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**ICTs: CHANGING ECONOMIES, CHANGING SOCIETIES – LOOKING FOR  
DYNAMIZING INTERFACES**

ICTs are revolutionizing almost everything. Also they are themselves the effect of the revolution, named in the various way – microelectronics revolution, information revolution, telematic revolution, digital revolution etc. Their impact on economies is immense and not only limited to highly advanced countries. In the latter ones they produce – at worst in some segments of economy – a type of economy which is often called information economy, digital economy, new economy etc.

ICTs have a great influence not only on economic sphere but also on human sphere. It is expressed both by direct impacts, i.e. the overwhelming use of ICTs in everyday life of people and by indirect influence via economy.

The problem is however how to reach a kind of compatibility or at best – synergy between these two spheres. A need of dynamizing interfaces seems timely. Some models of such impacts and of interfaces are presented and discussed.

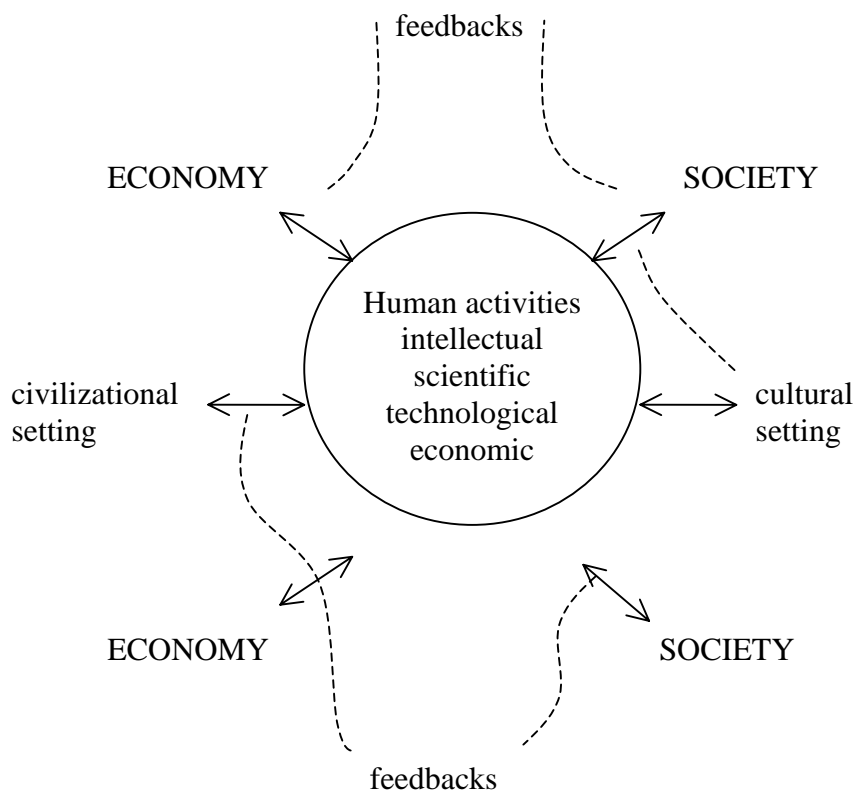
key words:

innovation flows  
multifaceted effects  
various rationalities  
large complex system  
sustainability

ICTs emerged as a result of human intellectual, scientific, technological and economic activity. Of course they appeared, developed and were diffused in a certain cultural, historical and civilizational setting. On the other side they immensely impacted economies and societies, not only these from which they originated. Fig 1 illustrates the first approach to this problematique.

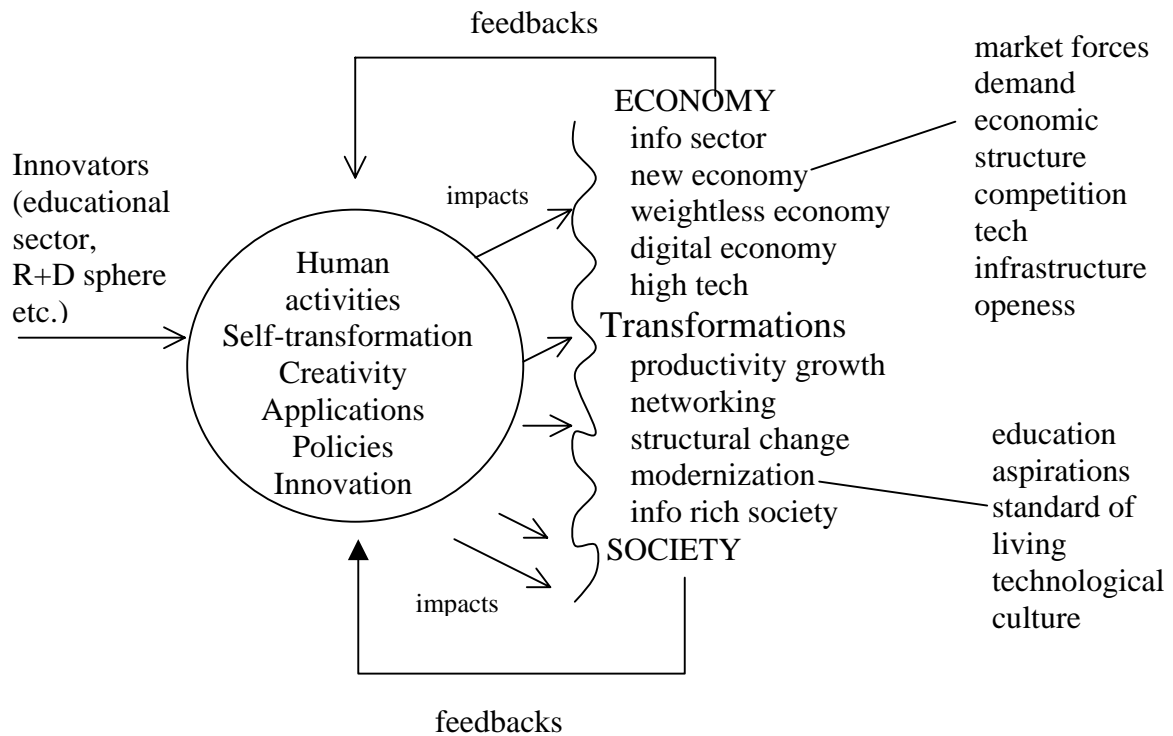
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**Fig. 1. Scheme of transformations of human activities, societies and economies in the existing settings**

The next figure – Fig. 2 – is more refined model considering emergence of innovation flows (in fact in the Schumpeterian sense) and their subsequent diffusion into economy and society. These flows are produced within knowledge sector (i.e. education, R+D sphere, intellectual entrepreneurship sector, design firms etc.). They are to some extent autonomously generated – by human cognitive approach, by existing research institutions and teams, by scientific competition and career advances. But they are also need-oriented (of industries, of export, of people, of army, etc. – which is usually reflected in market demand and in government policies). Moreover the production of innovation takes place not in a *vacuum* but within economy and society. It has then to reflect their needs, abilities, capacities, opportunities they possess.

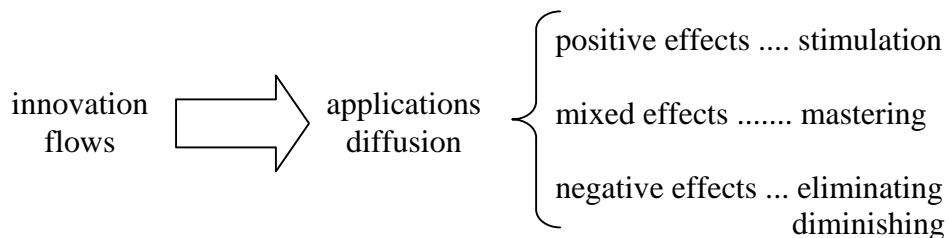


**Fig. 2 Diffusion model of innovators' impacts on economy and society with feedbacks**

So innovation production and flows have some background which enables them (or not) to appear and to which they respond meeting its various needs and demands and which they transform as the result of innovation application and diffusion. The more the better? Applications and widespreading of technological innovation is costly, often devastating the economic and social *status quo* (in other words – conflict raising), moreover it can produce costly (even irreversible) negative side effects. In recent decades the concept, procedures and practices of technology assessment were used to cope with it.

Fig. 3 presents a scheme of innovation effects: positive, mixed, negative. Their proportions are very important. Important limitations are costs of – immediate or later – negative ones.

SCIENTIFIC. TECHNOLOGICAL. ECONOMIC STRATEGIES AND POLICIES



SOCIO-ECONOMIC AND CULTURAL PROCESSES

**Fig. 3 Innovation flow effects – Evaluation and policies**

All effects can be profit – positive, so willingly stimulated by business. On the other side all effects can be socially harmful (e.g. technological unemployment, deskilling, work conflicts, imposition of change of job, workplace and skills, living in environmental devastation and so forth). Few rationalities (sets of rationality criteria) clash here – technological rationality, economic, social and ecological ones.

So we have *unsustainability situation* anyway. And it is not only due to detrimental social or environmental negative impacts but also because of worsening relation between economic (business) sphere and the rest, i.e. society considered not only as consumers but as workforce, citizens, politically empowered entities.

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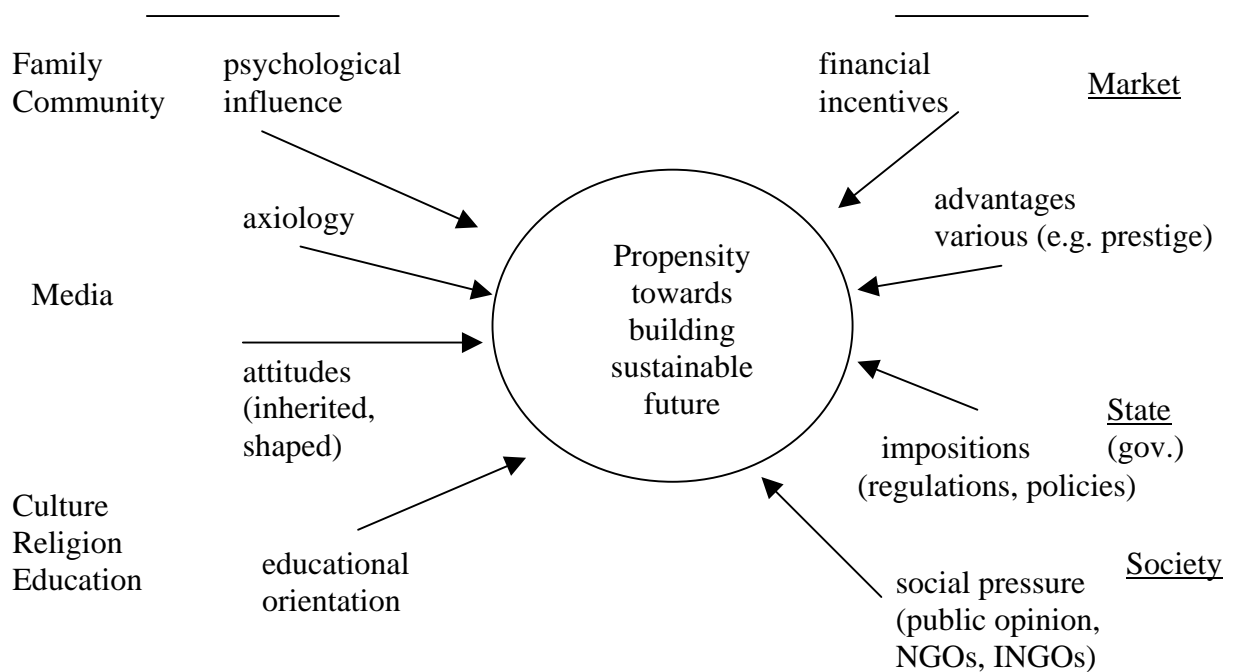
Thus there are two main issues here

- how to find out some dynamizing interfaces among the aforementioned components (sectors) of socio-economic systems to make technological and economic performances the highest possible,
- and how to make this system development sustainable – what means some permanent efforts to keep optimal all interests, abilities and opportunities, and also limits. It is extremely difficult task since all these networks and interactions, all various effects and various rationalities form a very large complex system. How to cope with such system? To realize particular rationalities in the past was much easier.

To build sustainability of socio-economic systems needs *cooperative* efforts. How are they possible in the present world – of egoisms, greed, political fights and manipulations, people's ignorance and passivism. To put it in the other way: how to create all-embracing *propensity* towards building sustainability or sustainable future.

First, we use term *propensity* in broader than psychological understanding. Such propensity can be also axiological (axiologically induced), attitudinal, can be learned orientation (educational factor), can be as well financial one (profit-oriented) or more broadly – advantage-oriented (e.g. of prestige type); of course, it can be to some extent imposed (e.g. by law, by public opinion pressure etc.). Such a multifaceted propensity seems to be potentially effective and efficient tool (Fig. 4).

## FUTURE ORIENTATION



## GLOBAL PERSPECTIVE

VALUES, ENLIGHTENMENT,  
REFLEXIVITY, KNOWLEDGE  
FACTORS

MARKET, REGULATION  
POLICIES, CITIZENS ACTIVISM

**Fig. 4 Building propensity to socio-economic sustainability – Factors to be operationalized**

Let us develop, at least a little, the factors contents.

- *Psychological influence* - can be very differentiated, can be connected with living in families, communities, with sharing of common fear of the future (or at least some possible risks), of possible environmental (also economic, social, international, global) crises or catastrophes. This may be shaped and stimulated (and manipulated) also by media, religious leaders, by writers, film makers and the like.
- *axiology* or value system – varies very much, but can contain such values as common good, human solidarity, justice, equal opportunity approach, trust, tolerance.
- *attitudes* – connected in many ways with value system and psychological dimension, however some distinct specificity, e.g. such attitudes like risk-taking, entrepreneurship, innovativeness, cooperativeness, future orientation, local solidarity, law respect, civil engagement, reciprocity, openness etc. All these attitudes can be inherited or learned in the

process of socialization and social interactions, they can be also shaped at least to some extent by media, politics, films, literature and so forth. They have their opposites: risk aversion, individualism, egoism, shortsightedness, unruly and helpless attitude, civil disengagement and so on.

- *educational orientation* is extremely important since it profiles our knowledge and intellectual skills; what to teach and how to teach has been always a problem,

Needless to add that the aforementioned factors can be labeled as *culture* in a broad sense. As we know *culture matters*; it can be favorable to using ITCs, networking, cooperation, innovativeness, entrepreneurship – or not. Culture is historically and socially rooted and institutionally framed. So it has some inertia and self-autonomy, but can be modified and reshaped by modifying its institutions and by their activity.

The other set of factors is somewhat different. It is predominantly connected with *relations* of market, state and civil activism. These factors are as following:

- financial incentives (taxes, exemptions, subsidies, joint risk undertakings etc.) and policies
- various advantages as for example prestige, respect, fame of being environment friendly company etc. (in many cases this can provide financial rewards as well)
- balancing interests of all stakeholders
- political and societal visions of info society and knowledge-based society
- political and business ethics and social responsibility of corporations
- pressure of social control and citizens' participation in technological (and other) decision-making (e.g. in the form of consensus conferences).

All these factors can be greatly strengthened by ICTs since they are also informational in character. Moreover they can positively influence ICTs development and proper effective utilization. So they can constitute dynamizing interfaces – not only metaphorically – between technology and society.

*Dynamism* of socio-economic system is extremely valuable and desirable, not less however – *sustainability* and *synergy*. To obtain the latter two a *principle of cooperative sustainability* should be introduced. Then propensity (psychological, political, business-type) towards cooperative sustainability will have to be promoted and rewarded. Of course this concept ought to be developed and refined. Anyway a *new culture of cooperation* must emerge (it was

already called for by the Lisbon Group some years ago during the debate on “limits to competition”). It is not simple since such culture requires a *new mindset*. Important key words connected with the cooperation culture can be as following:

- long term thinking, predicting and planning,
- attempting some coordination from local to global scale,
- looking for balance and sustainability,
- delimiting right proportions,
- sensitivity to negative side effects,
- assuring equal chance for all economic and social actors,
- consensus seeking,
- reaching reciprocity and mutual advantages,
- respecting legal regulations and ethical principles,
- requiring (and rewarding) responsibility (social and human),
- relying on solidarity and trust,
- promoting friendly competition (like fairplay in sports),
- striving for common good and synergy.

These are mostly *soft factors* but can be very powerful if generated, cumulated and permanently promoted (especially by institutions). Apparently the most difficult challenge is consideration and proper weighting all differentiated and often contradictory interests. Hopefully many of them can be re-invented and re-engineered in the form of non-zero sum game. In other way – some voluntary (or imposed) limitations can be rewarded in some new innovative way. Some constraints may emerge from fear connected with various dangers and possible conflicts, crises and catastrophes. Their costs are as a rule immense. Governments, business and civil society should – using ICTs – predict them, evaluate and elaborate cooperative strategies on all levels to cope with them as effectively as possible.

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