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**SOCIAL ENERGY - A NEW FORM OF
PERCEIVING CAPITAL IN POSTMODERN
ECONOMY**

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Social energy - new form of postmodern economy perception

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Abstract

The presented paper deals with the issue of social creation of knowledge in the postmodern economic order. The concept of beneficiaries as a core idea of this conception in connection with thermodynamic analogy in interdisciplinary problem leads to the materialistic and intellectual dual analysis of sustainable phenomenon of development and creation of knowledge. The paper discusses the possibility of a new way of development of institutional economy in the direction of knowledge economy and the change in an approach to an organisation from the traditional systemic to a cooperating community. The presented considerations are a germ of intellectual infrastructure and supporting the process of structural learning and sustainable development with artificial intelligence. It has been suggested that social energy should be considered as an alternative way of perceiving development.

Keywords: entropy, social complex systems, postmodern economy, econophysics, multiagent economy

JEL codes: A12, M21

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Introduction to methodology of research on postmodernism

Considerations on the problems of social development in economics, the field of science with considerable achievements and numerous additional forms of scientific research cannot be conducted without a historical context as well as cognitive and methodological interrelations. If we take into consideration the increasing non-linear character of discovered knowledge and a surprise with postmodern metaphor of diversity emerging economic and social reality, we face the necessity of new relevant solutions. One example is the search for a new economic order caused by the Internet communication and exchange (Zawojski 2006).

The practice of social experience forces the formation of new quality of known theories and paradigms. Postmodern works, not set in the historical context, researching the frontiers of science (Śpiewak 2002) are attempts in discovering the meaning of postmodernism. Although they are not fully methodologically coherent, they are creative and such willingness to identify and name a new experience should be perceived as positive in spite of its deficiency. The papers of Zygmunt Bauman such as *Postmodernism as a source of suffering* (Bauman 2000) as well as works of other postmodernists together with new economic phenomena are results of technological changes and are harbingers of the vision of new approaching reality. The works of J. Baudrillard (Baudrillard 2005), L. Lessig (Lessig 2005), G. Debord (Debord 1998) as well as the works of R. Vaneigem (Vaneigem 2004) can be perceived as a kind of framework of potential direction in forming of a new human kind and society with its threats and opportunities for further development. This vision is not complete but it comprises several pictures that can be gradually developed in the course of experience. A considerable number of various attempts and speculations as well as investigations on the chaos in capital markets applications and from the number and diversity of those approaches will gradually form a clear picture of ongoing transformations. Practice of searching for solutions forces to seek for possibly the cheapest and most rational solutions in which newly discovered knowledge is attained with the possibly lowest cost. The simple, ancient principle of empirical cognition is the most greatly valued tool of scientific researcher. However, it can be applied in the situations when certain solutions already exist and an experiment can be conducted. Contemporary in social practice we meet situations with no earlier solutions existing. It is difficult to experiment on a living society even if our experience is the result of the economic and political system. New methodological investigation in the economics should be based on several crucial assumptions:

- Splitting of the postmodern researchers from classical science is only a creational and marketing trick.
- Solutions are hidden in the approach to certain problems, their interpretation or development
- Arbitrary division of scientific cognition splits different fields of science and therefore there is no communication.
- Human perception of reality is originally complex.

Thus in the existing knowledge such a model paradigm should be found that would be able to define qualitative and quantitative ontology and architecture of cognition of postmodern reality and its creation.

Considerations on new versions of capitalism and its changes should be begun from questioning of traditional model of product exchange in economy. The research of I. Nonaka and I. Takeuchi from the 90s (Nonaka, Takeuchi 2000) proved that the value of a product is shaped by the amount of knowledge within the product. Although those works referred to traditional organisation, they explicitly show that this is knowledge and the ability to gain profit from it, which are the main subject of social exchange. The aim of the researchers was to discover organisational knowledge but presented above discoveries seem to have crucial value for economy. If we question a classical model of exchange, so what is a new model of exchange like and how does it work? If a new object of exchange is knowledge and practical abilities to obtain profits, so the key structure responsible for knowledge creation are the communities of knowledge. However these are not communities of knowledge built to solve single problems, but groups of beneficiaries – intentional communities which are responsible for realising profits from satisfying vital social needs.

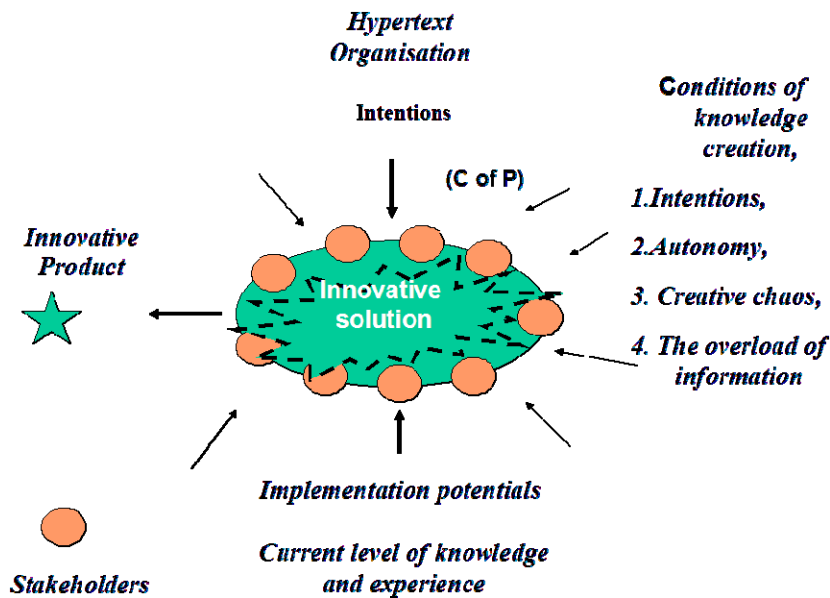


Figure 1. The role and functions of beneficiaries in public knowledge creation

Social exchange based on knowledge creation and building profits describes a real picture of global consumerism and hyper consumerism of basic needs (Zawojski 2006). The community of beneficiaries being a living, interactive and communicational community that exists mainly on the Web (those communities have been operating in the non-virtual world but they have not been recognised) possesses the capability of communicating and sharing experience referring to the change of value and intentions in influencing their participants as well as production and consumption decisions. In such a form of social organisation based on communities of knowledge a man becomes the key factor. A conscious and socially integrated individual that in the process of satisfying their needs participates in the actions of many groups of beneficiaries connects those groups enabling communication between them. Such an individual obtains an opportunity of developing their own personality, knowledge and gets the opportunity of satisfying the growing number of needs participating in the process of social development and the increase of product exchange. Participation in the process of creative problem solution enables the individual to increase their own attractiveness and competitiveness in creating their personal social offer.

Dropping out is caused by the lack of the opportunity for development for the individual themselves and for the community it results in the loss of chance for the increase in social diversity in the activities of the whole social group. On the basis of these considerations we can conclude that a community of beneficiaries is the key form of social organisation and cooperation based on knowledge created to satisfy certain social needs. Therefore the change of the beneficiaries – people as well as their views - results in the change of knowledge and in certain situation can lead to relinquishment of knowledge creation. A group of beneficiaries lives in accordance with their experience and interests which in turn are created via social interaction. Sustaining social bounds, the possibility of leaving in search for other relations or adapting to the group's requirements are strong self-educational factors as well as methods of choosing their own way of development. The definition of beneficiaries does not exclude the possibility of degradation and destruction caused by creation of closed systems of views and values which cause aggression that is the outcome of improper system of communication with other social groups.

The other important issue in the discussion on the postmodern economics is the complexity of

knowledge. Experience gathered in social interactions, outcomes of performed activities and the development of individual consciousness of community members are complex. In the canon of science of interdisciplinary knowledge it is the worst possible situation. The complexity of knowledge that is being discovered by beneficiaries refers to every possible aspect of human life and classical science lacks proper tools to shift so fast from disciplinary divisions to interdisciplinary interactions and building complex models. Introducing the concept of economic exchange in the group of beneficiaries and the concept of knowledge complexity within a group of beneficiaries requires a new interpretation on the part of classical economics. Is it possible simply to join the traditional concept of capital and models of social organisation? The answer is: yes, but is this problem regulated by a specific number of parameters? This is a question about Pareto of factors of the knowledge describing a given problem. This leads to defining an interdisciplinary problem concerning the representation of a model that is concerning the possibility of mapping of the reality under investigation. Which of the science disciplines are indispensable to define the model of postmodern economic order?

Physical and informational analogies in the postmodern economics

The gradually realised problem of chaos and self-organisation in social science creates the question about the genesis of knowledge development in the whole civilisation as a crucial issue concerning fundamentals of our existence. It cannot be said that economics passes over any social phenomena. However physical or technical analogies can widen the view on social reality. The science of economics has already used analogies of various types in the course of its development reaching for solutions typical for mathematics, physics, technology or even biology, psychology or sociology to enable various opportunities for development of the economic thought (Bartkowiak 2003). The growth of knowledge that can be described by the Gorgon Moor's law defining the increase of calculation power of computers as well as innovation treated as a panacea to obtain the economic growth define the basis and genesis of knowledge creation. It can be assumed that the main reason of the fact that the growth of knowledge within the civilisation is growing old is dissipation known in physics. Constant disintegration of structures and thermodynamic death in connection with the growth of entropy are the main elements of real, physical and biological reality. Knowledge accumulation is the evolutionary answer of the living nature to the increasing chaos. Accumulated knowledge enables the growth of order. The question is to what extent the contemporary economics describes those laws and how thoroughly it should describe them. The phenomenon of disintegration refers to structures created both by nature and by man. All the animate and inanimate entities oppose that phenomenon with various intensity thanks to their ability to influence their own inner order and the ability to supply their functioning from the outside. This phenomenon is regulated by thermodynamic ability for stable functioning.

$$(1) F = U - TS$$

where: F – free energy of the structure,

U – energy of the structure,

T – temperature,

S – entropy.

The condition of existence is that the value of the free energy F that the structure is able to create cannot be lower than “0”. The structure functions thanks to its surrounding that supplies it with energy. A thesis that contemporary economics can be named dissipative economics, in which the surrounding did not have any strong and decisive influence on economic relations of microeconomic environment actors can therefore be stated .

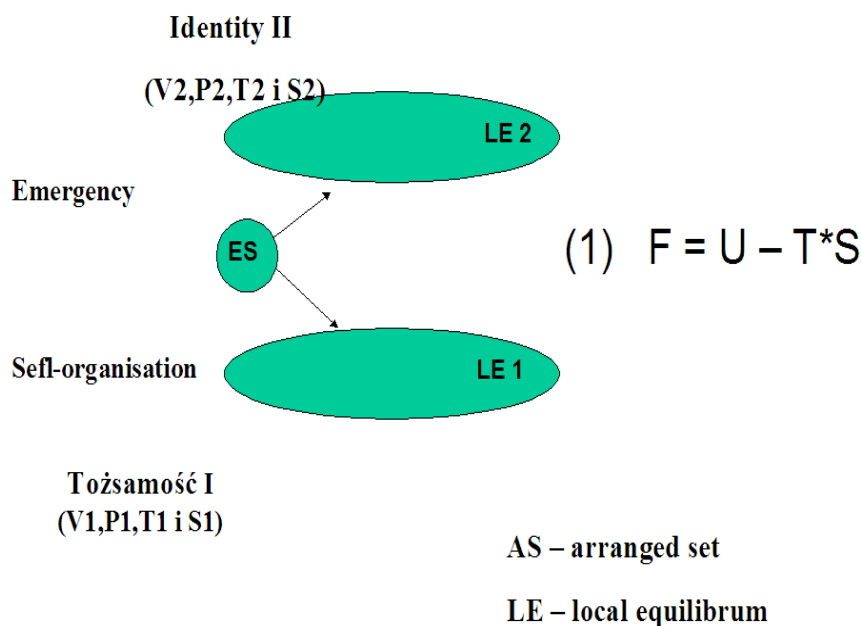
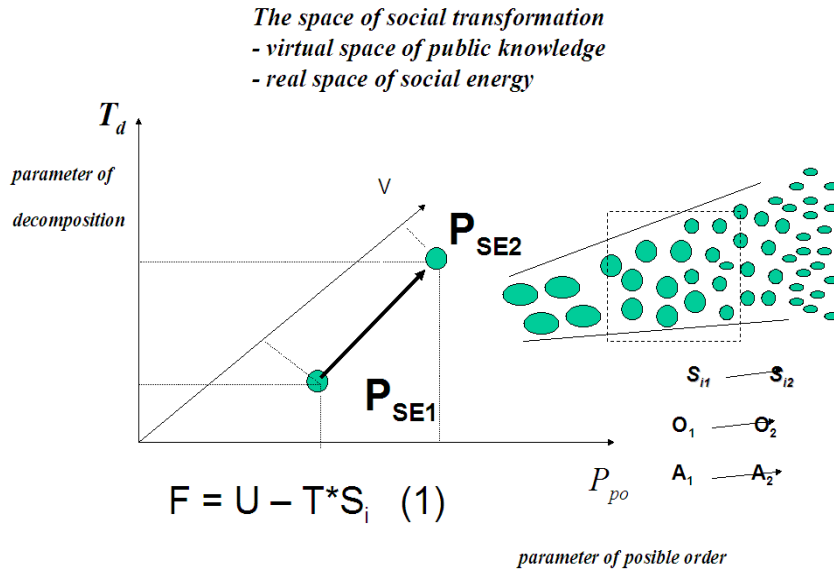


Figure 2. Changes of organisation in the structure - developed social form (DSF).

Macroeconomic solutions referring natural resources and reserves limitation do not differ from the problem of unlimited surrounding possessing permanent development abilities of an economic structure. Dissipative economy, understood also as postmodern economy, is the economy of strong confining activities that can result even in the death of the structure. In this type of economy social institutions and economic structures have a strictly defined life cycle and they disintegrate in the situations when they do not bring profits. In the presented considerations the relation of a system and its surrounding becomes a factor classifying the efficiency of economic activities. In the theory of systems applied in many fields of science the interest of researchers should focus on the immediate relation between a system and the environment from which the energy stabilising the entity comes, while the environment possesses measurable in time and space reserves. The dissipative economics should be able to define the limitations of solutions, technologies as well as a scales of gained profits when compared to the costs of dissipation of any organised form of activity. Competition causes that solutions get old and their creators and users must seek for more attractive ones. Referring to II law of thermodynamics we can notice that parameter S – entropy is a very important element of the equation as it describes order of an existing structure. A characteristic feature is the fact that the structure that wants to increase its diversity will need more energy and therefore it will increase the demand from the environment (-F). The structure that will decrease its diversity will be able to get free energy (+F). A very important fact is that the behaviour of a structure in a given environment depends on the accumulated knowledge and the entropy of the initial order. Inanimate entities, living organisms and a man himself will adapt various strategies and behaviours when facing changes in their environment. Dissipation makes us realise that our actions are accompanied by losses and there are no structure which could exist without external supplies that would enable it to cover losses at the least. Each structure wants to exist and therefore it tries to procure energy from its environment. And thus the environment determines the existence of every entity.



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Figure 3. Change of organisation in the structure - developed social form (DSF)

When we compare the abilities of a limited environment to the growing needs of expanding structures created by people it occurs that in a certain situations the environment cannot supply the structure so it has to dissipate. It is a classical problem of unbalanced development. Thus the existence of a certain ordered structure can be analysed in time that is in its life cycle. Building and dissipation of a structure is a problem for animate, biological entities for which the accumulated knowledge is located in their DNA. When people are taken into consideration we can observe the dissipation of social structures and verification of human experience comprised in models. The dissipation of one group of models makes it possible to create other and to introduce greater changeability and innovations. Variability of social structures is changeable when behaviour and learning of accumulated knowledge are concerned. Therefore in the II law of thermodynamics informational entropy can be considered informatically according to Shanon's law, where:

$$(2) \quad H = -\sum_{i=1}^n p_i \log p_i .$$

In this situation joined information entropy H is the probability function p_i of appearance of various logical formula describing human individual and group behaviours. Those formula create standard and non-standard schemes of action and activities such as behaviours, institutions or cultural DNA as well as technical solutions and other models. All those structures at various level of organisation and order are characterised by the probability of appearance and they compose a certain social model of satisfying certain needs. Informational entropy and accumulated social energy correspond to the models. If those models possessing certain variability and content do not obtain energy from the environment, they must dissipate. The identity of the structure existing in a certain environment disintegrates. Depending on the complexity of the model its parts can also disintegrate or they can participate in the creation of a new solution in other configuration. The fate of parts of the model depends on the conditions of bifurcation and parameters of causality of the new order. One-time or multiple model of transition between different states of organisation is described in the space of states corresponding to the space of social knowledge and they are characterised by the following quantities:

V- social capacity,
 T – parameter granicy rozpadu,
 p – parameter of a new solution emerging

The transition of the structure from one state to the other is connected with the change of order. If the structure creates knowledge, it uses energy and increases its diversity. If it reduces itself, it diminishes its diversity but it obtains freed energy. Direct usage of the II law of thermodynamics in the social practice would be difficult. However the key to this problem is the role of beneficiaries - a community of knowledge based on profits gained from satisfying a certain social need. Two groups of beneficiaries can be identified here – this of "patrons" – responsible for the creation of a need and creative intention for the other group of "creators – executors" responsible for the act of creation. Altogether a community acts upon the same intentions, values and experiences in satisfying needs on a certain technological level.

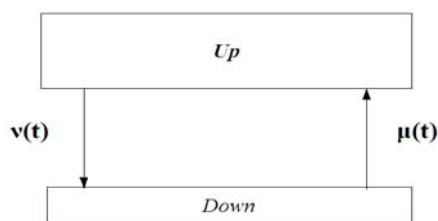


Figure 4. Graph of transition in two-state modeling of LDZ behaviour
 Source: (Zainetdinov 1999) s.1425 – 1435 opis obrazka : up ; down

A group of beneficiaries creates a local dissipative zone (LDZ), where a certain social structure that possesses a certain amount of accumulated knowledge lives and develops itself. LDZ is a theoretical solution that joins a structure and environment into one evolutionary whole that is defined by the group of beneficiaries who fulfill the requirements of a community of knowledge. A local dissipative zone together with a group of beneficiaries become main elements of modeling of evolution of social development phenomena. In LDZ developed social forms (DSF) are subjected to fluctuative influence of the environment consisting in the change of challenges and expectations considering profits and offers. The answer results in the development of knowledge and innovations as well as to the development of the group of beneficiaries. The situation of the lack of planning or insufficient supplies can inhibit development and even cause disintegration. In organised structures disintegration is only a reduction of certain levels of organisation. The cycles of changes in LDZ can be very different. Subsequent interactions – creating experiences - connected with measuring and change of value of parameters build an individual trajectory of DSF development and the changes of order. The knowledge accumulated in the structure thanks to interactions and fluctuations in the structure is gradually developed in compliance with acquired supplies and enables the development of order.

The II law of thermodynamics and informational entropy give the possibility of description of economic structure as an institutional model of operating constructed on the basis of at least four models. The first model is the one of the known environment and its reactions and a part of beneficiaries. The second model this is the need – its idea or emphatic vision. The third model – a product that can satisfy a certain need and the fourth one comprising creative abilities and the other part of beneficiaries who decide to satisfy the need. We can assign to each of these models a certain

ontology and architecture of structural relations. Models and their ontologies and architectures increase their complexity accordingly to the development of knowledge and they enable determining the representativeness to the explored reality. Those models create clusters which can and should be analysed with the help of logical and quantitative parameters. Application of cluster analysis (Romesburg 2004, p.75) to the investigation of areas of interaction between needs, products, conditions of environment and creative skills in the local dissipative zone (LDZ) makes it possible to identify conflicts as well as areas of new knowledge development. A group of beneficiaries existing either on the Web or in the physical world defines the context of experience and conditions as well as probability of new knowledge creation. Analysis of conditions of knowledge creation together with purposefulness, autonomy of entities, the availability of information and situational chaos can result in many interesting analyses and simulations as well as new decisive and development practices. This problem can begin a new complex, qualitative and quantitative approach to the description of social development problems and transformations that take place in the traditional capitalistic society shifting from capital to social energy. The suggested approach departs from the traditional differential mathematical apparatus introducing postmodern diversity and manifold picture of reality.

Formulating theoretical principle of sustainable development

The problem of sustainability cannot be solved on the basis of classical II law of thermodynamics in spite of the fact that this law describes the origins and process of degradation. The concept of an organisation defined on the basis of the classical system theory plays a key role in the current paradigm of economic activity. However, this paradigm has no application in the knowledge economy. In the new knowledge economy a group of beneficiaries, that realise a certain social need, creating a community of practice and LDZ (a local dissipation zone), becomes a fundamental social unit. A society receives the freedom of development and satisfying their needs as well as the ability to free profits in the consecutive, commonly agreed and accepted, rules of transferring experiences, information, values and products. The developed needs can be satisfied with a wide range of solutions that can join and develop depending on the knowledge that is being created. Connecting beneficiaries in a certain social capacity, enabling interactions and communication together with the community of intentions, of experience, and value results in the development and accumulation of knowledge in various forms of order. The transition from one state to the other and the change of parameters T and p requires the transition of the bifurcation point from the causality requiring separate discussion. The space of states where growing order takes place is filled with social relations and individuals who can behave the ways depending on the level of trust in various cooperative relations. The ability to see the difference, demanding the satisfaction of various social needs, sensibility and supplying different profits and products covering the full range of needs as described by Maslov together with civilisation expansion create a set - the sphere of public knowledge that comprises a range of solutions that can be joined and that can self-organise. Knowledge and social interactions are a form of defense against dissipation and out dating of solutions. Knowledge in the product and organisation of its creation together with the used DNA is of discreet character and they will have to undergo innovative transformations. The organisers of economic activities expect that the time and stability within one life cycle will be big enough to let them earn for another stage of development. Thus developed social forms will be improving solutions that can be named unstable structures – structures undergoing constant transformations because of the increase of accuracy and covered by them context. Their weakness is the fact that any change of value, context, social capacity, the appearance of new experiences or giving up the intentions can terminate them unless they change. All those structures are elements of the space of public knowledge. They are elements of self-organising chaos of developed social forms and they cover minds and actions of people, carriers of knowledge and information as well as current forms of communication and forms of institutional social reality. In this space there are coexisting different forms of order such as behaviours, individual ideas and projects, institutions and technical

knowledge. Their chance interactions - fluctuating because of external and internal challenges – result in creating new knowledge and building new relations. The movement is the difference from the classical theory of systems. Traditionally we talk about the flows of mass, energy and information or knowledge as cognition structures. In the presented consideration we deal with structures – informational objects that increase the number of their qualities accordingly to accumulated knowledge. Public space of knowledge creating the chaos of self-organisation has no movement and in contains object at different stages of self-organisation and emergence. In this situation in the system theory movement is identical with the boundary of a system organising the order at various scale. The development of a system means as well including structures as their disintegration and exclusion. Cluster character of the knowledge systems and their unclear boundaries implies the wider treatment of the term – developed social forms and their joining and disintegration in cluster co-operational relations. A described phenomenon of development in the situation of defining the assumptions of knowledge creation and development cooperation should fulfill the following conditions:

- developed social forms cannot consume energy when they do not possess the knowledge about their environment and its consciousness,
- developed social forms consume social energy to operate in the groups of beneficiaries,
- functioning in a given environment results in gaining new experience and creating new knowledge starting from socialising, externalisation, combination and internalisation (Nonaka Takeuchi 2000) p. 85 but the knowledge about a new, unknown environment we gain on the basis of our own sensitivity and cognition skills
- expending of organisation results in including the immediate environment.

The key to development is sufficient precision and measure capability that are able to determine new qualitative and quantitative facts taking place in the process of cooperation with the environment. The newly created knowledge depending on the sensibility of the system will determine new boundaries of the environment including definition of the groups of beneficiaries, the scale of acquired profits and benefits, competitiveness and the potential length of the life cycle of the created knowledge. Cognitive skills of the cultural DNA are critical for DSF. The theoretical principle of sustainable development covers the cycles of knowledge creation and spiral discreet expansion. The cycle of the spiral equals the life cycle of a certain order. The scale of development of the spiral determines the scope of external expansion of the DSF and joining the organisation of existing and disintegration forms.

$$(3) U=F\Psi$$

or

$$(4) U= T (S_2-S_1)\Psi$$

Climbing of the spiral depends on created profits and fulfilling the condition when the whole free energy is used to increase entropy in any consecutive cycle. The sustainable development is creating totally new order thanks to expanding and creating new order on the basis of knowledge gained in the course of activities and cooperation with the existing environment. It is vital that this knowledge increases the consciousness of DSF that has been created on the basis of earlier creative behaviours. The DSF that do not possess this quality do not develop causing the degeneration of their environment and their own disintegration.

Attractor learning and creative system

The fundamental element of creating a result in this measurement is sensitivity. The ability to accept new knowledge depends on the possessed and constantly developed creative skills (talking about artificial intelligence we will talk about cognition algorithm). It is individual sensitivity together with former experience in the existing social space that enables accumulation of experience and

knowledge. Interpersonal interactions together with interactions with technical and biological environments are the sources of measuring information and they can be treated as a part of an attractor. The core of cognition is the fact that a man can give an abstract form to his experiences and therefore they can function in the virtual reality and in the area of communication in the groups of beneficiaries. Those meanings are possible thanks to emergence. The mind has the ability to create abstracts and using them in the form of various ideas and projections. The mind and its key role in the process of cognition gives a crucial role to a man and his skills in the new society of knowledge. Creation and social development correlated with individual development of members of the community. It applies to social responsibility, the knowledge about oneself, technical knowledge and social relations that are results of participation in various groups of beneficiaries.

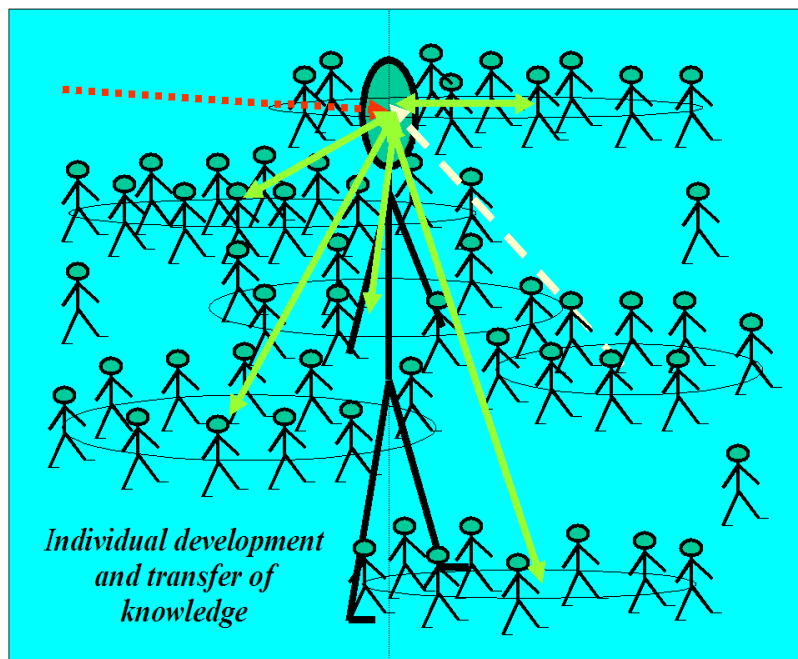


Figure 5. The model of individual development of an entity participating in knowledge creation and satisfying its needs in various groups of beneficiaries

Attractor learning consists in creation of models and meanings that join the values of the real world with a certain model and then the possibility of transformation of reality in compliance with its newly discovered features and expected profits.

Knowledge as understood in economics should be a form of an attractor that joins an abstract – idea reflection our experience. The arrangement of measurements divided in Pareto of a selection of scales that map the model in the reality and vice versa. The measurement and its precision reflects sensitivity. The crowning of the consciously created knowledge is the possibility of influencing via effectors as M. Mazur claims (Mazur 1976) and freeing real profits in the group of beneficiaries. The introduction of attractors as a form of two-dimensional knowledge allows joining the economic development with the physical one, in which important elements are the values of measurement of phenomena and the position of effectors. That means that social energy can be discussed only in the situation when it is connected with full awareness of knowledge and the opportunity of using it to introduce an assumed change. In other cases we can talk about inflation or exegesis – relative capacity to performing an action with the energy of the structure. Models in the form of attractors are a part of knowledge accumulated in the group of beneficiaries. They accumulate data concerning physical parameters reflecting logical form of knowledge. They enable the control of results of qualitative and quantitative knowledge creation. Together with the development of knowledge the scale and precision of measurement grows in the context of needs and phenomenon that determine

the satisfaction. The presented considerations can become the basis for the analysis of a model of a creative complexity that functions on the basis of:

- cognitive skills and abilities (cognitive algorithms) capable of knowledge creation on the basis of attractor learning,
- models created or analysed thanks to interactions with the environment.

The analyses of a model of a creative complexity, although they are rather difficult in practice, correspond to the economic and organisational practice better than reductionistic adaptive models (McElroy 2003). It can be stated contradicting the opinion of SFI (Santa Fe Institute) that creative analysis of developed social forms is much more interesting than reductionistic approach based on numerous biological analogies or adaptive complexity. The presented concept of a creative complexity is the key element of clusters of public knowledge social modeling and of development capabilities in the regional scale.

De-personalisation of knowledge, transparency in the dynamic social community and social cluster of knowledge

Creative approach to attitudes, behaviours of institutions and a wide range of solutions of social cooperation means that models and knowledge become the subject of conscious evolution and they are not owned by an individual man and are not elements of his economic and social game. Models freed from particularistic interests of individual people can become the subject of empirical improvement and implementation into the practice of the same people of community. A model becomes an offered product and its development depends on the development of individuals. Conscious evolution described by J. Stewart in *Evolution Arrow* (Stewart 2000) is the result of a new meaning of evolution. In the nature a considerable part of knowledge is transferred in the DNA of an individual. For a human such a change is too slow and unacceptable. Thanks to their mental and creative skills as well as the ability of creating and using abstracts a modern man implies knowledge models to the evolution and improves them in the empiric interaction with his environment. In this way humans speed up cognition and the possibility of influencing their own change as well as the transformation of his social, natural and physical environment. Knowledge that discovers new features of the reality enables its modeling. A man who has been shaped together with its biological environment in the course of unconscious evolution gains the opportunity of modeling the reality in compliance with his will. However this is not an arbitrary creation. All those solution have to stand the test of time and fluctuation of events caused by social changes, changes of climate, etc. Knowledge as a social creation requires the objectivity of sharing and disclosing one's own observations. Knowledge is not verified by an individual but by a community. It is important that in the social knowledge cooperation and sharing of profits from such a cooperation, socialisation and tightening of bound created in the course of creative teamwork requires overcoming a large number of one's own weaknesses and improving of business ethics. Creation of knowledge requires the externalisation of one's own ideas in the group as solutions are not necessarily individual and they require the use of common wisdom and intellectual potential. A group of beneficiaries is a community creating knowledge in the interactions of exchange. Traditional product exchange distorts this picture and reduces potential free exchange to basic needs decreasing social diversity of satisfied needs as well as their scale. Well-balanced intellectually society is so diversified that each member can satisfy their own needs as well as supply services attractive to other members of this society. If that member is not able to do that, they obtain sufficient signals that they should change as well as help to transform and create an attractive social offer. De-personalisation of knowledge creates the culture of creation in the public space of knowledge that is structured in compliance to social needs. Satisfying them is a form of an experiment both mental – creating visions in the virtual space and accumulation of the results of physical activities. De-personalisation needs determining of the individual identity of the participants who should be able to separate their privacy from self-development and creating new solutions. Interlocking a single beneficiary with other members of the group subjects them to the

constant verifying feedback that informs the beneficent about the level of his current social attractiveness. That allows each social entity – an individual or community – assess themselves and develop in relation to the values presented by the other members of the group. An individual has the right to accept and adapt specific values and opinions, but to share them with the other members of the group they should use education as an instrument of spreading the knowledge and convincing the other to using it. The communication skills and information technologies are indispensable for proper functioning of the whole community. The complete picture of the needs of a society together with all the satisfied needs create cluster of public knowledge. It is a picture of total economic activity of a given community and its diversity both existing and potential. Each element of the cluster is an individual developed social form able to adapt and create knowledge in their own local dissipative zone. In each moment all the distributed information and external and internal transformations in the whole area of public knowledge reach to all LDZ and influence current creation or dissipation and further self-organisation. Cluster of public knowledge comprises all the organised forms of co-operation thanks to social transparency and digital monitoring of social activities, what is already taking place in form of numerous camera monitoring, etc. When they are recorded in the Internet they increase the existing records of various texts. Such a situation will make possible the identification of knowledge accumulated for further potential use and social as well as individual assessment. The need for privacy will emerge a the space in which our mind – the main creator of ideas and solutions will be able to create its own individuality . An essential element of the culture of creation is tolerance and mutual help in the individual development. Technologically ensured simplicity of communication and conveying information causes mutual responsibility and alertness considering ethical social relations. The growing transparency and trust in communication will result in new forms of interpersonal relations. The openness and transparency of the projects in the common informational space is demanding both theoretically and practically. Social expectation of results will impose true progress and therefore thorough analysis of problems that will be solved. Projects that will be realised by teams will be a large part of social activities. Therefore communication and acceptance for the activities and projects become an important part of work. The work will be of model character and the risk of an enterprise will have to be taken into consideration and verified. An important part of this form of activities will be attributed to forecasting and experimenting in order to complete the missing knowledge. Reduction of costs can take place thanks to the joining beneficiaries with appropriate experience. Systemic way of reasoning together with the complexity of solutions will decide about the possibility and quality of progress. This approach is in compliance with the systemic reasoning presented by P. Senge in The Fifth Discipline (Senge 2006). Creative openness should be limited and determined by the identity of an individual and community. Openness cannot and should not be larger than identity because it can cause disintegration or aggression. The more complex and experienced is the identity the larger it can open and participate in the creation of models including those referring to the change and development of the individual themselves. In such an approach the scientist does not have to create a model of a man. Only the creative skills and abilities as well as awareness and participation in the evolution of models are interested to scientists. The world of human potentials and of their mind becomes one issue and therefore scientists can avoid reductionist approach to a human being and its humanistic value. The more differentiated intellectually is an individual or a developed social form, the bigger are their creative skills and their self-creation. When we interpret the space of chaos within public space of knowledge we have got orders in the form of cluster of beneficiaries who create local dissipative zone as the place for self-organisation and development of developed social forms. Each of such a forms has social energy of structure U and reacts with its physical and social environment. Thanks to innovativeness and competitiveness as well as developed values a social form gains free energy F that helps to maintain stability of the created structure. The excess of energy can be distributed individually or by higher levels of knowledge in the cluster respectively to the level of maintaining the stability by the whole cluster. Each of these clusters is a creative system in compliance with the presented herein concept of SFI (Santa Fe Institute) and is characterised by its own ontology and architecture developed on the basis of its

own trajectory of development and attractor learning. Presented above cluster of public knowledge corresponds to the classical approach presented by T. Fuller and his colleagues (Fuller, Moran, Argyle 2002) describing the social division in compliance to the traditional level of organisation where the highest (6) level is the level of social organisation and it regulates functioning of the whole community. The lower level (5) is occupied by the business relations between defined structures possessing certain identity and economic game (Strategor 1996), (4) level refers to creation of knowledge in organisations, (3) level is the level of group relations and level (2) is related with the social game of an individual. The last (1) level, this is mental level comprising creation in the minds of participants. Each of these levels is related with the creation of institutional knowledge that creates cultural DNA and describes the effectiveness of individual functioning and cooperation (Kransdorf 2006). If a reflection concerning an unattractive offer and therefore ineffective sale a stimulus to create new knowledge and institutional solutions that rationalise social functioning will take place at each of the described above levels. In front of our very eyes a lot of institutions, standards, behaviours, social rituals that seem to be a permanent element of modern social history can transform. However currently society is not interested in the considerable number of transformations. Transformation into postmodern reality will take place gradually accordingly to technical possibilities and emerging new groups of beneficiaries that will come into existence on the basis of accumulating in the networks knowledge, globalisation and integration of companies.

Barriers and problems of development

Why is social reality so unclear and unpredictable? In the classical approach to management and liberal philosophy of economy problems of sustainability and insufficient social relations are present. The theory is not faulty but a specific social paradigm that causes that changes and transformations take place in compliance with social acceptance of the new and the growth of social awareness. Focusing the system theory on a system itself, without its environment and interactions, hinders solving the problems of external conditioning of an organisation and its negative unbalanced influence on the environment caused by the fact that system is excluded from any larger whole (Mazurkiewicz 2002:207, 2003: 113). The problem which is often discussed in the European Union and caused by the problems in the interorganisational space that is the place of reserves as well as the areas of leaving behind unattractive or economically exploited assets. Classical organisational approach based on the system theory causes problems with interorganisational space as the potential areas of degradation, organisational competence and striving for preservation of one's own entity (Mazurkiewicz 2006:605). To achieve this aim conversations use their own identity in the competence and fight with other entities. This problem may be solved with the help of an experiment to test interrelations of two systems where one is in the environment of the other. The solution of this problem results in the game in two areas – physical and informational. Each of these areas is described with its own equation of II law of thermodynamics. The game is to gain energy, not only the free energy, but also energy that can be possibly obtained from common environment, the other environment or also energy accumulated in the structure of the opponent. The game can take place in both areas – physical and virtual – or in any of them.

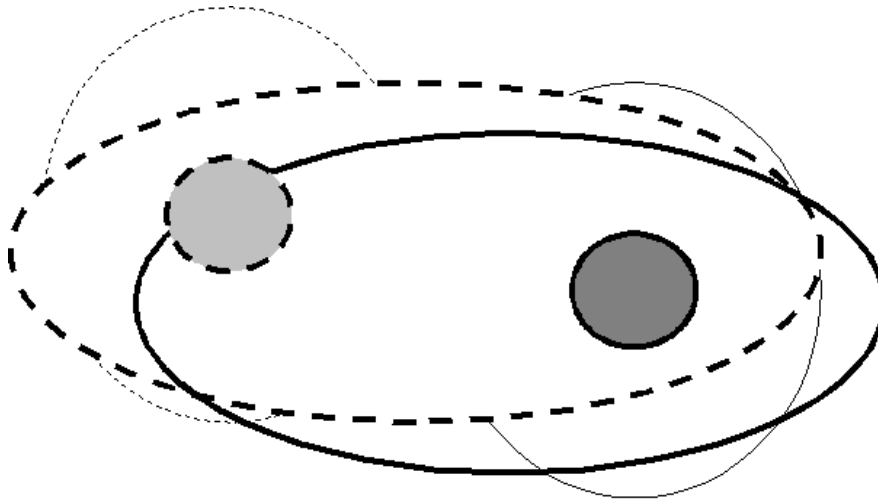


Figure 6. Phenomenological model of the interaction of systems

The competition will result in settlement by force or intellectual deinformation of the competitor. There are several solutions of the game:

Game for life

The appearance of a competitor in the life space of an individual who has low level of consciousness results in a fight. The identity of entities triggers defense mechanisms and enforces competition in order to eliminate the rival.

Energetically this form of activity results in winning the resources that might have been used by the rival.

External conditions

Total impunity, certainty of conditions of functioning and no impediments in the future. Priority of one's own survival and individual profit.

Exploiting game

More long-term approach results in discovery that a competitor themselves is a resource moreover not only a dead competitor but also an alive one. By one's own activeness the rival's resources can be used to increase one's own profits. Subduing to one's own order results in expanding the areas of the environment without creating new knowledge. The usage of the rival's resources can take form of physical fight or it can be informational only – taking advantage of the competitor's lack of knowledge. It is also possible to join those techniques. Actions resulting in the lack of profits on the part of "a partner" in long run causes the failure of the other structure and decreasing of one's own position.

External conditions

The lack of external control with explicit existential problems.

Negotiation game

In the situation when the individuals are strong personalities negotiations are the means of defining areas of influence and proportions in the environment. Different form of a dialogue help to decide on the most advantageous positions.

External conditions

Strong competition. External control, participation in the game and preserving one's own identity, the necessity of division.

Cooperation

In the situation of developing entities that function in difficult external conditions common actions and sharing outcomes multiplies opportunities and potentials. Cooperation as the result of joining knowledge, position, contacts, etc.

External conditions

Tough competition, limiting of existence and support with control rules enforces cooperation.

Creative integration and new entities creation.

The awareness of profits that may be obtained when joining into a new entity and taking advantage of common experiences creates the possibility of building a long-term order in a new context.

The awareness of profits discovered with the help of new knowledge that is a result of a solved conflict and creation of a new entity brings new diversity and complexity of the system. The ability to define synergic profits and excluding redundant elements of the system that are dissipatively costly and freeing them for another self-organisation.

External conditions

Very difficult conditions, the necessity of constant activity oriented at the increase of efficiency of structures.

Long-term solutions are oriented at the accumulation of the possibly largest amount of knowledge about the environment in order to ensure the survival of one's own system. In this situation the best solution is joining and acting on the basis of common order and self-organisation ensuring the highest advantage.

Liberal philosophy and market economy create the society of chance game in which apparent competition knowledge and biological domination improving in a given environment. The problem is that, in fact, that game does not exist. The market and the player are of periodical character. There are no stable and permanent environment. The market transforms and the requirements to traditional organisation that tends to react politically to threats, change. This game is an illusion and such an economy does not ensure sufficient long-term social development. Economic entities in the form of organisation are not able to resign from their identity in order to join and develop – they block the progress. Globalisation does not supply any solution and forces to numerous fusions. Too large competition results in simplification of an offer and hindering the development. Many organisations does not diversify their offer and simplifies it trying to maximize profits. Societies playing short-term games with no trust and innovational cooperation are insufficient and they have higher costs of functioning. Moreover they do not have a tool to assess their own efficiency. Economic statistics is not effective. The transformation of those societies is slower and they have few globally attractive products and services. All of such games concentrate on gaining profits and they depend on conditions, the size of structure, different changes in the environment and they are realised with different levels of consciousness and creative skills. The increase of knowledge, diversity and social complexity of the amount of entities participating in the game for survival causes identity changes and to creation of large common identity and fading away of inner identities. Knowledge creation is not automatic but it takes place thanks to conscious evolution. This concept used by J. Stewart (Stewart 2000, p.185) shows that social life develops thanks to fight and control of creating free energy of a given structure and then its "just" distribution. It consists in the fact that entropy control of progress and maximalisation of order become the criterion of the development assessment on all the levels of a cluster. It is not the control of one member of organisation by the other, but an objective criterion controlling everybody in the cluster relation and division of duties. Obtaining the social integration does not eliminate social games, but the creation of the system of assessment and social mirror will enable learning and gradual reevaluating of attitudes. This will facilitate individual and communal evolution through interactions and experimental testing of games. The

resulting solution will be optimal for the order of a given diversity and complexity of the structure. "Unconscious" evolution this is natural evolution that caused the creation of life and complex structures. Games of independent genes illustrate the simplest form of game for free energy of the system (selfish gene). Man has learnt to use knowledge and built tools thanks to which he can satisfy his needs. The fact of possessing knowledge gives profits and therefore a man is willing to attain it. The economic fluctuation and increasing social context cause that a man cannot exist independently and is forced to share his knowledge as well as the process of its creation. Humans become aware that generational evolutionary changes are not satisfying for them. They expect faster changes thus the process of knowledge creation must become faster as well. Creation of knowledge through programming of an intentional, cognitional interaction with the environment treated as an investment will influence the future of a man and profits created by him in various groups of beneficiaries. Tools and technologies that facilitate gaining new profits will play a specific role in the social development. Creation and division of free social energy is possible in the situation of self-steering. Creation of a new social quality and efficiency – that is the creation of conscious evolution can be achieved by creating self-steering capacities in the local dissipative zone so as to evoke a new permanent scheme of interactions in activities and knowledge creation process. The role of this steering is building informational feedback: creation-model-actions-results-creation. This will ensure the development of knowledge and awareness together with the evolution of the four models of knowledge. Wide creation of social conditions for the creation of knowledge about the individuals and about the society in the informational systems together with the transparency are the conditions for the development of the space of public knowledge and creation of the space of chaos where social order can take place. The intellectual infrastructure described in such a way, can prevent development of the society that escalates the illusionary knowledge that can bring only short term profits. Measurement is the basis for steering. This refers to the measurements of entropy and social energy that are created in the conditions of the highest order on the basis of model data recorded in the form of knowledge maps. Such a measurement is possible when the development of knowledge and its model version are observed. Therefore physical analogies in social sciences and economics can facilitate activities of humans by the assessment of their intellectual activities. Monitoring the human social activities and taking advantage of the chaos in the Internet makes it possible to investigate the level of social order and inform the society about the achieved level of development and the increase of profits. Developing observation of transformations and results will become an element of self-control and changing social acceptance for various social games and behaviours of groups and individuals. Capitalism that was developed in the society of games is coming to its end. Introducing new generation of social steering will bring new rationality of a community and efficiency of social productivity. The losses in the liberal societies are the result of uncontrolled games for free social energy (corruption, egoism and individualism, accumulation of capital) delay the development and prolong the time of reaction for a change. Internal social costs of untrustworthiness, transactional costs are the results of ineffective social games for free energy of local economic structures. A considerable part of profits is lost in competition caused by the low consciousness and ineffective cognition skills especially those referring to social relations and their creative use. The society of games creates an illusionary knowledge that does not bring long-term progress. There are many elements of unbalance and numerous development barriers in the society of games. In new conditions of knowledge the survival of an individual is conditioned by their cooperation. It should be remembered that when civilisation did not exist the survival depended on the nature as a system. Today the nature has been transformed into industrial capital, scientific and technical potentials of the civilisation grow and humans themselves create abilities for help and survival including the help for the nature. There is no other choice as the dissipative interpretation of changes does not allow to move backwards.

Knowledge creation results in the community of profits from the knowledge correlated with certain needs. The satisfaction of certain needs causes growing participation of the community members in the needs accordingly to the level of their development and self-awareness. The social development

results in the increase of the entities productivity and the development of their individual influence on the society. The opportunity of the influence of an individual on society as well as the responsibility of an individual increase.

The connection of communitarizm and liberalism in the knowledge economy

The growing cooperation and innovativeness gradually condition an entity in the social relations. The cooperating part of a community and its participation in different groups of beneficiaries directly influences decisions and solutions of both the individuals and developed social forms. The individuals and social structures operate in social mirror that either accepts or not offered forms of cooperation. The individual's ability to cooperate is being confirmed and the knowledge is being created. Attitudes, behaviours and offered products that do not offer any profits are being eliminated together with their creators. Therefore all the members of a society who offer unattractive solutions must change and develop. Critical points and blockades of development cause restrain of changes and degradation of the weakest elements of exchange relations. Social communication and spreading of information causes growing social capacity of complex transformations both adaptive and creative. This can be described as structural learning and creation. It means the change in the whole social capacity. Increasing knowledge and especially creative skills stimulated by the imagination on the environment prepare the beneficiaries for other stages of creative development that is, such development that foreruns and discovers potential diversity of the environment. Such form of development decreases the risk of failure, enlarges social volume and the scale of activities in the environment. Human mind and imagination enables stating development objectives overtaking the current state of matter and conditions. In such a situation building social relations on the principles of knowledge creation gives the individuals and the communities autonomy, the right to choose their own way as well as the right to the experience from their actions. Thus everybody can act but they take the consequences of their actions gaining their enriching value and directs them towards the truth verified by the objective and measurable increase of order and created profits. This area of individual decisions and taking risk of cognition is totally liberal. There is no contradiction between liberalism and communitarizm in social development from the point of view of the society of knowledge. Each of these ideas comprises other area of human activity. Diversity in the views on reality allows for division of disputable classification in simple cognition systems. The development of individuals and their attitude towards the development become a key problem of attitudes classification and of analysis of sources of development including the hidden scale of social investments.

Individual and collective approach to development.

The problem of free energy of structures creates a few potential attitudes and forms of specialisation of social skills.

Free readers

The first type of approach are free readers (Stewart 2000, p. 160), that is, individuals that specialise in taking over free social energy in the areas of the lack of social control. They create a wide range of techniques based on power or disinformation. Individually accumulated resources increase their individual ability to survive on the expense of other members of community and / or the community itself.

Proportional exchange

Proportional exchange in the controlled community leads to proportional division of worked out free energy befittingly to the work contribution. Such a community accounting controls itself and therefore it is certain that social energy is not accumulated at the expense of some group of its members. Proportional exchange makes possible "just division of free energy" However,

development dynamics cause that in many situations the potential resources necessary to reach the higher level of development is larger than an individual or / and a group of individuals can accumulate. In the communities with development barriers such demand is definitely larger than in the communities of sustainable development.

Altruism

Cooperating community creates cooperation and mutual help differentiated in time and space where all the members of community help one another and invest in one another increasing the total of gained profits. Altruism makes sense in the community without free riders, who take over such investments and prevent the social growth. Altruism is especially popular in the network environment and it is analysed in the categories of economy of gift.

Sacrifice

Sacrifice is a specific type of attitude conducing to conscious self-confining that is placing oneself in a more difficult situation. The aim of such an attitude is to prepare to face consecutive development challenges. The self-confining is to create in the individuals and developed social forms new skills. Those skills will be applied in the process of development in the future potential conditions. Sacrifice impinges the imagination and the development of informational models that create the increasing internal integration as well as stimulation of sensitivity of the immediate reality. Those new qualities will considerably increase the abilities to survive in consecutive development stages. Sacrifice plays an important role in the individual development and this is a form of investment that must be made by an individual to gain certain creative abilities.

Presented herein approach introduces the energetic cost account. Only its analysis can show real social efforts on the way to innovation and progress. Creative community should accumulate a certain number of potentials of attractors of knowledge and social energy to continue its independent development. When there is a shortage of them the situation of unbalance social games start. Experiences accumulated in the developed societies create cultural heritage and public space knowledge. This knowledge comprises the knowledge about a man as well. When it is applied to self-assessment it can regulate social relations with the help of social mirror, which should be an element of intellectual infrastructure controlling social creation and helping in the elimination of the illusionary knowledge creation.

Capital and its future

The riddle of "unconscious" evolution that is natural evolution conduces to the creation of a super individual adapted to the given environment. In the course of experience that super individual gains features that distinguish him form the rest of population and therefore he wins the competitions for the place in the given environment. A battle won in this way is also a failure. Why is it like that? Why can many companies fighting for in global competition fail? The size of a company that does not develop diversity compatible to the diversity of the environment results in a failure and degradation of the environment. Therefore empty accumulation of capital and physical power of an organisation does not guarantee the stability of its existence. Structures with the diversity lower than diversity of their environment "does not understand" transformations they participate in and they lose their steering abilities. Conscious evolution is based on controlling its own consciousness and creative skills. This task becomes the condition of the stability of existence and durability of development. The society of games developing an illusionary knowledge and making dependent one another, enforcing "levies" becomes a great threat. The importance of possessing the capital becomes less important than possessing certain skills and production potentials. From this point of view social energy can be perceived as the arrangement of economic abilities to create a certain change in the real world. The condition of this change is the awareness of the accumulated knowledge and the potential for its implementation. The lack of production potentials or ignorance

brings the inflation of social energy decreasing its real value. Social forms that are developed and constantly evolve their order in accordance with the social needs of their environment are socially the most valuable. That means a constant ability and skill to develop themselves in accordance with the external situation that dissipatively imposes the necessity of progress. Increasing responsibility and position of a individual in the society enforces the care for the development. The role of capital in this situation may be the role of free energy directed and distributed to the key areas that require development. Free social energy is not in the hands of politicians but particular individuals and developed forms organised in the clusters of public knowledge. Free energy has also its intellectual and physical dimension and its redistribution is held through the social acceptance and control of progress achieved by the beneficiaries of a certain enterprise. Objective criteria of progress control at various levels of social knowledge cluster are possible thanks to proportionality assessment and estimation of the progress in compliance with commonly accepted social values.

The problem of efficiency when discussing social energy

In the presented considerations capital is the social free energy created in the local dissipative zone thanks to satisfying needs with a certain competition advantage and profits higher than costs. The environment supplying this feeding is precisely controlled by a developed social form that reacts in a balanced way. The environment is created by the beneficiaries that control changes in the system. The concept of social energy creates the possibility of joining the purchasing potentials with a model and manufacturing potentials of an economic system and its ability to transform a certain economic reality in accordance with the changes in the ontology and architecture of accumulated knowledge. The increase of knowledge together with the growth of a group of beneficiaries, results in the increase of social volume and growing complexity and diversity in the form of ontology of applied concepts and their architecture in the accumulated knowledge. The main economic problem becomes the proportion of the created free energy in the system before the change to the development of knowledge and potentials of the system to the new expansion. If previously it was accepted that the limiting factors in the economy were the environment and reserves, so in the new economy cognition becomes such a factor and it will decide about social capability to create knowledge. The economic account of social energy will have to allow for new elements such as the

Cognitive economy

$$\Delta F_{\text{FSE}} \quad \Delta S_i(\Delta O; \Delta A; T; V; p)$$

F - Free social energy

$$\Delta s_{i(+,-)}$$

$$\alpha_{\text{CE}} \text{ ————— }$$

$$\Delta F_{\text{FSE}}$$

1

amount of social altruism (co operational and cross-generational) or the scale of sacrifice.

Figure 7. The problem of efficiency in the economy of cognition

The accumulation of social energy by free readers will be also assessed and compared to the level of the achieved social knowledge. The comparison of knowledge investments to the achieved

profits is a measure of progress. This analysis determines the life cycles and new range of satisfied beneficiaries. The loss of abilities of knowledge creation causes the loss of one's own stability and development. In this situation the intellectual potential and ability to produce the largest amount of free energy that is further allocated to gain new knowledge and reconstruct the new environment and LDZ become fundamental factors. The transformation takes place in the moment of crossing the bifurcation point. This transition will be possible thanks to emergent knowledge creation and increasing of chaos in which new self-organisation will be possible. This phenomenon is regulated by the state parameters T, p and V. It can be said that the change has been made by the change of social volume, the change caused by the ability to dissipate or the change caused by the pressure of new self-organisation. Crossing the bifurcation point can conduce to the development of the theory of organisational change together with introducing further interesting physical analogies and investigation of causality new social structures creation.

Social lack of trust and competition of identities connected with negotiations does not enhance social transformations. Connecting the applied social games and attitudes gives the answer concerning the social effort in sustaining and developing social order as well as the environments that make the largest effort in covering the dissipation and discovering new solutions. Practical investigation can show the elements of cultural DNA that are the most costly and which form of diversification of cultures and attitudes encourage the greatest development.

Conclusion

The essence of transformation is the transitions from the groups of interests to the groups of profits from satisfying needs. The transitions from the society of games to the creative society in which capital is connected with the changes of order in the environment. The fundamental element of development and cooperation is a conflict. Its overcoming depends on cognition skills that are used to transform the participants' own consciousness and the capability to creating new knowledge enabling new self-organising balance. The development comprising physical and informatic as well as intellectual relation results in four element ecological sustainability in the areas of economy, intellect and society. Liberal Western-European approach limited to the area of development should be limited to communal consciousness and cooperation. Liberal autonomy and independence of action should be applied to create knowledge and shaping individuals to social conditions. Such an approach will reduce wrongly understood knowledge and negative, uncontrolled influencing other members of the society. In the world of quality and quantity of transformations individuals are not able to stand challenges – only diversified complexity matters. Partnership and cooperation are challenges for contemporary Europe overcoming its national divisions. The increase of diversity in the result of growing knowledge increases the number of needs, the areas of self-development and expansion to find new areas for new members of community. Thanks to that exclusion of community members becomes impossible and the spiral metaphor of development described with the help of the equation of thermodynamic system and changes of entropy. This equation determines the condition of permanent stability of the developed social forms. The social energy of a system and the system's capability to transform the reality to maintain the stability of the system are the most essential factors.

In the contemporary world for most societies an important factor of survival becomes richness and diversity that can oppose climate changes or help to conquer the cosmic space. Mankind faces the challenge of effective social organisation that would ensure high development potentials. Therefore a question can be asked – how to introduce subsequent stages of transformations in the developing countries. Will bureaucratic European Union with its instrumental methods of operating manage to balance the European development and the other problem – whether the restrictions in the social development of the Far East countries will not slow down their future development. Those problems are a part of public space of knowledge and comprised in it attitudes, games, intentions,

values and experiences. They reflect the knowledge and creative skills of a given community and especially the costs of development members of the community should cover in relation to the gained future profits. Altruists and people who made some sacrifices to gain some experience and now can share this knowledge with their community to incite it to development are the key and solution to this problem. The other main factors are social games and capabilities of developing cooperation. When the social organisation, its institutions and values are known we can try to answer the question about the progress and growth of capital, what form of free energy will be created who will be consuming it and what form of development we can find in the future.

The interdisciplinary problem described in the introduction connected the knowledge management, traditional economics and then thermodynamic and informational analogies created a social vision described in the categories of chaos and order. The connection of psychological and sociological knowledge about a man as well as information about artificial intelligence applied to the model social mirror monitoring the efficiency of operating social institutions and social games has led to creation of an effective tool of self-development and assessment in the local dissipative zone. It can be stated that defining the frames of postmodern social model and order has been outlined. There is a large number of examples supporting the institutional correctness of such an approach, though further investigation and verification are necessary.

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