



Surfing the Waves of Socio-Economic Development

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The Constant Revolution

- “The bourgeoisie cannot exist without constantly revolutionizing the instrument of production, and thereby the relations of production, and with them the whole relations of society.

The need of a constantly expanding market for its product chases the bourgeoisie over the whole surface of the globe.

The bourgeoisie, by the rapid improvement of all instruments of production, by the immensely facilitated means of communication, draws all nations, even the most barbarian, into civilization. “

“All that is solid melts in air.”

The Basic Neo-Schumpeterian Assumption: Revolution in Slow-Motion

- The full impact of a new key technology is seen only when social institutions are aligned with the requirements of the new socio-economic paradigm.
- i.e., the “technology” is there before the society has learned to use it efficiently.
 - “Paradigms die when human generations die.”
 - Long economic waves of a ~ 50 years
- But in the New Economy:
 - The new global innovation economy is based on continuous reconfiguration of resources and ideas. Do social institutions really have time to stabilize?
 - Does the networked global economy still have Schumpeterian waves?
- To answer these questions, we need a social theory of action and social change.

Schumpeter I-II

I

1. Scientists and innovators create technological opportunities
2. Entrepreneurs see the profit potential of technological opportunities and grab them
3. Followers swarm in and erode profits
 - In the process, investments are made in the emerging technologies, and industry and market structure change

(Theory of Economic Development, 1912)

II

- Big corporations become main investors in technology creation

(Capitalism, Socialism and Democracy, 1943)

The Long Wave

- A crisis emerges when a new key factor / technology starts to re-organize the society and its institutions
 - New models for production and efficiency at the plant level
 - New model for the management and organization of the firm
 - A distinctively lower labor input per unit of output, with a different skill profile of employment
 - A strong bias in technological innovation, favoring key factor use
 - A new pattern of investment, favoring key factor related sectors
 - A redefinition of optimal scales
 - A new pattern of geographical location of investment
 - A restructuring of interbranch relationships, where those branches that produce or intensively use the key factor, become the new engines of growth

Perez, 1985

“Schumpeter” III-IV

III

- A global sphere of financing emerges, loosely coupled to technology creation
- VC's become an important engine of re-engineering
- Investments “swarm” to fastest growing industries
- Options are invented
- Big corporations try to renew by acquisitions, innovation management, and internal venturing

IV

- Internet changes the balance between labor and capital
- Mature industries live in Schumpeter II (+III)
- New businesses emerge in Schumpeter III
- Social institutions are adapted to Schumpeter II, except in Silicon Valley
- Important new technologies are created in Schumpeter V

“Schumpeter” V

- Collective production of technology and experience
- Loosely coupled to economic investments and interests
- Facilitated by the Internet
- New rules for competition
- “Symbiotic economy”

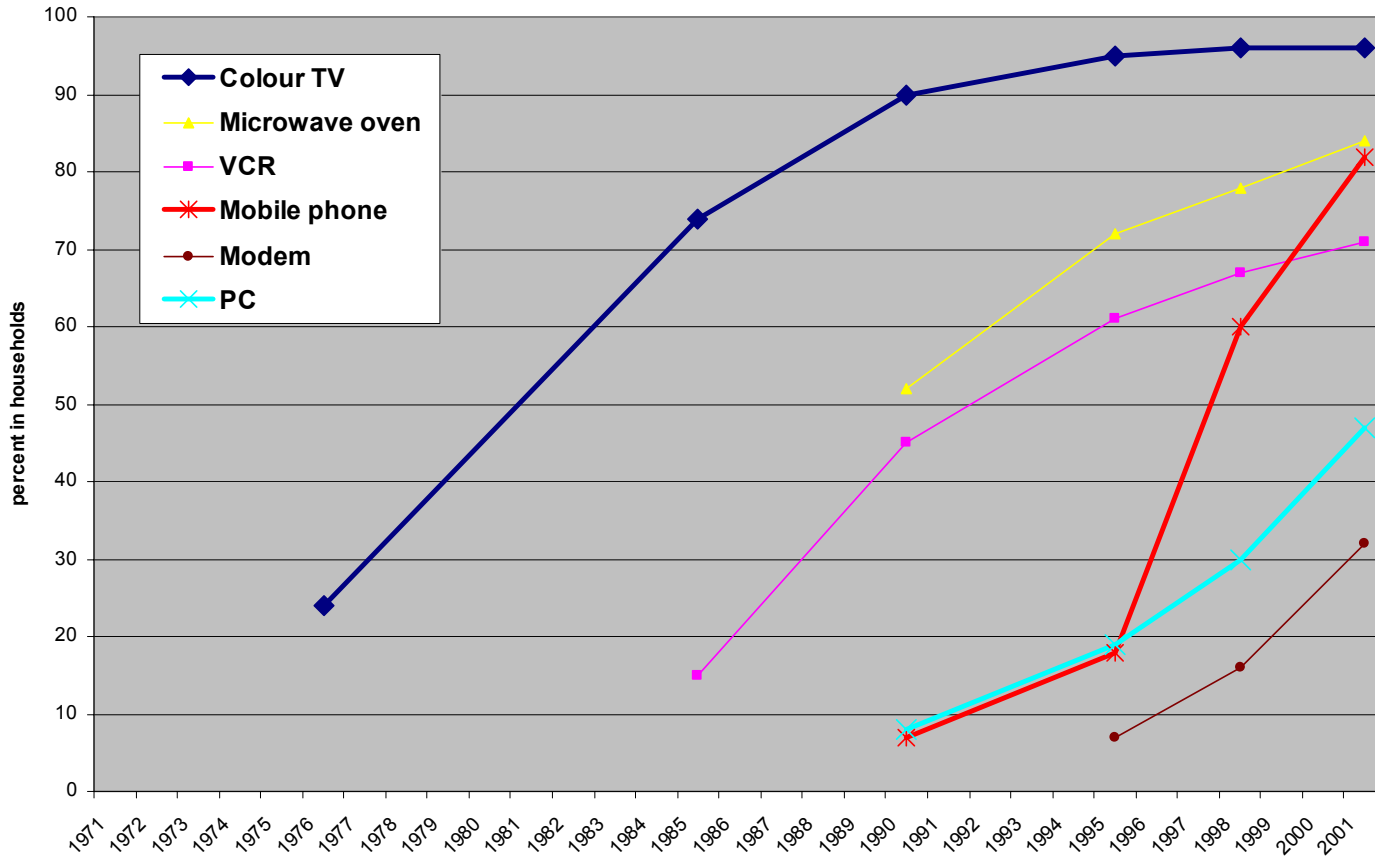
Rewriting Marx

The knowledge society, by the rapid improvement of all instruments of production, by the immensely facilitated means of communication, draws all individuals, organizations, and institutions, even the most barbarian, into constant revolution.

Key Technologies are Technologies that Change the Society

- Technologies and innovations materialize and become real when they are taken into use in the society.
- In other words, only technologies that are appropriated and recruited for fundamental (=revolutionary) social change are retrospectively viewed as key technologies.
 - Often the cumulative effect is viewed as a “general purpose technology” that is applied widely across the society.

Social Drivers of Technological Change



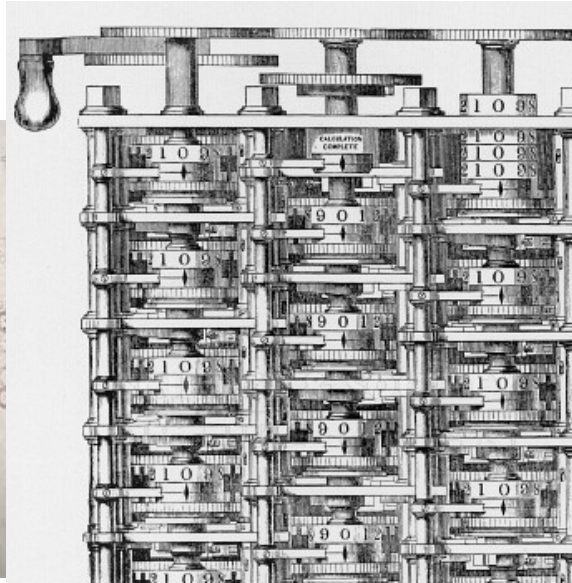
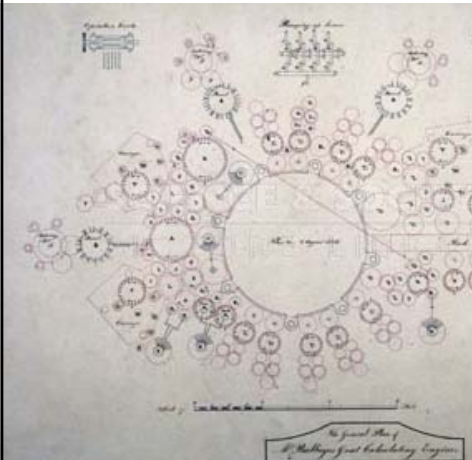
Great Technology: No Demand



“Because everything in her home is waterproof, the housewife of 2000 can do her daily cleaning with a hose.”

“Miracles You'll See In The Next Fifty Years,” Popular Mechanics, 1950

Good Idea, Wrong Timing



“Only part of the machine was completed before his death in 1871.”

The World Wide Network, 1935

- From afar anyone would be able to read any passage, expanded or limited to the desired subject, that would be projected onto his individual screen. Thus in his armchair, anyone would be able to contemplate the whole of creation or particular parts of it.
 - Paul Otlet (1935). *Monde: Essai d'Universalisme*.
- Cinema, phonograph, radio, television - these instruments considered to be substitutes for the book have become in fact the new book, the most powerful of means for the diffusion of human thought. ...From his armchair, everyone will hear, see, participate, will even be able to applaud, give ovations, sing in the chorus, add his cries of participation to those of all the others.
 - Paul Otlet (1934), *Traité de Documentation. Le Livre sur le Livre: Théorie et Pratique*.

Demand: No Idea

- Who the hell wants to hear actors talk?
 - H.M. Warner, Warner Brothers, 1927
- There is no reason anyone would want a computer in their home.
 - Ken Olson, president, Digital Equipment Corporation, 1977
- I see no advantage whatsoever to the graphical user interface.
 - Bill Gates, 1983
- I see little commercial potential for the Internet for at least 10 years.
 - Bill Gates, Comdex 1994

Configuring the Society

- So, what is holding back the change?
- Lack of imagination, corrected by new knowledge
 - “...aha, maybe the Internet could be used for something, after all...”
- Lack of competence and capability
 - “...but now we can make very very small cogs and put them together so that the computer starts to crank numbers! And we can even rotate electrons, instead of cogs!”
- Mutual adjustment and design of reality
 - “OK, lets not use the hose. The television would burn the house, the ashtray would fall to the floor, and the books are going to get really wet.”



Because everything in her home is waterproof, the housewife of 2000 can do her daily cleaning with a hose

- More exactly, these things hold Bill Gates back
- Lech Wałęsa plays with different rules, though

Evolution of Human Systems of Activity



The Structure of Activity

Three levels:

1. Socially motivated activity
2. Goal oriented action
3. Operations that implement the actions



Leont'ev, A.N. (1978). Activity, Consciousness, and Personality.

ICTs Are Special

- Activity
 - Corresponds to a need
 - Has a motive
 - Happens against a context of knowledge
 - Is social (because needs, motives, and knowledge are socially constructed)
- Action
 - Is how activity manifests itself
 - “Translates” activity into sequences of acts
 - Has a goal
 - Is based on reflective planning
- Operation
 - “Implements” the act within a specific situation, and with given tools and constraints

Culture and the meaning of objects and activities comes in here.

Knowledge tools and coordination technologies come in here.

“Traditional” technology (tools) comes in here.



Levels of Innovation

