Economic Horizons, January - April 2016, Volume 18, Number 1, 17 - 33
UDC: 33 eISSN 2217-9232

Original scientific paper
UDC: 005.22:005.521]:334.7
005.334
330.46
doi: 10.5937/ekonhor1601015Z

COMBINING THE METHODOLOGIES OF STRATEGIC ASSUMPTIONS SURFACING AND TESTING AND ORGANIZATIONAL CYBERNETICS IN MANAGING PROBLEM SITUATIONS IN ENTERPRISES

Dejana Zlatanovic*

Faculty of Economics, University of Kragujevac, Kragujevac, The Republic of Serbia

The limitations of the individual use of systems methodologies in creative dealing with complex, dynamic and ambiguous problems, i.e. problem situations, caused by the increasing complexity and diversity of problem situations, indicate the necessity of a combined, i.e. synergistic use of systems methodologies. The aim of the research is to show how some limitations of the individual using of the interpretive systems methodology of Strategic Assumptions Surfacing and Testing (SAST) and Organizational Cybernetics (OC), as a functionalist systems methodology, can be eliminated by their combining. After identifying Critical Systems Thinking as a relevant conceptual framework for combining systems methodologies, the key features and limitations of SAST and OC are specified, and the assumptions, the conditions, the potential way, as well as the limitations of their combined, i.e. synergistic use are then determined. Despite the limitations, the methodologically appropriate combined use of these systems methodologies enables the improvement of managing problem situations in enterprises.

Keywords: managing problem situations in enterprises, the SAST methodology, the Organizational Cybernetics methodology, combining the SAST methodology and the Organizational Cybernetics methodology

JEL Classification: M10, M21

INTRODUCTION

Numerous problems in contemporary enterprises, according to their key characteristics - high complexity, dynamics, interactivity and ambiguity - should be researched as management problem situations. Management problem situations generally represent the relevant complex, interactive, ambiguous and manageable set, i.e. systems of problems. In the conceptual framework of systems thinking, problem situations can be explored from the point of the two

* *Correspondence to:* D. Zlatanovic, Faculty of Economics, University of Kragujevac, Dj. Pucara 3, 34000 Kragujevac, The Republic of Serbia; e- mail: dejanaz@kg.ac.rs

key dimensions - systems and participants. The dimension of systems expresses complexity, and the dimension of participants reflects the relationships that exist between those individuals and groups concerned with the problem situation (Jackson, 2003, 18-20, Petrović, 2010, 277-281).

Creative dealing with and managing problem situations imply using different systems methodologies for problem situations structuring. By the critical evaluation and identifications of the strengths and weaknesses of different systems methodologies, as well as by researching the usefulness of using different systemic models, methods, tools and techniques within different systems methodologies, it is found that these methodologies should be combined with each other. According to critical awareness as the relevant commitment of Critical Systems Thinking, one can conclude that all systems methodologies have some advantages and disadvantages. The fact that no methodology is able to explore all the aspects of complex problem situations in enterprises is acknowledged in this way.

The paper focuses on the combined use of the interpretive, i.e. soft systems methodology of Strategic Assumptions Surfacing and Testing (SAST) and Organizational Cybernetics as a functionalist, i.e. hard systems methodology. The basic research aim in the paper is to show how some limitations of the individual use of the above-mentioned systems methodologies can be eliminated by their combined use. Therefore, the key scientific hypothesis of the paper is that the methodologically appropriate use of SAST and OC in combination creatively improves managing problem situations in enterprises.

After the Introduction, in researching the combined use of SAST and OC, some of the relevant characteristics of Critical Systems Thinking (CST) as a conceptual framework for combining systems methodologies are identified in the paper. Taking into account critical awareness as the basic principle of CST, the key theoretical-methodological features of the researched systems methodologies are introduced. Accordingly, one specifies their key limitations in managing problem situations and determines the assumptions and conditions of their combined use. Also, a potential way of combining SAST and OC, as well as a critical review, i.e. the benefits and limitations of the combined use of these systems methodologies in managing problem situations in enterprises are also presented. Finally, the conclusions, the standpoint on the validity of the proposed hypothesis, the main contributions and limitations of the paper as well as the directions for future research are emphasized.

THE CONCEPTUAL FRAMEWORK FOR COMBINING THE SYSTEMS METHODOLOGIES

The valid combined use of the systems methodologies, as a response to the increasing complexity and diversity of the management of problem situations, is founded within Critical Systems Thinking (CST). According to M. C. Jackson (2001, 233-234), the analysis of social paradigms and an organizational analysis (Burell & Morgan, 1979; Morgan, 1997) are particularly important for the development of CST, since they have enabled a critique of the assumptions that different systems approaches have about social reality and organizations. In addition to this, it is important that the various human interests - technical, practical and emancipatory (Habermas, 1972, 301-317) - those emphasizing the different roles of the systems methodologies and enabling a possibility of their complementary use should be identified. The attempt to reconstitute systems thinking, as a unified approach to problem solving in organizations, is suggested to be one of the CST goals. It implies showing the complementary roles that various systems methodologies can play in problem solving and decision making, as well as demonstrating the power of systems thinking, as a source of theoretical support and practical guidance in management science. Thereby, it is important to emphasize that the diversity of systems approaches is indicative of the strength, rather than the weakness of the systems movement (Jackson, 2001, 236).

CST is aimed at supporting the holistic management of the diversity of systems approaches, i.e. at revealing the ways of the appropriate combined use of diverse systems theories, methodologies, methods and models

in order to respond to the complexity, change and diversity of problem situations in contemporary organizations (Jackson, 2010, 136). In fact, CST is a relevant stream within contemporary systems thinking, based on the following commitments: critical awareness, social awareness, dedication to human emancipation, complementarity at the level of methodology and complementarity at the theoretical level.

In the given context, the critical awareness related to the fact that all systems methodologies have certain strengths and weaknesses as well as to the researching usefulness of using different systemic models, methods, instruments and techniques within different systems methodologies is of relevant importance. Another result of critical awareness is the continual assessment of the benefits and weaknesses of all systems approaches, as well as the recognition that systems methodologies should be combined in order to address different aspects of complex problem situations.

The combined use of systems methodologies, especially the methodologies stemming from different paradigms, can be carried out in different ways. Thus, one methodology can be used as the dominant one, and another as the supportive one. Also, one methodology, or parts of one methodology, can be involved in another methodology, or one methodology can use the relevant tools of certain methodologies in combination, rather than complete methodologies etc. Table 1 shows some potential types of the combined use of systems methodologies, i.e. multi-methodology research.

Respecting the above-mentioned, and in order to identify the assumptions, conditions, ways, benefits and weaknesses of SAST and OC combining,

Table 1 Different Types of Multi-methodology Research Designs

Type of Design	Method Mix	Illustration	Example
Sequential	Methods are employed in sequence with results from one methodology influencing the later one.	Statistically analyze questionnaire, then follow up with some interviews to better understand the results. Or, undertake ethnographic research and content analysis to design a questionnaire.	(Markus, 1994) (Ngwenyama & Lee, 1997) (Carlson & Davis, 1998)
Parallel	Methods are carried out in parallel with results mutually affecting each other	Observation and recording together with the interviewing and cognitive mapping of users	(Trauth & O'Connor, 1991) (Trauth & Jessup, 2000)
Dominant (Imperialist)	One method or methodology as the main approach with contribution(s) from the other(s)	An intensive study using ethnography or participant observation with some statistical data analysis	(Siliance & Mouakket, 1997)
Multi methodology	A combination of methods, embodying different paradigms, developed specifically for the task	Interviews, data analysis, and questionnaires, combined with the root definitions and conceptual models of Soft Systems Methodology, and Strategic Choice	(Ormerod, 1995)
Multilevel	Research conducted simultaneously at different levels of an organization and using different methods	Survey of employees and interviews/ cognitive mapping with supervisors and managers	(Taylor & Tashakkori, 1997)

Source: Mingers, 2001, 252

specifying the key theoretical-methodological features of these systems approaches is of relevant importance.

THE KEY THORETICAL-METHODOLOGICAL FEATURES OF SAST AND ORGANIZATIONAL CYBERNETICS

The SAST methodology

SAST represents a relevant interpretive systems methodology for solving unstructured, ill-defined problems, i.e. problem situations in enterprises. This methodology is suitable for pluralist problem situations, in which the focus is on the political and cultural aspects of organization. Therefore, SAST ignores the structure and functioning of an organization, i.e. problems arising from the complexity of researched areas.

Theoretically, SAST is based on the idea that problem situations should be researched from different aspects. Namely, a different, dialectical approach to objectivity is of essential importance: some dominant world view (the *thesis*) should be challenged by another world view, based on entirely different assumptions - the *antithesis* in order to bring about a conditionally more objective appreciation of a situation, expressing the elements of both the thesis and the antithesis, but going beyond them as well (Jackson, 2003, 139-140).

This approach to objectivity, as the key theoretical postulate underpinning the SAST methodology, is corresponding to the principle of participation, opposition and integration (Mason & Mitroff, 1981, 16; Petrović, 2010, 447-448). It is about the methodology that seeks to include different levels and groups of an organization in the process of managing problem situations in enterprises, as well as other relevant stakeholders, whose perceptions and viewpoints are mutually opposed, but which should be brought into an appropriate relationship, i.e. their synthesis should be provided. Apart from the above-mentioned, the important principle of the SAST methodology is the managerial mind supporting based on the belief that managers exposed to different assumptions will enable their deeper understanding of the organization, its policies and strategies.

SAST is employed in managing problem situations throughout the following four stages (Mitroff, Emshoff & Kilmann, 1979, 584; Jackson, 2003, 143): forming the groups, assumptions surfacing, a dialectical debate and a synthesis. Groups are formed taking into account both minimizing the differences or conflicts within the group, on the one hand, and maximizing the divergence of the perspectives between the groups, on the other (Elrod & Moss, 1998, 284). The process of assumptions surfacing consists of the sub-processes of stakeholder analysis, the specification of assumptions and assumptions rating (Mitroff *et al*, 1979, 586). The most important criterion that should be respected is how stakeholders can influence the strategy and how they are affected by the strategy as well, seeking to generate the list of assumptions on which the strategy or the policy of each group is based. Although the number of assumptions is not limited, there are five assumptions that should initially be specified, so that the process is not overloaded with a large number of assumptions. Regarding the assumptions rating, the assessment of assumptions, given both the relative importance of an assumption, i.e. its importance for the success or failure of the strategy and its relative certainty, i.e. the reliability that an assumption is justifiable, are of the key importance.

As the main part of this methodology, a dialectical debate starts with the representation of the most important assumptions underpinning the strategy of each group. After that, a discussion begins and can vary depending on the following (Mason & Mitroff, 1981, 105-106): groups can identify the same stakeholders, but different assumptions related to them; then, groups can essentially have the same stakeholders and the same set of assumptions, but they can assess the assumptions in completely different ways; also, different groups can have different stakeholders, and thereby completely different assumptions.

In order to achieve a dialectical synthesis, the modification of assumptions is essential, i.e. groups need to modify their assumptions up to the point when, if they proceed with the modification, the assumptions would not support the strategy at all. It is

not necessary that the members of the groups change their perceptions and perspectives, but they should rather be ready to involve the opposed perspectives in the process of decision making (Van der Veen, 2003). Also, if no synthesis can be achieved, the points of disagreement need to be identified, and the ways of their elimination need to be discussed, too.

Organizational Cybernetics

As a representative of the functionalist systems paradigm, OC is focused on exploring the structure and functioning of contemporary enterprises. In fact, through the Viable System Model (VSM) as its key methodological tool, OC enables a very powerful instrumentarium of diagnosing problems in the structure and functioning of an enterprise.

The Law of Requisite Variety and the principle of recursion stand for the theoretical core of Organizational Cybernetics. The Law of Requisite Variety generally reads as follows: „Only variety can destroy variety" (Ashby, 1966, 207). It further implies the attenuation of the variety of high-variety systems and the amplification of the variety of the low-variety system. This process, called variety engineering, can be effective if organizations deal only with the part of the environment causing the threats that the organization must react to in order to survive. This is about the so-called residual variety of the environment. Analogically, it can be applied to the organization and its management, where the residual variety of the organization is relevant, i.e. the variety not absorbed by the processes of self-organization and self-regulation (Schwaninger, 2000, 211; Schwaninger, 2006, 15). The principle of recursion refers to the fact that systems are hierarchically arranged, i.e. all systems consist of a set of subsystems characterized by their own organization and regulation. At the same time, these systems are the parts of the suprasystem, i.e. the higher-order system. Each subsystem also consists of its own subsystems, and so on, all the way to the lowest levels (Beer, 1994a, 228).

Originally developed by S. Beer (Beer, 1994a; Beer 1994b; Beer 1994c), the VSM contains the following five subsystems (Brocklesby & Cummings, 1996, 51; Howerstadt, 2010, 89; Azadeh, 2012, 67-68):

- the subsystem S_1 that represents the function of implementation, namely operational elements facing directly the external environment;
- the subsystem S_2 or the function of coordination, enabling the harmonious action of operational elements;
- the subsystem S_3 - the function of control maintaining and allocating resources to the operational elements, with the addition of the segment S_3*, representing the channels of revision, through which the monitoring of the functioning of the operational elements is carried out;
- the subsystem S_4 i.e. the function of intelligence that sees the system as a whole - its strategic opportunities, threats as well as future directions, and
- the subsystem S_5 or the function of the identity specifying the purpose of the system.

The VSM is employed in the (re)designing of the organization through the following three relevant subprocesses (Flood, 1995, 149; Petrović, 2010, 399-403): the system identification, the system diagnosis and the redesign (if necessary) processes. The system identification starts with the formulation of the organizational purpose or its *raison d'être*, and proceeds with specifying the following recursive levels: the system in focus, i.e. the system for achieving the purpose and the objectives resulting from the purpose - recursion level 1; the suprasystem, i.e. the relevant environment of the system in focus - recursion level 0; the operational elements of the system in focus, i.e. the subsystems of the system in focus - recursion level 2.

After identification has been carried out, in the process of the VSM use, the subprocess of diagnosing follows. It is conducted through a careful analysis of, primarily, the S_1, S_2, S_3, S_4 and S_5 segments of the system in focus, only to be followed by the analysis of all information channels, transmitters and control loops. The diagnosis implies the comparison of the researched organization with the VSM and the identification of

the problems in the structure and functioning of the organization. Accordingly, the diagnosis provides the identification of the following problems (Peréz Ríos, 2010, 1544-1547): incorrectly defined recursion levels, the inadequate identity implying that two or more different identity conceptions produce conflicts within an organization; the S_4 segment is missing or, if it does exist, it works improperly; the inadequate management style that constrains the autonomy of the S_1 segment; the authoritarian S_2 segment; the dominance of the S_1 segment; the uncontrolled growth and activity of some individual parts of the organization; the communication channels in the system, as well as those existing between the system and the environment, not corresponding to information flows etc.

When some of the mentioned problems are observed in an organization, the redesigning subprocess is carried out as the final subprocess in the VSM use (Flood, 1995, 159). The first step of redesigning is the diagrammatic presentation of the identified organizational problems. Their studying and analyzing are necessary then. Hence, the formulation of some procedures is of great importance, and those are procedures for operational elements and procedures for management functions.

THE ASSUMPTIONS AND CONDITIONS OF THE SYNERGISTIC USE OF THE SAST METHODOLOGY AND ORGANIZATIONAL CYBERNETICS

Respecting the key theoretical-methodological features of the SAST methodology and OC, one can conclude that SAST is the representative of soft systems thinking, while OC is the representative of hard systems thinking. Accordingly, the following differences between hard and soft systems thinking are very important for the combined use of these two methodologies (Petrović, 2010, 46; Zexian & Xuhui, 2010, 140-145, Zlatanović, 2010, 98).

The key difference between hard systems thinking (HST) and soft systems thinking (SST) is reflected in the interpretation of the system concept itself. The HST regards the system as an objective part of reality. On the other hand, the SST regards the system as an epistemological concept subjectively constructed by people rather than an objective entity in the real world.

In addition to this, the HST and the SST are based on different theoretical assumptions and use different analysis methods. The HST assumes that a system should have a well-defined structure and a well-defined objective. However, this kind of thinking implies optimization and cannot solve complex social problems because it ignores different perceptions, values and interests existing in organizations. On the contrary, the SST is not focused on a single well-defined problem, but rather on problem situations as the systems of problems. The focus is on improvement, rather than optimization, i.e. the focus is on the learning process.

Finally, the HST and the SST are based on the different principles of acquiring knowledge, i.e. they use different epistemological approaches. The HST regards the system intervener as an outsider of the system. Therefore, the HST corresponds with traditional epistemology employing the principle of division between the subject and the object of research. On the other hand, the SST respects the interaction between the observer, as the subject of the research, and the problem situation, as the object of the research. Accordingly, the observer is involved in the observed situation. Therefore, the SST uses the action research and interpretive paradigm in researching and improving problem situations.

In the given context, the fact that the SAST methodology, as the representative of soft systems thinking, is aimed at exploring different perceptions, beliefs, assumptions relevant stakeholders have about the problem area in the enterprise and relevant proposals for an improvement of business is of relevant importance. In contrast to this, even though Organizational Cybernetics is the representative of hard systems thinking, it is different from some other hard systems approaches, such as System Analysis, System Engineering, Traditional Operational Research, in its structural approach to systems theory. It is believed that the structural principles that are the basis of system effectiveness and their ability to survive and develop are possible to reveal. However, from the aspect of practical use, OC depends on the existence

of the pre-defined objective as well as the individuals and the groups that agree on a specific objective. Accordingly, OC can be treated as a „methodological instrumentarium for the improvement of the design, control, the functioning of the system, aimed at achieving the pre-determined results" (Petrović, 2010, 53).

Taking into account the identified differences between the hard and the soft systems approaches, and relying on the relevant theoretical and methodological features of the SAST methodology and Organizational Cybernetics, i.e. its basic methodological instrument - the VSM - the key limitations of the given systems methodologies, relevant for their combined use, can be identified. In fact, the following limitations are of crucial importance for their combining.

Above all, the SAST methodology focuses on the relationships between the participants, i.e. on research into different perceptions, perspectives, interpretation of problem situations in enterprises. In this regard, SAST fully ignores the systems dimension, i.e. the structure and functioning of the organization. In fact, by creatively managing problem situations in enterprises, the SAST methodology effectively handles pluralism, rather than the complex nature of problem situations. On the other hand, Organizational Cybernetics focuses on the organizational structure and communication, and respects the insufficiently meaningful role of individuals in organizations. The concept of the model requires that the pre-defined goals of the organization should be followed, whereas the parts of the organization to which control is delegated are only allowed freedom in the search for the alternative ways of achieving those goals. In this way, attention is paid to the achievement of the objectives, rather than the manner in which these objectives are defined. In fact, the focus is on the systems dimension, whereas the participants dimension is ignored. Respectively, OC can effectively deal with complex problem situations, but cannot handle the pluralistic nature of problem situations.

The removal of these limitations can be achieved by their synergistic use. The conditions of the synergistic use of SAST and OC depend on the nature of the researched problem situations, i.e. on the ways objectives are defined in enterprises. In fact, if in some enterprise the objective i.e. purpose is clearly defined, from which purpose the strategy that is clearly identified stems, i.e. if there is a general agreement of the relevant stakeholders over the objectives, the policies or the strategies, then the individual employment of OC would lead to better results. In this case, the objective is clearly identified, and it is necessary that the suitable structure and functioning of the organization should be designed in order to provide the efficient realization of the identified objective.

However, if there are different interests, the perceptions and understandings of what the purpose is, i.e. what the objectives the enterprise should be following are, then the combined use of SAST and OC will generate better results. Taking into account the fact that problems in enterprises are generally characterized by complexity and pluralism, it can be concluded that the individual use of SAST or OC cannot help the adequate management of these problem situations.

Respecting the above, the combined use of SAST and OC should rely on the following key principles: participation, opposition, integration; The Law of Requisite Variety, recursion and feedback. As already mentioned, the principle of participation implies the involvement of all relevant stakeholders in the processes of problem solving and strategic decision making, i.e. in the processes of identifying and choosing appropriate organizational policies, objectives and strategies. The principle of opposition includes identifying different, opposed perceptions of the researched problem situation, i.e. opposing the views and perceptions of the policy, the objectives and the strategies that a particular enterprise should be following. By the principle of integration, identified differences seek to be overcome and allow a certain adjustment of stakeholders' viewpoints, i.e. enable a synthesis.

Respecting The Law of Requisite Variety ensures the adequate processing of the complexity of the researched problem situation, i.e. enabling the balancing of the variety of organizations, management and the relevant environment. The principle of recursion suggests the process of unfolding complexity in the

given organization and of identifying the recursive levels. Finally, in enabling the efficient realization of objectives, the feedback control mechanism identifying deviations from the desired results and determining suitable corrective actions enhancing the creative management of problem situations in enterprises is of relevant importance.

Thus, SAST and OC can be combined in those situations in which the focus is on both the diversity of participants' views and efficiency and adaptability. Some of the application areas of combining SAST and OC are: the formulation and implementation of the strategy for information systems development (Clarke & Lehaney, 2000), the identification and implementation of the approach to redesign the organizational structure (Flood, 1995), knowledge management (Pollalis & Dimitrou, 2008) etc.

A POTENTIAL WAY OF COMBINING SAST METHODOLOGY AND ORGANIZATIONAL CYBERNETICS

In the combined use of the interpretive and functionalist systems approaches, one can observe that better results are achieved when the interpretative approach precedes the functionalist approach (Brown, Cooper & Pidd, 2006, 667). This means that the interpretative approach should be used to make sense of the researched problem situation and help to establish a proper context within which the functionalist approach will be used. Accordingly, and taking into account the key characteristics, the advantages and the limitations of the SAST methodology and OC, the following way of the combined use of these two approaches is identified in the paper.

Including various stakeholders' opinions and perceptions, i.e. identifying various strategic assumptions, throughout the process of a dialectical debate, the SAST methodology leads to the synthesis or adjustment of conflicting assumptions. This allows the defining of the strategy that the enterprise, faced with a certain problem situation, should follow. Relying on the identified strategy, through the Viable System model, OC will enable the efficiency and adaptability of the researched enterprises. In fact, if in the subsystem S_5 of the VSM, which represents the function responsible for the formulation of policies and strategies, the SAST methodology is applied, then it creates the basis for the combined use of these two approaches. In this way, some deficiencies of OC related to the inability to capture different aspects as well as the constraints of SAST concerning the structure and functioning of the company are removed.

A possible combined, i.e. synergistic use of these two approaches involves the following two key phases:

- identifying the objectives, i.e. strategies that the enterprise faced with a problem situation should follow, as well as the adequate levels of recursion, and
- designing the organizational structure and functioning that will enable the efficient achievement of the objectives, i.e. the efficient implementation of the defined strategy.

In this sense, the first phase implies the use of the SAST methodology through forming groups, assumption surfacing, a dialectical debate and a synthesis. The second phase involves the implementation of OC, i.e. the VSM, as a support to SAST in handling complexity. However, the SAST methodology, as a relevant soft systems approach, is used to provide a context within which OC, as a hard, i.e. functionalist systems approach, can be used. Given the fact that the first stage of the VSM application is the system identification, i.e. the identification of the purpose and objectives, and given the fact that the segment S_5 is actually responsible for the system identification, the combined use of these two methodologies can be represented in the conceptual framework of the VSM (Figure 1).

As one can see from Figure 1, in the segment S_5 of the VSM, the SAST methodology is first applied. When through the proper involvement of all the relevant stakeholders divided into different groups the formulation of the business strategy acceptable to the stakeholders and the one whose implementation will improve the functioning of the organization is enabled by a dialectical synthesis, then the diagnosis, i.e. determining the other relevant subsystems of the VSM, is carried out. The link between the S_5 and the S_4 subsystems is of relevant importance for the process of

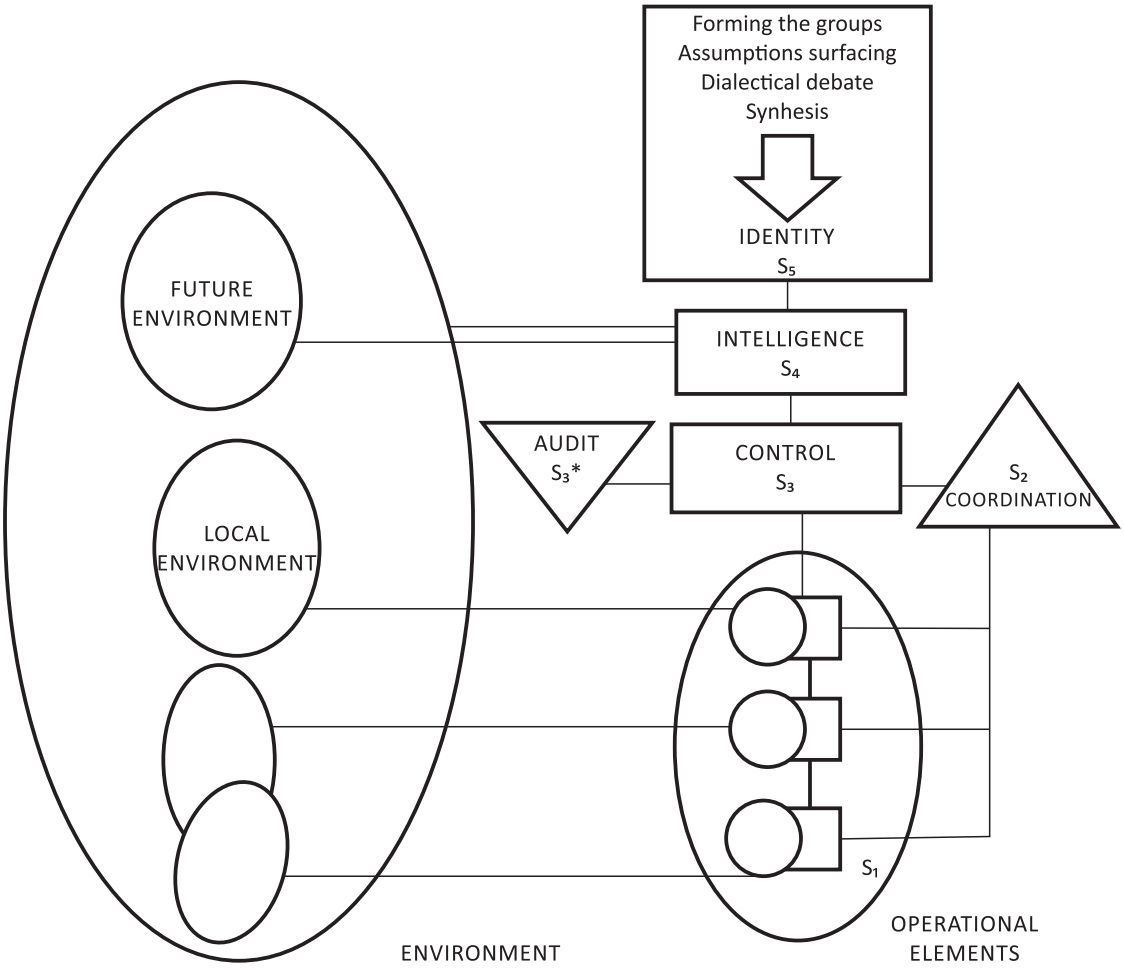

Figure 1 Combining the SAST methodology and OC in the conceptual framework of the VSM

Source: Author, adapted from Brocklesby & Cummings, 1996, 50

the business strategy formulation due to the fact that the S_4 subsystem collects relevant information about the threats and opportunities in the environment, as well as the strengths and weaknesses of the system.

When specifying the other VSM subsystems, it is, first of all, necessary that the operational elements that will enable the achievement of the identified objectives and strategies (the subsystem S_1), then the manner in which they need to be coordinated (the subsystem S_2) and controlled (the subsystem S_3) should be defined, and finally that different chances, threats, strengths and weaknesses of the given enterprise should be identified in implementing the defined strategy, i.e. in the realization of the defined objectives (the subsystem S_4). When all the activities of the SAST application have been performed, then appropriate recursive levels should be identified. To effectively implement the defined objectives, the strategies and/or the policy, it is necessary that the following should be determined:

- the system in focus - the recursion level 1 (for example, the enterprise as a whole)
- the suprasystem of the system in focus - the recursion level 0 (for example, the branch of the industry in which the company operates) and

- the operational elements of the system in focus - the recursion level 2 (for example, organizational divisions or parts).

The next step in the synergistic use of the SAST methodology and OC is to diagnose problems in the functioning of the researched enterprises, i.e. organizations. In fact, the current situation, namely the ability of the organization to implement its previously made decisions and achieve the defined objectives/ strategies is estimated. The given organization is compared with the VSM and possible deviations are determined. In this sense, S_1, S_2, S_3 and S_4 are carefully examined. The diagnosis of the subsystem S_1 is related to the existing operational elements of the system in focus, i.e. to the appropriate organizational units responsible for the achievement of the identified objectives/strategies. In this sense, it is estimated whether the specified organizational units are viable systems themselves. This is carried out by identifying their local management, environment, autonomy, and the corresponding limitations. In this way, a conclusion can be drawn with respect to the extent to which the operational elements absorb the complexity the given organization is being faced with.

The diagnosis of the subsystem S_2 implies identifying the mutual links between the organizational units within the enterprise, i.e. the way the functioning of the operational elements is coordinated. It is important to determine whether this segment really exists in the given organization according to the concept of the VSM as well as whether there are proper procedures and coordination teams, and to determine how authority is applied, what the sources of disturbances and conflicts are etc. The function of control, i.e. the subsystem S_3, is diagnosed through: the identification of those carrying out control in the enterprise, the determination of the way the resources are allocated, the specifying of the level of autonomy, i.e. the freedom that the operational elements have, as well as determining whether this function is centralized or decentralized, bureaucratic or non-bureaucratic etc. Specifying the opportunities, threats, strengths and weaknesses of the researched enterprise is the basis for the diagnosis of the S_4 segment. Also, it is necessary to determine whether such a segment really exists in the enterprise, whether and how the collected pieces of information about the strengths, weaknesses, opportunities and threats are submitted to decision makers etc.

Since the combined use of SAST and OC involves the application of SAST in the S_5 segment, thus eliminating possible limitations related to the (non)involvement of all relevant stakeholders in the decision-making processes or those related to the inadequately formulated policy or strategy, the diagnosis of this segment was partially implemented in the first stage of combining SAST and OC. However, the diagnosis of this function can further be implemented in terms of determining the real involvement of the stakeholders in the policies and strategies formulation process, i.e. the assessments whether all relevant stakeholders are included in the process, whether the defined organizational culture supports the implementation of the defined policy, objectives and strategies, as well as the commitment of the stakeholders in the implementation of the chosen strategy.

The issues in functioning, revealed by the previously described process of diagnosis, need to be grouped, and a possible redesign of the organization should be made a proposal for, so that it could operate in accordance with the relevant cybernetic principles and laws. As in the case of an individual use of OC, the procedures of the operational elements and the procedures of the management functions are important.

AN EXAMPLE OF THE INTEGRATED APPLICATION OF THE SAST METHODOLOGY AND ORGANIZATIONAL CYBERNETICS IN THE ENTERPRISE

The way of combining SAST and OC described above can be illustrated by the following example of using the above approaches in the strategies formulation and implementation process in the chosen enterprise A, which sells vehicle spare parts (Zlatanović, 2015, 250-289).

First of all, in the context of a possible use of the SAST methodology in the enterprise, an interview with the top management was conducted in order to provide

information about what the problems the enterprise is facing due to the global economic crisis are. In this way, it was found that the economic crisis negatively affected the operations of the given enterprise, i.e. the enterprise was faced with the following problems: a loss of purchasing power, the financial problems of some customers (for example, a blocked account and the inability to settle obligations), a lack of new liquid customers, as well as the inability to renew the vehicle park. As a result, there is a decrease in the sales and a decrease in profitability. Thus, the first symptoms of the crisis were observed in the enterprise, but its survival is not threatened. In the given situation, the enterprise's management decided to expand its business and enter new business operations. With such a determined strategy, there was a disagreement primarily between the internal stakeholders. Namely, there were conflicting perceptions of the owners, the top management, and the other employees of the enterprise (for example, the top management and the middle management).

The described problem situation represents an ambiguous, i.e. pluralist problem situation, in which the SAST methodology can be applied. The interview with the top management of the researched enterprise, in addition to the information relevant for the formulation of the problem and the proposed solutions to the problem, enabled the identification of the key assumptions supportive of the proposed strategy for entering new business, as well as an alternative strategy. For example, one of the key assumptions on which the top management based the strategy for entering new businesses is that this would reduce the risk. Also, the management started from the assumption that this would increase demand for their commodities, which would lead to better business results and the like. An appropriate questionnaire was created, based on the collected data and respecting the key determination of the SAST methodology. In addition, the top management of the enterprise A provided the information about which enterprises are its relevant stakeholders, i.e. which enterprises are the most important customers, suppliers and competitors.

The questionnaire was first distributed to the employees of the enterprise A as its internal stakeholders, and then to the representatives of its external stakeholders, such as the representatives of the suppliers, i.e. the manufacturers, the representatives of the customers, the competitors, the financial institutions and the local authorities. The aim was to establish to which extent the respondents agreed with the determined strategy for entering new business and the assumptions supporting it, and/or the alternative strategy and the assumptions supporting it.

The empirical results obtained by using the appropriate statistical methods, such as the methods of the descriptive statistical analysis, testing the statistically significant differences between the means and the Hi square (χ^2) test, represent the basis for forming the groups and identifying the assumptions, as the initial stages of the application of the SAST methodology. Taking into account that different types of stakeholders are crucial for the given context, the link between the different types of the stakeholders and their (dis)agreement with the proposed strategy for entering new business may be established, and for this purpose, the results of the Hi square (χ^2) test can be used (Table 2). In this way, certain groups of the respondents can be distinguished according to the degree of the agreement with the determined strategy for entering new business (for example, the group For, the group Against and the group For and Against are singled out).

In the process of the stakeholder analysis, the results of testing the significance of the differences also indicate some statistically significant differences between the respondents depending on the level of education, the type of stakeholders etc. The results of descriptive statistics indicate the degree of the respondents' agreement with the defined assumptions, as well as the level of the importance and certainty of the assumptions. For example, the results of descriptive statistics showed that the majority of the respondents agreed with the assumption that the growth of demand leads to better business results (M = 4.45), whereas the respondents least agree with the assumption that entering new business reduces the risk (M = 3.38). Consequently, it can be concluded that one of the initial assumptions of the top management of the researched enterprise (the one saying that entering new business reduces the risk) is challenged, i.e. that the relevant stakeholders have different opinions.

Table 2 The results of the Hi square (χ^2) test

Stakeholders		(Dis)agreement with the proposed strategy			Total
		Group1	Group 2	Group 3	
Enterprise A	Total	16	4	0	20
	%	80,0%	20,0%	0,0%	100,0%
Representatives of the financial institutions	Total	0	0	4	4
	%	0,0%	0,0%	100,0%	100,0%
Representatives of the manufacturers	Total	14	1	12	27
	%	51,9%	3,7%	44,4%	100,0%
Representatives of the competition	Total	8	2	0	10
	%	80,0%	20,0%	0,0%	100,0%
Representatives of the customers	Total	8	3	2	13
	%	61,5%	23,1%	15,4%	100,0%
Representatives of the local authorities	Total	1	2	0	3
		33,3%	66,7%	0,0%	100,0%
Total	Total	47	12	18	77
	%	61,0%	15,6%	23,4%	100,0%

χ^2=37,13, *p*=0,000; Group 1 - Group For entering new business; Group 2 - Group Against; Group 3 - Group For and Against

Source: Author

The alternative assumption with the highest mean is that entering new business involves the additional training of the employees (M = 4.23). In contrast to this, the alternative assumption with the lowest level of the respondents' agreement is that the costs of entering new business are higher than the expected revenues (M = 3.33). Therefore, the respondents regard the additional training of the employees as one of the key assumptions underpinning the alternative strategy. It can be assumed that this standpoint reflects resistance to change, but it can also be the consequence of the fact that the additional training of the employees requires additional financial recourses.

The identified differences are the basis for the phases of the debate and the synthesis, in which all the relevant stakeholders should be involved, with the researcher as a potential moderator. Due to the inability of the researcher to carry out these phases in real terms, the conclusions derived from a potential debate and synthesis were presented, respecting the given research results. The debate over the conflicting assumptions can be developed in different ways. For example, the assumption that entering new business will meet the different needs of customers and consumers and that this will lead to increased demand is based on the specific market information and the trends existing in the given field of business. The explanation of the given assumptions is reflected in the fact that the variety and the quality are more important to customers and consumers than the price is. Such reasoning and the assumption are supported by the long-term experience of the enterprise's management and the current trends in the given business area. This assumption can be rebutted by the fact that the market research did not equally include all the categories of customers. Since some categories of customers value the price more, it can challenge the prior explanation. Also, the experience of the management and the current trends are insufficient, because different social and structural changes require continuous monitoring and market research. The other assumptions may be criticized in a similar manner.

Nevertheless, despite the conflicting assumptions, and taking into account that the given research indicated

the existence of the group supporting both the strategy for entering new business and the alternative one (Group For and Against), one can conclude that a synthesis between the initially conflicting assumptions can be achieved, which in turn means that the strategy for entering new business, together with some aspects of the alternative strategy, can be applied to the selected enterprise A.

According to the above-mentioned, OC can be applied as a support to the SAST methodology in implementing the defined strategies. Respectively, the enterprise can be explored in the conceptual framework of the VSM, which would identify the problems in the structure and functioning of the enterprise. In this regard, in the process of the system identification, as the system in focus, i.e. as the operational elements by which the enterprise strives to realize its mission, and which refers to the provision of the high-quality system of services related to the sale and maintenance of various categories of vehicles, the sector of parts selling and the sector of vehicle sale and repair, which can be further decomposed by different types of products (the subsystems of the system in focus), were singled out. By means of direct and feedback links, the enterprise is also connected with the automotive industry, which represents a system of a higher order, i.e. the relevant environment of the enterprise.

This refers to the enterprise characterized by the functional organizational structure, and the following problems have been identified in comparing it with the VSM: the inadequate coordination between the specified operational elements, centralized control, the insufficient development of the audit channels, the disintegrated function of intelligence, an inadequate corporate culture, a lack of the stakeholder involvement in the process of formulating objectives and policies etc.

In accordance with the identified problems, it can be concluded that the redesign of the researched enterprise implies respecting the cybernetic principles and laws in order to implement the defined purpose and strategy. This further involves the improvement of each one of the subsystems of the VSM, i.e. the functions of implementation, coordination, control, intelligence and identity, as well as the improvement of the information flows and the communication channels. Overall, the redesign of the researched enterprise means that the operational elements must be viable systems by themselves with all meta-systems functions.

Thus, the identification of the recursion levels, the diagnosis of the VSM functions and a possible redesign of the given enterprise shows the way how the defined strategy for entering new business can effectively be implemented by using suitable cybernetic instruments. In this way, communication and control can be improved, as well as the adaptability of the researched enterprise.

In addition, the information obtained by the possible application of the VSM can be included in the strategy formulation process. Specifically, apart from a possible combined application of the SAST methodology and OC, in which SAST is the dominant methodology, and OC is the supportive one, the exploration of the combined use of SAST and OC, where OC is the dominant methodology and the SAST methodology is the supportive one, is of relevant importance. In fact, the problems diagnosed by using the VSM can be the basis for formulating appropriate business strategies, as a response to the identified problems.

CRITICAL REVIEW

Conducting research in different perceptions, interests, value systems and goals of relevant stakeholders by applying the SAST methodology ensures effective dealing with the pluralistic aspects of the researched problem situation, i.e. the participants dimension. In contrast, through the VSM, OC contributes to the creation of an efficient and adaptable organization that will implement the previously agreed upon objectives and strategies of relevant stakeholders, i.e. addressing the system dimension more efficiently. In this way, the identified key weaknesses of the SAST methodology and OC will be overcome. Also, the following limitation of SAST will be removed by combining SAST and OC: SAST is focused on the process of problem solving and decision making, rather than on the implementation of the preliminarily identified

alternatives and solutions resulting from the process of dialectical synthesis. In fact, it is OC that will provide the creation of an organizational structure by which the pre-defined solutions will be implemented. Then, the critiques of the VSM referring to the fact that the VSM only allows a search for the alternative ways of achieving the defined objectives can be eliminated by its combined use with the SAST methodology.

However, some weaknesses of the SAST methodology and OC will not be removed by combining them with each other. These are the following limitations of the primary SAST methodology that will not be eliminated by using OC as the supportive methodology: in many situations, the causes and stimuli for the implementation of the dialectical process of problem solving, i.e. problem situation structuring, as well as the sources of alternative, conflicting solutions to problems cannot be clearly identified; there are no clear guidelines on how to come to a synthesis, and it is not certain, either, whether the entire process will result in a synthesis.

Also, there are some common limitations characterizing SAST and OC, related to the fact that neither SAST nor OC will produce good results in coercive problem situations. Namely, critics point out the fact that the implementation of the respective approaches will primarily be in the interest of those who have power since none of these methodologies are concerned with the issues of power, the ways it is distributed throughout an organization and the like. Consequently, it is very difficult to provide the genuine, authentic participation of all relevant stakeholders, and some questions are never asked and will not be examined. In fact, the issue of the real involvement of stakeholders and their commitment to the implementation of the formulated strategy will not be adequately treated with the combined use of SAST and OC. In this way, that neither the SAST methodology though identifying hidden assumptions nor OCwill help handle the different power relations that exist in an enterprise is confirmed.

In addition to the foregoing, there are also some philosophical, cognitive, cultural and practical limitations relevant for the combined use of the SAST methodology and OC (Mingers & Brocklesby, 1997; Mingers, 2001; Kotiadis & Mingers, 2006). Since it is a combination of the methodologies stemming from different paradigms, the especially important problem is the paradigm incommensurability, for which the following fact is the crucial one: „A group of scientists relying on a different paradigm sees different things when they look from the same point in the same direction" (Kuhn, 1962, according to Petrovic, 2004, 164). Then, a lack of competence in using both approaches represents an important cultural barrier. Different types of personalities will have different tendencies to use some approaches, and there will be some difficulties in shifting the paradigm, which presents the cognitive barriers to the combining of the given approaches. Finally, the following practical limitations may be emphasized: the combined use of SAST and OC requires more time; the characteristics of the observed problems indicate the greater effectiveness of the individual use of these methodologies; a lack of experience; a tendency to conservatism and the like.

CONCLUSION

Taking into account the identified constraints of the SAST methodology and OC, the possible way of the integrated use of these systems approaches, which includes the complete implementation of the SAST methodology in the subsystem S_5 of the VSM that defines the organizational identity is presented and illustrated in this paper. Since the system identification, i.e. the identification of the objectives to be pursued enables the identification of the different perceptions of relevant stakeholders by using the SAST methodology in the subsystem S_5, a further diagnosis of the enterprise, i.e. the organization in the conceptual framework of the VSM enables the identification of problems in the structure and function of the organization. It can be concluded that the synergistic use of the SAST methodology and OC eliminates some limitations of their individual use. Nevertheless, some deficiencies (such as managing coercive problem situations, as well as philosophical, cultural, cognitive and practical constraints) cannot be eliminated.

Despite these limitations, some possibilities and strengths of combining these systems methodologies

in managing problem situations in enterprises have been shown in this paper. In fact, the contribution of the presented research is reflected in the study of the important issues in contemporary systems science related to combining the systems methodologies from different paradigms. The identification of the methodologically appropriate combining of SAST and OC that can creatively improve the process of managing problem situations in enterprises may be emphasized as a genuine contribution.

In fact, the conducted research first enables the identification of the problem situations in the enterprises where better results are achieved by combining the SAST methodology and OC, rather than by having them individually used. In the methodological sense, the implications of the conducted research concern the precise sequence of the application of the appropriate tools, i.e. the methods of these methodologies in managing problem situations in enterprises. The practical implications of the presented research are reflected in highlighting the ways of how the instruments of the given systems methodologies can help managers holistically understand and improve the problem situations management process in modern enterprises. Therefore, the overall considerations as well as the above-mentioned research contributions lead to the conclusion that the key hypothesis in the paper is confirmed.

However, we should point out the following limitations of the research. First of all, in this paper, one of the possible ways of combining the SAST methodology and OC, in which the application of the SAST methodology has preceded the application of OC, is considered. Consequently, the combined use of the SAST methodology and OC, in which OC is dominant, and SAST is the supportive methodology, presents a relevant area for future research. In addition to this, allow us to emphasize the limitation related to the fact that the possibilities of combining SAST and OC with some emancipatory systems approaches, such as Critical Systems Heuristics and Team Syntegrity, are not researched in the paper. Thus, in the context of such constraints, their synergistic use with an emancipatory systems methodology in order to adequately research the issues related to the power relations and coercion in modern enterprises is of particular importance for future research.

REFERENCES

Ashby, W. R. (1966). *An Introduction to Cybernetics*. New York, NY: John Wiley and Sons, Inc.

Azadeh, A., Darivandi, K., & Fathi, E. (2012). Diagnosing, Simulating and Improving Business Process Using Cybernetic Laws and the Viable System Model: The Case of a Purchasing Process. *Systems Research and Behavioral Science, 29*(1), 66-86. doi: 10.1002/sres.1102

Beer, S. (1994a). *Brain of the Firm*. Chichester, UK: John Wiley and Sons.

Beer, S. (1994b). *Diagnosing the System for Organization.* Chichester, UK: John Wiley and Sons.

Beer, S. (1994c). *The Heart of Enterprise*. Chichester, US: John Wiley and Sons.

Brocklesby, J., & Cummings, S. (1996). Designing a Viable Organization Structure. *Long Range Planing, 29*(1), 49-57. doi:10.1016/0024-6301(95)00065-8

Brown, J., Cooper, C., & Pidd, M. (2006). A taxing problem: The complementary use of hard and soft OR in the public sector. *European Journal of Operational Research, 172*(2), 666-679. doi:10.1016/j.ejor.2004.10.016

Burell, G., & Morgan, G. (1979). *Sociological Paradigms and Organizational Analysis.* London, UK: Heinemann.

Carlson, P., & Davis, G. (1998). An investigation of media selection among directors and managers: From „self" to „other" orientation. *MIS Quarterly, 22*(3) 335-362. doi: 10.2307/249669

Clarke, S., & Lehaney, B. (2000). Mixing Methodologies for Information Systems Development and Strategy: A Higher Education Case Study. *The Journal of the Operational Research Society, 51*(5), 542-556. doi:10.1057/palgrave.jors.2600865

Elrod, R., & Moss, S. (1998). Adversarial Decision Making: Benefits or Losses. Omega - *International Journal for Managemet Science, 22*(3), 283-289. doi:10.1016/0305-0483(94)90041-8

Flood, R. L. (1995). *Solving Problem Solving - A Potent Force for Effective Management*. Chichester, UK: John Wiley and Sons.

Habermas, J. (1972). *Knowledge and Human Interests.* London, UK: Heinemann.

Howerstadt, P. (2010). The Viable System Model. In M. Reynolds, & S. Holwell (Eds.). *Systems Approaches to Managing Change: A Practical Guide* (pp. 191-242). London, UK: Springer.

Jackson, M. C. (1994). Critical Systems Thinking: Beyond the Fragments. *System Dynamics Review, 10*(2/3), 213-229. doi: 10.1002/sdr.4260100209

Jackson, M. C. (2001). Critical Systems Thinking and Practice. *European Journal of Operational Research, 128*(2), 233-244. doi:10.1016/S0377-2217(00)00067-9

Jackson, M. C. (2003). *Systems Thinking: Creative Holism for Managers.* New York, NY: John Wiley and Sons.

Jackson, M. C. (2010). Reflections on the development and contribution of critical systems thinking and practice. *Systems Research and Behavioral Science, 27*(2), 133-139. doi: 10.1002/sres.1020

Kotiadis, K., & Mingers, J. (2006). Combining PSMs with Hard OR Methods: The Philosophical and Practical Challenges. *The Journal of the Operational Research Society, 57*(7), 856-867. doi:10.1057/palgrave.jors.2602147

Kuhn, T. (1962). *The Structure of Scientific Revolutions.* The 2nd Edition. Chicago, US: The University of Chicago Press.

Markus, L. (1994). Electronic mail as the medium of managerial choice. *Organization Science, 5*(4), 502-527. doi: 10.1287/orsc.5.4.502

Mason, R., & Mitroff, I. (1981). *Challenging strategic planning assumptions*. New York, NY: John Wiley and Sons.

Mingers, J. (1997). Multiparadigm multimethodology. In J. Mingers, & A. Gill (Eds.). *Multimethodology: The Theory and Practice of Combining Management Science Methodologies* (pp. 1-20). Chichester, UK: John Wiley & Sons.

Mingers, J. (2001). Combining IS Research Methods: Towards a Pluralist Methodology. *Information Systems Research, 12*(3), 240-259.

Mingers, J., & Broclesby, J. (1997). Multimethodology: towards a framework for mixing methodologies. *Omega - International Journal for Management Science, 25*(5), 489-509. doi:10.1016/S0305-0483(97)00018-2

Mitroff, I. I., Emshoff, J. R., & Kilmann, R. H. (1979). Assumptional analysis: a methodology for strategic problem solving. *Management Science, 25*(6), 583-593. doi: 10.1287/mnsc. 24.1.44

Morgan, G. (1997). *Images of Organization.* London, UK: SAGE Publications.

Ngwenyama, O., & Lee, A. (1997). Communication richness in electronic mail: Critical social theory and the contextuality of meaning. *Management Information Systems Quarterly, 21*(2), 145-167. doi: 10.2307/249417

Ormerod, R. (1995). Putting Soft OR Methods to Work: Information Systems Strategy Development at Sainsbury's. *The Journal of the Operational Research Society, 46*(3), 277-293. doi: 10.2307/2584322

Pérez Ríos, J. (2010). Models of organizational cybernetics for diagnosis and design. *Kybernetes, 39*(9/10), 1529-1550. doi: 10.1108/03684921011081150

Petrović, S. P. (2004). Sistemski prilazi rešavanju praktičnih upravljačkih problema. *Ekonomski anali,* 160, 147-177.

Petrović, S. P. (2010). *Sistemsko mišljenje, Sistemske metodologije.* Kragujevac, Republika Srbija: Ekonomski fakultet Univerziteta u Kragujevcu.

Pollalisa, Y. A., & Dimitriou, N. K. (2008). Knowledge Management in Virtual Enterprises: A Systemic Multi-methodology Towards the Strategic Use of Information. *International Journal of Information Management, 28*(4), 305-321. doi:10.1016/j.ijinfomgt.2008.02.005

Schwaninger, M. (2000). Managing Complexity - The Path Toward Intelligent Organization. *Systemic Practice and Action Research, 13*(2), 207-241. doi: 10.1023/A:1009546721353

Schwaninger, M. (2006). Intelligent Organizations - *Powerful Models for Systemic Management.* Berlin, Germany: Springer.

Sillince, J., & Mouakket, S. (1997). Varieties of political process during systems development. *Information Systems Research, 8*(4), 368-397. doi: 10.1287/isre.8.4.368

Taylor, D., & Tashakkori, A. (1997). Towards an understanding of teachers' desire for participation in decision making. *Journal of School Leadership, 7*(1), 1-20.

Trauth, E., & O'Connor, B. (1991). A study of the interaction between information technology and society: An illustration of combined qualitative research methods. In H. E. Nissen, H. Klein, & R. Hirscheim (Eds.). *Information Systems Research: Contemporary Approaches and Emergent Traditions* (131-143). North Holland, Amsterdam.

Trauth, E., & Jessup, L. (2000). Understanding computer-mediated discussions: Positivist and interpretive analyses of group support system use. *Management Information Systems Quarterly, 24*(1), 43-79. doi: 10.2307/325097

Van der Veen, C. (2003, November). *Deciding on Wicked Strategy Problem*. Paper presented at the 23th SMS Annual International Conference, Baltimore, US.

Zexian, Y., & Xuhui, Y. (2010). A Revolution in the Field of Systems Thinking - A Review of Checkland's Systems Thinking. *Systems Research and Behavioral Science, 27*(2), 140-155. doi: 10.1002/sres.1021

Zlatanović, D. (2010). Strukturiranje upravljačkih problemskih situacija Metodologijom *soft* sistema. *Ekonomski horizonti, 12*(2), 95-112.

Zlatanović, D. (2015). *Metodološki aspekti kombinovanog korišćenja sistemskih metodologija u upravljanju problemskim situacijama poslovne ekonomije*. Neobjavljena doktorska disertacija, Kragujevac, Republika Srbija: Ekonomski fakultet Univerziteta u Kragujevcu.

Received on 10th March 2016,
after two revisions,
accepted for publication on 14th April 2016.
Published online on 25th April 2016.

Dejana Zlatanovic is an Assistant Professor, teaching the subjects of Economic Cybernetics, Management Science, and Critical Managing Problem Situations, at the Faculty of Economics, University of Kragujevac, Kragujevac, the Republic of Serbia, where she received her PhD degree. Her research interest is focused on the cybernetic approach to dealing with complex problems in enterprises, the holistic conceptualizing and creative managing of problem situations, systems methodologies for problem situations structuring.