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HOW TO COMPETE ON THE EDGE OF CHAOS. CREATING A SELF-RENEWAL LOOP

The emerging concept of long term competitive advantage is related to the understanding of the market and organization as a complex adaptive system. Using analogies from the complexity theory, it can be assumed that a truly successful company has to be able to compete on the edge of chaos. The concept of the Self-Renewal Loop may offer a structural framework as to how such an edge of the chaos state can be achieved. The Self-Renewal Loop is built through interactions between the constructive confrontation mechanism and learning process. These interactions are supported by the open information system and proper organizational culture.

INTRODUCTION

The behaviour of the modern markets is often described in terms of the theory of complex adaptive systems. The markets are referred to the concept of punctuating equilibriums, where short periods of dramatic changes separate long eras of stability. At the same time there are also attempts to describe the companies as complex systems. One of the most important implications of these ideas is that the modern organization, in order to successfully compete in the contemporary turbulent environment, also has to achieve an operational excellence and creative flexibility. These two, seemingly contradictory sets of skills are necessary to compete in periods of market stability and to manage during major changes. Also the complex systems theory points out that the systems which are able to sustain both its basic stability and at the same time ensure a certain level of chaos, are the most effective. Such a state is called the edge of chaos.

If modern organizations have to compete on the edge of chaos, than they have to learn how to balance its internal standardization and routine forces leading to operational effectiveness with the needs for informality and instability ensuring creativity and the ability to change. These two sets of skills, procedures and cultures usually have been treated both by researchers

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and practitioners as two extremes impossible to combine. However, as some recent research and the cases of several companies indicate, it is possible to combine them, creating truly long term successful companies (Collins, Porras, 1994; Bartlett, Ghoshal, 1994, 1995).

The purpose of this article is to propose an early framework on how the organization can stimulate the processes of self-renewal, while maintaining its high levels of operational effectiveness. This framework is called a Self-Renewal Loop, and is based on the organization's abilities to build the mechanism of constructive confrontation, and to install learning processes supported by an open information system and proper organizational culture. The paper first analyses the market and organization as a complex adaptive system. Secondly the challenge of combining operational effectiveness and self-renewal capabilities is discussed. Then the Self-Renewal Loop concept, as a framework attempting to meet this challenge, is introduced.

1. MARKET AND ORGANIZATION AS A COMPLEX ADAPTIVE SYSTEM

With the growing complexity and uncertainty of modern markets, the evolution of web-like structures and globalization, the market less and less fits concepts of diminishing returns and closed equilibrium systems. Recognizing the limitations of neoclassical microeconomics in defining the markets, many researchers and practitioners have been turning towards the theory of complexity, explaining the behaviour of modern markets as that of complex adaptive systems. Complex interrelations between numerous agents, positive feedback leading to increasing returns and non-linear changes often driven by path dependence are the attributes brought up most often (Durlauf, 1997; Krugman, 1996).

The market is, as in other complex adaptive systems, capable of creating a self-emerging order (Kauffman, 1995). This means that as the complexity – number of agents and interrelations between them – reaches a certain level, a step change in the market structures and processes occurs. A new level of order emerges. The system undergoes a dramatic transformation that leads to a new set-up in a fraction of the time of the gradual development that took place before. This leads to a very important element of the concept of the market as the complex adaptive system: that the market behaves as a punctuating equilibrium. The punctuating equilibrium, taken from the evolutionary sciences, describes the evolution (of species, technologies, markets) as the process that does not occur in a constant, gradual and stable form, but rather in short periods of violent evolutionary activity, divided by long periods of stable

and marginal development. The concept of evolution as punctuated equilibria had been developed by Eldridge and Gould (1972, 1977) as a paleobiologic concept explaining the violent emergence and then extinction of species in certain periods. It has been further developed by a number of scientists, with a strong reference to the complexity theory (Kauffman, 1995). If the market behaves as a complex system, it should also evolve not in a gradual and constant way, but in short periods of dramatic changes – punctuations, and long periods of stability – when the market is in its local equilibrium.

The concepts of how complex systems behave and evolve are also applied to organizational theories, especially concepts of organizational evolution. If any organization is a system of values, norms, systems, policies, and individuals and groups, then not surprisingly the potential numerous relationships between these agents can result in very complex structures and processes. The complexity theory offers ideas that seem to be very useful in describing these interactions. Similar to other complex systems, the evolution of organization might be described as a process of long periods of gradual changes with short intervals of fundamental shifts. As Greiner (1972, 1998) pointed out, each organization evolves through a number of different stages of development. The move from one to the next is usually not stable, but rather a very turbulent process.

The drivers for such punctuating equilibrium-like behaviour of the organization are two major types of powers influencing it – conservative and adaptive. On one hand, the organization is governed by the conservative tendency to standardize processes, to freeze the effective behaviour types, and, as a certain track record is accumulated, to create organizational blindness for external signals. On the other hand, there is an outside pressure to modify behaviour, that grows as the changes in environment become more significant. This external pressure often goes in line with some internal creative drive for the development and introduction of new approaches and solutions. Using another analogy to the complex systems theory these tendencies can respectively be called a stable and chaotic state of the system. The stable state results from the dominance of the conservative tendency, while the chaotic is generated by the adaptive one. The conservative tendency is a “natural” attribute of some complex systems where after a major change each next improvement yields smaller and smaller benefits. Unless they enter the supercritical – chaotic – state, when opposite to the law of diminishing returns, the changes are generating increasing positive feedback. Small variations generate bigger and bigger changes in the system.

Both the conservative and adaptive tendencies play an important role in any company. The conservative tendency allows a company to foster successful

practices and to explore the advantages of experience. The example of such a tendency is the learning curve. The conservative tendency leads to higher operational effectiveness and therefore improves a company's competitiveness. But this is only true in periods of stability – between the market punctuations. Once the market is shaken by major changes, the conservative tendency is not a valuable asset anymore, but more a barrier for change. This results from that fact that the organization, in order to compete effectively in new conditions and to adjust to the new environment, has to “unlearn” its previous skills and experiences and develop or acquire new ones.

The ability to abandon the behaviour or solutions that worked and have been acknowledged for years, which is extremely difficult, is what the adaptive tendency is supposed to achieve. The adaptive tendency may emerge as a result of new leadership, or major external market shock, but also may be rooted deeply in organizational values and habits. In fact a number of organizations consciously create the environment that stimulate creativity and innovativeness.

In the complexity theory the system achieves its highest level of effectiveness and fit when it is balanced between stability and chaos. Neither the stable nor chaotic state gives the optimum performance level (Beinhocker, 1997). What is necessary is the ability to function on the edge of chaos. The same seems to be true for business organizations. The truly successful company can not base its strategy only on exploring one of the two tendencies. Focusing on operational effectiveness may generate above average returns for a number of years, but may also stop the organization once the market changes. The adaptive tendency may generate top class solutions and not only follow but also anticipate the changes. However, without the ability to effectively implement and utilize such ideas, that company may not be able to fully explore the potential benefits. The organization has to combine both tendencies. The ability to function on the edge of chaos gives the company a potentially truly long term strategic advantage – the skill of competing on the market as a punctuating equilibrium (Beinhocker, 1997).

2. BUILDING THE ABILITY TO COMPETE ON THE EDGE OF CHAOS

However, a successful combination of the conservative and adaptive tendencies is actually very difficult to achieve. The conservative tendency is based on the principles of focusing on the core skills, exploring the current advantages and building top class skills around them. Operational effectiveness comes from freezing the high performing processes and then making

incremental improvements that allow it to remain competitive. The adaptive tendency calls for a certain degree of freedom, a high tolerance for mistakes and a readiness to experiment. It shies away from any formalistic procedures or policies. Both tendencies call for different sets of values, skills, procedures and systems.

However, although successful management of the two tendencies may be difficult, it is not impossible. Collins and Porras (1994) intensive analysis of a selected "visionary" companies – like 3M, Nordstrom, Wal-Mart, Hewlett-Packard and others – shows that it is possible to sustain high long term effectiveness levels and above average results while stimulating innovativeness and creativity. There are some other examples of companies that, with different levels of advancement and success, have tried to combine these tendencies. These companies vary across countries, industries and size. Among them are such widely discussed cases like Intel, Microsoft and Japanese corporations like Kao, Honda or Matsushita. Other companies are Walt Disney, Chaparral Steel and ABB.

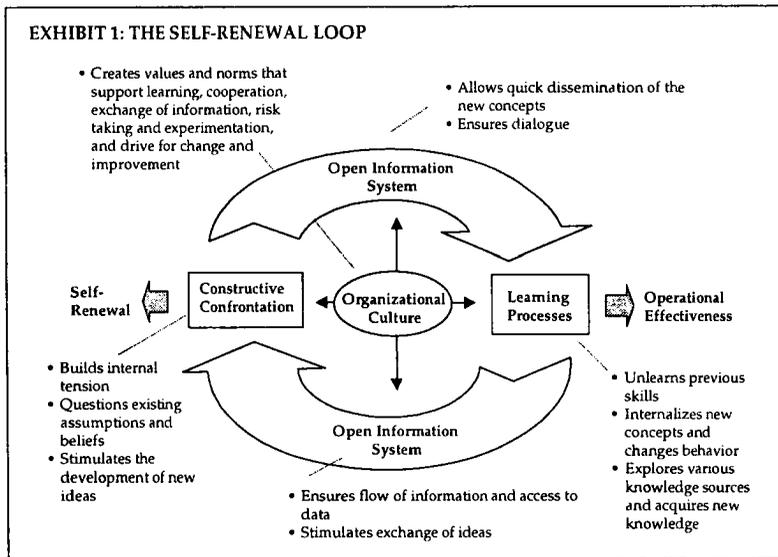
The important question here is whether there is a consistent set of principles and actions that allow these and some other companies to compete on the edge of chaos? The analysis of the actions undertaken by the companies mentioned above show that each of them put a different emphasis on different activities. However, these activities can be structured around one general framework – four building blocks – that explains how the conservative and adaptive tendencies in the organization can be combined.

The first step in defining such a framework is to understand what the combination of conservative and adaptive tendencies really means. The company competing on the edge of chaos has to constantly invest in its capabilities of self-renewal. It has to create a climate for the development of new ideas. It also has to be able to abandon previous approaches and to quickly and effectively change its behaviour. At the same time it has to have the skills of quick and efficient translation of new solutions into day-to-day practices in the whole organization. It has to be able to achieve a high level of effectiveness of these solutions in a short time. This means that it has to quickly achieve operational excellence in the areas that have just undergone major shifts. So the conservative tendency should actually support the creative one – it should allow quick implementation of new ideas, and lead to a high level of effectiveness before the need for the next change emerges. At the same time it is necessary to build into the conservative tendency a mechanism that would limit the negative trend of closing itself within the existing solutions.

However, to have these two sets of activities – one building the climate for self-renewal and innovativeness, the second stimulating the implementation

and quick improvements in the new solutions – working effectively over a longer period of time, it is necessary to ensure a constant flow of information, concepts and interactions between them. This means that not only the creative mechanisms fuel the ones leading to operational improvement, but also the later one supports the first. Without such a process each set of capabilities would quickly isolate each other, and as one would become stronger the organization would shift either into the stable or chaotic state. As Collins and Porras (1995) argued, it is crucial to create a set of strong underlying principles – core values – that would support the long-term survival of the company. Such a set of values is necessary to ensure that neither the conservative nor adaptive tendency would dominate an organization.

The useful framework that organizes all these requirements into one consistent structure, and therefore offers the managers a useful map guiding them through the various initiatives and actions that have to be undertaken is the Self-Renewal Loop (Exhibit 1).



Source: Author's own.

The Self-Renewal Loop is based on two key sets of activities. The first one is the mechanism of constructive confrontation. The constructive confrontation aims, via creating internal tension to question existing assumptions and beliefs and offers an atmosphere stimulating innovativeness and experimentation to foster the self-renewal capabilities of the organization. On the other hand, the second set of activities – the learning process – focuses more on gathering and

internalizing knowledge that leads to improvements in the operational effectiveness of the organization.

To have these two sets of activities leading towards the “on the edge of chaos” state, it is necessary to ensure constant interaction between the constructive confrontation and learning process. The ideas and concepts generated in the first have to be quickly disseminated in the entire organization and internalized by its members. It is simply crucial to have the changes in behaviour truly occurring. The effective combination of the learning process with the results of constructive confrontation also leads to a high level of effectiveness in operating the new concepts and solutions – so quickly achieving operational excellence. At the same time it is crucial to ensure a constant flow of knowledge acquired through the learning process into constructive confrontation processes. To achieve these objectives it is necessary to build one common information exchange platform, ensuring access to information and exchange of information. Such a platform can be called the open information system.

The Self-Renewal Loop – a constant development of different concepts and ideas, the quick internalization and application of them, and reinforcing the loop of knowledge fuelling the creativity and innovativeness activities – requires a certain set of values that would support its functioning. Without these values any declarations or procedures would soon be abandoned or limited in their impact. These values play an important role in creating a deeper basis for the long term existence of the constructive confrontation mechanism, the learning process and the open information system. The set of values, a new organizational culture, can be summarized in a few key points.

Firstly, the organization building the Self-Renewal Loop has to create a strong performance and improvement focus. These should be integrated with the willingness to take risk and accept mistakes as an inevitable, positive result of the experiments. The next set of values should refer to the willingness to share information, be open to new facts and cooperate with others. Such a culture considers change as a normal or even required feature of the life of the organization, and to make such change a positive experience the organization has to remain open, cooperative and willing to try.

3. THE MECHANISM OF CONSTRUCTIVE CONFRONTATION

If the self-renewal is supposed to take place in the organization, it has to create the ability to question current strategy and, going deeper, the beliefs and assumptions existing in the organization. This ability is a first step to change direction, introduce new solutions and alter behaviour. This has to be

combined with a constant flow of concepts and information – the organization has to create a hot-pot of ideas that would generate new solutions. At the same time, to make these new concepts true – to have them being implemented in the whole organization – the company has to be willing to take risk, experiment and make mistakes. These three abilities describe the principles of the constructive confrontation mechanism.

Questioning current assumptions about the market, competitors, beliefs regarding the sources of competitive advantages or the likely development of the industry play a crucial role in the self-transformation. Without that a new mission statement or strategy would be very difficult to implement. By changing the underlying assumptions, the basis for radical change can be created. The Intel Corporation is an often cited example of a company that constantly tries to redefine its view of the market. Actually, the term “constructive confrontation” has been used by Intel to express an aggressive, open and direct approach to cope with emerging problems. As CEO Andy Grove says (1996), “the management by paranoia – constantly assuming that tomorrow will require fundamentally different capabilities that have to be built today” – is the key of Intel’s success. The late 80’s example of the dramatic shift from the memory business to processors is probably the most profound illustration.

Constructive confrontation does not necessarily mean a major shift of the business the company is in, the technologies applied or the systems used. Questioning the assumptions may also refer to the understanding of the customer needs, product economics or effectiveness of the distribution channels. The internal mechanism stimulating people to constantly re-evaluate their actions has an impact both on major moves and small decisions.

The constructive confrontation in order to be truly “constructive”, has not only to question what exists, but actually offer new solutions. The questioning has to be fact based and followed by at least general ideas of what and how can be changed. To have this flow of new ideas, the company should aim to ensure the free and easy flow of concepts and information. Nonaka (1988) calls such a system an information chaos. Companies like NEC, Honda or Kao, from a large amount of often overlapping information extracted from numerous sources and being accessed by many employees are able to generate a lot of different improvement and change ideas. Without such a hot-pot of ideas – supported by the open information system – achieving *constructive* confrontation would be very difficult.

Once the current approach has been undermined and the new solution outlined, it is necessary to test it in practice. Experimentation is crucial here, since it sets an example and proves that new ideas may work. However, testing

often means taking very significant risk. Testing also implies failure, since not all ideas are going to work, and some would require iterations of changes and improvement. Therefore, to have experimentation taking place in a more common scale calls for the organizational culture to value taking risk, showing initiative, rewarding for trying and making positive mistakes. This has to be further supported by certain organizational, motivational and systems solutions fostering the “try it” approach.

Creating constructive confrontation mechanisms is not easy. There are a number of different barriers, including a need to change the mental models and overcome defensive reasoning (Argyris, 1977, 1986). There are a number of different actions that may stimulate the evolution of the constructive confrontation mechanism and foster its functioning. At least five important of which can be mentioned: (1) strategic inspiration, (2) organizational, systems and technological changes, (3) teamwork, (4) experimenting, and (5) changes in organizational values. The last one, already highlighted above, is a part of the more overall issue of the organizational culture as the fundament of the Self-Renewal Loop.

Strategic inspiration plays a vital role in stimulating people’s innovativeness, opening discussions and helping to break internal inertia. Strategic inspiration may be an aggressive vision or goals set by the management. Such goals often lead to the perception gap between current practices and envisioned end game state and lead to creative tension (Senge, 1990). Collins and Porras (1995) stress visionary companies. Boeing is an example of a company, which through its extremely challenging product development goals – like flying fortresses B-17, first jet passenger plane B-707 or the jumbo-jet B-747 – has been advancing not only in technological terms, but also market and financial performance. Setting ambitious goals has to be combined with setting an example by the management. The managers themselves must question the strategies that were developed by themselves. What is even more important, they themselves have to be opened to criticism and ready to change their own beliefs if faced with new findings and conclusions.

The external and internal changes in technology, reorganizations and changes in systems – like incentives system – may create a strong push to generate new ideas. The Polish company ABB Zamech – the ABB subsidiary manufacturing turbines – in order to sustain innovativeness and readiness to change is constantly redesigning its organizational structure. These changes, which are followed by decentralization and moving accountability lower down the organization, resulted in very good financial results and the introduction of a number of new business areas. Job rotation programs, incentive systems

strongly rewarding personal initiative and punishing unwillingness to change or the introduction of new technology offer opportunities and incentives to develop new insights. Also the next driver, the teamwork, plays an important role here. Project teams do not only create an atmosphere for the exchange of ideas and creative brain storming, but also may act as small testing laboratories.

The fourth driver – experimentation – has been successfully implemented by a number of companies. Wal-Mart is intensively investing in experiments of a different scale – daily it runs 250 tests in its outlets. Japanese companies put a strong emphasis on experimentation, especially in the early phases of the product development process. This may take the form of large scale projects and small initiatives. What is important here is that the new ideas are being tried and tested early on. The organization does not wait until all the details are solved, but tries even interim solutions to get the results and answers quickly. This also has an important motivational role, the employees – authors of the innovations – can quickly see them being implemented.

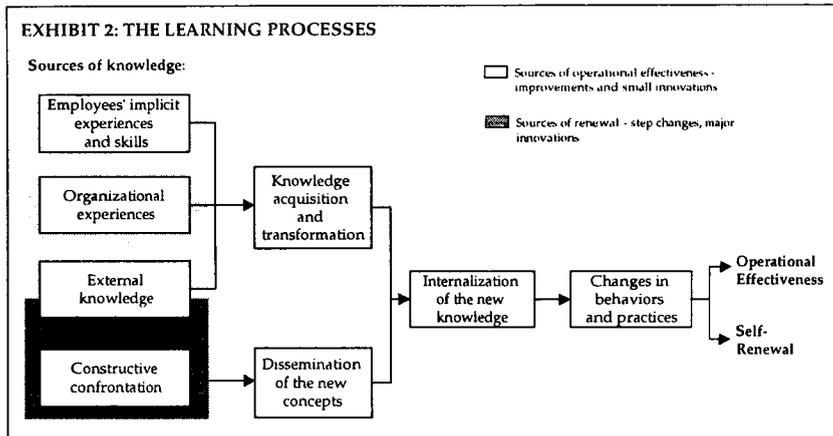
4. THE LEARNING PROCESS, OPEN INFORMATION SYSTEM AND CULTURE

The second important building block of the Self-Renewal Loop are the learning processes. The ability to develop new ideas has to be related to the capabilities of unlearning old skills and the fast and effective implementation of the new ideas. Through the learning process the organization may strive to achieve operational effectiveness while constantly trying to reinvent itself. It can achieve the state “on the edge of chaos”.

The issues of organizational learning and learning of individuals in business setting has been widely discussed, especially with the recent popularity of the Learning Organization concepts. Several different definitions of knowledge, concepts of the knowledge creation processes and learning processes have been developed. Some of them focus on aspects of individual learning and barriers to generate learning in organizations, others on the way of acquiring and disseminating knowledge in organizations. The important issues that emerge from these discussions are: (1) what are the key sources of knowledge in organizations, (2) how the knowledge can be acquired and disseminated in the organization, and (3) how the acquired knowledge can be internalized by the members of the organization and so alter their behaviour?

At least four general sources of knowledge in the organization can be defined. The first one comes from constructive confrontation. This is the stream of new concepts and ideas developed internally. The second source is

the outside world – the competitors, suppliers, customers or academic world. Another source of new knowledge would be the organizational experiences – a set of learnings coming from past projects and initiatives. The last source are the implicit experiences and skills of individual members of the organization. The latter two sources are mainly the basis for operational improvements in the organization (Exhibit 2).



Source: Author's own.

The individual and organizational experiences – translated into procedures, training manuals and new policies, and then implemented – result in raising the performance of the whole organization up to the local best practices. Also learning from outside – like benchmarking – may lead to operational effectiveness. On the other hand, the ideas generated by the constructive confrontation and acquired from the outside environment are important sources of self-renewal.

Depending on the different sources of knowledge, the learning processes focus either on knowledge acquisition and transformation or on the dissemination of the new concepts. Knowledge acquisition and transformation is especially important in the case of implicit individual experience. As Nonaka and Takeuchi (1995) have stressed, the key challenge here is to translate the implicit experiences into the tacit knowledge that can be easily communicated and understood by the other members of the organization. The organization faces a similar challenge with external knowledge, which has to be understood and translated into the language used in the organization. With the new concepts developed in the process of constructive confrontation, it is

crucial to disseminate them in the whole organization, gain understanding and commitment. The open information systems play a vital role in supporting all these processes.

The open information system is, first of all, based on a very different understanding of the role of information in the organization. From considering it as a source of power and a scarce resource that should be guarded and to which access should be limited to information as a shared resource, a source of competitive advantage only if widely used. From an attitude of hiding information towards openness, understanding of mutual information dependencies and willingness to share. This requires a major shift in organizational values – the creation of a new information culture.

The new attitude towards information combined with certain tools should support the interaction between constructive confrontation and the learning process. On one hand, it should give easy access to a lot of data and information. It should also allow the easy exchange of information. This can be provided by the effective use of modern information technology. However, even the most advanced usage of IT is not sufficient to exchange sophisticated knowledge, to build understanding and commitment to new ideas and to support truly effective internalization process. This requires the support of the second major tool of the open information system – direct communication.

Direct communication – face-to-face – is crucial to ensure a true dialogue between organizational members. Dialogue leads to understanding, and the development of close relationships (Senge, 1990; Bohm, 1991). This is important when diffusing new concepts and ideas. Without direct communication it would be difficult not only to develop, but share and implement them. Direct communication – through formal cross-functional meetings, informal gatherings in the cafeteria, one-to-one discussions or longer-term teamwork – is therefore an important platform supporting self-renewal.

The Japanese Kao Corporation may be used as an example of a company that invests both in information technology and direct communication. The company had invested in a sophisticated computer system, creating easy access to numerous databases and discussion platforms. At the same time intensive meetings, conferences and training schemes allowed people from different units and countries to share experiences and discuss ideas.

The last element of the Self-Renewal Loop supports the other three. This is the proper organizational culture. This supports the mechanism of constructive confrontation through the already mentioned values of personal initiative, risk taking, “try it” attitude and acceptance of mistakes. The learning process has to be supported by a climate of openness, and eagerness to constantly learn and

share knowledge. This is connected with the implicit assumption that there is always room for improvement and change. The assumption that nothing – except these basic values – is infinite and “sacred” – is also an important fundament of constructive confrontation. To have an open information system in place, the organization has to create a new information culture. Such a culture, as described before, is based on the willingness to exchange information and the understanding of mutual information dependencies (Exhibit 3).

From...	To...
Business Principles	
<ul style="list-style-type: none"> • Focus on core skills • Standardize and optimize to improve efficiency • Constantly improve performance 	<ul style="list-style-type: none"> • Focus on skills that are crucial for success, but that are not indefinite or the only right ones • Apply ideas quickly to grab the benefits before the next change occurs • Constantly improve end results
Information Culture	
<ul style="list-style-type: none"> • Information as the source of power and scarce resource that had to be tightly controlled • Everyone should get filtered information tailored to his/her duties to maintain focus and reduce information overload • 'I need information that they do not deliver' 	<ul style="list-style-type: none"> • Information is a common asset that generates real results only when widely shared • Everyone should have access to a wide scope of data and pick what is interesting or necessary • 'We are mutually dependent on information and have to communicate openly'
Risk and Experimenting	
<ul style="list-style-type: none"> • Risk averseness • Deliver success and do not make mistakes • Implement once all the details have been finalized 	<ul style="list-style-type: none"> • Risk acceptance and risk taking • Constructive mistakes are natural and normal • Test and try attitude, implement quickly

Source: Author's own.

Such an organizational culture may look fairly idealistic, but can be achieved. Of course there are always going to be problems in communication between different organizational units. Managers will always be reluctant to acknowledge their own mistakes. The temptation to withhold information or to assume that *we* know better will persist. However, all this behaviour may be limited and overcome by positive tendencies.

An interesting example is Famak, a Polish manufacturer of reloading machinery. The company faced a major recession of its market in the beginning of the 90s, after the collapse of the Soviet Union and the overall recession in Poland. To increase competitiveness and survive the recession, the management introduced a program called 5-C: Customer-Costs-Creativity-Communication-Culture. This program actually has been building each element of the Self-Renewal Loop. Changes in organizational culture played an important role. From being former socialist state-owned company, Famak

had to turn towards being a modern, performance-focused company. The new culture put a very strong focus on building close relationships between employees, formal and informal cooperation, openness and an eagerness to help. A climate supporting initiative and innovativeness was introduced. The process of building such dramatically different values was long and is not yet finished, but as a result Famak was able to create a strong foundation for constructive confrontation, learning and open communication.

5. CONCLUSION

Modern companies should aspire to create the ability to compete on the edge of chaos. Although the combination of conservative and adaptive tendencies is not easy, it can be achieved. The Self-Renewal Loop may work as a useful general framework, guiding the managers towards the edge of chaos state. This is a framework that builds heavily on the concepts of self-renewal, organizational learning, knowledge management and organizational culture. As such, it is based on a number of familiar and tested ideas. The key challenge here is to make sure that interaction between constructive confrontation and learning process, supported by the open information system and organizational culture can be effectively achieved. Although examples of both large western corporations and smaller companies from developing countries like Poland indicate that this can be done, there is still a need for further research to verify this concept.

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