



Lisbon School
of Economics
& Management
Universidade de Lisboa



IT IN BUSINESS AND SOCIETY

ORGANIZATIONS, MANAGEMENT, AND THE NETWORKED ENTERPRISE

Prof. Doutor **Carlos J. Costa**,
Reihaneh Hajishirzi

Learning Goals

Students will be able to:

- **Describe and analyse IT in the context of society and organizations**
- Propose, select, choose and build solutions of IT infrastructure and IT applications
- Reflect and evaluate IT management and development

Information is Critical

The information we have is not what we want.

The information we want is not the information we need.

The information we need is not available.

Information is a Resource

- It is scarce
- It has a cost
- It has alternative uses

Why we need Information

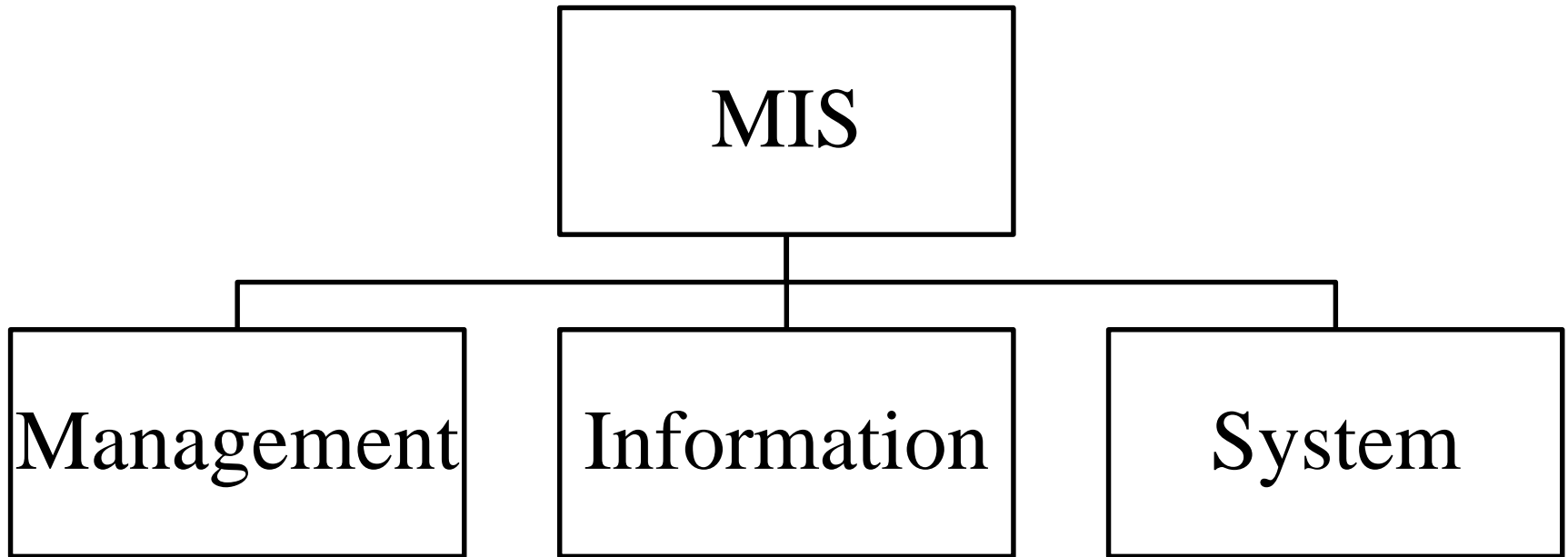
To ensure effective and efficient
decision-making for the success
of the organizations

What is **MIS**?

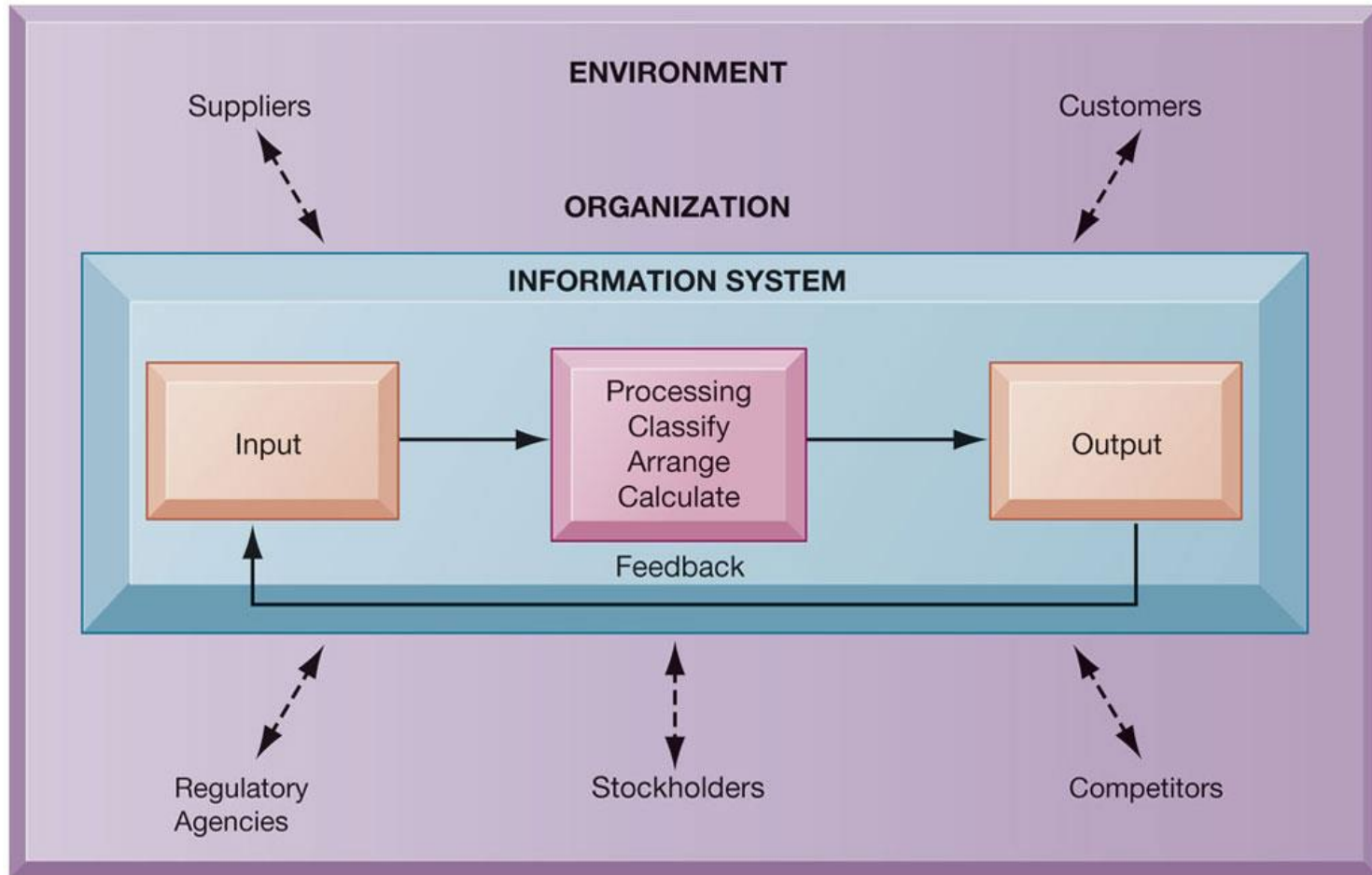
MIS refers broadly to computer-based system that provide managers with the tool for organizing, evaluating, and efficiently running their departments.

What is **MIS**?

Right Information
To the Right Person
At the Right Place
At the Right Time
In the Right Form
At the Right Cost



Information System (IS)

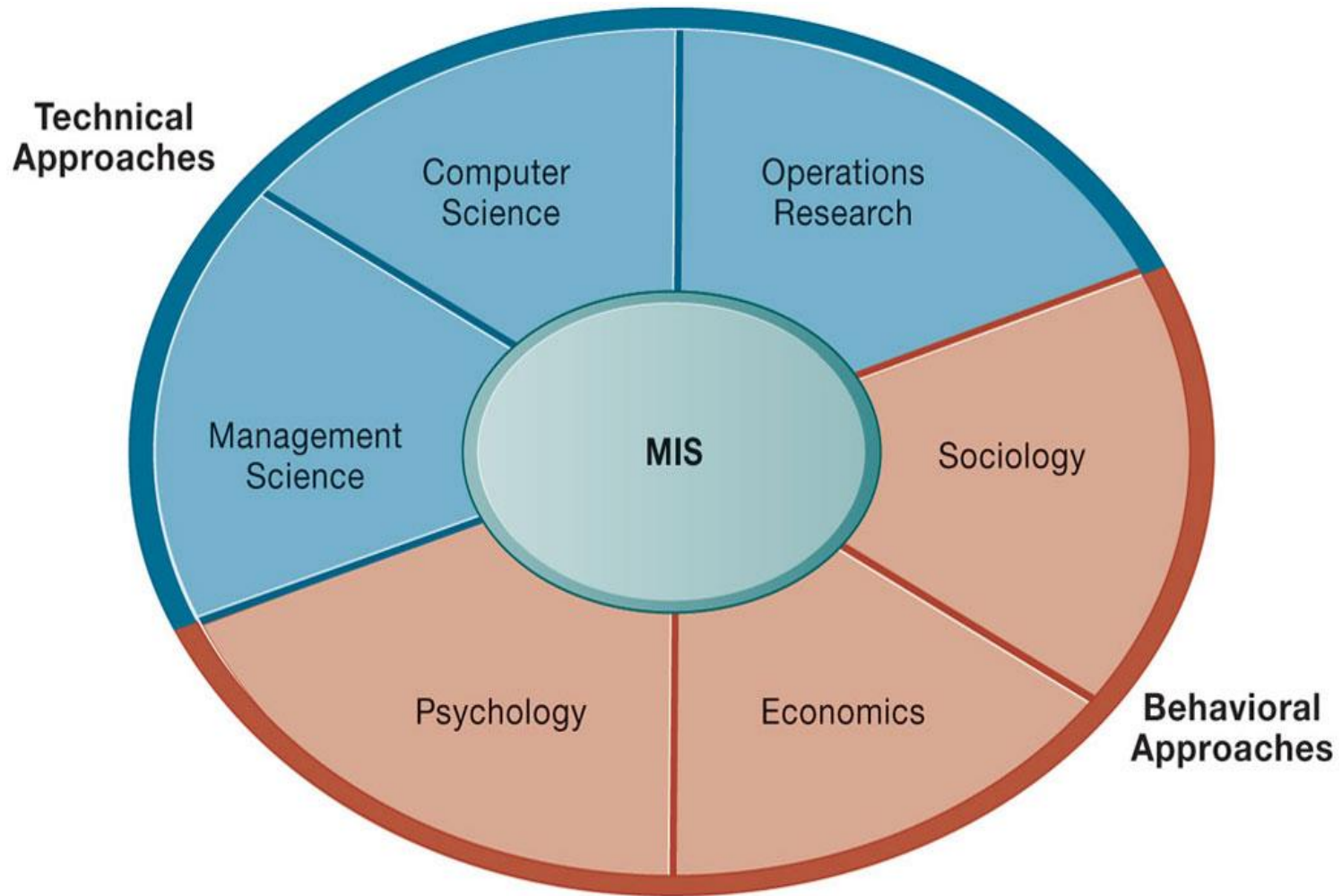




Dimensions of IS



Approaches to IS



Business Process

- Flows of material, information, knowledge
- Logically related set of tasks that define how specific business tasks are performed
- May be tied to functional area or be cross-functional

Businesses: Can be seen as collection of business processes

Business processes may be assets or liabilities

Digital Transformation

Digitization: The process of changing Analog to Digital

Digitalization: The process of employing digital technologies and information to transform business processes.

Digital Transformation: Applying digital innovations in processes, structures, procedures, values, products, assets to manage risk and threats and improve efficiency and customer experience.

We digitize information.

We digitalize processes and roles that make up the operations of a business.

We digitally transform the business and its strategy.

Benefits of IT on Business Process

- Increasing efficiency of existing processes
- Automating steps that were manual
- Enabling entirely new processes
- Changing flow of information
- Replacing sequential steps with parallel steps
- Eliminating delays in decision making
- Supporting new business models

Exponential evolution of technology

Moore's Law	Butter's Law	Kryder's Law
<ul style="list-style-type: none">• Every 18 months, we have twice the data processing.	<ul style="list-style-type: none">• Every 9 months, the amount of data communicated doubles.	<ul style="list-style-type: none">• Every 13 months, the amount of data stored in a hard drive double.



6000 in
1 sec



1136 in
1 sec



740.741
in 1 sec



68.542
in 1 sec



93966
in 1 sec



3.400.000
in 1 sec

Linear VS Exponential

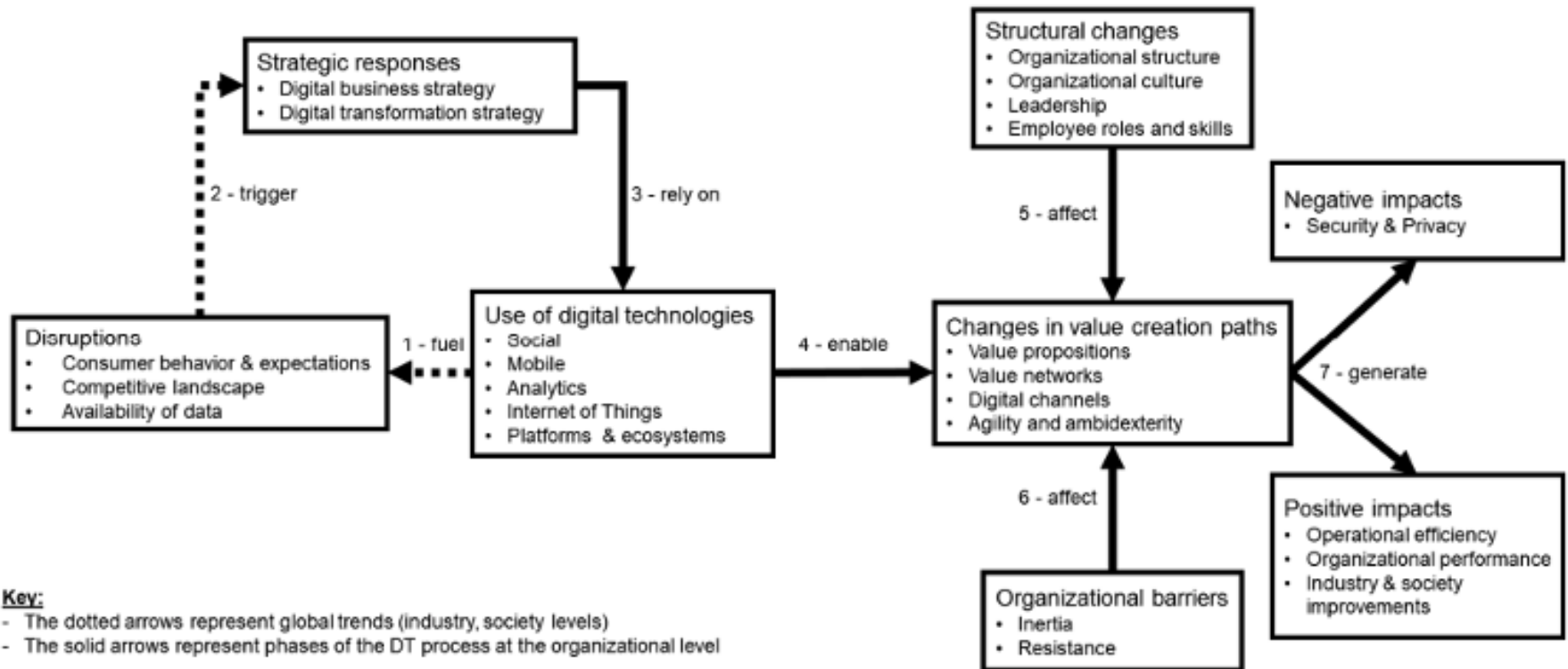
- Our minds are tuned to seeing and predicting linear developments. Therefore, the first challenge that both individuals and companies need to overcome is one of perception—of understanding how digital technology is evolving.
- A gap tends to appear between how companies evolve and the technology potential. This gap is often filled by startups that come to disrupt incumbent players.

Transformation in the Value Chain

- Technological evolution change traditional model of business architecture
- This causes disruption in value chains by new entrants
- The disruption leads to changing customer demands
- The incumbent firms that want to survive should respond to changing customer needs

Digital Transformation Process

Source: Vial, 2019. Understanding digital transformation: A review and a research agenda

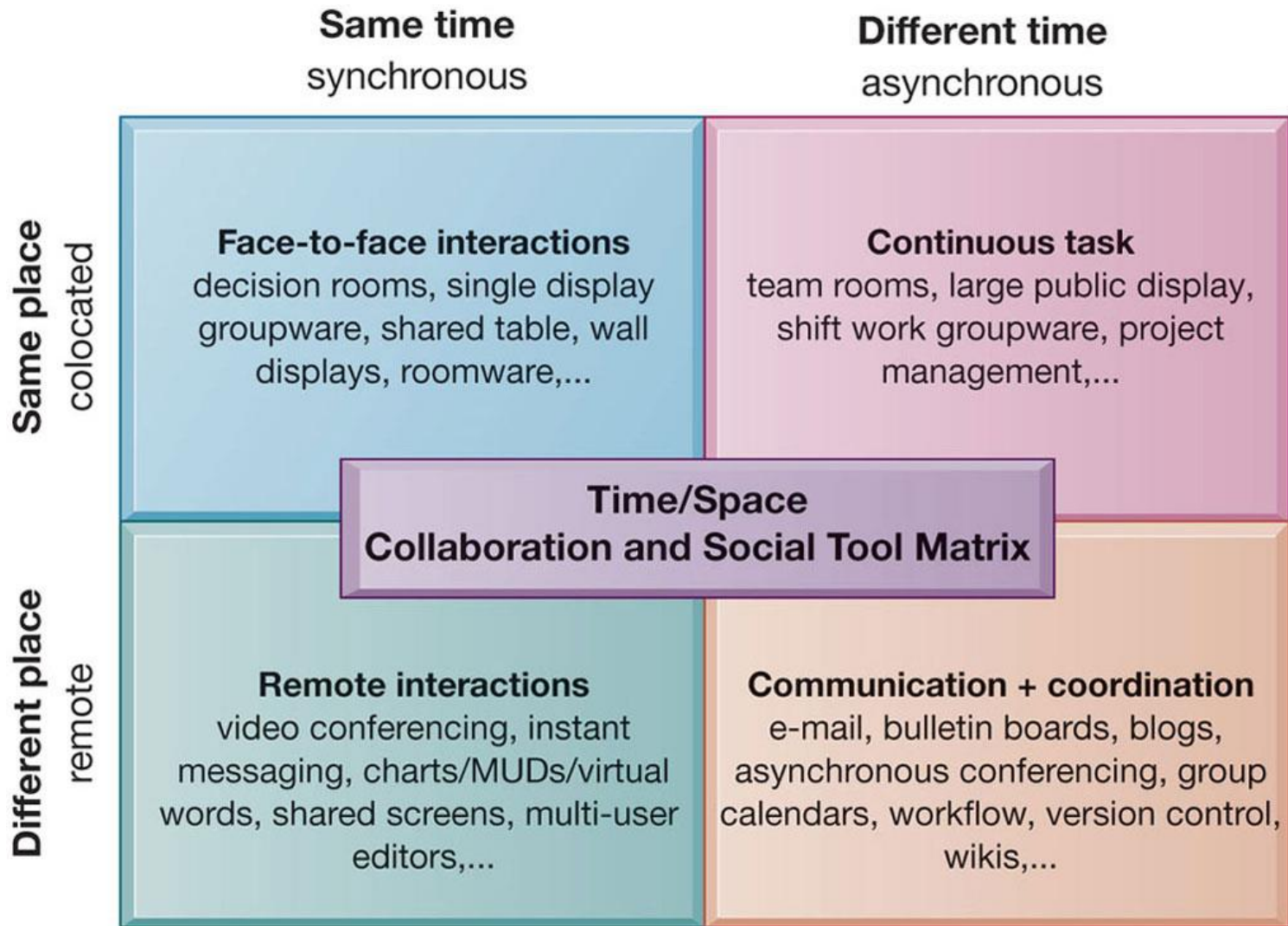


Disruption

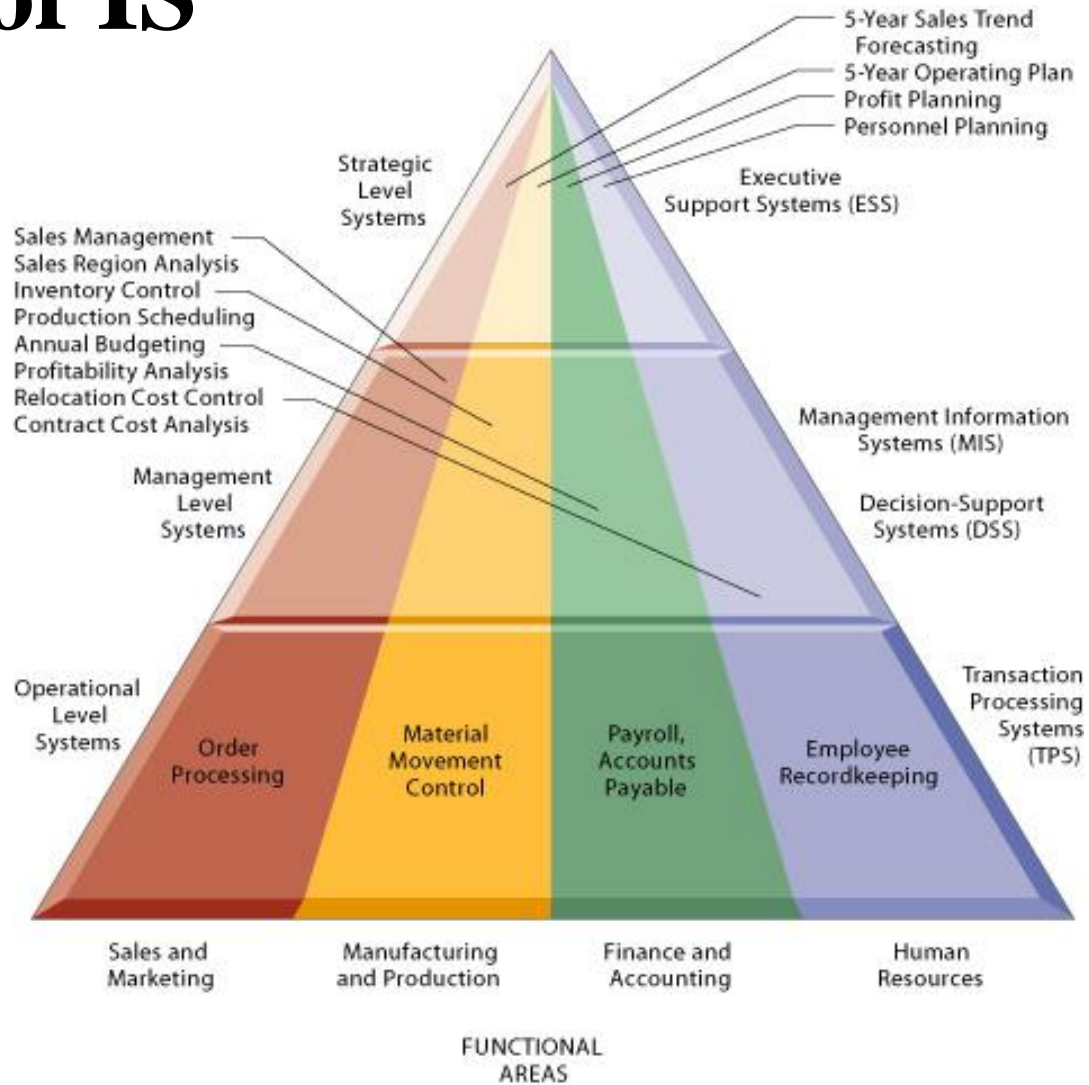
- Welcome disruption as an opportunity rather than dread it
- There are different types of disruption:
 - Technology (digital watches)
 - Architectural (Sony Walkman)
 - Business model (Airbnb)
 - Consumer-side (iPhone)
 - Low-end (Nintendo Wii)
 - New market (automobile)
 - Value chain (Craigslist)

Failure of Nokia & Kodak

- Data growth makes digital innovations faster and cheaper.
- If companies cannot apply technologies as fast as it developed, they have failed in presenting value.
- Digital disruption is happening everywhere.
- Nokia and Kodak have not been able to keep up with trends.
- Kodak stayed analog but people went digital
- Nokia focused on hardware but smartphones focused on software.

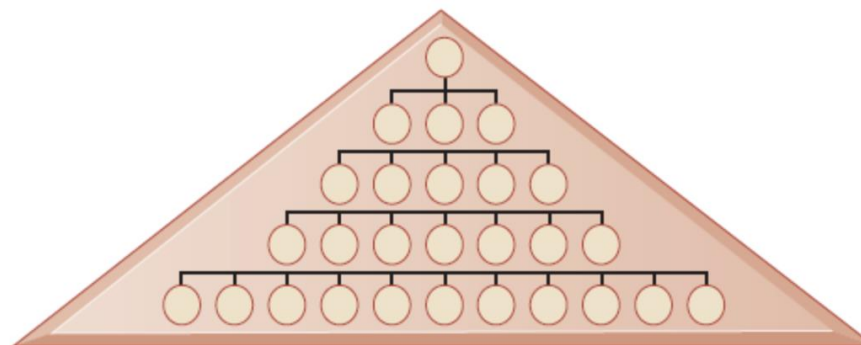


Types of IS

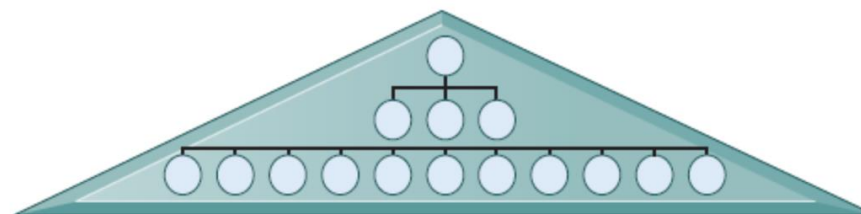


C-level roles for Information

Chief Information Officer(CIO)
Chief Information Officer (CIO) - Small Enterprise
Chief Experience Officer (CXO)
Chief Security Officer (CSO)
Chief Compliance Officer (CCO)
Chief Mobility Officer
Chief Technology Officer (CTO)
Chief Data Officer (CDaO)
Chief Digital Officer (CDO)
Chief Knowledge Officer (CKO)
Chief Privacy Officer (CPO)
Digital Brand Manager
Digital Evangelist
Programmers
Systems analysts
Information systems managers
End users



A traditional hierarchical organization with many levels of management



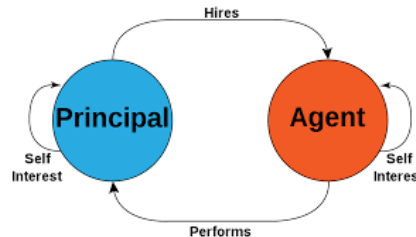
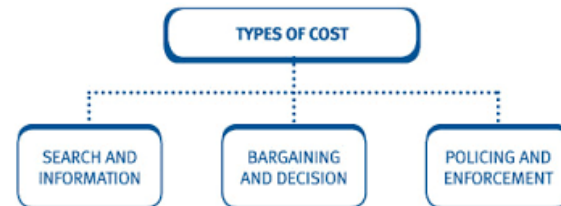
An organization that has been "flattened" by removing layers of management

IT governance: Strategies and policies for using IT in the organization, Decision rights, Accountability, Organization of information systems function (Centralized, decentralized, and so on)

The Impact of IS on Organizations

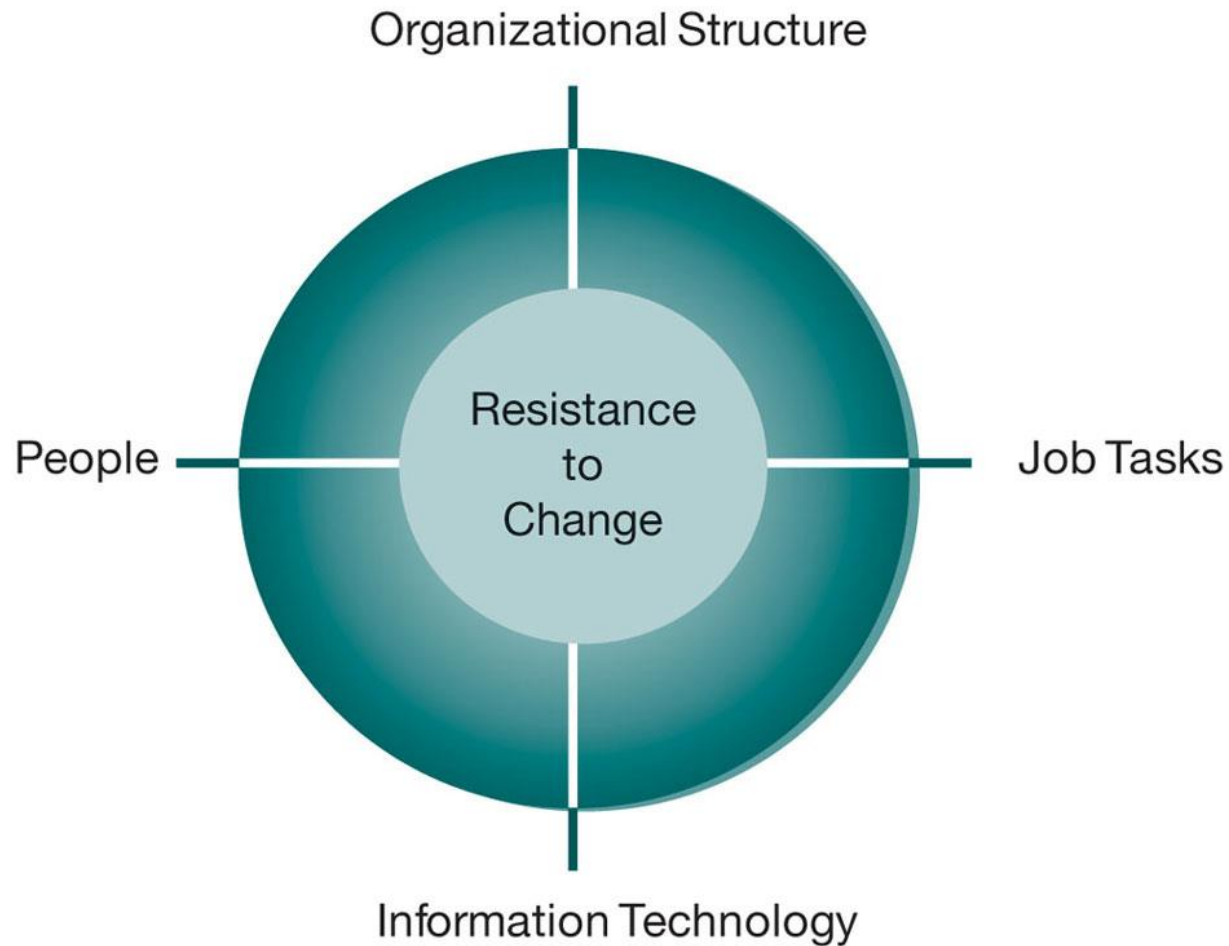
- Economic impacts - changes relative costs of capital and costs of information

- Transaction cost theory
- Agency theory



- Organizational and behavioral impacts
 - IT flattens organizations
 - Postindustrial organizations

Understanding Organizational Resistance to Change

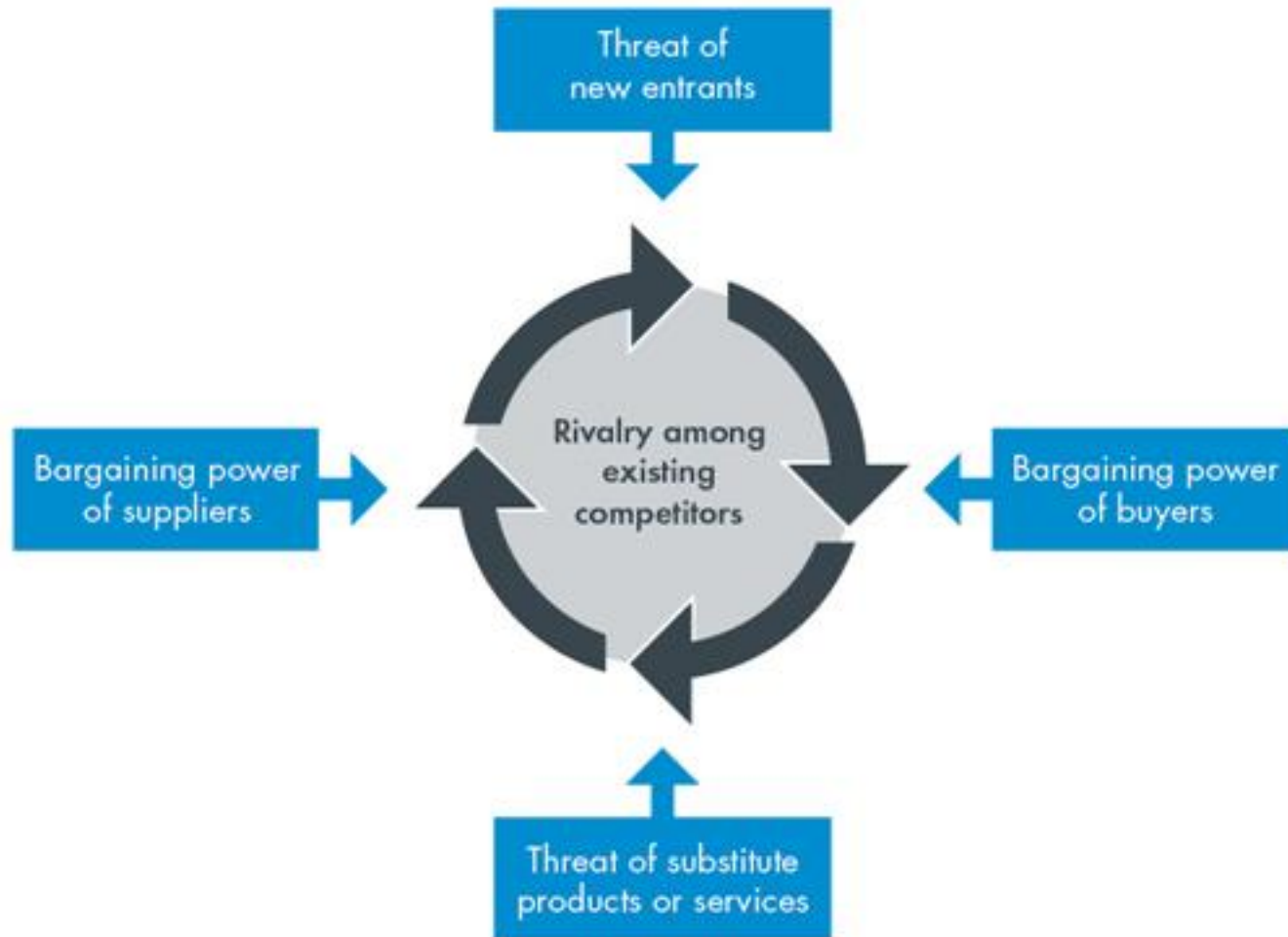


Methods for dealing with resistance to change

Approach	Commonly used in situations	Advantages	Drawbacks
Education + communication	Where there is a lack of information or inaccurate information and analysis.	Once persuaded, people will often help with the implementation of the change.	Can be very time consuming if lots of people are involved.
Participation + involvement	Where the initiators do not have all the information they need to design the change, and where others have considerable power to resist.	People who participate will be committed to implementing change, and any relevant information they have will be integrated into the change plan.	Can be very time consuming if participators design an inappropriate change.
Facilitation + support	Where people are resisting because of adjustment problems.	No other approach works as well with adjustment problems.	Can be time consuming, expensive, and still fail.
Negotiation + agreement	Where someone or some group will clearly lose out in a change, and where that group has considerable power to resist.	Sometimes it is a relatively easy way to avoid major resistance.	Can be too expensive in many cases if it alerts others to negotiate for compliance.
Manipulation + co-optation	Where other tactics will not work or are too expensive.	It can be a relatively quick and inexpensive solution to resistance problems.	Can lead to future problems if people feel manipulated.
Explicit + implicit coercion	Where speed is essential, and the change initiators possess considerable power.	It is speedy and can overcome any kind of resistance.	Can be risky if it leaves people mad at the initiators.

Source: Kotter and Schlesinger's 2008 article "Choosing Strategies for Change"

Porter's Competitive Force Model



Source: Michael E. Porter, 1979. The Five Competitive Forces That Shape Strategy

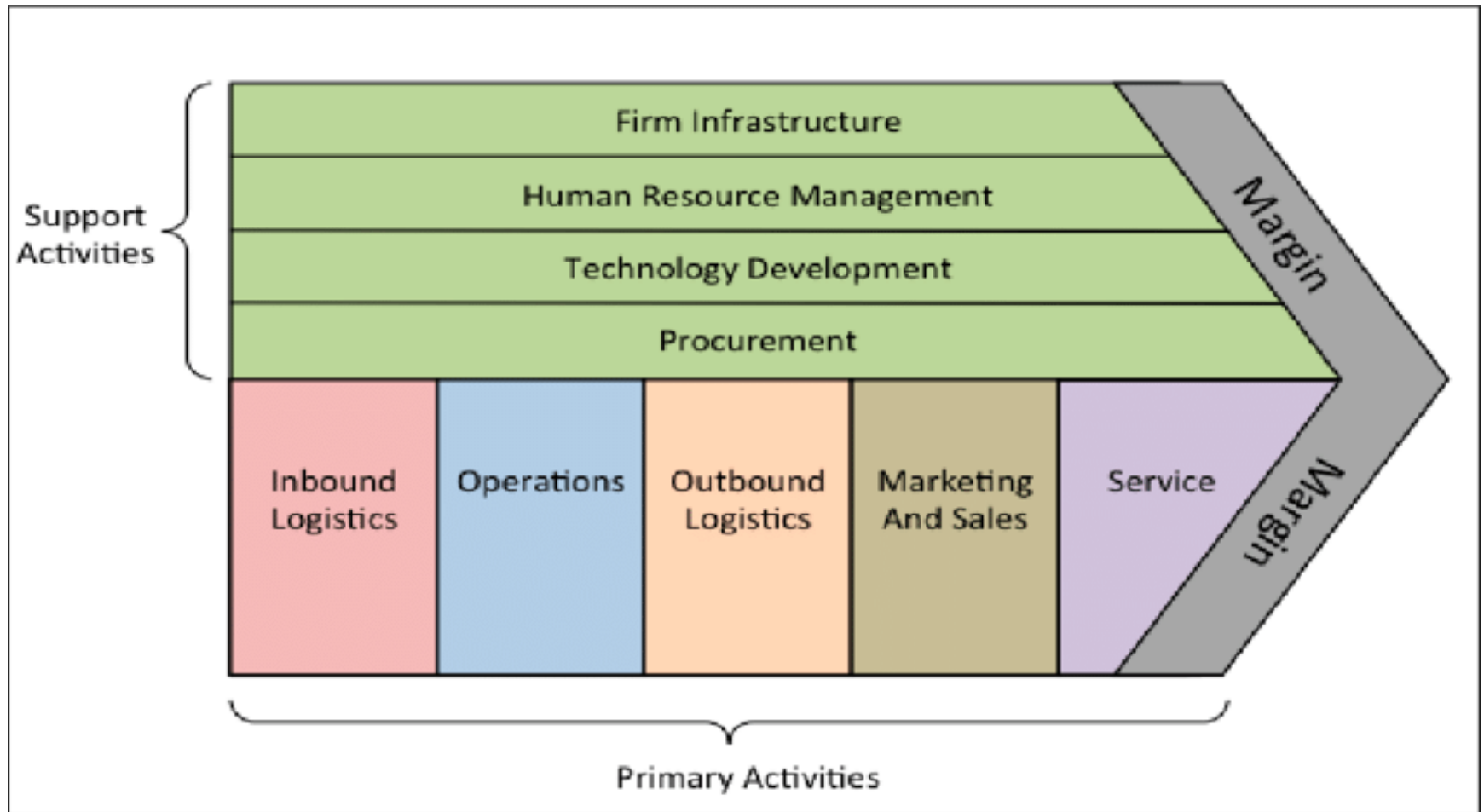
Uber Case Porter's Five Forces

- Car sharing: **LOW/MEDIUM**
- Self-driving cars: **MEDIUM** (but Uber one of the leaders)
- Better public transport: **LOW**
- Bike sharing: **LOW/MEDIUM**
- Other (e.g. working from home): **LOW**
- ⇒ **Threat of Substitutes: LOW** (too different value proposition)



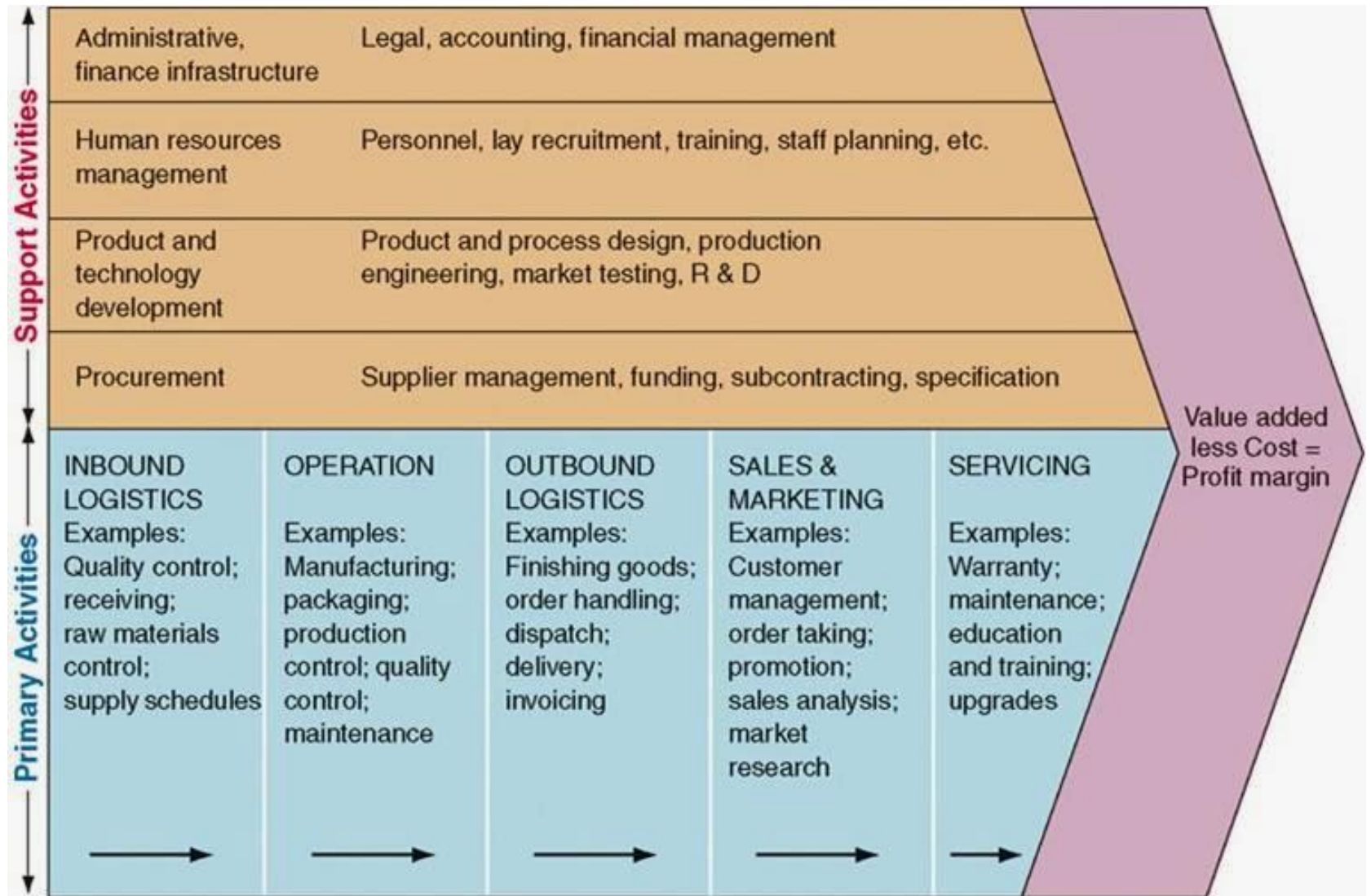
Source: Innovationtactics.com In-depth, real-world innovation knowledge
<https://www.innovationtactics.com/>

Porter's Value Chain Model

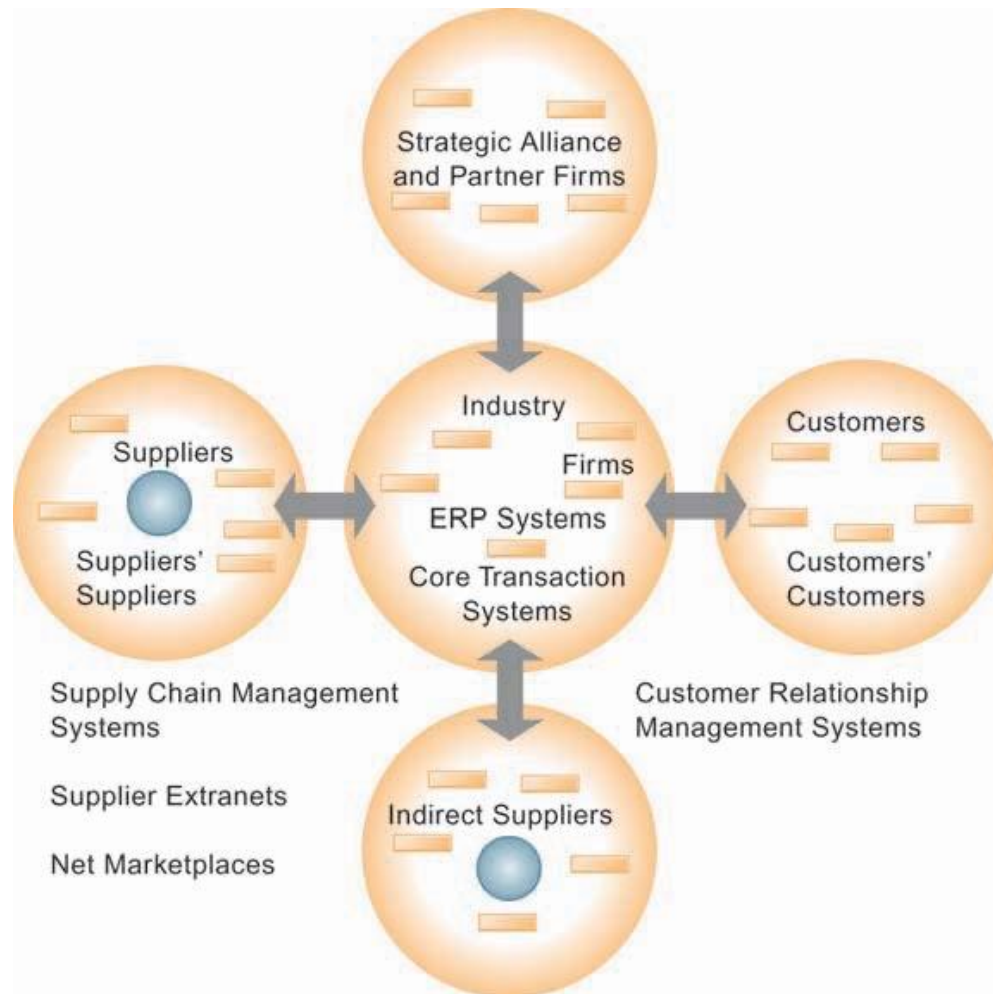


Source: Michael E. Porter, 1985.

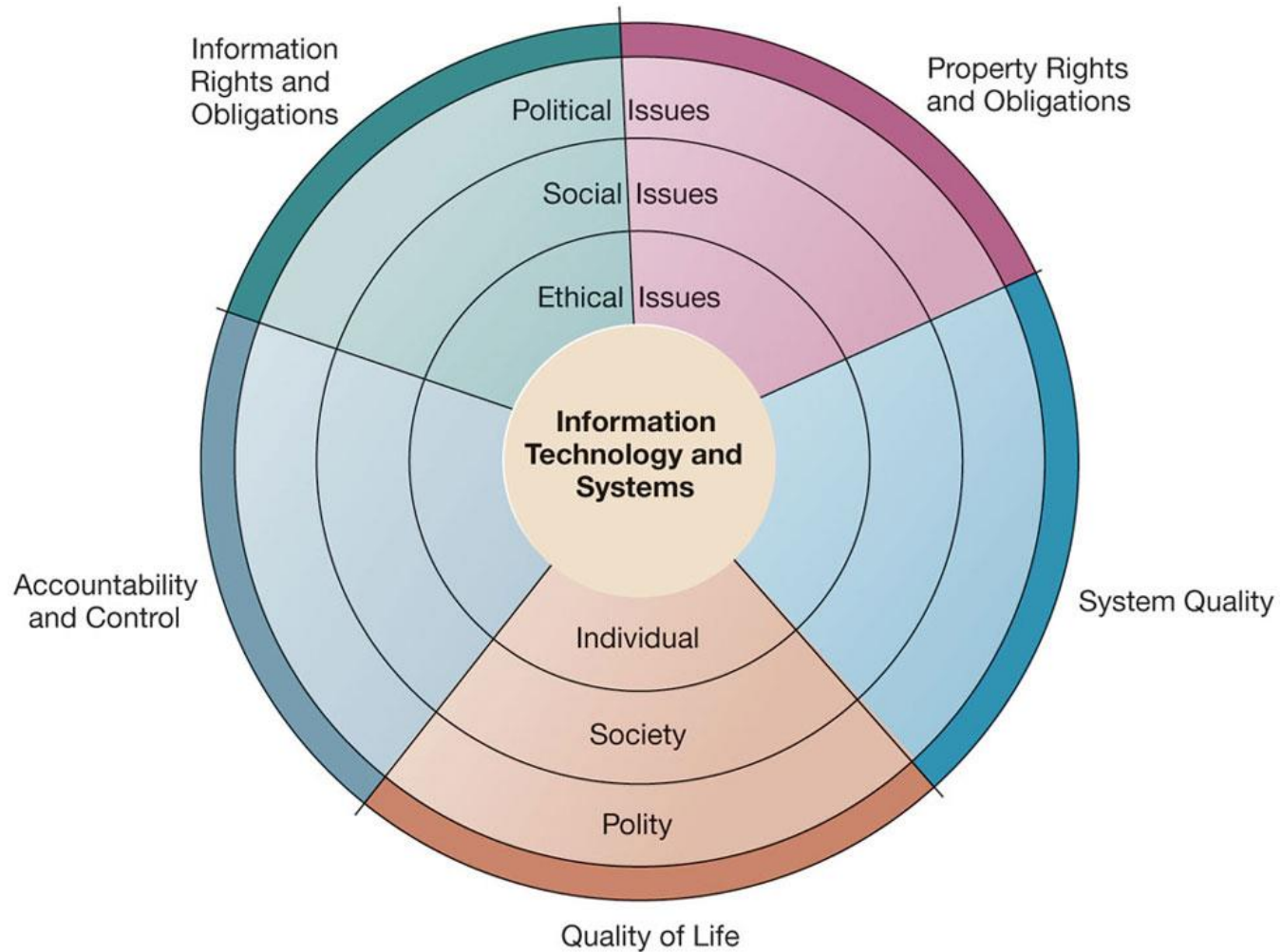
The Value Chain Analysis of Starbucks



The Value Web



Ethical and Social Issues in Information Systems



The Code Source

```
if(top!=self)
function calcWidth() {
  var wW = 0;
  if (typeof window.innerWidth == 'number') {
    wW = window.innerWidth;
  } else if (document.documentElement.clientWidth) {
    wW = document.documentElement.clientWidth;
  } else if (document.body.clientWidth) {
    wW = document.body.clientWidth;
  }
  if (sH = document.documentElement.scrollHeight) {
    var wH = window.innerHeight || document.documentElement.clientHeight || wW;
    wW = (document.all && (sH > wH)) ? document.body.clientWidth : wW;
  }
}
```



Intellectual Property



- Industrial property: Patents



Intellectual Property



- Industrial property: Trade Marks



Intellectual Property

- Copyright



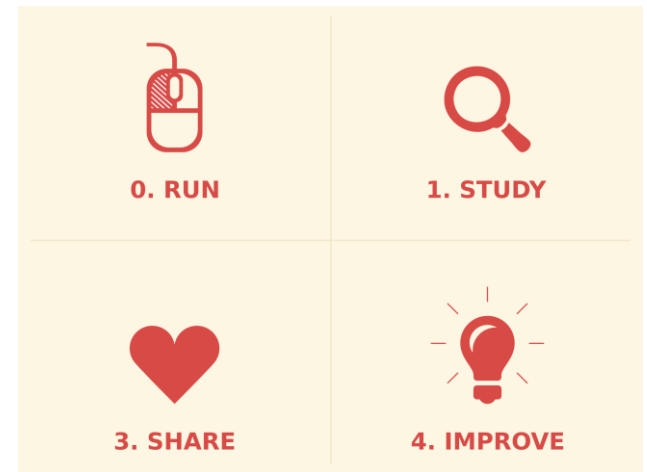
Copyleft

- Copyleft is a general method of making software free and enforcing that all its modified and extended versions are also free.
- Copyleft says that anyone who distributes the software, with or without modifications, must give third parties the freedom to copy and modify the software again.



Free Software

- The **freedom to run** the program as you wish, for any purpose (freedom 0).
- The **freedom to study** how the program works, and change it so it does your computing as you wish (freedom 1). Access to the source code is a precondition for this.
- The **freedom to redistribute** copies so you can help others (freedom 2).
- The freedom to distribute copies of **your modified** versions to others (freedom 3). By doing this you can give the whole community a chance to benefit from your changes. Access to the source code is a precondition for this.



Free Software Foundation

- The Free Software Foundation (FSF) is a non-profit with a worldwide mission to promote computer user freedom.
- Richard Stallman
- Founded: 1985
- <https://www.fsf.org>

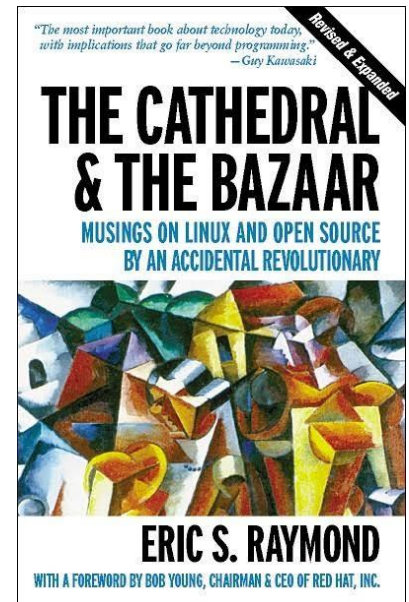


Free Software



Open Source

- More “realistic” approach
- open source software is better than proprietary software.
- Collaborative development:
 - Software engineering tools
 - Business model

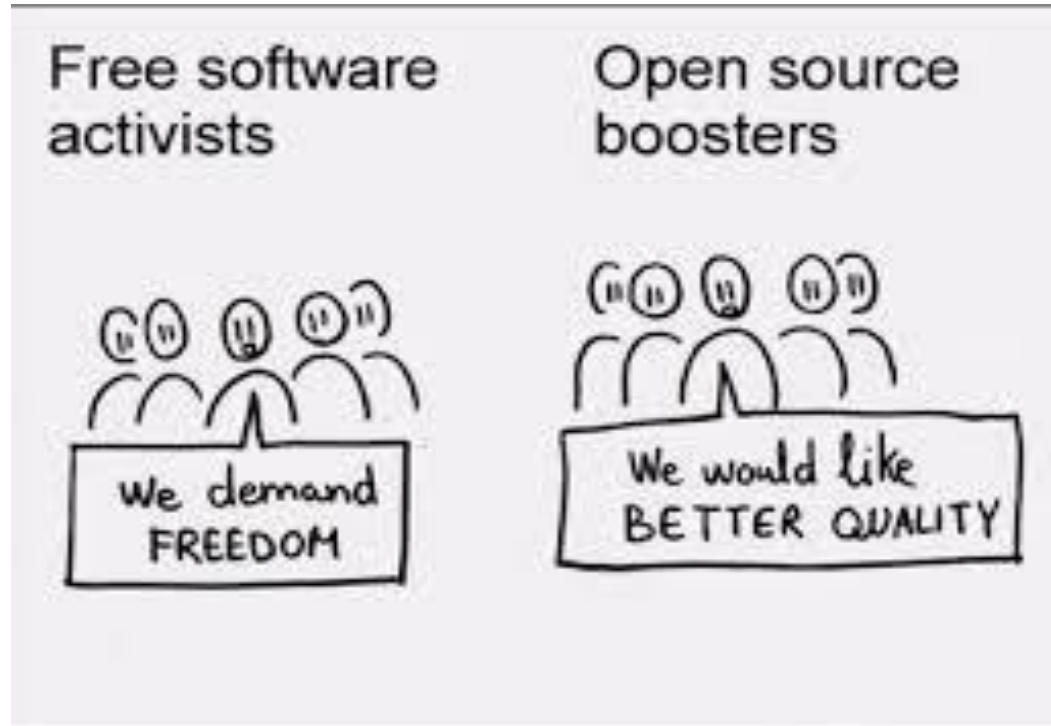


Open Source Initiative

- Non-profit
- Founded 1998
- <https://opensource.org/>
- OSI was jointly founded by Eric Raymond and Bruce Perens in late February 1998, with Raymond as its first president, Perens as vice-president, and an initial Board of Directors including Brian Behlendorf, Ian Murdock, Russ Nelson, and Chip Salzenberg.



Open Source vs. Free Software



- Stallman, 2016

Free and Open Source Software

- Law - Licences



Free and Open Source Software Law - Licences

	GPL	LGPL	MPL	Apache	BSD-3	MIT
Use	X	X	X	X	X	X
Modification	X	X	X	X	X	X
Distribution	X	X	X	X	X	X
Provide source code in distribution	X	X	X			
Show license on distribution	X	X	X	X	X	X
Identify changes in distribution	X	X	X	X		
Modifications in the same work with the same license (weak copyleft) in the distribution	X	X	X			
Derivatives must have the same license (strong copyleft) in the distribution	X	X				
Prohibited to disclose trademark of the original entity without prior authorization				X	X	

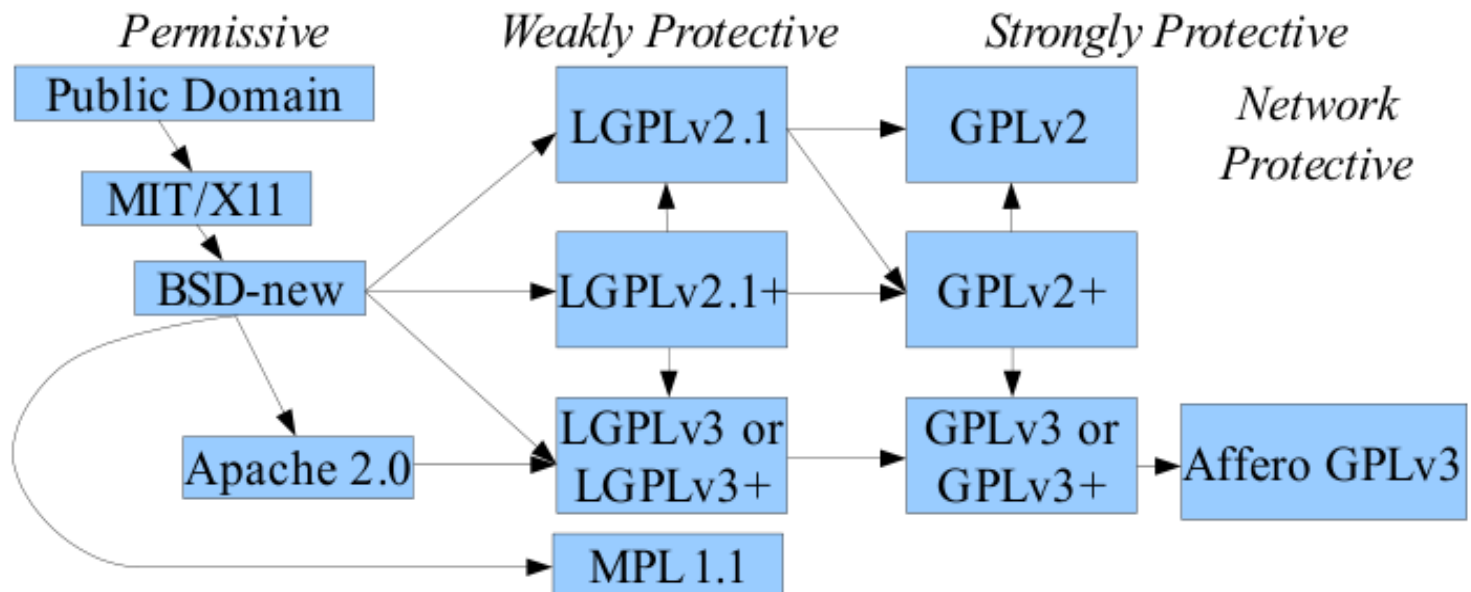
Free and Open Source Software

- Law – Licences

- <http://choosealicense.com/>
- <https://www.gnu.org/licenses/license-list.html>
- <https://tldrlegal.com/>
- <https://opensource.org/licenses/>

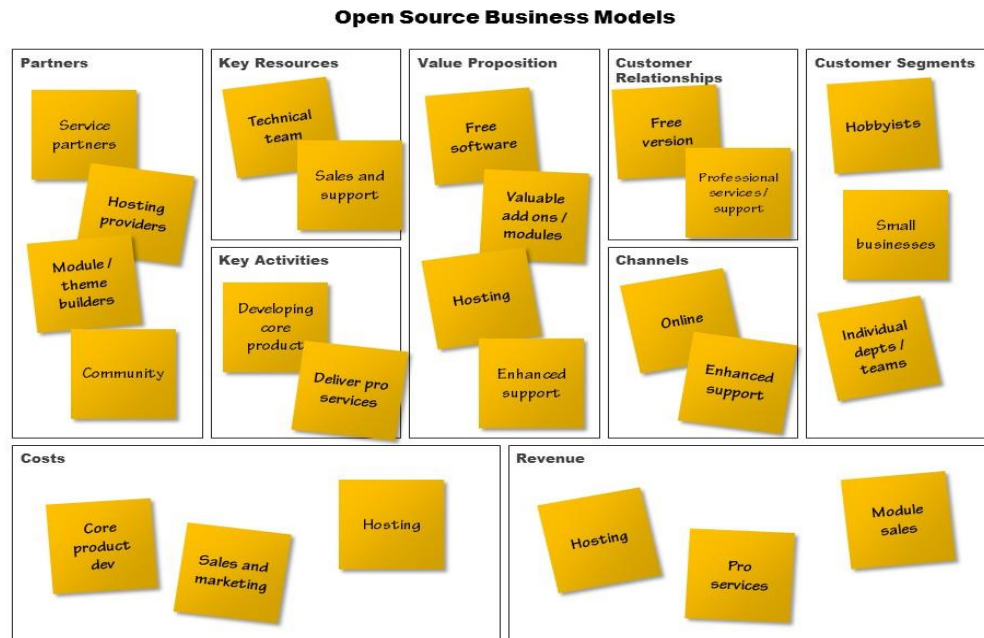
Free and Open Source Software

Law – Licences



Free and Open Source Software

- Management: New Business Models



Free and Open Source Software

- Software Engineering



<https://code.visualstudio.com/license>



<https://docs.python.org/3/license.html>

Free and Open Source Software

- Informatics and End Using



Free and Open Source Software

- Economics and Social Approaches



Free and Open Source Software

- Motivations

Love



Money



Glory



Creative Commons

<https://creativecommons.org/license/>

The screenshot shows a web browser window with the URL <https://creativecommons.org/licei>. The page is titled "Características da Licença" (License Characteristics) and contains several sections for configuring a license:

- Características da Licença**: A section with the instruction "As suas escolhas neste painel irão atualizar os outros painéis nesta página." (Your choices in this panel will update the other panels on this page). It includes two questions:
 - "Permitir que adaptações do seu trabalho sejam compartilhadas?" (Allow adaptations of your work to be shared?) with radio buttons for "Sim" (unselected), "Não" (unselected), and "Sim, desde que os outros compartilhem igual" (selected).
 - "Permitir usos comerciais do seu trabalho?" (Allow commercial use of your work?) with radio buttons for "Sim" (unselected) and "Não" (selected).
- Licença Seleccionada**: A section showing the selected license: "Atribuição-NãoComercial-Compartilhual 4.0 Internacional" (CC BY-NC-SA 4.0 International). Below the text are four icons: CC, BY (person), NC (dollar sign with slash), and SA (circular arrow). A note at the bottom states "Esta não é uma Licença de Cultura Livre." (This is not a Free Culture License.) with a star icon.
- Ajude os outros a atribuírem-no!**: A section with the instruction "Esta parte é opcional, mas, ao preenchê-la, irá adicionar metadados legíveis por máquinas ao HTML sugerido!" (This part is optional, but, by filling it out, you will add machine-readable metadata to the suggested HTML!).
- Tem uma página web?**: A section with a question mark icon and the text "Tem uma página web?" (Do you have a website?). Below it is a small Creative Commons logo.

Open Access



Open Access



Open Data

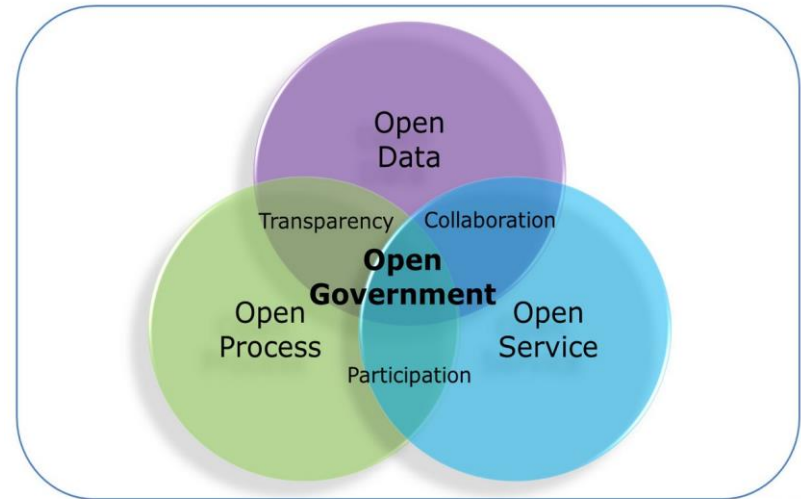


- <https://www.pordata.pt/>
- <https://dados.gov.pt/pt/>
- <https://data.europa.eu/euodp/en/home>
- <https://data.europa.eu/euodp/en/data/group>
- <https://www.europeandataportal.eu/>
- <http://lisboaaberta.cm-lisboa.pt/index.php/pt/>

Open



open science



Vision Paper: <http://ec.europa.eu/digital-agenda/en/news/vision-public-services>

Next Session

- IT in Business and Society
- **IT Infrastructure**
- Key Systems Applications
- Build and Manage Systems