

The background of the image is a futuristic, multi-level office building. The structure is composed of a complex, white, lattice-like framework that forms a series of interconnected, curved levels. The building is lit with a cool blue light, and several windows are visible, some of which are illuminated from within. In the foreground, several bright orange chairs are arranged in a row, facing towards the building. The overall aesthetic is clean, modern, and high-tech.

Alexander Blinkov

# REINVENTION OF BUSINESSES

*Natural Intelligence Technology*

**Alexander Blinkov**  
**Reinvention of businesses.**  
**Natural Intelligence technology**

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**Аннотация**

The book is about the qualitative transformation of business in its crisis situations. Today, the world is amazed by the creative possibilities of generative neural networks. This book is about what is still the prerogative of human thinking. An out-of-the-box approach that can help businessmen and managers better adapt to the turbulence of today's world. Contains more than 100 explanatory diagrams, a large number of practical examples, ready-made methods for application.

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# **Reinvention of businesses Natural Intelligence technology**

**Alexander Blinkov**

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# Author's foreword

Today, the world is experiencing the advent of artificial intelligence, surprised by the creative possibilities of generative neural networks. The success of AI at the present time actually demonstrates how little true ingenuity and quick wits are involved in our lives. This book is just about what is still a human prerogative.

First of all, I want to express my gratitude to Kirill Vladimirovich Zbykovskiy, corporate manager, associate professor of the university and my old friend. Thanks to him, there was an opportunity to put my thoughts in order, summarize them with personal experience and jointly hone the result in the form of a course «Transformation of business models» for the university master's degree.

My first book was called «The ultimate problems solving. Non-standard thinking and behavior», was published in a limited edition back in 1994. As it turned out, her material was widely distributed in the bases of student abstracts, as a rule, without indicating the source.

Terribly long ago, in the memorable nineties of the last century, it seemed to me that I was forever closing the page of life connected with scientific interests. There is a huge gap between the first book and the one that you see in front of you, almost 30 years. During these years, the author seemed

to have had to go far from the scientific questions that interested him at that time. But it turned out that not so far. Business, entrepreneurial activity, in which I had to immerse myself with my head, gave many reasons again and again to return my thoughts to theories, it would seem, left forever – apparently, there are no former physicists. Thirty years were devoted to the development of a modest regional computer firm. Now it is one of the largest players in the market of IT solutions for business in the country. During this time, I managed to fruitfully work out almost all business functions: the development of wholesale and retail trade, the development of a partner and branch network, the creation and promotion of software products, economics and budgeting, work as a director of a company and participation in the board of directors of a corporation.

I hope that my experience, supported by a scientific view, will be interesting.

Who will be interested? Difficult question. I'm afraid entrepreneurs who ride the wave of success don't need advice. And usually business people are not at all inclined to theorizing. And the language of the old school is unlikely to be close to them. I think, definitely, this is a book, as they say, for an amateur. And I hope she gets one.

Readers from the category of managers and entrepreneurs will be able, with the help of the material in this book, to systematize much that their own experience has taught, as well as to supplement the knowledge that they have gathered

in the system of business education. As a maximum, discover new approaches to solving your problems.

Alexander Blinkov

# Introduction

What is business? This is work, life, drive, struggle at the same time... And it is not always a struggle with a victorious outcome. This is a lot of everyday issues, big and small problems that need to be overcome. Race against competitors. Finding solutions under pressure, lack of resources and uncertainty. The world, including the business world, is full of surprises.

Everyone will agree that business is not an easy task, it is a difficult task. It's a minefield path from survival to prosperity. It's worse if it's the other way around.

Business is a game. Which has its own rules, and its unforeseen twists and turns. Someone in this game is lucky, but someone is bad if we are not.

How do we play this «game»?

Experience is «the son of difficult mistakes.» Its result is a certain «correct» course of action. Debugged, proven, calculated – protecting against failures. A routine, a habit of doing just that, a generally accepted state of affairs. As a rule, we act (sorry for the pun) according to some rules, patterns, or, as patterns of behavior are also called, patterns. Whether or not we are aware of their presence. Many patterns of behavior we absorb subconsciously in childhood from adults, others we receive during training, others we adopt from colleagues, partners or competitors. Mastering thus the experience accumulated

by society. Education is precisely the development of our past experience, the development of standard reactions and skills. Including – based on such collections of templates as textbooks, information bases, reference books, encyclopedias, etc.

– It's accepted.

– That's what everyone does.

– Historically, it happened.

These turns of speech are pattern markers.

A pattern is a concentrated experience, the result of bumps stuffed with predecessors. Undoubtedly, experience is good: making something with a predetermined quality is a technology, a strict order, a pattern. Deviation from technology, violation of the pattern – will give a marriage in the end. A well-established business model, ready for alienation and transfer, is already a commodity. A franchise is a successful pattern that costs some money.

By itself, a pattern does not mean a guaranteed result. Problems arise, and within the framework of the established patterns, a person is also constantly making efforts to achieve the maximum result. And to eliminate unwanted results. The essence of our actions within the framework of existing processes is to search for some optimal conditions – parameters, modes, schedules, volumes of resources, financial flows, and so on, which, in turn, will provide the maximum positive result.

Sometimes our efforts produce something different from the previous result – a new offer for the market, new ways

of working.

There is a new quality, a breakthrough – there is a change of old patterns with new approaches. As a rule, the most significant breakthroughs have proper names. These are their authors – well-known reformers and visionaries, such as Bill Gates, Elon Musk, Steve Jobs. It is no longer optimization, but special, innovative solutions and actions that provide their authors with serious success, a breakthrough in creation, and a competitive advantage in business. The innovative path generates new designs and technologies, opens up other ways to achieve results, creates other innovative business models. Which, in turn, in the future can become and become new patterns – the generally accepted course of action.

A modern entrepreneur, like never before, must be able to constantly analyze the adequacy of his business model, notice and use new opportunities in time. Since the present is characterized precisely by the fact that new technical solutions have become permanent accelerators, drivers of a continuous revolution in technology, and therefore in business.

We hope this book will help you understand the secrets of creativity in general and in business in particular. It contains over 100 drawings.

Those who are primarily interested in practical recipes, decision-making technologies, and not scientific theories, can start reading right from the «Creation act. Manual» chapter. Everyone else, welcome in order.

What are these decisions that lead to a change in paradigms and patterns? Are there rules and methods? Is it possible to acquire this knowledge? Or is it just the innate creative abilities of individuals, naturally talented people, visionaries and innovators?

Experience is undoubtedly important in any business. Modern technologies of Artificial Intelligence have mastered the history of almost all the facts of human activity. Is that enough? Or are rules and patterns also important?

We suggest looking in the direction of Physics to find answers.

Physics? What's the deal with physics? How can she help in business?

# Existing and Emerging

## Finding answers to questions

Science is a tool for finding answers to questions: what is happening, why and what will happen next.

At the same time, at an early stage of its development, the dominant role was played by a worldview formed by faith – religion.

Various religions offered people their own pictures of the origin of the world, which, however, are close in one thing – the whole world was once created by a certain deity or higher powers. In many sacred texts there is a certain act of creation, the moment of the origin of the world. And then the world moves under the influence of that initial impulse from the Creator, following, whether it is bad or good, its laws.

Within the framework of this concept, natural science arose. And its part Dynamics. Not just dynamics, as a separate section of Mechanics. And Dynamics in a broad sense – as a method of searching for answers to the question about the causes of the motion of matter in the form of «driving forces».

The purpose of science is to describe what happens and why, and especially what will happen if... And the opposite question is how can I do something to get the desired result? – is the main

customer for any scientist. How to hit the target with a cannon?  
How to build a house so that it does not fall apart?

The key feature of this approach is the confidence that we control all the parameters we need. That we have all the data for substitution in the equation.

And for such answers, indeed, science had to discover the laws of nature, which, when specific parameters of the problem were substituted into them, began to give reliable results.

*«Physics, by definition, is a field of natural science: the science of the most general laws of nature, of matter, its structure, movement, and rules of transformation. It is an exact science. The concepts of physics and its laws underlie all natural science.»*

How will this help the entrepreneur?

Traditionally, the scheme of science is presented in the form of a diverging beam, the tip of which is somewhere at the lower end of the axis along which you can line up all the objects of our world according to their complexity – from the smallest particles to galaxies, wildlife, consciousness... and somewhere further.

By complication we mean complexity, combination, when objects are combined into new objects-systems with new qualities. At the tip of such a beam of knowledge are the physical theories of microworld objects and fundamental interactions. The structure of objects of any kind is explained on the basis of the laws of behavior of its constituent elements: an atom

as a system of elementary particles, a molecule as a system of atoms... the operation of a mechanism as the interaction of parts... society as a system of individuals.

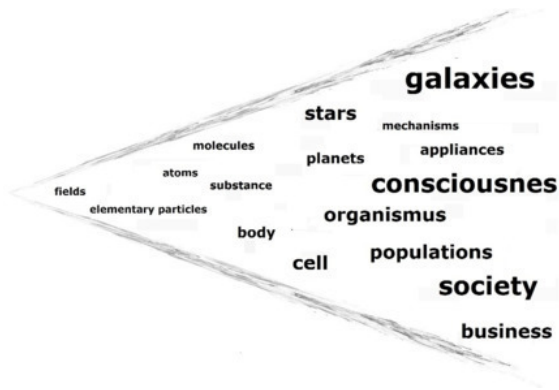


Fig. 1. Ray of combinational complexity of nature

As you move along the beam and move away from its tip, objects of nature are combined into more and more complex systems – atoms, molecules, substances, bodies, living nature, society, etc. In accordance with this, the branches of science are splitting up, if the universal theories of the united building blocks of the universe are at the forefront, now private areas of knowledge appear: chemistry, mechanics, electricity, radio engineering, materials science, hydraulics and other technical sciences...

The drawn picture is quite familiar. We always, if we ask

ourselves how something works, or why it happens, we first of all try to look inside and see the reason inside the object of our attention. Since childhood, when we broke the toy, trying to see what was buzzing there and how it worked.

The laws that describe the behavior of objects through their device and interaction with other objects will be united by a common name – «Dynamics».

Accordingly, the branches of science that bud within this ray of Dynamics give rise to Special Knowledge. And people who have been trained in these industries are called Specialists! Chemists, mechanics, metallurgists, electricians, radio engineers, etc. – these are all of them.

And what do we have higher along the axis of systems? Biological objects of wildlife. And then there are human societies. It would seem that physics has nothing to do with it? It is unlikely that we will be able to explain the behavior of our dog or our project team using basic physical interactions. Sociology, psychology, politics – these are the humanities. Which are clearly opposed to the «exact sciences» – natural science:

*«The humanities are disciplines that study a person in the sphere of his spiritual, mental, moral, cultural and social activities. If specificity is important in other sciences, then in the humanities, if such accuracy is important, for example, descriptions of a historical event, then the versatility and even infinity of such a work (description) is important, so that, if possible, each person finds something of his own in it, while*

*receiving a certain aesthetic satisfaction.»*

So. Fixing a car, figuring out how a fireplace or ventilation works, installing electrical wiring – some of the physics can be useful to any of us. At least in order to understand when your employee is trying to fool you, talking about the need for alcohol to wipe the optical axes. What about business concerns? Business is a complex object that, in addition to technology, includes human relations, motivation, financial movements, and work with markets. The humanities are certainly connected with the daily problems of business, and «exact», natural science – quite, it would seem, far, far away.

# Big systems

So, Dynamics implies control over all task variables. Then her laws work. But systems, even simple in content – just air, gas in a room, consisting of countless molecules – show us the opposite, we never control the movement of all elements of such an object.

In this case, apply the laws and principles that are of a general nature and belong to the section Thermodynamics. Thermodynamics is characterized by an extremely general view of objects – the specific nature of systems does not matter, it is only important that they have some system-wide state parameters, for example, energy, entropy, temperature, pressure, which can be measured. So, the accuracy of physics has already taken a step back? Science no longer calculates the state of each element, but only undertakes to make predictions about the state of their entire set.

A section of thermodynamics familiar from school is the doctrine of heat. This is the study of systems striving for a position of equilibrium both within themselves and with the outside world. The water in the glass cools down, the gas fills the entire available volume, the dust is scattered around the room in an even layer. This is a very sad world – a world of increasing entropy, an inevitable increase in chaos. Even if there are some inhomogeneities – heating, concentration or

charge, thermodynamics draws one end – «everything will pass», resolve, level out over time. Everything will come into balance. In a state of equilibrium, when all differences should disappear.

To imagine the opposite, James Clerk Maxwell (1831—1879) – a British physicist, mathematician and mechanic, at one time came up with a hypothetical demon living inside a gas at the molecular level, which could estimate the speed of each molecule, for fast ones – open the door, but not for slow ones. Then one part of the body would spontaneously cool down, while the other would heat up. The impossibility of such a miracle in nature has been called the Second Law of Thermodynamics.

# **The act of creation is to be studied**

But wait! The world is not so dull around! And he is not at all balanced. In it, something is constantly born, something new arises! Stars and planets are born from clouds of scattered gas in space. Stars form and form galaxies. On the planet, a calm atmosphere gives rise to a cyclonic whirlwind or tornado. And that's just inanimate nature. Living is simply an inexhaustible fountain of origins, origins and occurrences. Including – its highest manifestation as human society and the most important part of human activity – business, its history with the change of technological eras, the generation of new products and industries.

At the beginning of the 19th century, the German thinker, one of the founders of all Western philosophy, Georg Wilhelm Friedrich Hegel, drew attention to the fact that the Act of Creation had not ended at all. The world continues to change and develop! There is always something new in the world. Something that didn't exist before. Quantity turns into a new quality. The new order denies the old constructions. The laws of the emergence of the new were formulated by him in the form of the laws of dialectics in the book Science of Logic.

And what does Thermodynamics say about Arising? After

all, this is all a direct and obvious violation of the Second Law: a new order is emerging, chaos is decreasing, disequilibrium is increasing, entropy is clearly decreasing! In fact, not quite so: physicists say that the emergence of new forms of complexity, orderliness is also an increase in entropy. What does it mean? A gas cloud in interstellar space, condensing under the influence of gravitational forces, «seems to be more ordered than scattered. But this is not the case, because in a scattered cloud the velocities of the molecules are all orderly small, while when compressed, the velocities of the molecules increase. The cloud compresses in physical space, but scatters in phase – and this is more significant,» explains Carlo Rovelli, one of the authors of the Theory of loop gravity.

We are not going to dive into the subtleties of physical theories. Let the rise of order be the increase of disorder. Let, according to physics, the emergence of vortices in a gas and liquid, the appearance of living nature, the development of social forms – this is all "self-structured disordering.» We are interested in the very fact of the Emergence of the New.

The most common phenomena of self-organization – the spontaneous emergence of a new order – boiling water, the emergence of atmospheric vortices. From the point of view of Dynamics, which explains the behavior of an object on the basis of the interaction of its parts, it is impossible to find a reason that would force the molecules of a liquid or gas to change their behavior abruptly. At the particle level, nothing

new happened, no new force was added, no one interfered with the atmosphere with a giant ladle, and a typhoon vortex appeared in the system. Or does Maxwell's demon still exist? But this is unlikely.

Does this mean that some more physics is needed? Or is it no longer physics?

So far, physics is modern thermodynamics, which studies the processes occurring in open, complex, non-linear systems – active or passive, located far from the equilibrium position. A new, far from complete physical doctrine, called non-equilibrium thermodynamics, describes the processes of spontaneous appearance of ordered structures in various highly non-equilibrium open systems, i.e., self-organization processes.

A great contribution was made by Ilya Romanovich Prigogine (1917 – 2003), a Belgian scientist, winner of the Nobel Prize in Chemistry in 1977 for his work in the field of nonequilibrium thermodynamics. His works are widely known: «From Being To Becoming» and with Isabelle Stengers «Order out of Chaos: Man's new dialogue with nature».

It is the categories of *Emerging, Arising, Becoming, New Quality* that will be the central point for us, entrepreneurs, because the conditions of constant competition make us be very attentive to innovations. Whether in technology, or in the organization of affairs – how and why does something original appear that did not exist before?

# The wisdom we need

For us, such terms of non-equilibrium thermodynamics as *a qualitative transition, state bifurcations, self-organization are important*. Because both technological revolutions and the birth of new business models are just examples of these phenomena.

*«BIFURCATION (from Latin bifurcus „forked“) is all kinds of qualitative rearrangements or metamorphoses of various objects when the parameters on which they depend change.»*

This word will be our most commonly used term. So, let's dwell on understanding it. The main content of the term *bifurcation* lies in two important points:

First. These are phenomena when something qualitative happens, fundamentally different from what has been so far – up to *the point of bifurcation*. Separation of the state of an object into before and after.

The water was calm, but now boiled and seething.

The microphone was silent and suddenly «beeped» so that everyone clutched their ears.

Mobile phones in a short period «buried» landline communications.

Second. When further development can take place in fundamentally different ways, when at a certain point – the same *bifurcation point*, there is a separation of possible

trajectories. For example, the phenomenon of bifurcation in hydrology: in Russia in the Far East there is the river Delkyu, from which several channels depart about 180 km from the source, gathering into a river that flows through the rivers Kuidusun and Indigirka into the Arctic Ocean. The other part of the river below the bifurcation zone flows into the Okhota, that is, it carries its waters to the Pacific Ocean. This means that two particles of one drop of water from a glacier may end up, for reasons beyond their control, in two different oceans of the planet! (The author of these lines, by the way, visited this interesting point on a hike along the Suntar- Khayat ridge.)

The guiding star of our entire future path will be the question: water molecules, okay, nothing depends on them. For them, it's a coincidence. What about people in their business? We are «thinking molecules» in the social fluid. Can we act consciously and independently determine what route the fate of our cause will draw? Will our project end up in an arctic ocean without hopes, or in a warm one, full of life and prospects?

Is this exactly what promises us to reveal the secrets of a qualitative transformation in our affairs? Maybe!

The modern view of the structure of science is to recognize the equal complementary position of Dynamics and Thermodynamics.

The ray of the laws of Thermodynamics is directed from

the higher systems of nature towards the ray of the laws of Dynamics.

In the area of systems, which man has been looking at since time immemorial as objects of his influences, there are three main postulates, which physicists called the Beginnings of thermodynamics. Closer to the tip of the beam, that is, where there are systems over which a person no longer has power as over a gas or liquid in a vessel, at least because he himself is a particle of them – these are biological or social objects, there are patterns of non-equilibrium systems. And in the very tip of the second ray, one can assume the existence of still undiscovered fundamental laws of the balance conservation, which should unite all nested systems – both galaxies, and cyclones, and life forms. However, the laws of the highest level could be discerned only by one who is at the very tip of the beam – who can look down on everything in any of its complexity, who is above everything – that is, the Almighty. Science is still very far from such heights. Even the existence of alien life forms is still only a hypothesis.

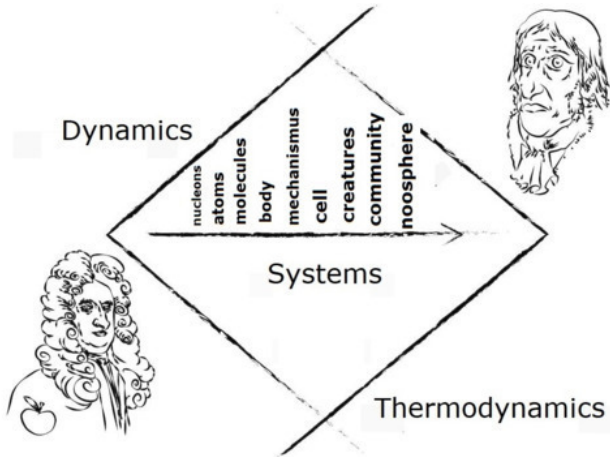


Fig. 2. Two rays of the laws of nature

Let's not anger the gods and make serious scientists laugh, let's descend from metaphysical heights to our sinful Earth. What is important for our mundane concerns, we could learn? It seems that we have groped for a part of physics that deals with the emergence of the New in any of its incarnations! We hope that innovations in business that are of interest to us may also be in the area of attention of this physics.

To summarize: the behavior and structure of any object of nature is thus determined not only by the laws of Dynamics, that is, from below the axis of complexity – from the inside, but also by the laws of Thermodynamics, from the opposite end

of the axis, if you like – from above.

Theories belonging to the first ray – Dynamics, as we have already noted, constitute *Special Knowledge*. A person who understands the intricacies of phenomena, in their nature is called Specialist. Knowledge of the laws of the second ray – Thermodynamics, allows a person to see the important reasons for the behavior of any systems, regardless of their nature. This is exactly the very knowledge that from time immemorial has been called *Wisdom*. And wisdom in any business can be very useful. Especially if she is ready not only to explain why it happened that way, but also to suggest innovative solutions – such that something new happens, and in the right way and when we need it.

# Arising not subject to calculation

Cheers cheers! Will physics help us now? Explain how fundamentally new businesses arise, how their products capture markets? Will he give the laws by which we will build formulas for success? Give us wisdom?

Not so simple.

If we carefully look at the very edge of both one and the other rays of Physics, we will see strange things.

In the microcosm, as one penetrates into more and more subtle parts of matter, many basic concepts familiar to man become unsteady. Einstein's space turns out to be a field that can move, bend, oscillate. Time can flow at different speeds. A particle to be at the same time a wave. Quantum mechanics has declared that in the world of very, very small objects, everything is «grainy», discrete. And in all movements there is an element of chance. Events at this end of the axis are ambiguous, probabilistic – the state of the particle at the moment cannot accurately determine what will happen to it in the next instant. At the microscopic level, you can calculate the probability of an event that will happen, but you cannot predict the future with complete certainty.

But what about at the other end of complexity, at the tip of the ray of Thermodynamics? In a completely different way, but clarity and unambiguity also disappear. The foundation

of physics – the measurability of the properties of objects, disappears with increasing complexity. The trouble is that if more and more complex systems are included in the consideration, the concepts of temperature, entropy, and energy for them lose their rigor. It is impossible to measure or mathematically describe such parameters for society or for an organization. The basic concepts of thermodynamics – energy, entropy, temperature – turn out to be only metaphors in the world of people. Physics, as you move up the scale of complexity, disappears as an exact science. It seems that the tips of both divergent beams blur in a haze of fundamental uncertainty.

And in this haze, our hopes for help from physics in the world of business problems dissolve?

And that's not all – washes his hands and the instrument of physical knowledge – Her Majesty Mathematics!

Even where equations for the behavior of complex systems are still being written, they turn out to be nonlinear. In such complex systems and their models, everything depends on everything! Dependencies are sometimes contradictory: it is good for predators in the forest if there are many small animals around – their food supply. Predators multiply, and... and destroy their food supply. The population of predators begins to decline sharply.

Solutions of non-linear equations lose their stability at certain points, which means that they become ambiguous. Such points

on the mathematical trajectories of mathematics are called bifurcations.

*«The bifurcation point is a critical state of the system, at which the system becomes unstable and uncertainty arises: whether the state of the system will become chaotic or whether it will move to a new, more differentiated and high level of order. A term from the theory of self-organization.»*

The number of both predators and their prey can fluctuate, and under certain conditions one or both populations can end their existence catastrophically.

How to «feel» this very bifurcation? Play with it, look at this strange self-organization. This, it turns out, is not difficult – there are a lot of bifurcations with us and around us!

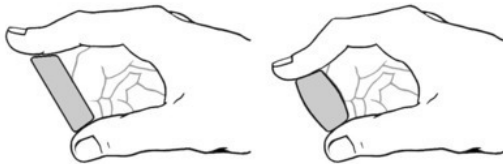


Fig. 3. Expected behavior of an elastic object

It is unlikely that in today's computer world someone uses an eraser – an elastic band to erase what is written with a pencil or pen. Maybe you remember this subject from school? Such a small brick of gum, which was fun to play with, squeezing it with your fingers. And now, let's extract science from such an» anti-stress»

of our childhood.

Squeezing the elastic between the fingers, we make it shorter. We compress even more – we deform the elastic bar even more.

But at some point, the elastic band suddenly refuses to compress further and bends to the side. Squeezing and unclenching our fingers, we repeatedly reach this point, when the behavior of a simple elastic object changes qualitatively. And each time in a different way: once the deflection will be in one direction, and once in the other.

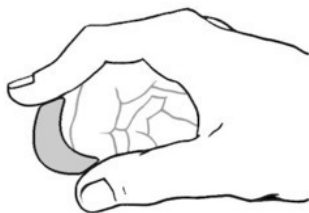


Fig. 4. Buckling – the real behavior of an elastic object

We will not write the equation, as we promised, but we will only say that it has a unique solution only up to a certain compression. And at this critical point, the solution loses stability. If we imagine that we have an absolutely perfect bar of gum inside and out, and we press our fingers strictly along its longitudinal axis, the gum will continue to shrink without bulging. But this will already be an unstable segment of solutions.

Just as a ball can, in principle, stick to the top of a convex surface, but only in an absolutely ideal case.

If you «move» your finger at least a little bit – physically, or the homogeneity parameter of our rubber band – mathematically, the solution of the equilibrium equation will immediately rush to another, stable state. But! Now there are two possible stable states in the solution – the deflection is either «to the right» or «to the left», and which one our object will fall into depends on those very random, literally microscopic «movements».

That is, the point is not that we do not know how to count, but that mathematics fundamentally cannot give an unambiguous solution. On the contrary, mathematics proves that now there can be no uniqueness! Moreover, if we took not a rubber block, but a rubber cylinder, we would get not two possible positions after the deflection, but an infinite number – any direction in a circle.

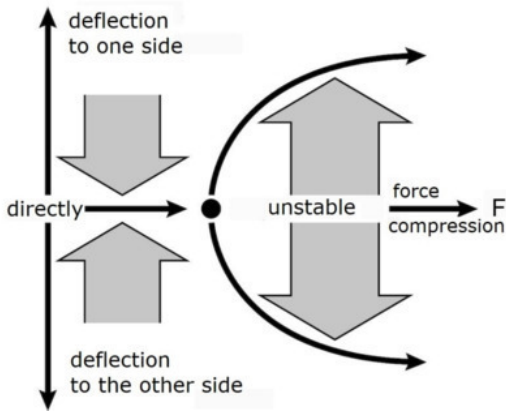


Fig. 5. The condition of the gum under pressure. Pitchfork bifurcation

To sum up, in what state the system will pass, hitting the critical point, mathematicians cannot unambiguously calculate – the solutions become unstable with respect to fluctuations. This means that there are solutions to the equations, but there can be many of them. And even infinitely many. What solution is implemented in practice depends on infinitesimal deviations in parameters that occur only in the real world, more precisely, in the microcosm, and which a person and, therefore, mathematics can never know. These are such small movements, such small inhomogeneities of the gum material, that it is impossible to measure, plan, or take into account in advance. Such small deviations are fluctuations. To calculate the exact

state of a complex system in the future, it is necessary to know a huge number of initial conditions onshore, which will never be known to anyone. And someone who, and business is definitely a system with an infinite amount of uncertainty.

# Qualitative Considerations

So it looks like we're left with nothing?

However, let's listen to the greats. It seems that not everything is so hopeless!

The mathematics of describing nonlinear effects is highly non-trivial. But, as Academician V. I. Arnold (1937—2010), one of the greatest mathematicians of the 20th century, said:

«These objective laws of the functioning of nonlinear systems cannot be ignored. Only the simplest qualitative conclusions have been formulated above. The theory also provides quantitative models, but qualitative conclusions seem to be more important and at the same time more reliable: they depend little on the details of the functioning of the system, the structure of which and the numerical parameters may not be well known.»

Henri Poincaré (1854—1912), «the last of the great universal mathematicians,» also said that only a limited amount of qualitative information is needed to understand qualitative changes in the behavior of systems.

So there are no formulas. They are useless. But there is good news! It turns out that it is important not to calculate the exact trajectory of changes, but to be ready for the phenomenon – for the critical point and for the qualitative transition that will follow.

Actually, this is what we do in the morning when we boil water for tea. We do not calculate or measure anything, we just wait for the moment of a qualitative transition – we wait for the water to boil. And this is enough for us to understand that the moment has come, you can make tea.

Let's return to our elastic band, to our manual bifurcation. When we squeezed it and got a deflection, we can play with it further, for example, try to put pressure on the bulge.

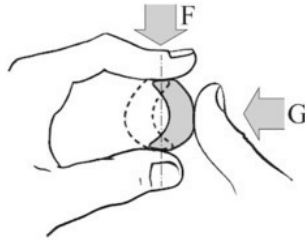


Fig. 6. Longitudinal and transverse action on an elastic object

Our «antistress» with a certain effort will begin to flip in the opposite direction. If we draw a set of solutions to the equation in the parameter space: Deflection / Longitudinal pressure / Transverse pressure, then we will find a funny surface in it, similar to the assembly of a fabric. This surface is in a section of mathematics called Catastrophe Theory and is called Cusp catastrophe.

On this decision surface, we will see the buckling path under longitudinal pressure, which we have already seen in Fig. 5. To

do this, it is enough to cut our Assembly with a vertical plane, for which the transverse pressure is equal to zero.

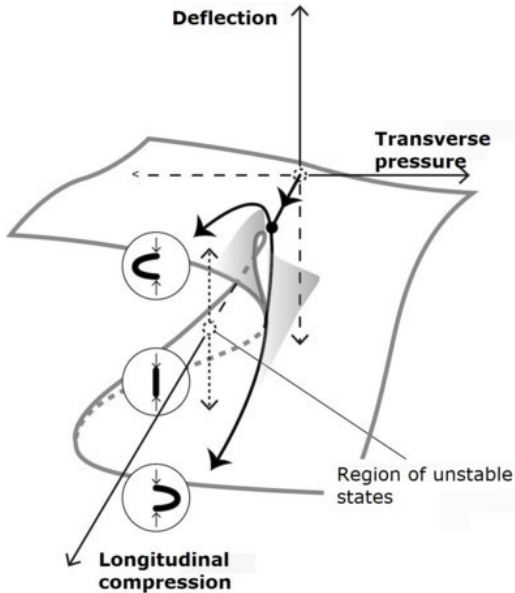


Fig. 7. Surface of the state of an elastic object. Buckling under longitudinal compression

The area of instability is represented by a triangular «tongue», indicated by a dotted line in the middle of the Cusp, where the system can get and stay in this state for some time, until any infinitely small impact throws it into one of the stability zones – a deflection in one direction or another.

We can also trace the trajectory of the state of the object under the influence of transverse pressure.

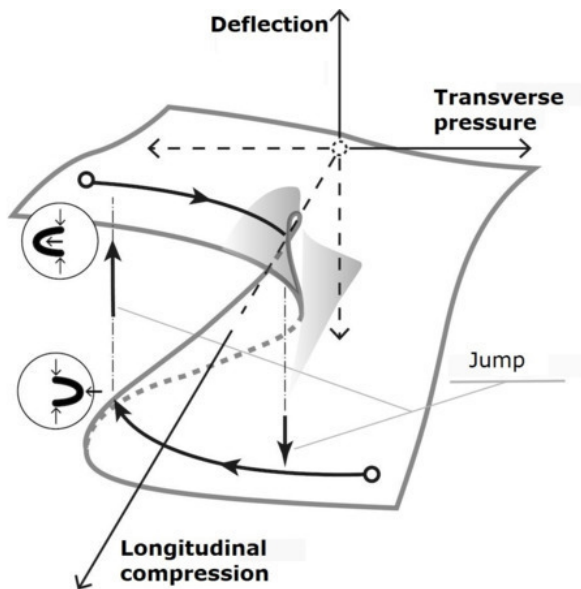


Fig. 8. Transverse route on the state surface. Memory effect

By itself, the understanding of a mathematical catastrophe, as a kind of map, a qualitative picture of the space of possible states, already allows us to understand a lot about the behavior of an object, to be prepared for surprises, and moreover, to use these properties. Despite the fact that our pictures of catastrophic

behavior do not promise any quantitative accuracy, the operating point of the system, having fallen into the zone of instability, for example, does not know when and where it will leave it.

The transverse route – the transfer of such systems from one state to the opposite (the so-called hysteresis phenomenon) is used in many places, for example, in binary memory cells. And in order to use this memory, it turns out that it is necessary to control only one control parameter, which switches the cell.

Is a high-quality picture enough to expect and manage high-quality transitions in our systems, including business ones? We will see this below.

# Beyond the boundaries

Beyond the boundaries of physics as an exact science, there are attempts to generalize the formation and self-organization of structures in open systems that are far from thermodynamic equilibrium. As conceived by its creator, Professor Hermann Haken, synergetics is an interdisciplinary direction that is called upon to play the role of a kind of metascience, noticing and studying the general nature of those patterns and dependencies that private sciences considered «their own».

*«Synergetics (from other Greek prefixes «syn» with the meaning of compatibility and «ergon» – activity) – «together action».*

*«It should be emphasized that synergetics is by no means one of the frontier sciences such as physical chemistry or mathematical biology, emerging at the intersection of the two sciences.»*

This is a fairly new area of science – there are still no clear boundaries, or even clear definitions of areas. The area of research in synergetics is not clearly defined and can hardly be limited, since its interests extend to all branches of natural science. A common feature is the consideration of the dynamics of any irreversible processes and the emergence of fundamental innovations.

Since there are no clear boundaries and definitions, there

is an inevitable dispute in scientific and pseudo-scientific circles. Anyone is ready to declare himself a zealot of true metaknowledge, and to call everyone else pseudo-scientists, scholastics and charlatans.

I must say that this is a completely normal phenomenon for science. True Science differs from faith or ideology in that it itself calls into question all its achievements. Especially on the frontier of knowledge, that is, exactly where new knowledge about the self-organization of matter is being formed today.

Maybe our approach will be accused of being pseudo-scientific. Real academics are simply obliged to do this.

Truth, scientists say, is just the most appropriate concept to explain facts. I think this principle is good for business as well. Let's test our theory with practice.

So, what do we get from the sciences at the start of the path? No strict laws, no numerical mathematical apparatus. The more complex and larger the system, the less numerical accuracy, the more qualitative considerations. Is this enough to put such knowledge into practice and apply it successfully?

Here we'll see. What difference does it make whether it is physics or something else, as long as the conclusions work! That is, they would help us in business.

# Chaos that creates

## Progress

The evolution of matter today is already widely considered as part of a global synergetic process. And the emergence of life on the planet, and the origin of the mind, the evolution of conscious life – as part of the epic self-organization of matter.

The origin of life itself is still a big mystery. And we're not going to solve it. But, since we live in this world, now we are concerned about another question – how to live? For us, it is only important that with the transition from inanimate nature to living nature, the essential feature of systems changes. Inanimate systems are passive systems. And self-organization arises only when the system is pumped with energy from outside. The water in the kettle starts to move (convection), and then boils just because we turned on the stove. Whirlwinds in the atmosphere – cyclones and tornadoes – are the result of its heating by the energy of the sun. If the energy supply is cut off, the systems will rush to an equilibrium state, any heterogeneity will sooner or later be resolved.

But living matter is a completely different matter, these are active systems. Which have their own behavior. And the behavior of living organisms is aimed at reaching the sources of energy

necessary for life. Energies in a broad sense are both the heat of the sun for plants, and a nutrient medium, and other living beings that serve as food for a predator, and all kinds of resources necessary for a person to live.

With the transition of passive-to-active systems, the driving force of self-organization changes by 180 degrees. If for the passive it is an excess of energy, then for the active, the main reason is its lack, or, in other words, resource hunger. Indeed, living nature has the ability to reproduce, to produce its own kind. And, in combination with a purposeful movement towards the most favorable living conditions, this inevitably leads to the fact that living organisms, populations and societies always create redundancy. Which, in turn, causes intra- and interspecies struggle and, finally, competition. As a result, there is a resource hunger, which is characteristic of wildlife in all its manifestations. As the poet noted: «Sweet gingerbread is always not enough for everyone.»

This pressure of hunger forces any systems to undergo stages of self-organization, qualitative rebirth, it is hunger that constantly drives them to more and more complex levels of organization, increases disequilibrium. Both the development of life and the emergence of its intelligent form, followed by the evolution of social and economic forms, are precisely the most ambitious stages in the growth of complexity. And within these global stages, many subsystems are just as precisely involved in their struggle for survival and evolution: the origin

and disappearance of species, populations, peoples, states... And of course, businesses!

Progress, therefore, is not at all an optimistic process of endless and unrestrained improvement of everything and everything. But only a chain of stages necessary for the survival of any active systems in the face of ever-increasing resource hunger. A chain of alternating stages of adaptation – adaptation, and bifurcation – rebirth.

The principle of minimum dissipation (scattering) of energy, as Academician of the Academy of Sciences of the USSR Nikita Nikolayevich Moiseev (1917—2000) suggested calling it the compass of global development in the world of active systems. In the chaos of competition and selection, the structures that make the most efficient use of fading resources win.

*«Dissipation of energy is the transition of part of the energy of ordered processes into the energy of disordered processes, and ultimately into heat.»*

Homo sapiens (reasonable man) as a biological species, unlike others, ceased to develop immediately upon its appearance. What's the matter? Everything, the end of development? No, just with the emergence of consciousness, development was transferred to the area of the technosphere – to the area of creating a protective shell around itself, a «fur coat», the so-called «second nature». Machines, mechanisms, technologies – these are all tools that allow a reasonable person to exist more and more efficiently. And the very existence in terms of the creation

and use of technology gives rise to the economy, special ways of managing the economy, trade,.. business, finally.

Thus, the global synergetic process is a series of continuous complication of currently existing systems:

- living beings have come a long way from the simplest organisms to very complex ones, to mammals, to «reasonable man» as a result;
- technologies born by a thinking being – man, are continuously becoming more complex from the simplest stone tools – to information technologies, space ships and biotechnologies;
- and the very ways of doing business, business models, are constantly becoming more complicated: a shop in the market – a small store – a supermarket – a trading network – e-commerce – a marketplace.

# Evolution, revolution, turbulence

Let's take a closer look at this continuous progress in all areas. What will we notice? We have already used the combination «sequence of complications». This implies the phenomenon of some transitions – rapid, in historical terms, almost instantaneous changes. The emergence of new qualities.

Indeed, progress is moving in leaps and bounds. Periods of calm change of some forms are replaced by moments of the emergence of others, new ones. Which can remove the former from the historical stage. How capitalist relations and states replaced feudal ones, leaving in some places the monarchs a purely decorative role. How internal combustion engines replaced steam engines. Airplanes have removed balloons and airships from the scene of serious transport. Mobile communications have taken landlines out of widespread use. The old taxi services in major cities have been largely superseded by services like Uber.

So, periods of evolution and periods of revolutions. Prolonged calm stages, and quick qualitative upheavals.

We are particularly interested in technological progress, as it always goes hand in hand with changes in business life. Progress is a constant process. And the technological revolution is a sharp leap in development.

«The scientific and technological revolution is a fundamental

qualitative transformation of the productive forces, a qualitative leap in the structure and dynamics of the development of the productive forces.»

There are various ways to describe the history of leaps and bounds in technological change. Some speak of six technological revolutions in human history. Others are about the development chain: Industry 1.0, Industry 2.0, Industry 3.0, Industry 4.0.

Still others begin the history of high-quality technological transitions from the end of the Stone Age – from the Neolithic.

«The Neolithic revolution or neolithization is the transition of mankind from an appropriating economy

to a manufacturing economy, which includes agricultural sub-sectors (agriculture and animal husbandry), as well as handicrafts that stand out as a separate industry.

In any description of the chains, it is important for us to note the fact of a clear acceleration of the scientific and technological spiral of development. It turns out that each stage of calm evolution following the technological leap was about 2 times shorter than the previous one.

You can ask questions about the dates in Table 1 – most likely, they are simply adjusted to the doubling pace model, you can argue about the significance of certain scientific discoveries or inventions in history, but hardly anyone will dispute the very fact of accelerating scientific and technological progress.

Stages of technological structures	Stage boundaries	Stage dyration about, years
Neolithic revolution	about 10 000 years BC	6000
The use of cooper tools	about 4 thousand years BC	3000
The use of iron tools	about 1 thousand years BC	1450
End of ancient civilizations. Previously Middle Ages	around 450 AD	800
The first mechanims and machines driven by the power of wind and water. Mill, loom, lathe	around 1250	400
Technical revolution XVI-XVII: water and steam. Industry 1.0, machanisation	around 1650	170
Technical revolution xvii-xix : from steam locomotive to electricity. Industry 2.0	around 1820	93
Technical revolution XIX-XX: the era of internal combustion engines, the first electronics	1913	51
Space and computers. Industry 3.0	1964	25
Birth of the Internet	1989	11
Mobile Internet	2000	?
GPS, Cloud Computing, AI, IoT... Industry 4.0	continuously	??

Table 1. Acceleration of scientific and technological progress

And today we exist in an era of technological turbulence – it is no longer possible to talk about years or months between jumps – now they happen all the time: high-speed Internet in mobile communications, cloud computing, GPS, Internet of Things, artificial intelligence and drones, generative neural networks –

these transitions fundamentally change capabilities of modern technologies and products based on them, and do it continuously.

The business sector has become just as turbulent. New technologies are continuously bringing new service delivery models to the fore. Free online trading to replace brokerage houses. Ordering through the application and delivery is a replacement for going to the store. Affordable taxi at the touch of a smartphone to change the search for a car on the street or order by phone. Traditional businesses are rapidly being replaced by new, more innovative, and usually more global ones. And often these new ones, not having time to earn the title of «traditional», give way to even newer and more modern ones.

The pace picks up sharply. Futurologists warn that over the next 10 years, humanity will have to go through as much change as it has experienced in a thousand past ones.

So what happens? What does this mean for us?

First. Progress was not at all an optimistic triumph of pure knowledge. But just a way to survive. A means of struggle, in particular, the struggle for markets, if we look at the economy.

Second. This requires the attention of any entrepreneur – progress in business, in business has become so rapid that no one can dream of building a quiet, solid family business. Pass it on to your children, who will pass it on to their grandchildren.

On the contrary, you have to be prepared for the fact that any business you start will not be durable. That in your life you will have to do many different things, master different professions or start different business projects, develop different products. Only change is permanent.

Third. Progress, the process of global self-organization is not only the birth of new structures, but also the disappearance, death of the old ones. Any structure of human society, be it an ethnic group, a state, a technological order or a separate company, has its own moment of birth. But the moment of death is the same. No system is permanent. Companies, businesses are exactly the systems in which we are honored to work, or even these are our projects that we ourselves have created and are developing. Why are they mortal? How are they dead? Can I, with my business, get out of this «wheel of samsara» – an endless chain of deaths and births? (Spoiler – you won't be able to get out, but you need to be able to transform, reinvent your affairs. Then rebirth will not be a mortal enemy, but your ally.)

# Life cycle

The person lives. He is born, grows, grows old and dies. No one can escape the inexorable law of being. But that's not all sadness. A person lives in a society of other people, works in a team, coexists with the state, belongs to some ethnic group. So, each system (family, firm, country, etc.) like an individual is also born, develops, withers and dies. Not only is our own age of life a burden that we can't do anything about. Quite independently of our desire, we are born in a country with a thousand-year history, or vice versa, which appeared quite recently, we find ourselves in a company that, perhaps, is experiencing the age of youthful folly, or is an example of a wise old man. Although nothing can be done about it, it probably won't hurt anyone to understand life in general and social systems in particular.

Let's start from the description of ethnogenesis – the theory of L. N. Gumilyov, which he created while in prison in Stalin's Norillag.

Gumilev Lev Nikolaevich (1912 – 1992) – the son of Nikolai Gumilev and Anna Akhmatova, poets of the «Silver Age», the author of the term «Silver Age of Russian Poetry», historian and geographer, author of the theory (more precisely, teaching) of ethnogenesis – that is, the origin and development large supranational communities.

Reading Gumilev, the chaos of historical events appears as a clear picture of the complex, but natural interaction of emerging and disappearing systems. Before the genius of Gumilev, a picture of a pattern opened up, which he tried to explain. To do this, he had, for example, to introduce the concept of «passionarity» – a sexually transmitted genetic trait that determines the active behavior of people, thanks to which large social systems are created and developed.

*«Passionarity is a sign that arises as a result of a mutation (passionary impulse) and forms within a population a certain number of people with an increased craving for action. We will call such people passionaries.»*

*(L. N. Gumilev)*

However, following this, we would have to admit that molecules with atoms in vortices of cyclones or in layers of boiling water should also be supplied with a similar genetic factor. When summarizing the theory under the global historical picture that opened up to him, L. N. Gumilev rearranged cause and effect. Quite the contrary: this social system objectively implements strict rules for selecting a certain behavior of individuals, its components – at different stages, different, and not «innate» qualities of the elements determine the state of the system. The fact is that social systems are the same open dissipative structures as, for example, atmospheric anti- and simple cyclones, whirlwinds of boiling water in a kettle, or vibration modes of atoms inside a laser.

Let us state Gumilev's theory, shifting it to the modern synergetic representation, as we understand it:

Every system (including human) arises, exists and disappears. The entire course of the life of the system can be divided into six stages: rise, growth, fracture, blooming (aka inertial), convolution and memorial.

1) Let us imagine some human system, a structure that is in a stable state balanced with the external world (this is the Memorial Phase). Let's make a reservation right away – in fact, any human structure, be it a people, and even more so a company, the external environment gives too few chances to live to equilibrium. Let us assume, however, that adversity has not yet touched this part of society. In this system, people live (for example, in some hidden corners – in the mountains, on the islands) according to custom, according to the covenant of the fathers, according to the order established by someone once and for all. They do not claim anything beyond what their familiar environment gives them.

2) The family, as usual, is not without its black sheep – there is always a certain number of passionate individuals who cannot or do not want to be like everyone else. The main mass does not perceive them otherwise as eccentrics, renegades or, worse, degenerates; and crushes them in all possible ways – both moral and physical. Due to this, deviations from «normal» behavior, from the generally recognized standard, usually exist at the level

of barely noticeable deviations – fluctuations. But as soon as the original community is weakened – natural disasters are to blame, the economic crisis, or the invasion of aliens – «renegades», passionaries get a chance: they first form small companies, communities, which are later joined by fragments of obsolete systems. This is the beginning of the Rise Phase. First of all, in the embryo of a new structure, a clear self-consciousness arises that we are We, they are not at all those who are near and around. Those are strangers, enemies! A spontaneous, unconscious unity arises – the psychology of the pack: «one for all, and all for one.» The ideological dominant has not yet been worked out. The vigorous activity of passionaries causes the growth of a new system. This structure is active, it seeks to annex new territories, markets, areas of activity. The stereotype of behavior of the old system «be like everyone else, do as usual» is replaced by the imperative of Duty:

*«You must be just like that for the sake of the Common Cause, for the sake of our Community.» The general passionarity of the members of the system is growing. From quiet townsfolk, adapted to the old conditions, they turn into seekers of improvement, first without risk, and then at the risk of their lives. This marks the transition to the Growth Phase (according to Gumilev – «Akmatic»).»*

3) This is the phase of prophets, fanatics of the new cause, revolutionaries. This is the phase when «Striving for the ideal of success and victory» becomes the imperative

of behavior. «The greatest rise in passionarity – the akmatic phase of ethnogenesis – causes people's desire not to create integrity, but, on the contrary, «to be themselves» – not to obey general regulations, to reckon only with their own nature. In general, this is a very «boorish» stage. The right of force reigns here, whoever has time – he ate it, the end justifies the means, the competitive struggle for leadership is the most ruthless. During this period, the system spends a lot of energy both on external expansion and on internal civil strife.

4) So much energy is spent on fighting external enemies and leaders with each other that the Fracture Phase begins.

*«Usually in history this phase is accompanied by such internal rivalry and slaughter that the course of ethnogenesis is temporarily hampered.»*

Civil wars, conflicts at work, conspiracies begin. The passionate charge of the population is reduced: harmonious personalities become the leaders in the system, in which both activity and caution do not have excessive deviations. The imperative of this stage is: «We are tired of the Great Ones!» Away with the heroes! This period of the system's life ends with the victory of one of the competing leaders.

5) The system enters the Inertial Phase. She is the Blooming Phase. The winner is proclaimed the slogan – «Be like me!» That is, a pattern of behavior is offered, an example to follow, sometimes from the heroes of a past heroic era. Extreme regulation of life and work, "Ordnung!», the establishment

of a clear hierarchical organizational structure of the community. Differentiation of objects of activity, areas of responsibility, spheres of influence. living standards. Ordering everything and everyone: Laws and Rules. The accumulation of material culture, the creation and preservation of a huge number of cultural, scientific, technical and other monuments. In a word, the Inertial Phase is a flourishing, Civilization. It was the ethnic groups of this period of life that created everything that today we call Ancient Egypt, Hellas, Ancient Rome, the Mayan and Aztec civilizations, the Renaissance. It turns out, however, that the era of enlightenment and civilization is in fact not the heyday, the «spring», but the decline, the «autumn» of the system. All the numerous fruits of the Inertial Phase are only the gradual dissipation of the former passionary charge. Indeed, «golden mediocrity» is the social ideal of this era. The creations of artists, scientists, technicians, although numerous, are inferior in quality to the achievements of the restless era of «Sturm und Drang». Imitation prevails. Not creators, but artisans, not Artists, but Manufacturers. The social ideal is material gain. If the phases of rise, development and breakdown can be called the Age of Chivalry, then all subsequent stages are the Age of Trading: everything is just for money, altruism and heroism are ridiculous, personal income is the measure of everything. There is an erasure of features, outstanding personalities are persecuted, driven into the framework of the standard. (However, after their death, they are willingly canonized!) Zealots of traditions and law,

conservatives – these are the favorites of the system at this stage.

6) When the last remnants of passionarity disappear, the Convolution Phase begins (according to Gumilev – «obscuration»). People with a complete lack of a progressive beginning strive to destroy not only passionaries, but also simple burghers – hardworking harmonious people. Sluggish and selfish people, guided by consumer psychology, dominate everywhere. «Though a day, yes mine! After us – even a flood! Pleasure is here and now!» – these are the slogans of this era. Corruption, compilation, mistrust and betrayal, ignorance and parasitism reign. An intelligent person who tries to maintain at least some order is perceived by the system as worse than an enemy. It is at this stage that a small detachment of barbarians is able to take possession of a huge city, mired in debauchery and indifference.

	Rise	Growth	Fracture	Inertial	Convolution	Memorial
The slogan of the moment	Public debt	Sturm und Drang		Rules and law	Nobody wants anything	Custom and traditions
Subjective moment of action	Everyone does everything	I do what I think is right		From and to according to the instructions	I say one thing, I do another	I do it because it's always been done
Relation to the system	We are one flock	What is good for me is good for the System		The system is the authorities, the state, the king	To hell with the System! If only I felt good	We are part of nature
Relation to time	Time is linear. Something new awaits in the future			Time has stopped, this order will always be	There is only a moment, do it now!	Time is cyclical, what was and will be
Relationship with neighbors	Turn inside yourself	Absorb or destroy		Rob the weak	Defense	Hospitality, border defense
Technology, culture	Assimilation of other people's results	Creation of new quality		Replication of old solutions and developments	Simplification and perversion of old achievements	Ignoring other people's ideas, borrowing tools
Structure	Team unity	Competing parties		Formation of classes, estates, hierarchies	Structure simplification	Established castes
Personnel policy	Power to those who can	Nomination based on results of cases		Transfer of power along class lines	Approximation of sycophants	Power to the oldest

Table 2. Imperatives of behavior at different stages of the life cycle according to Gumilev

7) After they have eaten and drunk everything valuable that has been preserved from heroic times, the last stage begins – the Memorial Phase, when the system retains only the memory of its historical tradition. Then the memory also disappears, the time of balance with the environment comes, when people prefer philistine peace and measured existence to great plans. The despotism of Tradition, the authority of the Elders (age is the measure of everything, not talent or heroism), and an unchanging caste structure are established. Passionarity is only enough to maintain the economy established by the ancestors. Peace reigns until an external enemy destroys the system that has outlived itself, or a new community is born inside it, whose members will proclaim – «We are different! The old course of life must be broken,» and the old system no longer has the strength to destroy the new formation.

# Company life cycle

Don't you think that all this applies to companies as well? And the organizations where we, fortunately or unfortunately, have to get into, and the organizations in which we ourselves are the founders, just as accurately go through the same stages of their lives. And the rules adopted in them and the emerging relationships are very similarly transformed.

Dr. Ichak Kalderon Adizes is one of the unsurpassed business consultants in the world, a brilliant specialist in the field of effective business process management, he studied in detail the stages of the life cycle (LC) of the company. It is easy to see direct parallels between his description for companies with the characteristics of social systems by Gumilev.

Adizes about the life cycle of the company:

*«The stages of Growth are the stages of sacrifice. Blossoming is a stage of existence. The stages of Aging are the stages of acquisition.»*

Adizes' characteristic of companies in the early stages of the Recession – he called it the "Aristocratic Stage»:

*«The closer a company approaches the Aristocratic stage, the less desirable change becomes. The decrease in flexibility, which began even at the heyday stage, makes itself felt. In an effort to minimize all kinds of risks, the organization uses*

*only those opportunities that give a tangible result in the short term. Yes, she does not master new technologies, does not show interest in the implementation of innovative projects, does not conquer new markets. In other words, she is losing the entrepreneurial spirit that propelled her to the pinnacle of success not too long ago.*

### ***Atmosphere of stagnation***

*What about people? They become passive. They try their best to avoid conflicts and disagreements. So, while the worker is quieter than water, lower than grass and does not actively try to raise existing issues that others prefer to turn a blind eye to, he has a chance not only to earn respect, but also to move up the career ladder. In turn, those who speak openly about the difficulties that have arisen receive a massive rebuff. He becomes an outcast in the team. And his most insignificant oversight becomes the reason for dismissal.*

### ***Rituals***

*In an aristocratic company, people attach great importance to rituals. They don't care about the end result. Generally accepted standards and values come to the fore. Form beats function.*

*No more jeans and sweatshirts. There are strict requirements for the dress code, which even the most courageous democrat does not dare to violate. All managers wear one-piece corporate-colored business suits and look as if they were going to a funeral ceremony.*

*The main feature of aristocratic companies is*

*a commitment not only to expensive uniformity in clothes, but also to expensive surroundings. An office in the most prestigious area, elite massive furniture, chic carpets, paintings depicting the founder and expensive designer «tricks». Thus, by demonstrating their status, they identify their belonging to the elite.*

### ***Paralysis of the center of power***

*The top management of the company, who have fallen into the stage of Aristocracy, as a rule, becomes a victim of the former triumph that turned their heads. Instead of living in the present and looking to the future, leaders are still thrilled by old accomplishments. They imagine themselves to be omnipotent, although in fact their powers are limited. They are unable to quickly accept and implement any decision, since each of them needs to be coordinated with several centers of power.»*

Practical complete coincidence with the characteristics of the Convolution (obscuration) phase by Gumilev, isn't it?

Generalized change in the characteristics of the company by phases of the Adizes life cycle is shown in Table 3.

The company is a complex system. With its numerous subsystems, each of which is also subject to its own stages of development. They also have their ups and downs. And they can lead to the premature death of the entire organization. For example, childhood illnesses – growth difficulties that occur at the start of projects – are especially relevant for so-

called «startups». To quote the descriptions of the «childhood diseases» of companies from Adizes:

**«Premature aging**

In the event that a manager with a dominant vitamin A – administration – wins, employees with entrepreneurial inclinations in droves begin to leave the organization.

Phases of existence	Power and control	Structure	Strategy	Internal order and mood	General
Birth	Founder authoritarian style. There is no budget	No structure. Everyone does everything. Informal relationships	Product orientation, not sales. Increasing cash flow	No rules or regulations. Main result	Conquer your niche. Readiness for risks. Problems are pouring in
Height	The owner is a leader with high self-esteem. Lack of administrative mechanism and planning	Some formalization of the structure. Defocusing of responsibilities, duplication of functions	Increasing sales at any cost, spreading the focus on new ideas	The main thing is not to argue with the boss, do as he says, admire him	Rapid growth, costs exceed revenues. Spontaneous entrepreneurship. Innovation. High risks
Maturity	Separation of ownership and control. Hired management apparatus	Establishment of requirements and segregation of duties	Focus on profit	Conflicts between administrators and entrepreneurs	Strengthening positions. Management reform. Internal squabbles and disassembly
Heyday	Shareholders. Effective management. Good planning and confident control	Clear separation of functional services and maintaining a balance	Mission focuses on customers	Internal rules of value. Appearance and office space standards	Achieving balance. Clear plan and control
Recession	A large number of centers of power, endless coordination. The reins of government for financiers and lawyers	Form beats function. Rituals are more important than results	The main thing is defense. Keep good prices	Passivity and non-conflict. Let someone decide, but not me. Internal standardization of all	Loss of entrepreneurial spirit. Formalism. No change and no flexibility
	Bureaucracy	Disintegration	Reduce prices.	Search for witches. Every man for	Financial difficulties.

Table 3. Characteristics of companies at different stages of the life cycle according to Adizes

The loss of the entrepreneurial component and the increased control on the part of the manager-administrator leads to a minimization of flexibility and, as a result, to premature bureaucratization. The company ceases to quickly adapt to the changing reality and is rapidly losing its leading position. She begins to age before she can reach her Prime.

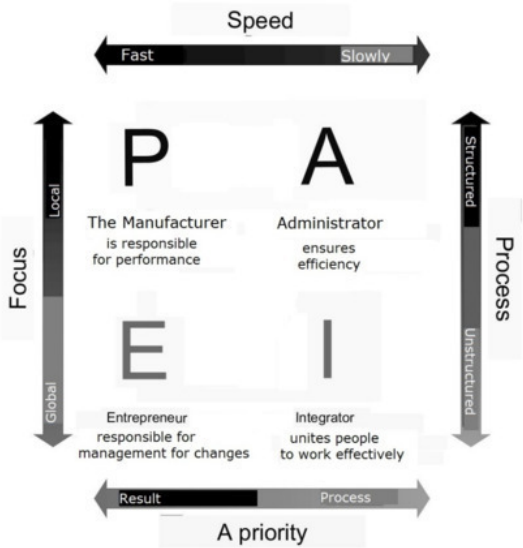


Fig. 9. Typification of managerial styles according to Adizes

## **Unfulfilled entrepreneurship**

Another scenario for the development of events: the owner understands that he can no longer and does not want to be a substitute player in the team. He decides to voluntarily give up power in order to leave and start from scratch.

He is often pushed to such a decision not only by the hired manager, but also by the board of directors.

## **The collapse of the business partnership**

Another danger that lies in wait for the company in Youth is «divorce». If the company is headed by two founders who are carriers of different management styles, then it is during the Youth period that their partnership ends.»

# Product life cycle

The ruthless picture of the life cycle can also be projected onto the results of a business project – its Product.

According to the marketing concept, any product goes through a life cycle, that is, there is a certain period of time when it is present on the market. In a typical product life cycle, the same main four phases, four stages are distinguished:

**Bringing goods to market.** First appearance of the product on the market. Characteristic is a small increase in sales volumes and, accordingly, the profit is minimal or non-existent.

**Height.** A period of rapid growth in sales volume if the product is accepted by the market and the demand for it increases. Profits also increase as sales increase.

**Maturity.** Sales volumes are significant, but further sales growth is not observed. Profit at this stage has stabilized, since additional costs are not required to bring the product to the market.

**Decline,** withdrawal from the market. This phase of the product life cycle is characterized by a significant decrease in sales volumes up to a complete drop in demand for this product. Profits plummet to zero.

The so-called BCG matrix is a tool for strategic analysis and planning in marketing. Created by the founder of the Boston

Consulting Group (BCG) Bruce D. Henderson to analyze the relevance of the company's products, based on their position in the market relative to the growth in demand for these products and the market share occupied by the company selected for analysis.

This matrix highlights four possible product roles for the company producing it, and the names of these roles themselves also indicate the «age character»:

«Question mark». Low market share, but high growth rates. The outlook is not clear.

«Stars». Under conditions of substantial investment, they show high sales growth and a high market share.

«Cash Cows». High market share but low sales growth.

«Dogs». The growth rate is low, the market share is low, the product is generally low profitability. Looking ahead, we note that, according to the BCG methodology, the only correct marketing strategy regarding «dogs» is the closure of such projects, the withdrawal of products from the market. Later, we will show examples of how just such a stagnant market, according to another taxonomy – «scarlet ocean», turns out to be fertile ground for the emergence of bifurcations – completely new, innovative business models.

# System dictates

Now that there are clear parallels between the life stages of social systems of completely different kinds and their products, let us describe the very phenomenon of the life cycle in the universal language of synergetics. Hoping that this will help us reach the same universal rules of behavior within different systems – projects or companies.

If we introduce some action potential (we will not go into what physical meaning this value has), then during the life of the System, the potential from the zero level reaches a maximum at the break stage, and then drops to zero (the middle plot of Fig. 10).

Formation. The main direction at the stage is expansion. The system emerges, it needs to grow, expand, take shape – and this requires resources. Expansion for systems of various nature can be territorial or market. Capture, expansion, obtaining resources from outside. Expanding your living space is the main trend. The impulse of the development of the system is directed outward – capture, conquest, expansion. Growth of potential due to the extraction of resources around. Where else can a newborn get them from!

Peak – Expansion Momentum exhausted.

Rise. Which actually means the beginning of the movement by inertia. Establishing a balance with the surrounding hostile

world, securing the necessary flow of energy from the outside. Sometimes a painful transition (breakdown) from capture to stability and protection of what has been achieved. From the era of «warriors» to the era of «administrators». From «knights» to «traders».

**Recession.** The transition to protection from external challenges, the use of extracted resources to strengthen one's own structure within oneself. Digestion of what has been achieved by the members of the system. The economy of managing – including, as a consequence, the streamlining of behavior and structure, and for this, the development of knowledge and culture is necessary. In the end, crystallization is the fixation of form, the concreting of order, patterns.

The potential, in turn, can be considered as a certain rate of entropy reduction in a particular self-organization (upper graph of Fig. 10). The system spends energy both on expansion and on the development of order, which is reflected in the form of an increase in negentropy – information, including coded in the form of scientific achievements, works of art, etc.

«Negentropy is a philosophical and physical term, formed by adding a negative prefix neg- to the concept of entropy, and denoting its opposite. In the most general sense, it is opposite in meaning to entropy and means a measure of orderliness and organization of the system or the quality of the energy available in the system.»

Initially – a minimum of order, at the peak – active ordering, including in the form of administration through a large number of laws, instructions, regulations, descriptions, etc. On the decline – necrosis, when a lot of information has been accumulated, order is cast in granite, but energy, the ability to act is no longer in the system.

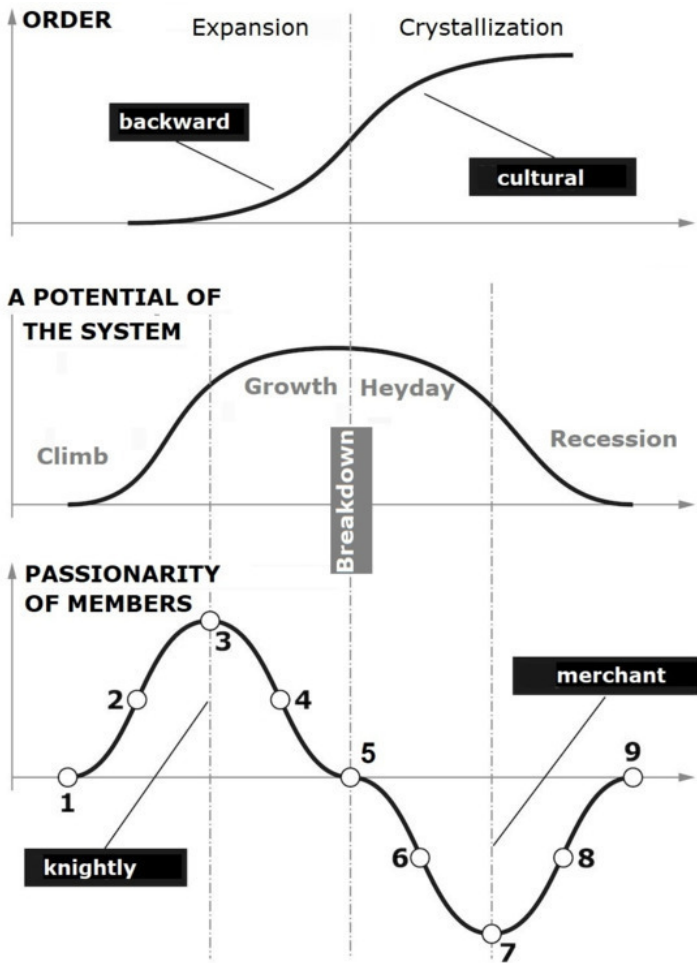


Fig. 10. Thermodynamic metaphor of Gumilev's theory

The derivative of the potential function (bottom graph of Fig. 10) reflects just the nature of people's behavior that at this stage of the life cycle most of all reflects the system's imperative – an informal collective aspiration. The vertical scale can be called the axis of passionarity, with the most active progressive/knightly activity at the top, and the most active conservative/philistine activity at the bottom.

We emphasize that, unlike Lev Nikolaevich, passionarity for us is a derivative (in the literal and figurative sense) of the systemic charge. Like electric current or temperature. As a system indicator of the internal movement of particles – people. And not vice versa – not an internal force that drives every person and thereby changes the system. And in this understanding, we consider passionarity as a systemic dominant, the result of the action of internal, so-called, feedbacks in the system – positive and negative. These feedbacks close on any members of the system – on groups and on individuals and encourage, or vice versa, suppress certain actions and ideas. Exactly how these feedbacks work is a complex question and not very important in our context. We will look at these connections in more detail below.

Now it is important to understand that the total effect of feedback on our actions in the system changes with its age! And this pressure within the system at each stage of its life stimulates different types of our behavior and our thinking.

Man, however, is not a one-dimensional, binary being: active/

passive. Our actions are largely determined by our psychotypes, various character traits and abilities.

It can be assumed that the very activity of the individual is an impulse, a vector, unchanged in magnitude, but the direction of the application of our forces changes according to the social dominant.

Passionarity, like a psychotype or character, can be a complex characteristic. The derivative of the potential can determine the projection of various personality traits that is most in demand by the current state of the system: let's put aside upwards on the vertical axis – the desire for creative activity, downwards – towards consumerism, horizontally to the left – the predominance of instinctive reactions, to the right – mental activity. Then the points on the passionarity curve will be located on approximately the following trajectory – see Fig.11.

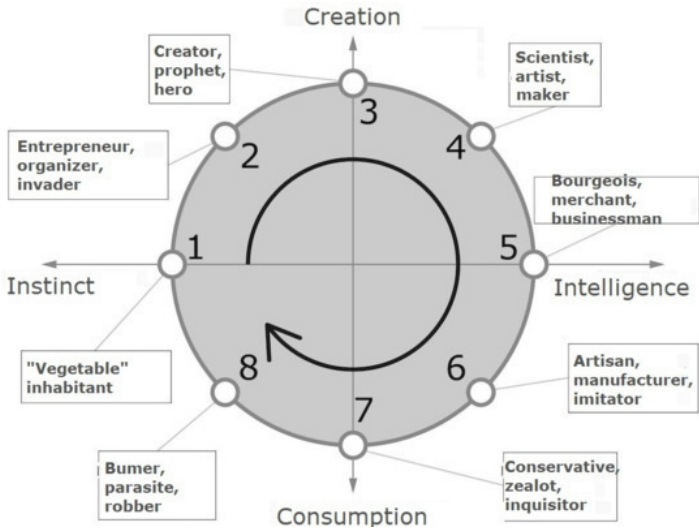


Fig. 11. Passionarity as a systemic dominant of selection

And this is already a result that can be used for self-diagnosis for the compliance of individual actions with the «age characteristics» of your company, for example.

So, each organization overcomes successively several stages of development. We – working in companies, managing companies, business owners – should first of all keep in mind that different stages of the life of our businesses are different dominant behaviors. Which means significantly different types of behavior, thinking and action that are adequate at different points in the life cycle. That is, at different times – different recipes for the success of business projects and the success of our

careers, as a result.

«There's a time to scatter stones and a time to gather stones together» [Ecclesiastes 3:5]. And these times are dictated inside, to its elements, by the system surrounding them. The next step is to take a closer look at how we feel different times, being in the thick of things.

# **Reporting from a particle**

## **Our object is with us inside**

So, nothing lasts forever – any product or company will someday exhaust its potential. They even leave the stage. And we? We want to live on, and most likely, we want to live well. Then the main interest for us is the miracle of the emergence, the birth of new systems, products, projects. To be at the origins, to be the initiator of a new business, a new project – this is the sought-for secret of entrepreneurial immortality. Unlike the barbaric times in history, when the losers lost everything forever, in business, the same people who have experience in failed projects or experience in decrepit companies can start again. Experience is always useful, and negative experience even more so.

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