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INTELLIGENT COMPETITIVE
ENTERPRISE
(ERUPTION CLUSTER ENTERPRISE)

1. Competitive Intelligence

Globalization – is the word intervening the life of each individual, enterprise, politics. In fact this is the load, trigger and gear of our current lives, of everything, which surrounds us.

The current form of globalisation is manifested through the following relevant aspects:

a) *Glocalization* – very aggressive and concrete forms of global processes demonstrated in concrete localities, and vice versa very „energetic" demonstration and pushing through forms of specific and original local impulses within a global dimension

b) *Selection process* – it means that all economic, social, political and other processes of global character enforce natural selection principle both among regions and enterprises, universities, etc.

Within the context mentioned it is necessary to take into consideration the fact that individual enterprises rank within a hierarchy corresponding to „the spheres of global influences, impacts, effects".

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

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

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

The process mentioned above is typical for a new form of global competition, which at the beginning of the third millennium displays a new aspect – a phenomenon of entrepreneurial (organisational) intelligence. A variety of organisations and firms with different typical „generation attributes" can be found.

Looking back into history we find the oldest forms of enterprise and entrepreneurial subjects based on material substance (raw material extraction, manual and machinery production, exploitation of natural resources). Development of information and communication technologies transformed enterprises into firms with "advanced" information knowledge. The character of work and enterprise has changed; the efficiency has increased at both economic and social levels. The added value of human activities and that of information society enterprise have been based on eliminating the uncertainty, removing misbalance in economic, social and other processes.

The change of enterprise is associated with the change of information. The knowledge itself is the significant and essential characteristic feature of the organisation. The terms "the generation of knowledge societies" and "knowledge firms" were introduced. Current efficient firm cannot survive only on "the passive knowledge intake, induction" from its surroundings any more. "Life long learning" of organisations or firms has initiated the birth, genesis and growth of "self-learning" entrepreneurial subjects.

The ability to learn, accumulate the knowledge, process information does not guarantee the conscious and target oriented process of the firm's or company's development. The evolution process of enterprise and organisations of present society has been completed with so called *intelligent firm*. The intelligent firm distinguishes itself with intellectual and emotional (internal motivation) self-reflection (identification), organic (genetically codified) development of material, non-material and particularly intellectual potentials.

The developmental spiral of the organisation from the stage of "material" form up to the stage of "intelligent" one can be found in picture 1.

The intelligent firm
The self-learning firm
The firm based on knowledge
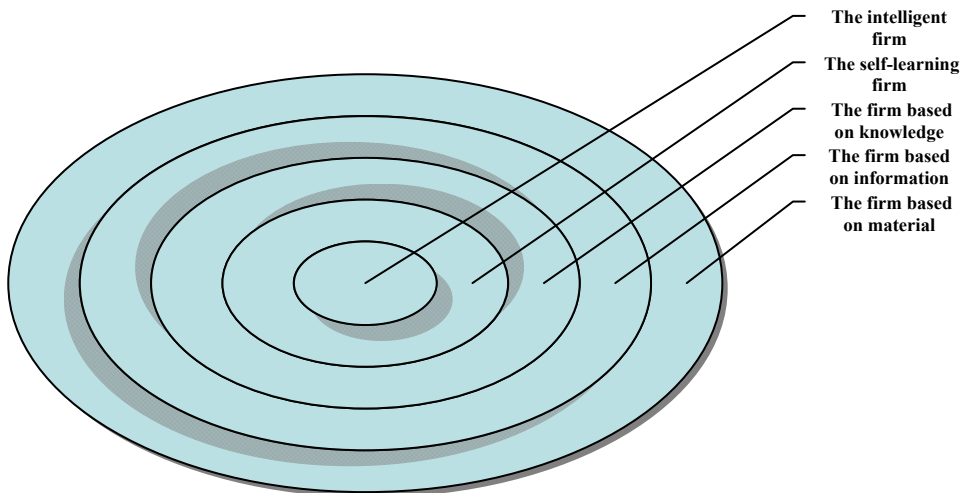The firm based on information
The firm based on material

Figure 1. The Developmental Spiral of an Intelligent Firm

It is necessary to note that *the intelligence* of the firm cannot be developed without the existence of some substance of lower developmental stages (material etc). So-called *virtual firm* can be executed only via the existence of material, informative and other environments surrounding the firm. This surrounding must be competitive enough so that the intelligence can be retained and even devel-

oped. Sustainability of the firm's development must be based on harmonization (balanced coexistence) of the firm and its internal and external environments.

The entrepreneurial ideal and concept of current enterprise is demonstrated in the *"intelligent competitive firm",* achieving positive synergic effect in its behaviour within the competitive environment due to its added value resulted from produced added value (not only in its economic, but also social, ecological and military-power aspects). The added value of such a firm has to be produced by its own workforce and by the added value absorbed from less intelligent enterprises and non-enterprising (satellite) subjects.

2. Definition of intelligent enterprise

Generally we have to admit that at the global market there does exist a real offensive of companies dominating in non-material resources. For the intelligent firm this kind of potential, human potential namely, represents the most significant resource of the developmental capital. A human being and his non-material products – philosophy, mission, policy, strategy, tactics, know how, goodwill, loyalty – create a strong power base, as well as the basis for competitiveness. Material and/or financial resources do not lose their value, but without imagination, strategy, and other aspects, without the intelligence generally, all these material and financial resources turn „blind", second rate with no developmental potential.

Company missing creative human resources, their intelligence, turns degenerated.
– Despite the ownership of databases the company misses, in fact, its memory in a generic sense.
– The company is unable to understand nor itself nor its surroundings, it lacks achieving new knowledge, experience. Despite the fact it is equipped with the latest, top quality computers; the firm's behaviour just follows regular algorithms.
– Despite the possession of knowledge and behaviour algorithms the company does not learn any more.

The firm can be transformed into an intelligent organisation only provided its development strategy is based on maximal exploitation and development of the intelligence of human potential both of individuals and the whole society. (Perechuda, 2000, s. 36-37).

The intelligent company does not display only its genial structure and genial assets, but the ability to exploit its own intellectual potential and potential of its environments. (Perechuda, 2000, s. 38) The ability to learn is a must, a relevant condition for achieving this developmental stage of enterprise. The learning process is the process aiming at modifying information, findings, statements, and declarations. It is a specific kind of a memory producing conditions for storing and transforming significant elements of knowledge and a variety of different reactions at them.

Intelligence itself is a more developed matter, compared to the learning process. This includes the ability and skills to utilise, employ tools of thinking to produce totally new views of yourself and your environment, all these reflecting the learning process and getting experience. This is a particular organism genotype which makes learned knowledge and findings negative and transforms then into new and genius forms and activities (Niemczyk, 2000, p. 76).

The intelligent company is the organisation of a permanent external (market) and internal competition. This is the reason why it has to renew its creative resources, to be able to face competition. Intelligent company boasts its genetic base and cultivated instinct, which initiate its development and changes (Perechuda, 2000, pp. 42-43). This kind of company can efficiently utilise all the information obtained from its surroundings and interpret it properly and correctly, distribute it within its internal organisational architecture, transform it into knowledge and configure it into new entrepreneurial potentials, and spread, widen, the space for its key competences.

Intelligent company executes an ongoing, permanent process of enrichment, actualization, creation of new knowledge and a dynamic way of learning.

This organisation form encourages and develops its own motivation mechanisms aiming at fulfilling its "existential usefulness" via the process of achieving success at market confrontation of its powers, economic power particularly.

The success of an intelligent firm is demonstrated at three levels:
- *Firm's prestige*
- *Original know how*
- *Opportunity to develop the knowledge potential* (Mikula, 2002, s. 21).

The firm's success and the success of individual bearers of this intellectual potential have its emotional dimension – demonstrated as *happiness* of an individual, a human being. Happiness may be defined as a concentrated expression of individual's usefulness and usefulness of his activities. The internal feeling of happiness is, above all, the enormous motivation impulse for further empower-

ing and development of intellectual potential of an individual and a company, he is employed with.

M. Romanowska (2001, s. 302) defines an intelligent firm as a firm with unlimited dimensions. The author describes two reasons: the firm's intellectual potential cannot be stolen copied, or faked, and the firm displays permanent ability to change its behavioural models. Intelligent company produces its added value due to its perfect and flexible organisational structure, architecture and reputation, and due to the fact that it derives and appropriates the added value from other resources, especially resources from less intelligent market subjects.

3. Multidimensional view of time of intelligent enterprise

Intelligent company achieves a positive synergic effect, added value, from the organic integration of separate functional segments of its intelligence. The following is the list of individual segments of the firm's intelligent:
– *(1.) Informative, (2.) Technological, (3.) Innovative, (4.) Financial, (5.) Marketing, (6.) Organizational, (7.) Social, (8.) Ecological, etc. (9., 10.)*

Although the above mentioned functional segments differ in their basic substance, the common denominator for all of them is the rapidity and frequency of changes, relatively short time duration of changes when being confronted with (competing) separate functions. Dilemma of an organic belonging to the firm's functions is manifested when trying to ensure its mobility and integrity. 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), the dimension of each segment (function) is permanently being developed and is permanently producing new "intelligent" combinations (urbanism), which cannot be grasped, copied, or faked at a specific moment (Figure 2).
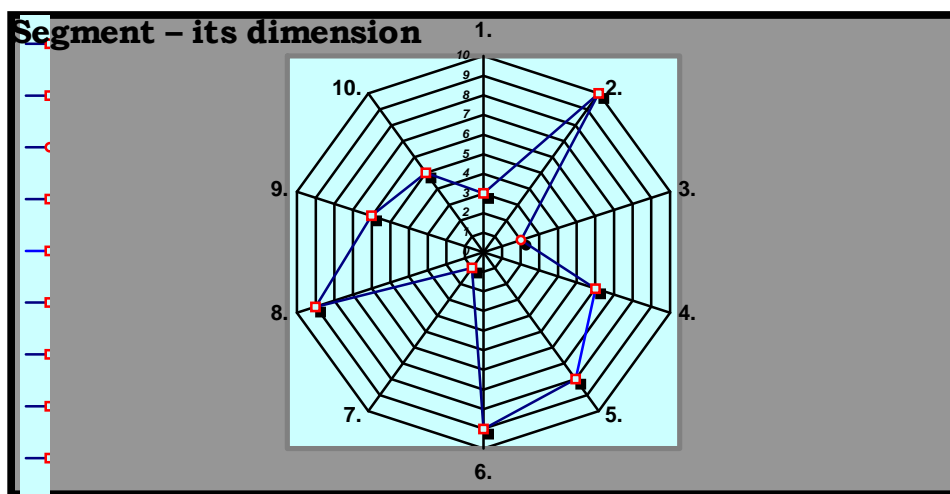
Figure 2. Intelligent company – functional segmentation

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 (Penc, 1998, s. 213-217).

A typical feature of this process are still shortened change cycles and still increasing intensity of change alterations in quality, adaptation, organisation, and function. The harmonisation process of dimensions of relative (relatively, sizeably 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.

4. 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.

Taking into account the time aspect of changes two ways how to utilise potential of individual functional segments can be found:

a) Potential (PS_a) of segment (a) with a lower change frequency depends on a larger time span of its exploitation when compared to potential (PS_b) of segment with a higher frequency (b), which results in an absolute, total loss of potential (ZPS_{ab}) of function „a".

b) Potential of segment (a) with a lower change frequency is depleted during two succeeding phases by functions of segments „b" a „c", which results in a relative loss of potential of segment (a) with a relatively slower change dynamics.

Simplified version of a mathematic formula of the above statements can be expressed and presented by the following formulas and ratio (Mikoláš, 2005, pp. 110-117).

Let's imagine the changes in a firm as some tiny, separate projects. We take into consideration time span „τ", needed for the project progress, the beginning being at " zero moment" ($t_0 = 0$) and finish at the moment „t", while $\tau \geq 0$.

We suppose that the effects (generally spoken the contribution, benefit) „E" have an increasing tendency during the time, $KU_t = E_t : E_0 > 1$.

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 $KM_t = M_t : M_0 \leq 1$ the condition $KE_t = KU_t : KM_t > 1$ can be derived.

The basic question still remains open: formulation of the relationship between the effect „E" and the amount of resources „M". We have concluded that the link between these variables is the change velocity „v", and the change frequency. This means the dynamics of the innovation process, earned by respective amount of the resources „M". The general relationship is as follows: $E = M.v$.

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 gen-

eration („**1**"). For this reason the contrast, distinction between times of innovation dissemination $d\tau = \tau_0 - \tau_1$ 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 feets 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 graphic description of a sinus function demonstrated as a projection of a point moving on a circle and the axis y can serve as an example (the axis of dependable variable). The effort to insert "the feets" into a proper shoe is successful. The idea is graphically demonstrated in figure 3.
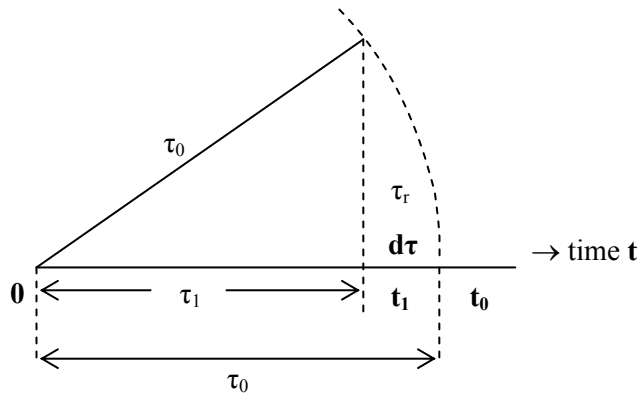

Figure 3. Time description of innovation dissemination – transformation

The time description –and its transformation – of the innovation dissemination denotes:

- The difference of time span between succeeding innovations (projects) $d\tau = \tau_0 - \tau_1$ 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 τ_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 τ_r, $\tau_0^2 = \tau_1^2 + \tau_r^2$, 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: $\tau_r/\tau_0 = \sqrt{(1 - \tau_1^2/\tau_0^2)}$. Provided $X\tau = \tau_0.v_0$ and $X\tau = \tau_1.v_1$, $X\tau$ are taken for a generally arbitrary (or purposely) defined time of exporation, 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 $\tau_r/\tau_0 = \sqrt{(1 - v_0^2/v_1^2)}$.

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", so $X\tau = \tau_1$, which results in $v_1 = 1$ a $v_0 < 1$. Simplifying the formalised relationship we achieve at: $M_1 \leq M_0 > 0$, $M_1 = KM_1.M_0$ a $M_0 = 1$.

The basic (standard) considerations on time economy and effective behaviour of the intelligent firm can be expressed by the following simple model:

a) absolute ("standard") gain, increase of the innovation effect is based on the relation: $DE_1 = E_1 - E_0 = KM_1 - v_0$,

b) relative gain, increase of the effect derived from relative time of innovation can be expressed by: $RE_1 = M_0.(\tau_r/\tau_0) = \sqrt{(1 - v_0^2)}$,

c) the total relative effect of innovation can be expressed by:
$ER_1 = E_0 + RE_1 = (v_0 + \sqrt{(1 - v_0^2)})$.

d) the relative synergic increase of the effect can be derived as a difference:
$RSE_1 = ER_1 - E_1 = (v_0 + \sqrt{(1 - v_0^2)}) - KM_1$.

Following the above mentioned relations (simplified mathematic model) a simple and clear simulation can be demonstrated (table 1). Independent variable of the simulation is represented by the dissemination speed v_0 of the innovation „0". At the same moment we suppose that the coefficient of the dynamics of the amount of innovation resources still equals 1.
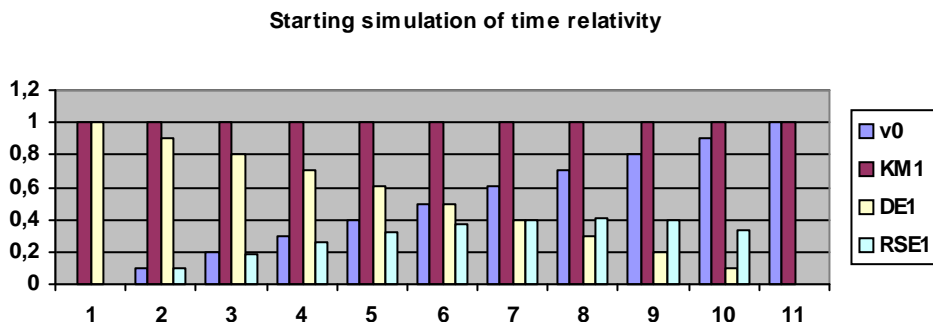
Table 1

Simulation of the speed of innovation dissemination
/frequency of the potential changes/

$KM_1 = 1$

V_0	0	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0
DE_1	1,0	0,9	0,8	0,7	0,6	0,5	0,4	0,3	0,2	0,1	0
RE_1	1,0	0,995	0,980	0,954	0,917	0,866	0,800	0,714	0,600	0,436	0
ER_1	1,0	1,095	1,180	1,254	1,317	1,366	1,400	**1,414**	1,400	1,336	1,0
RSE_1	0	0,095	0,180	0,254	0,317	0,366	0,400	**0,414**	0,400	0,336	0

Simulation expressed in a graphic form can be found in picture 4:

Starting simulation of time relativity

Summing up all the previous simulations and findings we can state that in the described conditions the succeeding innovation cycles are relatively optimally efficient. The maximal positive synergic effect is achieved when shortened in the rate **1: 0,705**.

The function of innovation cycle shortening, growth of the firm's intelligence (expressed in transponed, face-reflected function process towards the trend of innovation cycle shortening) can be derived:

a) *Special* function for simulated optimum of cycle shortening (optimization of the firm's intelligence): $\tau_c = \tau_0 . 0,705^c$,

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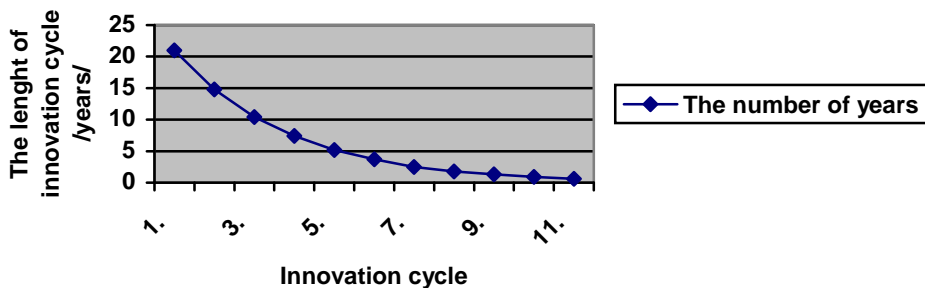
Provided **c** … states the order, sequence of innovation cycle, c = 0, 1, 2… n,

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 process of „special function of innovation cycle shortening" is expressed in a graphic form in picture 5, respecting $\tau_c = \tau_0 . 0,705^c$

Diagram of shortening of innovation cycle

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 indefinitive 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:

a) a part of producers strives 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 of a lower grade,

b) top innovators, intelligent competitive firms, leave the position in current innovation line and transfer into the 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 the firm's intelligence and "high speed" enterprise. Intelligent competitive firm does not follow physical concept of time as a measure for its efficiency (synergic effect) but it substitutes this time by 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 (Mikoláš, 2005, pp. 102-132).

5. Eruption intelligent enterprise

Enterprise within the described context gains the character of eruptions (gush) of the mass of changes of a new generation (new quality, new intellectual dimension). This form of entrepreneurial movement is not typical for all contemporary firms. In fact the total figure of entrepreneurial subjects even worldwide is rather limited, but these play a pilot role for the development globally and in fact they control other firms, organisations or even countries, not only in the economic way. The basis of their power and global influence is guaranteed by the ability to control time within the micro cosmos of own companies and within the environment.

The terms as identity, integration, sovereignty, mobility, collaboration with competition and universities of advanced technologies, formulation of strategic alliance and innovation clusters, etc. create the enterprise portfolio of these firms typical for a rather limited figure of staff employed.

To sum up the contribution we have to focus also on small and medium enterprises and try to forecast development of small and medium sized intelligent competitive firms. The process is based on the philosophy of formation innovative clusters.

If the development of small and medium sized entrepreneurship is connected with activities of universities (especially with a technical and scientific scope) in the appropriate region, the creation and subsequent development of „an Eruption Innovative Cluster" is possible.

The Eruption Innovative Cluster (EICL) is composed by:

a) *Conception Centre* (KC EIJ),
b) *Eruption Innovative Centre* (EIC),
c) *Virtual Scientific-Technological Park* (ViVTP),
d) *Eruption Innovative Centre* Core (EIJ), this means virtual and real small and medium sized firms that guarantee the required "eruption of innovations" in the region,
e) *Financial Syndicate* (FK EIJ), consisting of the group of banks, endowment funds and other financial institutions financing „innovation eruptions" and guaranteeing the effective evaluation of financial resources. These resources could be gained from the implementation of innovations and development of eruption innovative kernels of a region.

Universities and colleges of the region must create a *Conception Centre of the Eruption Innovative* Core (KC EIJ), which will guarantee minimally three basic tasks:

a) Monitoring of the worldwide development in the fields of "common interest" and defining the trends that meet conditions of „the innovation dynamism".
b) Searching for students-innovators (especially from the first to the third study year) who prove unusual invention and ability of practical implementation of their ideas and findings.
c) Coordinating the work of universities and other institutions that are engaged in a system. Creating a formation of the *„Eruption Innovative Centre"* (EIC) and consequential *Cluster* (EICL).

Eruption Innovative Centre (EIC) must be built as a part of the Scientific-Technological Park (VTP) or as a separate Scientific-Technological Park, which fulfils the following tasks:

a) Creation of a *Virtual Firm* (organizationally identifiable section of EIC) for selected students. The firm should have a sufficient financial budget, technical and personal equipment.
b) Assignment by an *excellent tutor* (mostly one or more professors from universities engaged in the project) in the appropriate field to the student-innovator.

c) Providing complete *organizational and formal services* to enable the student-innovator to fully concentrate on his innovation project.

d) Assuring a *planning and control* of targets fulfilment and innovation project costs exercise.

e) Assuring a *completion of fictive firm work* (after 2-3 years) and a statement of fictive innovation firm work results (usually parallel with the completing of student – innovator university studies).

f) Guaranteeing the *implementation of a successful project into the business reality* – assistance in the establishment and providing services for the graduate – innovator real firm.

g) Construction and development of a *Virtual Scientific-Technological Park* and *an Eruption Innovative Cluster*.

Virtual Scientific-Technological Park (ViVTP) is a specific „virtual" form of a *Scientific-Technological Park* (VTP). Entrepreneurs are not physical parts of it – they exist outside its territory. But as "a members" of a Virtual Scientific-Technological Park they have an access to all services and activities provided (as well as other firms settled directly in the VTP). This access of the "external" firms to the VTP is possible and welcome because of the application of the latest communication and information technologies.

The Examples

Exemplification no. 1

The scientific-technological activities of Technical University of Ostrava offer a variety of opportunities, which can be implemented into the above described Eruption Innovative Clusters. The deposit of Technical University of Ostrava into a described system could be supported, in our opinion, by the research activity of the following workplaces:

- The Institute of Materials Chemistry (IMACH),
- The Pavilion of Geology,
- The Observatory and Planetarium,
- The Laboratory of Bulk Materials,
- The Supercomputer Centre,
- The Institute of Modelling and Control of Forming Processes,
- The Energy Research Centre,
- Technology Transfer Centre,
- High-Tech Centre.

It is necessary to highlight especially *The Transfer Technology Centre* assisting at making contacts at national and international levels in the field of commercial exploitation of the science and research by Technical University of Ostrava. The establishment of Scientific-technological Park of Ostrava (STP) on the premises of VŠB-TU can be regarded also as a promising step. The STP was established in collaboration with other universities within the Moravian-Silesian Region, but its potential still remains not fully utilized.

Newly established *The Institute of Materials Chemistry* (IMACH) has started its collaboration with other institutions, expressed in a recently formed alliance between Faculty of Metallurgy and Materials Engineering, Faculty of Mechanical Engineering, Faculty of Electrical Engineering and Computer Science and the company Vitkovice – Research and Development Department declared as a co-investigating workplace.

Great expectations spring from a newly-framed *The Centre of Advanced Innovative Technology* focusing on research in areas of development and applications of high-tech knowledge, such as nanotechnologies, nanomaterials etc. Advanced innovative technology should bring needed elements of novelty, innovation, and prospective potentials. If we require the invention of a world-wide standard resulting in an adequate added value, it is necessary to create the world-standard conditions. Since all the projects cannot be financially supported, a rigid selection procedure is recommended.

Ostrava´s region offers a variety of opportunities with scientific- technical potentials. Except Technical University of Ostrava other universities, for instance University of Ostrava, Silesian University in Opava or School of Business Administrations in Karvina, Business school Ostrava plc locate here. Nevertheless it is necessary to mention that the eruption potential is located rather in schools focused on natural sciences or technical range. These schools contain the potential of discoveries and inventions of a global significance.

Exemplification no. 2

The Developmental Centre of a Czech company The Value Engineering Services was founded in Pilsen. This project should employ 150 developmental and tester engineers. The investment has overreached 130 millions Czech crowns. The Centre is focused on development of and testing mechatronic systems, since the stage of drafts, development and testing till the stage of prototype production. The developmental products and constructions will be implemented into a mass production. The project is run by Czech managers supported by German capital and government subsidy, which can reach 61% of total invest-

ment during a following decade. The developmental centre has been cooperating with The University of West Bohemia in Pilsner, mainly in the field of diploma and graduate works, and concrete developmental projects.

Exemplification no. 3

The cybernetics is the key to the discovery made by a team of a professor of CVUT, Vladimir Marik. Vladimir Marik is the head of the department, which sells its ideas to such companies as Bosch, Toyota, Rockwell, Honeywell, Boeing, Samsung, and also to the American army. Mr. Marik personality displays the top qualifications and managerial skills. The way of testing the software for life important applications has attracted a Netherlands producer Vitatron Medical, whose share at the world market of pacemakers has reached 50%. During last five years the Czech Republic turned to be the world development centre for the software for pacemakers. The testing of pacemakers is provided by two private firms outside CVUT, while the university takes only the responsibility as a supervisor of technical quality. The university teachers have already found the fourth firm. The department does not have enough money on patenting, which is the reason why this payment is made by other firms. The department has made long-term agreements with foreign firms; the projects usually last approximately two or three years. Some firms even offer the department cheques in blank and say: "Research, we are really interested in everything, what you have done, suggested, designed". The government applies a totally different approach: specialists in cybernetics haven't received any financial support for their key areas since January. But they managed financing their department thanks to contributions made by foreign firms. Nevertheless the department of CVUT doesn't want to be fully dependent on foreign industry; the university mission should not be based on technical inventions only.

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