

THE CHAOS THEORY IN MANAGING AN INTERNATIONAL COMPANY; EXAMPLE OF PKN ORLEN

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Abstract: *In the article, the authors have made an attempt to apply the chaos theory in company management process. Basic conceptual categories in this field as well as changing context of the operations of companies in international aspect has been indicated.*

Theoretical analyses have been enriched with elements of an analysis of PKN ORLEN, international company.

It has been assumed that the chaos is a specific conceptual category and a positive phenomenon, desired and ensuring possibilities of flexible and creative operation for contemporary international companies.

Keywords: company management, chaos theory, IT revolution, technical progress.

JEL classification: M₁₅, M₁₆, O₃₃.

1. Introduction

In the contemporary world, internationalisation of economic phenomena reaches sufficiently considerable sizes to speak commonly about the progressing process of globalisation of economies of particular countries. This process is characterized by a constantly growing mobility of production factors, goods and services. The internationalisation of economic

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processes is accompanied also by technological revolution with fast spreading of innovations, as one of its aspect.

The basic signs of the growing internationalisation of the contemporary world economy, include expansion of international companies into new markets, however, search of formulas of thinking and action in a strategic aspect of innovative character requires application of more and more sophisticated tools and concepts, already based not only on relatively young field of science, namely the theory of games, but use sometimes of unconventional methods and concepts, which can allow achieving success on the market.

In the present study the authors make an attempt to indicate the extent to which the chaos theory (as a concept) may be a useful tool in the process of managing an international company, assuming that "the order arises from the chaos", as it was written by Anaximander of Miletus, an ancient philosopher. Thus, in the initial thesis it has been adopted that the chaos is regarded as a specific conceptual category and a positive phenomenon, desired and ensuring the possibilities of flexible and creative actions.

Certainly, adoption of such assumptions is limited by some conceptual frameworks that, when defined properly, create premises of the possibility to verify the initial concept.

2. Selected aspects related to international management problems

Depending on the author, various designations describing international companies can be found. Liberska, B. (2002) and World Investment Report¹ use the notion of transnational corporations, Głuchowski, J. (2001) and PWN Universal Encyclopedia (1996) use "international corporations", and according to Johansson, J. (1997), Kotabe, M. (1996), Koslow, L. (1999) and Asheghian, P. (1998) we are dealing with multinational corporations. Buckley, P. (1997) and Chaudhuri, S. (2001) define the entities in question as multinational companies, whereas Dunning, J. (1992), Jones, G. (1996) and Luo, Y. (1999) - as multinational enterprises.

¹ World Investment Report, Transnational Corporations and Export Competitiveness, UN, New York - Geneva 2002.

International corporations are not homogeneous structures. They differ in ways of expansion into new markets, forms of corporate structures' organization as well as types of competitive strategies. Apart from market magnates, we have family companies. The result of presence of extensive range of entities on the global market is difficulty in formulation of their commonly acceptable definition. KMN researchers focus mostly on emphasizing international scope of their operations. Managerial and control functions of the parent company are often mentioned, however, a precise determination of the required level of treasury shares in foreign branches is missing. Instead, "common strategy" of entities being parts of corporations is emphasized, which is difficult to verify in practice.






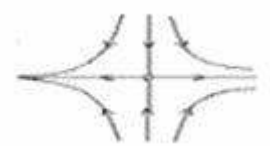
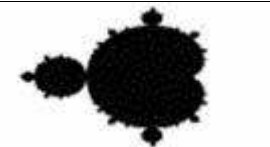
It seems, however, unquestionable that the main category related with the function of purposefulness of every company's operations is focus on development. Consequently, a basic question applies to searching for possibilities of development, both in terms of sources of funding, and, which seems to be a far difficult issue, selection of philosophy or concept whose assumptions would be consistent with the vision of the strategic development of the company. And just with regard to this latter issue, it can be ascertained that entering the stage of operations in an international aspect itself is insufficient and requires assuming the concept that will support this stage of development. Among many commonly already known management philosophies, thinking over the possibilities to apply the chaos theory seems interesting.

3. The chaos theory vs. management sciences

The phenomenon of chaos is used in the chaos theory, which is a universal approach to phenomena taking place in nature and society. Its broad scope of applications covers nearly all branches of science and their many fields (table 1). According to Tempczyk, M., it is a new, interesting and creative look at the dynamics of social matters and phenomena at particular levels of the organization, also at the level of social structures. According to him, this theory is a candidate for the paradigm of the whole science (Tempczyk, M., 1998).

Table 1

Forms of the chaos in theory

Types	Varieties	Sample graphic form
Single-dimensional mapping	linear in sections	
	logistic	
	other	
Two-dimensional mapping	standard	
	Smale's	
Bifurcations	logistic	
	Hopf's	
	branching	
	saddle-knot type	
Intermittences	type I	
	type II	
	type III	
Strange attractors	Lorentz's	
	Henon's	
	Rossler's	
Attractors (unstable)	"source"	
	"border cycle"	
	"saddle"	
	"strange attractor"	
Fractals	Mandelbrot set	
	Cantor set	
	Juli set	
Soliton	-	-

Source: Makowski, C., *Implikacje logistyczne teorii chaosu*, LogForum, No. 5/4/4/2000, p. 3

According to this theory, there are systems where simple causes lead to substantial behaviour irregularities, and these seem accidental. However, thorough analyses of such systems lead to detecting specified rules and regularities in them. To distinguish such irregular, but explicit phenomena from a complete disorder the notion of chaos (or deterministic chaos) is used. Thus, the chaos is not accidental. It is a hidden form of the order. Mechanism of creation and dynamics of chaotic systems is very submitted. *In statu nascendi* these systems are characterized by (Krupski, R., 2005):

- great sensitivity to initial conditions,
- rapid strengthening of the first deviations.

This phenomenon is jokingly called "the butterfly effect"(flutter of butterfly wings over Tokyo may cause a hurricane over Florida). At a large sensitivity of the systems to initial conditions and mechanism of great reinforcement of error at subsequent transformations, behaviour of the system becomes irregular. Often in such a system it is not possible to precisely determine (measure) the initial condition and a turbulence being observed seems quite accidental. Such a chaotic system, in which sensitivity to initial conditions is strongly interlaced with irregularity of the behaviour, though deterministic, is unpredictable at all or is hardly predictable. In the latter case the predictability of chaotic systems enables subtle behaviour patterns, called attractors.

An attractor is a distinguished condition of the system dynamics, to which the system elements move in a non-linear manner. It is a unique limit towards which non-linear dynamic system moves. In two-dimensional space, it is most often a limit point or cycle (closed loop). An attractor is often a fuzzy structure or with specified geometric and dynamic properties (it has e.g. fractal structure). A long-term dynamics of the system is governed by its attractors, and the attractor's shape determines the type of present dynamics. Thus, the order created by the attractor plays a fundamental part in the dynamics of non-linear systems, giving them a global structure. The shape of attractor can be often anticipated, as it is not disturbed by the butterfly effect. The butterfly effect causes only that the system moves in various ways towards the same attractor. The search for attractors in gathered empirically, but poorly theoretically identified sets of data is a difficult task, both in terms of their detection and quantitative description.

In comparison with well-structuralized methods of statistical tests, it is a very young field. However, such methodological approach gives new

epistemological possibilities. The chaos theory and the search for attractors give indirect possibilities of testing dynamic systems in relation to deterministic and statistical modelling. For example, in this latter case, information on courses of unit part system elements disappears.

The chaos theory distinguishes three basic paths leading to chaotic behaviour in the system. These are: bifurcation, intermittence and odd attractors. In non-linear dynamic systems, exceeding a given value, the so-called control parameter, results sometimes in a change in the manner of the system's operation. It is called bifurcation, and a point in which a change happens is called a bifurcation point. Intermittence is another way of manifestation of the chaotic system. The system behaves regularly up to some values of the control parameter. After exceeding this value a chaotic cycle appears, followed by the regular one, and so on, alternately. Along with the increase in values of the control parameter, the cycles of regularities become more and more shorter and in the end they completely disappear. Another manner of manifestation of chaos is the so-called odd attractor. It is a distinguished condition, towards which move all trajectories, in a non-linear manner. It has a complex fractal geometric and topological structure, interesting comprehensive properties and the order independent from the local impact of parts (Krupski, R., 2005).

The phenomenon of chaos occurs not only in nature and physics, but also in the market economy, affecting single companies and economies of the states. In today's conditions, at significant degree of complication of mutual relations and dependencies, each company bears higher risk of operation.

Factors that cause its growth include (Kotler, P., 2009):

- technical progress and IT revolution;
- critical technologies and innovations;
- emerging economies;
- hypercompetition;
- environment;
- increased customer power.

One of the most important driving forces of the contemporary globalisation is information technology (IT). IT revolution is probably the strongest factor affecting a new, global economy. Thanks to creating a network of relations between potentially all people and all economic entities - the Internet - customers from around the world can seek, assess, buy and sell at long distance. Purchases and sale do not have to be limited to the local area.

The Internet has led to trade transition and globalisation, creating new ways of entering into transactions, production organization, conducting marketing, recruiting staff and establishing contacts. New means of transfer have been created - e-mail, websites, instant messaging applications, chats, electronic bulletins, blogs, podcasts, Internet transmission - as well as a new worldwide system which makes it easy for people and economic entities to find counterparts with similar interests, in order to exchange information and cooperate.

Global IT revolution has been driven by an extraordinary decrease in the costs and rapid growth in processing power in more and more recent IT technologies - over the last 20 years, memory and calculation power doubled on average every six months. However, in the future, a driving force that will raise IT revolution even at a higher level, will be the so-called cloud processing (Kotler, P., 2009).

The term "cloud processing" refers to complicated infrastructure, embedded in the Internet, whose IT possibilities are offered as necessary. The user has access to computer services in the Internet "cloud" (but does not have to master or be expert at technology that enables it to the user).

As information technologies take over a global, Internet cloud, more and more data processing will proceed in centres available from any place on Earth. Information technology will become even more centralized. Digital technique which, thanks to a cloud, may arrive to each corner of economy and society, will give rise to some complex political problems and consolidate economic turbulences the companies will be undergoing. One trend is already emerging. Business must more and more remind technology - have more adaptation capacity, be more specialized and must plate easier in other fields. Supposedly there is nothing new about it; however, the cloud processing technology will lead to acceleration of this process.

Impact of services embedded in the network on macroeconomics will become sensible when, thanks to the cloud processing, small companies begin to compete efficiently with great ones. Emerging economies will be able to compete easier with the developed ones. Under the impact of these two factors, turbulences affecting companies of all sizes will intensify. Since the cloud processing has a global scope, political tensions related to supervision of this technology will appear. The cloud processing requires virtual computer systems and electronic services which will not encounter any obstacles in the form of state boundaries. Governments will most likely

defend themselves against further loss of the reign over the Internet, which, in turn, will inevitably lead to creation of subsequent turbulences and chaos among economic entities basing their IT strategies on the cloud processing technology (Kotler, P., 2009).

In this context, at a significant growth in the quantity of complicated information and, at the same time, necessary to be processed, the chaos seems to be a natural condition. However, under this option, one should seek features of structuralization and a special type of order and make attempts aiming at drawing constructive conclusions whose effect (not necessarily a butterfly one) would be decisions strengthening competitiveness of an organization in international business.

4. Application of the chaos theory in company management

Application of the chaos theory in practice is difficult, however, some ideas of descriptions of the structure and operation of the systems can be generalized, compared and adapted at a sufficiently high epistemological level. Assuming that from the presented fragments of the chaos theory, some elements are practically already in use, using other names, terms and categories, one has to think over elements which could possibly enrich the theory of organization and management.

Applicability of the chaos theory is noticed, perversely, in reverse and in translation of apparent defects into actual advantages. Stewart J. believes that there are many situations in which small changes in initial conditions, causing great changes in further behaviour of the system, may be beneficial. In addition, the chaos makes it easy to respond rapidly to an external stimulus, which may be of great importance in the theory and practice of control (Stewart, J., 1999). However, from the theory and practice of management it is known that every organization exists because it is an anti-chaotic system. Any negative disturbance does not cause snowballing reinforcement, but quite to the contrary, it is the most effectively suppressed in the negative feedback mechanism. Sometimes management is generally regarded as levelling of deviations (some assumptions of system school). However, the concept of favourable use of "butterfly effect" seems interesting. The management personnel should search for such subsystems in companies where beneficial effects may be generated, even in a short term. In the company, itself these can be e.g. motivation systems designed

so that even not very costly change would cause a disproportionately great increase in effects, generating sometimes synergistic effects. In marketing activities, e.g. through a right, not very expensive advertisement, a special product of the company may be created. Potential mechanisms of such systems are socio-psychological mechanisms (Krupski, R., 2005).

Applicability of the idea of the chaos theory can be examined also in the context of creativity of people in the organization, which is an important factor determining organizational flexibility. A classic organizational science avoids recognizing the chaos as a useful factor of creativity. It happens perhaps because the chaos receives only pejorative meaning. After all, the chaos may mean: open communication, partner cooperation, intentional network of interrelations, multiplicity of strengths (Müller, U. R., 2000).

Optimisation of processes and procedures is preceded by non-directed activities. Vagueness and chaos perform an important function: they enable alternative courses in chains of processes and their optimisation through selection. The course of searching is a course of mistakes and discoveries, alternating periods of the apparent peace and stabilization as well as times of the apparent chaos and rapid transformations. However, the scope of freedom of units can be neither too extensive, nor too narrow. Therefore, a question appears: how to determine relevant scopes of freedom. The purpose of the management is finding a relevant scope of freedom for each single part of a given management subsystem.

Finally, Müller U.R. formulates the following conclusion. "For management systems, the vagueness and the chaos mean vitality necessary for maintaining the existence. *Chaotics* of leading organization is determined by a degree of freedom of its communication and cooperation processes. The more free the management system, the more complicated the grid of its relations, the more complicated its communication and cooperation processes, the more complicated possible diagrams of operation and behaviour, and finally, the more creative the management system in a daily fight for staying alive" (Müller, U. R., 2000).

Applicability of the chaos theory in management can be examined also from the point of view of its most important categories.

The main category of the chaos theory is attractor. From the past considerations, it results that this is a unique manner of nature's reaction to variety, i.e. replicating of the same pattern in different scales and in various

processes. If small changes occurring in short time are only a replica of changes in longer periods, it may have a crucial meaning for forecasting, and thus strategic planning of conditions in the increasing environment turbulence. In the theory and practice of management, an attractor can be translated into specified, known courses of the trajectory of the systems behaviour, their ends and various balance points. Such attractors are thus commonly known:

- product life cycle;
- market life cycle;
- organizational (business) life cycle;
- sector life cycle;
- strategy life cycle.

Perhaps macrorends may also be considered as specific attractors in social anthropology: Toffler and Kondratiev waves. In economics this will be, for instance, dynamic points, balance of demand and supply, mechanism of levelling marginal profitability of goods.

Another distinguished category in the chaos theory is bifurcation. In bifurcation points the system acquires new characteristics, first of all, of qualitative nature. Marking out bifurcation points understood in this way, for instance, for the series of environment transformations (levels of turbulences) as presented by H.I. Ansoff: stability – reactivity – anticipation - exploration - creativity, or otherwise defined stages of changes in the environment, stages of the above cycles - may be significant for theory and practice of management. For a long time, in theory and practice of finance management, one has been determining such separating points, not only quantitatively expressed, but also qualitatively defined, of different conditions of the company, e.g. or the whole set of various indicators in the controlling system. These conditions are reflected in the adopted methods of management (Krupski, R., 2005).

The category of intermittence may also have a significant meaning when planning the company's operations in a turbulent environment, in investment decisions on the stock exchange, etc. The very fact of a possibility of having knowledge about periods where there are any regularities and about periods where these regularities cannot be identified, either in temporary or spatial sense, may have a fundamental meaning when analysing the future and when selecting forecasting methods.

A very interesting idea is maintaining the organization in a condition of permanent turbulence. According to Stewart J. it is easier to perform some movement, when you are in sleep mode. The economic practice provides many examples of organizational solutions and external activities of companies that can be qualified, by intuition, as companies more dynamic than others.

5. The possibilities of applying the chaos theory when managing international group PKN ORLEN

It may be ascertained that oil industry was born in Poland. In the period 1852-1853 two young Polish pharmacists, Ignacy Łukasiewicz and Jan Zeh, carried out research on liquid that was generating when thickening rock oil. Experiments with purified liquid, known later as light kerosene, indicated that it had powerful, clear light. On July 31st, 1853, in a Lvov hospital, for the first time in the world, oil lamps designed by Ignacy Łukasiewicz went on. This event is regarded as the beginning of the Polish and world oil industry. Ignacy Łukasiewicz kept on improving his invention and was the first to use crude oil, extracted in the region of Podkarpacie, on the industrial scale. In 1854, along with partners, he established the first oil company in the world, which began to extract and use oil in Bóbrka near Krosno, and in 1856, in Ulaszowice, he launched the first Polish oil distilling plant.

In May 1998, the Council of Ministers made a decision to create a national oil concern, by merging Centrala Produktów Naftowych CPN S.A. and Petrochemia Płock S.A. On September 7th, 1999 Polski Koncern Naftowy S.A. was formally established. The image of the oil concern being established required creation of a new brand. When creating the marketing name, the aim was to obtain the effect of association of the name with terms dominant in the image strategy of the concern: world, oil, modern and national. It was decided that the name should reflect: quality, strength, power, energy, characterize a producer from fuel and petrochemical industry and present technological and environmentally-friendly progress of the company as well as customer focus. As a result of research initiated at the end of 1999, from more than 1000 proposal of names, one was selected - ORLEN, which guaranteed desired associations, enabled simple interpretation and registration as trademark. The word ORLEN consists of the following elements EAGLE and ENERGY (Fig. 1).



Source: <http://www.orlen.pl/PL/> 20.09.2010

Fig. 1. PKN ORLEN logo

Apart from operations on the domestic market, PKN ORLEN is an international company having their subsidiaries in the Czech Republic, Lithuania and Germany. Since June 2004, under an agreement with the Fund of National Property of the Czech Republic, PKN ORLEN has become the major shareholder (63%) in the Czech holding Unipetrol a.s., involved in oil processing, fuel distribution and petrochemical production. Key holding companies are **Ceska Rafinerska** - the greatest oil processing plant in the Czech Republic, **Paramo** - the greatest Czech producer and supplier of, among others, car fuels, diesel fuels and industrial fuels, **Chemopetrol** - the main supplier of semi-finished products for the chemical industry and the pharmaceutical industry and plastics, **Benzina** - the greatest distributor and seller of fuel in the Czech Republic.

Since April 2009 the company PKN ORLEN has been holding also 100% of shares in ORLEN Lietuva (former AB Mazeikiu Nafta) - one of the largest companies in Lithuania. ORLEN Lietuva is the only refinery of oil processing in Baltic countries, having the dominant position on the markets in Lithuania, Latvia and Estonia. The company uses three main sales channels of fuel products, which are Lithuanian local market, land export to Latvia and the Ukraine as well as to Poland and Estonia, and sea export to Western Europe and the USA, with the use of Klaipėdos Nafta terminal.

ORLEN Deutschland, in which PKN ORLEN holds 100% of shares, conducts operations in the field of retail sale of fuel in Germany, within the

fuel network managed by this company, under STAR brand. At the end of 2008, the German company managed 400 own facilities, 77 factory stations, including 33 at supermarkets.

A strategic point of PKN ORLEN's operations is to satisfy the needs and expectations of clients with regard to the product quality. The primary objective and ambition is to maintain the position of quality leader on the Polish and international market. Particular attention is paid to strengthening trust of customers in the company, which guarantees top quality, environmentally friendly properties and punctuality of deliveries of produced and sold products. The above objectives and actions are implemented based on quality management systems, including quality of products intended for the army and NATO, environmental, occupational health & safety, food safety and information safety.

Possibilities of application of the chaos theory in PKN ORLEN may be verified through analysis of the following areas:

- critical technologies and innovations;
- environment;
- increased customer power;
- technical progress and IT revolution;
- competition.

The aim is to find signs of the chaos causing even small changes, which sometimes may become a source of significant transformations in the company.

Critical technologies and innovations

Large competition on the fuel market has forced PKN ORLEN to upgrade and continuously improve their plants and gas stations. To ensure the best fuel quality, the company has upgraded the production line, improved sales of products and services, in order to implement the Quality Management System PN-EN ISO 9001:2009. The company has managed to obtain also certificate according to the requirements of standard AQAP 2120 in the field of production and wholesales of motor fuel and aviation fuels, which has made it possible for the company to enlarge target markets. Additionally, it has raised prestige of the concern on the international market. The concern has expanded its operations also by entering markets of the neighbouring countries (Czech Republic, Lithuania, Germany).

Environment

New approach of the society to environment and ecology has induced many companies to undertake a number of activities in this field, and PKN ORLEN is not an exception. In order to meet the needs of consumers, it has introduced innovations aimed at achieving maximum possible ecological neutrality for direct environment with simultaneous minimization of the environmental impact. To confirm their activities, the company has managed to implement Environmental Management System, meeting standard PN – EN ISO 14001:2004. It has made it possible to increase trust of customers in products and the concern itself.

Increased customer power

Large competition on the fuel market has resulted in the fact that consumers, when selecting fuel, follow not only price, but also other considerations, such as:

- fuel quality;
- service quality;
- station availability;
- the possibility to make other additional purchases;
- the possibility to wash a car;
- the possibility to make pauses during travel, rest;
- the possibility to eat a hot meal.

To ensure the highest level of services on PKN ORLEN gas stations and in restaurants, the highest standards concerning sanitary regulations have been introduced. The above is confirmed by HACCP certificate, consistent with standard PN-EN ISO 22000:2006. It has made it possible to guarantee to the clients that the food products offered meet the requirements of new sanitary regulations, are safe for health and consistent with their expectations with regard to quality. It applies both to products in unit packages and hot meals served in restaurants. Additionally, it is a guarantee for the consumers that the food products offered are under constant control and must be of the highest quality.

Like in western concerns (e.g. BP – though now, in the wake of crisis on extracting platforms in the US, it may not be the best example), PKN ORLEN has introduced on their stations a loyalty program for regular customers and has taken care of complementary nature of the services provided

Technical progress and IT revolution

Continuous development of technique has forced PKN ORLEN to adjust to new trends in this area. The company has had to upgrade production lines, purchase new technologies, and implement new IT systems. However, the undertaken actions have improved production process and allowed increase in receipts. Additionally, actions in the area of IT have allowed presence of PKN ORLEN in the Web. It has helped the company in promotion of products and services. The concern has introduced the Information Safety Management System consistent with the requirements of standard PN-AND-07799-2:2005. It has made it possible to secure data of customers and contractors against unauthorized access, loss of confidentiality, theft or unauthorized modification, increasing their confidence in the company.

Competition

Along with a resilient development of the automotive market, petrochemical industry has been developing. Increasing demand for gasoline and diesel oil have resulted in creation of new refineries and increase in competition on the market. In the case of the Polish market, explicit competition in this area began after the fall of "Iron Curtain", when concerns such as BP, SHELL, CASTROL, TEXACO and others entered into our fuel market. Growing competition has made one care more and more for the quality of fuel and services provided. Polish refineries, including PKN ORLEN, have had to raise production standards, upgrade technologies and gas stations, to compete efficiently with strong competition. It has not been all when fighting for regular and new customers. The concern from Plock has began to develop and undertaken also expansions to neighbouring markets.

Employee motivation system

PKN ORLEN has several motivation programs for its employees and improves them on current basis. Everything is aimed at increasing efficiency of human capital and shareholder value added. Business benefits arising from implementation of motivation programs are much more long-term and reflect indirectly in the possibility of creation of market advantage.

In the analysis of the above areas, it can be noticed that dynamics or turbulence of changes occurring in them may sometimes even bear signs of the chaos. Growth in demand for fuel has resulted in increased competition

on this market. To remain in the game, grow and win new customers, fuel concerns have had to undergo a number of changes and PKN ORLEN is not an exception. Fast expansion of the concern has caused the need for adaptation to giant changes.

Assuming the possibility of analysis of different attractors, at the attempt of adaptation of these assumptions to the conditions present on the market, one can reflect on the processes of forecasting their dynamics of changes in the subsequent periods, adapting, at the same time, both particular component units of the capital group and aiming at greater coherence with trends present on the market. In consequence, the analysis of basic processes in short time periods may be reflected in setting strategic directions of actions.

In functional systems, referred to the area of marketing, human resource management, research and development, etc., the chaos theory at appropriate modification of organizational culture, may also constitute a starting point for conducting significant changes.

Similar consequences can take place in the case of right identification of the category related to the chaos theory, which is bifurcation. In the section of different activities and related routine, sometimes basic qualitative changes, of crucial nature, escape from the field of vision, though in the practice of current operations it is hardly noticeable.

And in consequence, intermittence, as a constituent part or even an indicator of strategic decisions, may be of critical importance, especially when it applies to a concern with so complex operations. The analysis of regularities (interferences) taking place on the market or knowledge about their temporary absence is often an indicator of strategic decisions.

6. Conclusions

The chaos is something desired, ensuring creativity for the company. A man, by nature, always demonstrated natural resistance against changes, regardless of their source. The 21st century reality does not beguile us: dynamics of any kind of processes will keep on intensifying. In this perspective, not only the mentality of people, but also of companies and people employed, should be directed towards the condition of permanent change.

Though nature of a man and systems, where a man operates (also, and maybe first of all, organizational systems) includes a sense of safety and related stability in the hierarchy of their needs, it can be perversely ascertained that this stability is restored by the chaos theory, whose assumptions make it possible to see in apparently unordered phenomena just a special type of order and interferences, between events and phenomena that need not have had to be noticed earlier.

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