47006- ANÁLISE E MODELÇÃO DE SISTEMAS

Digital transformation of the organizations and society (and its impact in software engineering)

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v2020/10/07

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Learning objectives for this lecture

Describe cases of digital transformation of businesses

Identify three main axes in digital transformation

Explain what is the Systems Development Life Cycle

Explain how the business environment brings opportunities and risks to the software industry

Digital transformation and the strategic role of IS

Technological change has never occurred as rapidly, or on as large a scale, as today.

"Technological innovation enables – indeed, requires – companies to boost their agility and thus their competitiveness. That's why CEOs' top priorities in 2016 should be to digitize the core components of their business and rethink organizational design and governance processes. Catching this fast-moving – and rapidly growing – "digital wave" is the only way to avoid getting left behind."

PROJECT SYNDICATE
THE WORLD'S OPINION PAGE

PRINT

DOMINIC BARTON

Dominic Barton is the global managing director of McKinsey & Company.

JAN 15, 2016

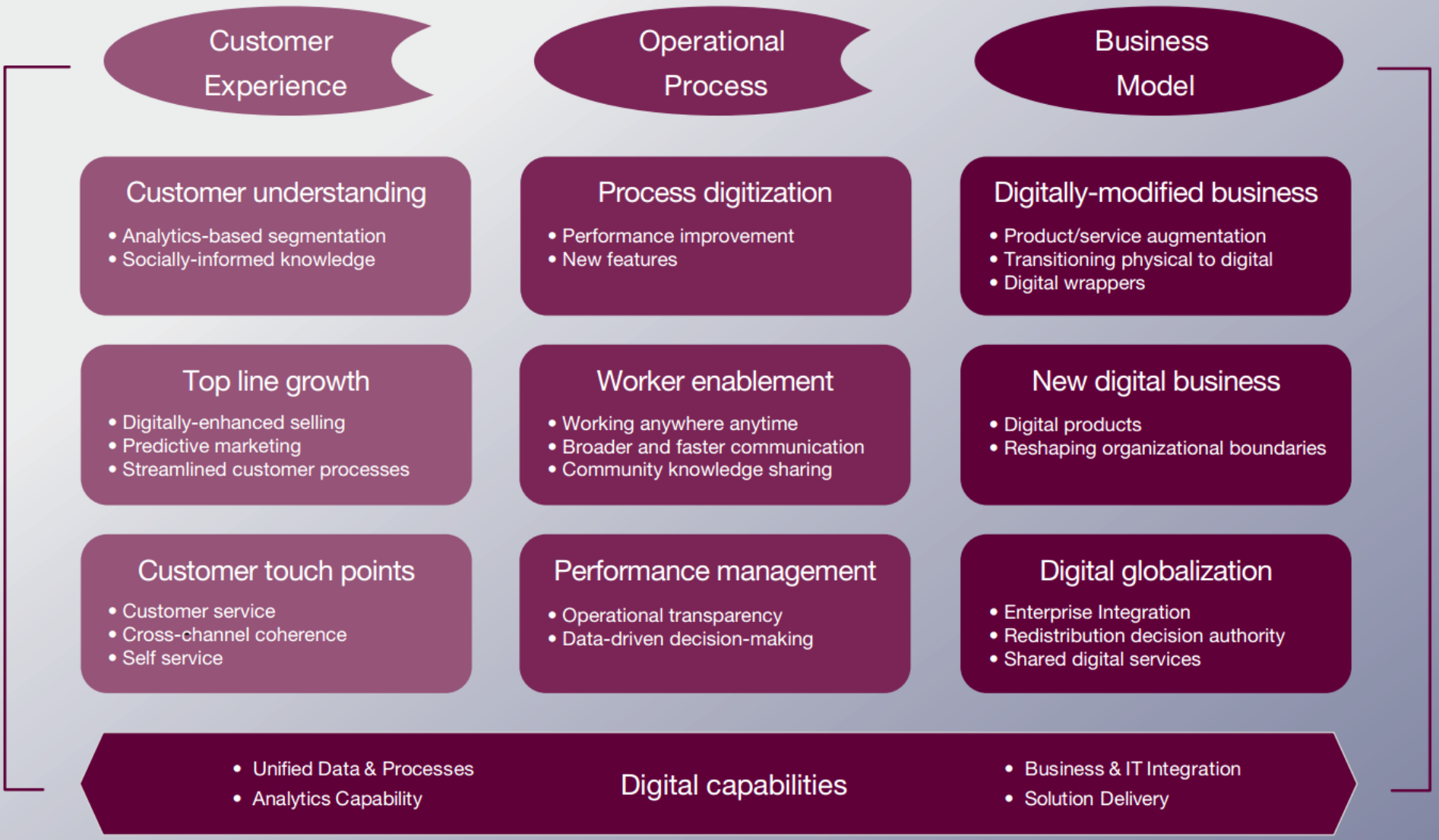
Catching the Digital Wave

NEW YORK – Technological change has always posed a challenge for companies. But, as we saw once again in 2015, it has never occurred as rapidly, or on as large a scale, as today. As innovation sweeps across virtually every sector, from heavy industry to services, it is transforming the competitive landscape, with the most advanced companies – rather than the largest or most established players – coming out on top.

For incumbents, the threat of displacement is very real. The average tenure of a company on the S&P 500 has fallen from 90 years in 1935 to less than 18 years today. Disruptive new players like Uber, which has upended the taxi industry, are tough competitors, often staking out market share by shifting more surplus to consumers. This is part of a broader trend of intensifying competition that, according to recent research from the McKinsey Global Institute, could reduce the global after-tax profit pool from almost 10% of global GDP today to its 1980 level of about 7.9% within a decade.

http://prosyn.org/lxXI60W

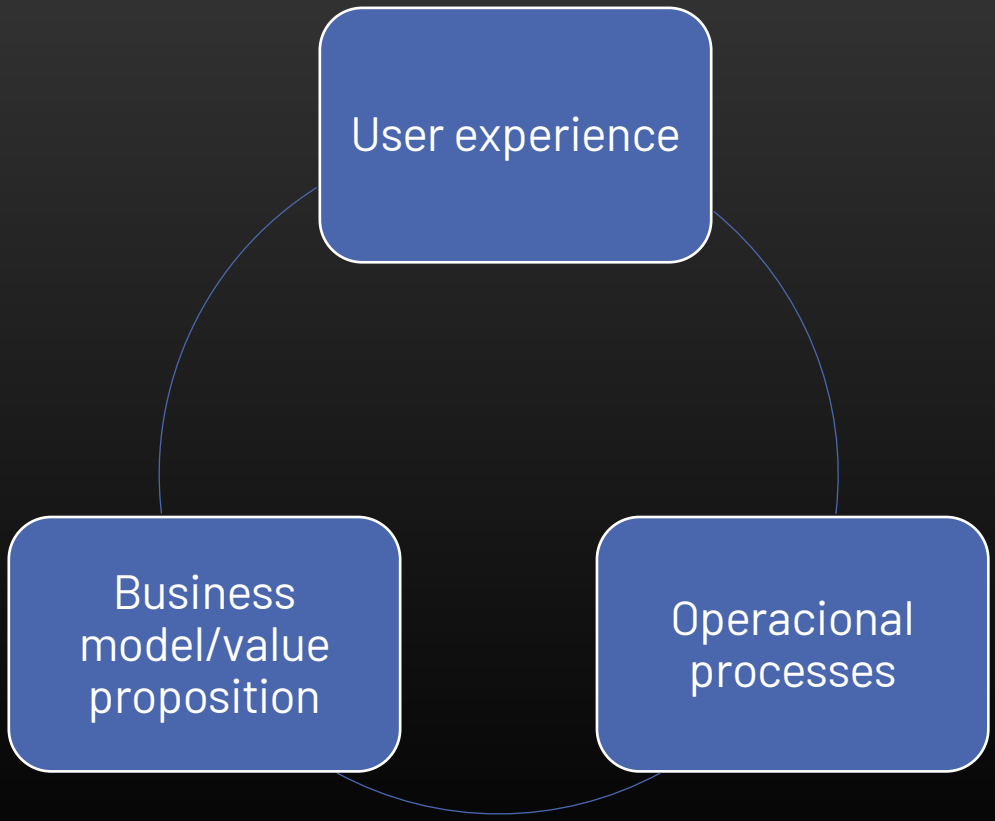
Figure 3: Building blocks of the digital transformation



"Digital Transformation: A Roadmap for Billion-Dollar Organizations", MIT Center for Digital Business

Digital transformation

The use of ICT to decisively improve the performance or value proposition of a company

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SGQ

A partir de 26 de Janeiro, a Universidade de Aveiro (UA) implementa o Subsistema para a Garantia da Qualidade das Unidades Curriculares relativo ao 1º semestre do ano letivo 2014/2015.

A partir dessa data e até ao dia 22 de fevereiro, a UA promoverá o lançamento dos inquéritos pedagógicos junto dos estudantes. Os inquéritos são preenchidos eletronicamente, via PACO (http://paco.ua.pt/) ou diretamente em http://sgq.ua.pt.

Participa! A tua opinião é fundamental!


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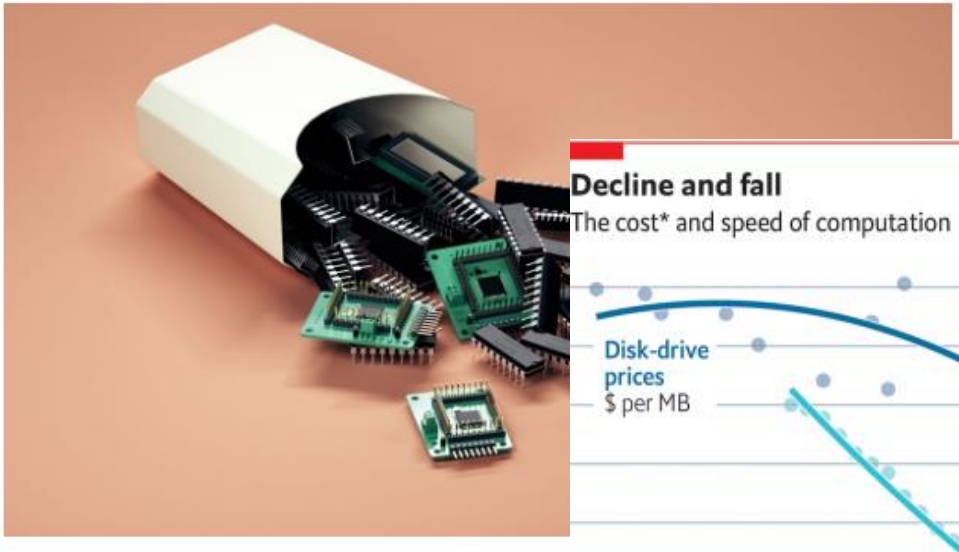
Drastic falls in cost are powering another computer revolution

The Internet of Things is the next big idea in computing



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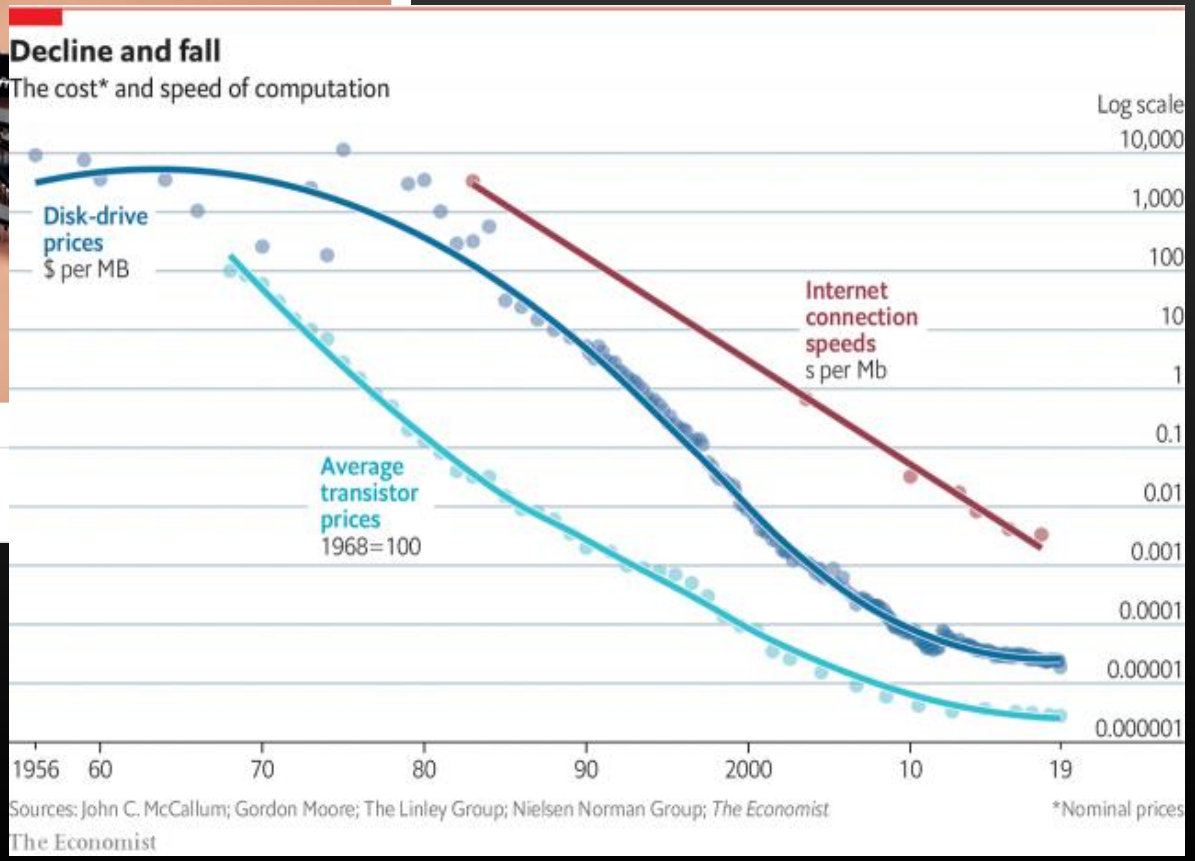

I Oliveira (2018)

Technology evolved ...

THE EVOLUTION OF TECHNOLOGY &

Its Impact on the Development of Social Businesses

We are babies.

1960s

Technology has **little impact.** It is a curiosity.

The company is king, but a benevolent king. Good focus on customer satisfaction, but customers have few options. Communications makes global business difficult so customers make geographic-based decisions.

We are still children.

1970s

Technology is for academics and has **little impact.**

Greater focus on margins and revenue. Customers become concerned about monopolies as customer satisfaction has less importance.

We are still children, but we can pout to get what we want.

1980s

Technology invades the home and starts to **change behaviors.**

Customers become increasingly concerned about company practices and lack of customer satisfaction. Communications have improved to help customers make more informed decisions and to have better choices.

Like teenagers, we now have some control but don't know what to do with it yet.

1990s

Technology is now everywhere. A great leap forward. It begins to **connect us** around the globe.

e-Commerce helps give customers a greater - and more informed - range of decisions. Companies use the web to make themselves more accessible but haven't begun truly focusing on customer relationships.

We are growing up, and feeling pretty cool about it.

2000s

Technology enables more seemless communications across the globe. Growth is **explosive**, but like "explosions" is uncontrolled - all over the place.

Social Media allows customers to articulate their satisfaction with companies and make decisions based on the company's behavior, not just on price alone. Companies begin to react and change.

Welcome to adulthood!

2010s

Technology becomes **fully intergrated** into our daily lives. We live more fully in a digital world.

Social Businesses are the evolution of companies now keenly aware that how they act and how they engage with customers can be more important than price, that the relationship is part of the value. Companies allow greater transparency into all apsects of the company and use social media channels to effectively engage with customers, but with a focus on WHAT the customer wants and HOW best to deliver it to the customer.

https://visual.ly/community/infographic/business/evolution-technology-its-impact-social-businesses-development

Systems development life-cycle

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deti

In 2015

MODERN RESOLUTION FOR ALL PROJECTS

	2011	2012	2013	2014	2015
SUCCESSFUL	29%	27%	31%	28%	29%
CHALLENGED	49%	56%	50%	55%	52%
FAILED	22%	17%	19%	17%	19%

The Modern Resolution (OnTime, OnBudget, with a satisfactory result) of all software projects from FY2011–2015 within the new CHAOS database. Please note that for the rest of this report CHAOS Resolution will refer to the Modern Resolution definition not the Traditional Resolution definition.

https://www.infoq.com/articles/standish-chaos-2015

Integrated Requirements Engineering: A Tutorial

Ian Sommerville, *Lancaster University*

Before developing any system, you must unde
tem is supposed to do and how its use can
the individuals or business that will pay for
volves understanding the application doma
tions, railways, retail banking, games, and so on); the
constraints; the specific functionality required by the st
ple who directly or indirectly use the system or the info

and essential system characteristics such as performance, security, and dependability. *Requirements engineering* is the name given to a structured set of activities that help develop this understanding and that document the system specification for the stakeholders and engineers involved in the system development.

This short tutorial introduces the fundamental activities of RE and discusses how it has evolved as part of the software engineering process. However, rather than focus on established RE techniques, I discuss how the changing nature of software engineering has led to new challenges for RE. I then introduce a number of new techniques that help meet these challenges by integrating RE more closely with other systems implementation activities.

This tutorial introduces the fundamental activities of requirements engineering and discusses recent developments that integrate it and system implementation.

The fundamenta

The RE process
ing on the type of
oped, the size and cu
volved, and the softv
used. For large mil
tems, there is norma
the systems engineer
tensively documente
ware requirements.
veloping innovative
process might consi
sions, and the prod
simply be a short vis
software is expected

Whatever the act
tivities are fundamer

- *Elicitation.* Iden
tion about the sy
quirements from
- *Analysis.* Understand the requirements, their overlaps, and their conflicts.
- *Validation.* Go back to the system stake-

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- *The need for rapid software delivery.* Businesses now operate in an environment that's changing incredibly quickly. New products appear and disappear, regulations change, businesses merge and restructure, competitors change strategy. New software must be rapidly conceived, implemented, and delivered. There isn't time for a prolonged RE process. Development gets going as soon as a vision for the software is available, and the requirements emerge and are clarified during the development process.

Towards an engineering process

Why do we need a formal process?

Failures occur (too) often

Creating systems is not intuitive

Projects are late, over budget or delivered with fewer features than planned

Credit: Dennis et al, "*Systems Analysis and Design: An Object Oriented Approach with UML*", 5th ed.

Systems development life-cycle (SDLC)

the process of determining how an information system (IS) can support business needs by designing a system, building it, and delivering it to users.

Role of the Analyst

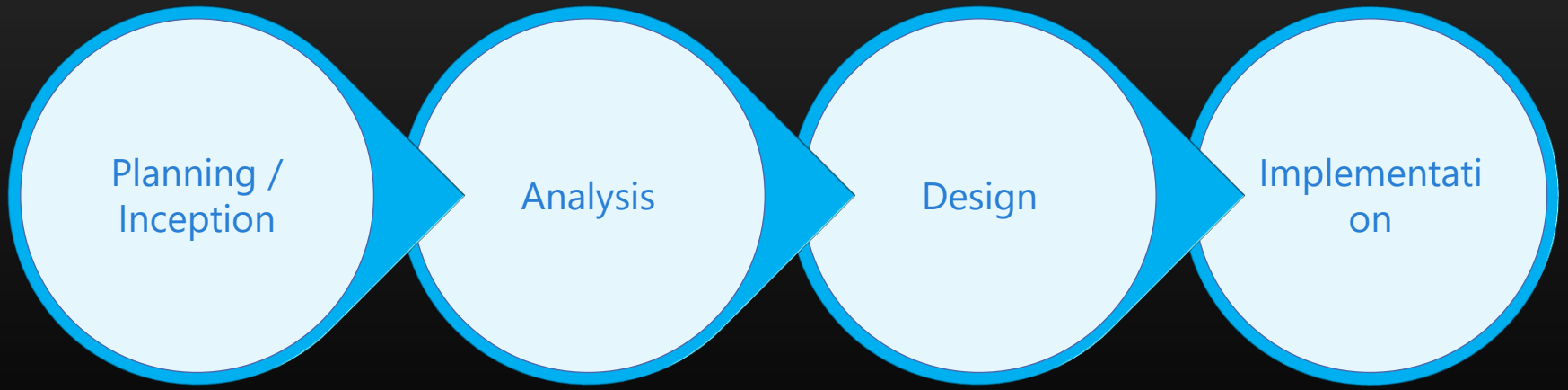
The key person in the SDLC is the systems analyst, who analyzes the business situation, identifies opportunities for improvements, and designs an information system to implement them. Being a systems analyst is one of the most interesting, exciting, and challenging jobs around.

The primary objective of a systems analyst is not to create a “awesome system”; instead, it is to create value for the organization.

SDLC phases

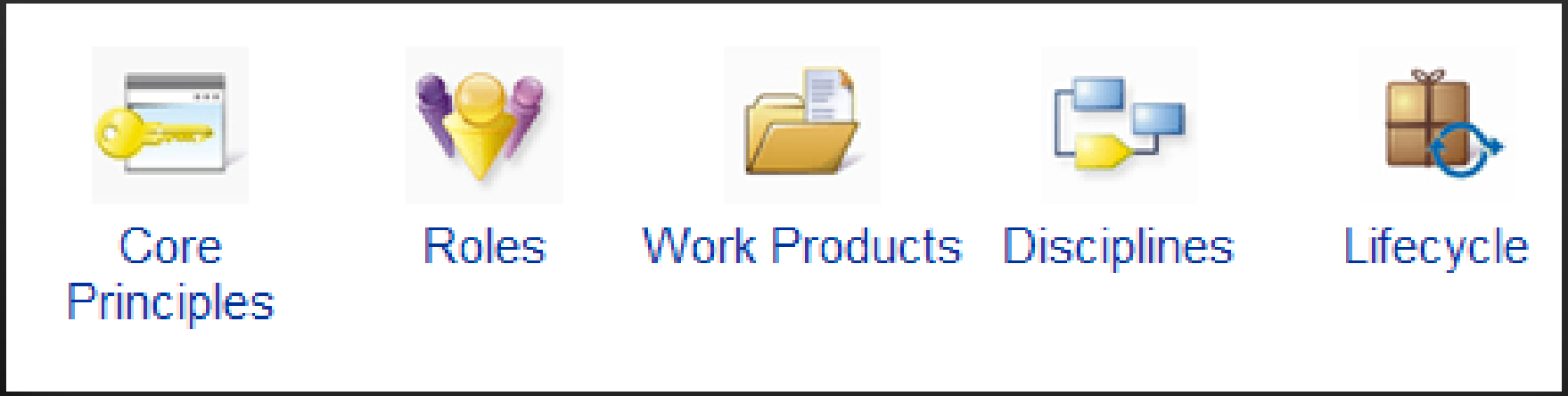
Four fundamental phases: planning, analysis, design, and implementation. Different projects might emphasize different parts of the SDLC or approach the SDLC phases in different ways, but all projects have elements of these four phases.

Each phase is itself composed of a series of steps, which rely upon techniques that produce deliverables (specific documents and files that provide understanding about the project).



The SDLC is instantiated in a specific development methodology

What is included in a “process”?



http://sweet.ua.pt/ico/OpenUp/OpenUP_v1514/

Ferramentas CASE

Visual Paradigm

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Readings & references

Core readings	Suggested readings
• [Dennis15] – Chap. 1	• [Pressman14] – Chap. 1 • "Catching the digital wave" • "Digital Transformation: A Roadmap for Billion-Dollar Organizations", MIT Center for Digital Business