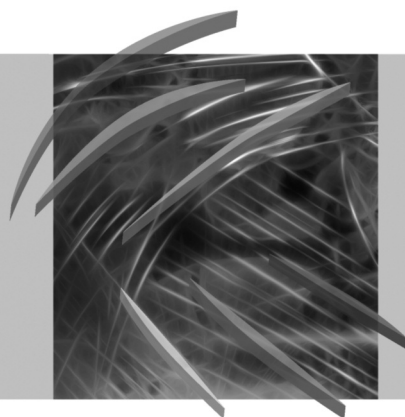


# **Advanced Information Technologies for Management – AITM 2011 Information Systems in Business**



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Wrocław 2011

**ISSN 1899-3192**

**ISBN 978-83-7695-178-2**

The original version: printed

Printing: Printing House TOTEM

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## **PREREQUISITES FOR BUSINESS ENVIRONMENT SCANNING IN VIRTUAL ORGANIZATIONS**

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**Abstract:** The use of modern technological solutions in the area of business environment scanning has become a necessity for contemporary organizations. As results from the theory of management, the organizations aim at creation of the structures which would allow them for adjustment to environment needs. Therefore, the emergence of organizations which flexibly manage their resources in order to maximally satisfy environment needs can be emphasized. The response to these problems is provided by the emergence of information technology solutions which allow for business environment scanning in order to detect the risk early and to provide opportunities which can be used by the organizations. One of such tools is intelligent multi-agent systems, discussed briefly by the authors of the present paper.

**Keywords:** virtual organization, model of multi-agent system, business environment scanning.

## **1. Introduction**

Business environment is one of the fundamental determinants which have impact on its operation and stimulate making permanent adjustments. It is generally accepted that what happens in the environment is more important to organization's operation compared to what happens inside it and the environment is the location of appearance of essential factors which impose certain limitations on the organization, thus affecting its future [Nizard 1998, p. 11].

Business environment represents a source of information which permanently generates signals and stimuli essential for the enterprise.

As a response to the evolutionary nature of the business environment, the organizations have been aiming for effective structures characterized by different degree of stability. An implication of evolution of organizations' operation is modern concepts of business management. The focus today has been on learning, agile, intelligent,

knowledge-based, network, fractal and virtual organizations [Najda-Janoszka 2010, pp. 35–41]. All these concepts of management are aimed at creation of the organization which would flexibly respond to turbulent environment. This necessitates the high flexibility of operation and having resources. In order for the organization to respond to these stimuli properly and on time, it must have and use appropriate methods of environment scanning.

The aim of the present paper is to emphasize the importance of business environment scanning to organization's operation and presentation of one of selected models of environment scanning, which authors deem the most beneficial to virtual organizations.

## 2. Reasons for business environment scanning

In the plethora of definitions [Bednarczyk 1996, p. 21; Jeżak 1999, p. 6; Wach 2003, p. 301] of business environment in the literature, the basic categories include typically:

- formal factors, which include in particular legal conditionings the organization must operate in [Majchrzak 2002, p. 10],
- institutional factors, connected with identification of groups of stakeholders and assessment of their operation and the scope of effect on the organization [Bielski 2002, p. 55],
- functional factors which include e.g. market and market changes, economics and economic changes (changes in the structure of the economy), political, social, demographic (ageing of societies) or cultural phenomena (changes in the systems of values, effect of fashion, etc.) (more information see: [Majchrzak 2002, p. 10]).

The association of an organization with the business environment represents a feedback. Therefore, changes in the environment and in an organization are a natural and permanent process. Consequently, it is important to identify changes in the environment through its constant observation and monitoring of its selected areas. This is supposed to make it possible for the organization to utilize changes in the environment as a chance for the development.

Recognition of an organization as an open system has caused the necessity of analysis of mutual effect of the organization on the environment and business environment on the organization [Kozuch 2007, p. 225]. Of the essential importance is the feedback between the organization and its environment.

The effect of the environment on contemporary organizations is increasingly strong. In virtual or network organizations, identification of all the impulses which are of special importance to achievement of the intended goals is essential. Cooperation of an organization with the environment can be defined as interactive with a restriction that not all the stimuli cause a response from both partners. Interdependence of both entities is a structure of relationships which are formed and improved.

The characteristics of business environment with the strongest effect include the uncertainty and dynamics of changes.

The uncertainty makes it difficult to plan and predict the effects of the activities. Uncertainty can be defined as a state when possible alternatives and the likelihood of occurrence in the future are unknown. Therefore, the uncertainty, contrary to risk, concerns changes which are difficult to be evaluated or events with the likelihood which, due to the insignificant amount of data available, cannot be evaluated. High dynamics of changes in business environment is defined as turbulent changes. R. Krupski [2005, p. 44] finds that the fundamental factors of the increasing turbulence in the environment are: innovations in science and technology, globalization and competition intensity. Therefore, the reply of the organizations to environmental turbulence should be an increase in flexibility of implementation processes and structures.

Technological advances in the field of information processing and communication have contributed to increased turbulence in the environment. A precondition for company's survival in the market is immediate response and flexibility of the processes which lies in adaptation to environmental variability. Adaptation to changes in business environment allows for using the market opportunities which arise and minimization of threats. Adaptive activities bear reference to current conditions, whereas adaptation of the enterprise to the expected conditions of business activities is defined as anticipation or creative dynamic adaptation (for more information see: [Jelonek 2007, pp. 239–245]). Development of information technology, especially in the domain of network and communication, stimulates globalization processes which force companies to employ advanced IT solutions. The globalization processes have caused intensified activity of all market participants and intensified business exchange that contributes to the establishment of virtual or network organizations, which makes it easy for them to respond to turbulent environment.

Contemporary enterprises, being participants in the game on electronic market, are facing the challenge of effective organization of business processes. The answer to this challenge is provided by virtual organizations for which concentration on the best possible use of available information is becoming a dominant strategy of management.

The organizations which function on the virtual market must change the principles of activity and their approach to asset management. Virtual organizations create specific principles of operation, which generate specific business processes, innovative methods of use of information, contact with customers, suppliers and even the employees.

Business environment in virtual organizations generates huge amount of data, but in order for them to become the information useful for the processes of decision-making, they must be suitably processed, analysed and made available in a form which is comprehensible for users. Meeting these conditions allows for limitation of



the ignorance of behaviour of the environment and reduction of the uncertainty in decision processes.

The organizations which operate on the Internet primarily offer exchange of their key competencies. The Internet allows them to find contractors and implement the process of exchange of key competencies [Perechuda 2000, p. 50].

The ability to identify opportunities or threats translates into the necessity of continuous observation of the environment and identification of signals which they send. Management in this variable environment is possible only if mutual interaction is continuously monitored.

In the virtual environment, the speed of changes is unimaginable. The customers are able to compare products and services according to different criteria as they have access to great deal of information. Availability of opinions about products and services makes it easier and faster to make purchasing decisions. Therefore, the organizations should constantly monitor both customer needs and activities undertaken by competitors.

Under such new conditions of operation of enterprises, it is purposeful and legitimate to fully utilize information technology in business environment scanning.

### **3. Nature of virtual organizations**

The answer to turbulent environment is provided by modern organizational forms. The theory of management today seems to focus more often on management of process, virtual, network, fractal or learning organizations. The emergence of these organizational forms is connected with both globalization of market processes and wide scope of opportunities opened up to the organizations as a result of spectacular development of information and communication technologies.

The concept of virtuality was initially related to specific technical and technological solutions such as artificial reality, machine or virtual memory. Driven by technological advances and even wider use of technology in organization, the adaptive opportunities in the organization have changed dramatically. The commercial use of the Internet has transformed the idea of marketing [Wuthrich, Philipp 1998] and the methods of communication with markets, whereas development of mobile technologies allowed for creation of flexible organizational structures.

Combination of the use of modern technology and communication solutions with modern business models has contributed to the appearance of the concept of the process of virtualization of organization, which included such stages as ([Moselein 2001], after [Najda-Janoszka 2010, pp. 41–44]):

- identification of key competencies in the organization,
- formation of new configuration of the processes around the defined core competencies,
- definition of value added for created network of relationships,
- reconfiguration of the organization.

Wide range of activities which might be taken throughout the process of virtualization of the organization contributes to the lack of unequivocal definition of virtual organization and its characteristics. In the theory of management, virtual organizations are analysed with two types of approach: narrow and broad.

According to the latter, virtual organization means a geographically decentralized organization which uses modern information technologies for internal communication [Appel, Behr 1998, p. 23]. This type of organization does not exist as a whole in a particular location. With broader approach, the virtual organization is perceived as a set of organizational elements which might include both enterprises and individual people, cooperating with each other in order to achieve a particular economic goal; after achievement of this goal, the organization might automatically cease to exist [Bultie, Wijk 1998, p. 8].

As results from the above, the model of virtual organization depends on a variety of parameters, whose importance and effect on final form of the organization result from the adopted business model.

M. Brzozowski [2005, pp. 154–155] identifies the following characteristics of a virtual organization cited by Polish managers:

- striving for the most comprehensive utilization of information technologies,
- high flexibility and speed of operation,
- focus on core competencies,
- opportunity to operate globally,
- product individualization,
- lack of limits, trust,
- great emphasis on knowledge management,
- cooperation between independent entities.

These characteristics of virtual organization perceived by the managers allow for the conclusion that the aspect which is gaining importance in the process of virtuality of Polish organizations is utilization of modern information technologies in order to ensure best possible communication, which allows for quick transfer of knowledge between the entities included in the organization.

A very important characteristic of virtual organizations is fuzzy identity which results from overlapping of organizational boundaries. Huge diversity and mobility of participants in virtual organizations make it impossible to unequivocally determine the limits of the organization. In consequence, it is a creation which is difficult to control and standardize. The fundamental problem of definition of the boundaries of virtual organization is not the communication and the scope of utilized technologies but making a closed economic account. The vagueness of the boundaries in virtual organizations multiplies the need for monitoring the stimuli which occur in the organization environment.

Proper identification of the needs of the environment allows for flexible organizational transformations and changes in competencies of individual elements of organization. External boundaries of the organization, more vague through concluding

new strategic alliances, create situations where the resources and competencies of the organization are used not only for its needs but in favour of its partners.

In the communicational aspect, permeability of external boundaries allows for uncomplicated interference between the organization and the environment, which is one of the conditions of the development of virtual organizations [Perechuda 2000, p. 81].

Although virtual organizations are viewed as one of the most flexible organizational forms, continuous business environment scanning is necessary in order for them to effectively respond to stimuli from the environment.

#### **4. Proposal model of multi-agent system of business environment scanning in virtual organization**

Virtualization of economic processes caused by the development of information and communication technology (ICT) has dynamically extended the traditional business environment with new informational space. The organizations can utilize new communication solutions and new methods of making transactions and distribution of goods in digital form. Conducting business activity necessitates familiarizing with new sectors, opportunities and customer needs which emerge in electronic space. Fast response to stimuli in business environment allows those who respond immediately to gain competitive edge (for more information see: [Jelonek 2003, 2004]). For tracking behavioural patterns of customers, competitors and potential business partners, abilities and involvement of managers are insufficient today. It has become necessary to use modern solutions of information technologies, e.g. program agents who can monitor the environment without direct intervention of human (for more information see: [Manvi, Venkataram 2004; Borkowska 2004, pp. 65–71; Jelonek 2006, pp. 47–56]).

To the program agents are attributed several properties which make them different from other types of software. The properties which are the most frequently listed in the subject literature include (see: [Manvi, Venkataram 2004; Borkowska 2004]):

- autonomy and independence, i.e. ability to undertake actions without direct user intervention,
- ability to communicate with different systems and other program agents,
- ability to cooperate, i.e. cooperation with users and a variety of systems and other program agents,
- adaptation to different needs,
- long period of activity of the system in the background,
- mobility, i.e. ability to move between different system platforms in the network,
- reactivity: quick response to changes in its environment,

- proactivity, orientation towards goals: rather than only responding to changes, it operates so that the set goals are achieved.

The above programs are also termed “intelligent agents” (see [Manvi, Venkataram 2004]). In this case, key characteristics include: abilities to learn and abilities to create interactions with users and other agents. The necessity of monitoring of activities in virtual organization and its environment caused that intelligent scanning systems have extended the scope of observations. The process of scanning should involve the organization’s interior and both virtual and traditional environment with their e-customers, current and potential e-competitors, e-suppliers or new entities to cooperate with.

Intelligent agent technologies are the best response to rapid increase in the amount of information available on the Internet. It is program agents which, based on the knowledge of activity profile or the organization’s specialization, will be able to filter the contents of the Internet and to provide the defined scope of information which will allow for suitable adaptation of the organization to the needs of the environment.

Another substantial argument for utilization of agent solutions in business environment scanning in virtual organizations is the fact that they exhibit self-learning ability. They allow for efficient communication between individual elements of the organization and its environment.

Multi-agent system of business environment scanning provides updated information about changes and impulses from the environment and the users can obtain advanced analyses and reports.

The information collected by multi-agent systems is sent and stored in databases or in knowledge bases and then it is processed by analytical and reasoning modules according to the criteria of analysis defined by the users.

The implementation of an interactive user interface allows for full cooperation of users with the system. These tools allow organizations for effective observation of evolution of the environment and identification of customer needs, which allows for making key market decisions.

The efforts are being made to extend these systems with macroenvironment scanning. Changes in legal regulations for business activities, new solutions of information and telecommunication technologies, events in the political environment and, first and foremost, wide scope of business environment represent informational challenge for business environment scanning in virtual organization.

## References

- Appel W., Behr R. (1998), Towards the theory of virtual organizations: A description of their formation and figure, *Newsletter*, No. 2, www.virtual-organization.net.
- Bednarczyk M. (1996), *Otoczenie i przedsiębiorczość w zarządzaniu strategicznym organizacją gospodarczą*, Zeszyty Naukowe, Seria specjalna: Monografie, nr 128, Wydawnictwo Akademii Ekonomicznej, Kraków.
- Bielski M. (2002), *Podstawy teorii organizacji i zarządzania*, C.H. Beck, Warszawa.
- Borkowska A. (2004), Inteligentni agenci w handlu elektronicznym, *e-Mentor*, Dwumiesięcznik wydawany przez Szkołę Główną Handlową w Warszawie, nr 5 (7).
- Brzozowski M. (2005), *Koncepcja organizacji wirtualnej i jej zastosowanie w działalności gospodarczej*, unpublished PhD thesis, Akademia Ekonomiczna, Poznań.
- Bultje R., Wijk J. (1998), Taxonomy of virtual organizations, based on definitions, characteristics and typology, *Newsletter*, No. 2, www.virtual-organization.net.
- Jelonek D. (2003), Przewaga konkurencyjna e-przedsiębiorstwa, *Ekonomika i Organizacja Przedsiębiorstw*, R. 54, nr 3, s. 26–38.
- Jelonek D. (2004), Wybrane źródła konkurencyjnej przewagi przedsiębiorstwa w przestrzeni internetowej, [in:] A. Nowicki, D. Jelonek, J. Goliński (Eds.), *Informatyka ekonomiczna. Aspekty naukowe i dydaktyczne*, Wydawnictwo Wydziału Zarządzania Politechniki Częstochowskiej, Częstochowa, pp. 91–96.
- Jelonek D. (2006), Monitorowanie otoczenia e-przedsiębiorstwa, *Roczniki Kolegium Analiz Ekonomicznych*, z. 16, SGH, Warszawa, pp. 47–56.
- Jelonek D. (2007), *Wykorzystanie systemów monitorowania otoczenia w dynamicznej adaptacji przedsiębiorstwa do otoczenia*, Prace Naukowe Akademii Ekonomicznej nr 1150, Informatyka Ekonomiczna 10, AE, Wrocław, pp. 239–245.
- Jeżak J. (1999), Strategie działania firmy, *Ekspert*, nr 3.
- Koźuch B. (2007), *Nauka o organizacji*, CeDeWu, Warszawa.
- Krupski R. (Ed.) (2005), *Zarządzanie przedsiębiorstwem w turbulentnym otoczeniu. Ku superelastycznej organizacji*, PWE, Warszawa.
- Majchrzak J. (2002), *Zarządzanie zmianami w przedsiębiorstwie*, Materiały dydaktyczne 118, Wydawnictwo Akademii Ekonomicznej, Poznań.
- Manvi S.S., Venkataram P. (2004), Applications of agent technology in communications: a review, *Computer Communications*, Vol. 27, No. 15, pp. 1493–1508.
- Moselein M.K. (2001), Die virtuelle Organization: Von der Idee zur Wettbewerbsstrategie, [in:] M. Rohde, M. Rittenbruch, V. Wulf (Eds.), *Auf dem Weg zur virtuellen Organization*, Physica-Verlag, Heidelberg.
- Najda-Janoszka M. (2010), *Organizacja wirtualna. Teoria i praktyka*, Difin, Warszawa.
- Nizard G. (1998), *Metamorfozy przedsiębiorstwa. Zarządzanie w zmiennym otoczeniu organizacji*, Wydawnictwo Naukowe PWN, Warszawa.
- Perechuda K. (2000), Organizacja wirtualna, [in:] K. Perechuda (Ed.), *Zarządzanie przedsiębiorstwem przyszłości. Koncepcje, modele, metody*, Agencja Wydawnicza Placet, Warszawa.
- Wach K. (2003), Identyfikacja otoczenia przedsiębiorstwa, *Zagadnienia Techniczno-Ekonomiczne, Kwartalnik AGH im. S. Staszica w Krakowie*, Tom 48, Zeszyt 1.
- Wuthrich H.A., Philipp A. (1998), Virtuelle Unternehmensnetzwerke, *IO Management*, Vol. 67, No. 11.

## PRZESŁANKI MONITOROWANIA OTOCZENIA DLA ORGANIZACJI WIRTUALNEJ

**Streszczenie:** Stosowanie nowoczesnych rozwiązań technologicznych w obszarze monitorowania otoczenia staje się dla współczesnych organizacji koniecznością. Jak wynika z teorii zarządzania, same organizacje dążą do tworzenia takich struktur, które pozwalają im na dostosowywanie się do potrzeb otoczenia. Toteż coraz częściej możemy mówić o organizacjach elastycznie zarządzających swoimi zasobami, tak aby maksymalizować zaspokajanie potrzeb otoczenia. Odpowiedzią na powyższe problemy organizacji jest powstawanie informatycznych rozwiązań, które umożliwiają monitorowanie otoczenia organizacji w celu wczesnego rozpoznawania ryzyka, ale również szans, z których organizacja może skorzystać. Jednym z takich narzędzi są inteligentne systemy wieloagentowe, których funkcjonowanie autorki pokrótce omówiły.