

Impact of Informatics on Economic and Financial Crisis

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The theory of *technical systems*

- Bertrand Gille, *Histoire des Techniques*, Gallimard, La Pléiade, 1978
- A « technical system » is defined by the synergy between a small number of technologies
- Industrialization : synergy between mechanics, chemistry and energy (electricity, oil)
- Computerization : synergy between microelectronics, software and network

Social and geopolitical dimensions of a technical system

- Consequences of industrialization: birth of the working class, revolution, urbanization, education, capitalism, imperialism, colonialism, world wars...
- Computerization is presently transforming the economy and society as profoundly as industrialization did in the eighteenth, nineteenth and twentieth centuries

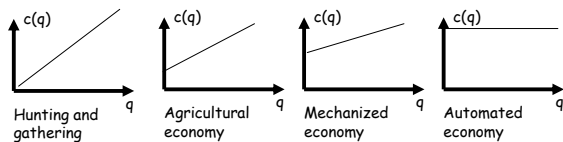
Consequences of computerization

- The set of interconnected computers builds an **Ubiquitous Programmable Automaton (UPA)**
- The UPA assists the human brain and they form a specific alloy
 - It replaces the old industrial alloy of hand and machine
 - In the firm « brainpower » replaces « manpower »
- This alloy emerges in a space where geographical distance does not exist
 - This « new continent » presents new possibilities but also new dangers

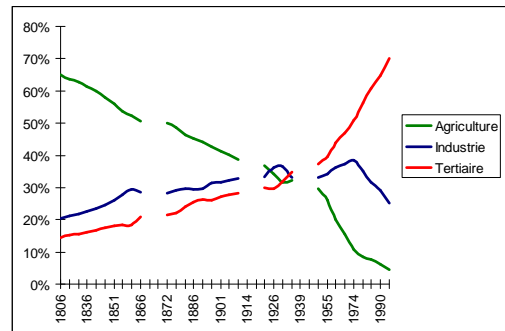
Economics of computerization

- Automatisatation : a fixed cost of production
- Change in the structure of employment
- Monopolistic competition
- The economy of the maximum risk
- Globalization, violence, predation

Evolution of cost function

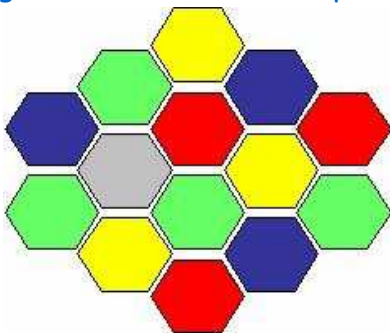


Employment : a rupture in 1975



Source : Marchand et Thélot

Monopolistic competition : segmentation in « needs space »



The « maximum risk »

- Consequences of fixed cost production
 - All the cost is incurred before the firm sells the first unit of its product
 - Violence of competition increases
- Globalization
 - Fixed cost : the firm targets the world market
 - Competition becomes global
 - Cost of transportation decreases, due to computerization of logistics and automatization of containers handling
- Predation
 - Maximum risk encourages corruption
 - Computerization facilitates money laundering
 - Crime and corruption prosper

One example...

- « In recent years, Union Bank of California, American Express Bank International, BankAtlantic and Wachovia have all been caught moving huge sums of drug money. Wachovia alone had moved more than \$400 billion for account holders in Mexico, \$14 billion of which was in bulk currency that had been driven in armored cars or flown to the United States. »
(Robert Mazur, « Follow the Dirty Money », *The New York Times*, September 12, 2010)

Culture of predation

- « I want to become a godfather, I want to have malls, shops and factories, I want to have women.
- » I want three cars, I want people to respect me when I go somewhere, I je veux que les gens me respectent quand j'entre quelque part, I want stores around the world.
- » And then I want to die like those who lead for good : I want to die murdered »
(Roberto Saviano, *Gomorra*, Gallimard 2007, p. 141)

What financial crisis ?

- « Nobody understands anything, we do not know where we are going, what policy should be recommended » (Frédéric Lemaître, « Le forum de Davos en plein brouillard », *Le Monde*, 27 janvier 2009)
 - Liberal dogmatism and sovietic planification equally discredited
- What financial crisis ?
 - Appearance : under-estimation of risks
 - Reality : an episode of an economic crisis
 - A root cause : inadequacy of behaviors (investment, consumption) with the new technical system
 - Finance attempted to conceal this inadequacy until the building collapses...

Computerization of finance

- The world market is unified
 - The whole banking system
 - A feeling of security
- Breakdown of profit / risk arbitrage
 - Deregulation, « laissez-faire »
- Algorithms and automatization of transactions
 - Complexity defies human understanding
 - Failure of control of automatism and human beings

Automation of finance

- "Use of digital technology caused the present financial turmoil" (Neville Holmes, "The Credit Crunch and the Digital Bite", *Computer*, January 2009)
- "The Wall Street titans loved swaps and derivatives because they were totally unregulated by humans. That left nobody but the machines in charge" (Richard Dooling, "The Rise of the Machine", *The New York Times*, October 12, 2008)
- "Since the Big Bang of the 1980s, large amounts of stocks and shares - and derivatives of them - have been traded automatically by computers rather than by humans. These so-called "algotrades" accounted for as much as 40% of all trades on the London Stock Exchange in 2006; on some American equity markets the figure can be as high as 80%" (Sean Dodson, "Was software responsible for the financial crisis?" *The Guardian*, October 16, 2008)

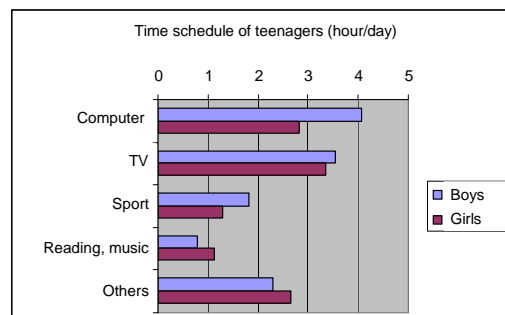
Is computerization the cause of the crisis?

- Computerization is the « material cause » of the financial crisis
 - « Mr Hudd (CEO of Fannie Mae) said to its employees to take risks aggressively, or they have to leave the firm » (Duhigg Charles, « Pressured to Take More Risks, Fannie Reached Tipping Point », *The New York Times*, 4 octobre 2008)
- Whoever perceived the risk was ejected from the market
- Possibilities determines the behavior

A new economy

- Product *diversification*, consequence of monopolistic competition
- Any product is a *package of goods and services*, developed by a *partnership*
 - A car is a package of the vehicle and services : consulting, finance, maintenance, warnings ; when rented, the car is a pure service
- The *information system* ensures the cohesion of this package
- Satisfaction depends more on the *qualitative* diversity of products that consumers can access than on the *quantity* consumed

Society is moving fast...



Source : Der Spiegel, 16 mars 2009

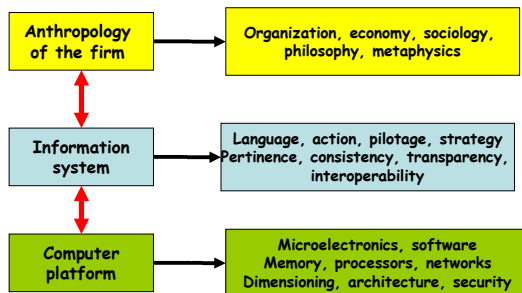
... but the firm advances backwards...

- 90s
 - One had to fight...
 - ...in order to introduce office automation, e-mail, Web, Intranet
- 00s
 - IT is seen as a cost center
 - One have to fight...
 - ... to take into account the urbanization of IS, its semantic quality, automation of processes, security of data access, supervision of service from end to end, interoperability with customers, suppliers, partners etc.
 - Services are considered a waste
 - Partnerships are difficult to conclude

... and demand does not express the needs

- In a digital economy the marginal cost is (virtually) zero
 - Value depends of quality more than of quantity
 - La valeur se détache du volume pour adhérer à la qualité
 - Consumers give more importance to quality/price ratio than to quantity and to price
 - In a diversified supply, they search the variety that suits them best
- Some signs announce this change...
 - Emergence of environmental needs
 - Traceability requirement
- ... but the marketing (and behaviors) are based mainly on the research of the lowest price
 - We are still far away from the economy of quality, yet necessary

Layers of computerization in the firm



A very high failure rate

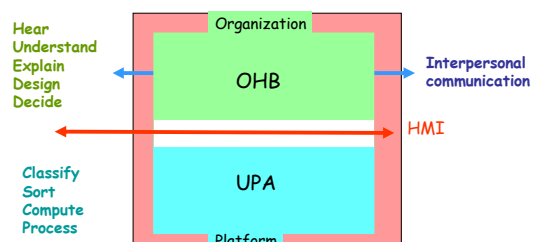
	1994	1996	1998	2000	2004	2006
Success	16 %	27 %	26 %	28 %	29 %	35 %
Excess	53 %	33 %	46 %	49 %	53 %	46 %
Failure	31 %	40 %	26 %	28 %	18 %	19 %

Source : Standish Group

...and yet...

	Begin 80's	Begin 90's	Begin 00's	Begin 10's
(1) Share of tertiary in employment	55 %	65 %	75 %	80 %
(2) % of employees equipped in tertiary	5 %	35 %	70 %	100 %
(3) % of work before screen & keyboard	15 %	35 %	60 %	75 %
(4) = (2)*(3) Weight of informatics in tertiary	0,8 %	12,3 %	42 %	75 %
(5) = (1)*(4) Weight of informatics in the working time	0,4 %	8 %	31,5 %	60 %

Productive dialectic of OHB & UPA



What did Keynes in the 30s?

- Situation
 - An economy stuck in pessimism
 - Paradoxical combination of shortage and underemployment, « poverty in abundance »
- Explanation
 - The industrial society remained faithful in the conservative habits of the agricultural society
 - Excess savings, low investment

What did Keynes in the 30s?

- A theory
 - Expectation errors and irrationality of agents
 - The stock market crisis of 1929 is not the cause, but the symptom of irrationality
 - This theory has shocked the economists at the time
- Prescription
 - Stimulate demand through government spending

What would Keynes say today?

- Situation
 - Economy is as unbalanced as in 1930...
 - Expectation errors, inadequate behaviors

What would Keynes say today?

- A similar, but different cause
 - 1930 : permanence of values, attitudes, expectations of an « agricultural » economy in an industrialized society
 - 2010 : permanence of « industrial » values etc. in a digital economy