SYNERGIC TIME EFFECT OF INTELLIGENT ENTERPRISE

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Abstract- The aim of the paper is to describe the main important changes in entrepreneurial environment appearing in recent years. The main findings of this paper are: (a) intelligent business and firms operate globally; the process is selective; (b) centers of intelligent firms (companies) are only found in a few developed countries and their productive potential intelligence diffuses throughout the world; (c) contemporary intelligent business must take place not only real but also in virtual space; (d) business in the virtual space brings new synergies and opportunities and the acceleration of productive processes; intelligent business and firms in recent years have of eruption character and synergic time effect.

Keywords - Competitive intelligence, glocalization, global pilot firms, satellite firms, firms of periphery character, innovation spreading, time relativity, enterprise potential, synergic time effect

Introduction

In recent years, there have been many important changes in the entrepreneurial environment that cannot easily be described by traditional terminology. The entrepreneurial environment is distinguished by increasing spontaneity and the development of flexible networking organizational structures that often grow into virtual organizations able to quickly react to changes in the entrepreneurial environment. The definition of virtual enterprise and intelligent enterprise are not definitively settled. These two concepts play an important role in grouping enterprises according to the global influence. This paper seeks to contribute, to the literature related to intelligent enterprise in several ways. On one hand this paper offers a new way how to describe the phenomena that appears in entrepreneurial environment. Second, by employing a theory of potential and rate of innovation diffusion there can be determined many important processes and business activities. This paper emphasizes the need for a holistic approach to contemporary business, in both virtual and real space plays an important role of virtual space (a necessary component competitive potential of firms.

Globalization and Competitive Intelligence

Globalization is a phenomenon of the turn of the 20th and 21 century. "Globalization theory" emerged in the 1980s and appeared strongly in economy, politics and culture, along with the sweeping away of the significance of territorial boundaries and national economies, states and cultures. Ohmae [1, 2] is often cited as an example of this approach, and other proponents include Reich [3] and Albrow [4], as well as Hey and Marsh [2]. The first part of the process of globalization had strong globalist account of the economy. National economies became less significant, or even no longer existed. The reason was free movement of capital, multinational corporations and economic interdependency [6]. In our research findings the current form of globalization is manifest in the following relevant aspects. "*Glocalization*" is very aggressive and concrete form of global processes demonstrated in localities, and vice versa very „energetic" demonstration and pushing through forms of specific and original local impulses within a global dimension. *Selection process* means that all economic, social, political and other processes of a global character enforce natural selection principle both among regions and enterprises, universities, etc. Diffusion means dispersion of productive and other activities around the world and connected through the virtual space.

Within the foregoing context mentioned individual enterprises rank within a hierarchy corresponding to „the spheres of global influences, impacts, effects". From this perspective, the business can be divided into three main groups [7]:

• *global pilot firms* (globally controlling and dominating the world of enterprise),

• *satellite firms* (demonstrating efficient behavior due to the position of controlled services provided for global pilot firms),

• *firms of periphery character*: self-employer - entrepreneur, local firms (with no significant impact within global entrepreneurial competition).

This selection is typical for a new form of global competition – a phenomenon of entrepreneurial (organizational) intelligence. The character of work and enterprise has changed; the efficiency has increased at both economic and social levels. A firm can no longer survive only on "the passive knowledge intake or induction" from its surroundings. To acknowledge this reality the professional academic community has developed terms such as: "lifelong learning" or "self-learning".

The ability to accumulate knowledge, process information and learn does not guarantee the development. The evolution of enterprise in contemporary society has been completed with so called intelligent firm. According to Viedma and Cabrita [8], competitive intelligence supports the strategic process in organizations, acting as a sensor to indicate to top management whether the organization is still competitive. At the same time, company vision, mission and strategic objectives act as a constant guide to the competitive intelligence process. But in our formulation intelligent firm distinguishes itself with intellectual and emotional (internal motivation) self-reflection (identification) and organic (genetically codified) development of material, non-material and particularly intellectual potentials [9]. The developmental spiral of the organization from the stage of "material" form up to the stage of "intelligent" one can be found in Fig. 1.
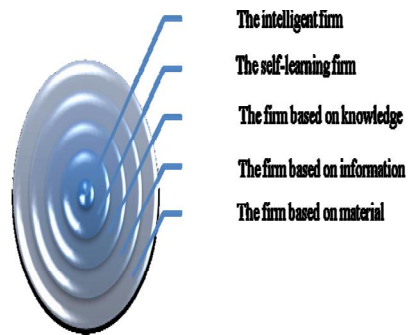

Fig. 1 Developmental Spiral of an Intelligent Firm [9]

The intelligence of the firm cannot be developed without the existence of substantive exploitation of lower developmental stages. The so-called *virtual firm* can be brought into being only after the engagement of various environments surrounding the firm. This engagement with the surrounding environments must be extensive enough that the intelligence brought into the firm can be retained and even developed. Sustainability of firm's development toward becoming a "virtual firm" must be based on harmonization of the firm's internal and external environments. According to Wozniaková [10] the virtual firm uses information technology, creates "apparent picture" of itself in virtual

reality. Based on these and other facts the firm amplifies its potential.

The entrepreneurial ideal and concept of current enterprise is demonstrated in the "intelligent competitive firm", achieving positive synergy with the competitive environment due to its ability to add value (not only in its economic, but also social, ecological and political-military aspects). The added value of such a firm has to be produced by its own workforce and by the absorbing added value from "less intelligent enterprises" and "non-enterprising (satellite)" enterprises.

Definition of Intelligent Enterprise

For the intelligent firm, human potential represents the most significant resource for the developmental capital. Human beings and their non-material products – philosophy, mission, policy, strategy, tactics, know how, goodwill, loyalty – create a strong power base for the enterprise, as well as the basis for its competitiveness. Material and/or financial resources lose their value without imagination, strategic thinking, and intelligence. Material and financial resources lose their value, turn second rate and even turn "blind" with an associated decline in development potential.

The firm can be transformed into an intelligent organization only provided its development strategy is based on maximal exploitation and development of the intellectual potential of individuals inside and outside the firm [11]. The intelligent company displays not only its genial structure and genial assets, but the ability to exploit its own intellectual potential and the potential of its environments [11].

Intelligence itself is a more developed matter relative to the learning process. It includes the ability and skills to employ tools of thinking to produce new views of one's self and one's environment, reflecting the learning process and gaining experience. This particular organism genotype creates new knowledge, identifies negative patterns of behavior and transforms them into new and genius forms and activities [12].

The intelligent company represents the organization of a permanent external (market) and versus internal organization dynamic. For this reason it has to renew its creative resources to be able to face competition. The intelligent company stimulates and amplifies its genetic base and cultivated instincts, which initiate its development and changes [11]. This kind of company can efficiently utilize all the information it can obtain from its surroundings, interpret it, transform it into knowledge and configure it into new entrepreneurial potentials, and spread, widen, the space for its key competencies. The intelligent company executes an ongoing, permanent process of enrichment, actualization, creation of new knowledge and a dynamic way of learning.

M. Romanowska [14] defines an intelligent firm as a firm with unlimited dimensions, a condition to which she attributes two factors: the firm's intellectual potential cannot be stolen copied, or faked, and the firm displays an ongoing ability to change its behavioral models. The intelligent company's ability to produce added value is attributable to its perfect and flexible organizational structure, architecture and reputation, and due to the fact that it derives and appropriates the added value from other resources, especially the resources from less intelligent market participants.

Multidimensional View of time of Intelligent Enterprise

An intelligent company displays a permanent evolution of disharmonies of its functional segments, aiming to achieve a relative harmony of a total unit (firm). An intelligent company is a pulsing organism (pulsing in time dimension) of each segment (function) are continuously producing new "intelligent" combinations (urbanism), which cannot be grasped, copied, or faked at a specific moment.

An intelligent company achieves and produces positive synergic effects also from the historical-dialectical integration (genesis) of history, present time and future – for instance: the firm's history, memory, reputation, respect, recognition within a society, mission, vision, objectives, etc. [15].

Typical features of this process are shortened change cycles and increasing intensity of alterations in quality, adaptation, organization, and function. The harmonization process of dimensions of relative (relatively, sizeable expressed) times in individual functional segments, in a firm as a unit, and in its environments serves as a measure for the intelligence, added value and success, the existence usefulness of the intelligent company.

Synergic Time Effect of Intelligent Enterprise

The change frequency in firm´s individual segments and that of its relevant environment usually differ. When compared they demonstrate different time dimensions [7]. Taking into account the time aspect of changes two ways how to utilize potential of individual functional segments can be found.

Potential (PSa) of segment (a) with a lower change frequency depends on a larger time span of its exploitation when compared to potential (PSb) of segment with a higher frequency (b), which results in an absolute, total loss of potential (ZPSab) of function „a". *Potential of segment (a)* with a lower change frequency is depleted during two succeeding phases by functions of segments „b" and „c", resulting in a relative loss of potential of segment (a) with its relatively slower change dynamics. Simplified version of a mathematic formula of the above statements can be expressed and presented by Mikoláš [7].

Let's imagine the changes in a firm as tiny, separate projects. Assume time span „τ" is needed for project progress, the beginning being at " zero moment" ($t_0 = 0$) and finish at the moment „t", while $\tau \geq 0$. The effects generally the contribution or benefit) „E" have an increasing tendency during the time, $KUt = E_t : E_0 > 1$ (1).

At the same time we take into consideration the amount of resources „M", which has formed the base for the achieved effect (both material and non-material resources used during the whole reproduction cycles – and also pre-production /development and research/, production cycles and consumption cycles). The sustainability of a human society needs to respect and meet the condition that the amount of resources does not increase, but decreases with a still increasing effect (natural resources and other resources are not exploited in a wild way. From the relation $KM_t = M_t : M_0 \leq 1$ (2) the condition $KE_t = KU_t : KM_t > 1$ (3) can be derived.

The basic question still remains open: formulation of the relationship between the effect „E" and the amount of resources „M". We propose that the link between these variables is the change velocity „v", and the change frequency. This means the dynamics of the innovation process, achieved by exploiting the respective amount of the resources „M" can be expressed as follows: $E = M . v$ (4).

The above described conditions can be met only provided the change frequency (innovation speed) respects $v_t > v_0$. This derived condition supports the idea on shortening relative time span of projects etc. We are still not sure how to measure and compare so called "longer" time (τ_0) of the dissemination process of the project – innovation from a previous innovation generation („0") with a shorter time (τ_1) of innovation dissemination of the following, succeeding generation („1"). For this reason the contrast, distinction between times of innovation dissemination $d\tau = \tau_0 - \tau_1$ (5) is in no way appropriate. This would e lead either to an absolute loss of the time difference ($d\tau$), an adequate potential or the „effort" to insert a large feet into a small shoe. The question how to solve the dilemma, to press larger time into a smaller one, still remains open and to be answered.

We also have to take into consideration two time coordinates (dimensions), in the same way as if defining goniometric functions. The time description – and its transformation - of the innovation dissemination denote:

• The difference of time span between succeeding innovations (projects) $d\tau = \tau_0 - \tau_1$ (6) does not respect innovative philosophy of enterprise. This is only a spring board for some economic thoughts, not being an adequate indicator for a relevant description of time relationship, coherence between innovation and firm's intelligence.

• The time τ_0 can be "pressed, boxed up" into time dimension $\tau 1$ only in a relative way, it means that the square of time τ_0 equals the sum of squares of times τ_1 a τr, $\tau_0^2 = \tau_1^2 + \tau_r^2$ (7), where τ_r stands for „relative difference" of time of competing innovations. These create the base for a new architecture of intelligent firm – a new multidimensional and relative approach to the added value, competition synergy of interrelated subjects, firm's segments, its environments, etc.

When simplifying the above stated equation we achieve:

$$\tau_r / \tau^0 = \frac{\tau r}{\tau 0} = \sqrt{\left(1 - \frac{\tau 1^2}{\tau 0^2}\right)}$$ (8). Provided $X\tau = \tau_0.v_0$ (9) and $X\tau = \tau_1.v_1$ (10), $X\tau$ are taken for a generally arbitrary (or purposely) defined time of exploration, the process of competing projects (innovations). In fact this describes „a work segment" of the astronomic time (for instance 10 years), during which we can monitor and research all the aspects associated with innovation dissemination. The above stated equation can be transformed into

$$\frac{\tau r}{\tau 0} = \sqrt{\left(1 - \frac{v 0^2}{v 1^2}\right)}$$

(11). It is logical, that the basic time unit is the time of the existence (life span, life-cycle) of the innovation (project), for this reason marked as „1". The maximal positive synergic effect is achieved when shortened in the rate $\frac{1}{0,707}$ (16) or $\frac{1}{\sqrt{2}}$ (17). The function of innovation cycle shortening, growth of the firm's intelligence (expressed in transposed, face-reflected function process towards the trend of innovation cycle shortening) can be derived:

• *Special function* for simulated optimum of cycle shortening (optimization of the firm's intelligence): $\tau_c = \tau_0 .0,707^c$ (18),

• *General function* of the cycle shortening with a constant intelligence quotient $0 < g < 1$: $\tau_c = \tau_0.(1 - g)^c$ (19), provided c … states the order, sequence of innovation cycle, c = 0, 1, 2… n,

τ_c … the length of simulated innovation cycle „c" in years, c = 1, 2,…... n,

τ_0 … the length of initiative („zero") innovation cycle, it means c = 0.

The speed of innovation launching is generated by competing "innovators" within the "space" (branch) of common interests. This process can be viewed as "bombing" a specific area with a certain amount "K" of the production of competing parties with still increasing quality and frequency of bombing "raids". Provided the firm insists on keeping its prominent position at the market its own innovation dynamics has to control and "dictate" the frequency of innovation cycles at the market, or at least to approach this market frequency. In this case this firm earns the attribute "intelligent competitive". If not, the firm "fails", becoming a satellite of leading firms, a supplier, an assembly firm or a logistic part of a distribution chain, if not becoming a total "outsider".

The real dynamics of the innovation cycles oscillate the simulated optimal innovation rate. The dynamics depend on the production branch, regional and other characteristics of the market, political and other factors. Some branches are rather "slow", the innovation cycle shortening being slight, negligible – forest industry, agriculture, while other branches experience rapid, helter-skelter changes - microelectronics, nanotechnology, biotechnology, genetic engineering. In "technologically progressive" branches the combat for time has earned a global character, cell phones production being the right example lately. In such technologically advanced branches the bases for the birth of intelligent competitive firms have already been laid.

The fact is that innovation cycles cannot be shortened in an in definitive way. So called zero time of innovation dissemination (life span, life-cycle) can never be achieved. There is a natural border, termination line, for the time of the innovation existence $\tau_m > 0$, which is defined by the ability of innovation consumers to absorb new innovation. Behind this border the demand for a new "progress" (innovation) is either of a zero quality or remains of no interest for the producer, because of being inefficient. The is the reason why the combat for shortening the innovation cycles deceases when approaching the moment close to this limit time $\tau_m > 0$ and is transferred into two alternative fields of competition :

• after decreasing the amount of inputs for reaching a new innovation KM < 1. The innovation process in this production line keeps the character of innovation at a lower grade,

• top innovators, intelligent competitive firms, leave the position in current and transfer innovation line of a higher grade. Intelligent competitive firms launch a new competition.

The ability to perceive time in a subjective way (in relative competition, in mutual self-reflection) is a typical feature of a high spends enterprise and its intelligence. The intelligent competitive firm does not follow the physical concept of time as a measure for its efficiency but substitutes this time with the time derived from confrontation of competing firms, projects, segments etc. Physical (astrologic) time remains a measure for its entrepreneurial space. More detailed description of the topic discussed can be found in literature published by the paper's author [7] more in [16].

Summary

Obviously, the intelligent business and firms operate globally. The process is selective. Canters of intelligent firms (companies) are only found in a few developed countries and their productive potential intelligence diffuses throughout the world. Contemporary intelligent business must take place not only real but also in virtual space. Business in the virtual space brings new synergies and opportunities acceleration of productive processes. Intelligent business and firms in recent years have of eruption character. Emissions of innovation and production recall the eruption of magma human knowledge, which now spilling into the world. A practical example University of Ostrava (Czech Republic) shows only "embryos" this process. On the other hand many transnational companies (mainly Asian) expand their intelligent business around the world with extraordinary vigor.

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