

# Penetrating Beyond Forms in Modelling. A Core Sample

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*Paper aims sustaining the necessity of adapting studying criteria to the analysed matter and to the times: to the knowledge based economy. It tries to be a proposal to look for profound causes of economic activity results. Methodologically, paper replaces earn marking by the criterion of the place of registering with that Cartesian one of the generating of the plusses of utility. A demonstration of re-assigning results consistence with their adequate source is made on the subject of technology returns. By reinterpreting growth phenomena, the sample points out the role and gains of intellectual activities. Passing beyond the classical period and analyzing by appropriate modern principles, the main conclusion is that all economic actors should grow intellect-intensive inputs in their business.*

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JEL classification codes: *C6, D8, L8, O3*

## 1. Introduction

Modelling means to simplify the expression in a logic course, frequently by using symbols. But this special manner of description contains the risk of making it simplistic. The routine in setting up the importance of different aspects of reality can show disagreements or inconsistency or simply disuse: using approaches that are not consistent with the moment, with the place or even with the nature of the analyzed phenomenon; approaches, elements approached or features

pointed out can be sometimes just *linked with*, but not central, *essential* or cardinal for that phenomenon. Such modelling should be avoided: simplicity should not mean maiming; the result should not be simplistic, truncated or distorted.

## 2. Insight the productivity phenomenon

The economic science has basically built its hypothesis and analysis starting with perceiving the reality through the angle of the wealth of some individuals or groups (family, organizational, national) directly, that is, *the way it appears*, respectively the way it is *registered* from an individual point of view at given moments. The wealth and the economic effects have therefore been *directly correlated with the work* of those people or nations, but without always analyzing the profound determinants, the generators.

Based on the effect of juxtaposition – turned into habit – between the individual and certain goods (“of his own”), under the conditions of insufficient strictness (given the nature of some quite ambiguous utterance and the derogation from the Cartesian character), it came to be implied that wealth, however expressed, really *would be* a consequence of those (economic) activities, *outcome of the person’s work*. So, the wealth and the other economic effects have come to be practically unanimously interpreted (considered) as **results** not (only) **following** the processes in question (that is, from a *strictly temporal* point of view), but also **of** the processes themselves (from a *causative* point of view).

That is why the *productivity* is measured based on the *incomes of the person in question* (e.g. the case of Smith, incomes cashed by Smith, registered *in or on the accounts of Smith*), compared to **his efforts**, regardless of **who really created** the equivalent cashed by Smith and registered on him; so, “to produce” ended up by meaning to cash, to register, *to appropriate to oneself*. By this method, the role of the environment is ignored, even if from a causative (generating) point of view this environment can be the *real producer*, or at least *co-producer*. that means

that Smith himself did neither caused the out-put based on which his incomes are made, nor the cashing itself; but there were as well other contributions, “efforts”, co-producers, co-productive elements, most often not being singled out or having no benefit by anything, but only Smith registering the entire earning); the rest are at the most called “externalities” – to the degree to which someone pursues and/or distinguishes them.

The way in what John Kay (the inventor of the “flying shuttle” in the English industrial revolution, John Hargreaves (the one who invented in the same period of time “spinning Jenny”), Samuel Krompton (the creator of the famous “Mule Machine”), John Cartwright (the inventor of the first mechanical weaving machine), J. Roebuck (the supporter of James Watt’s experiments) etc., on one hand and Bill Gates on the other hand, were remunerated are most important. That is because this “payments” for Kay, Hargreaves, Krompton and for the others prove *the way of declaring them **productive or unproductive by the market mechanisms.***

That is, seeing that the same work done, the same produced asset, the same scientific contribution may bring *extremely different* retributions for the agent in question (from gaining wealth like Bill Gates, to dying poor like the ones mentioned above), result the fact that the economic analysis should not limit itself to what is important for the economic agent (exclusively) *from his point of view* (namely, what he cashes or collects, the profit or the productivity – the way it results from the math of the market’s game). The scientific approach should find out, study and reveal his *real contribution*: it should not be ignored, as it (the real contribution) is not lost (the way the contributions of John Kay or John Hargreaves, and the one of Bill Gates did not simply disappear), but will be found in a *good* done (benefit, gains) for other economic agents or disseminated globally on a social level, without any possibility of a strict individualization on profiting persons (beneficiaries). That is why economics should eliminate routine in approaching phe-

nomena and thus in modelling - by changing usual criterion in purpose of more profound understanding.

Obvious would be the tendency of every agent to increase what he “receives” (what he attracts or **cashes in**) and to reduce what the others are to get from him (what he **transfers** to others or induces to the environment – in the narrower sense of servicity – and, generally, what he himself **creates**, what he generates – in the broader sense of servicity [3, 6]).

### 3. Reinterpreting a cardinal growth case

A demonstration in favour of the above principia can be given on the case of technology returns.

In the book *The diminishing returns of Technology* (Orio Giarini, Henri Lubergé – 1978) [2], reference are made to the results induced by the incorporation of new and more and more expensive technologies in production (especially in the industrial “production”). Studying the matter, one can easily notice that the scientific research, generally the intellectual services which form the base of creation and introduction of new technologies use science as resource, besides other resources. “Diminishing returns” (decreasing results) are registered by the industry (manufacturing activity), and not by these intellect-intensive activities the growing efficiency of which we sustain. So, when speaking about the diminishing returns of technology, the discussion concerns **exclusively the decreasing efficiency of the industry**, and not the returns regarding intellectual services.

The decreasing results in the industry per unit of spending for technology comprises one of the market’s main manifestations of the **intellectual activity’s increasing returns** (growing efficiency): their “*growing more expensive*”. A greater and greater “part” of the general result returns to these services, and the “production” is left with a smaller and smaller part. This fact is distinguished when the intellec-

tual services are “external” to the industrial enterprise, service coming from outside industry; and it is camouflaged when they are “internal”, the service coming from the inside of the industrial firms. In both cases, however, the income of the intellect is not registered as a surplus, but as an expense (spending), as an effort (for the industrial enterprise). (That also happens when we keep approaching the economy like in the classic period of industrialization: from the point of view of the industry branch, of the industrial enterprise.)

The industrial enterprise appears as spender: to finance that (scientific) activity will charge the “production” costs. Even if these can be separately cumulated, they are considered (internal) costs giving diminishing returns.

In reality they represent the payment done for a more and more expensive service, service which has – as a logical consequence – bigger incomes (returns), therefore greater “productivities”.

Distinguished separately, as external, that is performed by other economic agents than the industrial enterprise, these services allow the understanding that they are more and more expensive on the market, correlated to the fact that they are – evidently – more and more necessary and demanded (the prices are growing also because of the bigger complexity and higher knowledge and scientific level); externalized, the service – from now on independent and distinct – can prove itself stronger and stronger: it earns more and more and this is the reason why the profits registered (on the bases of the service) by the industry are smaller.

There could be differentiation between this ordinary industrial-productivity vision, which takes into consideration the micro-economic profit (especially subsistence), and a possible servicity approach, considering the entire society (including the social ensemble’s angle): lacking this “product” of research (without this intellectual service) there would not be the other “product” (the new industrial one, the improved output of manufacturing). The scientific research, the

intellectual services have led and lead more and more to improved productions, with servicity effects: good effects for the industry, but also for third parties and for the economy in general (including here the advantages for the industry's beneficiaries, as well as the advantages of the research itself, that of managing to reach a high qualitative "product", etc.) the way it is schematically presented in fig.1.

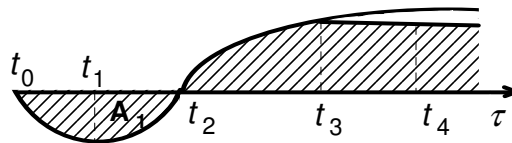


Fig.1 .The servicity effects

This diagram appears in the demonstration from the book on which background the present notices and developments are made ([2], Cap. 3), to show that after a period of relative stagnation (stabilization) of results (between  $t_3$  and  $t_4$ ) there follows their decrease: the investment in research and development becomes less and less profitable (of course, for the „productive” enterprise).

The  $A_1$  hachured area practically represents the expenses for the acquisition of the  $I$  factor (intellect, intelligence, idea, innovation, knowledge etc.); the fact that they are produced by the industrial enterprise is just a matter of aspect).

*The performers of the intellectual service* will perceive advantages throughout the entire period of the performance activity, or according to contract. A great advantage - although not directly of monetary expression - is the plus of intellect gained, the increase of intellectual-performing potential of those economic agents.

After acquiring the *I* factor, the beneficiary of this service *for industry* will benefit from advantages of servicity, at least for the period *t1* - *t4* (especially its financial results will increase until *t3* and will not decrease at least until *t4*).

Regarding the third parties („the consumers” of industrial products), they will benefit either from the up-dating of or the increase in quality, or from those product’s personalization, or in the form of price effect (as a result of the improvement in the quality of production, the „producer’s” performance, following the *I* factor „infusion”) at least for the period *t2* - *t4*. After the period *t4* it will also be possible they to benefit from better productions and products.

It is clear that in *t4* the investment for the time *to* appears *outdated* regarding the *I* factor. The material element (the object, the technology) - in which the *I* factor (the intellectual factor from the *to* time) has turned into - already represents, for the time *t4*, only material (*M*) factor, which will bring about only decreasing returns.

In the purpose of understanding this, a distinction should be done between immaterial (*I*) and material (*M*) factors [6, pp. 101 and next].

The returns of science, which consist of the effects upon growing productivity, are increased; and they could increase even after the *t4* time; but that what exactly is blocking the continuous rise is demand: the demand which addresses industry, and not the scientific research.

From those evolutions of the demand for the output of the industrial (manufacturing) activities (in contrast with the evolutions of the demand for the scientific activities) results that the returns are decreasing just in the case of the industry, because the demand for its products is limited. Practically, the demand for *quantity* increases slower or even decreases, but the demand for *quality* is continually increasing.

As said before, the further increase of returns in manufacturing (after the *t4* time) does not refer to some decrease of the returns of the *I* factor: the decreasing returns belong to the material factors (*K*, *L*),

which continue to grow or remain unchanged at the same  $I$  (out-of-date from now on).

The  $I$  factor has to be continually up-to-date (at the scientific level of the times). Therefore **the performance of intellectual services has to be** not only renewed, up-dated, but also **permanent**; any decision taken today only has to prepare (not to substitute) tomorrow's decision.

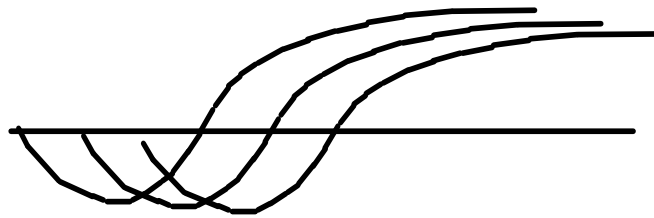
For the example submitted in the cited book regarding „the life of the product” (and so, the necessity of introduction of new products, from time to time), the intellectual services have the very mission of tracing out the optimum moment for the new products being introduced (maybe somewhere in the  $t_3 - t_4$  interval), or other measures to be taken by supply (contribution) of  $I$  factor, so that the *ensemble's* efficiency should be advantageous. If not, the decreasing returns are put down to the  $K$  factor.

By that distinction (using the criterion of materiality), we can see that the (industrial) enterpriser (manufacturer) has diminishing returns if he bought some  $I$  factor and will no longer acquire such factor ( $I$ ) again, but  $M$ . There is always the need for new ideas, extra-information; knowledge could give (again) increasing returns (implying a rise in efficiency).

Buying just factor  $M$  (and ignoring  $I$ ) will surely have diminishing returns, because the *equipment* bought or owned today – according to the old *idea* or knowledge, does not represent  $I$  factor, but  $M$ : the  $I$  factor has basically the meaning of *the additional I* brought to (the new level of knowledge in the manufactured tools, equipment, technology, methods), *the plus* of idea, knowledge, intellect, innovation etc., so the most current (present-day)  $I$ , not the inertness, maintaining some ancient, out-dated ideas. (This wording is not meant to exclude re-actualization, turning account of some older ideas, put in good use – or not – some other time, the re-actualization of which would seem as *novelty*).

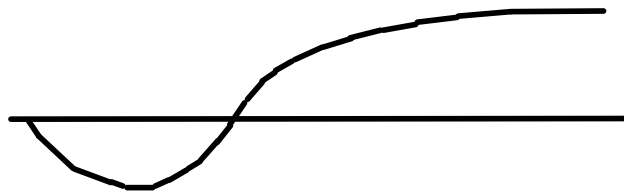


The way the intellectual service submitted at the  $t_0$  time had favourable effects, the one subsequently submitted will also have.



*Fig.2. The effect curve*

If one wants to include in the effect curve (the way it is presented in fig.2) the price of these services as well (the price that causes the depression from  $t_0$  to  $t_1$ , given the background of the investment character of the intellectual services – of delayed appearance of positive effects), this curve would have a shape similar to the one in figure 2, which actually means a permanent „cohabitation” with the intellectual services – the ones with increasing returns – precisely for the „survival” of the industry and of every other material activities (based mainly on the  $M$  factors, so having defining decreasing returns – at least in our time), in order to maintain a general evolution of the shape suggested in fig.3. “Survival” is ensured by permanent investment and mankind will either stagnate or move forward, depending on the servicity of the ensemble of the activities and of the general intellectual character.



*Fig.3. The general evolution of the shape*

There is how, using practically the figures and even the wording of the quoted authors, and based on some of their ideas, we arrive at some reinterpretations, sometimes even to opposite conclusions [4, 6]: by a change in perspective, which we consider completely justified and legitimated by the facts of the reality. Through the entire economic history of mankind, when some activity's returns (efficiency) became diminishing (decreasing), so that these couldn't be compensated (through scale increases or other methods), the respective activities entered in a relative decline given others (the latter having temporary increasing returns).

The very **survival** of mankind at greater and greater scales (considering the increase in population) under more and more difficult conditions (the lessening of natural resources), only demonstrates the rising efficiency (contribution) of the mankind's knowledge (**I** factor). In this regard, *the issue of development should no longer be considered from a preponderant quantitative point of view*: we live in a complex qualitative world – knowledge society.

So, the **I** factor, the way we perceive it (meaning in a permanent additional and renewing view), has rising efficiency. O. Giarini [2, page 75] underlines the fact that a lessening of the effort to invest in research and development, as well as the prolongation in the duration necessary to ship-shape renewals – and other elements - are causes which can contribute to the lagging of technological renewal. The observation is made in the same book we cited. From this we can only conclude the fact that the consumption of **I** factor (especially in the case of industry) should not be diminished, and, moreover, that the need for the **I** factor is higher and higher. (Readings from Orio Giarini's books and papers were a most important background for setting up and modelling our own conceptions on productivity, including the ideas of this paper; he always honoured us with his superior and comprehensive understanding of the complex realities, from a profoundly scientific perspective.)

Consequently, the cause of the technology's diminishing returns should not be looked for in the intellectual services' returns (especially in those of technological research, or related to technology) but in the lagging of the *I* factor's growth: there is a need for more and more *I* factor, and the remedy is **a suitable speeding up of its growth.**

#### 4. Conclusion

The economic literature may contain important references in this matter (for instance, we could see some essences of the judgements we made in this paper, in Orio Giarini's fundamental thought). But the interpretation and conclusions are usually in an "industrialist" way (on the grounds of the traditional thought coming from classicism): putting in front or in the centre the industrial activities. If we can be better inside the *modern service economy* and if we agree with the idea of the core role of the intellect (factor *I*) in the *knowledge based economy*, the line and the conclusions of the study could be else: better for our society and for our planet.

In this approach, origins of productivity and the nature of returns can be better seen, proving that such an appropriate economic behaviour – including in that what concerns the intellect-intensity of investment - could be better for a sustainable growth and in motivating the necessity of continuously investing in research and in higher and higher intellectual services (we can include here the costs for preserving nature and for a better attitude for the whole environment).

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