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Dilemmas of Innovative Dynamism Production Systems and Social Responsibility

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Abstract
The paper presents the findings from research activities. It focuses on the dilemmas of growing dynamics of innovation and related corporate social responsibility. There have been mutually encountering the interests of social responsibility of entrepreneurship, economic optimization of company´s management, development of knowledge-based society and the dynamics of innovative cycles. The authors draw attention to the disparity between the economic and physical time of products, and manpower as well.

1. Introduction

We live partly in a clasp of dogma, that innovations are only some positive characteristics of economic and social development. If we read about innovative dynamism in some statistics and professional literature, then we find out how far (CR) we have been left behind the world etc. ... but we are missing the answer why it is the case! Nobody has asked the question, how innovation is understood and manifested itself in the society-wide context. Innovations are often perceived as a magic formula without any answer if the innovation is socially needful or not.

During the past years we used to the fact that innovation is often understood to be a positive phenomenon (J. Schumpeter, Oslo manual OECD; see Mikoláš 2011, see Ludvík and Peterková 2012, see Ludvík and Peterková 2014). There are only a few people who have been pointed out the fact, that innovations can reach also negative orders (F. Valenta, P. Švejda, M. Pittner; see Mikoláš, 2011). Moreover, nowadays the word "growth" is usually understood as dynamism, it means more, more effective etc. Then the innovative dynamism could be described in a tendentious way as „a growth of the quantity of innovations without regard to a fact, if they are positive or negative for society", ... the main thing is to secure the growth of economic yields, GDP etc.

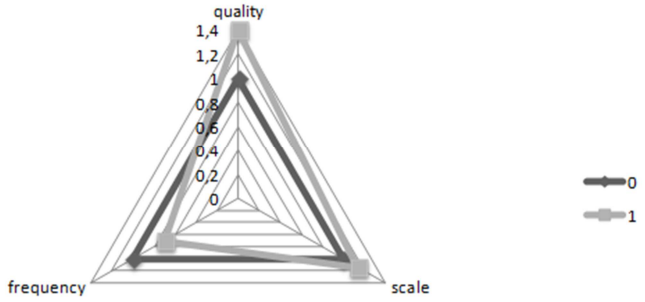
Then let us point out in our contribution the fact that mainly at the beginning of 21st century the innovative dynamism primarily in the area of industrial production has come into conflict with classic paradigms. In other words, the innovative dynamism is full of contradictions. There have been mutually encountering the interests of social responsibility of entrepreneurship, economic optimization of company´s management, development of knowledge-based society and the dynamics of innovative cycles.

2. Innovation and Social Responsibility of Business Activity1

Let´s elaborate the previous ideas in the introduction into some following theses. Innovation of industrial product includes mainly the three facts:

- The qualitative (functional and others) parameters of innovated product have been improving.
- New knowledge of materials, raw materials and resources enable to reach their bigger „utilization rate“, it means that we can achieve larger scale of production, longer life time, etc. from the same quantity of the resource.
- As a consequence of the new knowledge, a technology of production has been changed, thus after the innovation we produce the same volume of production during a shorter time – i.e. innovative, production, sales, investment and others cycles have been shortening.

There are graphically drawn the above mentioned ideas in the following Figure 1. An original product is marked with zero, a product from the following innovative cycle with number one (1).



Source: self-processed

Figure 1. *Changes of the product potential in two innovative cycles chart*

On the axis y (quality) is drawn a growth of qualitative parameters of a new product. On the axis x (scale) is drawn a change of the resources´ utilization extent (utilization ratio), i.e. enlargement of the resources´ potential utilization.

On the axis z (frequency) is a change of the innovative cycles speed, i.e. shortening of "relative economic" time.

In the following Table 1 some simulated quantities of the product potential changes in two innovative cycles are given.

Table 1. *Simulated quantities of the product potential changes in two innovative cycles2*

Generation (cycle) /*Characteristics of innovation*	**0**	**1**
Quality	*1*	*1,4*
Extent	*1*	*1,14*
Frequency	*1*	*0,7*

Source: self-processed

It is necessary to note some dilemmas:

a) The new product (1) can potentially physically "live" 14 % longer than the original product (0). It means, if the original bulb can be used for lighting for 1000 hours, a new generation bulb can emit light for 1140 hours. Therefore we need about 8,8 pieces of bulbs instead of 10 pieces of original bulbs, approximately fewer about 1,2 bulb.

b) The new product is the higher quality therefore it substitutes a part of the original generation products (0), then the new generation bulb (1) has better luminosity e.g. about 40 %, instead of 10 pieces of old bulbs we need only 7, 1 of new ones.

Thus, if we sum up the findings from the points a) and b), then instead of 10 pieces of bulbs we need only 5,9 pieces of new generation (i.e. 1,2 + 2,9 = fewer about 4,1 pieces). This resulted in drop in production and profit 3 with a producer, thereby the main motive for entrepreneurship and existence of market society (capitalism), which means the profit maximization4, has been disappearing.

c) But innovative cycles have shortened and instead of physical lifetime period tf = 1140 hours we can meet up with economic time te = 700 hours (i.e. 1000 x 0,7). It means the loss of physical time potential $tz = tf - te = 1140 - 700 = 440$ hours. In other words although the bulb could emit light for 1140 hours in consequence of innovative dynamism it “can live” only 700 hours, because in the market has become next generation of bulbs. Then economic time has shortened. Compared to the original bulbs (the 0^{th} generation) we sell (resp. produce) 10 pieces of bulbs during 70% of original time (generation 0). In other words during

1 The chapter presents in the form of a contemplation a concentrate of about forty-year long research and special activity of the author Mikoláš, Z. presented in tens (hundreds) of articles, compilations, books etc. (*the main sources of the author are mentioned at the end of the article*). It is fully obvious that to create certain view on the issue of innovation, entrepreneurship etc. requested familiarization with thousands of printed and electronic sources, application of hundreds of research methods and techniques used in particular specific research projects etc. Although with years of professional work the author comes to conclusion that the best creative methods are not the statistical or more precisely quantitative, but on the contrary qualitative methods and techniques for the core of things or processes research. Mainly these are induction and deduction, critical (sceptical) thinking base on examination of differences, conflicts, contracts, negation of negation, transformation of quantity into quality and vice versa, relational and causal analysis etc. That is why the presented contribution is concentrated on the dilemmas of paradigms („truths“) thus on questions what, why, how etc. and not how much! Mathematical apparatus is only an aid to depict the author´s construction of thoughts. It is only simplified way of communication between the author and a reader.

2 Simulated quantities are responding to optimum quantities derived from the models of competitiveness of industrial companies (see the source Mikoláš, Z., Peterková, J., Tvrdíková, M. et al. 2011, or rather Mikoláš, 2012) that are shortly described in chapter 2 of this contribution.

3 Under otherwise unchanged conditions.

4 Necessary to point that within economic literature there is commonly defined „the law of falling rate of profit, that has confirmed our simulation but in another context then was originally (in past) considered. The initial concept of “the law” was derived from growing quantity of production in the market not from its quality – i.e. the dilemma of innovative dynamism. Here is necessary to state also an ideological shade of the mentioned „law“. Marxist-Leninist ideology used the interpretation of stated “law” to prove a putrid nature of capitalism. Now the main stream economics (i.e. capitalistic) quietly “ignores“ the link of this “law” with crisis phenomena of contemporary capitalism. More detailed see e.g. Cameron (1996).

the original period of time of the zero the generation there are sold (i.e. produced) not 10 pieces, but approximately 14, 3 pieces of bulbs innovated. From this results that *potential physical time must be artificially (intentionally) shortened into real physical time (tfe) to be in accordance with economic time (tfe = te)*. This is typical „*anti-innovation*“ (innovation in negative order of magnitude!!!) – the physical lifetime of product was "effectively" (functionally) shortened in the interest of a profit maximization!

Not only production and sales, but also the profit that is however unrealistic, is growing. This is an inflation increase in production (about 4, 3 pieces, resp. 14, 3 - 10), thus also in the profit as a result of negative innovation ("useless" innovation). It comes to the drawing of some consumers´ finances (needless, or rather enforced buying of new products) and their transfer to producers and business persons. *Inflation comes into existence by the growth of price level relating not to unit of production, but to time of utilization of the production unit*! Even worse *market economy is transformed in this way into market society*!!! People (society) are forced to consume without regard to economic rationality of consumption (economic rationality of production and sale is given by maximization of profits).

There follows a dilemma from the mentioned example – is innovation of the product always positive or also negative within the meaning that it bears financial inflation, ecological burden (with the volume of waste growth) and mainly latent threat of a crisis of overproduction?!

Have a look at the above mentioned phenomenon also from the point of view of producer´s social responsibility from ethical point of view. The overproduction and loss of products potentials (see the text above) lead to ecological burden both entering into production (we plunder excessively natural and others sources) and during the output (excessive production brings excessive waste of used products etc.). The overproduction and losses of the products´ potentials create also further emissions, e.g. psycho-social anti-product, i.e. *the consumer and prodigal society*.

There is still one bigger problem – *human being*. This is a problem of philosophical character penetrating up to inward roots of a man and human community. Let´s imagine a man instead of a bulb5. Hundred years ago a man lived in Europe for about 60 let and worked from 15 to 55. Thus a man was economic needful (i.e. at productive age) estimated for 40 years and only for the period of 20 years he was socially needful. The index measuring the productive age against the total length of life was iž0 = 2/3.

Current young man lives to the age of 80 years, but he usually looks for his permanent job till 30 years of age and he finishes his productive age approximately at the age of 50. He will be a productive (economic needful) contemporary man only for 20 years and index of "productive life" will be equal only to iž1 = 1/4.6 There the Neruda´s question “where to put him?” suggests itself! Social necessity of a man in the stated essay has risen from 20 to 60 years and economic (productive) necessity has shortened from 40 to 20 years. This is not only a matter of pension security (as nowadays some politicians and experts have been debating), but psycho-socio-physiological nature of a human being´s existence called a man of “the modern age”.

Will we in the future willfully shorten the physical life of people to so called economic lifetime like in the case of bulbs (see above mentioned example)?! Or do we find another "non-human" but so called rational solution to unproductive people? In other words, we don´t renovate (don´t have them overhauled) some devices (e.g. copy machines), but we hand them over to the scrapheap as a trash and buy new ones. Thus, reduced to absurdity, we will transport the people into the waste collection point to carry out euthanasia, not to bother, because the society (or rather state, municipalities, families etc.) won´t have finances (and moral scruples) for people at pre-productive and post-productive age?!

There will probably live some new categories of inhabitants inside the community of people – *social and economic useless, social and economic needed*. That is *subhuman's* and *supermen*?! Or self-reflection of human community will come and some companies will take part in young generation of employees´ education in a social responsible way and will take care of their pensioners as it was during the old (the first-republic "Tomáš Baťa period" or even "inauspicious" socialistic) times?! Or historically (evolutionarily) we will come back to the philosophy and faith from the period of thousand years ago … “revere your father and mother ...”, what if the old status of family (dynasty, village) returns into the current “modern age”, when parents look after children and their old parents or rather relatives or municipality again create the socioeconomic commune, kibbutz and so on?

Well it is dilemma!

3. Special Theory of the Productive System Growth

We won´t further continue with the thoughts about bulbs and human destiny with open ending and so without answers to the questions. The extent of this article is limited therefore within this chapter I will try to summarize the findings of previous researches leading to the conclusions stated above. We will take a step to logical reasoning of foregoing statements (see chapter 1).

Special theory of productive system growth 7 is described

5 Following example has not been exemplified with mathematics or statistics there is only a parallel of the previous consideration (see above the issues of bulbs).

6 Is it a surprising fact that a long time before K. Marx came to the similar finding in his book Capital and further records. Even free time or rather conception of work not as the necessity, but as the need was one of ideological concepts of communism. There have been founded in the course of time that this social concept had been idealistic and compared poorly at the end of 20th century in the competition with capitalism. But it doesn´t mean, that there has disappeared the dilemma of “productive and social time“!

7 *Productive system* is usually determined in literature as *a company* (or *a*

by means of mental model using elementary mathematical (symbolic) relations.8

Let´s assume *productive system as an organic complex*, that has existed for certain time t_0 (i.e. is keeping and developing its own potential) and is able to generate a following generation of productive system ("descendant").9

Total potential of the productive system PC is made up of *purposeful potential* U (bringing useful "output" of system in given quantity, quality, reliability at acceptance of existing conditions of reproduction), *expended potential* VP (that ensures formation of potential U, further it includes losses of potentials emerging during their transformations and potential related to elimination of negative emissions – anti-products) and *stabilized potential* SP (evolutionary asset) bringing evolutionary potential into next cycles of reproduction (generations). It means this is the postponed consumption, investment and unspecified forms of potential into the future.

For natural and social systems there are valid the evolutionary principles ("instincts, reflexes"):10

$$PC_1 > PC_0 \text{ a } (U_1 + VP_1) > (U_0 + VP_0).$$

Then under the given conditions it is possible to write down a basic evolutionary (reproductive) rule for two following generations of productive system in next two variations:

a) $KPC_1 = PC_1 : PC_0 > 2 - (SP_0 : PC_0)$,

b) $KPC_1 = 1 + ((U_0 + VP_0) : PC_0)$.

Each productive system is characterized by two inclinations:

a) Propensity to consume $1 < ESP = (PC_0 - SP_0) : PC_0 > 0$,

b) Propensity to save11 $EUS = 1 : ((PC_0 - SP_0) : SP_0) > 0$.

Finding the balance between these two propensities we can come to several optimal values:

a) $KPC_1 = PC_1 : PC_0 = 1{,}618034$,

b) $KSC_0 = SP_0 : PC_0 = 0{,}381966$,

c) $KUV_0 = (U_0 + VP_0) : PC_0 = 0{,}618034$,

d) $SUV_0 = SP_0 : (U_0 + VP_0) = 0{,}618034$.

Translated from "formulas language" into the common speech: If starting (0) generation12 postpones for the future *38,2%* of its potential, then following generation (1) will increase the total potential of *61.8%* compared to total potential of previous generation (0). At the same time it is valid that consumption (U + VP) of the starting generation (0) is *61,8%* of total potential, but also the share of postponed (stabilized) potential SP of consumption (U + VP) equals also *61,8%*.13

From economic practice and the theory it is evident the relation U = v. VP, where v is *velocity of productive transformation* of potential expended on a purposeful potential (in economic literature this general characteristic in various connections is differently marked: *labour productivity, profitability, productiveness, efficiency etc.*).

The optimum velocity ratio of two following (generations) transformations is derived from the optimum of positive synergetic effect "coexistence and competition" of two generations:14

$$KE_1 = v_1 : v_0 = 1{,}414. \text{ Then } KU_1 = U_1 : U_0 = 1{,}896 \text{ a } KVP_1 = VP_1 : VP_0 = 1{,}340.$$

Translated from "formulas language" into the common speech: new generation (1) is reaching within its reproductive cycle the higher speed limit of productive transformations of *41,4 %,* than is a speed ("productivity") of cycle (generation) previous (0). Then it results from the context of relations that purposeful potential U of the new generation (1) is of *89,6 %* higher than in original cycle (0) and at the same time the invested potential ("sources") will increase between generations of *34 %*.

Consequence of the above described effects is:

a) Prolongation of physical $t_{f1} = (KPC_1 : KE_1). t_0 = (1{,}618. 0{,}707). t_0 = 1{,}144. t_0$,

b) Reduction of economic time $t_{e1} = (1 : KE_1). t_0 = 0{,}707. t_0$.

In simple terms: as a result of the "productivity" growth the economic time between cycles (of generations) *has been shortened of* 29,3 %, but, simultaneously, the increase in total potential of productive system is causing *prolongation of physical time of* existence (cycle) of following generation of 14,4 %. Then there is a time paradox (dilemma): *at the same time the new generation lives for economic shorter time* t_{e1}, its economic (innovative) life cycle is shorter compared to original generation (0), and *simultaneously its physical time of existence* t_{f1} *has been lengthened*! *Disparity*, or rather loss („waste"), *of time* then equals

$t_{z1} = t_{f1} - t_{e1} = 0{,}618. 0{,}707. t_0 = 0{,}437. t_0$! Then with every innovative cycle (new generation) we are losing as a "waste" 43,7 % of physical time (t_0)!

We can interpret the last relation also this way. If the following relations are valid:

a) $KUV_0 = (U_0 + VP_0) : PC_0 = KUV_1 = (U_1 + VP_1) : PC_1 =$

business, or rather archaic as *a factory*). In the branches of industrial engineering and entrepreneurship we have started to use instead of the terms company, business etc. "more accurate" term of *productive system* (more detailed in the book Mikoláš, Z., Peterkova, J., Tvrdíková, M. et al. (2011), 2011).

8 Not pure mathematical or statistical model, but a model transcribing logical relations from the text into symbolic form- more detailed issues of „mathematical-logical models making", e.g. Fajkoš (1978).

9 Following relations and patterns are more detailed descriptive in the article of Mikoláš (2012) and in the book Mikoláš, Z., Peterkova, J., Tvrdíková, M. et al. (2011) (2011, s. 51 - 61, 143-191).

10 Where „0" is marking the initial ("old") and „1" the following ("new") evolutionary generation.

11 It should be pointed to "new fuzzy" philosophy of conception of reproduction (evolution), that offers not only standard analytical view, i.e. *what share a part within the whole has* - see a) *propensity to consume* equation, but it is seeking also the answer to the question *what share the future whole (1) has in the old part (0) from which has been derived its birth* - see b) *propensity to save* equation. Propensities to consume and to save are inversely related, therefore b) equation is expressed as a ratio 1: ....)

12 Necessary to realize that these are the values valid under "ideal" conditions of reproduction!

13 Mentioned numbers (that were derived for some natural phenomena already in Ancient Greece) are called to be the numbers so called *of golden cut*.

14 Derivation, see e.g. Mikoláš et al. (2010), s. 152-156.

0,618034,

b) $SUV_0 = SP_0: (U_0 + VP_0) = SUV_1 = SP_1: (U_1 + VP_1) =$ 0,618034,

c) $KE_1 = v_1: v_0 = 1{,}414$, resp. $IKE_1 = v_0: v_1 = 0{,}707$,

then the loss (disparity) of physical time compared to economic time is getting bigger, if:

a) Propensity to consume in the original generation (0) $SUV_0 = SP_0: (U_0 + VP_0)$ has been on the increase from zero ad infinitum (only theoretically, not practically),

b) Propensity to consume in the new generation (1) $KUV_1 = (U_1 + VP_1)$: PC_1 is increases from zero to one,

c) Indicator comparing velocities of innovative dynamism of the two following generations (0, 1) $IKE_1 = v_0: v_1$ falls practically from one (theoretically from $+\infty$) to zero.

It is still necessary to point to next two paradoxes of special theory of productive system growth. The questions are: What is optimum dynamics of developing (innovative) potential of the two following generations of productive systems and how distinct should be the growth of human potential between generations?

Developing (innovative) potential is defined15: $D_1 = D_0. (U_1: U_0). (H_1: H_0)$, H is human potential. On fulfillment of all conditions of rational development of the productive system (see above) it results:

a) $0{,}853 < KH_1 = H_1: H_0 < 1{,}1$

b) $1{,}618 < KD_1 = D_1: D_0 < 2{,}1$.

So human potential of the new generation has oscillated around the value of the original generation within interval from 85,3 % to 110%. Human potential then must not exceed original state in growth about +10% and must not fall below 85,3 % of original generation state.

Then developing (innovative) potential of the new generation is located in the zone from 161,8 % to 210 % compared to the original generation.

On the basis of simulations have been found that the productive systems having long cycles (in tens and more years) of reproduction (e.g. productive systems linked with natural processes, e. g. agriculture, forest industry and so on) are getting closer to lower values KH and KD, on the contrary the productive systems with short cycles (annual and the like) are getting closer to maximum values KH and KD.

After a recalculation of given values per one year of existence a generation there are the differences (disparity) even considerably more distinctive (more extreme)!16

In this way the dilemma described in the first charter has deepened (it is more outlandish)!

4. Conclusion

The experts are facing a multidisciplinary problem – accelerating dynamics of human cognition and innovative entrepreneurship bring some contradictions among given economic, managerial, political and others paradigms. Furthermore, the particular paradigms have been in conflict and all in all they bring a disharmony in economy, business activity, social and political sphere, contemporary ethic of particular generations etc.

It is necessary to study innovative dynamism in the context with social responsibility of business activity. It is not possible to consider the economic performance without relation to ecological, social, ethical and others impacts.

For example: Innovation of sub-machine gun against occupiers during the war has quite different social context than innovated gun serving to occupier for the nation´s destruction only because they believe in another god than a murdering occupier!

From the above mentioned text results the necessity to understand innovative dynamism of business activities in a wider context. It will be necessary to re-evaluate our view on businesses performance, too – to overcome above described "unity of conflict of contrasts" there is necessary to understand as a performance of a business not only its volume of production and services provided, but also the number of offered jobs (i.e. share in the employment), social, ecological and others outputs.

15 Similar relation (pattern) was presented and through the practical simulations verified already tens of years ago (Mikoláš-Ludvík, 1987).

16 Here is necessary to point to absurdity of some requirements of economists and politicians so as the states with different configuration of branches (agriculture, metallurgical or electro technical industry etc.) should have the same annual growth rate of GDP, or so as the companies with various trade specializations should reach e.g. identical cost- profitability etc.

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