

BUSINESS SYSTEM: SUSTAINABLE DEVELOPMENT AND ANTICIPATORY SYSTEM

*Vojko Potočan**

Received: 8. 01. 2002
Accepted: 10. 04. 2002

Author review
UDC: 658

The existence and development of humankind depends mainly upon the coordinated operation of all areas and levels of human activity. However, in theory and in practice there is no model of operation, which would provide a harmonized and target oriented development. A partial solution is offered by sustainable development, which tries to define and carry out common goals of mankind with a harmonized implementation of human activities at all levels of its living and behaviour. Companies belong to central institutions of modern society which essentially co-create the sustainability of society. The company's endeavour by simulation to prepare models of their goals concerning their internal and external environment. On the base of systemic treatment, we can define companies as business system, which can survive in a long-run only on the basis of sustainable development. The business system can also be supported by the application of the anticipatory systems. The anticipatory systems can be, in this sense, understood as an entity of the methodological approach, techniques and modes of work. Their characteristics have, a direct impact on the determination of goals, on the orientation of operation, and hence on the achievement of the business system results.

1. THE SELECTED PROBLEM AND VIEWPOINT

The existence and development of mankind (and of the world we live in) mainly depends upon the coordinated operation of all areas and levels of human activity. Human history is linked to various development concepts. Different authors created their individual concepts from their own selected (systems of) aspects and/or levels of activities and their results are substantially smaller than the possible ones, if their aspects are too narrowly concerned and applied.

* Vojko Potočan, PhD, Assistant Professor of organization, management and systems theory, University of Maribor, Faculty of Economics and Business, Razlagova 14, SI - 2000 Maribor, Slovenia, Tel: + 386 2 / 22 90 255; Fax: + 386 2 / 25 16 681, E-mail: vojko.potocan@uni-mb.si

Modern living and behaviour of the man are more and more conditioned by the development concept, which would enable a harmonized and target-oriented operation of mankind as an entity (World Commission on Environment and Development, 1988). A partial solution is offered by sustainable development, which tries to carry out common goals of mankind with a harmonized implementation of human activities at all levels of its living and behaviour (Harman & Porter, 1997; Lafferty & Meadowcroft, 2000; Potočan, 1998).

This is also and even especially true of the economic operation of mankind, which provides the material bases for it's living and considerably co-creates the society as a whole. The major part of present investigations of the sustainable development in the economy has been directed to the macro-economic level and treated less within the operation of the fundamental economic subjects, i.e. enterprises (Lafferty & Meadowcroft, 2000; OECD, 2000).

The enterprises are, therefore, faced with the challenge of how to set up their business operation on the basis and/or in the harmony with sustainable development. In the introduction of sustainable development, the enterprises encounter a number of problems (OECD, 2000; Rebernik & Mulej, 2000). Firstly, they must define sustainable development from the aspect of content, where they define the adequacy of its introduction, the role and the importance of sustainable development in business operation and benefits of the thus conceived development for their business operations. In the next step, the enterprises form an entity of methodologies, methods, and techniques to introduce and apply sustainable development in their business operation.

The entire research of the sustainable development application in the entrepreneurial operation surpasses the framework of our investigation of this contribution. Herein, we shall attempt to present the role and importance of the sustainable development for the enterprises, the possibilities of support for the implementation of sustainable development with the anticipatory system and the basic starting points of the business anticipatory system.

2. SUSTAINABLE DEVELOPMENT AND BUSINESS SYSTEMS

Numerous definitions of sustainable development are well known, but they mutually differ in terms of the applied concepts, approaches and goals. To this end, we have selected the definitions which are most frequently mentioned both in theory in practice, and are as follows (World Commission on Environment and Development, 1988):

- "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (p. 43)
- "...sustainable development is not a fixed state of harmony, but rather a process of change in which the exploitation of resources, the direction of investment, the orientation of technological development, and institutional change are made consistent with future as well as present needs." (p. 9).

The presented definitions point out the significance of the coordination of common goals of human operation in order to ensure the equal possibilities of meeting the needs of both the present and the future generations. The idea of the global sustainable development can be applied for the entrepreneurial operation provided that we adjust its starting points, principles and characteristics to the specific requirements and needs of business operation (Potočan, 1998; Rebernik & Mulej, 2000; Rebernik, 2000). In this contribution, we present only a part of the problems of adjustment, i.e. the process of adapting the general goals of the existence and development of mankind into business goals, but not inversely. The acceptance of sustainable development in enterprises depends on the argumentative justification of its possible benefit for business targets and for the economic performance (results) of their achievement (Harman & Porter, 1997; World Commission on Environment and Development, 1988).

In the adapting of goals in sustainable development, we proceed from the systemic approach and the understanding of the world (as an entity) and of its phenomena in the objective reality (e. g. economic operation) (Potočan, 1998; Kajzer, Mulej & Farn, 1999). Based on the systemic approach, the enterprises can be defined as dynamic and relatively open business systems, which are closely linked with their environment / environments (e.g. economic, natural, technical, social). For a business systems it can be stated that (Potočan, 1998; Potočan, 2000):

- All the factors of business operation, synergic ally (positively or negatively) influence the achievement of the fundamental goals of operation including the economic goals of operation; for this reason, all the factors of operations can be defined as indirectly or directly economic, and
- The individual goals also indirectly or directly influence the economics of business operation and, therefore, the goals of the enterprises' operation (internal, external; partial, entire) can be defined as economical, indirectly or directly.

Under the modern conditions of operation, the adequacy of the enterprises' operation also substantially depends on a simultaneous implementation of the

goals of their internal environment (business operation) and on the external environment (public interest). The definition of the internal and external environment depends on mainly subjective and objective factors and is implicitly soft and fuzzy (Potočan, 2000).

Enterprises try to adjust their goals of business operation to public interest and/or even they take over defined goals of the environment as their own. Thus, they can also partially introduce the goals of the global sustainable development into the operation since the goals based on the public interest, are the same (or very similar) as the general goals of the human sustainable development.

The enterprises are also trying to appropriately meet the customer requirements and needs, which increases the importance of the indirect economic objectives of business operation. This group of goals can also cover those goals, which are not set for economic reasons (e.g.: ecological, social, cultural); however, their implementation also, indirectly at least, influences the economic results of business operation. This is one more way, how an enterprise can introduce the goals of the global sustainable development into its own business operation.

From the above statements it can be established that the functioning of the world as the entity and of its parts, e.g.: enterprises, is based on similar global goals (universal laws) of living and behaviour. On this basis, we can form specific goals for the individual levels of operation, which must be harmonized with the sustainable development and related general goals.

In this way, the business systems support their own existences will enough, if they can carry out their business operation: purposefully (efficiently and effectively), respectably (reasonably from their business behaviour aspect) ethically (morally appropriate from their aspect of responsible attitude towards their social and natural environment) and innovatively. The objective of enterprises' operation is, therefore, to achieve "adequate" economic results within an "adequate" care and responsibility for the nature and social environment (Potočan, 2000; Rebernik & Mulej, 2000; Rebernik, 2000).

Based on the cognition on the adequacy of the sustainable development for the enterprises' operation, we can conceive the process for the sustainable development to be implemented in business operation. Among all its activities, we shall focus on the conception to the methodological support to the sustainable development with the anticipatory system.

3. ANTICIPATORY SYSTEM AS A PRECONDITION FOR SUSTAINABILITY OF BUSINESS SYSTEMS

By consideration of the principles sustainable development, the enterprises endeavour to improve the quality of their operation. The introduction of the sustainable development idea requires the company to reconsider and restructure their behaviour on all levels and in all areas including the subjects of business operation. Both in theory and practice, different solutions are known, which are purpose created to support selected individual levels and parts of operation (Flood, 1999; Rebernik, 2000). This is not holistic enough (Potočan, 2000; Rebernik & Mulej, 2000), mostly for this reason, their results at the enterprise level are, as a rule, lesser than realistically possible ones.

A corresponding sustainable development of the enterprise can be best provided on the basis of the support to the business operation which will enable a simultaneous change of the thinking approach, the operation and the methodology of the development, the implementation and the management of business operation (Potočan, 1998). Its performance and efficiency can be significantly improving by a systemic treatment of the enterprise. Based on the soft system approach, a starting point for the adequate conception of the support to the business operation can be formed. Systemic methodology offers us most of the necessary additional knowledge (about values, content, methodology, subject of treatment) for a substantial and adequate support to our business operation. In compliance with the cognitions from the systems theory, we shall attempt, for the needs of our work, to define important characteristics of the business anticipatory system supportive of the sustainable development.

The idea of anticipation has been known since the times of ancient Greece (Black, 1997). On the Latin rather than ancient Greek basis, anticipation is expressed in a number of European languages (Britovšek et al., 1960). The concept of anticipation was, for the first time, linked with the systems and systems theory (with theory of living system) by Rosen in his book "Anticipatory Systems" (Rosen, 1985). In his research, Rosen proceeded from the concept of living systems and from the possibility of one's management of their complexity. The author explains his approach in this way: "When I was trying to develop the idea of an anticipatory system, I was interested more in how it behaved as such than in how it got to be an anticipatory systems." (Rosen, 1997).

The fundamental cognitions of the Rosen's work have been summarized by Dubois (Dubois, 1998): "Robert Rosen, in the famous book Anticipatory Systems

tentatively defined the concept of an anticipatory system: a system containing a predictive model of itself and/or of its environment, which allows it to state at an instant in accord with the model's predictions pertaining to a later instant." "Robert Rosen considers that anticipatory systems are related to the final causation of Aristotle. A future cause could produce an effect at the present time. Then the causality principle seems reversed. Robert Rosen relates some anticipatory systems to feed forward loops." (Dubois, 1999).

The investigations carried out do not give a complete answer to the question: "What does the anticipation offer to the business systems and which characteristics determine the anticipatory features of the system?" The anticipatory system is significantly influenced mainly by its ability to support an adequate operation, behaviour in relation to its environment and the direction of the behaviour (Potočan, 2000). The fundamental conditions of the anticipatory system are:

- Complete flexibility (structure, functioning, behaviour), which supports the ability of the system's operation, takes suitable (Flood, 1999; Kajzer, Mulej & Farm, 1999).
- Suitable level of ergodics, i.e. a dynamic coordination and changing of goals of the current functioning and development of both the whole and the parts, which support an adequate behaviour ability of the system to the environment (Lange, 1965) and
- Openness and dynamics of the system in which an innovative operation is taking place and which support a corresponding ability of the anticipatory treatment of the system linked to the direction of work (current and future) and to the behaviour of subjects of the system.

Anticipatory system is also largely determined by the fundamental starting points for its conception and creation. Numerous authors found their anticipatory system concept on the trans-disciplinarity, holism and the standardization of operation (Flood, 1999; Mulej et al., 2000; Rebernik & Mulej, 2000).

The following facts can be established for the anticipatory system points:

- The application of the transdisciplinary approach enables an open definition of the field of the treated anticipatory systems phenomenon and the area of its possible solution; with its application, the subject select, for the treatment, only those sciences necessary and sufficient for a corresponding definition of the system; the starting points for the treatment and the knowledge of the system's impact on the selection.

- Whether or not an anticipatory system is adequate, also depends on how holistic are the definition, preparation and consequence or cause of implementation of a business operation; the holism can be ensured by the consideration of cognition which are necessary for the concept, operation and organization of the systems; in practice, it is possible to reach only a partial wholism of business operation which takes up a value in the interval between the total holism and total one-sidedness. Hopefully, this is a requisite holism (Mulej & Kajzer, 1998; Potočan, 1998; Rebernik & Mulej, 2000).
- Standardization of business operation also presents an important starting point; by standardization we create comparability of the starting point and thus quite a unified treatment of various fields/subsystems of operation in different business systems.

In our treatment of the basic starting points for the anticipatory system we are encountered with two types of problems. By the defining/selecting areas, aspects and goals of the anticipatory operation we restrict the research field and consciously denounce a possible holism. Then we attempt to investigate the defined area (as holistically as possible, on the level of the requisite holism), but our main factor of judgment about the suitability is still the criterion of economics.

On the basis of the presented conditions and starting points, the anticipatory systems can be defined as the entity of the methodological approach, techniques and modes of work, which, in the business systems indirectly and/or directly provides for the possible future to have its impact on the current determination of objectives and goals of business operation, on the directing of process operation and on the (re)structuring of the systems structure (Potočan, 1998; Potočan, 2000).

Anticipatory system, as defined by above-mentioned conclusions, should help mankind control its general and individual future rather holistically. Hence, it should help mankind face entanglement of its current and future life/lives, and have a basis for it, which is as holistic as possible. If this statement is correct, and it is derived from our experience, research, and reading the above references about anticipatory systems, then a number of issues are surfacing. These issues about anticipatory system present the basis for a further investigation of selected fundamental starting points, and characteristics of business anticipatory system.

4. BASIC CHARACTERISTIC OF BUSINESS ANTICIPATORY SYSTEM

The definition of the anticipatory system characteristics presents the starting points for the actual formation of the holistic support to business operation, which will be operatively applicable for the enterprise (Potočan, 1998; Potočan, 2000). In the conception of the support we proceed from the process aspect of business operation, which defines a business process as the entity of the basic, management and information processes. The traditional central area of the business process is the basic process as the process directly creating the effects of business operation - products and/or services. For the basic process to have its support and to attain its efficiency and effectiveness it is, therefore, necessary to construct a corresponding management and an information process.

All three processes are open to the environment and, at the same time, interlinked: from the reproduction (basic) co-dependency precedes the management co-dependency and from this the information co-dependency. Because of the mentioned co-dependencies, the process of conception of the process of the anticipatory system can be defined as the entity of the following activities:

- The conception starts by the synthesis of the selected systems of viewpoints and the resulting analysis of basic processes with the focus on the research of their actual and development co-dependency. On their basis, the synthesis of the reproduction co-dependency is carried out for the system (i.e. its reproduction relations).
- Then follows the construction of the management process, which will correspond to the cognitive reproduction to the management levels in the integrated systems (i.e. creation of adequate management relations for system operating).
- The conception is concluded by the definition of the information needs and by the construction of the information system to support both the management and the operating on the individual levels and in the individual areas of the integrated system (i.e. creation of new information co-dependencies).

The presented concept enables the conception of the requisitely holistic anticipatory systems aimed to support business operation. In order to meet the needs of business operation of the individual parts of the enterprise it is necessary to research the holistic anticipatory systems and create specific and specialized anticipatory systems. The purpose created and target oriented

anticipatory systems present parts of the requisitely holistic anticipatory system and can be, therefore, characterized as its partial systems or subsystems.

A large variety of possible kinds, forms and the types of partial or (sub) anticipatory systems, do not allow their uniform definition and holistic classification. However, it is possible to present, in general, the framework of their operation. In the creation of the partial and/or sub anticipatory systems, we can proceed from: 1) Aspects of treatment (e.g.: basic anticipatory system, management anticipatory system, information anticipatory system), 2) Function areas of treatment (e.g. purchase anticipatory system, production anticipatory system), 3) Viewpoints of research (e.g.: economic anticipatory system, technical anticipatory system), and 4) Various combinations of them.

In the formation of the anticipatory system in the individual enterprise we can apply anyone of the above stated starting points or their combination(s).

In addition, numerous objective and subjective factors of business operation have an additional impact (indirectly or directly) on the anticipatory system concept. The following most important or the most frequently facts are:

- Which are the subjects of the anticipatory system (their characteristics, role and significance, abilities);
- What is the objective of the system's operation?
- What are its aims, its orientation and the knowledge of management of anticipatory systems; and
- What is the time aspect of the treatment?

With the questions about the factors of business operation, which have their impact on the anticipatory system, we returned to the initial questions about the definition of the adequate treatment of the enterprise, to sustainable development concept of enterprises, and to the possibilities of the requisitely holistic support to business operation. Thus, the discussion about the selected problems is concluded.

5. SOME CONCLUDING REMARKS

There are more questions than answers, when thinking about business systems and anticipatory systems. It can easily be stated that for a business system to contribute to the sustainable development it should include in its structure and process an anticipatory system. There is also no doubt that the anticipation is a necessary precondition for a business system. But, how to built a business system that will be capable of being anticipatory? In the field of

technical and life - sciences there are many laws and principles that enable a relatively high level of anticipation when in use.

The economic life is much less predictable, as human behaviour is hard to anticipate. Namely, economics as a science deals with the problem of how human beings make decisions and act when means are scarce. The essence of economic life is therefore, in fact, non-anticipatory: the more predictable is a certain result, the less profitable is. It is impossible to build a perfect anticipatory business system that would be capable of sustainable development. But, it is possible to improve its anticipatory power by introducing many anticipatory systems at different levels of activities taking place in a business system, especially if they are requisitely holistic.

REFERENCES:

1. Black, J. (1997), *A Dictionary of Economics*, Oxford University Press, Oxford
2. Britovšek, J. (ed.) (1960), *A Guide Through Time and Society (In Slovene)*, ZMK, Ljubljana
3. Dubois, M. (1998), *Journal CHAOS*, Vol. 2, No. 1 (pp. 10-45)
4. Dubois, M. (1999), *Journal CHAOS*, Vol. 3, No. 1 (pp. 67-102)
5. Flood, R. (1999), *Rethinking the Fifth Discipline*, Routledge, London
6. Harman, W., Porter, M. (1997), *The New Business of Business*, Berrett-Hoehler, San Francisco
7. Kajzer, S., Mulej, M., and F. Marn (1999), The Process Approach to Business, *Systemica*, Vol. 10 (pp. 46-67)
8. Lafferty, W., Meadowcroft, J. (2000), *Implementing Sustainable Development: Strategies and Initiatives in High Consumption Societies*, Oxford University Press, Oxford
9. Lange, O. (1965), *Wholes and Parts: A General Theory of System Behaviour*, Pergamon Press and PWN - Polish Scientific Publisher, Oxford - Warszawa.
10. Mulej, M., Kajzer, S. (1998), Ethics of Interdependence and the Law of Requisite Holism, In: Rebernik, M., Mulej, M. (Eds.): *STIQE '98, Proceedings of STIQE* (pp. 214-228), Institute for Systems Research, Maribor
11. Mulej, M. (et al.) (2000), *Basics of Systems Theory*, FEB, Maribor
12. Organization for Economic Co-operation and Development - OECD (2000), *Framework to measure sustainable development*, OECD, Paris
13. Potočan, V. (1998), Holistic Decision-making as A Practical Example of Training for Systemic Thinking, In: *Proceeding of IDMT '98* (pp. 57-78), Rudolf Trauner, Linz

14. Potočan, V. (2000), A New Perspectives on Business Decision Making, *Management*, Vol. 5, No. 1 (pp. 13-28)
15. Rebernik, M., Mulej, M. (2000), Requisite holism, isolating mechanisms and entrepreneurship, *Kybernetes*, Vol. 29, No. 9/10 (pp. 1126-1140)
16. Rebernik, M. (2000), Anticipatory inadequacies of business economics and entrepreneurship theory, *Journal CHAOS*, Vol. 4, No. 1 (pp. 315-332)
17. Rosen, R. (1985), *Anticipatory Systems*, Pergamon Press, New York
18. Rosen, R. (1997), *Videotaped interview of dr. Robert Rosen*, <http://views.vcu.edu/mikuleck/rsntpe.html>
19. World Commission on Environment and Development (1988), *Our Common Future on Environment and Development*, Oxford University Press, Oxford

POSLOVNI SUSTAV: ANTICIPATORNI I SUSTAV ZA ODRŽIVI RAZVOJ

Sažetak

Postojanje i razvoj ljudske vrste ovisi o koordiniranom djelovanju svih područja i razina ljudske djelatnosti. Međutim, u teoriji i praksi ne postoji model djelovanja koji bi opisao harmoničan razvoj usmjeren prema ciljevima. Djelomično rješenje nudi model održivog razvoja, koji pokušava definirati i provesti opće ciljeve čitavog čovječanstva i povezati ih s harmoničnom provedbom ljudskih aktivnosti na svim razinama življenja i ponašanja ljudi. Poduzeća pripadaju ključnim institucijama suvremenog društva koje sudjeluju u stvaranju održivosti društva. U ovom se radu, uz pomoć metode simulacije, pokušavaju pripremiti modeli ciljeva poduzeća, promatrani s aspekta njihovog internog i eksternog okruženja. Na temelju sistemskog pristupa, poduzeće se definira kao poslovni sustav, koji može dugoročno preživjeti isključivo na temelju održivog razvoja. Poslovni sustav može podržavati i primjena anticipatornih sistema. Anticipatorni se sistemi, stoga, mogu shvatiti kao cjelina koja objedinjuje metodološki pristup, tehnike i načine rada. Njihove karakteristike imaju izravan utjecaj na postavljanje ciljeva i usmjerenje rada, te, stoga, i na postizanje rezultata poslovnog sustava.

