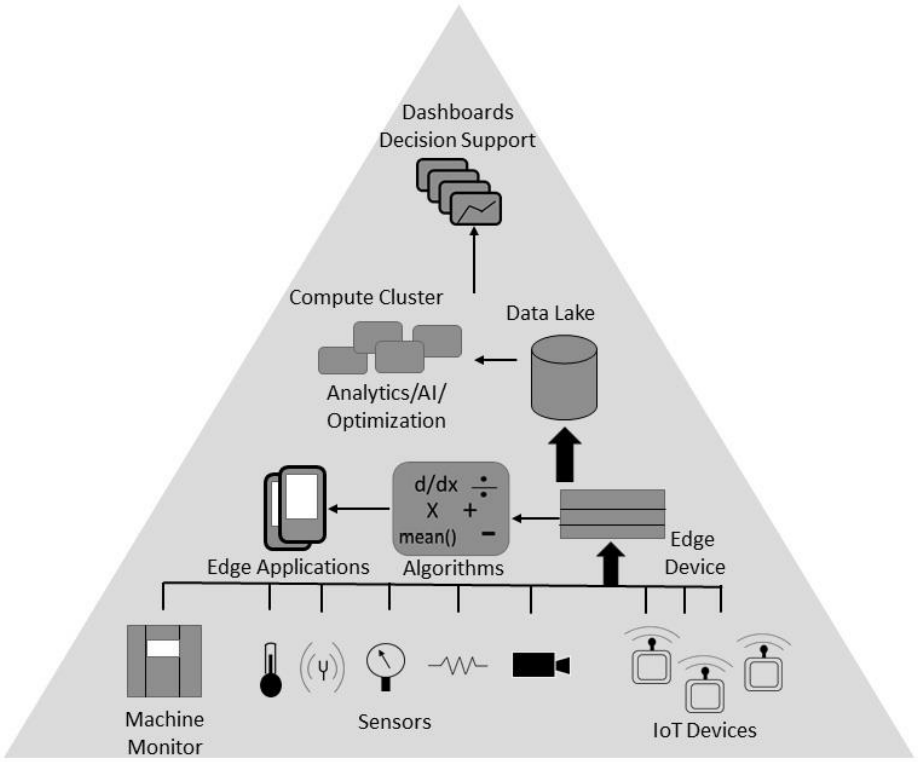

Figure 1.3 – Key technical components for digital transformation. The pyramid denotes distilling information and increasing data intelligence as we move from the bottom toward the top

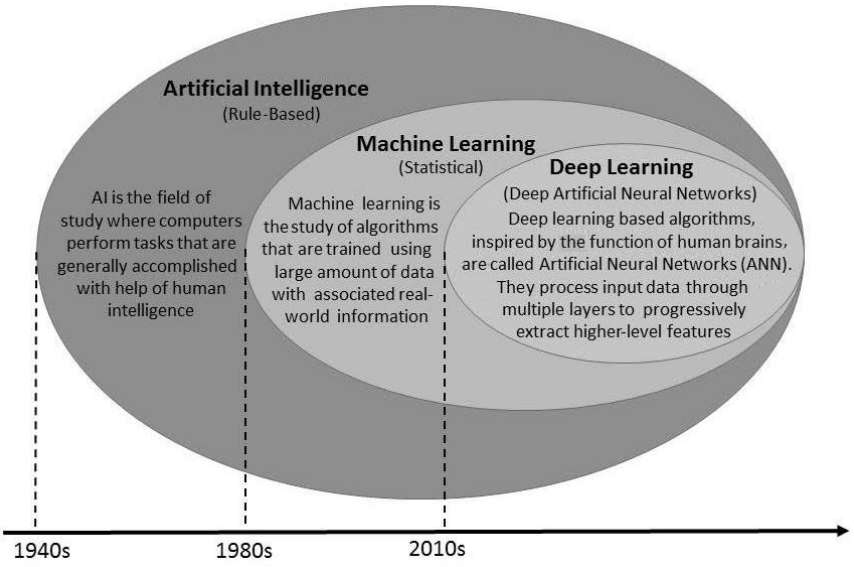

Figure 1.4 – Different fields under AI and the approximate timeframe they gained in popularity

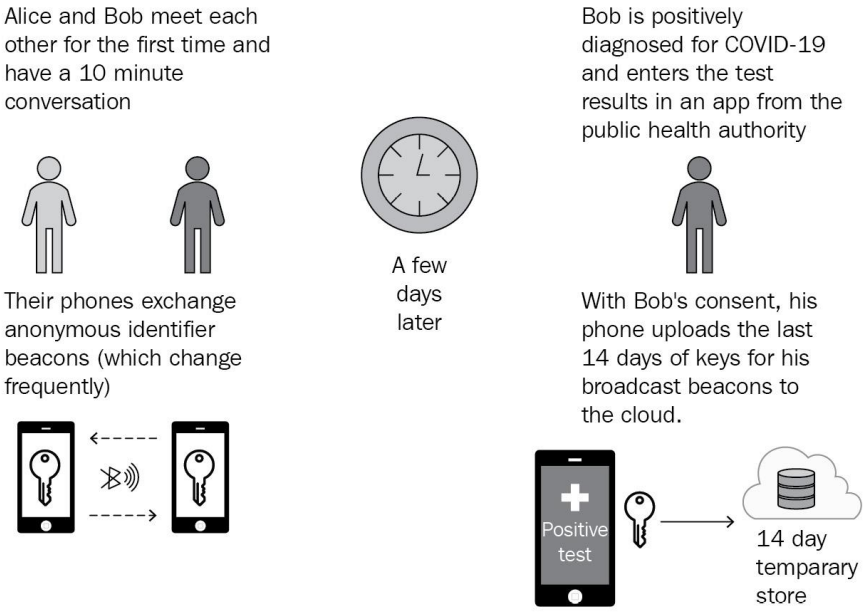

Figure 1.5 – Using smartphones to track the spread of COVID-19

Fourth industrial revolution
Cyber physical systems

Third industrial revolution
Electronics and IT systems, automation

Second industrial revolution
Mass production and electricity

First industrial revolution
Mechanization, steam, and water power

Figure 1.6 – The history of industrial revolutions

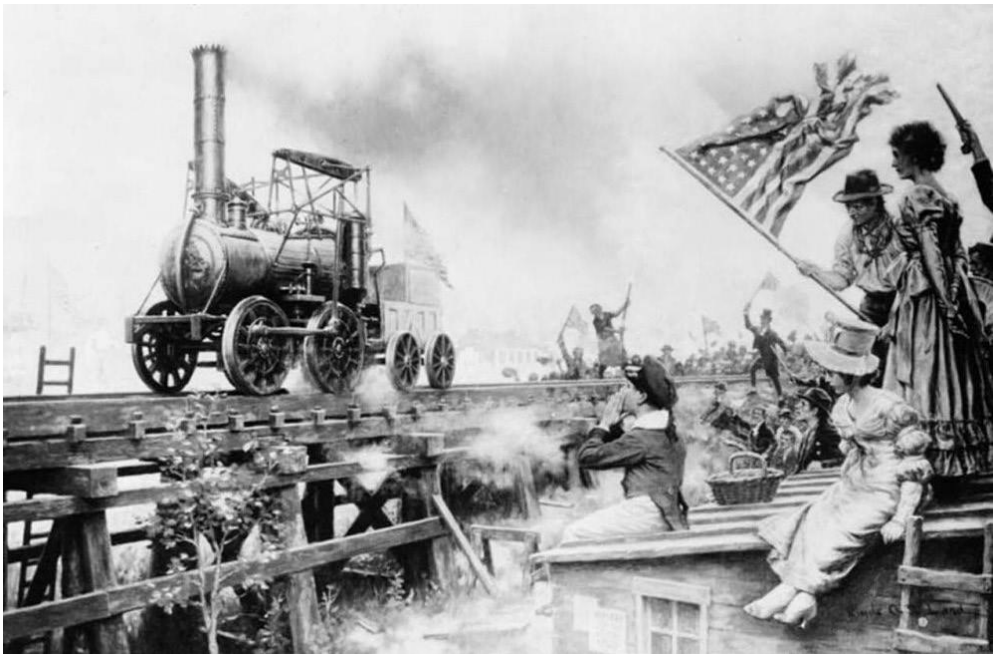

Figure 1.7 – The first industrial revolution (Source: http://brewminate.com/the-market-revolution-in-early-america/, License: CC BY-SA-NC)

Figure 1.8 – The second industrial revolution (Source: https://en.wikipedia.org/wiki/File:Ford_assembly_line_-_1913.jpg, License: CC BY-SA)

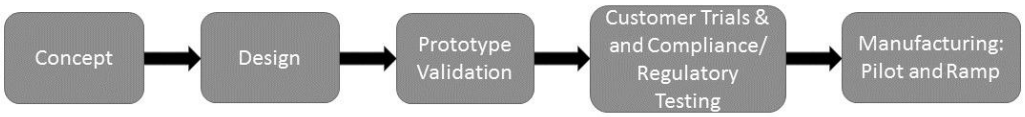

Figure 1.9 – Generic steps involved in a new product introduction

Tables

Serial Number	Crisis	Scope	Time Period	Lesson(s) Learned	Technology Contributing to Transformation
1	COVID-19 pandemic	Global	2020 (H1)	Remote working capability, the importance of basic industries such as healthcare, retail stores for food and essential supplies, and distribution systems	Cloud computing, Video conferencing, 3D printing, open source and collaborative manufacturing, and contact tracing
2	Financial crisis	US	2008–09	Changes in regulations, Dodd-Frank	Tools for governance, risk management, and compliance (GRC)
3	September 11	US	2001	Aviation safety	Screening technologies at airports
4	AIDS, SARS, swine flu, bird flu, and so on	Global		Healthcare awareness	Thermal cameras and the rapid development of vaccines and new drugs
5	The Gulf war	Middle-East, Asia	1991	Oil crisis	Renewable energy sources to reduce dependency on oil and battery banks to store energy

Serial Number	Crisis	Scope	Time Period	Lesson(s) Learned	Technology Contributing to Transformation
6	The Great Depression	US, global	1929–33	Preserving food and use of canned food	Mechanization of farming
7	World war, famine, natural disasters, and so on	Global	1900s	Alliances between countries are powerful	World War II – mechanized code breaking (essentially the first computers) World War I – the beginnings of modern warfare with the use of planes

Table 1.1

Number	Invention	Time Period
1	Flying shuttle made weaving easy.	1733
2	The spinning jenny increased wool mills' productivity.	1764
3	The Watt steam engine: the engine that changed the world.	1775
4	The cotton gin: the engine that made cotton production boom.	1794
5	Telegraph communications, a pillar of the industrial revolution.	1800
6	Portland Cement and the invention of concrete.	1824
7	The modern roads designed by John McAdam.	1800s
8	The Bessemer process that changed steel.	1856
9	The first modern battery by Volta.	1800s
10	The locomotive revolution.	1804
11	The first factory opened by Lombe.	1721
12	The power loom, taking over all UK factories.	1784
13	Arkwright's water frame spinning machine.	1769
14	The spinning mule: the yarn game-changer.	1775
15	Henry Cort's puddling process.	1783
16	Gaslighting lighting the streets of the modern world.	1804
17	2,000 cells to create the first arc lamp.	1807
18	The tin can, jumping to new production heights.	1810
19	The hydrogen fuel cell spectrometer (how we studied glowing objects).	1814
20	Camera obscura: the first photograph.	1814
21	The first electromagnet findings.	1832
22	The Mackintosh raincoat	1823
23	Modern friction matches made possible with wood.	1826
24	Every great writer's companion: the typewriter.	1829
25	The dynamo, powered by the Faraday principle.	1830s
26	Blueprints from Herschel and Poitevin.	1839
27	The hydrogen fuel cell	1838

Table 1.2

Number	Description	Digital Transformation Opportunity
Goal 1	No poverty	Micro-lending and peer-to-peer lending
Goal 2	Zero hunger	Smart farming, newer techniques to conserve resources, and vertical farming
Goal 3	Good health and well-being	Digital twin of humans
Goal 4	Quality education	Remote delivery of education
Goal 5	Gender equality	Better tracking of equality in the public and private sector
Goal 6	Clean water and sanitation	Smart water management
Goal 7	Affordable and clean energy	Smart micro grids
Goal 8	Decent work and economic growth	
Goal 9	Industry, innovation, and infrastructure	IIoT testbeds
Goal 10	Reduced inequality	
Goal 11	Sustainable cities and communities	Smart cities
Goal 12	Responsible consumption and production	
Goal 13	Climate action	
Goal 14	Life below water	DARPA Ocean of Things
Goal 15	Life on land	
Goal 16	Peace and justice; strong institutions.	
Goal 17	Partnerships to achieve the goals	Consortiums and public-private partnerships

Table 1.3

References

- **Traditional AI**: rule-based systems and fuzzy logic inferencing (Zadeh, L.A. (1965), *Fuzzy Sets, Information and Control*. 8 (3): 338–353)
- **Statistical machine learning**: tree-based classifiers, such as random forests (Breiman L (2001), *Random Forests, Machine Learning*, 45 (1): 5–32) support vector machines (Cortes, C. and Vapnik, V. N. (1995), Support-vector networks, *Machine Learning*. 20 (3): 273–297)
- **Deep Learning**: convolutional neural networks for image processing (Lecun, Y., Bottou, L., Bengio, Y. and Haffner, P. (1998), *Gradient-based learning applied to document recognition*, *Proceedings of the IEEE*, 86 (11): 2278-2324); and deep reinforcement learning (Arulkumaran, K., Deisenroth, M. P., Brundage, M. and Bharath, A. A. (2017), *Deep Reinforcement Learning: A Brief Survey*, *IEEE Signal Processing Magazine*, 34 (6): 26–38).

Questions

Here are some questions to test your understanding of the chapter:

1. What are the main drivers of industrial digital transformation?
2. Are there major differences in the commercial sector compared to the public sector for transformation objectives?
3. What is the role of digital technology in driving transformation?
4. What are the benefits of industrial digital transformation to an organization?

Why is it important to understand the history of the industrial revolutions in order to understand industrial digital transformation?

Chapter 2

Images

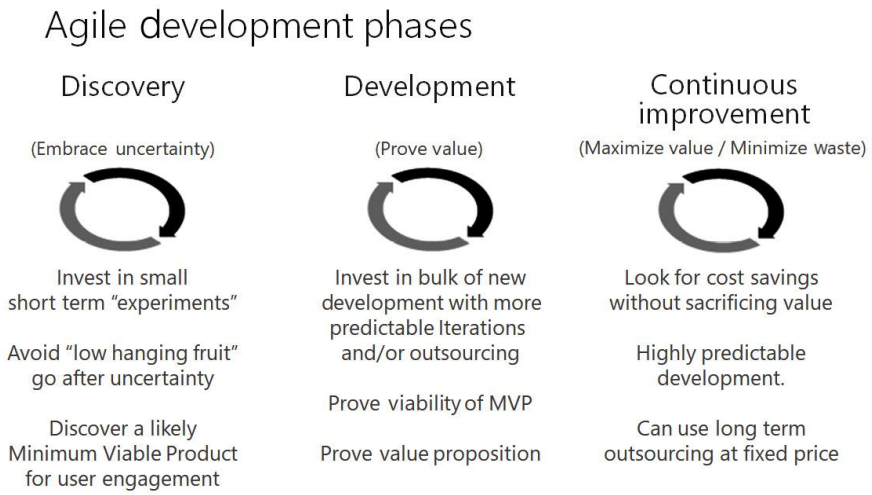

Figure 2.1 – Agile development phases

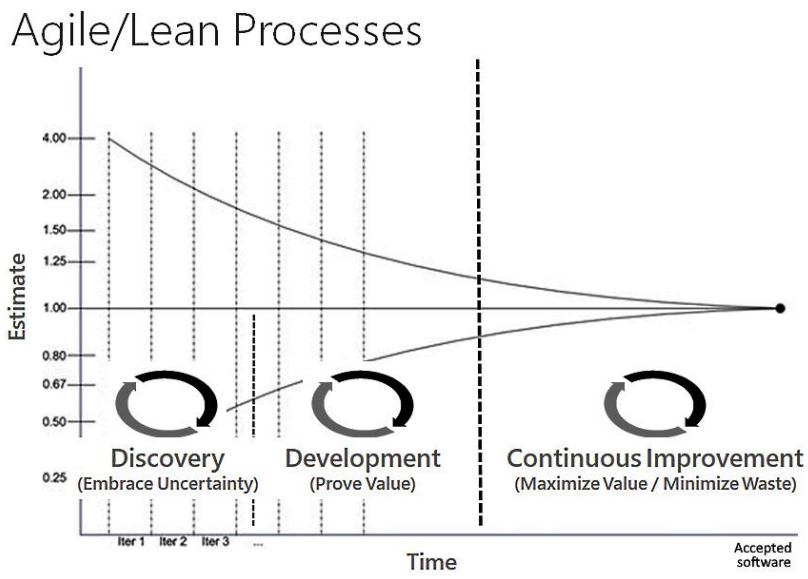

Figure 2.2 – Agile/Lean processes

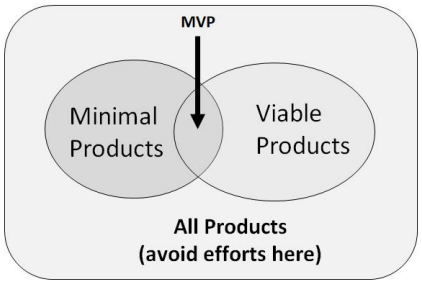

Figure 2.3 – MVP

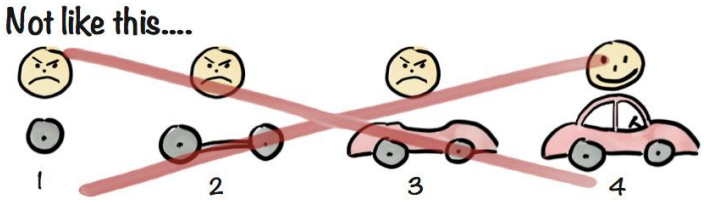

Figure 2.4 – Traditional approach to build a product [Source: Henrik Kniberg]

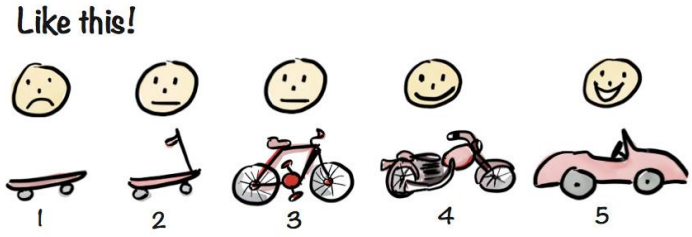

Figure 2.5 – MVP approach to build a product with lower risk [Source: Henrik Kniberg]

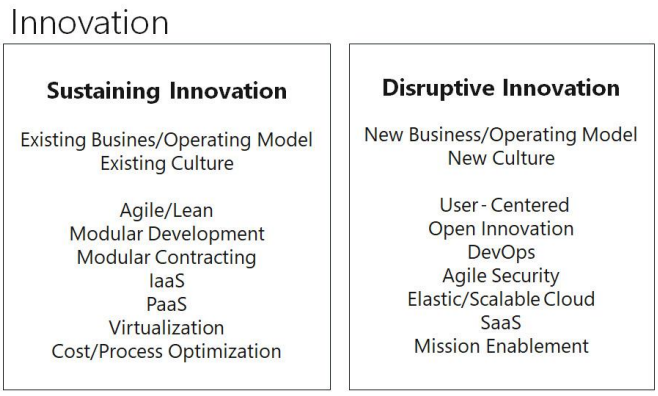

Figure 2.6 – Innovation continuum

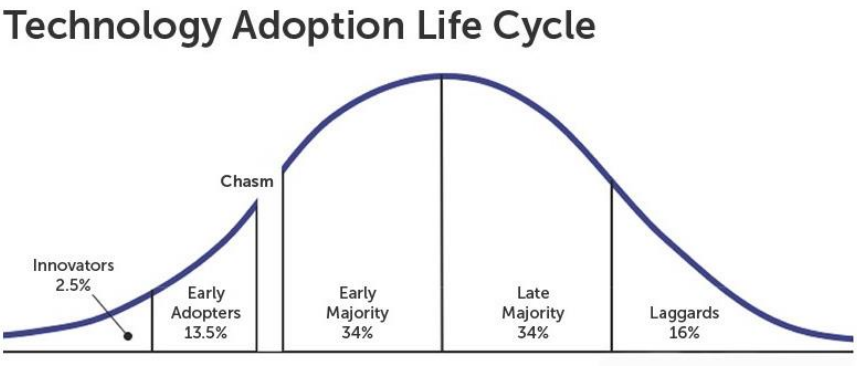

Figure 2.7 – Crossing the chasm

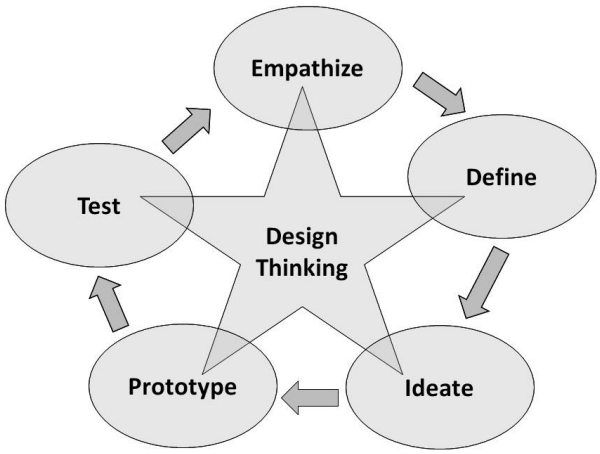

Figure 2.8 – The five steps of design thinking

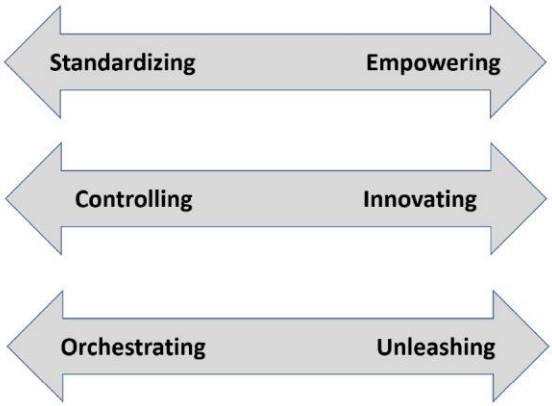

Figure 2.9 – The paradoxes (Source: Leading Digital)

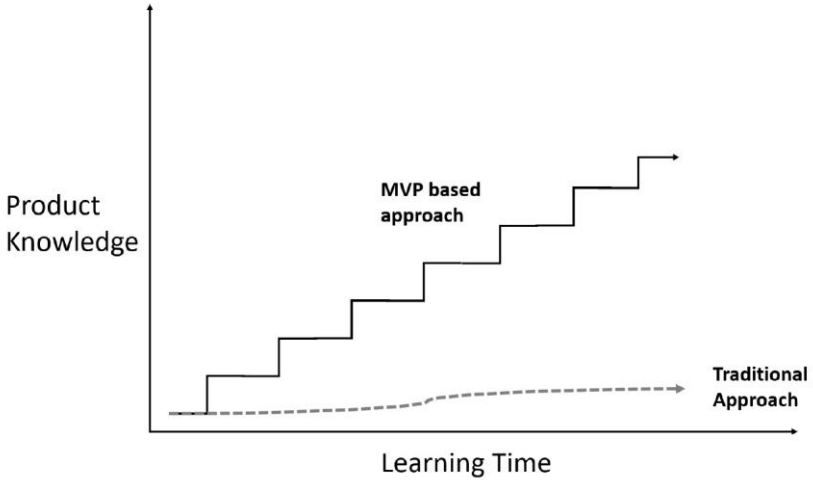

Figure 2.10 – The accelerating innovation using MVPs

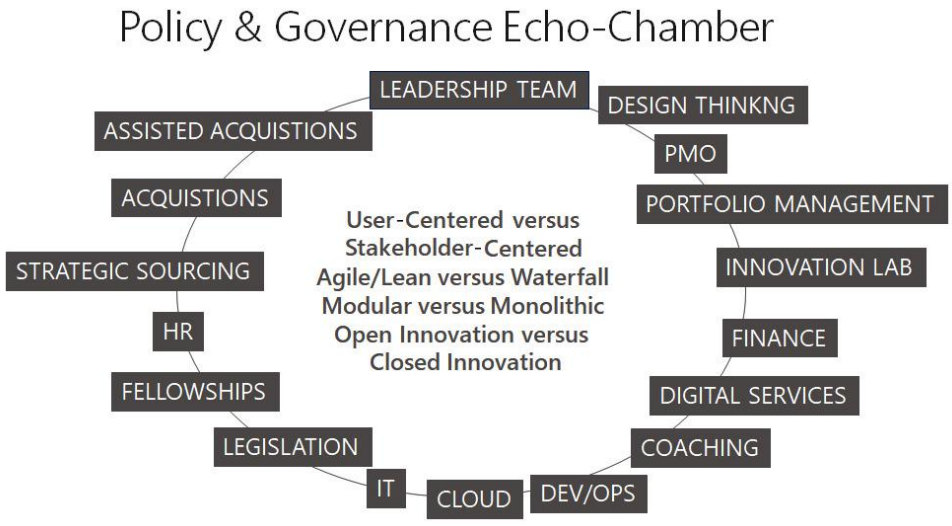

Figure 2.11 – The policy and governance echo chamber

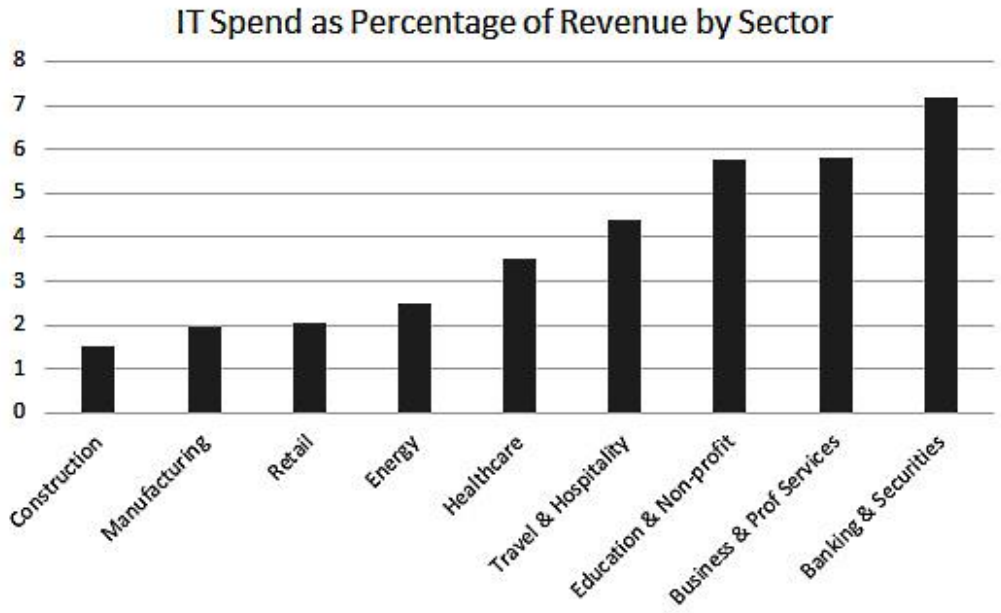

Figure 2.12 – IT budget as percentage of revenue

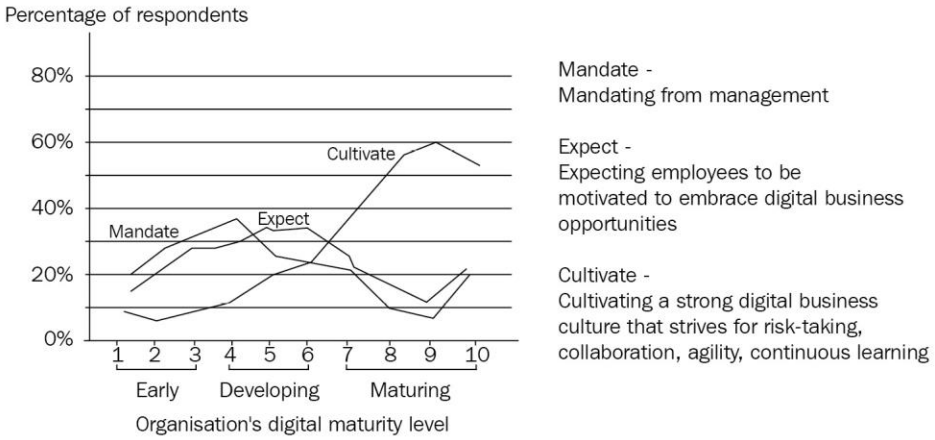

Figure 2.13 – Driving business adoption

Figure 2.14 – The cycle of digital talent development

Table

Values	Evolving	Mature
Agile	Disciplined agile methodology.	Cross-functional team (including users) participating regularly.
User-Centered Design	Engaged with users on regular basis and integrated into the development cycle.	User engagement occurs in a production state.
Shared Services	Integrating some shared services per digital service consultants' recommendations.	Integrating all shared services per digital service consultants' recommendations.
API-First Development	APIs are integral to the architecture.	APIs are using an approved API gateway.
Cloud	Clear strategy to integrate IaaS, PaaS, or SaaS in an elastic and scalable cloud.	Integrated IaaS, PaaS, or SaaS, in an elastic and scalable cloud.

Values	Evolving	Mature
DevOps	Integration of automated testing.	Integration of automated and continuous deployment tools as well as security to evolve to DevSecOps and cyber-physical security.
Adoption of Open Source Code and Tools	Limited use of open source code and tools.	Significant use of open source code and tools.
Open Source Code Repository	Working in private but deploying code in an open repository in stages.	Working in an open repository.
Lean Practices	Align system development with business/mission process changes.	Align system development with business/mission value metric (not a self-reported metric).

Table 2.1

Questions

Here are some questions to test your understanding of the chapter:

1. Why is the culture of an organization important for the success of industrial digital transformation?
2. What are the key phases of the agile development life cycle?
3. What are the capabilities required to deliver a modern digital service?
4. Are there major differences in digital leadership in the commercial sector as compared to the public sector?
5. What is the role of digital talent in driving transformation?
6. What are the benefits of design thinking in product innovation?
7. How is the role of CDO different from that of the CIO?

Further reading

We recommend reading these books:

- *Leading Digital: Turning Technology into Business Transformation, George Westerman, Didier Bonnet, Andrew McAfee, Harvard Business Review Press*
- *Why Digital Transformations Fail: The Surprising Disciplines of How to Take off and Stay Ahead, Tony Saldanha, Berrett-Koehler Publishers*
- *Mindset: The New Psychology of Success, Carol Dweck, Ballantine Books*
- *Now, Discover your Strengths: How to Develop your Talents and those of the people you manage , Marcus Buckingham, Donald Clifton, Simon & Schuster*
- *High Velocity Innovation: How to Get Your Best Ideas to Market Faster, Katherine Radeka, Career Press*

Chapter 3

Images

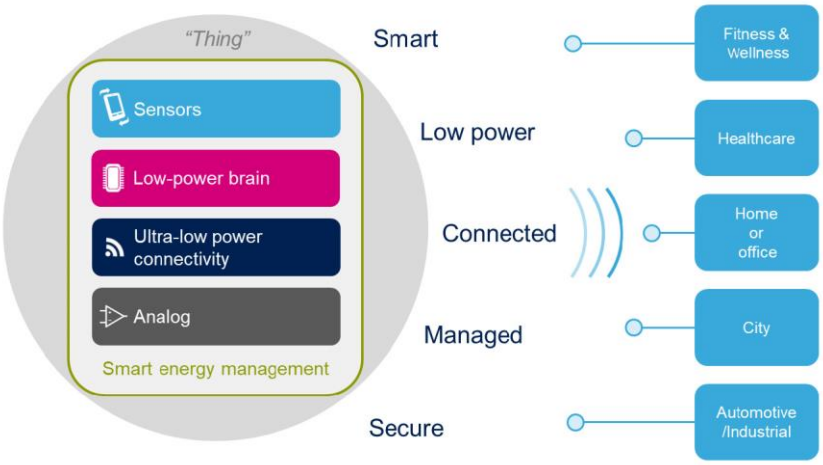

Figure 3.1 – Conceptual view

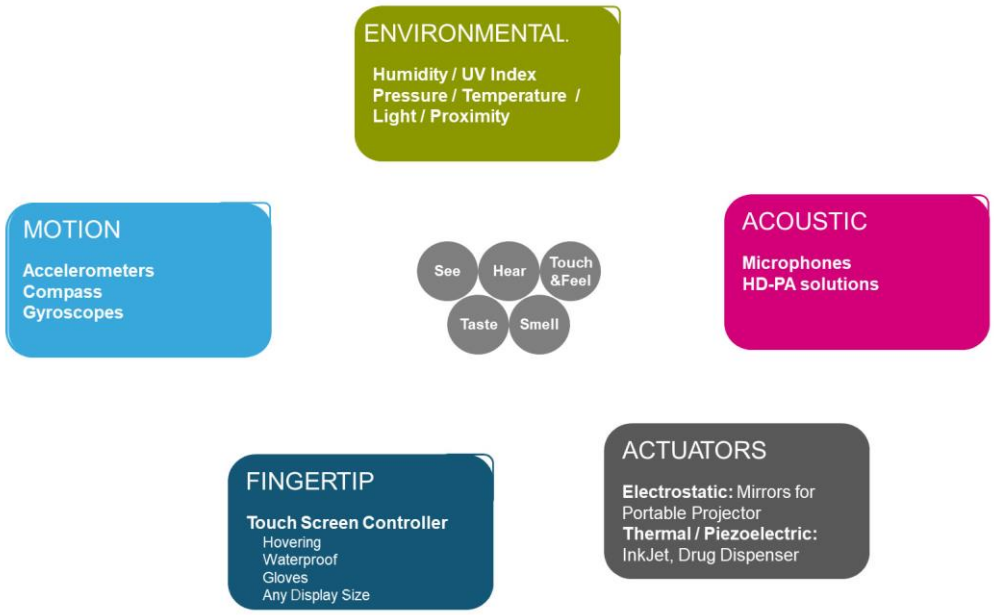

Figure 3.2 – Digitization of the five senses

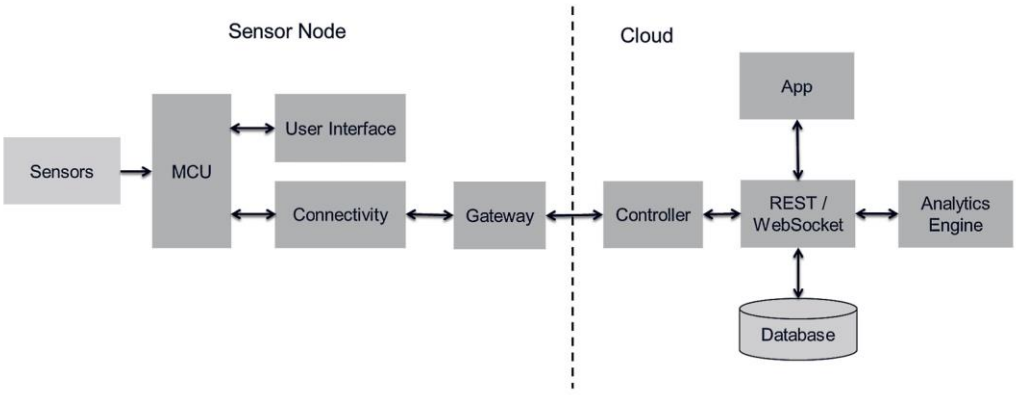

Figure 3.3 – IoT architecture concept diagram

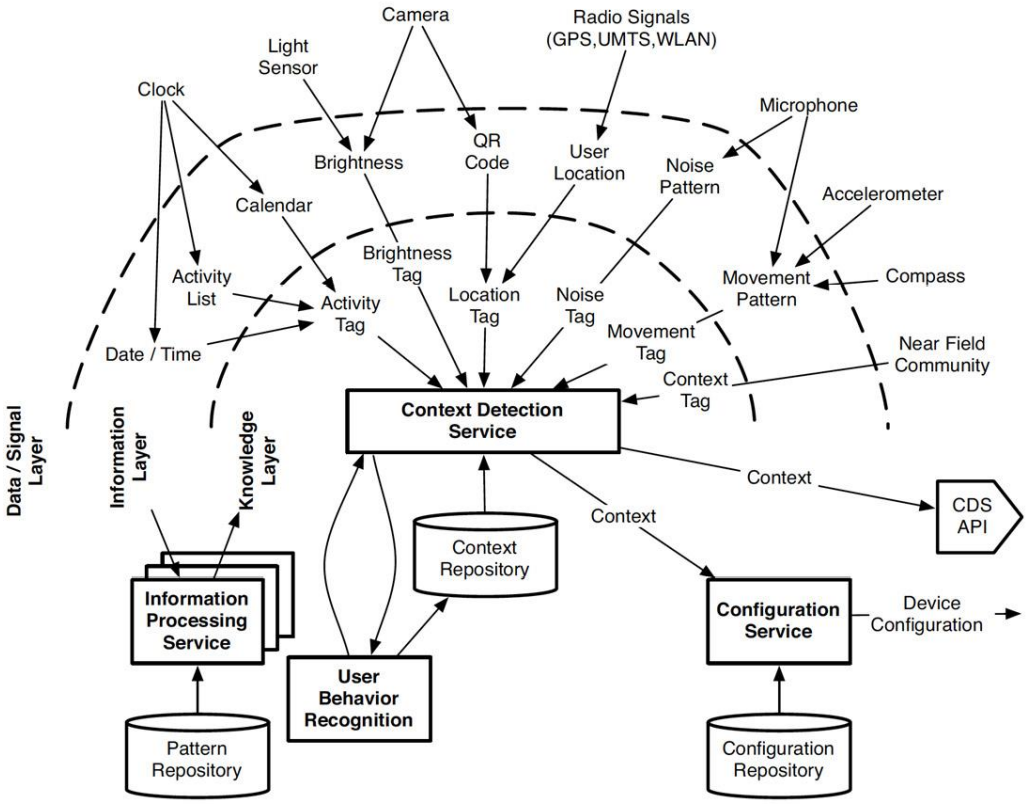

Figure 3.4 – Context awareness framework

Figure 3.5 – An AR device (Source: http://1319.virtualclassroom.org/media.html, License: CC BY)

Figure 3.6 – The Peloton digital experience [Source: https://medium.com/@FelixCapital/peloton-the-netflix-of-fitness-joins-the-felix-family-4c26d789314b]

Figure 3.7 – A Nest thermostat (Source: http://www.flickr.com/photos/nest/6264860345/, License: CC BY-NC-ND)

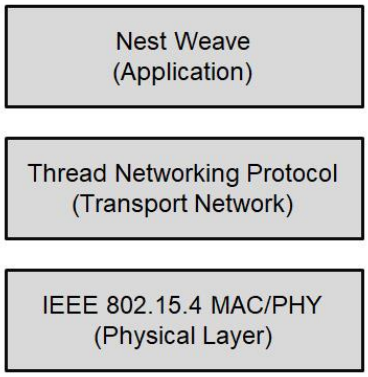

Figure 3.8 – Nest connectivity stack

Questions

Here are some questions to test your understanding of the chapter:

1. Why are enabling technologies important to industrial digital transformation?
2. What are some of the key technologies that are enabling the current wave of digital transformations?
3. How would you identify new enabling technologies?
4. What is a digital twin and how are digital twins helpful in digital transformation?

5. What are some examples of the use of enabling technologies in the consumer sector?
6. How does the digital thread transform the supply chain and improve product quality?

Chapter 4

Images

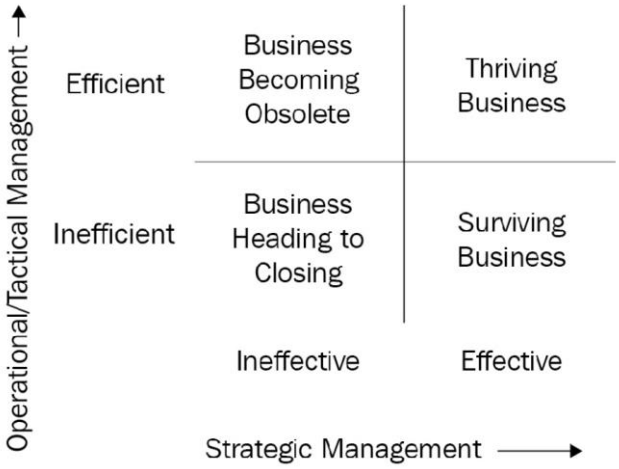

Figure 4.1 – Efficient versus effective business

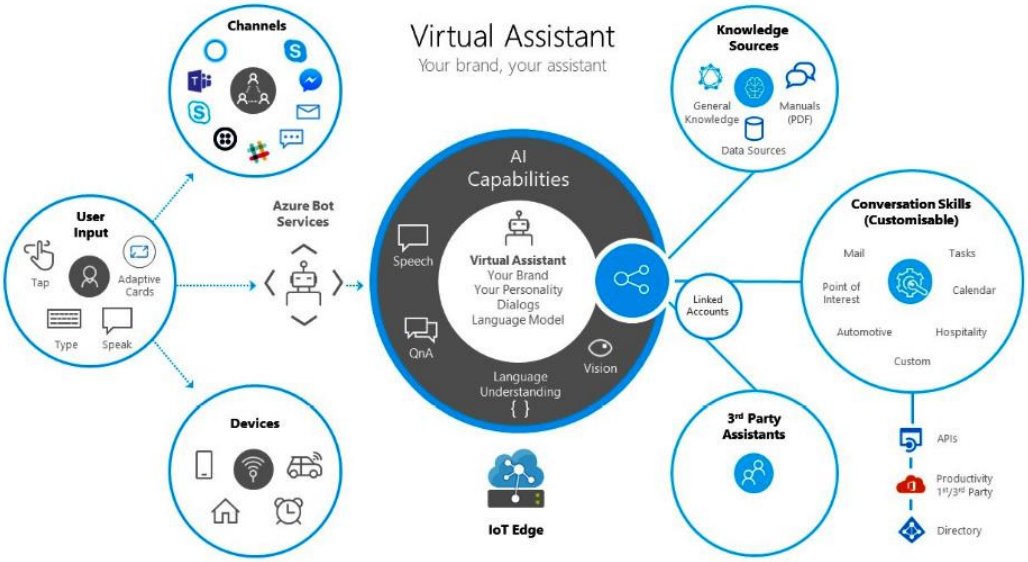

Figure 4.2 – Virtual assistant (Source: https://stackoverflow.com/questions/57204473/remembering-context-and-user-engagement, License: CC BY-SA)

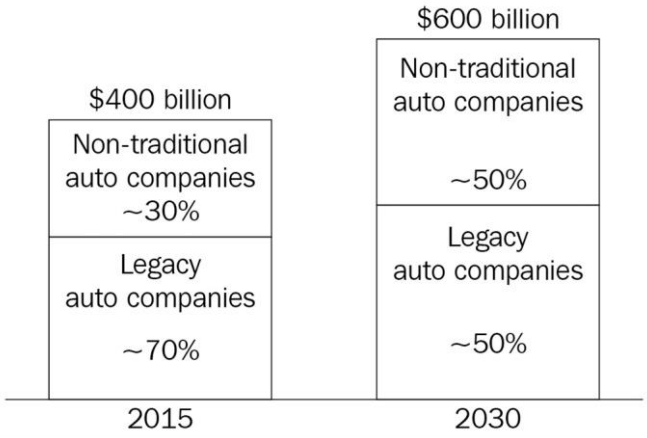

Figure 4.3 – Revenue share and split for the auto industry

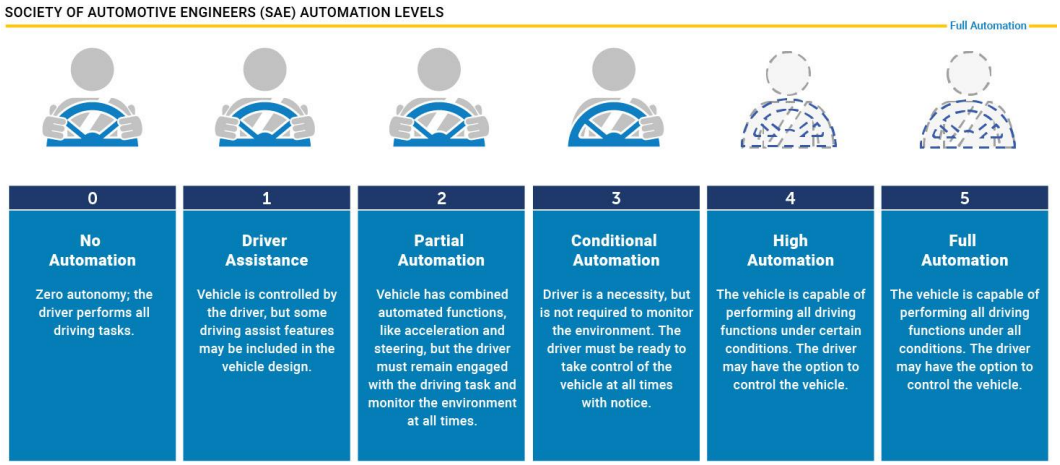

Figure 4.4 – The evolution of autonomous vehicles (Source: https://scipol.duke.edu/track/s-1885-american-vision-safer-transportation-through-advancement-revolutionary-technologies-0, License: CC BY-SA)

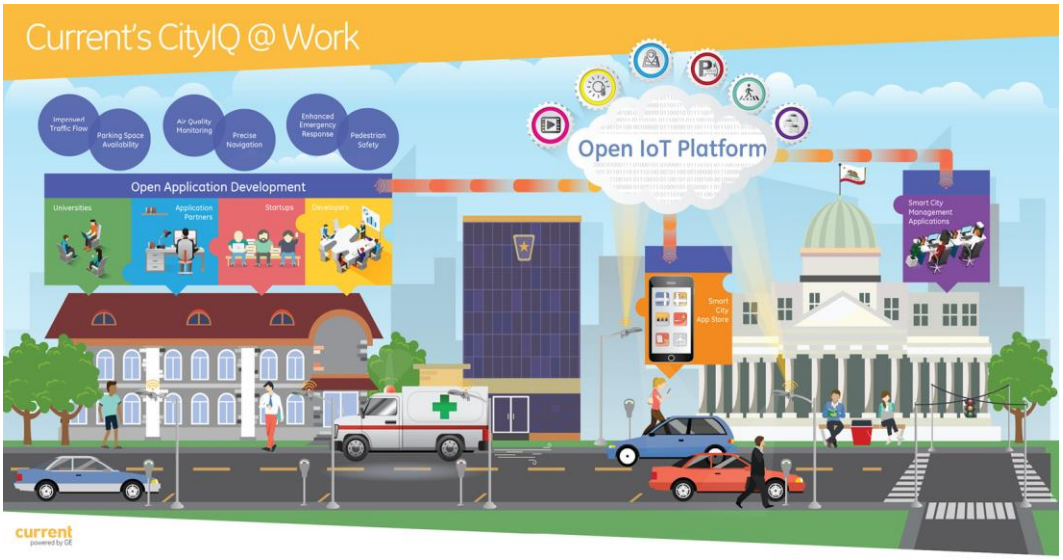

Figure 4.5 – San Diego using GE's LED-based smart city solution [source: https://readwrite.com/2017/03/11/san-diego-ge-io-cl4/]

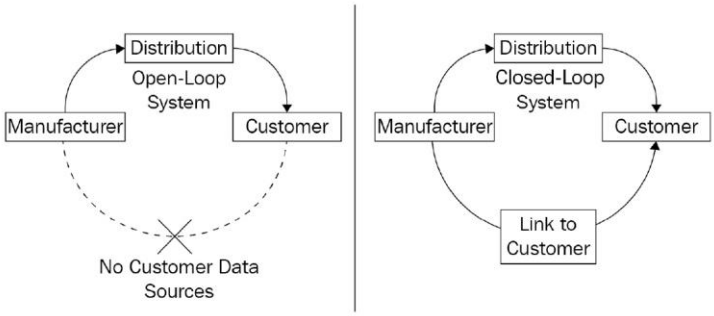

Figure 4.6 – The paradigm shift from open-loop to a closed-loop customer relationship

Figure 4.7 – Square payment solution (Source: http://gadgetynews.com/apple-selling-square-iphone-credit-card-swiper-turning-backs-on-nfc/, License: CC BY-SA)

	Service Name
A	Air-as-a-Service (Kaeser Kompressoren)
B	Backend-as-a-Service (Mobile backend mBaaS)
C	Container-as-a-Service
D	Data-as-a-Service
E	Enterprise-as-a-Service
F	Function-as-a-Service / Furniture-as-a-Service
G	Games-as-a-Service
H	Hardware-as-a-Service
I	Infrastructure-as-a-Service
J	Juju-as-a-Service (Kubernetes service)
K	Kubernetes-as-a-Service (Rackspace)
L	Location-as-a-Service
M	Mobility-as-a-Service
N	Networking-as-a-Service
O	Operations-as-a-Service
P	Platform-as-a-Service
Q	Quality-as-a-Service
R	Recovery-as-a-Service
S	Software-as-a-Service
T	Tires-as-a-Service
U	Update-as-a-Service
V	Voice-as-a-Service
W	Workspace-as-a-service
X	Anything-as-a-Service (XaaS)
Y	Hybriss-as-a-Service (YaaS - SAP Hybris)
Z	Zenoss-as-a-Service

Figure 4.8 – As-a-Service models in the industry

Top 5 Digital Transformation Challenges: Ordered by Company Size	
Less than 1,000 Employees	100 – 1,000 Employees
1. Lack of Expertise to Lead Digitization Initiatives 2. Employee Pushback 3. No Overarching Strategy for Digitization 4. Business Partners Unable to Support 5. Limited Budget	1. Employee Pushback 2. Organizational Structure Gets in the Way 3. No Overarching Strategy for Digitization 4. Limited Budget 5. Lack of Expertise to Lead Digitization Initiatives
1,000 – 5,000 Employees	More than 5,000 Employees
1. No Overarching Strategy for Digitization 2. Lack of Expertise to Lead Digitization Initiatives 3. Limited access to required Technical Expertise 4. Employee Pushback 5. Limited Budget	1. Lack of Expertise to Lead Digitization Initiatives 2. Organizational Structure Gets in the Way 3. No Overarching Strategy for Digitization 4. Limited access to required Technical Expertise 5. Employee Pushback

Figure 4.9 – Results of a survey conducted by Jabil

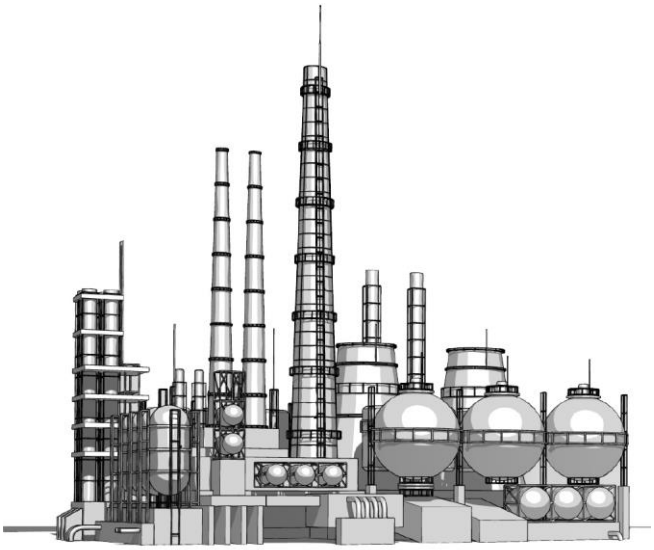

Figure 4.10 – Petro-chemical plant [source: https://www.pngfuel.com/free-png/ogate/download]

Questions

Here are some questions to test your understanding of the chapter:

1. What are the main business drivers for industrial digital transformation?
2. What are the four steps to business process optimization?
3. What is the role of the new business model in driving transformation?
4. What are the common challenges in the semiconductor industry?
5. What is meant by an as-a-Service model?
6. What are some of the emerging digital platforms with applications in oil and gas and related industries?

Chapter 5

Images

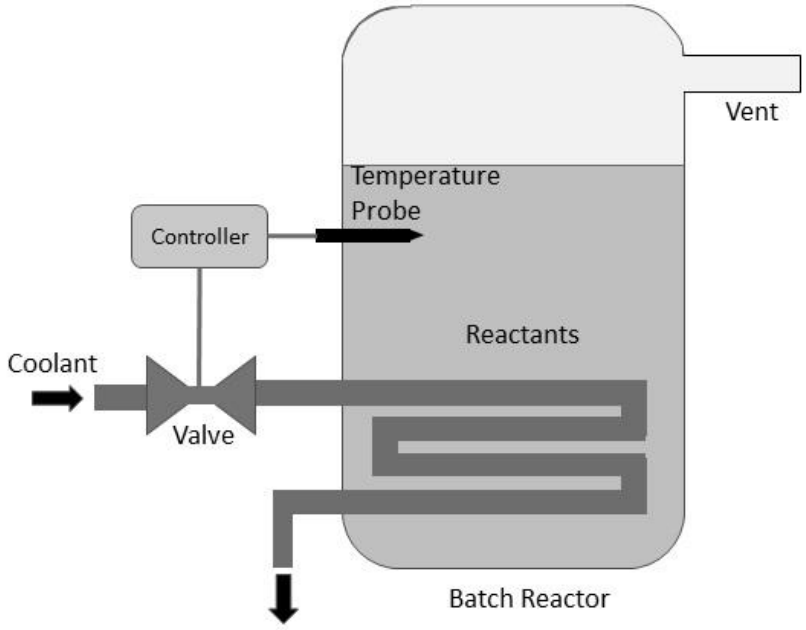

Figure 5.1 – Concept of feedback control

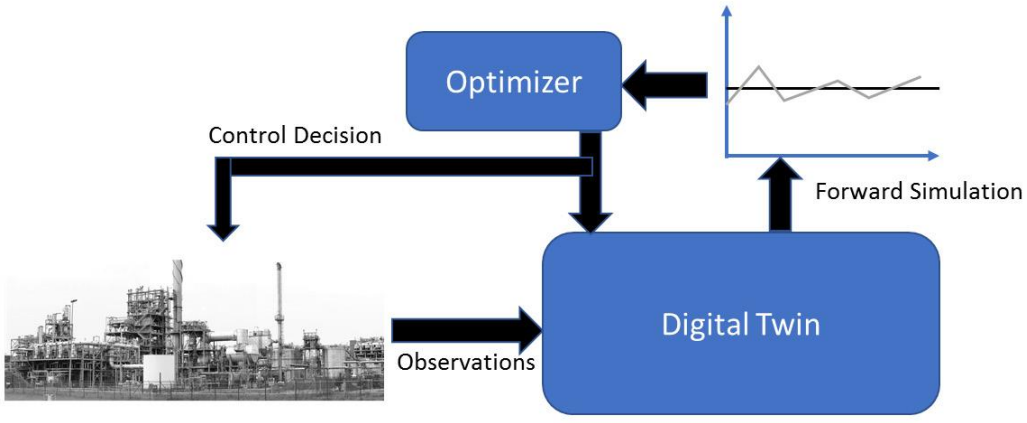

Figure 5.2 – Overview of the logic behind MPC

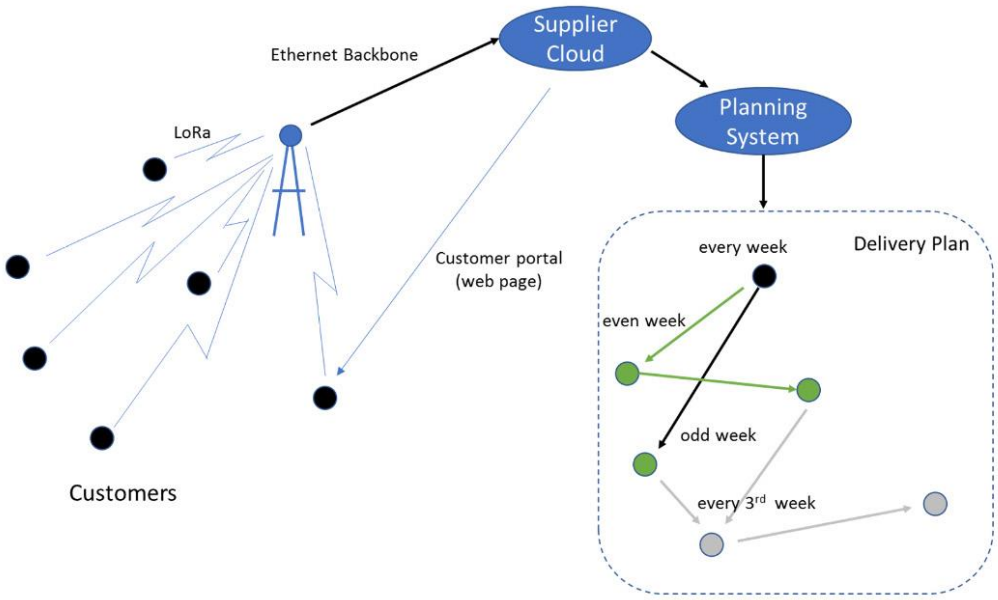

Figure 5.3 – Remote monitoring drives predictive replenishment of customer supplies

Figure 5.4 – Picture of a wafer fab; overhead delivery vehicles can be seen moving along their tracks (Courtesy of Intel Corp.)

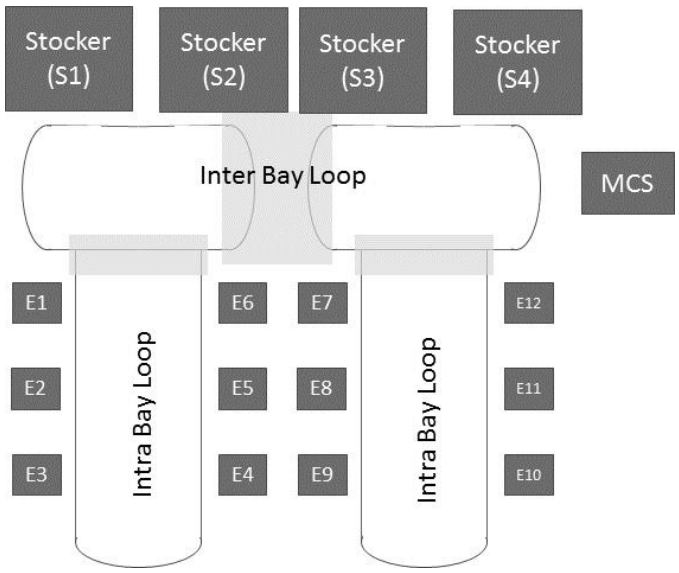

Figure 5.5 – Example of an inter-bay and intra-bay layout (E = Equipment)

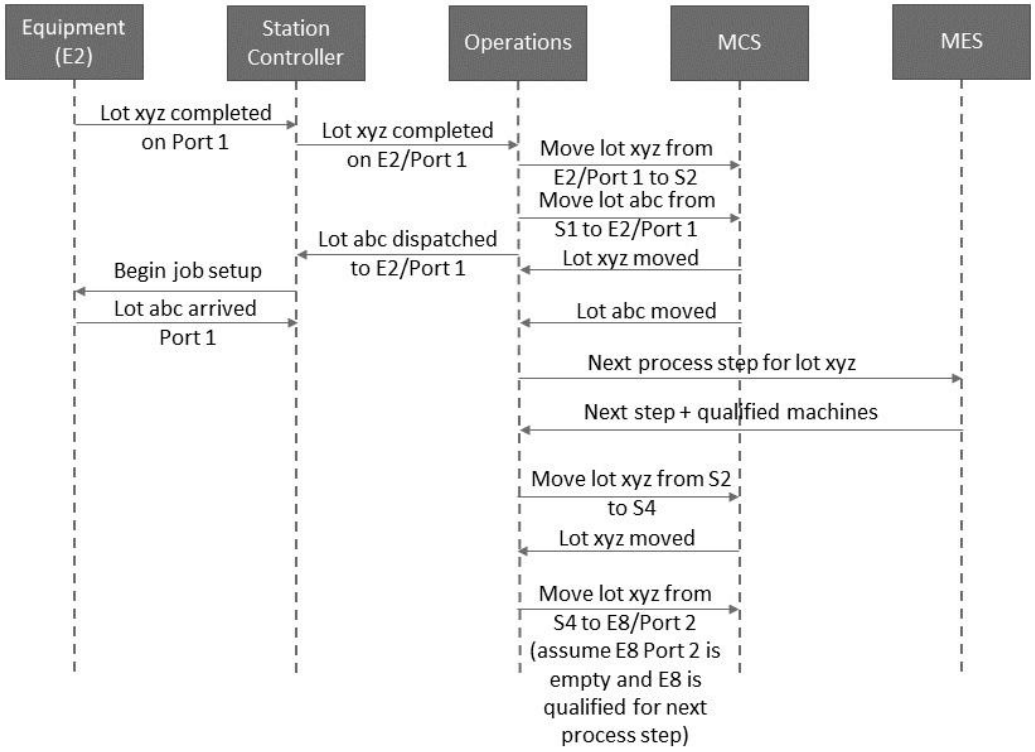

Figure 5.6 – Simplified material handling event sequence (equipment and stocker IDs are referred to in Figure 5.5)

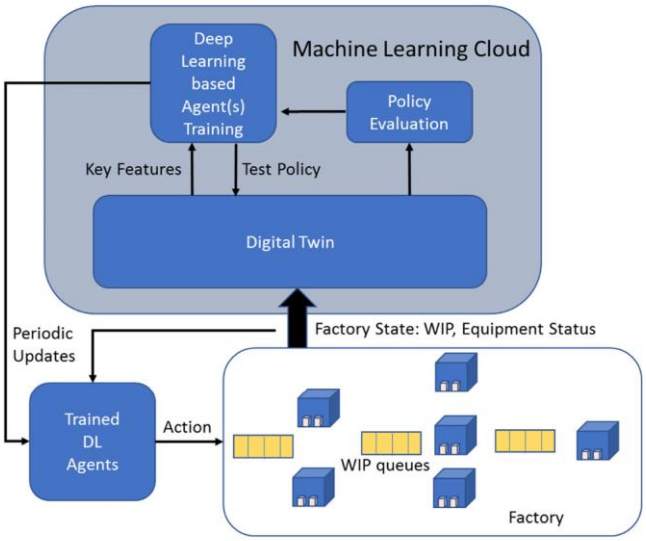

Figure 5.7 – DRL for factory scheduling

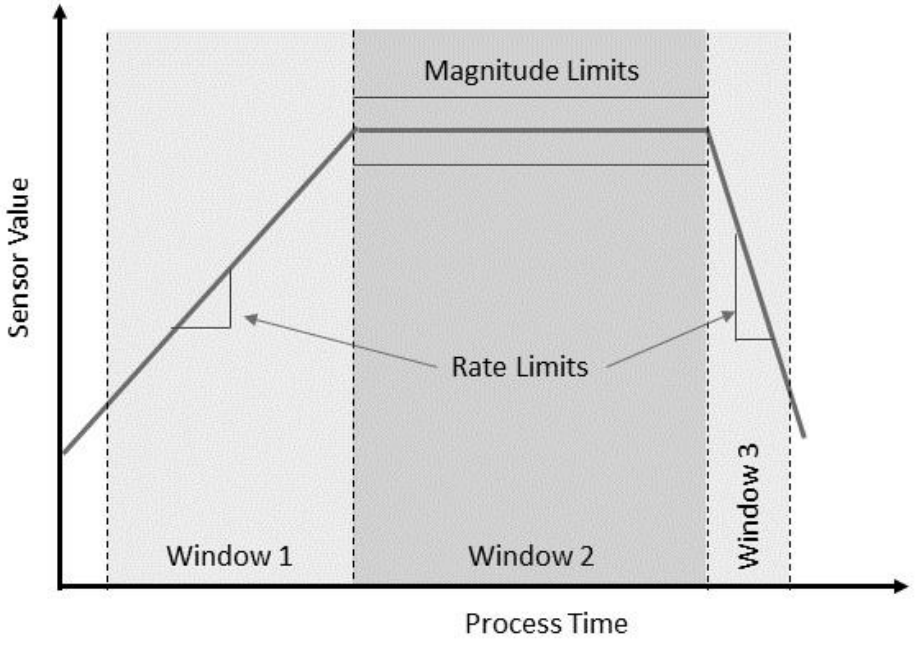

Figure 5.8 – Traditional methodology for defining limits to detect faults

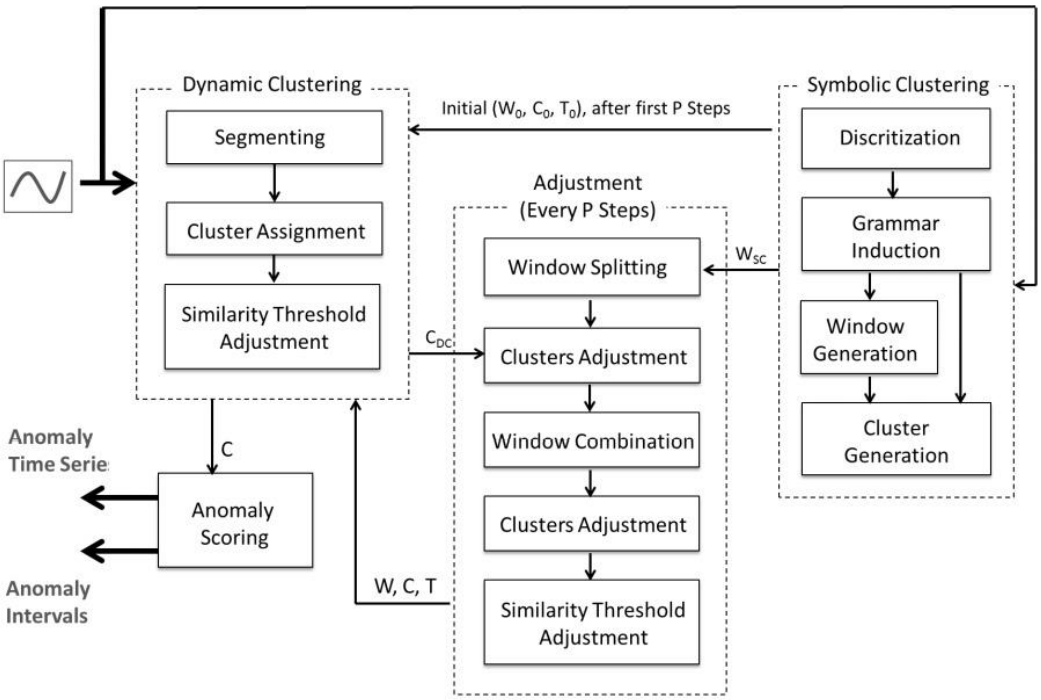

Figure 5.9 – Overview of the self-learning online algorithm for time series anomaly detection

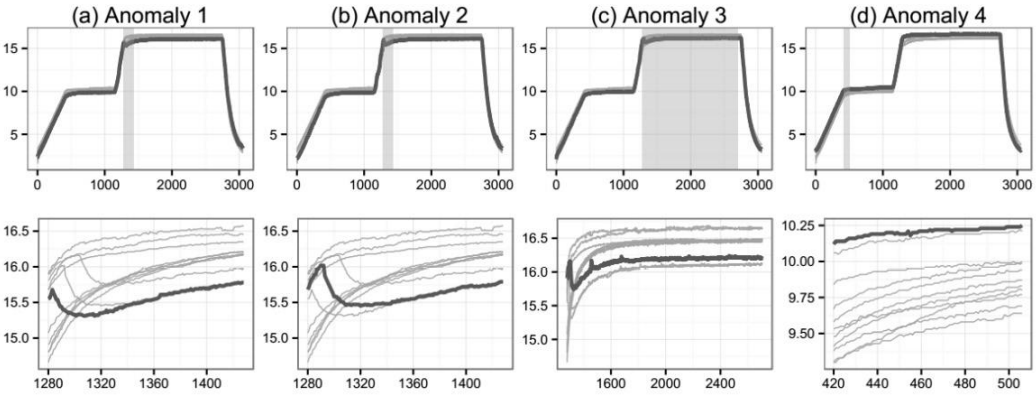

Figure 5.10 – Detection of point and shape anomalies in oven temperature data

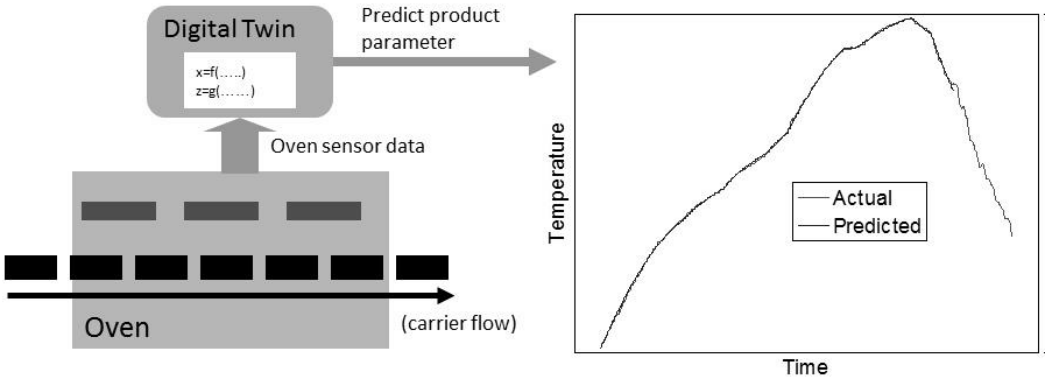

Figure 5.11 – Virtual metrology applied to predict solder temperature on a package in a reflow oven

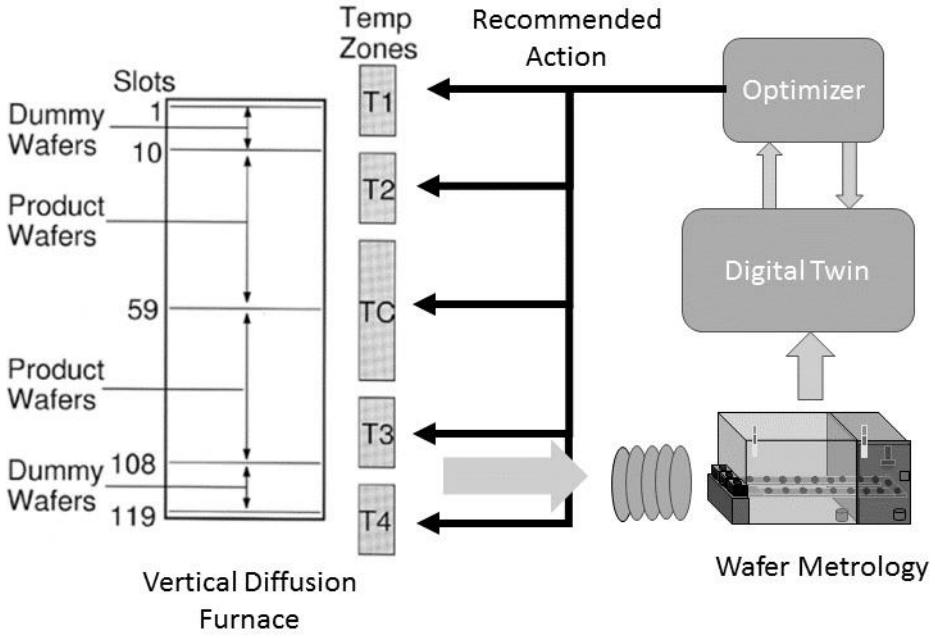

Figure 5.12 – Scheme for controlling a vertical diffusion furnace from downstream metrology data

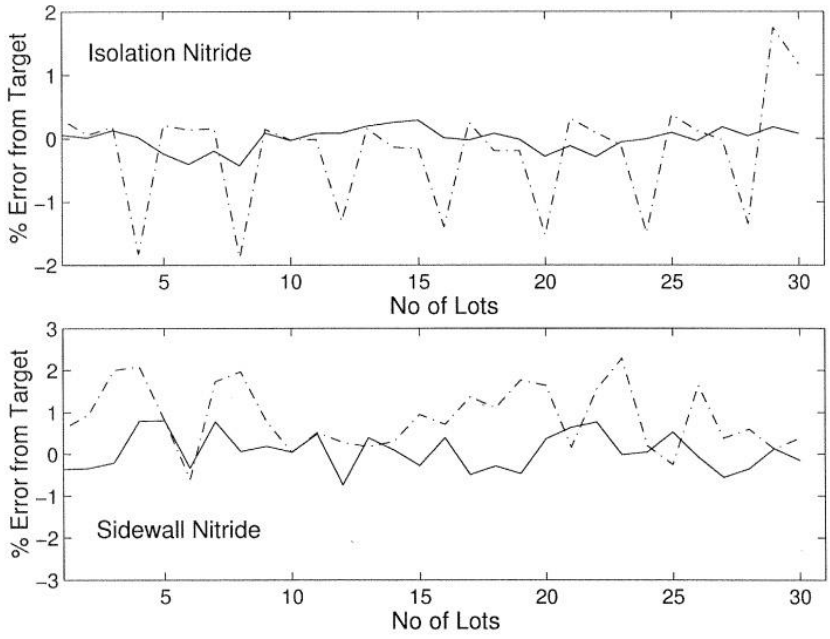

Figure 5.13 – Impact of optimized recipes on process performance

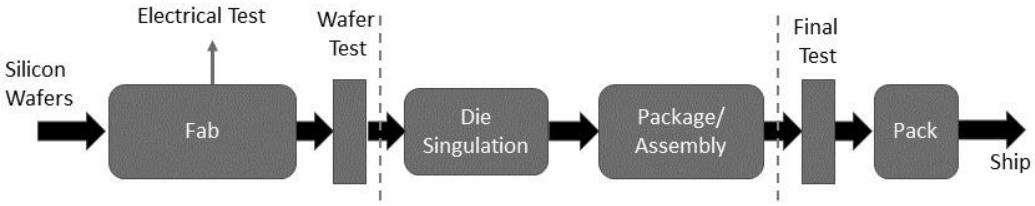

Figure 5.14 – Overall semiconductor product manufacturing flow (vertical lines indicate material may be cross-shipped to different manufacturers if the company is fabless)

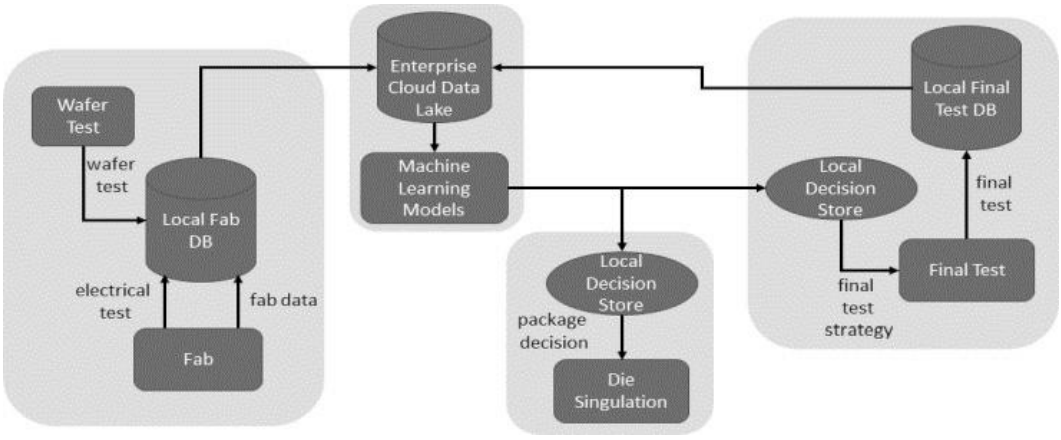

Figure 5.15 – Distributed architecture for yield prediction; the figure shows fab, singulation, and final test potentially occurring at different physical locations, and using different suppliers

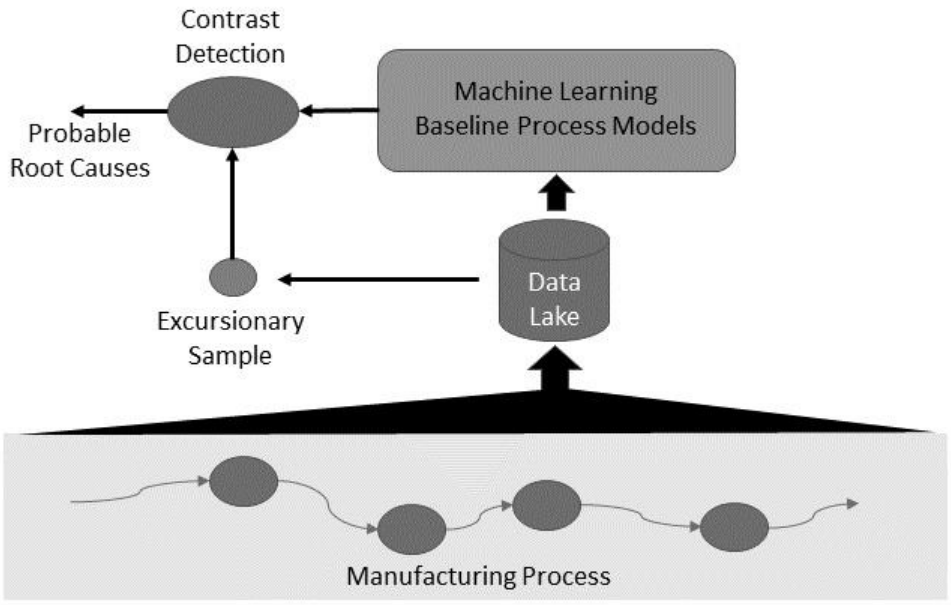

Figure 5.16 – Architecture for rapid contrast mining of excursionary samples

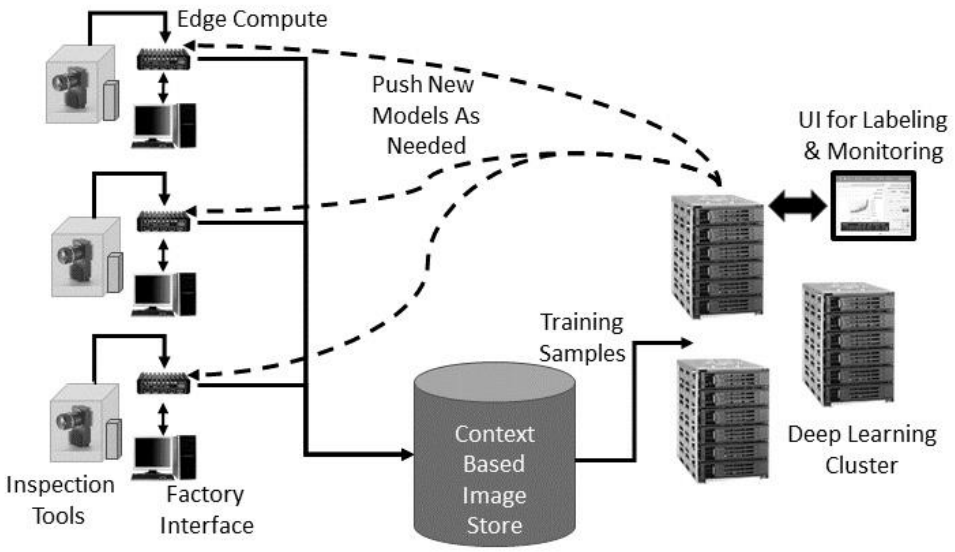

Figure 5.17 – A general architecture for implementing DL-based inspection solutions

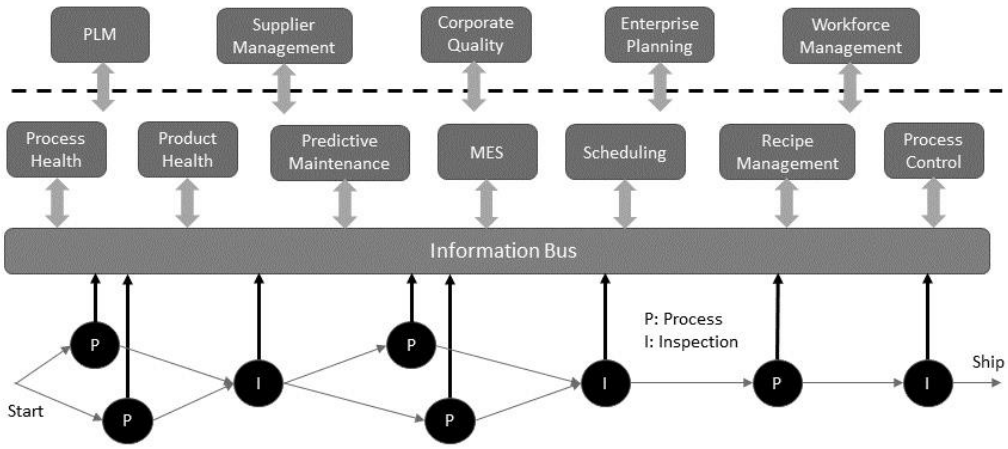

Figure 5.18 – Systems for the smart factory

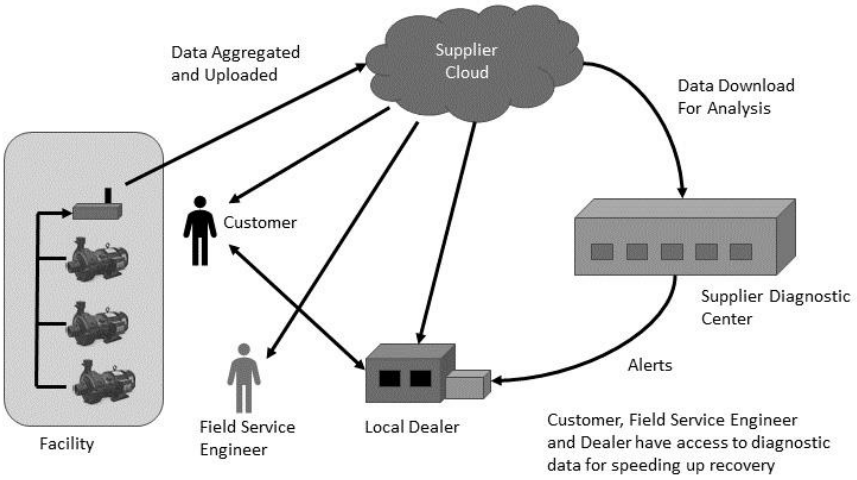

Figure 5.19 – Connected equipment architecture with local dealership support

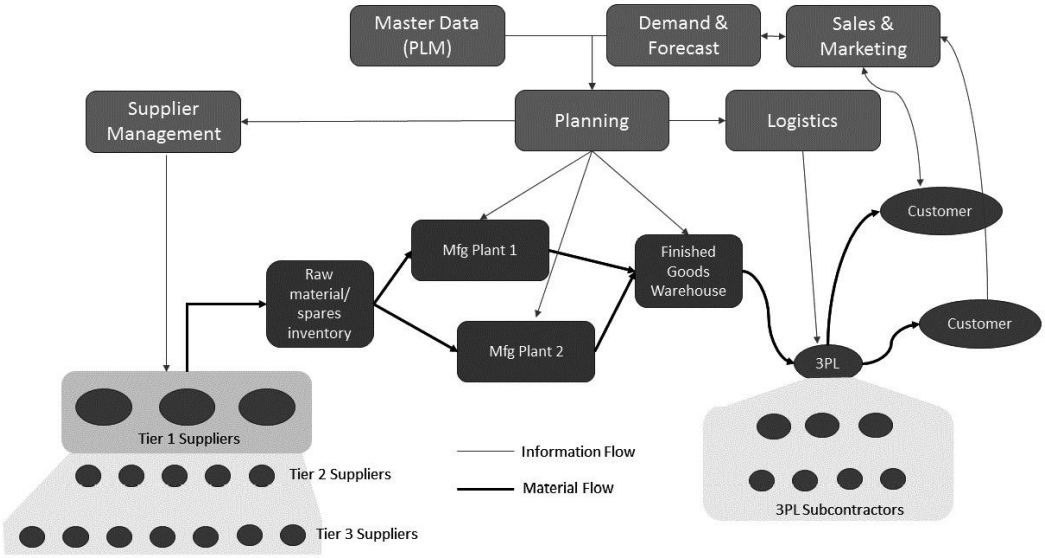

Figure 5.20 – Overview of the supply chain

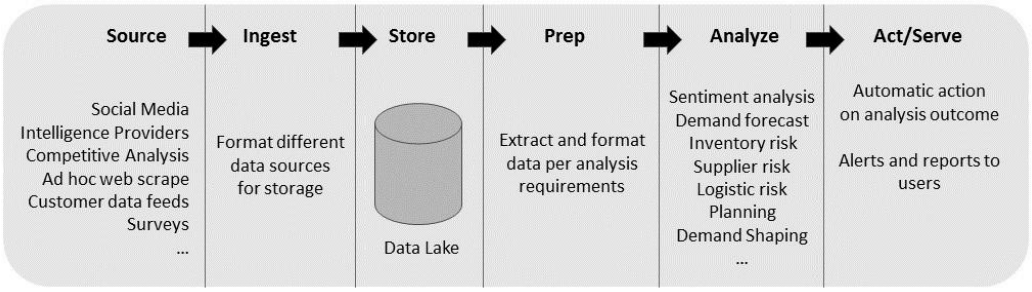

Figure 5.21 – Data lake concept for data aggregation for supply chain analytics digital transformation of demand forecasting

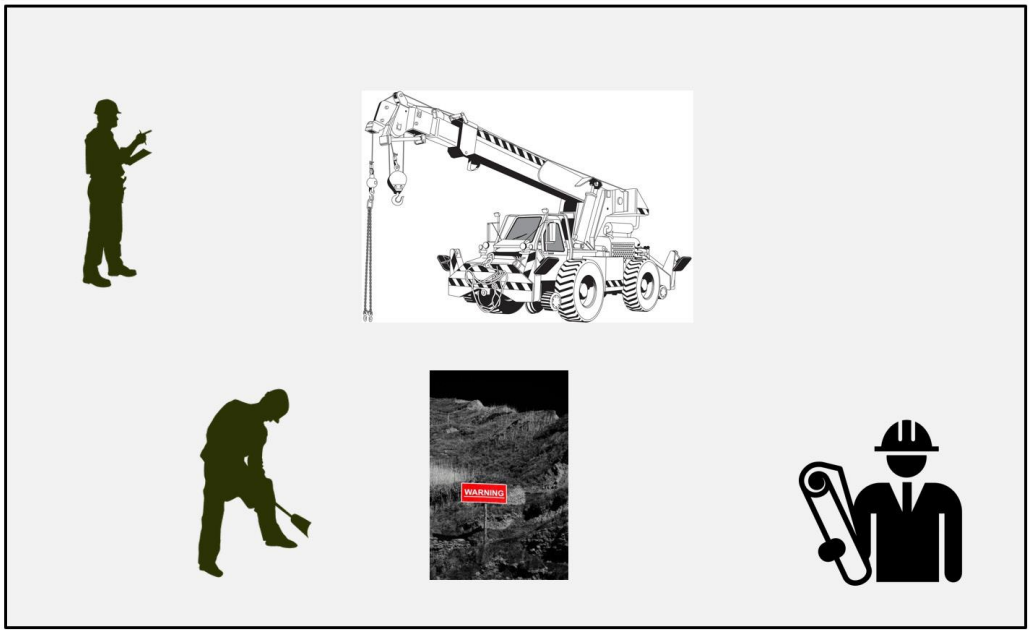

Figure 5.22 – Construction job site

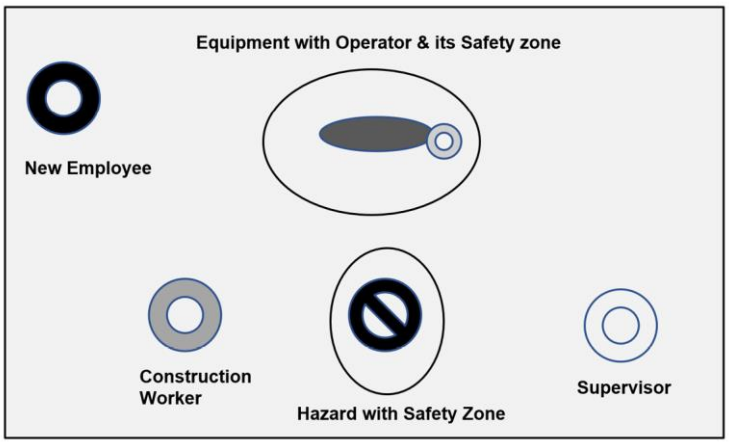

Figure 5.23 – Connected Industrial Worker application dashboard view

Figure 5.24 – Need for 3D rendering and fall detection capabilities (Source: http://civilengineerthoughts003.blogspot.com/2015/09/general-safety-in-construction-site.html, License: CC BY-NC-ND)

Questions

Here are some questions to test your understanding of the chapter:

1. Why are the main outcomes from industrial digital transformation in the chemical industry?
2. How is industrial digital transformation driving lights-out manufacturing?

3. What is the role of digital transformation in supply chain management?
4. How can we make buildings and facilities smarter?
5. How can industrial digital transformation make workers safer and more productive?

Chapter 6

Images

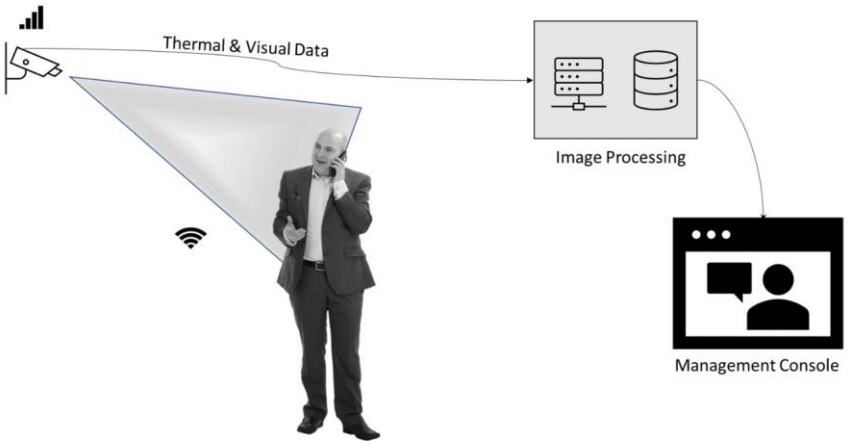

Figure 6.1 – Remote temperature monitoring

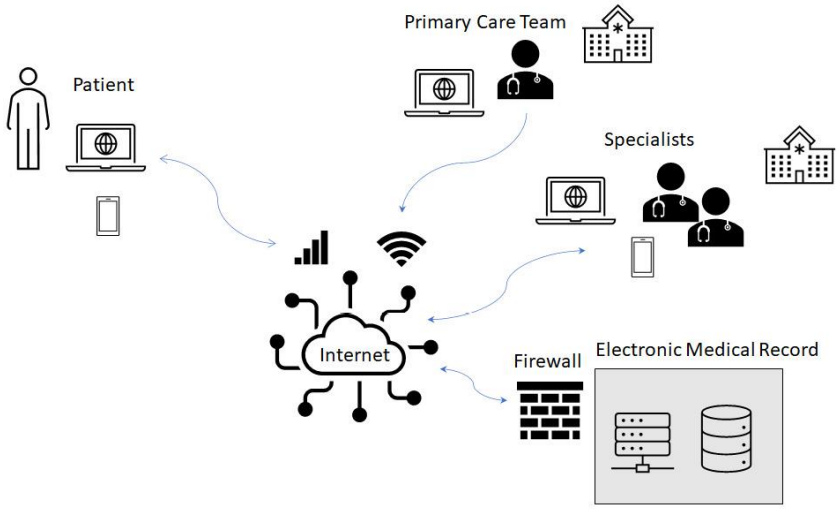

Figure 6.2 – The ecosystem of a telemedicine visit

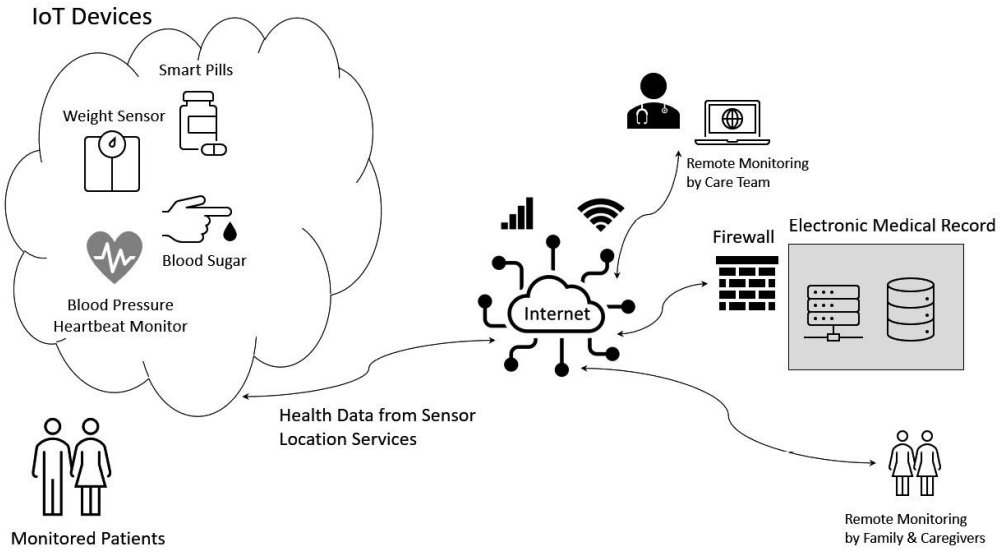

Figure 6.3 – IoT enables healthcare

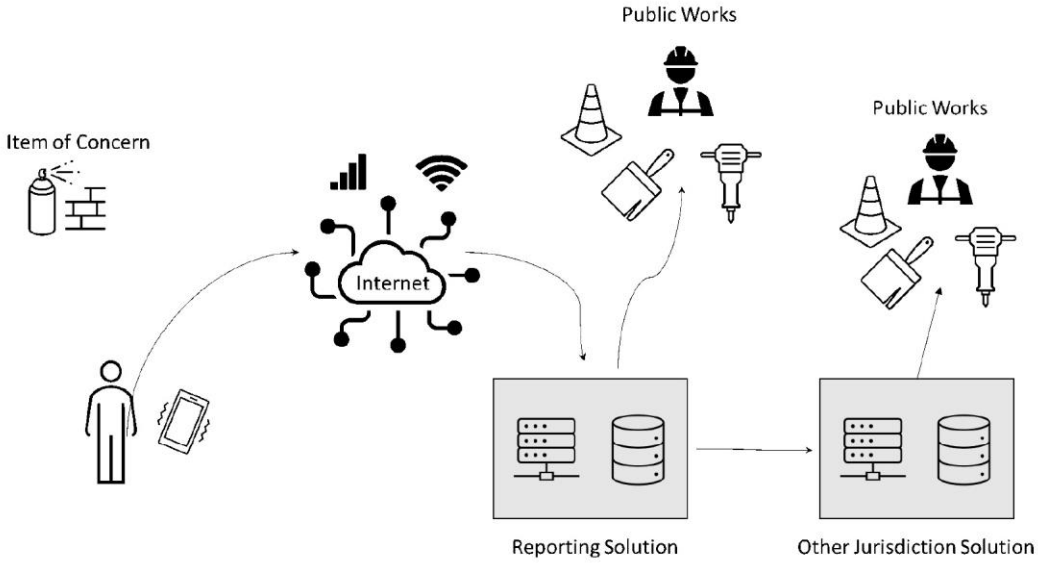

Figure 6.4 – 311 applications

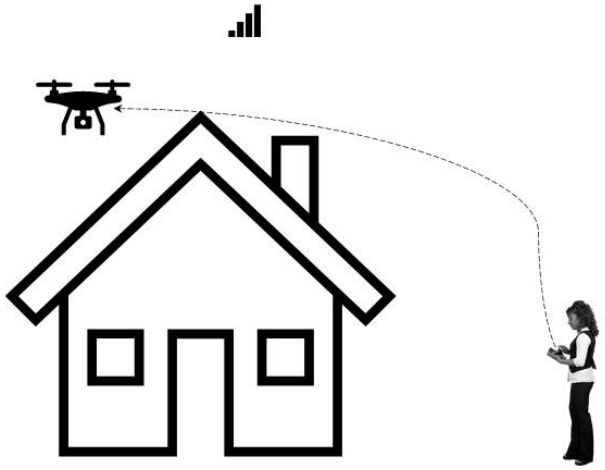

Figure 6.5 – Drone inspection

Stage	Description	Examples
Substitution	Replaces activities performed by hand with activities performed using a device. The method of teaching is not functionally changed.	Using word processors to type assignments or writing on an overhead projector slide instead of a blackboard.
Augmentation	The addition of technology enhances the learning experience.	Using advanced features of a word processor, such as cut and paste, spell check, or graphics, or enhancing presentations with graphics and other advanced features.
Modification	Teaching tasks are partially or entirely redesigned.	Flipped classrooms where students watch recorded lectures at home and work on assignments in the classroom
Redefinition	Technology creates brand new methods of instruction that were not possible without technology.	Classrooms connected via video conference to other classrooms around the world to complete lessons that require engagement or collaboration between classrooms.

Figure 6.6 – The SAMR model

Figure 6.7 – Village Green in Durham, NC. Photo by the author

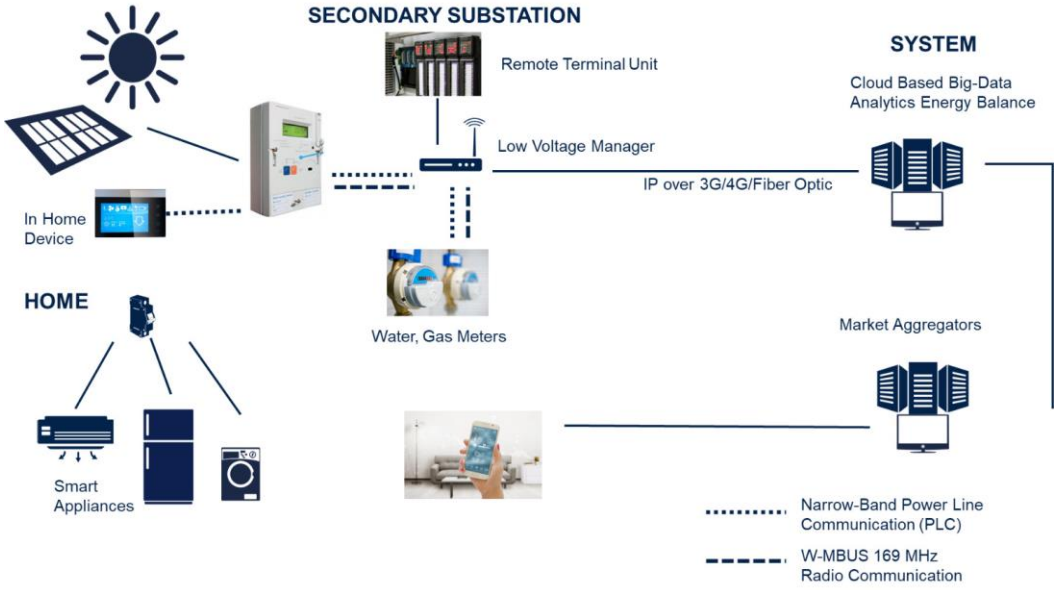

Figure 6.8 – Open Meter architecture

Figure 6.9 – Connected Smart Home

How to choose the channel

Red Channel	Green Channel
Good to declare	Nothing to declare
• Lost goods • Cash and traveller's cheques when totalling more than BRL 10.000 or the equivalent in another foreign currency • Items under control of the Sanitary, Agricultural and Army or subject to restrictions and provibitions of other agency • Taxable goods that exceed the exemption limit.	• Exemption goods • Cash and traveller's cheques, up to BRL 10.000 or equivalent in another foreign currency • Good of personal use or consumption • Other goods up to the limit of exemption quota

Figure 6.10 – Red and green channels

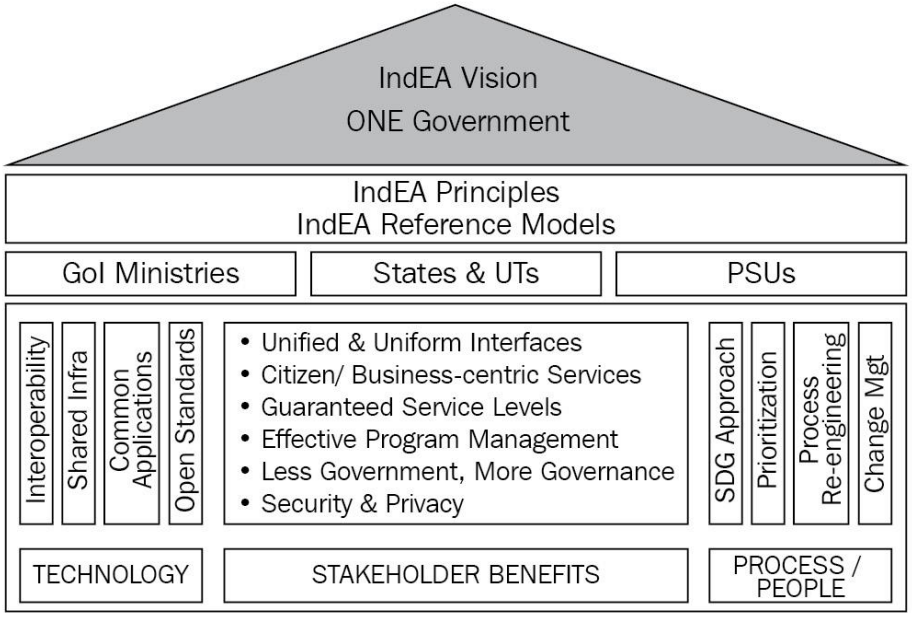

Figure 6.11 – The India Enterprise Architecture vision

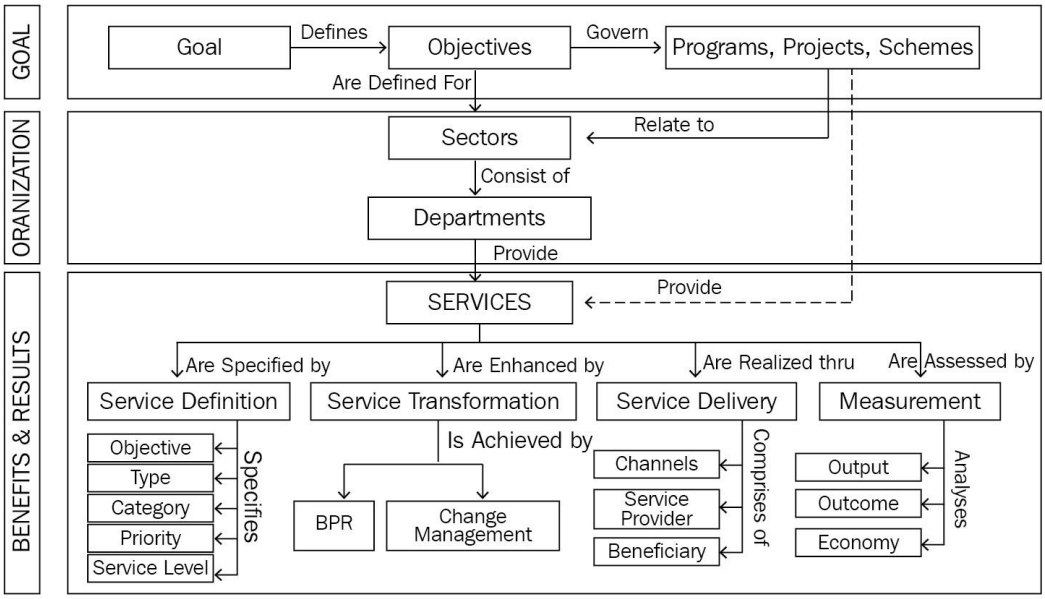

Figure 6.12 – The BRM for Digital India

	Definition	Role	Use Case
IoT	Communication network between devices	Collecting data	monitoring (surveillance) and control
Cloud Computing	Expandable/shrinkable "lake" to provide unified computing resources	Processing data, providing application services	Data centers, software and information service platforms
Mobile Internet	Wireless communication network	Transporting data, providing mobile application services	Mobile applications (mobile office work, mobile law enforcement)
Big Data	Ultra-large amounts of data with different structures, able to be used to illuminate data with valuable information	Data mining, data visualization	Industry and government intelligentization

Figure 6.13 – The role of digital technologies in smart cities in China (source: https://www.uscc.gov/sites/default/files/2020-04/China_Smart_Cities_Development.pdf)

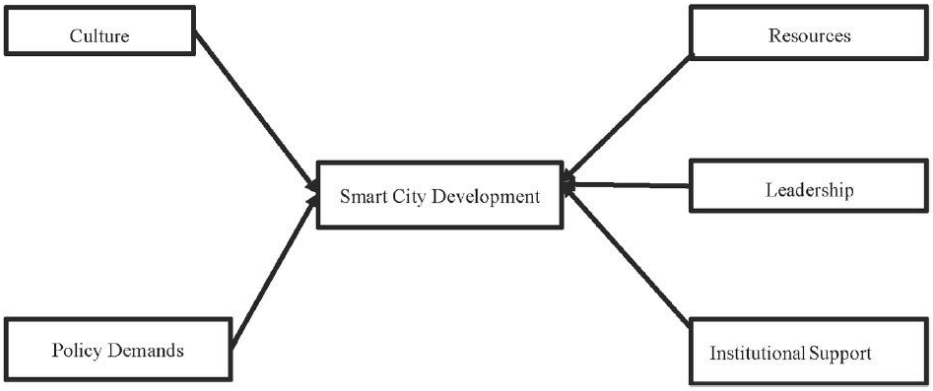

Figure 6.14 – Smart cities explanatory model of performance in China

Questions

Here are some questions to test your understanding of the chapter:

1. What are some of the challenges that public sector organizations face when executing digital transformations and how are they different from the challenges faced by the private sector?
2. What is technical debt?
3. How is digital transformation changing the citizen experience?
4. What are some examples of how the government has used digital technologies to improve the citizen experience?
5. What are the building blocks for smart city transformations?
6. How can a local digital transformation initiative be scaled to a national level?

Chapter 7

Images

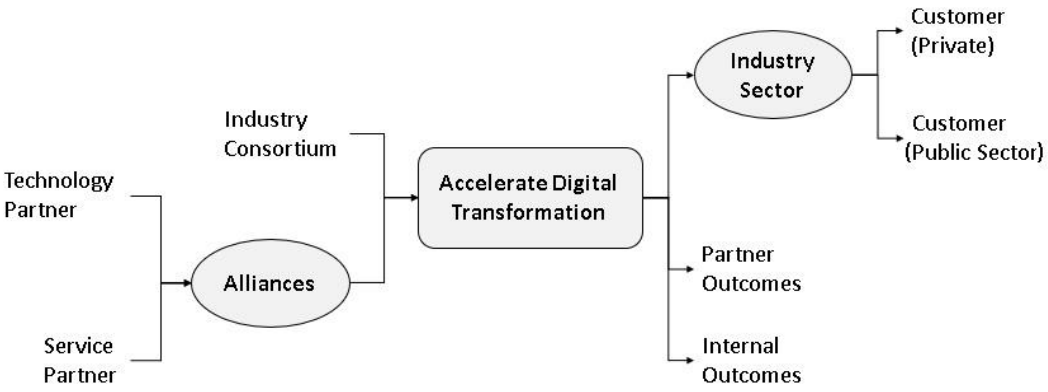

Figure 7.1 – Role of ecosystems in industrial digital transformation

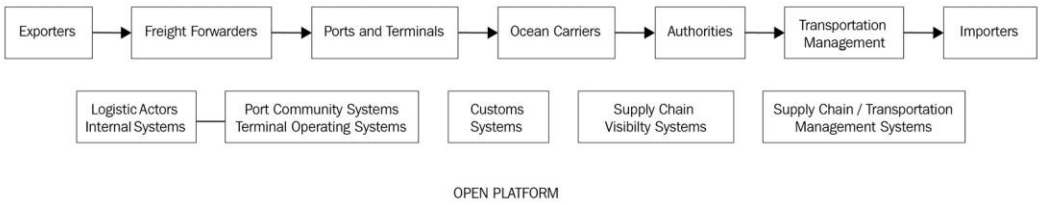

Figure 7.2 – How blockchain adds efficiency to the shipping industry

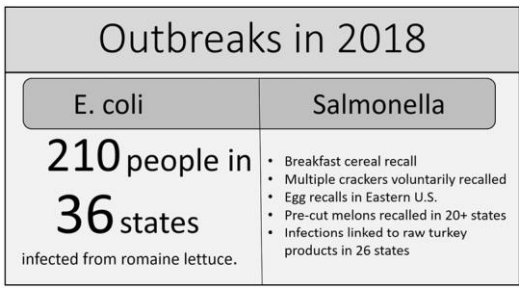

Figure 7.3 – Food poisoning

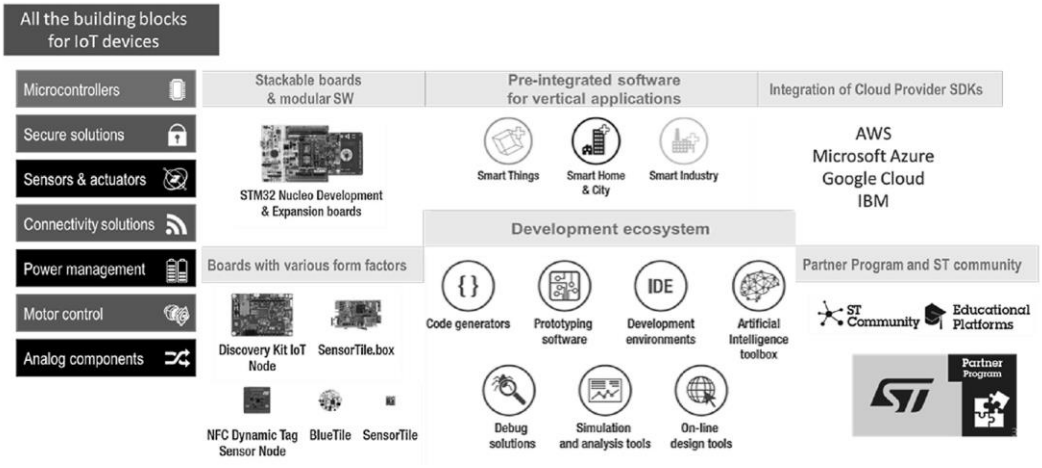

Figure 7.4 – STMicroelectronics ecosystem – components for complete solutions

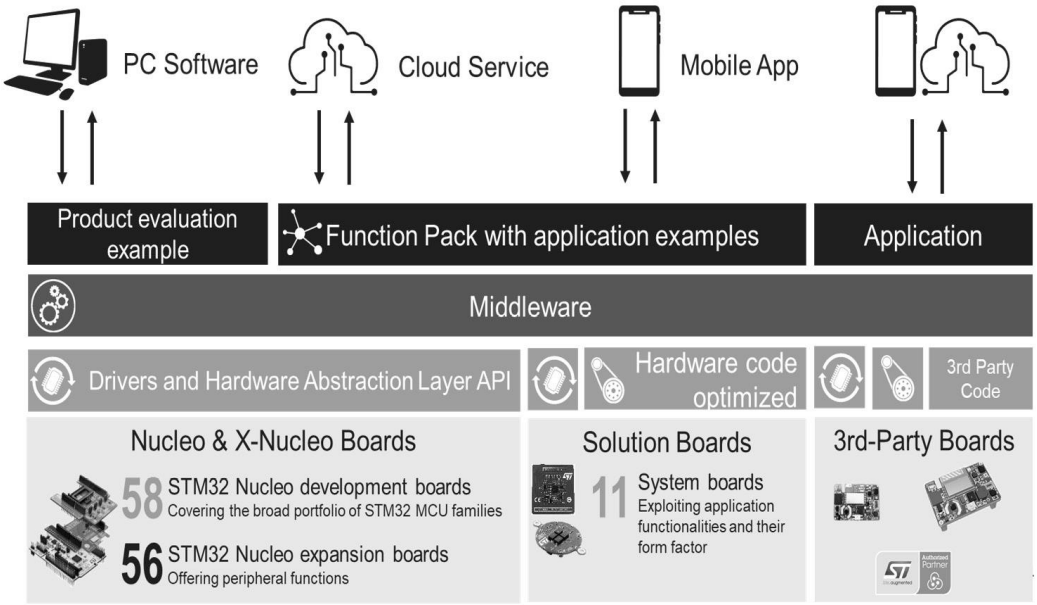

Figure 7.5 – STM32 ecosystem overview

Questions

Here are a few questions to check your understanding of this chapter:

1. Why are partnerships needed for digital transformation?
2. What is a consortium?
3. Are partnerships and ecosystems only relevant for private companies?
4. What are some examples of partnerships in the autonomous vehicle industry?
5. Name a few partnerships in the semiconductor industry.

Chapter 8

Images

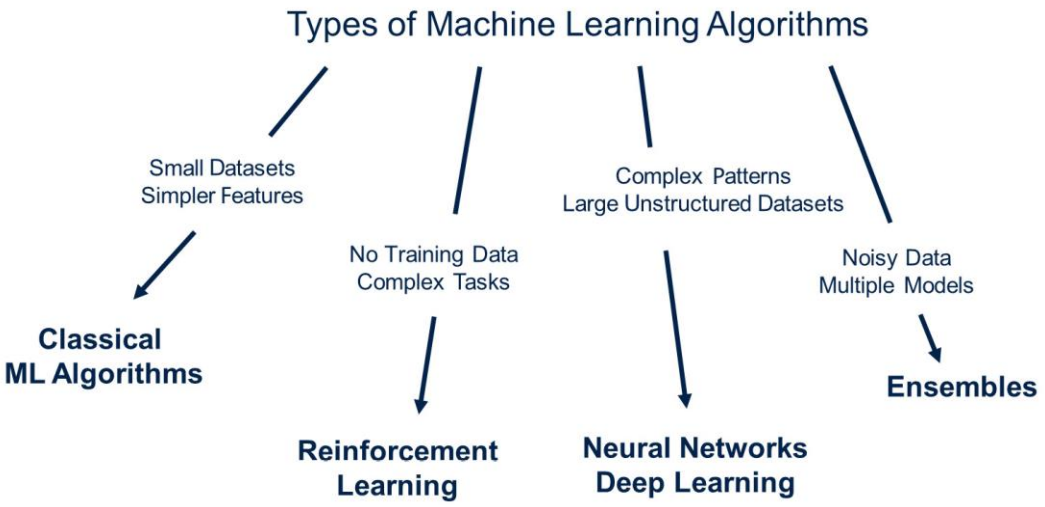

Figure 8.1 – Comparison of ML algorithms

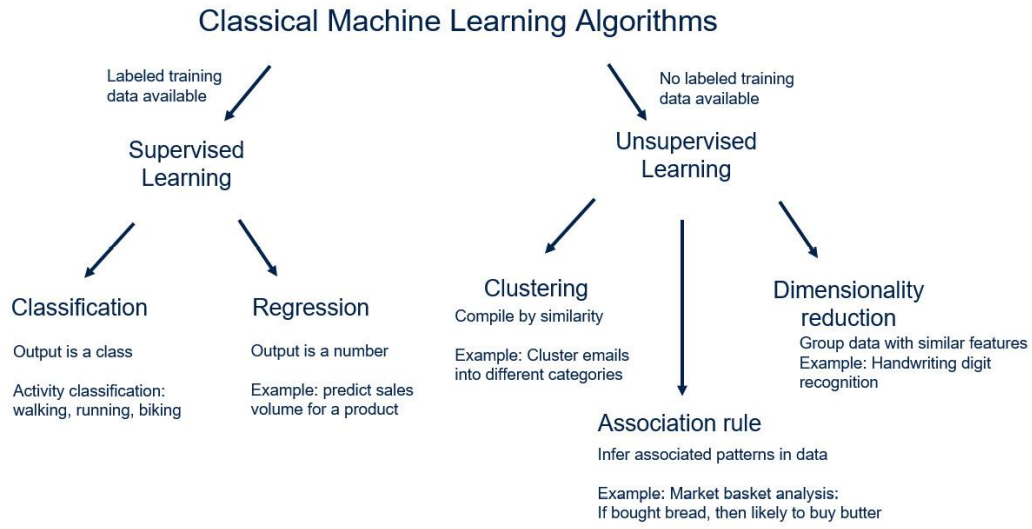

Figure 8.2 – Classical ML algorithms

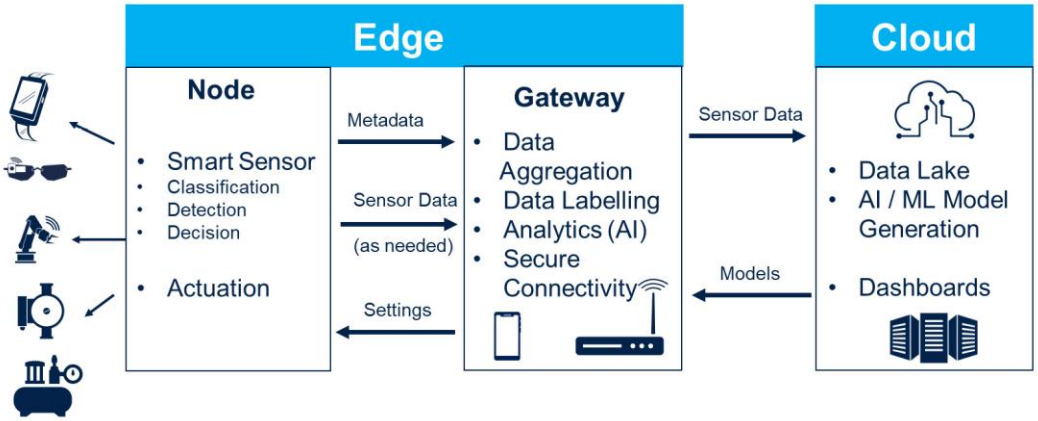

Figure 8.3 – Cloud and edge computation

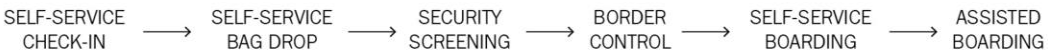

Figure 8.4 – The SITA Smart Path solution for airport automation

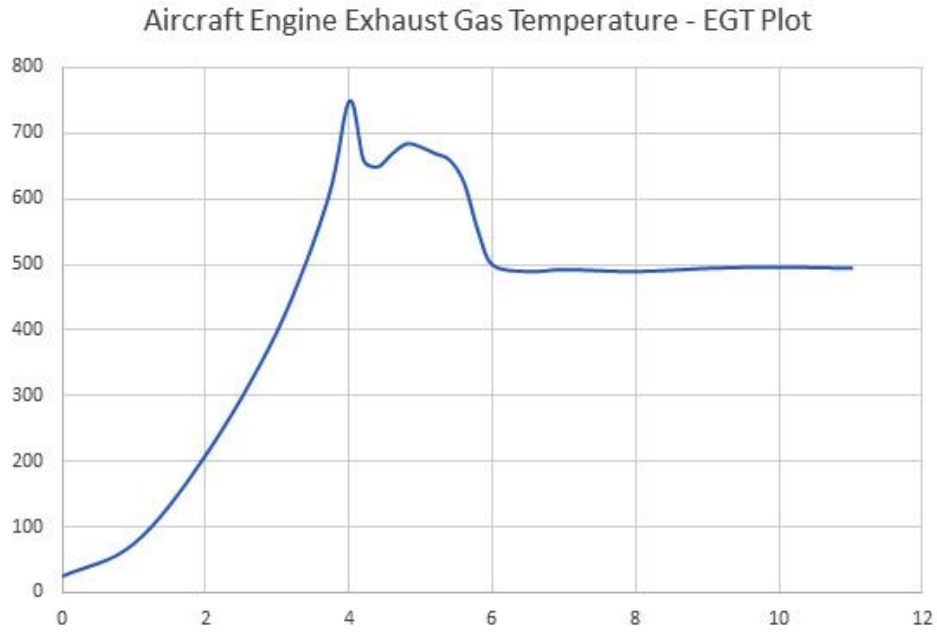

Figure 8.5 – An aircraft jet engine's EGT plot

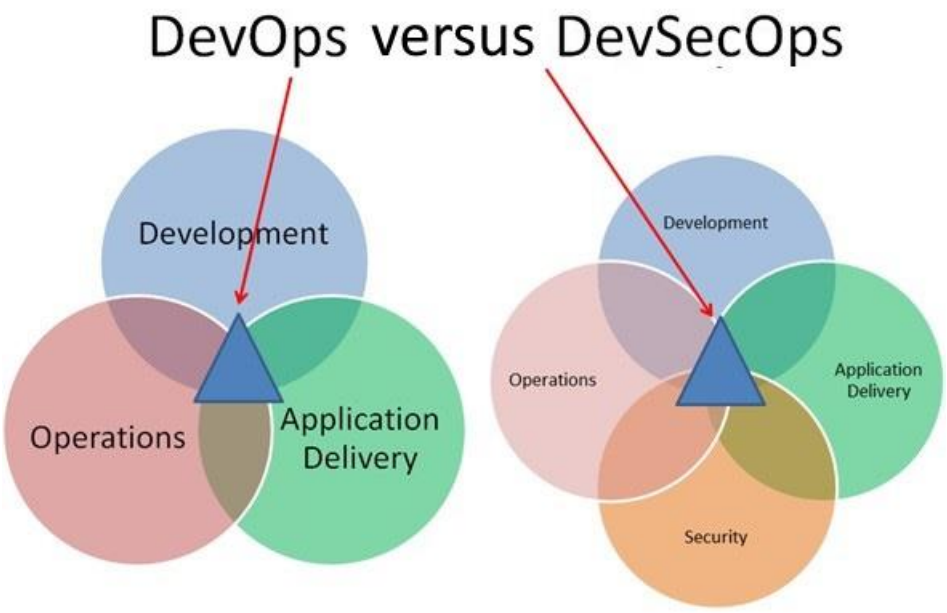

Figure 8.6 – DevOps versus DevSecOps (Source: https://commons.wikimedia.org/wiki/File:DevOps_vs_DevSecOps_Mginise.jpg, License: CC BY-SA)

Table

	SAST	IAST	DAST	RASP
Phase	Development	Quality Assurance (QA) Testing	Testing, production	Production
Speed	Instant to hours	Instant at the runtime	Hours to days	Instant at the runtime
Continuous Security Testing	Yes	Yes	No	Yes
CI/CD Integration	Yes	Yes	No	No
Integration	IDEs, build tools, and issue trackers	Build tools, test automation, issue trackers, and APIs	None	Language runtime, application server
Accuracy	Medium	High	Medium	High
Actionability	High	High	Low	High

Table 8.1

Questions

Here are some questions to check your understanding of this chapter:

1. What is the difference between ay eye, ML, and deep learning?
2. What is ShotSpotter technology used for?
3. What are the possible downsides of using ay eye-based facial recognition technology?
4. How is ay eye used in factories?
5. What is the role of the MOOCs in evangelizing ay eye?

Chapter 9

Images

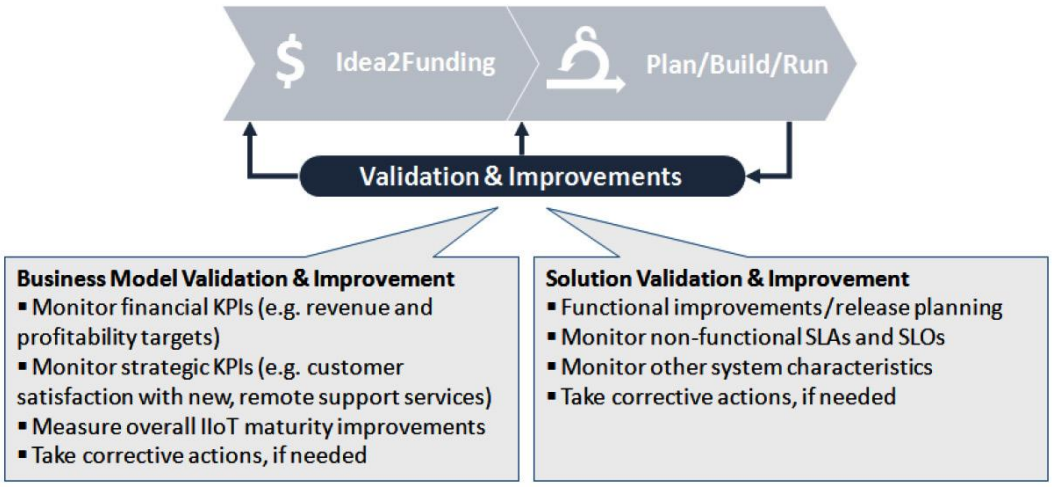

Figure 9.1 – Validation and improvement loop for digital transformation (source: IIC)

Table

	Attribute	General Electric	Siemens
1	Founded when	1892	1847
2	Revenues (2019)	$95 billion	$99 billion
3	Employees	205,000	385,000
4	IIoT platform	Predix (2013)	Mindsphere (2016)
5	Industrial specialty	Turbines	Automation
6	Software foundation (starting point)	Cloud Foundry	SAP
7	Digital unit/venture	GE Digital (2015)	Next47 (2016)
8	Digital investment	Over $1Billion	Over $1Billion
9	Country of HQ	USA	Germany
10	Acquisitions	ServiceMax ($915m, later divested)	Mendix ($700m)
11	Smart buildings	Current by GE (divested)	Acquired Enlighted (2018)
12	Software engineers	22,000 software and IT engineers in 2016	17,500 software engineers in 2016

Table 9.1

Questions

Here are a few questions to check your understanding of this chapter:

1. What are some examples of digital industrial companies?
2. What are some of the leading indicators of failure in an IDT?
3. Give examples of technical causes of failure in IDT projects?
4. What is the role of cybersecurity in IDT?
5. Can transformations fail due to economic reasons?

Chapter 10

Images

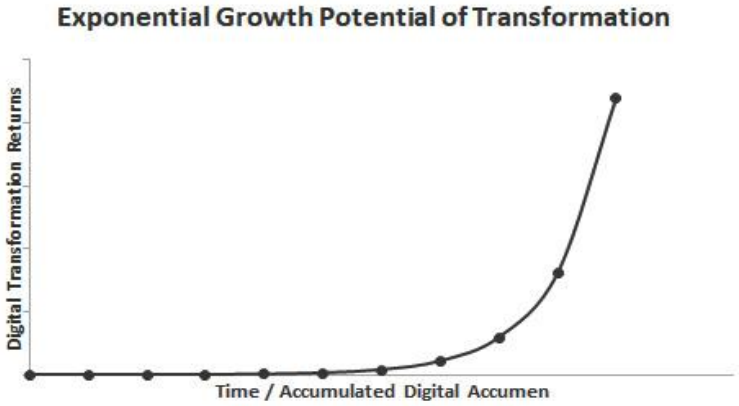

Figure 10.1 – Exponential growth potential of transformation

Questions

Here are a few questions to test your understanding of the chapter:

1. What are the seven steps of developing a business case for digital transformation?
2. Why is it important to complete a proof of concept before building your business case?
3. Describe the three types of benefits that can come from a digital transformation project.
4. What are the key factors in an ROI analysis?
5. Give some examples of the societal benefits of digital transformation.

Chapter 11

Images

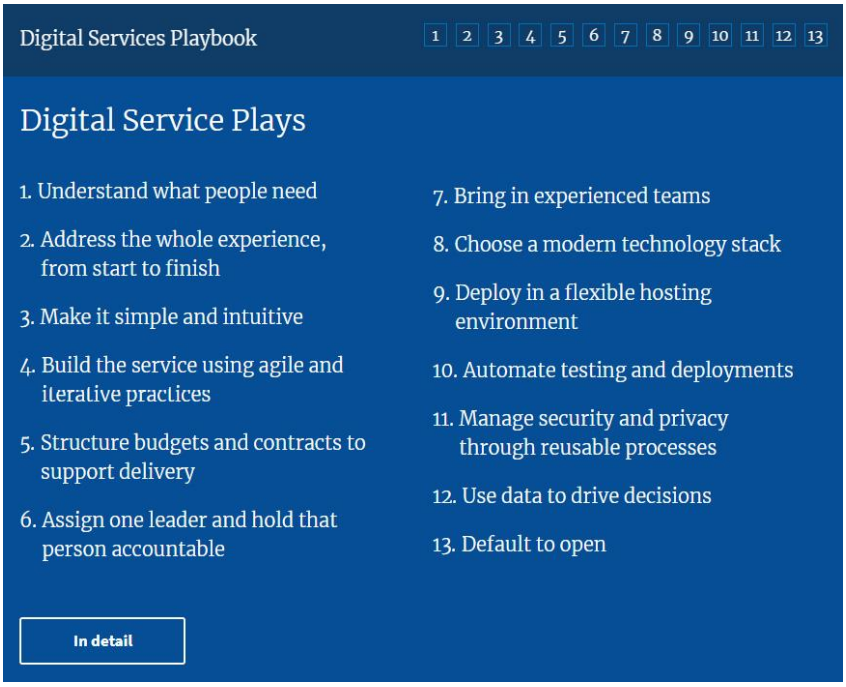

Figure 11.1 – The USDS playbook (source: https://playbook.cio.gov/)

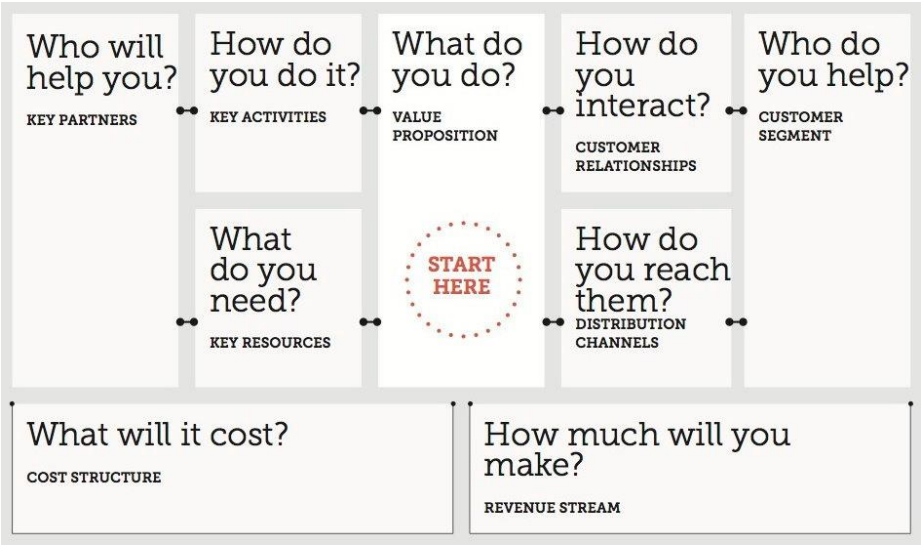

Figure 11.2 – Business model canvas template (Source: http://diytoolkit.org/tools/business-model-canvas/, License: CC BY-SA-NC)

1) Business Driven Product / Service Description Pro-Health app is a mobile app + devices to provide: • Life Policy quotations for desired life/health products • A benchmark of how much can be saved if some health related metrics improve • Set up a suggested plan to improve health supported by devices connected to the app • Motivate and close the purchase once prospect customers have achieved target milestones	**3) Key Stakeholders** • Chief Actuarial • Chief Operations Officer • Marketing Director • Operations Manager • Compliance Officer • CIO / IT Delivery Head **7) Partnerships** - Devices for bio-metrics: IoT for health connectivity - Health coaches - App Usability.	**4) Data Objects in Scope** Prospect Customer Personal Data: age, date of birth, etc. Prospect customer biometrics: weight, blood pressure and sugar Products suit for prospect customer Health Measurements and milestones	**5) Data Objects Current Available format** - Health measurements (Biometrics) Data: Not available - Policy and quotation forms: paper-based 6) Machine Readable DO transformation technologies - Devices connected to provide health measurements (IoT) - Digital forms and electronic signature	**8) Business Value Drivers** Increase Revenue **9) Implementation Model** - Mobile Application with connected devices (body measure, IoT bracelet
2) Business Value Proposition Our **Pro-Health app** help prospect customers **who want** to get more affordable life and health insurance **by** improving their overall health status through an easy to use app and devices to set up a tailored program targeted to accomplish key health metrics goals, **unlike** traditional approaches who focus only on prospect customer risks.				**10) KPI's** - 10% in increased premium - 4% persistency - 5% improvement in opportunity to closed ratio.

Figure 11.3 – Digital transformation canvas for planning personal health transformation (source: https://medium.com/@ricardoivison/the-digital-transformation-canvas-a56b29ed219d)

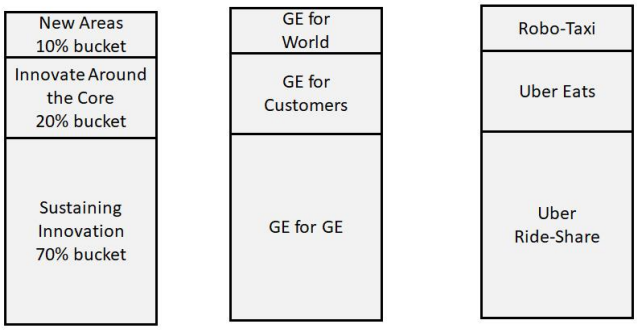

Figure 11.4 – Industrial digital transformation innovation paradigms

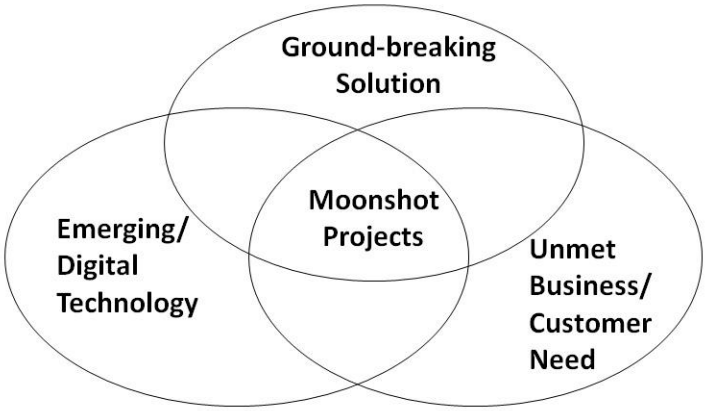

Figure 11.5 – Moonshot projects

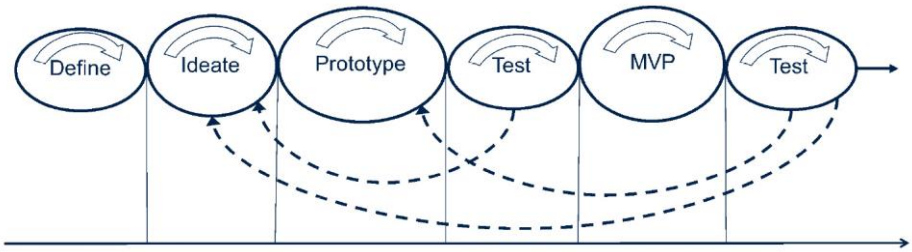

Figure 11.6 – Process stages

Figure 11.7 – Typical smart home and mobile app

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Questions

Here are a few questions to test your understanding of the chapter:

1. What factors are critical to the success of a digital transformation?
2. Why are playbooks important to the success of a digital transformation?
3. Explain the 70:20:10 percent rule for innovation models.
4. What is a moonshot project?
5. What are some models for sustaining a digital transformation?
6. What are the challenges in maintaining a center of excellence?
7. What is a software factory?