

BUSINESS SYSTEM: SUSTAINABLE DEVELOPMENT AND ANTICIPATORY SYSTEMS THINKING*

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The existence and development of humankind depends a lot upon a co-ordinated operation of all areas and levels of human activity. However, in either theory or practice we found no model of operation, which would offer a harmonized and target oriented development. A possible solution is offered by sustainable development, which tries to define and carry out common goals of humankind with a holistic harmonization of humans' activities at all levels of their living and behaviour. Companies belong to central institutions of the modern society and essentially co-create the sustainability of society. Companies endeavour (e.g. by simulation and planning) to prepare models of their goals and ways concerning their internal and external environment. On the basis of systems approach, we can define companies as business systems, which can best survive in a long-run on the basis of sustainable development. This business system's effort can also be supported by the application of the anticipatory systems thinking, which can improve its planning methods, if it is holistic, understood as a future oriented mental activity made of its methodological approach, techniques, and modes of work. Its characteristics have a direct impact on holism of the definition of goals, on the orientation of operation, and hence on the achievement of the business system's results.

1. THE SELECTED PROBLEM AND VIEWPOINT

The existence and development of humankind (and of the world we live in) depend a lot upon a coordinated operation of all areas and levels of human activity. Human history has seen various development concepts. Different

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authors created their individual concepts from their own selected (systems of) viewpoints of activities. Their results are substantially lagging behind the possible ones, if their (systems of) aspects / viewpoints are too narrow.

Modern living and behaviour of the humans depend more and more on the development concept, which would enable a harmonized and target-oriented operation of humankind as an entity (WCED, 1988). A possible solution is offered by sustainable development (SD), with which one tries to carry out common goals of humankind with a harmonization of implementation of humans' activities at all levels of their living (Harman & Porter, 1997; Lafferty & Meadowcroft, 2000; Potočan, 2000).

Thus, the SD reaches beyond the traditional planning methods (Harman & Porter, 1997; Lafferty & Meadowcroft, 2000). This is also, and even especially, true of the humankind's economic operations, which provide the material bases for their living and considerably co-create the society at large. A major part of the present investigations about the SD in the economy has been directed to the macro-economic level and the operation of the basic economic subjects, i.e. enterprises as business systems (BSs) (Lafferty & Meadowcroft, 2000; OECD, 2000).

The BSs are, therefore, faced with the challenge of how to plan and carry out their business operation on the basis and/or in the harmony with their need for a SD. In the introduction of their SD, BSs encounter a number of problems (OECD, 2000; Rebernik & Mulej, 2000), and they do so in their effort to keep their SD alive, too.

Firstly, they must define their own SD from the aspect of its content. Thus, they define the adequacy of its introduction, the role and the importance of the SD in their business operation, and benefits of their business operations resulting from the thus conceived development. In the next step, the BSs form an entity of methodologies, methods, and techniques to introduce and apply SD in their business operation. A holistic research of the SD and its application in the BSs' operation reaches beyond the framework of our investigation of this contribution.

We shall rather discuss the role and importance of the SD for the BSs, the possibilities of support by anticipatory systems (AS) and the anticipatory systems thinking (AST) to the implementation of SD, and the basic starting points of the business AST. This would make BSs develop to anticipatory business systems (ABSs), as demonstrated by Figure 1.

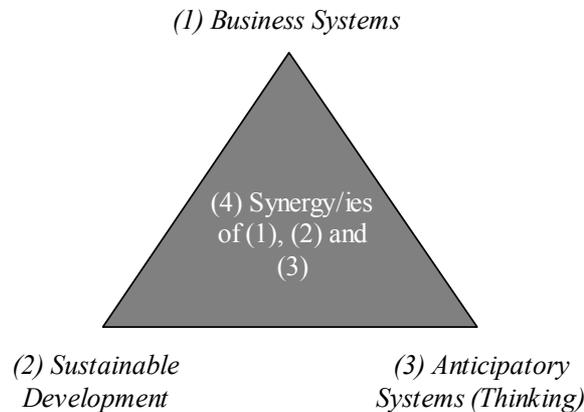


Figure 1. The Interdependence of Business Systems, Sustainable Development, and Anticipatory System (Thinking) Making ABSs

2. THE SUSTAINABLE DEVELOPMENT AND BUSINESS SYSTEMS

Numerous definitions of SD are well known, but they mutually differ in terms of their applied concepts, approaches and goals. Therefore, we selected the definitions, which are most frequently mentioned both in theory in practice and read as follows (WCED, 1988):

- "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (WCED, 1988, 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." (WCED, 1988, p. 9)

The presented definitions point to the significance of the coordination of common goals of the future human operation that aim at ensuring equal possibilities of meeting the needs of both the present and the future generations. The idea of the global SD can be applied to the BSs' operation provided 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 discuss only a part of the problems of adjustment, i.e. the process of incorporating the general goals of the

existence and development of humankind into business goals. The acceptance of SD in BSs depends on the argumentative justification of its possible benefit for business targets and for the economic performance (results) to be achieved (Harman & Porter, 1997; WCED, 1988).

In the adapting of goals of a BS concerning its own SD to the societal goals concerning SD, we use the dialectically systemic approach to understand of the World (as a whole) and its phenomena in the objective reality (e. g. economic operations) (Potočan, 1998; Kajzer, Mulej & Marn, 1999).

The Dialectical Systems Theory (DTS – OECD, 2000; and earlier, since 1974 – Mulej et al, 2000) tries to support the both Bertalanffian and practical finding that interdependence (i.e. dialectics, in ancient Greek) is a crucial overseen attribute of reality. This oversight cause human view, insights, thinking, decision-making, and action to be dangerously onesided, or lack holism, at least. DTS provides for a methodology supportive of holism by interdisciplinary creative cooperation.

Based on the dialectically systemic approach, the BSs can be defined as dynamic and relatively open BSs, which are closely linked with their environment / environments (e.g. economic, natural, technical, social). About a BS it can be stated that (Potočan, 1998 & Potočan, 2000):

- All the factors of BS operation, synergetically (positively and/or negatively) influence the achievement of the basic goals of the BS operation including its economic goals; for this reason, all the factors of the BS operations can be defined as indirectly or directly economic.
- The specific goals also indirectly or directly influence the economics of BS operation; therefore, the goals of the BSs' operation (internal, external; partial, holistic) can be defined as economic ones, indirectly or directly.

In the modern conditions of operation, the adequacy of the BSs' operation also substantially depends a requisitely holistic definition and on a harmonized realization of the goals of their internal environment (BS operation) and on the external environment (public interest). The definition of the internal and external (social, economic, natural) environments depends on both subjective and objective factors and is implicitly soft and fuzzy (Potočan, 2000).

BSs try to adjust their operational goals to the public interest; they even accept certain goals of their environment as their own. Thus, BSs can also partially introduce the goals concerning the global SD into their own operation, since the goals based on the public interest are the same (or very similar) as the general ones of the humankind's SD (if agreed upon holistically and

democratically). The BSs also try to appropriately meet the customer requirements and needs, which increases the importance of their indirect economic objectives of business operation. This group of goals can also cover other goals, which are not set for the very economic reasons (e.g.: ecological, social, cultural); however, their implementation also, indirectly at least, influences the economic results of BSs' operation. This is one more way, how a BS can introduce the goals of the global SD into its own business operation.

From the above statements it can be established that the functioning of the World as a whole and of its parts, e.g.: BSs, is based on similar global goals (universal laws) of living. On this basis, we can form specific goals for the specific levels of operation, which must be harmonized with the SD and related general goals. In this way, the BSs support their own existences well enough, if they can carry out their business operations: purposefully (efficiently and effectively), respectably (reasonably from their business behaviour aspect), ethically (morally appropriate from the aspect of their responsible attitude towards their social and natural environment) and innovatively (creating and gaining new benefits from novelties). The objective of BSs' operation is, therefore, to achieve "adequate" economic results within a requisitely holistic care and responsibility for the natural and social environment (Potočan, 2000 & Rebernik & Mulej, 2000; Rebernik, 2000).

Based on the cognition on the adequacy of the SD to the BSs operation, we can conceive the process for the SD to be carried out in business operation in future. Among all its activities, we shall focus on the conceptualization of a methodological support to the SD with the AS and AST as a holistic future-oriented thinking, reaching beyond the usual, traditional business planning.

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

By consideration of the principles of the SD, the BSs endeavour to improve the quality of their operation. The introduction of the SD idea requires the BSs, which have not cared for their own environment and future so far, to reconsider and restructure their behaviour on all (crucial) levels and in all (crucial) areas including decision makers of business operation. Both in theory and practice, different solutions are known, which are created on purpose to support the selected individual levels and parts of operation (Flood, 1999 & Rebernik, 2000). This is not holistic enough (Potočan, 2000, Rebernik & Mulej, 2000) and this is mostly the reason, that results at the BSs level are, as a rule, poorer than the realistically possible ones.

A corresponding SD of the BSs can be best provided on the basis of the support to their business operation, which enables a simultaneous change of their thinking approach, their operation, and their methodology of their development, their carrying out and their management of their business operation in order to make them more holistic (Potočan, 1998). The BS's performance and efficiency can be significantly improved by a systemic treatment of the BS. Based on the soft (rather than hard) system approach, especially the DTS, a starting point for an adequate conception of the support to the business operation can be formed. The Dialectical Systemic methodology offers us most of the necessary additional knowledge (about values, knowledge on content and on methodology, subject of treatment) for a requisitely holistic support to a BS's business operation. In compliance with the cognitions from the DTS, we shall attempt to meet the needs of BS's work, to define important characteristics of the business AST supportive of the SD better than the planning methods of so far.

The idea of anticipation has been known since the times of ancient Greece (Black, 1997), at least. On the Latin rather than ancient Greek basis, anticipation is expressed in a number of European languages (Britovšek, 1960). The concept of anticipation was, for the first time, linked with the systems and systems theory (with the living systems theory) by 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: "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). This means, that to him, the capacity of anticipation is a rather natural attribute, or at least a learned one. ASs can thus cover, as a concept, anticipatory living systems and ASs as their tools.

The fundamental cognitions of the Rosen's work have been summarized by Dubois (1998): "Robert Rosen, in the famous book *Ancipatory 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). In his series of conferences and books, Dubois made room for AS to evolve as mathematical and other tools of human thinking and action (Dubois, 1998; Dubois, 1998; etc). To us, this means, that anticipation can receive support in mathematical and

other methods, which can be developed, provided the AST is developed (about which we found no contributions so far).

The investigations carried out so far do not give a complete answer to the question: "What does the anticipation offer to the BSs and which characteristics define the anticipatory features of the BS?" The AST is significantly influenced mainly by its ability to support a requisitely holistic operation/behaviour in relation to its environment and the direction of the behaviour of a human, BS, etc. (Potočan, 2000). The fundamental conditions of the AST concerning BSs include:

- A great flexibility (structure, functioning, behaviour), which enables a suitable ability of the BSs to function now and in future (see Flood, 1999; Kajzer, Mulej & Marn, 1999);
- A proper level of ergonomics, e.g. a dynamic coordination and changing of goals of the current functioning and development (of both the whole, and the parts), which provides for an adequate adjustment of the BSs' behaviour to the current and future requirements of environment (Lange, 1965);
- Openness and dynamics of the BS in which an innovative functioning is taking place and which support a corresponding ability of the BS to anticipatorily treat both its own direction of (current and future) work and the behaviour of its own and other BS participants (owner, co-workers, co-competitors, etc).

Anticipatory BSs are also largely determined by the basis for their conception and creation. Numerous authors base their AS concept on interdisciplinarity, holism and standardization of operation (Flood, 1999; Dubois, 1999; Rebernik & Mulej, 2000). The following attributes can be found typical of the AST concerning BSs:

- The application of the interdisciplinary approach enables openness in the process of definition of the ASs to be treated, and of the area of their possible solutions; with AS application, the decisive person selects, for the treatment, only the sciences found requisite (Mulej, 1974; Rebernik & Mulej, 2000) for a definition of the BS's attributes found crucial.
- Whether or not an AST is adequate, also depends on how holistic are the definition, preparation, and consequence of the carrying out of a business operation; a requisite holism can be ensured by the consideration of cognitions, which are requisite for the concept, operation, and organization of the BS. In practice, it is possible to reach only a partial wholism of the 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, 1974; Potočan, 1998; Rebernik & Mulej, 2000).

- Standardization of business operation also presents an important starting point; by standardization we create comparability of the starting points and thus a quite unified treatment of various fields/subsystems of operation in different BSs. AST can lean upon the standards and have more time to work on the less predictable attributes ahead.

In our treatment of the basic starting points for a BS as an AS we are encountered with, at least, two types of problems. By defining/selecting the areas, aspects and related goals of the anticipatory operation we restrict the research field and consciously reduce our 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 of the BS, but with the SD included, because it is very costly if left aside now, in the future. The concept of “external economies” shows up as fictitious economics (see WCED, 1998; etc).

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

AST, as defined by the above conclusions (on a preliminary basis, opening a discussion about AST), should help humankind control its general and individual future requisitely holistically. Hence, it should help humankind face entanglement of its current and future life/lives, and have a basis for mastering it, which is requisitely holistic. If this statement is correct, and it is derived from our experience, research, and reading the above references about ASs, then a number of issues are surfacing. These issues about AST present the basis for a further investigation of the selected basic starting points, and characteristics of business AS.

4. BASIC CHARACTERISTIC OF BUSINESS ANTICIPATORY SYSTEM THINKING

The definition of the AS characteristics presents the starting points for the actual formation of a requisitely holistic support to business operation, which will be applicable for the BS (Potočan, 1998; Potočan, 2000). In the creation of this support we proceed from the process aspect of business operation, which defines a business process as an entity of the basic, management and

information processes. The traditional central area of the business process is its 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 corresponding management and information processes.

All three processes are open to the environment and, at the same time, interlinked: from the reproduction (basic) interdependence proceeds the management interdependence and from both of them the information interdependence. Because of the mentioned interdependences, the process of creation of the process of the anticipatory BS (ABS) can be defined as an entity of the following activities:

- The creation of ABS starts by the synthesis of the selected dialectical system of viewpoints and the resulting analysis of the basic processes with the focus on the research of their current and development interdependencies. On their basis, the synthesis of the reproduction interdependence is carried out for the BS (i.e. its reproduction relations).
- Then follows the creation of the ABS management process, which will meet the needs of the defined basic process on all the crucial management levels in the BS (i.e. creation of adequate management relations enabling both a requisite efficiency and effectiveness of the BS operation).
- The creation of ABS is concluded by the definition of the information needs and by the construction of the information system to support both the BS management and its operation of the basic process as a whole and per parts of the BS (i.e. creation of new information interdependences).

The presented concept enables the conception of the requisitely holistic ABS aimed to support business operation of the BS. In order to meet the needs of business operation of the individual parts of the BS it is necessary to create a dialectical system of specific and specialized (sub/partial) ABSs. The purpose-created and target-oriented ABS present parts of a requisitely holistic anticipatory BS and can be, therefore, characterized as partial systems and/or subsystems of requisitely holistic ABSs.

A large variety of possible kinds, forms and types of partial or (sub) ABSs, do not allow for their uniform definition or their totally holistic classification. However, it is possible to present, in general, the framework of their operation. In the creation of the partial and/or sub ABSs, we can proceed from:

1. Aspects of treatment (e.g.: basic AS, management AS, information AS of the ABS),

2. Function areas under consideration (e.g. purchase AS, production AS of the ABS),
3. Viewpoints of research (e.g.: economic AS, technical AS of the ABS), and
4. Various combinations of them.

In the formation of the AST and ASs in the BS under consideration we can apply anyone of the above stated starting points or their combination/s and synergies.

In addition, numerous objective and subjective factors of business operation have an additional impact (indirectly or directly) on the AST in ABSs (at least). The most important or most frequent issues include:

- Which are the actors of the ABS (their characteristics, role and significance, abilities)?
- What is the objective of the BS operation?
- What are aims of ABS, its orientation and the knowledge and values of managers and others members of the ABS?
- What are the ways to include SD in AST for SD to requisitely holistically influence the ABS?
- What is the time aspect of the treatment of ABS?
- What about the diffusion of ABS as a novelty aimed at becoming an innovation?

With the questions about the factors of business operation, which have their impact on the ABS, we returned to the initial questions about the definition of the adequate treatment of the BS, to SD concept of BSs, and to the possibilities of a requisitely holistic support to business operation. Thus, the discussion about the selected problems is concluded for the time being. We have no more room.

5. SOME CONCLUDING REMARKS

There are more questions than answers, when thinking about BSs in terms of the AST. It can easily be stated that for a BS to contribute to the SD, the BSs should include in its structure and process many attributes of an ABS. There is also no doubt that anticipation is a necessary precondition for a BS. But, how to build a BS that will be capable of AST?

In the field of technical and life - sciences there are many laws and principles that enable a relatively high level of precise anticipation when in use. The economic life is much less predictable, as human behavior is hard to

anticipate reliably. Namely, economics as a science deals with the problem of how human beings make decisions and act when means are scarce (WCED, 1998; OECD, 2000). The essence of economic life is therefore, in fact, non-anticipatory in a precise way: the more predictable is a certain result, the less profitable it is. It is impossible to build a perfect ABS that would be fully capable of SD and competitiveness. But, it is possible to improve its anticipatory power by introducing many ABSs at different levels of activities taking place in a BS, especially if they are requisitely holistic.

The general aim should be a methodological innovation of the usual planning methods in order to attain more of its requisite holism, including also the SD, in the case of the BSs (be them individuals, organizations, or political entities).

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POSLOVNI SUSTAV: ANTICIPATORNI I SUSTAV ZA ODRŽIVI RAZVOJ

Sažetak

Postojanje i razvoj ljudske vrste uvelike ovise 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. Moguće 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 koje sudjeluju u stvaranju održivosti društva. One, primjerice, uz pomoć metoda simulacije i planiranja, pokušavaju pripremiti modele svojih ciljeva i načina funkcioniranja, koji se odnose na vanjsko i unutarnje okruženje. Na temelju sistemskog pristupa, poduzeće se definira kao poslovni sustav, koji, u dugoročnom smislu, najbolje preživljava na temelju održivog razvoja. Ovakve napore poslovnog sustava može podržavati i primjena promišljanja na temelju anticipatornih sustava, koji mogu poboljšati metode planiranja, ukoliko se ono shvati kao holistička i intelektualna djelatnost, usmjerena prema budućnosti, ali i cjelina metodološkog pristupa, tehnika i načina rada. Karakteristike planiranja izravno utječu na stupanj u kome se može govoriti o holističkim ciljevima, te poslovnom usmjerenju, a samim tim i na razinu rezultata poslovnog sustava.