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**Circular,
functional,
collaborative
economy,**

**new business models
for a responsible economy?**



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Summary

- 1) **What is LCA?**
- 2) Circular economy
- 3) Functional economy
- 4) The need of ecodesign
- 5) Collaborative economy
- 6) Are these new business models sustainable at all?

What is sustainable development?

”Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs”

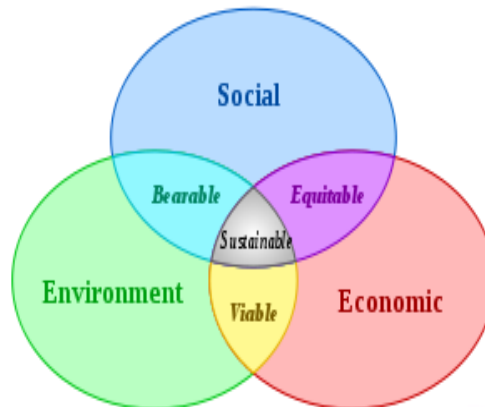
(Brundland report, WCED*, 1987).



* World Commission on Environment and Development

3 pillars : Leans on democratic principles

- **Economic development**
- **Social justice**
- **Environment protection**



Who am I?

My first: *Essential in developing countries, I'm also relevant to developed countries.*

My second: *Thanks to me, sick, pregnant women and isolated farmers access to vital informations.*

My third: *I finance the civil war in Democratic Republic of Congo.*

My fourth: *I'm responsible for cyanide contamination in some rivers and soils.*

ANSWER:

MOBILE PHONE



The LIFE of MOBILE PHONE



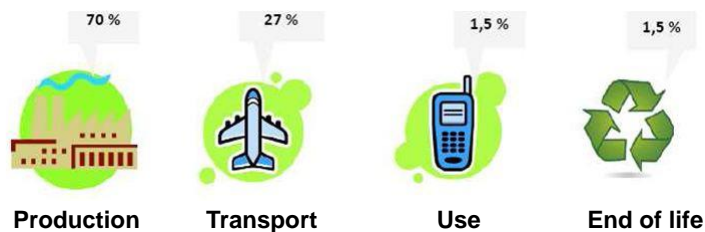
IMPACTS of MOBILE PHONE

Do we already think about environmental, economic and social impacts of our mobile phone during his entire life?

Environmental impacts	Economic impacts	Social impacts
1 – Pollutions	1 – Creation of wealth	1 – Health
2 – Natural ressources	2 – Employment	2 – Culture
3 – Biodiversity	3 – Innovations	3 – Governance , social cohesion
4 – Greenhouse gas emissions (GHG)		4 – Knowledge

MOBILE PHONE

Allocation of Greenhouse gas emissions (GHG) through his life cycle:



<http://www.ademe.fr/internet/telephone-portable/site-web/portable.pdf>

EXTRACTION of RAW MATERIALS: IMPACTS



Coltan mining is causing the disappearance of gorillas.

The extraction of only 5g of gold generates around 20 t of rubble, and cyanide is generally used to leach gold from the ore.

Mining is a currency income for developing countries.

It can be the cause of chronic political instability or favouring a rent-seeking economy over a goods-producing economy for the country.

Mining operations increase the local standard of living due to the paid salaries.

But population can suffer health effect because of bad working conditions in mines.



Coltan is used to control the flow of electric current in mobile phones and other electronic devices.

Coltan mines are located in forests and many women, men and childrens work in these mines.

Coltan mines remove from underground by manually.

Forests and nature are deformed and habitats of gorillas are reduced. Workers are hunted gorillas for eating. Because of all these reasons, gorillas populations are minimized day by day. In recent 5 years , population of the gorillas reduced 90% in Congo.



Blood in coltan

My third: *I finance the civil war in Democratic Republic of Congo.*

UN resolutions since 2000...

Obama's law (Dodd-Frank 1502) in 2010

EU Commission Proposal in 2014 on responsible trading strategy for minerals from conflict zones

human rights abuses

<http://www.youtube.com/watch?v=in0A8SFL3XM#t=129>

<http://web.mit.edu/12.000/www/m2016/pdf/coltan.pdf>

Coltan, Congo & Conflict
POLINARES CASE STUDY
The Hague Centre for Strategic Studies N° 20 | 03 | 13



Intel, the largest commercial consumer of tantalum, announce at the Consumer Electronics Show in Las Vegas in 2014:
"Every microprocessor of Intel ships will be made entirely with conflict-free minerals."
Good publicity for Intel? Sure
Conflict free? Impossible to tell...

The raw materials of mobile phones:

Opaque supply chain

Traceability impossible
(although currently further progress...)



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CONFLICT-FREE
CAMPUS
INITIATIVE



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MANUFACTURE of the product: IMPACTS



Use of substances that are hazardous to human health and the environment.

Source of innovations, processes involve the use of high technology.

The people's standards of living raise (cost of the work: 3 € per mobile...).

Poor health and safety at work.
Child labour.



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May 14, 2014

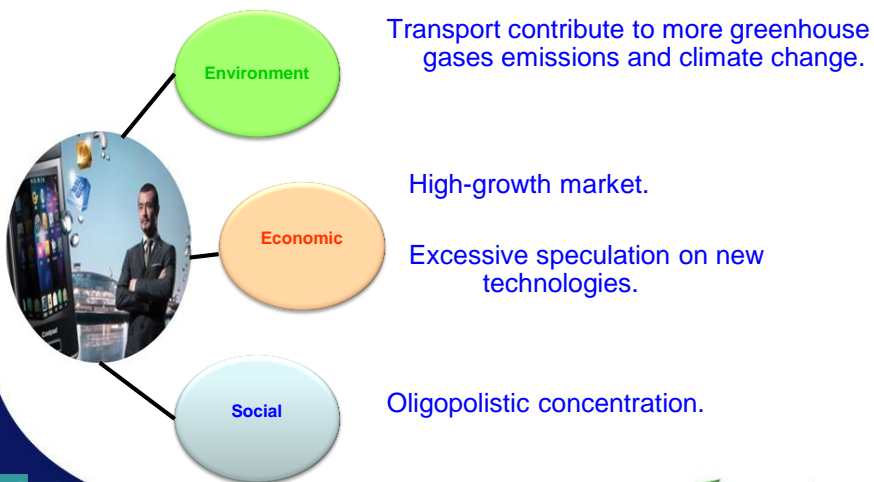
South Korean electronics giant **Samsung** has officially apologized over the illnesses and deaths of some of its factory workers.

Samsung would make "appropriate compensation to those who were affected and their families," after activist groups claimed hazardous working environments caused some employees to contract lethal diseases.

In 2011, a Seoul administrative court said there was a high probability that Hwang Yu-mi, who died from leukemia in 2007, contracted the disease after coming in contact with dangerous chemicals at a Samsung plant in Suwon.

A documentary released last month uncovered 56 cases of leukemia and other blood cancers among Samsung workers.

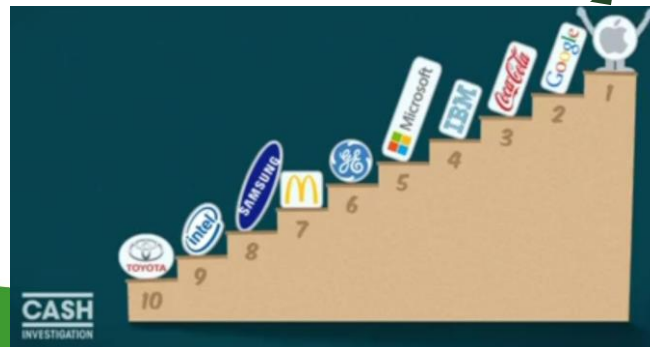
Distribution/Marketing: IMPACTS



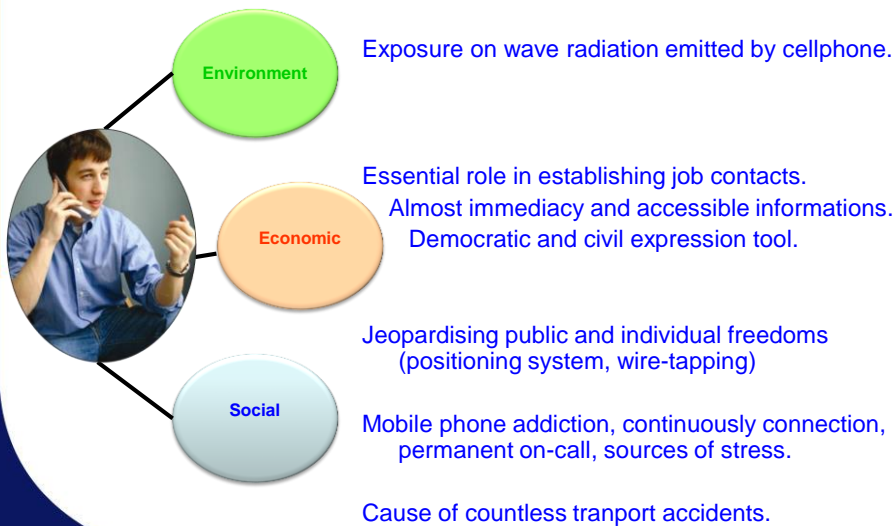


Oligopolistic concentration ?

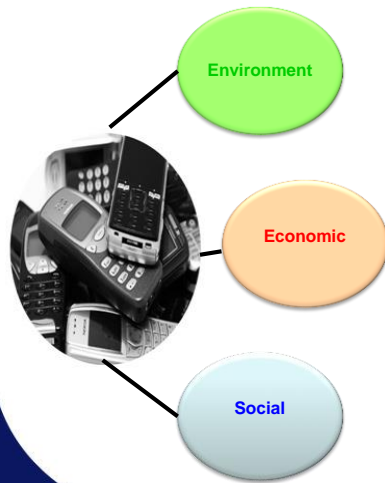
37 MILLIARDS €
of benefit



USE of the product: IMPACTS



END OF LIFE of the product: IMPACTS



Only a small percent are recycled.

Tons of e-wastes exported in Africa, India and China, themselves large consumers.

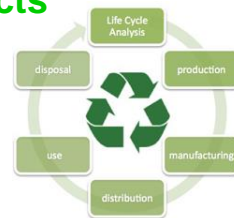
In EU, internalisation of the waste management cost: 0,01 € ecoparticipation to buy a phone.

Reusing, repairing and recycling expand job opportunities locally.

Donations and trading networks.

TO SUM UP:

Life Cycle Assessment (LCA) is a tool to evaluate environmental and social impacts of products or services along their life cycle.

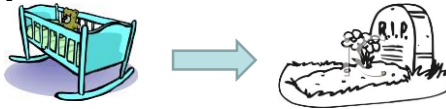


Life cycle thinking expands the traditional focus on the production site and manufacturing processes **to incorporate various aspects over the entire life cycle.**

Life-cycle thinking: a systematic approach to avoid any transfer of impact of a life cycle phase to another.

What is Life Cycle Assessment (ELCA) ?

A technique to assess environmental impacts, associated with all the stages of a product's life from *cradle-to-grave*:



from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling.



ISO 14040

ISO 14044

Sustainable Development for cell phone???



What can we do?

- ◆ as users
- ◆ as producers

Some response in this movie:

www.theseconlifeofthings.com

SD for MOBILE PHONE?

What can we do?

- On environmental and health safety conditions in mines and plants.
- On collection and recycling systems.
- On giving recognition to the suffering and the job stress.
- On respect of private life, public rights and freedom, for instance on geolocation control.

Regulations

Environmental standard ISO 14001

Ecolabelling

Corporate Social Responsibility

OHSAS 18001

Ecotaxes

ISO26000



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Material content of mobile phone

mobile phone substance (source Nokia)

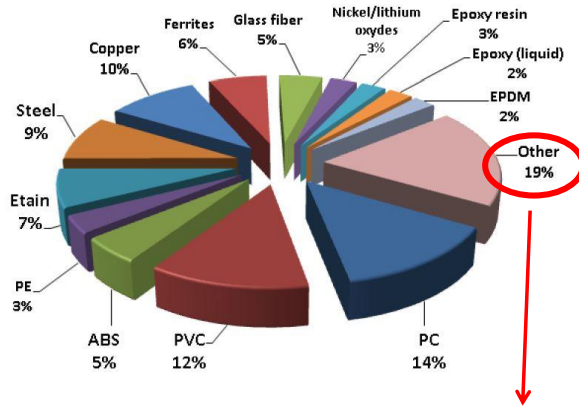
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20												
1 H	2 He																	3 He													
3 Li	4 Be																	10 Ne													
11 Na	12 Mg																	18 Ar													
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr														
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe														
55 Cs	56 Ba	57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
87 Fr	88 Ra	89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Uun	111 Uuq	112 Uub	113 Uut	114 Uuq	115 Uuq	116 Uuq	117 Uuq	118 Uuq



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Composition of a mobile phone:



The "Other" category consists of all materials and substances in a telephone with quantity less than 1g.

Among these substances are of gold (66 mg) or rare earth elements.

(ADEME study)

Strategic metals

The new technologies that are now part of everyday life all depend on valuable metals which, although used only in small quantities, have unique properties and are very difficult to substitute.

Families	Metals studied		
Platinoids	Platinum	Ruthenium	Rhodium
	Palladium	Indium	Osmium
Rare earth elements	Lanthanum	Terbium	Yttrium
	Cerium	Dysprosium	Gadolinium
	Praseodymium	Holmium	Scandium
	Neodymium	Erbium	Europium
	Promethium	Thulium	Lutetium
	Samarium	Ytterbium	-
Other metals	Cobalt	Gallium	Beryllium
	Titanium	Indium	Lithium
	Tungsten	Tantalum	Silver
	Rhenium	Germanium	Vanadium

35 critical/strategic metals listed by the EU

Sources : These metals are not found in large quantities in the earth's crust and the deposits are concentrated in a small number of nations:

China produces over 97% of the world's rare earth elements.
Brazil accounts for 92% of niobium extraction.
62% of chromium is extracted in South Africa and Kazakhstan.
Cobalt production is dominated by the Democratic Republic of Congo.

For many strategic metals, including the rare earths, the recycling rate is currently less than 1% !

Scarcity of resources

Metals are of vital importance to the global economy, whether in the manufacturing of buildings or cars or in the rapidly expanding production of mobile phones.



Since metals are a finite resource, the potential challenge on metal supply could be addressed through recycling across the life-cycle.

Products become raw material banks

One tonne of electronic scrap contains more gold than that recovered from 17 tonnes of gold ore and 40 times more concentrated copper than that found in copper ore (USGS 2001).

Concept of Urban Mines



■ A recycling campaign to collect used mobile phones in Japan was launched in November 2009 and involved 1,886 stores and supermarkets. Those who returned used mobile phones in exchange for purchasing a new device were invited to enter a lottery to win coupons worth 1,000-50,000 Yen (equivalent to US\$ 12 to US\$ 600) depending on the price of the mobile phone they bought. The initiative collected 569,464 mobile phones containing precious metals amounting to 22 kg of gold, 140 mg of silver, 10 g of copper and 4 mg of palladium in just four months.

Source: Mohanty (2010)

75% of gold is lost in a conventional WEEE recycling process. Much electronic waste is not actually collected for recycling and is either stockpiled in homes or disposed of to landfill. Illegal exports of WEEE are responsible for a further leaching away of valuable resources. Finally, some metals are not being recycled because the technology is not yet available.

Urban mines

Hoboken plant in Belgium is one of the world's largest precious metals recycling facilities with a capacity of over 50 t PGMs (palladium, platinum, rhodium, iridium, ruthenium), over 100 t of gold and 2400 t of silver.



Aerial view of Umicore's Hoboken plant

The 3R Initiative: Reduce, Reuse and Recycle for an effective use of resources and materials:

Agreed upon at the G8 Sea Island Summit in June 2004, it was formally launched at a ministerial meeting in Japan in the spring of 2005.



① **R**educing means choosing to use things with care to reduce the amount of waste generated.

② **R**eusing involves the repeated use of items or parts of items which still have usable aspects.

③ **R**ecycling means the use of waste itself as resources.

Rapid population growth and economic expansion have led to escalating demand for energy, basic industrial commodities and consumer goods.

Linear economy model

Unlimited resources



TAKE

Raw material extraction and synthesis.



MAKE

Manufacturing, Production, Distribution, Use.



WASTE

Landfill, Incineration

Unlimited waste

We are now in a situation where finite materials are running out, our surroundings are being polluted and landfill sites can no longer contain our waste.

The "take, make, waste" model is no longer feasible. It is unsustainable.

Cell phone upgrade:

Cell phone companies typically allow free or very inexpensive upgrades every two years. This leads people to stop using working cell phones simply because there is something newer, possibly with more features.

Yesterday



Incredible

Today



Old-fashioned



Commercial obsolescence

Obsolescence of the product

**A fantastic tool to boost the linear economy:
More products are sold, the more you earn money!**

- Low cost product
- Irreparable product

It needs a lot of raw materials who are lost after use.

**But how can we imagine an infinite growth
in a finite world???**

Yesterday: How to produce more?

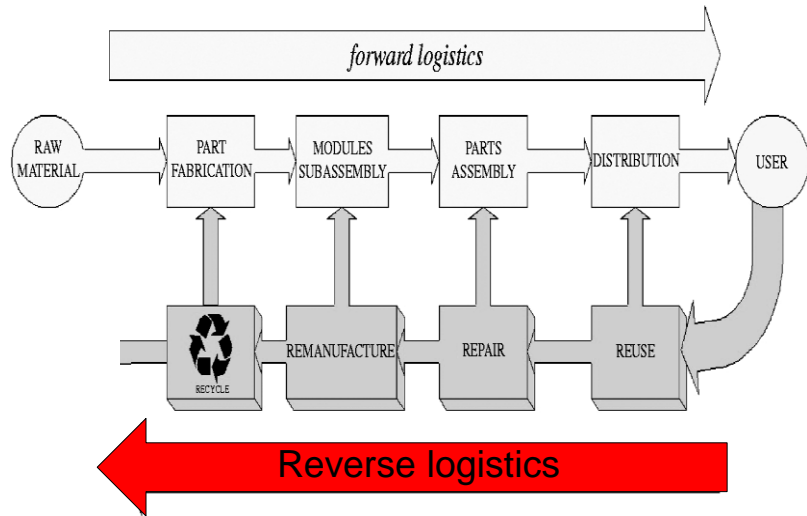
Today: How produce quality product for as little cost as possible?

**Tomorrow: How produce quality product for a little cost as possible
and more environmentally friendly?**

Davos World Economic Forum, Klaus Schwab, 2012:
**"Capitalisms, in its current form, no longer fits the
world around us."**

**WBCSD describes a world of about 9 billion people in 2050 which
the manufacturing industries follow life-cycle approaches,
are less carbon and less material intensive, and offer products
and services based on high longevity. (Vision 2050 report, 2010)**

* World Business Council for Sustainable Development



_"Reverse Logistics" is the process of returning goods from consumers back to suppliers.

We have to close the loop



Summary

- 1) What is LCA?
- 2) **Circular economy**
- 3) Functional economy
- 4) The need of ecodesign
- 5) Collaborative economy
- 6) Are these new business models sustainable at all?

What is circular economy?

An economy in which material use and waste generation is minimised,

any unavoidable waste is recycled or remanufactured,

any remaining waste is treated in a manner least harmful to the environment and human health, or in a way which generates new value.



Circular economy

By optimising and synergising different industrial sectors and resource flows

Outputs of one sector become the input of another to create a circular economy.

⇒ Eco-industrial park

⇒ The concept of cradle to cradle (C2C)

McDonough and Braungart, 2002

<http://www.ellenmacarthurfoundation.org/>

Example of eco-industrial park in region Nord Pas de Calais

The heating coming from the industrial process of the steel plant of Arcelor Mittal



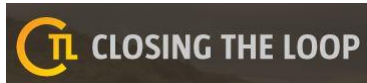
The biggest equipment of industrial energy recovery in France.
20 000 t of CO₂ avoided each year.



The district heating network of the city of Dunkerque



One positive example in Netherland:



<http://closingtheloop.eu>

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What is functional economy?

To buy the use (the function) of a product,
in order to buy the product itself.

The aim is to break the link between

the added value of the product

and

energy consumption, raw materials for
production of this consumer good.

Functional economy, Product Service System

Change in economic approach: adopting a model based on the service economy.

PPS concept promote a focus shift from selling just products to selling the utility, through a mix of products and services while fulfilling the same client demands with less environmental impact.

Offering a service rather than a product.

Some larger firms are offering a whole-life service to customers, from design and development through to manufacture and maintenance and, ultimately, to disposal.

Forget ownership, focus on performance!

Several companies are already successfully collecting and reusing their own products and components.

Xerox, for example, has designed its products for ease of dismantling and is able to remanufacture them, using some components up to seven times.

Ricoh, another supplier of office equipment, has enjoyed considerable success with its high quality remanufactured GreenLine range.

Truck manufacturer Caterpillar uses a deposit system to encourage customers to return end-of-life products, which go to make a range of remanufactured vehicles with guaranteed performance.

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The need of Eco-design

Ecodesign aims at reducing the environmental impact of products throughout their entire life cycle.

The set up of an eco-design process is generally performed in two steps:

① The first step is an assessment phase during which, using tools of life cycle analysis (LCA) identify areas for improvement a product.

② In a second step, searching solutions to improve the product. It is during this stage that the eco-design can be as a driver of innovation for a company.

Eco-design

DESIGN FOR DISASSEMBLY

The challenges are:

- Preserve the raw material resources,
- Reduce the amount of non-recyclable waste send to landfill,
- Facilitate the achievement of recycling regulations requirements.



The WEEE regime were amended to make each manufacturer responsible for the recovery of its own products (individual producer responsibility), there would be a greater incentive across industry to “design for disassembly”.

Eco-design

DESIGN FOR REEMPLOY and REUSE

in order to prolong the lifespan of products

Reemploy and reuse activities of goods have three environmental and social objectives:

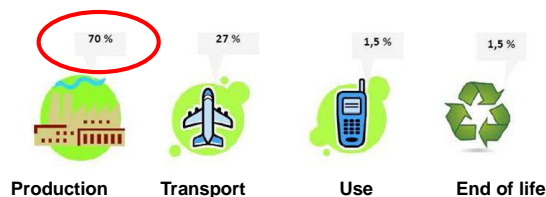
- ⇒ The waste recovery (environmental issue),
- ⇒ The employment of persons in difficulty (social issue),
- ⇒ The resale of these goods at low prices (social issue).

The marketing of products having a longer lifespan improves branding of the company by increasing the perception of quality and reliability by the user.

Eco-design

DESIGN FOR LONGEVITY

The most significant impact for a mobile phone take place during the production.



The solution is to extend the life of the phone before the renewal.

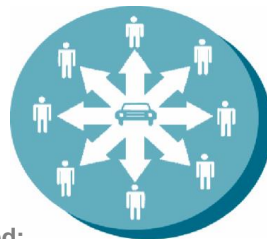
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Collaborative consumption

Class of economic arrangements in which participants share access to products or services, rather than having individual ownership.

Often this model is enabled by the new technologies and peer communities.



The collaborative consumption model is used:

- In marketplaces (eBay)
- In crowdfunding (Zopa)
- In peer-to-peer accommodation (Airbnb)
- In peer-to-peer travel experiences (LocalGuiding)
- In peer-to-peer task assignments (TaskRabbit)
- In travel advising (Locish)
- In car sharing (Blablacar)
- In peer to peer cooking (Homediner)

etc...

Examples in the area of transportation

Bicycle sharing system

Instead of owning a bike, you use it!



Examples in the area of transportation

You don't buy a plane, you use it.

Why? Too big in your garden... too expensive

Sharing a bike?

Why? Too big in your flat... faster than walking.

Green? Doesn't reduce the GES in the cities.

Why? The transfer of modal share of cycling comes mostly from pedestrians...



Sharing a service electric vehicle?

Not green? Transfer of pollution from the cities to the countryside (use of coal fired plant).



Sharing your vehicle?

Why not? We use it only 12% of his entire life (mostly parked).

Summary

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Are these new economies sustainable?

We can identified **two types of functional economy**:

B2C:

Benefits to the company:

To preserve **their** raw materials in demanteling **their** own products.

To have **captive consumers** in offering service contracts.

C2C:

Increasing the purchasing power of consumers in buying a services less expansive than products.

Is there any B in C2C? If yes, what rules are in play?

Is users not consumers ?

The rebound effect

(video: SPREE- The concept of SERVICIZING)

Is there any B in C2C? If yes, what rules are in play?



Why should we give our personal data to private companies who resell them without any protection of our private life?

<http://degooglisons-internet.org/>

Careful attention to the model...

Multinationale or cooperative sector ???

→ Democratic process
One voice = one citizen



Vertical world	Horizontal world
Hierarchical	Participatory
Chrome	Firefox
Google	DuckDuckGo
Google maps	Open street map
Doodle	Framadate
Facebook	Diaspora
Microsoft softwares	Open source softwares
Patents	Creative commons
...	...



The positive point is:

People (re)-discover the power of the Commons.

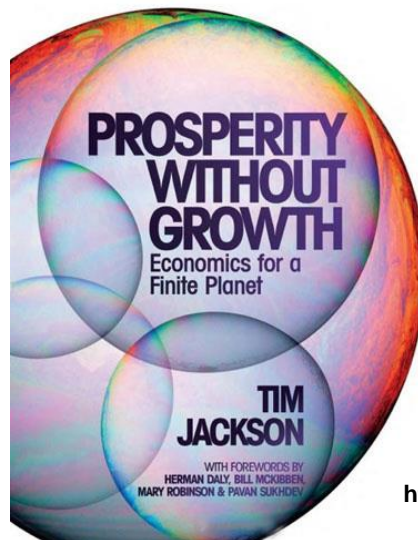
open source in the virtual world,
collaborative economy in sharing objets in the real world

To eliminate the economics of scarcity,

to empower a truly democratic marketplace

to move towards an economy of abundance.

'Business as usual is not an option.'
Oliver James, author of *Affluenza*



<http://postgrowth.org/>

*“The world is big enough to satisfy everyone's needs,
but will always be too small to satisfy individual greed”
Gandhi*

Thank you for your attention

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