Environmental approaches in productivity analysis. Improving proposals

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Abstract

Switching the angle of concern from the most usual one, our paper focuses rather on the "external" effects of the economic activities. It aims at reconsidering the useful effects of productive activities by applying specific reinterpretation of usual data, having in mind the general economic-social welfare. Methodologically, the indicators we propose for this purpose use simple ratios, logarithmic summaries and some simple summation, and certain completions, in an original approach. The analysis of the economic activity is proposed in terms of certain effects on the natural environment and on the economic and social environment, upstream and downstream of the studied activity (different than the effects on the economic entity itself), directly targeted. Other connections in the systemic environment are also concerned, suggestions for more applied researches being provided. The paper is a purely theoretical one, presenting just certain researches with their conceptual explanations and also with suggestions for future developments and for empirical applications. It brings interesting openings to the common productivity analysis. The formulas (serviceability ratios) in which the available existing indicators (data) can be included allow us to obtain meanings that are less or are not had in view, in the usual productivity calculations. By applying such proposals, interesting differences between the analysed economic entities can result; and also differences between the common productivity (in "internal" benefit, serviceable for the companies themselves) and the environmental effects (that concern just the "external" serviceability).

Keywords: productivity, serviceability, servicity, production, job creation, heterodox approach

Introduction

Productivity, despite being one of the most often used economic ratios and despite being well known in its most commonly accepted form, still raises problems regarding the rigor of the information it provides. The main problem – that we refer to in the present paper (and for which we provide a few solutions) – is the limited orientation of the information it captures, solely towards the "internal" aspects (of interest for the economic entity), leaving the "external" aspects (the environment) in the shadow. Opposed to the common approach, our research aims to address exactly the environment of the economic entity.

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As there is a vast literature and considering that our paper is a theoretic-conceptual work, we are going to cite only from the theoretic-conceptual literature regarding the subject/topic, just one essential work that has a conceptual, synthesizing value in respect to the problem of productivity, namely Djellal and Gallouj (2008). This volume analyses an impressive number of suitable bibliographic references, and, based on rigorous research, it brings new value (conceptual) additions to the field. We consider that the most important scientific contribution of the source we refer to is the change in the approach, in the analysis angle, the horizon used being enlarged in the sense that economic reality perception and understanding is done through the companies' environment. In Jivan (2014), the conceptual horizon enlargement is amplified, on different levels: of economic interests (but not only economic), of space, time and so on.

In the conditions when the stress and interest of the economic analyses are almost exclusively in the business performance, in the servicity approach (Jivan, 2000), productivity and profitability ratios measure strictly the ability of obtaining production in advantageous market and financial conditions; such results are directly useful for the concerned ("productive") companies and for their "profitable" economic activities. But such activities can bring forth serviceable (or non-serviceable) effects for other entities too. Our paper focuses directly on their serviceability, in the attempt of seeing it in a horizon that is more widened than the own private interest of the companies (for themselves). In the researches we present here, the need for improving and expanding the system of ratios is especially taken into account: particularly in that what concerns including the economic entities' *environment* in the current analyses, at least from the point of view of the ecologic and social dimensions. We consider that reviews and new openings as those suggested and motivated by Bossel (1999) and Stiglitz, Sen, Fitoussi (2009), for example, are necessary. Other bibliographical references are made during the presentations in the next sections, as suitable for the specific issues discussed in such sections.

From the methodological point of view, the present research is a theoretic-conceptual one. In order to capture the effects from the environment's point of view, we (*i*) present a possibility of conceiving a productivity formula in a more complex manner, taking into account also certain apposite elements belonging to the problem of the natural environment (section 1), we (*ii*) offer a few ratios in an original interpretation that refers to the economic-social environment that is exterior to the concerned entity, also adding (*iii*) suggestions and useful openings regarding the identification of other aspects that are related to the economic entities' environment (relational and quality elements). More precisely, we focus on the development of the study area by including or mainly considering (*i*) the ecologic component (the natural environment) and (*ii*) the contribution of the economic entities that is "externally" beneficial (*i.e.* serviceable upstream and downstream of the economic entity);

namely, in the present research (which is part of a larger study), we focus on making operational just two of such beneficial aspects, namely *job creation* and *generating output* on the market (in the economic environment): creating real production (i.e. in physical units). In our paper, the environment is also (*iii*) considered in respect to the relations inside the socio-economic system.

The results consist in methodological ideas and settings that bring important theoretical openings and developments in the purpose of widening the economic analyses focused on productivity. They are arguments for actually promoting sustainable development, by involving such conceptual proposals and settings in empirical research built on such widening contributions

The nature of our proposals and especially of the ratios we present is an important new opening, with original elements that, without useless complications and avoiding the empirical calculus (so keeping the theoretical approach of the study), shows that applying them in future concrete empirical analyses has the reserve of a chance to be able to draw specific conclusions that are adequate for those ratios; and the unorthodox ratios can generate an hierarchies (ranking, "order") in terms of the *environmentally serviceable* character of the results of the economic activities of the companies analysed. The research offers the possibility of partial confirmations of the common productivity analyses' conclusions, but also (due to the original logic of their design) the possibility that the conclusions based on such ratios to rarely be similar to the ones given by usual ratios: the interpretation given to the indicators in the databases and the computed ratios generated being not only different, but sometimes even opposed to the usual ones.

1. A more complex productivity formula

When calculating productivity, the interest is usually limited to the private business interests of the company. The environmental impact is not captured by the common most simple productivity formula. Therefore, completions should be made (ecological, social etc.). The first proposal discussed in our paper refers to certain *elements added* to the usual productivity formula, in the purpose of taking into account main ecological aspects. Diverse models can be figured in this respect. We present in this section, as a suggestive interesting example, a formula from Mihai, 2014 (a doctoral research, which focused on local productivity and social equity in a serviceability approach, in nowadays globalized economy[1]). The quoted thesis brings a more detailed research on the productivity formula,

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[1] The core idea of this doctoral research comes from (and was grounded as) the servicity theory (or the serviceability approach), which starts from underlying the individualistic view of the most common approach in economic analyses (and by opposing to it another approach): productivity and economic growth are usually concerned as processes and effects that refer to the interest of the analysed entity (individual, economic firm, company); but all the remaining reality (the environment of such entity and the whole system) is rather ignored or presumed to be optimized automatically by the very growth and productivity improvement (*i.e.* the growth and productivity of the concerned particular entity). By

but the concern of our paper is just the environmental approach on economic productivity; therefore, we present here just a single model stressing on ecological issues:

$$\Omega = \text{VNB} \times (\frac{1}{EMPC} + \frac{1}{GCF}) \times \alpha; \ \alpha = (1 - \frac{ED}{EFC})$$

where:

Ω - the economic productivity adjusted in consistency with sustainability

VNB – Gross National Income

EMPC – Compensation of employees

GCF – Gross Formation of Capital

ED – Ecological Deficit

EFC – Ecological Footprint of Consumption

The quoted formula aims at calculating productivity by including a sustainability approach, consistent with the temporal environment (intergenerational view of serviceability, according to Jivan, 2014)

In this formula, productivity is computed employing gross national income (GNI) and it is being approached as sum, taking into account labour and capital as factors (the labour productivity – computed by dividing the GNI to the payments towards the employees –, and the capital productivity- computed by dividing the GNI to the expenses made to complete the fixed assets of the economy plus the net changes of the stock, according to the World Bank definitions). The indicator is adjusted by excluding the productivity generated by a consumption that generates a deficit, from the total productivity.

As the cited source explains, the formula includes, in its second part, the responsibility degree (level) of a country's productivity, as any productivity is generated by the exploiting of a certain

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opposition, the theory of servicity proposes the extension of the scientific horizon and the deepening of the analyses by taking into account exactly the environment of the concerned (analysed) entity (in the narrow meaning of servicity) and the whole comprehensive system (that has to include, in this approach, the analysed entity and its environment too – in the extended sense of servicity). That proposal comes from the observation revealing that some private growth does not always result in improvements for the environment; the destruction of the natural environment and the deepening of the development level differences between diverse entities could mean that, sometimes, presuming such general improvement may be, rather venturesome. This approach is developed in diverse papers, from which we exemplified in this paper only a few, like, for instance, Jivan (1993), Jivan (2000), Jivan (2014). The criterion proposed and followed in such research (and in the present paper as well) is the service rendered to others (to the environment) – *i.e.* the serviceability considered for else entities rather than that for the analysed one; it means the general value created rather than the individualistic benefit of the concerned entity for itself (than self profit of productivity). Productivity is not always verified as a true *quality of producing values* (as such values are not always beneficial for the whole system, but just for the concerned entity, sometime even on the account of its environment). Therefore, in the servicity approach, productivity (as it is commonly calculated) is revealed as being also a "power of *absorbing*" values from the environment (production just for itself). In this respect, please see also the explanations and developments in the next section of our paper.

biocapacity[2]. In respect to the widening and correcting the calculation of productivity, by considering the ecological aspects, we are interested to see if a certain economy, by means of production activity or by waste deposition or diffusion, is using a biocapacity that is bigger than the own biocapacity of that country. By such indicators, data regarding the ecologic reserve or deficit are basically considered, reserve or deficit that can be computed by extracting from the country's biocapacity the ecologic print of its consumption[3]. By such a way, we can establish if a country has an ecologic deficit (it imports biocapacity by commerce, or it affects the global ecologic system above its own capacity of assimilating its own polluting emissions thanks to its own forests)[4].

Such approaches are not usual for the economic analyses that are interested in strictly economic values (therefore, the most common economic studies are ignoring the ecological and natural environmental values). The approach in the line of servicity proposed the extension of economic analyses, to "external" purposes (external if compared with the strictly individual and narrow economic goals that an economic entity usually imagines). Such extensions are precisely meant to improve the scientific character of economic research, in consistency with the concept of knowledge based economy. The formula we quote here, conceived on the conceptual basis of the servicity approach, may be taken into account as a widening analysis on productivity, being much complete than the common simple formula of productivity.

2. Proposals for Formulas from the Angle of the Environment

This section discusses certain ratings concerning the economic activity, from an angle that is apart from the most common ones (particularly from the usual indicators of productivity). The approach is from the same angle of servicity that we already referred to previously (indicating a few core explanations and literature). In the subsection 2.1 we present and shortly discuss certain meanings that can be given to some useful (and usual) data, if we adopt an uncommon approach (in

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[2] Biocapacity measured in number of global hectares, by multiplying the total surface of the country with coefficients related to the production capacity it has, but also with absorption coefficients, in the need to simulate the human activity support potential, in consistency with the specific nature of diverse lands or areas and in diverse time spans.

[3] „the ecologic print of consumption is the surface needed to support the consumption of a certain population; the consumption print, measured in global hectares, includes the surface that is needed for producing the materials used and the surface needed for absorbing the emissions of carbon oxides; the consumption print of a country is computed as sum of the primary production print and the imports minus exports print", according to the Global Footprint Network: http://www.footprintnetwork.org/, cited in Mihai, 2014.

[4] We note and underline that we do not refer to accounting imports or exports (or both), we do not speak about trade deficit (about the strictly commercial operations); but about the natural environment; "importing biocapacity by commerce" refers precisely to the biocapacity issue: it means that an entity, or a country, for instance, can absorb and consume an extra-biocapacity (exceeding its own), thanks to its economic power or ability on the international markets. Biocapacity concerns the natural environment, the ecological problem, which is not taken into account by the common productivity analyses. Our scientific concern is precisely for such environmental aspects that are ignored by economic interests and, generally, by the economic activity.

the line of servicity), thus preparing *the conceptual foundation* for building our proposed indicators (formulas alternative to the commonly calculated indicators): the elements we present in subsection 2.1 are the constitutive ones for the indicators (rations) of the next subsection. In the subsection 2.2, those notions (concepts) are put in the formulas that come near (and are compared with) the common ones.

2.1. The elements we consider. Certain explanations

In the purpose of capturing environmental ("external") effects of the economic activity, there are several ways of conceiving indicators. In this paper we focus on certain main serviceable results that can be captured by indicators that can be called *serviceability*–ratios); there should be used/ employed one variable for each positive and negative impact (Jivan, 2000), or more complex formulas and composed indicators to express such effects. The method of our choosing for this paper in computing serviceability is to use simple fractions: the numerator expressing positive effects, and the denominator expressing the ones that are not consistent with the general serviceable effects provided (those last ones may be even negative). In practically applied analyses, the choice of variables is limited by/due to the availability of data.

As the present study has a non-orthodox approach, the ratios we consider are also different from the usual ratios employed in the common productivity analyses (the correlations captured are else than the ones usually taken into account). Namely, we have focused not on the results of consumption or of employment of diverse factors, from the *specific* angle of the interest of the economic entity, but considering the *general* interest (*i.e.* the interest from the *internal* and from the *external*, as well, points of view); therefore, the concerned economic activity is regarded from the point of view of the effects and efforts of the economic entity's environment in general. We have given a special importance to the effects (serviceable) of the economic activity that we explain as having a contribution *upstream and downstream* of the company analysed. In this approach, among the effects of a company's activity in a certain economy or economic area, we can consider (*i*) the results that are beneficial for its suppliers and (*ii*) those that are serviceable for its clients.

What is different from one ratio to another is the content of the numerator and of the denominator (and the explanations given to the two). In the present paper, we focus only on (*i*) the extent of the employment provided, the jobs created during the analysed period, jobs that obviously have social implications (we especially point out the case of the labour force employed in countries other than the richest ones) and on (*ii*) the extent of the supply to the market (what is meant for the welfare of the potential customers, of the population in general). We have in mind the revenues of

some labour services providers (wages generated by the creation of jobs) and the output created (put on sale, on the market).

We underline that the same (usual) basic data can be interpreted and put in various relations. Our approach is sometimes uncommon (in the optics of servicity, according to Jivan, 2014), resulting unusual interpretations and ratios too.

Creating jobs and supplying commodities on the market are "external" serviceable effects, as being beneficial for the companies' *environment*. The job creation is useful for the *employees* of the analysed companies, and the physical output is a good opportunity for their potential *clients*. To represent such economic effects of a company's activity, we employ the indicators N (representing the *number of jobs created*) and Q (*output in physical units of production*), as opposed to R (*revenues/ net sales*) and, as well, to π (*net income*).

The number of employees (N) expresses the "labour factor" employed by economic entities as input paid to carry on the economic activity. It describes as well a positive "external" aspect, an effect beneficial for the economy in which jobs are created.

In that what concerns the "production", in the common perception, any increase in production (physical or value) leads to an increase in calculated productivity. From the angle of "external" serviceability (Jivan, 2000), physical output is a serviceable element, but if the revenues from selling that output grow faster than the output in physical units, the effects are opposed to the serviceability concerning the customer (such growth of the company's revenue represents a diminishing of the client's benefit). *Physical production* (Q) is therefore a serviceable effect both from the point of view of the analysed company and from the "external" (environment, in particular supplying the market) – as created output (in physical units of production).

But if we take into account the value of production – *revenues* (R) – this is the company's receipts for that produced output, *i.e.* the effect of its sale to customers, following market policies, as a consequence of marketing and negotiation; its growth, at the same physical output, means more advantageous prices for the company, but as already said, relatively more disadvantageous for the customers. And *Net income / profit* (π) takes into account, in addition to the effect of sales to *customers*, also the negotiations with *suppliers* (for inputs used in production; see also Jivan, 2018, section 5). Increasing this value indicator means more advantageous prices for the company, but it also usually involves relatively more disadvantageous prices for suppliers.

The numerator of our ratios should be the serviceable effect for the company's environment. We analyse it in relation to the company's individual advantage; thus, we us as denominator the total or net income of the company, considering that income represents the ultimate private goal of its productive activity.

We underline by comparison that the approach of the common economic thinking takes into account the value indicators (R and π) at the productivity's numerator; but in the "external" serviceability approach, these values express success in the strict interest of the enterprising actor, but not necessarily in favour of the environment.

In empirical analyses that apply such formulas, data can be obtained from diverse data sources, like annual reports, websites, but also like sustainability reports (that can widen the approached horizon, with certain qualitative aspects concerning the environment), and other corporate communications. When the analysed companies report their financial statements in diverse currencies, they must be transformed in a unique (comparable) currency.

In the current stage of a broader research, we focused just on the number of jobs created and on real output (in physical expression), originally indicators being proposed (as built in the next sub-section). Such ratios can be calculated and the formulas proposed below take into account also the possibility of concerning in detail diverse categories of markets (according to official Morgan Stanley Capital International/ MSCI market classification, where developed markets "DM" are apart from emerging markets "EM" and from frontier markets "FM").

When calculating the common productivity indicators, we used, in our present research, certain incomes (revenue or net revenue) as numerator, and, as denominator, data concerning the number of employees. But apart from it, we can calculate (and we propose: see next subsection) also certain servicity (serviceability) ratios: a ratio showing the number of jobs created for each dollar of revenue, an analogous ratio with special concern for the jobs created in less developed countries (frontier economies), a ratio having the real output (in physical units) as numerator (capturing the "external" serviceable effect of supplying the market of goods in physical units; such ratio we call *real effective output* creation), and an aggregate ratio (sub-section 2.2). All those ratios we propose put the value income (R) and net-income (π) of the company as denominator, in the purpose of revealing the "external" serviceable effects that come out for each success in the own private interest of the enterprising actor (internal benefit).

2.2. *Proposed indicators*

It is well known that productivity is usually calculated as a ratio (1), pointing out the revenues got by the company for each unit of factor employed (for instance, for each employee, in the case of the common "labour productivity"). It can be calculated, also in physical units (ratio 2). Another ratio can be the built if the net income is taken into account as nominator (3) – a *net* productivity per employee:

$w = R/N;$

(1)

$w_{ph} = Q/N;$

(2)

$w_\pi = \pi/N.$

(3)

If the ratio employing the production in physical units is a *real* productivity (2), the commonly calculated ratio (employing the revenue as nominator) could be named "incoming per employee", or in the optics of the present paper, *incoming* for each job created (1). The third ratio (3) is, in this optics, a certain "net incoming per jobs created". In an individualistic view, the concern for productivity growth may eventually be reduced to capturing the simply appropriation of values from the environment of the analysed economic entity (company). Taking into account its usual manner of calculation (that employs the revenue as nominator), the common *productivity* means rather the *revenue absorbing power*.

Using the above, this subsection presents certain formulas we propose; *e.g.*, based on the explanations in the previous subsection, and employing the usual indicators in databases, several service (serviceability) ratios can be built:

- "external" *serviceability ratios consistent with the number of jobs created*; taking into account both total job creation (σ_N), as well as job creation limited to frontier markets (σ_{Nf}):

$\sigma_N = N/R$

(4)

$\sigma_{Nf} = N_f/R$

(5)

- a *serviceability ratio concerning the generated/ created output (in physical units of production)*

$\sigma_Q = Q/R$

(6)

- a *serviceability* ratio *consistent with both output and new jobs created* (σ_{QN}); for summing we us logarithmic values of the indicators (because the number of jobs and the quantity of real output are indicators expressed in different units of measurement):

$\sigma_{NQ} = (\ln N + \ln Q)/R$

(7)

According to the previous theoretical explanations, all such ratios are also valid for our analysis when using net income as a denominator, instead of revenue (in the purpose of deducing the outlays), thus resulting:

$\sigma_{\pi N} = N/\pi$

$\sigma_{\pi Nf} = N_f/\pi$

$\sigma_{\pi Q} = Q/\pi$

$\sigma_{\pi QN} = (\ln N + \ln Q)/\pi$

The above ratios calculation is useful for carrying out concrete data searches, analyses designed to reveal comparative aspects between various economic entities. The rates so calculated can be analysed in parallel with the usual labour productivity indicators of those economic entities. The stress of the research is on the ratios calculated with the indicators (data) from the data bases. By such analyses, the differences between a year and another are not the most important, but rather the differences between the values of the *productivity* (on the one hand) and the *serviceability* ratios (on the other hand). By comparing diverse companies, the concern is mainly for the differences between them that each indicator allows to be seen.

We emphasize that the achievements for general (systemic) benefit are always in the individual benefit too, even if in the short term and immediately they can sometimes appear as being even contrary to individual interests (according to the contradiction of interests that is specific to the competitive way of the economic life and to the defining individualism seen in a "short-sighted" view).

Here, we can also refer to the alternative of cooperation (see next section), even if it is applied not for selfless purposes, but for individualistic gains (it is about individualistic interests that can be better realized in a collaborative manner, together with the advantages of others and for others: co-production can prove to be beneficial in a medium-term, long-term, and especially in the very long-term, according to Jivan (2011); they can be very serviceable in the manner in which, for instance, the avoidance of some momentary profits from forest cuts, for example, will find itself in the planet's ability to provide oxygen, to reduce ozone holes and to diminish other damages already generated by profit-driven choices and by the immediate interests; so it will provide better living conditions also to those who, in the short term, will give up some profits; as well as for their offspring).

3. Shortly suggesting other possible openings in researching productivity

More in-depth research can also address other issues, including qualitative, on *environmental* and *social-human* issues. In this respect, it is possible to use data describing (1) the market image of companies – with reference to the high level of performance, of quality of their offers or of novelty (which can be suggested also by the market competitiveness, profitability and by their productivity);

and, as well, data that directly describe (2) the satisfaction in the economic relation with the entities upstream and downstream of the concerned company. For example, it may be the satisfaction of employees – labour factor suppliers – and of other suppliers, as well as the satisfaction of the beneficiaries: satisfaction may concern price issues (of course, in relation to the quality of the goods supplied or sold by the concerned entity); but it may be also aspects of market supply in terms of quantity (abundance corresponding to the good satisfaction of needs) and in terms of the quality and diversity (structure) of the offers of the entity in question (the latter are also reducible to the quality-price ratio).

Of scientific interest are also some *cultural* aspects specific to consumption patterns. The demand for consumption is based on certain traditions and customs; but, with regard to consumption patterns, it certainly depends also on the level of economic development, on the size of the incomes and, therefore, on the purchasing power of the population. Such issues have differences in different countries. By taking them into consideration as elements for systemic approaches, analyses concerning transfers of serviceable effects from one economic entity to another can be conceived (see the produced values transfers and the transfers of servicity, as described in Jivan, 2015; Popa and Jivan, 2016).

Such research can be approached on the basis of available / recorded data (data in databases). Researching such rich empirical data over several years – if made in the optics of the servicity approach – can bring novel conclusions about how different masses of consumptions (in certain structures and at different prices), vary according to the economy in which they are sold, therefore depending on the characteristics of the consumption that certain populations acquire. Thus, the same physical output can be sold / acquired by purchase at prices that differ from one economy to another (here it is not about small price variations, with changes from one period to another, from one market to another; but about configurations of prices that tend to be defined as relatively constant, at least for some lengthy enough periods, with notable differences between countries; it is known that some big companies practice pricing differentiated on different markets, both on sale, and supply). Consumption prices in an economy with relatively low average incomes may, paradoxically, be higher than in others (*e.g.,* certain final consumer prices); and purchase prices (from the labour factor price, to prices of natural resources and raw materials such as wood, for example) may be lower than in others, precisely in the conditions when local incomes are generally lower (may be because of such reduced economic power).

Such differences reveal value transfers from populations that pay relatively more for certain goods (or the same price, but under conditions of inferior quality if compared to those in other countries), to the selling companies concerned, companies being in relative *oligopoly* conditions.

Similarly, buyers being in relative *oligopsony* conditions have notable value advantages when purchasing labour factor or raw material resources from a certain economy at relatively lower prices than labour factor and similar resources from other countries or, generally, from other suppliers (Jivan, 2018).

By such differences – inherent in the globalized market economy – value transfers can also be perceived, at least in conceptual terms (theoretically). The situation depends on the structure of consumption in the whole economic and social system (at the level of the national economies) and on the relative economic power.

Addressing issues of productivity and value creation in the optics of servicity should take into account the broadening of the analysis represented, in the context of the relational idea, by co-production: co-production is a beneficial (favourable) framework for productivity (see also Jivan, 2016). We consider A.L Barabasi's general theory of connectivity (see, for example, Barabasi, 2003) is the basis for the development of the coproduction theory and for a better understanding of the concept of coproduction; but the general connectivity and the relational economy mean themselves also a form of co-production as a whole and, more generally (but appropriate to the present paper), a form of productivity: *co-productivity*, *i.e.* productivity in a complex approach. For this paper we underline that productivity should take into account value creation in the general approach we propose (*including the environment* of the "productive" entity concerned). On this issue (in the same approach) we also refer to Bressand and Nicolaidis (1988), and to Silaşi and Jivan (1994).

We do not develop this topic in the present paper; it is much broader (we only mention it as an opening suggestion for developing research). But we want to emphasize that the relations in the economy are the very way of existence and functioning in the generalized market economy and in the context of the generalized concept (or logic) of service (Jivan, 1993; Vargo and Lusch, 2004).

In the present section, we supplementary suggest the possibility of moving from the mechanical approach (Newtonian – the usual one in studying the economy) to a more current one, more consistent with the era in which physics has broadened its horizon to a great extent, passing itself, from long time ago, to completing with the quantum vision. We consider that, while the quantum approach is, in physics, propitious to the subatomic horizon (so when considering smaller dimensions), in the case of the economy, changing the horizon is conceptually and analytically needed rather from an entrepreneur's limited, to broader horizons (to horizons regarding the complex systemic ensembles in which the entrepreneur acts; we remind here Bossel's systemic principles – Bossel, 1999). We consider that if the openings in physics horizon have passed the stage of Newtonian mechanics (by moving to understanding superior to the horizons specific to this mechanic), they also suggest for the

economy the renunciation of the conceptual mechanics of the Orthodox economy, thus claiming scientifically updated perceptions in economics too.

The approach concerning serviceable results can be developed on a *narrow* meaning line – which basically takes into account everything that represents the environment from the point of view of a company (and to which we have referred in this paper, on strictly delimited issues and with some suggestions for widening the analysis framework: as "external" serviceability); but serviceability can also be addressed in a *broad* sense, so taking into consideration the whole system composed of the economic entity (on which the productivity approach is focused), and its environment as well (taken into account by the external serviceability ratios in the manner that we proposed in this paper). Putting both of these viewing angles together offers the broad meaning / sense of servicity.

Conclusions

The research we propose in this paper is part of a wider research and proposes some customized indicators and further suggestions for widening the conceptual area in the question of productivity research. The indicators were appropriately designed to focus on the effects of companies' activity in their environment. But they are noted by trying to involve a non-conformist point of view, which is found here in only a few simple ratios, resulting from the reinterpretation of a small number of indicators (in the approach specific to our research, according to Jivan, 2000). In our work, we have replaced the routine focus on the results that are beneficial for the concerned companies, by focusing on some "external" effects (related to the environment of the concerned economic entities). In this purpose, the indicators (commonly used data) got interpretations in the specific servicity view (Jivan, 2014). In this optics, we have paved the way for obtaining (by applying to empirical data for diverse concrete situations) results that can also be attributed to less common meanings.

In the above-mentioned theoretical proposals, the limitation assumed was in the area of the "external" effects of the companies (on the environment), corresponding to the narrow meaning of servicity; we also took into account this limitation in the formulas we conceived: when proposing indicators capturing environmental effects, in section no. 2, we developed such proposals just concerning labour services providers and supply for the customers. We propose developing, in future research, also other dimensions concerning the customers and then focussing on other external entities too, like, for instance, on competitors; and effects that can affect the whole society, and even the whole planet, as far as possible (the natural environment here included), should also be taken into account, as well.

The proposals we made involve a *directly* targeting of the environmental effects of economic activity (*i.e.* not only by the presumed optimizing effect of market mechanisms). Given the common approach to productivity issues – approach according to that any increase in revenue (income) of an economic entity is beneficial – our approach considers any revenue in a relative understanding: *i.e.* we underline that the direct market relations of the concerned entity, with its suppliers and beneficiaries, must be also taken into account; a systemic relational approach is thus considered, in a view as complex as possible (as allowed by the existing data and, generally, by the research knowledge, by the skill of capturing the diverse dimensions of the reality).

The theoretical developments that we presented and the set proposals we made represent a conceptual basis for applied analyses that could employ the indicators from this paper. Our research may let discover new dimensions that can be revealed by unorthodox approaches, mainly concerning the serviceable effects that can be brought, by companies' activities, for correlated entities in their environment. Such empirical developments could see interesting differences between the analysed actors, and the differences revealed could be diverse by the nature of the indicators considered, inside the limits imposed by the existing data. By applying our original opposite approach, the results that would be obtained (from empirical studies and specific calculations) will be as well apart from those consistent with the conclusions obtained from the common productivity calculations.

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