Introduction to Management Cybernetics

Author: Dr. Werner Boysen





Cybernetics is a

transdisciplinary approach for exploring regulatory systems their structures, constraints, and possibilities. Norbert Wiener defined cybernetics in 1948 as "the scientific study of control and communication in the animal and the machine.

Introduction to Management Cybernetics

Motivation and Objectives of this Learning **Series**



Dr. Werner Boysen

The author's motivation for this Learning Series is to help influential people get to better decisions in our dynamiccomplex (business) world.

Motivation and **Objectives of this Learning Series**

The author's motivation for this Learning Series is to help influential people reach better decisions in our dynamic-complex (business) world.

Our (business) world is characterized by an increasing dynamic complexity which often cannot be fully understood. Therefore, this complexity is often inappropriately reduced by decision makers. Simple mental models are applied. Exponential developments, tipping points and trend inversions are often not recognized, underestimated, missed, ignored or faded out.

Such wrong understanding and handling of complex interrelations may lead to wrong decisions and illusory solutions. We observe and suffer the consequences in bad politics, in climatic changes, in dealing with raw materials and in the management of companies.

We do not treat the roots of aberra- Nitrate diffuses into the soil very tions, but impose covers on acutely arising symptoms. For example, funds are created to compensate Brazilian farmers for economic losses in soja cultivation for large food companies due to the forest clearance – instead of preventing the forest clearance. The system will tip. The Amazon forest will become a steppe. We are destroying our livelihood.

The consequences of our activities appear with delay and have a caster effect. That makes it difficult to enforce effective measures.

An example is the high nitrate pollution of our ground and drinking water by using too much fertilizer. Another example is the global warming taking course exponentially by human intervention in natural regulation systems. We can also observe undesired developments in companies caused by harmful management.

Usually noticeable phenomena appear with a delay and are ignored or suppressed for a long time. The later counter measures are introduced, the more dramatic measures have finally to be taken to reach the "green area" again. Often it is not possible at all. The **phenomena continue to** have an effect.

slowly and seeps into the ground water many years after having been applied in agriculture. But then the nitrate concentration in the ground water further increases although no additional fertilizer is applied.

Counter-measures are often taken too hesitantly and not with the necessary enthusiasm.

Unfortunately, people introduce measures too hesitantly and only if the pain cannot be cushioned any more. And people often do not wait until their measures show effectiveness, but skip over the measures too early because they do not understand the interrelations and they are not patient enough to wait for the results of correct decisions.

As effective decisions normally imply constraints, they are unpopular and harm the decision makers. To avoid personal consequences, right decisions are often softened, are not implemented with the necessary enthusiasm and fail to meet their objectives while the underlying problems become worse.

In many cases, decision makers "buy" apparent carefreeness and take comfort in continuing to consume resources. Human beings also belong to these resources, suffering physically and psychologically from enduring problems. Apparent solutions cause further cascaded problems.

Major problems require holistic solutions and well coordinated processes, also in companies.

People often try to tackle global problems with local measures, which cannot be successful. For example, a German solo attempt cannot resolve the global climate problem. A global alignment often fails because of diverging interests and (too) long decision-making procedures. Serious problems are often not solved because of relatively unimportant rivalries.

Because many problems are complex, measures have to be set up holistically. This also applies to developments and changes in companies. As in topics with global relevance, highly qualified experts also act in companies within their departments; the large levers for improvement are the capability to consistently embed companies in attractive markets with high potential and in achieving a high-quality alignment among specialists - with the background of a mutual goal.

I. Why we need Management Cybernetics

How can you

benefit from

this Learning

Every learning session

can be completed in 15

minutes. Hence, working

2.5 hours of your time.

on the content of each

session and transfer the

recommendations to your

own business and to your

specific challenges. Build

your growing business case!

through the full series of 12

• To make the most of it, reflect

learning sessions will require

Series?

What you can What you expect from this Learning Series

The objective of this Learning Series is to set stimuli for self-reflection and to offer references for benchmarking organizations in dynamic-complex environments.

- This learning series provides a compact view of management cybernetics.
- Within the scope of this Learning Series it is not my intention to deliver a detailed blueprint for implementation, but rather stimuli for selfreflection and references for a rough benchmark for your organization. For further details, feel free to contact me.
- Many management areas are touched on in this Learning Series, but I consciously avoid an outright management revision course; this Learning Series rather **highlights** the cybernetic specialties in each of these areas.

benefit from this Learning Series

By working through my Learn- • ing Series about Management Cybernetics, you will be able to considerably improve the quality of your business.

- You will recognize that dynamic complexity is increasing.
- You will understand why traditional management does not work in dynamiccomplex environments and that we need cybernetic thinking in management.
- You will learn the necessary basics about cybernetics and will be introduced to the most relevant aspects of cybernetics in management.
- You will gather useful additional techniques for improving your management skills.
- You will become familiar with practice-proven methods and tools to improve the quality of the dynamic-complex system and to lead systems.
- You will get relevant sources for further reading about each topic.

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for the new releases of this Learning Series!

Coping with dynamic complexity

Integrated IT workflow applications

est-practice leadership cybernetic organizations

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1

Introduction to Management Cybernetics

Why We Need Management Cybernetics





Learning **Objectives** Session I

In this section...

- You will learn why linear causeand-effect thinking does not lead to sustainable results in a dynamic-complex world
- You will be introduced to basic terms of cybernetics
- You will get a first glance of how organizations in dynamiccomplex environments can be successfully managed

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2. How Does the Cybernetics Approach Work? PAGE 20

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Our thinking patterns do not work any more because our world is de-materilizing,

1. Why Management **Cybernetics?**

Many of our "thinking patterns"

...only work reliably in steady environments with mostly linear cause-and-effect relationships

...date back to former times when ad-hoc solutions were required without considering network effects

... are the wrong orientation frame and lead to wrong conclusions in complex environments

Many of our thinking patterns endanger the survival of organizations. The relevance of tangible assets is decreasing!

Our complex world is not explained by the properties and the capabilities of its elements, but by the properties and the capabilities which arise from the relationship between these elements (emerging properties).

Therefore, the new sources for value are:

- Individuality, plurality and diversity ("both ... and ..." instead of "either ... or ...")
- Interdisciplinary work
- Relationships in open networks
- Communication along processes
- · Intangible values (intellectual property, contractually secured rights etc.)

Why are these patterns no longer effective?

Managers should make sure that these sources are explored!

They should learn to think in complementary dimensions!

...and because networks increase the complexity and create uncertainty. - By nature, we will not be able to dominate the complex world.

- Networks cause mutual effects and direct and indirect feedback on their own actions.
- In networked structures effects on actions can appear in random places and at random moments.

sub-prime crisis in USA 🕤 worldwide financial crisis 🕤 Worldwide economic crisis 📀 national cash nutrition 📀 risk of inflation
subsequent effects?

• The effects can crop up in completely unexpected magnitudes (the "butterfly-effect").

"Even if the complete information of all elements of this complex system were available, we could not predict the behavior of the system."





Even though all rules and basic conditions are known, by nature, the future cannot be predicted.

Nescience

It is not possible to predict how the dune lines will develop. (Photo: Namib panorama)

- **Bad News:** There is uncertainty and it is unavoidable.
- **Good News:** It is exactly this uncertainty that enables evolution!

"It is not necessary to predict the future, but it is advisable to be prepared for probable scenarios. Making assumptions about the future means thinking about possible scenarios and their consequences."

Wisse Dekker, CEO Philips 1982-1986, Chairman European Roundtable of Industrialists 1988-1992)

We should realize that we are parts of our world. We cannot "outsmart" our world without suffering the consequences.

The top objective of all systems is to survive.

Our nature is capable of surviving by dint of an adaptive and dynamic evolution, driven by complexity. The species-rich and networked nature is "living" the complexity - unlike human beings, who tend to inappropriately simplify interrelations and to opt for short-term objectives, jeopardizing long-term survival. Human beings rather act as if they are not operating within systems, but are in fact dominating the systems from an exterior and higher position. That cannot work well. We are all parts of our world. All our decisions and actions have repercussions for us.

Cybernetics offers methods to achieve organizational stability and sustainability.

Our society is a system, and our companies are also systems. Both are best defined as communicative feedback systems. The larger and the more complex organizations become, the more their behavior and their performance are defined by the quality of the feedback between their members (citizens, employees, departments etc.) and towards their environments.

Communicative feedback systems





I. Why we need Management Cybernetics

Organizations led in line with the cybernetics approach develop resistance to disturbance and disruption. They always find new stabilities.

2. How Does the Cybernetics Approach Work?

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The tricky thing is that organizations **need a certain complexity** (variety) to install possibilities with which to cope with the complexity of their environment

William Ross Ashby

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However, the more complex organizations become the more difficult it is to manage them with conventional means

Heinz von Foerster



I. Why we need Management Cybernetics

Attentively "listening" at the interfaces, they perceive opportunities for adapting at all times in order to find the best balanced result. Consequently, the system's behavior and its performance results from an agile circular interaction between the "elements" instead of from topdown instructions

Complexity also means diversity. The more experience, insights and cultural views, the more successful well-balanced decisions and action become. Allow your organization the needed variety to become self-controlled.



Ensure that all processes are clearly defined, well interlinked and regularly kept updated. Advocate an effective organizational

Strive for this complexity in your organization and make sure that the risk is managed within the organization (thinking in probabilities, hedging and/or sharing of risks etc.). Allow for redundancy which can support the organizational stability.

Promote individual responsibility and grant the necessary authority to the people to take well balanced decisions at the respective operative level (subsidiary principle). Only intervene as an exception. Accept the **black-box-phenomenon** (Stafford Beer).

The challenge for top management is to initiate top-down the move towards self-regulation and to monitor carefully how the system is performing in terms of adaption (surface behavior). "The purpose of a system is what it does!" (Stafford Beer)

organization has to be continuously on the move and constantly find "floating equilibrium" (homeostasis according to Karl Ludwig von Bertalanffi). This so-

methods in order to improve the capabilities of further sharpening processes

Questions for Reflection

- 1 Please, draw your organization as a system of interacting elements.
- 2 Evaluate the quality of the communication in your organization.
- **3** What makes your organization special?

4 How well embedded is your organization in its environment?

How flexible and adaptable is your organization? What do you do to achieve and to keep the needed adaptability and capability for development of you organization? I. Why we need Management Cybernetics

Summary of Section

- The author's motivation for this Learning Series is to help influential people to improve their decisions in our dynamiccomplex (business) world.
- The objective of this Learning Series is to set stimuli for self-reflection and to offer references for benchmarking organizations in dynamic-complex environments.
- By working through my Learning Series about Management Cybernetics you will be able to considerably improve the guality of your business.
- Cybernetics can provide useful additional techniques to improve your management skills.
- Our **thinking patterns** no longer work because our world is dematerializing and because networks increase the complexity

and create uncertainty. We will not be able to dominate the complex world.

- Even though all rules and basic conditions are known, by nature, the future cannot be predicted.
- We should realize that we are parts of our world. We cannot "outsmart" our world without suffering the consequences.
- Organizations led in line with the cybernetics approach develop resistance to disturbance and disruption. They always find new dynamic stabilities.
- Allow your organization the necessary variety to become self-regulated.
- The management's task is to initiate selfregulation and to keep it running by making sure that enough information and energy are added.

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2

Introduction to Management Cybernetics How to Implement Cybernetics in a Business



Learning Objectives Session II

In this section...

- You will get to know the crucial difference between indicator parameters and flow parameters
- You will learn the significance of well-aligned operational functions for sustainable results
- You will be introduced to the elements of a proven model kit for a cybernetic organization set-up

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1. Why Management Cybernetics? PAGE 34

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Management Cybernetics offers methods to achieve organizational stability.

1. Why Management **Cybernetics?**

1. A corporation's top objective is to survive - to do this, it is necessary to have a sustainable and good financial result.

2. The required pre-conditions are a sufficient order intake, a sufficient gross margin and an effective and efficient order execution.

Many managers tend to directly call in results on target figures. They do not realize that these target figures are just the result of the underlying complex interactions. The target figures only serve as indicators, but not as levers. The next level down also usually just consists of non-operable recording parameters.

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The key management task is to identify the flow parameters and to optimize their operational alignment within the market context. In enterprises, these flow parameters are the effects of the operational functions.

Management cybernetics is about optimizing the information flow between these operational functions. According to Stafford Beer, an enterprise is an emergent system that does exactly what is defined in its information flow. Thus, the properties of an enterprise are defined by the interaction of its operational functions.

"Cybernetics and good, effective management are identical" (Fredmund Malik, Führen, Leisten, Leben, p. 28). We should overcome the "old" mechanistic way of thinking and "think and act in systems".



II. How to implement cybernetics in a business

3. These pre-conditions can only be fulfilled by a well-aligned dynamic-com-plex interaction of the operative functions along the business process...



4. ...within the given market conditions.

5. Not all variables are suitable for management action. We should distinguish between flow parameters and indicator parameters.

Flow parameters

These parameters significantly influence other param-These are parameters which are influenced by many eters. Their settings can be influenced by the actors. other parameters, but do not influence other parameters. Indicator parameters record the result of the **Critical parameters** interactions of flow parameters. They show the status Critical parameters are a special subset of flow and their changes over time show the development parameters. Critical parameters influence many of the system.

other parameters and are influenced by many other parameters. As the behavior of a system is particularly influenced by the interaction of such critical parameters, the highest attention should be paid to the critical parameters.



Indicator parameters

6. We can neither directly act on the objective nor on the indicator parameters; we can only influence the flow parameters.



Effectiveness

- Timing of the effect
- Direction of the effect
- Function of the effect
- stabilizing dynamic

1. If the operational output is poor, ...

- If customers are not happy because of delayed delivery,
- and/or the quality does not meet the specifications,
- · and/or the staff is not satisfied because their activities are not well coordinated, resulting in extra work and unplanned overtime,

then there is no point in inviting customers to a formula 1 race or arranging a team-building event with the staff. That will not solve the underlying problems.

The customer and the staff satisfaction are just objectives and not operable levers.

2. ... dig deeper to really understand the system (Jay Wright Forrester).

Instead, have a look at the classic indicators "Cost", "Processing Time" and "Quality".

But be aware that these indicators are just recording parameters; they are also not operable levers.





3. In particular, check whether the management is able and willing to understand the system.



You should start to scrutinize the management's awareness of the reciprocal effects as the most important pre-condition for any improvement.

When you are sure about the management's awareness, design the processes and carefully define the communication around the interfaces.

Then introduce stabilizing feedback mechanisms (e.g.: traffic light systems).

II. How to implement cybernetics in a business



4. Design the system's "in-betweens": processes, communication, especi-ally feedback, multi-project management, and leadership.

the defined process as smoothly as possible by appro- And last, but not least: promote good leadership. priately designing the resources in each process step.

Finally, make sure that competing projects run through Support the feedback with the right IT applications.

5. You now have a suitable basic cybernetic setup. Cost, processing times and quality will improve, resulting in staff motivation and a better image.

Success will further boost the improvement as it will lead to a circular feedback to the management set-up and the systems services.



Always start by ensuring that the management is ready for a cybernetic approach.

The approach to a cybernetic set-up works in the same way as the approach to a restructuring project: Staying at the surface is just like fighting against symptoms.

You should go back to the roots!



II. How to implement cybernetics in a business





Questions for Reflection

- 1 Please, list up the most relevant flow parameters in your organization which are suited to influence the results.
- Write down the external factors your organization must take as given.
- Is your management open-minded for a cybernetic mode of operation?
- Are the processes in your organization designed in an integrated way? How well are the processes geared with each other?

Summary of Section

To improve the resilience of your organization, build a cybernetic management set-up and identify and operate the effective flow parameters.

- A corporation's top objective is to survive

 to do this, it is necessary to have a
 sustainable and good financial result.
- The required pre-conditions for sustainability are a secured sufficient order intake offering sufficient gross margin and an effective and efficient order execution.
- These pre-conditions can only be fulfilled by a well-aligned dynamic-complex interaction of the operative functions along the business process within the given market conditions.
- Not all variables are suitable for management action. We should distinguish between flow parameters and indicator parameters. We can neither directly act on the objective nor on the indicator parameters; we can only influence the flow parameters.

- Optimize your system by really changing the basic conditions, instead of trying to realize changes with inappropriate basic conditions.
- The management's task is to initiate selfregulation and to keep it running by making sure that enough information and energy are added.
- Always start by ensuring that the management is ready for a cybernetic approach. In particular, check whether the management is able and willing to understand the system.
- Design the system's "in-betweens": processes, communication, especially feedback, multiproject management, and leadership.
- You now have a suitable basic cybernetic set-up. Cost, processing times and quality will improve, resulting in staff motivation and a better image in the eyes of your customers.

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3

Introduction to Management Cybernetics

The Cybernetic Strategic Set-Up





Dr. Boy

Learning Objectives Session III

In this section...

- You will learn how you can naturally find and follow your strategic
- You will learn how to maintain strategic flexibility and adaptability
- You will learn how to stay successful in your strategic partnerships
- You will learn how to install an effective innovation process and to derive compelling products and services for your target markets

Index III

"Structure Follows Strategy" раде

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Demand-based strategy should be implemented by means of the business process, while the corporate structure should best support the processes.

"Structure Follows Strategy"

Alfred D. Chandler



"Embed" your organization in the market by creating value for the market participants and stakeholders

- According to the subsidiary principal, every organization is fully responsible for its own success. Do not blame markets or other players for your failure.
- Every organization is just a part of its environment. To be successful, it should add value to its environment (private and public stakeholders, customers, suppliers and partners, employees). What is your added value (unique selling propositions (USPs)?
- Companies which add value are in demand and are supported and sustained

Feed your business with descriptions of "future scope" with highly probable, consistent parameter values by means of a corporate foresight dialogue.

To prepare for an uncertain future ...

- Install a continuous multi-dimensional and interdisciplinary strategic "foresight" dialogue in your organization. Establish a kind of thinking in contexts, in complex interactions, in contrasts and in paradoxes to better acknowledge the "insight horizon" of your organization.
- Introduce new aspects for corporate development and prepare the future corporate path by developing an open communication concerning connected developments and the limits of your own operations.
- Feed topics with medium-term horizon into the discourse about the operative business.

- **by their environment.** Critical question: "What would our environment miss if your company did not (yet) exist?"
- Develop a clear profile in your market and communicate it. Decide what you should not do (anymore) by yourself and, if necessary, develop partners for these activities.
- Contribute to value in networks.
- Look for natural lock-in effects through performance, trust and reliability. Do not rely solely on formal contracts (e.g.: acceptance duties).

- **Replace "uncertainty" by "probability":** Probability is calculable. By applying probability, the future loses its cloudy appearance.
- Methodological tool-box for corporate foresight:
 - Scenario technique, based on legal, political and technology scouting, literature research, trend survey (exponential developments, disruptions, inversions) by Delphi surveys, technology surveys, wildcard analyses, statistics, information theory etc.
- Choose a solid balance between scientific expectations and practical relevance



Include the "blue oceans" approach in your considerations, equipping your organization with an "osmotic skin" and a continuous open discourse.

- **Describe "future scope for possibilities"** with highly probable, consistent parameter values for influencing factors, trends and possibilities
- Identify potential business areas (new services, new markets, neighboring markets) for "blue ocean" opportunities (untapped demand) and derive conclusive and consistent strategies, also considering co-operations in partnerships and networks. The Business Model Canvas methodology can help you to structure the process (see attachment).
- Crystallize future-orientated innovations.

- The combination of insights leads to a coherent corporate mindset concerning descriptors for the future, including possible disruptive incidents with serious effects, so-called "wild cards". Make sure that weak signals for wild cards are perceived by your organization and that opportunities are capitalized and risk is actively managed instead of being avoided.
- In cross-border relationships, the intellectual capital increases by sharing it.
- At all times, stay strategically flexible and capable of adapting to changing environmental conditions.

Consider the basic conditions in co-operation relationships and try to influence them in your favor by means of game theory and statistics.

- **Consider the game you are in**. Do you want to stay in this game? Are there other, better games? Are there better customers or even markets?
- Find out who is defining the rules in the game you are in? Can you influence these rules?
- Can a supplier be a customer at the same time?
 Can a competitor be a co-operation partner
 ("co-opetition") or a customer at the same time?
- What is the strategy behind decisions? Do you see the "big picture"?
- Which trends can we identify?
- In networked markets and in organizations decisions have to be made in situations

Provide the basic conditions for innovation, supporting a structured innovation process leading to precise fulfilment of market requirements

- Define your strategy position and derive the innovation objectives regarding products, processes and the structure of your organization directly from your strategy position.
- Define an innovation team, consisting of the Managing Director and representatives of Sales, Product Development/Engineering, Production, Finance and Controlling. Define the rules for the decision-making process. Crucial to success is the well-coordinated organization of innovation!
- Invite all employees, but also customers and suppliers, to come up with ideas for innovation, best thinking in solutions and not in product categories.

- of strategic interdependency with asymmetric information, often not leading to the best possible solutions.
- Try to understand the balancing act and often the dilemma between individual logical rationality and collective damage.
- Make use of game-theoretical analyses to analyze the structure of interactions and to find solutions.
 Statistical data can also be helpful.
- Use institutions, social norms, social sanctions and also the self-organization of co-operation to cope with public goods problems.

- Introduce a checklist for describing innovation ideas in a simple, but structured way (see attachment).
- Establish a defined stage-gate process for all innovation ideas (see attachment).
- Define and implement a practice-orientated innovation process, including the identification of the idea, the evaluation, the sign-off procedure, the cycle times, the meeting frequency and all respective responsible functions.
- Fill the process with life: Look for precise requirement profiles backed by the market/customers. Do not forget to protect your intellectual property.

Checklist for the Descriptions of Innovation Ideas

Label of the idea			
Type of innovation			
Product innovation			
completely new product			
new product feature/attribute			
New application of an existing product			
Process innovation			
Service innovation			
New revenue model			
Degree of the innovation			
Novelty in the market			
Imitation of market-proven features			
Potential			
One-off effect			
Repetition and scaling potential			
Estimates additional revenue potential	kEUR/year		
Estimated annual cost saving potential	kEUR/year		
Target market/target costumers			
Target market			
Target costumers			
Who had the idea?			
Date			

Stage-gate Process:

Example for Innovation Sign-off of Innovations

	Sign-off Phase	Content oft the Phase
	1	Basic acceptance and sign-off for market analy conception and first investment calculation
	2	Sign-off for engineering, business model spec
	3	Sign-off fort he realization of prototypes (produ features, business model with a lead costume
	4	Sign-off for commercial readiness, maker-or-b
	5	Sign-off for market roll-out
	6	Succes monitoring

The "Business Model Canvas" (BMC) method allows and supports a systematic approach to strategy, starting in the market.

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Main activities	Value offer
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Based on Alexander Osterwalder and Yves Pigneur, https://www.startplatz.de/startup-wiki/business-model-canvas/

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ouy decision

Sub-Organization:



Questions for Reflection

- 1 Is the strategy of your organization explicitly formulated?
- Is each of the members of your organization aware of the strategy and is it understood, accepted and supported by everybody?
- 2 How well do the processes of your organization support and foster the implementation of the strategy?

- Which are the most relevant result drivers?
- 4 Are the key partners co-operating with your organization suitable to implement the strategy?
- How does your organization acknowledge the need for strategic correction?
- 6 How is the innovation process defined in your organization? How is it "implemented"?

Summary of Section

A demand-orientated strategy is always the first step to embed your organization in markets. Focus on solutions for customers; skip all the rest.

- A demand-based strategy should be implemented by means of the business process, while the corporate structure should best support the processes.
- Embed your organization in the market by creating value for the market participants and stakeholders
- Feed your business with descriptions of "future spaces" with highly probable, consistent parameter values by means of a corporate foresight dialogue.
- Use cross-border relationships to increase the intellectual capital by sharing it.
- Include the "blue oceans" approach in your considerations, equipping your organization with an "osmotic skin" and a continuous open discourse.
- Make sure that weak signals for wild cards are perceived by your organization and that opportunities are capitalized and risk is actively managed instead of being avoided.

Establish a strategy-driven innovation process, involving the whole organization. Be alert to any changes in strategic partnerships.

- Consider the basic conditions in strategic partnerships and try to influence them in your favor by means of game theory and statistics.
- Provide the basic conditions for innovation, supporting a structured innovation process leading to precise fulfilment of market requirements.
- The "business model canvas" method allows and supports a systematic approach to strategy, starting in the market.

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Introduction to Management Cybernetics Management's awareness for reciprocal effects



Learning **Objectives** Session IV

In this section...

- You will learn about managers' limited direct influence on the properties and capabilities of their organizations
- You will acknowledge the need to perceive the "big picture" and operate in an integrated way
- You will understand the significance of variance and the need for complexity
- You will get to know "CyberPractice", a proven management model

Index IV

1. Why Awareness of Reciprocal Effects? PAGE 14

The Management Model "CyberPractice" PAGE 18

Questions for Reflection PAGE 22

Summary of Section PAGE 24

Relevant Sources for Further Reading PAGE 25





The sustainability of enterprises strongly depends on the management's awareness of reciprocal effects and their leadership attitude.

1. Why Awareness of Reciprocal Effects?

- Living beings in nature adapt to changing environmental conditions and dynamically improve their capabilities. Evolution works because the full complexity in the eco-system of the interaction between all plants and animals happens naturally.
- In human society, as in politics and in enterprises, it is different because humans tend to improperly simplify existing complexity, leading to myopic decisions which do not consider the whole pattern of interlinked effects. This creates cascades of knock-on effects.

The better we acknowledge the complex reality, the more effectively we can decide and act.

Therefore, nature has the edge over societies with human involvement.
Stop believing that you can solve the problems because you are in a management position. Try to understand and to use your system!

Managers are paid for results. The sad fact is that a single person can never have the overview of the whole picture in order to take good decisions alone.

"The image of the world around us "People are only role players in a which we carry out in our head is system. They act within the system, just a model. Nobody in his head even though they believe that they imagines all the world, govern- are managing it. This is not a popument or country. He has only se- lar idea for those who believe that lected concepts and relationships they are real "men of action" between them, and uses those to represent the real system"

Jay Wright Forrester

Our decisions and actions have reciprocal effects. Make decisions based on expected longterm effects, not for apparent quick results.

"Everything is connected to "Science" is derived from the everything. It is not that A acts on Greek "ski" that means "cutting B, or B on A, but everything si- off". This illustrates that we are multaneously affects everything rather used to analyzing sections else. Jupiter is far away; never- of our reality instead of trying to theless, our personal decisions capture the whole picture. Managand actions have an effect on ers should seek to recognize rela-Jupiter and vice versa"

tions and interactions, instead of thinking in a mono-causal "cause and effect"-scheme"

Heinz von Foerster

Use the knowledge and the experience in your system as the key source for good and sustainable solutions.

The specific interaction of a sys- "The purpose of a system is what tem's elements defines the proper- it does." ties and the behavior of the system.

Stafford Beer

In complex environments, the complexity of your organization is the basis for survival. Increase the degrees of possibilities for action (variance)!

tem should be at least as high as to find solutions! the variance of the emerging disturbances to be able to control them"

Do not try to replace complexity

by mono-causal reasoning. Accept

complexity. You cannot reduce it.

Build at least the same complexity in your organization as the

environment of your organization

Promote open interaction within

your organization. Foster diver-

sity! Facilitate inter-disciplinary

discourse. Build trust in the joint

competence of your teams by in-

William Ross Ashby

possesses.

"The variance of a controlling sys- viting and authorizing your teams

Promote far-sightedness and attentive behavior.

Allow initiatives at the borders of your core business activity, because innovation arises from the borders - from the interfaces with others.

Strive for well-aligned decisions involving all relevant needs and interests.

In dynamic-complex environments, do not try to strictly follow a plan, but always be alert to spontaneously arising opportunities and threats! Make use of the power of the moment!

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Do it like nature does: Use your staff's competence in a cybernetic discourse and achieve well-aligned and sharpened solutions with high staff acceptance.

The Management Model "CyberPractice"



Formal Management

- · Managing Director
- · Business Unit Directors
- · Department Heads

Self-regulation needs a starting impulse from top management. Are you personally ready for cybernetics?



Heinz von Foerster

"Everybody in the company should act as a manager - in their expert role and regardless of their hierarchical level!"

"If everybody is a manager, selfregulation arises; a circular interaction is implemented in which everybody steadily influences everybody in the interest of the company."

In a world characterized by uncertainty, your "Inner Form" becomes in-creasingly relevant for your orientation and to become effective.

"We build a personality cult around the conductor, but we should know that not he makes the music, but the music makes him."

Bernd Linder-Hofmann et al.: Integrale Aufstellungen, p. IX

The Western Way

"Scientific" approach, based on functional skills and oriented towards benefit, measured by the criteria of efficiency and effectiveness, making use of all resources.

- In turbulent environments, gain your own orientation from your inner balance - your "Inner Form" (Linder-Hofmann, Zink).
- Be present and alert, supported by your awareness that you are connected with

The Eastern Way



A relationship approach requiring parties to cooperate, to develop ideas in co-existence with different opinions, to pause for a moment, to disengage and to get involved again, to tolerate and to resist.

everything, by your attitude of attentiveness and by an integrative comprehension of the world.

• Do not try to be the hero. For effectiveness and sustainability, rather rely on your organization and on your personal relationships.

Questions for Reflection

- 1 Are you aware of the degree your management unerringly acknowledges market developments and tendencies within the organization?
- 2 To which degree is the mode of operation in your organization initiated by the employees?

3 Does the capability of reaction correspond with the possible market scenarios (e.g. loss of an important customer, decrease of the demand for certain technologies or certain techniques)?



5 How punchy is your organization?

Summary of Section

- Stop believing that you can solve the problems yourself because you are in a management position. Try to understand and to use your system.
- Our decisions and actions have reciprocal effects. Make decisions based on the expected long-term effects in the system, not for apparent quick results.
- Use the knowledge and the experience in your system as the key source for good and sustainable solutions.

- In complex environments, the complexity of your organization is the basis for survival. Increase the degrees of possibilities for action (variance).
- Do it like nature does: Use your staff's competence in a cybernetic discourse and achieve well-aligned and sharpened solutions with high staff acceptance.
- Self-regulation needs a starting impulse from top management.
- In a world characterized by uncertainty, develop your "Inner Form" for your orientation, in order to make good decisions and to become effective in a natural way.

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5

Introduction to Management Cybernetics

Systems thinking





Learning Objectives Session V

In this section...

- You will understand the effect of positive and <u>negative</u> feedback loops
- You will get an understanding of the "system dynamics" method to model and simulate the behavior of (complex) systems
- You will become aware of system dynamics resulting in exponential developments, tipping points and trend inversion

Index V

1. Why "Systems Thinking"? PAGE 14

Questions for Reflection PAGE 24

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Relevant Sources for Further Reading PAGE 27

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The sustainability of enterprises strongly depends on the management's awareness of reciprocal effects and their leadership attitude.

If you do not wait with reinforced action until your basic action becomes effective ("time-delayed balance"), the result may become uncontrollable.

1. Why "Systems Thinking"?

- "Systems Thinking" is a disciplined way of understanding dynamic relationships in order to make better decisions and to avoid undesired consequences.
- With the help of Systems Thinking practitioners gain a better understanding of interdependent components which make up a system and this enables them to recognize levers for effective action.
- We constantly create mental models without being aware of doing so. But research has shown that we are not always good at understanding the implications of our mental models.
- By creating a "computer model" which corresponds to our mental model we can simulate scenarios and achieve analytical results which are not biased by personal influences.
- System Dynamics is a method of implementing systems thinking with the aid of computers. This is particularly useful in the event of complex problems.

Approach to solution: Observe the effect of introduced measures before reinforcing the action.



Approach to solution: Active de-escalation by an intermediary; avoid future escalation by introducing negative feedback mechanisms.

You can only act in a system-orientated way and compensate deviations if you acknowledge the behavior patterns.

terns which can be copied into terns (The fifth discipline). qualitative models.

terns have to be identified within patterns. their structures.

Typically, complex systems are Peter M. Senge systematically driven by repetitive behavior pat- described 10 typical behavior pat-

Finally, conceptual approaches to To purposefully change the behav- solutions are drafted to facilitate ior of systems, these behavior pat- the handling of these behavior V. Systems thinking



Relatively successful systems enjoy a larger feed of resources, making them even more successful ("success for the successful").



Approach to solution: The disadvantaged party can improve its position only by a strongly motivated survival fight (increasing performance, high creativity, smart positioning), if the constellation is not balanced out by the intervention of a higher-order institution (e.g.: the state, competition/cartel law).

If stability is required, positive feedback mechanisms should be replaced by negative ones ("limit to growth").



Homeostasis: Coping with crisis by limiting or replacing positive feedback mechanisms by negative, stabilizing feedback mechanisms (homeostatic equilibrium = floating equilibrium)

The "treatment of symptoms" may result in a temporary alleviation, but it leads to the dependence on further treatment of symptoms.



Approach to solution: An intensive discussion of the situation's real complexity can help to acknowledge and to accept the true cause of the problem. An extensively applied system analysis, even utilizing the collective intelligence of teams, should be preferred to short-sighted measures.

Inappropriate corrective measures can - in the course of time increase problems, even though the problem seemed to be solved.



Approach to solution: Introduction of mechanisms ensuring that initiatives are always scrutinized as to whether they contribute to success or not. Avoid the perception of any illusory stabilization. Decide as close as possible to the point where things are taking place.

If you do not wait with reinforced action until your basic action becomes effective ("time-delayed balance"), the result may become uncontrollable.



Approach to solution: Keep the objectives valid and scrutinize whether all possibilities to act have been tackled (different approach?). But do not "hunt a phantom": If it becomes evident that the objective cannot be achieved, set realistic ones (different direction?).

Two inherently stable systems linked by means of a variable can wind each other up ("escalation").



Approach to solution: Mitigation by a sound analysis and alignment of the system resulting from the cooperation; make sure that future cooperation relationships are equipped with stabilizing negative feedback mechanisms.

If you do not wait with reinforced action until your basic action becomes effective ("time-delayed balance"), the result may become uncontrollable.



Approach to solution: By a meaningful alignment among the involved parties (comprehension) cyclical oscillation can be reduced and a quasi-stable situation around the optimum can be maintained; an intervention can mitigate the situation.



Approach to solution: As resources become scarce, transitional decreasing capabilities and results should be accepted while new resources are made available. This step should be regarded as an investment in a new prosperous phase.

With "System Dynamics" methodology, dynamic-complex systems can be modeled and their behavior can be simulated.

- System Dynamics is a methodology developed by Jay Wright Forrester at the Sloan School of Management at the Massachusetts Institute of Management (MIT) for the holistic analysis and simulation of dynamic-complex systems.
- The effects of management decisions on the systems' behavior can be derived from the simulation.

- Qualitative models
 (influence diagrams):
 - » Help to generally discuss dynamic-complex problems and to identify feedback and missing feedback in the processes

Quantitative models

» Offer quantitative

scenario analyses,

» Help to substantiate

corporate, political or

ecological planning

forecasts and insights

- » Can provide valuable insights and lead to mind changes
- » Can easily be transferred in equations and are the basis for quantitative models

Meanwhile, appropriate system dynamics software is commercially available.

Proven SD software					
ANYLOGIC	Agent-based SD simulation, Java-based				
HERAKLIT	Authoring software for simulation and strategy games				
IMODELER	Java-based SD tool for qualitative cause-effect analysis				
ITHINK UND STELLA	SD simulation tool	isee Systems			
POWERSIM	SD simulation tool	Powersim Software AS			
SAVANNAH SIMULATIONS AG	Simulation software for traffic planning, city planning, Production and supply-chain management				
VENSIM	SD simulation tool	Ventana Systems Inc.			

With SD software, challenging dynamic-complex systems can be modeled and simulated. Some experience is necessary for meaningful models.



Example of an SD model. Source: https://www.semanticscholar.org/paper/On-developing-system-dynamics-model-for-business-An-Jeng/8e-7ab9136fe0baf7794c0e1a6e15f193c9015133/figure/3

SD has successfully been applied to meaningful complex topics and has led to significant insights.



Limits to Growth, 1971.

• Given business as usual,

i.e., no changes to historical

growth trends, the limits to

evident by 2072, leading to

"sudden and uncontrollable

decline in both population

and industrial capacity".

growth on earth would become

Results





Extract

successfully be applied to solve business and organizational problems.

Industrial Dynamics, 1991.

Explanation of how SD can

John D. Sterman.:

Business Dynamics – Systems thinking and modeling for a complex world.

BUSINESS

DYNAMICS

Modeling for Complex World

Systems Thinking and

Extract

System dynamics is both a currently utilized approach to organizational problem solving at the professional level, and a field of study in business, engineering, and social and physical sciences.

Questions for Reflection

1 Does your organization think in system contexts?

2 How well are the decision makers in your organization aware of the limits of their mental models in a dynamiccomplex world?

- Growth trends existing in 1972 could be altered so that sustainable ecological and economic stability could be achieved.
- The sooner the world's people start striving for the second outcome above, the better the chance of achieving it.

V. Systems thinking

3 How well are the effective relationships in your organization really known?

4 Have you ever modeled important dynamic relationships and simulated scenarios to support decisions?

Summary of Section

- "Systems Thinking" helps to perceive the big picture of interrelations and interactions instead of "stopping short" and analyzing only fragments.
- You can only act in a system-orientated way and compensate deviations if you acknowledge behavior patterns.
- Peter M. Senge systematically described 10 typical behavior patterns (The fifth discipline).
- By means of the "System Dynamics" (SD) methodology, developed by Jay Wright
 Forrester, dynamic-complex systems can be modeled, and their behavior can be simulated.

- Meanwhile, appropriate SD software is commercially available.
- With SD software, challenging dynamic-complex systems can be modeled and simulated. Some experience is necessary for meaningful models.
- SD has successfully been applied to meaningful complex topics and has led to significant insights. For example, in 1971, Donella and Dennis Meadows conducted an SD-powered analysis about the future of humankind at Jay Wright Forrester's institute for system dynamics at the MIT, commissioned by the Club of Rome: "The Limits to Growth".

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6

Introduction to Management Cybernetics System-orientated process design and stabilizing feedback mechanisms





Learning **Objectives** Session VI

In this section...

- You will learn how to design processes in an output-orientated way
- You will learn how to avoid "blind" effort, errors and redundancy by aligning demand and possibility at the interfaces
- You will learn how to design processes as nature does
- You will be introduced to the significance of feedback mechanisms in processes and you will learn how to establish effective feedback in practice

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a. Bullwhip Effect and Processes PAGE 101
b. Contribution of Business
Processes PAGE 101
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Stafford Beer PAGE 103

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e. Co-ordinators as Exceptional Solutions PAGE 104

(Stabilizing) Negative Feedback Mechanisms PAGE 105

g. Responsibilities and Documents PAGE 107

h. Implementation PAGE 107



The processes bear tremendous unreleased potential for financial results and stabilization

1. Where can cybernetic processes help?

Do you sense that the potential of your staff is only partially used?

- Do you want to considerably reduce the friction in the interaction between your teams?
- Do you want to make sure that relevant information is regularly absorbed, channeled and processed in your organization?
- Do you want future solutions to be holistically set up to make sure that the corporate result is optimized?

- Do you want to ensure that resources are deployed even more sustainably than so far?
- Do you want to see that your staff finds a rewarding meaning in their activities and that managers give their employees a comprehensible orientation?
- Do you want to keep your organization adaptive and punchy?

Holistically designed processes can be kept stable and agile by real-time feedback mechanisms.

a. Bullwhip Effect and Processes

"Low operative performance and the often observed "bullwhip effect" are usually the consequence of processes not interacting well with each other rather than a consequence of market variabilities." Jay Wright Forrester

The performance can be considerably improved by a well-aligned dynamiccomplex interaction of the operative functions along the business process.

b. Contribution of Business Processes



VI. System-orientated process design and stabilizing feedback mechanisms

Think and design processes in the stress-field of expectations and possibilities at the interfaces!

c. Interfaces



- Focus your attention on the interfaces along your processes.
- · (Internal) customer expectations should be aligned with the possibilities of (internal) suppliers.

Avoid "waste" by alignment at the interfaces by thinking and designing processes starting from the customer expectations!



- Missing performance has to be added later, often by the subsequent parties along the process. Consequence: Additional cost, delay and fading motivation!
- Blind performance is not used by anybody later in the process. Consequence: Useless cost and unnecessary work load!
- The expectations at the process end (customer expectations) should define the process chain. Therefore, processes should be thought through and designed starting from the end!

Install all five core functions of living systems in the processes!

d. The "Viable System"-Approach **According to Stafford Beer**

Core functions of living systems according to Stafford Beer (observed in living beings in the nature):

- Function 1: Value-creating direct activities (fulfilment, responsibility)
- Function 2: Co-ordination of the valuecreating direct activities (communication, processes, recursion and circularity)
- Function 3: Optimizing of the value-creating • Function 5: Principle Decisions (governance, direct activities "here and now" (monitoring, policies, intervention in exceptional cases) auditing, agility, continuous improvement)

Each of these functions should be installed in the processes of organizations. Any delegation of these functions into staff positions usually does not work.

With the "Viable Systems Model" Stafford Beer laid the foundation stone for management cybernetics.

The Viable Systems Model (VSM) is a reference model for viable systems, derived from observations in nature and from system thinking

Cybernetics and Management, 1959

Stafford Beer

• Function 4: Adaptation of the value-creating direct activities ("the world of the options": market research, strategy development, R&D, organization development, cognition, innovation, evolution and creation, sustaining and changing of structures)

Ideally, co-ordination is effected by direct interaction between the operative functions; only sometimes, coordinators can help to see "the big picture".

e. Co-ordinators as **Exceptional Solutions**

If the processes are still not defined according to Stafford Beer or the organization is not yet ready for them, coordinators at the interfaces can help.

To illustrate this, look at the following examples:

Ē

1. Management of inventory volume

The management of the inventory is a typical interface topic. Purchasing adds materials, production and sales withdraw materials and warehousing monitors and books the ins and outs of the inventory. There is usually no responsibility for the inventory volume/value and for the "quality" or composition of the stocked items for operations. The stock is floating and is not optimized.

2. Customer Project Management

Customer projects should be executed along the process. Nevertheless, competing projects cause priority issues, ideally to be solved by the involved parties. In transition periods coordinators can be helpful to manage critical paths across different projects.

3. Coordinated Contract Management

Contracts with customers are usually signed by sales managers, while contracts with suppliers for fulfilling sales contracts are signed by purchasing managers. Unfortunately, both contracts are often not linked with each other "end-to-end". Financial damages from customer claims caused by non-conforming material cannot, therefore, often be passed on to suppliers. If sales and purchasing are (still) not aligned, a coordinator is useful to carry out an integrated contract management.

Pro-actively defined (stabilizing) negative feedback mechanisms help to avoid surprises.

f. (Stabilizing) Negative **Feedback Mechanisms**



· Problems are usually the result of deviations which have been recognized either too late or not at all.

Examples of topics for proactive "foresight feedbacks":

- · Will the pre-conditions (expectations) for the next process step be fulfilled?
- Will the customer's expectations from today's view - be fulfilled?

Feedback mechanisms, firmly installed in the processes, can help to avoid negative surprises.



Negative feedback loops are the essential component of control circles. They are **necessary to achieve** equilibrium states, in particular floating equilibriums, and to lead to stability.

In organizations, networked control circles with negative feedback loops should be installed.

- The earlier mistakes or delays are detected, the lower is the probability that these mistakes or delays have an effect on subsequent process steps and the lower is the cost of corrective measures.
- · Deviations should be made visible and actionable.
- · Will the relationship between value and effort be within the pre-calculation/budget?
- Will there be bottlenecks or unused resources?
- Will all necessary information and tools be available in time?
- Are guality issues becoming apparent?

Install foresight-feedback: "Will this activity be finished in-time?" to allow for preventative corrective actions.

Oscillation in negative feedback loops (hysteresis) are no reason to worry, they are a necessary characteristic of regulation.

In practice, a mix of feedback options is recommendable. They do not only reduce costly mistakes, but also foster learning effects.

Create opportunities for feedback!

- · Stimulate foresightfeedback in meetings
- Install Kanban-based feedback along the IT-supported workflow without any "optout" possibility
- Implement "traffic-lights" in regular reports

Manage by means of

defined intermediate

objectives (e.g.: in the

form of "sprints" (scrum))

and measure the results

• Use peer-reviews

mutual definition

of the next steps

of results and

.

- Spread simplified "living" Gantt charts
- Have managers report on Key Performance Indicators (KPIs) in short intervals
- · Work with results of filled-in checklists

Ċ

Implement a culture where all available resources are immediately activated to solve appearing problems



Hold project reviews to activate the learning circle

- · Carefully segregate the specific process and interfaces to other processes.
- · Document the process in a graphic way.
- Define each value-creating activity needed in the process.
- · Define clear responsibilities for each of these activities.
- · Define "specification documents" such as checklists, standards, results from previous steps or from other processes etc.
- Define output documents for each process step ("record documents").
- · Carve out needed decisions.
- Make clear who should be informed about what.

Example

Make sure that defined processes are really "implemented" in your organization.

h. Implementation

- Define "Process Owners" who are responsible for keeping "their" processes up to date.
- · Edit your processes in suitable workflow software; processes should become executable directly via the IT-supported workflow and the information flow will be channeled as defined.
- Prevent the "actual" interaction from differing from the defined processes while the

Make sure that all activities lead to productive results taken up in the process. Define the links of the specific process to other processes.

g. Responsibilities and Documents



- processes "sleep" in a drawer. Improvement potential will continuously be realized because shortcomings directly hurt.
- Make sure that the resources along the process are well sized and flexible enough to lead simultaneous or overlapping parallel projects through the process (see also: "Right-sizing").

Questions for Reflection

- **1** Where do you see blind performance, redundant performance, or lacking performance along the processes of your organization?
- **2** Which activities carried out in your organization do not contribute to your customers' expectations?
- **3** To which extent are the five functions of viable organizations, according to **Stafford Beer, really** implemented in the processes of your organization?

4 Which feedback mechanisms are installed in the processes of your organization? Do they effectively contribute to avoiding surprises?

5 Are the process owners clearly defined?

VI. System-orientated process design and stabilizing feedback mechanisms

6 Are the responsible parties for all activities along the processes clearly defined? Are there any deviations between the documented processes and the "implemented" practice in your organization? Why?

Summary of Section

- Holistically designed processes can be kept stable and agile by real-time feedback mechanisms.
- The performance can be considerably improved by well-aligned dynamic-complex interactions of the operative functions along the business process within the market conditions.
- Think and design processes in the stress-field of expectations and possibilities at the interfaces.
- Avoid "waste" by a thorough alignment at the interfaces, thinking and designing processes starting from the customer expectations.
- · Install all five core functions of living systems (according to Stafford Beer) in the processes. Ideally, coordination is effected by direct interaction between the operative functions; only sometimes, coordinators can be installed to optimize the work from "the big picture" perspective.

- Pro-actively defined (stabilizing) negative feedback mechanisms help to avoid negative surprises.
- · Feedback mechanisms, firmly installed in the processes, can help to avoid negative surprises.
- In practice, a mix of feedback options is recommendable. They do not only reduce costly mistakes, but also foster learning effects.
- Make sure that all activities lead to productive results taken up in the process. Define the links of the specific process to other processes.
- · Make sure that defined processes are really "implemented" in your organization.

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7

Introduction to Management Cybernetics How to right-size resources along the business process



Learning **Objectives** Session VII

In this section...

- You will learn how to right-size the overhead of organizations without suffering from shortcomings afterwards
- You will also learn about the general options for efficient and sustainable direct operations
- You will be introduced to a model for effectively down-sizing staff without losing flexibility and "air to breath"

Index VII

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General Options PAGE 103

Right-Sizing Human Capacity

Questions for Reflection PAGE 105

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Carefully monitor the development of your overhead while sizing the direct staff according to the expected business volume.

Overhead and Direct Force





Always monitor the overhead development

- More complex businesses in a world increasingly shaped by "VUCA require more coordination.
- But: Overhead naturally tends to grow as administrative people usually create administrative work for each other.
- · Cut all activities which do not contribute to the fulfilment of customer requirements (see: Session IV: Process design), but keep some skills at the borders of your core business to enable the organization to adapt and further develop.

Cyclically cut the overhead like a hair-dresser!

Make sure that direct productive workforce is well-sourced

- Identify the basic quantitative demand for direct workforce.
- · Keep the staff flexible by looking for a broad skill profile of the people.
- Add temporary workers who provide . flexible capacity at a calculable cost.

Clearly decide whether to avoid, outsource or scale up activities which currently disturb the workflow and are not profitable.

General **Options**



Avoid by **Specializing**

Keep by

 Be creative in order to avoid activities which disturb the core workflow by re-designing the portfolio of your own market services or the depth/breadth of the services – even if you

reduce contribution margin.

- Think about outsourcing activities which are only occasionally necessary and which disturb the core in-house workflow.
- Think about "in-plant" factories of specialists for activities which require highly specific resources (e.g.: for print color processing in the packaging industry or for tooling in a mechanical engineering company)
- · Think about co-operation with competitors (e.g. for steel hardening) instead of currently keeping own capacity available.

VII. How to right-size resources along the business process



Outsourcing

Scaling up

- Draw up a business plan to develop special activities originating from your own business process, and offer them to the market to scale the volume and spread the overhead cost.
- Standardize and automate repetitive activities to increase efficiency.

The productivity of your direct staff depends on the quality of the process flow and the effective planning and preparation of the activities.

Right-Sizing Human Capacity

How to right-size required direct staff

- Measure the workload of each direct function (by applying REFA methodology)
- · Try to optimize not only the work method, the tools and auxiliary materials in each function, but also the overall workflow and the interfaces to other functions and "labor systems", a REFA term.
- Standardize and automate repetitive activities.
- Eliminate bottlenecks in some areas and unused personnel capacity in other areas by adjusting the personnel capacity according to the expected workload along the process flow. Often it is not a reduction which is effective, but a re-allocation.

Ensure that resources are sized in a way that it allows parallel projects to easily run through the process; if it is unavoidable, reduce personnel in a social way.

- Make sure that the resources along the process are well sized and flexible enough to lead simultaneous or overlapping parallel projects through the process. (see also Learning Unit VI: "Process design")
- . If a personnel reduction is necessary and unavoidable, best follow these three steps:
- 1. First make offers to people willing to leave voluntarily
- 2. Secondly, make offers to people close to retirement
- 3. Then start a selection according to social criteria

Questions for Reflection

1 Is the overhead in your organization really well dimensioned? What would be missing for your customers or for you if you were to reduce the overhead?

VII. How to right-size resources along the business process

2 Does your direct workforce have sufficient capacity?

3 Where can you find capacity and competence bottlenecks along the business process of your organization?

Summary of Section

- Carefully monitor the development of your overhead while sizing the direct staff according to the expected business volume.
- Clearly decide whether to avoid, outsource or scale up activities which currently disturb the workflow and are not profitable.
- The productivity of your direct staff depends on the quality of the process flow and the effective planning of the activities.
- Ensure that resources are sized in a way that allows parallel projects to easily run through the process.
- If it is unavoidable, reduce personnel in a social way. That usually also saves money.

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8

Introduction to Management Cybernetics Coping with dynamic complexity





Dr. Bo

Learning **Objectives** Session VIII

In this section...

- You will learn what complexity is, in particular dynamic complexity, and what the drivers for it are
- You will also learn how to best cope with (dynamic) complexity
- You will get a set of practical rules on how to cope with complexity

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Coping with Complexity PAGE 127

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c. Knowledge Gaps, **Relevance Filters and Nescience** PAGE 131

d. Rules of Thumb PAGE 132



In economics, dynamic complexity is increasing.

Development of the Basic Conditions



Coping with Complexity

- Organizations are operating in increasingly dynamiccomplex environments.
- Dynamic complexity is not understood by many managers, who tend to act with mental models of improperly reduced complexity.

VIII. Coping with dynamic complexity

As a consequence, decisions taken often do not lead to the desired results. Deviations are perceived as surprises (cf. the introduction to section 1).

These findings feed the motivation to learn more about dynamic complexity relevant to the management of organizations. The behaviour of complex systems cannot be described by linear means.

a. What is Complexity?



- Unchanged operational "self-status"
- Unambiguous relationship between input (stimulus, cause) and output (reaction, effect)
- · Predictable process with predictable results



Non-trivial Machine

- Dynamically changing operational "self status" dependent on the past
- The result of the process is not predictable
- · An observer who does not know the mechanism of the black box has only very little chance to capture the logic of a non-trivial machine



Simple linear relationship

· The movement is predictable



• The movement is not predictable "the non-trivial machine" (acc. to Heinz von Foerster)

Companies are complex networked systems!

Chose an appropriate way of dealing with the given complexity.

b. What Can We Do When Facing Complexity?

- Accept given complexity; do not try to ignore it!
- Try to recognize the basic patterns of complex systems.
- Keep possibilities for decisions and actions (alternatives)!

In complex environments, we should change our approach to solutions.

Paradigm with linearcausal relationships

- "Keep it Simple"
- Analytical approach ("Taylorizing")
- Entities and functional competences in the focus

While you should accept the level of complexity, you can shape the spread of complexity in your organization!



not influenceable

External Complexity



Complexity is not necessarily a problem you should fight against.

Complexity is rather the basis for every evolution - it is the basis of life!

Take complexity as a chance!

Paradigm with complex relationships

- "Cope with complexity"
- Synthetic approach (Modularization)
- Relations and capabilities in the focus

Influencing the external Complexity

cooperations, Mergers & Acquisitions

Reasonable limiting of the internal complexity

Behavior rules, clear corporate objectives, value-orientated incentives, stabilizing circuits

influenceable

Understand and design the complexity in your organization using a practice-proven procedure model.

Sharpen the awarenes of the effects of complexity

Analyze the complexity drivers in their interaction

Design "your"

complexity

Methods and Me

- · Recognize the effects of complexity
- Understand complexity management as an important success factor
- · Capture possibilities of designing complexity
- Develop an understanding for systemically meaningful management

- •
- .

The more aware people are of the limits of their knowledge, the better their ability to find sustainable solutions tends to be.

c. Knowledge Gaps, Relevance **Filters and Nescience**

				+
leasures			Part of the knowable	l I
 Choose a process- orientated corporate set-up Take up significant (external and internal) complexity drivers Assign the resources bound by these drivers Make a sensitivity analysis, showing the reciprocal effects between the complexity drivers 	 Establish a competence team and introduce a cybernetic discourse Do scenario analyses and visualize the effects/changes Promote an understanding for the whole process Try to design the external complexity, if possible Adapt the internal complexity to the external complexity to the external complexity Reduce value-demolishing internal complexity 	 Introduce risk management Introduce an end- to-end contract management Provide access to relevant information (autonomy, "info- osmosis", interaction, pattern recognition (data mining), problem-orientated, dynamic access to knowledge and skills (semantic network)) Offer value-orientated incentives Apply a Balanced Scorecard Execute "enzymatic" management 	"Blinding " by wrong perception of knowledge, even though the co- herence is unclear and cannot be known (inferential principle)	Knowledge gaps" b aggregating knowled (inappropriate reducti of complexity, wrong relevance filters)
			Area of Nescience Recognition of true nescience Acceptance, that possigned oviste	I I I I I (unconscious fading c selective perception, consistency principle, stabilizing principle)
 Understanding of cost and benefit of complexity Understanding of reciprocal effects 	 Coordinated complexity profile Sharpened business model 	 Introduction of complexity management process Increased flexibility and ability to adapt 	Encouragement to flexibility and adaptability	Area of in Knowledge gaps through lack of specif information

Self-reflection

Results

• Awareness of your own possibilities of influence

• Raising awareness of

the topic "complexity"

- Commitment to personal responsibility

 Improved sustainable profitability

Implement an

management

effective complexity

nowledge Area

зy lge tion



Decision process on the basis of the full information, in a cybernetic discourse or by applying the abstraction principle)

Fundamental "knowability"

- out,
- Coaching
- Sparring
- Teamwork

ncomplete Knowledge

fic

- Training
- Collection of experience

Acknowledge complexity as an opportunity.

d. Rules of Thumb

	Do not try to reduce complexity.	(~	Make sure that the degree of your ir at least equals the external complex
	There is no prediction of uncertainty. Try to recognize the interrelations and interactions relevant to decisions.	(~	Reduce value-demolishing complexi
	Accept and welcome uncertainty as a necessary pre-condition for evolution.	(~	Increase value-creating complexity.
	Intransparency, dynamics, network effects and incompleteness or falseness of the knowledge about the system are the characteristics of situations in complex systems (Dietrich Dörner: Die Logik des Misslingens, S. 59).		<u>~</u>	Make sure that your leadership syste complexity drivers – and that it does
	Don't be satisfied with simply recognising the present situation, but rather try to recognize in which direction the "picture" is going.	(✓ 	Design complexity by means of cost aspects, including opportunity cost e
	Always tend to decide in a way that the number of possibilities is maximized by your decision (Heinz von Foerster).	(~	Focus your attention on organization instead of the functional excellence
	In an interrelated and interacting system, you cannot do just one thing. You always influence more than one thing. Therefore, also consider	(~	Acknowledge interdependencies – I
	new problems which might arise from solving existing ones.	(~	Design self-regulating processes
\checkmark	Break complex interrelations down to simple relations. Then have a look at the big picture composed of the correlated simple relations (system dynamics approach). You will see the resulting effect of correlating simple relations.	(<u>~</u>	Eliminate weak points in the process
	In a world of interacting partial systems, you should think in interacting partial systems if you want to be successful. (Dietrich Dörner: Die Logik des Misslingens, p. 13)	(~	Incorporate feedback mechanisms to
	Adapt the internal complexity and the complexity of the leadership system to the (often given) external complexity.	(✓	Create robust product structures, us
	Check whether you can influence and shape the external complexity by co- operations, by contracts and/or by your business model or innovation.	(~	Optimize the complexity for your rele

Rules of Thumb

internal complexity xity.

xity.

tem precisely captures the essential is not become a complexity driver itself.

and benefit effects.

onal capabilities and relationships e of individuals.

leave the "island" view.

ss architecture, e.g.: partially involved elements

to stabilize the processes.

sing the modularization potential.

elevant economic environment.

Questions for Reflection

- 1 How do you assess the degree of dynamic complexity of the environment in which your organization is active?
- 2 How well do you reliably know the developments? Which developments do you think you only 'know'? Which developments don't you know?

- 3 What are the essential complexity drivers?
- Which complexity drivers can you influence?
- How are you preparing your organization to master complexity?

Summary of Section

- In economics, dynamic complexity is increasing.
- We face complexity in many work situations.
- Dynamic complexity is not understood by many managers. Improperly reduced complexity often leads to undesired surprises.
- The behavior of complex systems cannot be described by linear means.
- Chose an appropriate way of dealing with the given complexity.
- In complex environments, we should change our approach to solutions.
- While you should accept the level of complexity, you can shape the spread of complexity in your organization.

- Understand and design the complexity in your organization using a practiceproven procedure model.
- The more aware people are of the limits of their knowledge, the better their ability to find sustainable solutions tends to be.
- Acknowledge complexity as an opportunity.
- Act in a system-oriented manner.
- Set your sights high.
- Develop a permanent ability to change and adapt.

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VIII. Coping with dynamic complexity


9

Introduction to Management Cybernetics Best-practice leadership in cybernetic organizations



Learning **Objectives** Session IX

In this section...

- You will recognize the need for different leadership in VUCA environments (volatile, uncertain, complex, ambiguous)
- You will see the differences between traditional and cybernetic-oriented leadership
- You will take away precise recommendations for successful leadership under VUCA conditions
- You will learn in particular how to implement change management under VUCA conditions

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End-to-End Value Chain

Why cybernetics is a topic for leadership

- In section II we saw that the organizational capability for cybernetic behavior strongly depends on the management's mindset.
- Leadership is the most challenging function in our world as it makes things work or not (Fredmund Malik).
- Driven by globalization and by the availability of internet-based applications of communications

technology, the networking, the information flood and the development speed is increasing. As a consequence, the complexity is increasing as well, and simultaneously, the amount of uncertainty and ambiguity is increasing (VUCA).

VUCA implies a changing leadership style. In this section, we will highlight the different requirements concerning leadership under "VUCA conditions" and work out practical recommendations.

Stop believing that you can solve the problems because you are in the management position. Try to understand and to use your system.

b. The "Power Illusion"

Managers are paid for results. The sad fact is that a single person can never have the overview of the whole picture in order to take good decisions alone.

- "The image of the world around us which we carry out in our head is just a model. Nobody in his head imagines all the world, government or country. He has only selected concepts and relationships between them, and uses those to represent the real system."
- "People are only role players in a system. They act within the system, even though they believe that they are managing it. This is not a popular idea for those who believe that they are real "men of action."
- "Who really wants to change the system should understand the system."

Hans Ulrich consistently applied cybernetic principles to the leadership of companies.

a. Productive Social System

Hans Ulrich introduced the concept of a company as a productive social system.

He raised the question of the leadership in such an institution: This leadership cannot be derived from the single entities, but only from the interaction between the different entities.

Hans Ulrich

Jay Wright Forrester

Leaders need to start thinking in terms of cybernetic behavior.

c. Cybernetic Leadership

Complex tasks in complex environments require managers with special skills.

d. Summary

Traditional Behavior

- Growth maxim
- Taking influence on environment
- "Lean" thinking in closed organizations
- Focus on individual capabilities and functional excellence
- Attention to linear cause-effect relationships and to structures
- Economizing in "one-way roads" from the source to the trough

Cybernetic Behaviour

- Stability maxim
- Symbiotic adaption to the environment
- Thinking in plurality and in complements
- Focus on the effective "surface behavior" of the whole organization
- Comprehension of complex networked relationships and focus on processes
- Economizing in effective cycles



With high volatility, evaluate experiences with first implemented steps ("agile working") higher than a complete plan without "proof of concept".

The significance of the leadership quality increases with the uncertainty. Provide orientation and - at the same time - room for creativity - and adaptability by principles, not by (limiting) rules.



The higher the degree of uncertaintly is, the more important good and open communication becomes.

First of all, as a leader you should learn to understand the "degree of VUCA" that is shaping your business. You should recognize and accept the complexity and be aware of potential exponential developments and tipping points.

As a leader you should recognize the existence of "nescience" (to be distinguished from not sufficient knowledge) and accept this; you should substitute uncertainty by the group intelligence involving all relevant stakeholders and by an open

VUCA imposes new, additional requirements on leadership. Information, findings and knowledge become more volatile.

e. Leadership with Volatility

Life and business tend to happen with an increasing frequency. The exponentially increasing speed is driven by the faster availability of larger amounts of information.

As a leader you should be aware that you cannot cope with this information flood by a top-down management approach. Rather try to understand the spirit of your organization. The better you succeed in channeling the information flows within the teams - instead of being drowned, the more successful you will become.

As a pre-condition you must understand the information flows and make sure that they contribute to stable and robust operations.

Do not intervene (apart from in exceptional situations); rather encourage your team to act independently in critical cases by sharpening and improving the processes. I call this kind of leadership "enzymatic leadership": Your cybernetic leadership input enables improvements without you getting absorbed – like an enzyme.

In uncertain environments, try to think in probabilities and hedge different possible outcomes by simultaneous initiatives.

f. Leadership with Uncertaintly

Dynamic-complex environments are characterized by high evolution dynamics; they are also distinguished by disruptive changes.

As a leader in a dynamic-complex environment you should acknowledge the nature of the uncertainty and think in probabilities. You should be capable of developing and implementing appropriate strategies and tactics with your teams.

To reach your objectives despite of the uncertainty, you should allow and promote several competing

activities simultaneously. The activities should be monitored by the teams in an ongoing stage-gate process. At each stage decisions about continuining or ceasing the initiatives should be taken.

The additional cost of the parallel initiatives should be understood as a premium for an insurance preventing your business from failure rather than as waste. Leaders operating in uncertain environments should canvass for their shareholders' understanding.

With increasing (dynamic) complexity you should initiate self-regulating teams.

g. Leadership with Complexity

In a complex-networked world, leadership should be As a leader you should recognize early signal for imcarried out in a networking form. Top-down leaderportant changes and make sure that these changes ship does not cope with the dynamic complexity. are considered in the proceedings.

Consequently, complex environments require leader-As an experienced leader you know that it is easiship with the aim of self-regulating teams. The sucer to move within the natural stream that against cess factors for such leadership are the **capability to** the stream. Therefore, you create awareness in your initiate self-regulation and to contribute experiences team that the future natural stream should constantfrom complex environments. ly be monitored.

The leadership task consists of involving all relevant interests and perspectives in your challenge and establishing a constructive discourse.

Consider "ambiguity" as a key for the solution. h. Leadership With Ambiguity

In VUCA environments, it becomes more challenging to make good decisions. Be aware of the following: What can rationally be decided, is already decided. Decisions are needed in cases where no clear signals are given for a distinct way.

In business, the "one single truth" is often not available. However, several – at first glance opposing – perspectives to the same matter help to disclose approaches to solutions which were previously hidden.

In situations with ambiguity, leaders will be more successful if they take the opportunity to integrate several perspectives and interests in the search for solutions. An approach that is designed and hence supported by all involved parties will be implemented in a natural way and become sustainable. A supported trade-off is a better option than a solution drafted on an isolated drawing board that will have to be implemented and kept alive under pressure.

The extent of VUCA requirements on leadership strongly depends on the business environment and the task to be carried out.

i. Requirements Shift

Complex tasks in complex environments require managers with special skills.

j. Basic Leadership Skills





You understand the performance level and the limits of the "new media"

You are used to working in a lean way and to avoiding unnecessary effort

Basic Leadership Skills

Self-regulation needs a starting impulse from top management. Are you personally ready for cybernetics?

"Everybody in the company should act as a manager - in their expert role and regardless of their hierarchical level!"

"If everybody is a manager, self-regulation arises; a circular interaction is implemented in which everybody steadily influences everybody in the interest of the company."

Heinz von Foerster

Under VUCA conditions, you should observe carefully, think in probabilities and proceed iteratively.

k. VUCA Leadership Skills

	Under VUCA cond	litions
		On the basis of a solid methodical sl well as keeping an open mind towa
		You possess a certain " hyper-aware you have a good power of observati You especially look out for exponen
		You have the willingness and the abi applications of Artificial Intelligenc rational decision making instead of
		You trust in the power of the interac they act as managers for the benefit
		You show intellectual modesty: You a acknowledged experts with their sp
		You lead by means of " visionary pict and supporting a creative, iterative a
		The willingness, the attitude and the perspectives relevant to the outcom linked tasks to avoid "island solutio (the willingness and the capability of
		The willingness and the ability to see discourses independent of hierarch

kills set, you can **think freshly as** ards methods and result

ness": You continually search for information, ion and a pronounced attentiveness for changes. tial progressions and possible tipping points

ility to analyze existing data with e and to identify patterns supporting deciding based on experience

ction within and among your teams: You know that of your organization better than you ever could

do not hesitate to **involve** pecific knowledge

tures" of the target situation and fostering approach, oriented towards moving targets

ability to involve all interests and ie and to concurrently work on mutually ons" and to find self-supporting solutions f holistic and simultaneous approaches)

ek for open and constructive hy ("Delphi circles")

Dynamic-complex environments require leadership that enables and supports an agile, opportunity-driven approach.

You should lead hands-on, based on cybernetics principles.



You have the convincing power in the eyes of the shareholders to explain to them the required heuristic approach and the thinking in possibilities and probabilities

The ability to lead: You have "leadership genes", are skilled in leadership

You can lead interdisciplinary teams with quite diverse members

• You become effective by influence instead of by applying hierarchical power

solutions; keep administration and reporting at a minimum level

VUCA Leadership Skills

Leadership in VUCA environments requires change management. After a change, do not "freeze" completely, but keep your organization agile and adaptable at a higher level.

I. Change Management under VUCA **Conditions (acc. to Kurt Lewin)**

Elements of organizational learning "Moving" "Re-freezina" while staying flexible with the momentum Organizational forgetting of behavioral patterns Create a discrepancy · Exploit the momentum Documentation and experience (Problem/ freed up by dissolving implementation of the agreed option no longer required mechanisms Review the Encourage own effectiveness: Destroy inconvenient initiatives: Make Will fine-tuning or routines and dissolve affected people to corrective measuresbe necessary? involved people! Organizational memory of behavioral patterns Simultaneous Common developing and prioritizing of improvement of the perception of loss by alternative solutions adaptability to enable good communicative the organization Formal decisions to more easily find Organizational storing of on future processes new solutions when knowledge and capabilities and structures new problems occur (double-move)

Pre-conditions for organizational learning:

- Tolerance, especially failure tolerance
- Open co-existence of diverse opinions





"De-freezina"

by dashing down

target situation)

Raise responsibility

non-appropriate

structures

Overcome the

monitoring of

the changes

Leadership in VUCA environments requires change management. After a change, do not "freeze" completely, but keep your organization agile and adaptable at a higher level.

m. Organizational Change Management



- Constructive discourse
- Knowledge management
- Organizational self-reflexion (Audits)

Questions for Reflection

- How well developed are the willingness and the abilities to take on leadership in your organization? Are managers allowed to take on leadership tasks with the appropriate authority?
- 2 How well developed is the mindfulness in your organization?

- 3 How are patterns for future developments derived from observations and included in the decisionmaking process?
- 4 Is your management aware of potential <u>"Tipping Points"?</u>
- Do you usually have an iterative approach (Trial and Error) in your organization instead of following a fixed plan?

- 6 Consider to what extent there is an open and constructive discourse taking place in your organization.
- 7 How successfully are possibilities for alternative action recognized and developed?

8 How well developed is the desire to learn in your organization?

Do managers in your organization consider themselves to be "doers" or rather "enablers" and "supporters"?

Summary of Section

- Stop believing that you can solve the problems because you are in a management position.
 Try to understand and to use your system.
- Leaders need to change their paradigm in terms of cybernetic behavior.
- Complex tasks in complex environments require managers with special skills. VUCA imposes new, additional requirements on leadership. Information, findings and knowledge become more volatile.
 - » In uncertain environments, try to think in probabilities and hedge different possible outcomes by simultaneous initiatives.
 - » With increasing (dynamic) complexity you should initiate self-regulating teams.
 - » Consider "ambiguity" as a key for the solution.
- The extent of VUCA requirements imposed on leadership strongly depends on the business environment and the task to be carried out.

- Under VUCA conditions, you should carefully observe, think in probabilities and proceed iteratively.
- Dynamic-complex environments require leadership that enables and supports an agile, opportunity-driven approach.
- You should lead hands-on, based on cybernetics principles.
- You need (i) the **disposition**, (ii) the **possibility** and (iii) the **ability to lead** in changing environments.
- Leadership in VUCA environments requires change management. Do not "freeze", but keep your organization agile and adaptable at a higher level.
- Instead of just administering a given business, you take up the challenge to drive organizational change towards adaptability, agility and innovation.

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10

Introduction to Management Cybernetics Integrated IT workflow applications





Learning **Objectives** Session X

In this section...

- You will understand why the IT applications supporting the processes should be fully integrated
- You will take away the necessary requirements for an integrated "IT landscape"
- You will learn how to succeed in integrating your IT applications

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The IT applications should best support the coordinated processes and reflect the process quality.

The software applications should best support the defined processes.

The IT should best link the single processes and entities of the company or the value network with each other, supporting the collaboration in distributed teams.

 By means of the IT-supported workflow, feedback mechanisms (sign-offs, traffic light signals) should be provided to users during process interfaces.

IT should provide users with an integrated view of the whole process, showing the interdependencies and possible effects of measures. Operative efficiency, transparency, realtime and "single truth" (Oracle claim) are key.

Process-oriented, well channeled reporting (taskrelated information push service) is required.

To optimize the whole business activity, especially co-ordination tasks around manifold interfaces like a "360° view on project management including settlement and billing" and "stock optimization" should be supported by IT applications.

Try to capture and monitor the system's cost by IT. The quality and fit of companyspecific IT solutions significantly contribute to the corporate success.

- IT applications should be flexible to adapt to changing processes. Even though ERP vendors have usually implemented a lot of industry experience in their applications, processes should never be slaves of the ERP, but should rather define the kind of support to be provided by IT-based ERP.
- Consider the opportunity of improving your corporate flexibility by means of IT.
- Keep your IT capable of easy release updates without any need for interface adaptations

Consider cloud-based access to ERP applications: Service on demand may offer flexibility and scalability to your organization. Your IT should be able to breathe with the situational corporate challenges.

The information system which supports the management decisionmaking process should guide the management's attention to the most relevant business parameters for each respective situation by means of a dynamically fed information cockpit. Ideally, the IT applications are fully integrated.

- Avoid IT "point solutions" and silo cultures; the handling of interface problems which might arise can become challenging and expensive.
- B Rather select one suitable integrated ERP system. By working with an integrated system you can minimize data checks and preparation tasks for analyses – saving time, cost and effort.
- Integrated IT systems support process stability.
- Strive for data integration from machine data logging to data assessment and reporting.

For an integration platform architecture, appropriate layers are, according to the IEEE, "business", "user interface", "integration", "services", and "data" (acc. to the International **Conference on Information Technology Systems and** Innovation (ICITSI), 2018).

- Avoid disruptions between different systems, e.g. a production planning and an ERP system.
- A unique database helps prevent departments from working side-byside without coordinated information. Centrally managed data avoids data incongruity and mismatch.

Appropriate applications are commercially available. The challenge is to find IT specialists with cybernetic understanding..

IT Applications for Networked Thinking



Current IT Support

- Technical maintenance of services (content server, communication server, ERP, network infrastructure, desktop computers, shared infrastructure (printers, facsimile, scanners etc., software)
- Software updating (versions) and hardware updating (performance, replacement for aging)
- · Adaptation and extension of capacities
- User training



Exploiting New Possibilities

- IT support of the business processes (project-related involvement of third parties, maintaining the data security)
- IT contribution to improve the innovation capability (collaboration applications)
- Enabling a cybernetic set-up supporting decision-making (visualization of interdependencies)
- IT infrastructure for cybernetically designed controlling instruments (Balanced Scorecard, monitoring the system's cost)

Questions for Reflection

- 1 How positively do your employees assess the IT support of the processes?
- **2** Does IT initiate strategic **5** Is your IT really and/or operative need for action?
- **3** Are system costs in your organization recorded and evaluated by IT systems?

- 4 How well can your IT adapt to changes in your organization or business environment?
- integrated? Where might there be any IT "island solutions"?

Summary of Section

- The IT applications should best support the coordinated processes and reflect the process quality.
- The IT applications should be flexible to adapt to changing processes.

Relevant Sources for Further Reading

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- · Ideally, the IT applications are fully integrated.
- IT should dynamically provide the most relevant management information for each individual situation.

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11

Introduction to Management Cybernetics

Measuring cybernetic excellence



Dr. Bo



Learning **Objectives** Session XI

In this section...

- You will learn which informative value you can expect from traditional KPI systems
- You will be introduced to an overview of risks and opportunities
- You will be introduced to the nature of cyberneticsoriented reporting systems
- You will gain practice-proven means for an effective risk management

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Performance KPIs are pure indicators and are often optimized without considering their mutual relationships.

Classic Key Performance Indicators (KPIs)



KPI systems aggregate performance indicators without optimizing the interactions between the performance-creating areas

Aggregation in a KPI System



A KPI system does not coordinate and thus does not optimize the activities

 It leaves unsolved interest conflicts It does not optimize the total result, but only "shows" it The more we focus on details the less we understand the big picture.

ANALYSIS VERSUS HOLISTIC APPROACH **AND INTEGRATION**

Analyze complex systems by observing the system's behaviour and influence it by aligning the key variables.

Understanding **Complex Systems**

To understand the behaviour of complex systems, any approach that is limited to partial areas is not suitable.

Abraham Lincoln

- Often, the meaning is only recognized from a certain distance.
- Success does not depend on the analysis of each detail, but rather on the comprehension of the big picture.
- Companies are characterized by their "surface behaviour", not by their partial functions.

Integrative Approach, as opposed to the analytic approach

Recognition of patterns from holistic view, even though it might be "out of focus

The behaviour of complex systems can only be understood with a holistic view.

...Versus Integration

Example: Intention of a cat

A cat's intention to jump cannot be derived from the analysis of its single cells.

Only the observation of the cat as whole, combined with personal experience, allows the conclusion that the cat is intending to jump.

- Address your analysis towards the whole system
- Observe variables that can easily be captured
- Try to recognize changes, fluctuation, trends, leaps, thresholds and reversions of trends
- Try to understand the relationships between the observed changes and the constellation of the variables
- Carefully adjust and bundle these variables



Under VUCA conditions, special controlling methods and instruments are useful to lead companies.

Integrated Leadership Concept

Concept	Instruments	Effect
Corporate foresight	Scenario technique, Analysis of strategic risks	 Strategic flexibility and adaptability
Innovation management process	Creativity techniques, Initiative portfolio	 Capability of developing and adapting
Holistic approach to business processes	Business process modeling, Capturing and molding effect networks, operational risk self-assessment (ORSA) process	 Process stability while improving the efficiency, accepted and enforceable solutions
Complexity management	Internalization of risks, balanced scorecard concept, beyond budgeting approach	 Cybernetically meaningful decision-making, follow-up of measures, multi-dimensional view regarding results
Corporate policies	Corporate mission state- ment, leadership statement	 Orientation, providing meaning
Cybernetic leadership approach	Self-organization, cybernetic discourse, recursively designed structures, trust as the basis of business, triggering of intrinsic motivation factors	 Making use of the personal potential of employees and development of the organizational self- regulation capabilities and dynamics

In quality management, cost is recorded as the total of the cost of failure and the cost of preventative measures.

Quality Cost Record

	Qualitätskostenentwicklung	Star	nd 2008	Stand 2009		08 Stand 2009 Ziel 2010		itand 2009 Zie			Stand 2009 Ziel 2010		
		[EUR]	[%]	[EUR]	[%]	[EUR]	[%]	-					
Α	Interner Ausschuss	1.528.667	66,1	1.449.167	61,4	1.223.333	51,0						
	Materialwert des Ausschusses	500.000	21,6	425.000	18,0	400.000	16,7						
	Transformationskosten des Ausschusses	400.000	17,3	340.000	14,4	320.000	13,3						
	Kapitalkosten für zusätzl. Lagerhaltung durch Ausschuß	6.667	0,3	5.667	0,2	5.333	0,2						
	Abfallwirtschaft	10.000	0,4	8.500	0,4	8.000	0,3	_					
	Doppeltarbeit, Nacharbeit	20.000	0,9	20.000	0,8	20.000	0,8						
	falsche oder ineffiziente Planung	136.000	5,9	180.000	7,6	150.000	6,3						
	Blindleistung	80.000	3,5	40.000	1,7	40.000	1,7	_					
	Trouble shooting	76.000	3,3	80.000	3,4	80.000	3,3						
	mangelhafte Informationskanalisierung	300.000	13,0	350.000	14,8	200.000	8,3						
								_					
В	Kundenreklamationen	163.000	7,0	210.000	8,9	305.000	12,7	_					
	Gutschriften an Kunden	90.000	3,9	160.000	6,8	150.000	6,3						
	Verwaltungsaufwand, Personal	40.000	1,7	40.000	1,7	40.000	1,7						
	Kundenbesuche	3.000	0,1	10.000	0,4	15.000	0,6						
	Materialsanierung	30.000	1,3	0	0,0	100.000	4,2	_					
	Anwalt-/Gerichtsverfahrenskosten	0	0,0	0	0,0	0	0,0	_					
	entgangener Gewinn	0	0,0	0	0,0	0	0,0	_					
	Imageverlust	0	0,0	0	0,0	0	0,0						
	Vertrauensverlust, Auftragsverlust, Kundenverlust	0	0,0	0	0,0	0	0,0	_					
c	Toleranzüberschreitung	212 000	92	255.000	10.8	185,000	77	-					
-	Beschichtungsdicke	0	0.0	0	0.0	0	0.0	-					
	Materialstärke	0	0.0	0	0.0	0	0.0	-					
	Überlappungsmaß	0	0.0	0	0.0	0	0.0	-					
	Sicherheitsüberproduktion	5.000	0.2	5.000	0.2	5.000	0.2	-					
	überhöhte Materialgualität	0	0.0	70.000	3.0	50.000	2.1	-					
	überhöhte Verarbeitungsgualität	0	0.0	0	0.0	0	0.0	-					
	Übergualifikation von Personal	45.000	1.9	0	0.0	0	0.0	-					
	Übergualifikation von Maschinen	162.000	7,0	150.000	6,4	130.000	5,4						
	Personalüberschuss	0	0,0	30.000	1,3	0	0,0						
D	Qualitätssicherung und Vorbeugung	410.200	17.7	445.000	18.9	685.000	29.6	-					
	Personal in Q-Sicherung	275.000	11.9	250.000	10.6	280.000	11.7	-					
	Kontroll- und Meßgeräte der Q-Kontrolle	0	0,0	60.000	2,5	60.000	2,5	_					
	Kontroll- und Regelgeräte in Produktion	0	0,0	30.000	1,3	0	0,0						
	Personalschulung, Q-Zirkel, Methoden	5.000	0,2	5.000	0,2	30.000	1,3						
	EDV-Einsatz zur Datenerfassung	0	0,0	0	0,0	160.000	6,7						
	und -auswertung							_					
	Arbeitsabläufe und Arbeitsanweisungen	130.200	5,6	100.000	4,2	25.000	1,0						
	Standardisierung	0	0,0	0	0,0	0	0,0	_					
	Teamarbeit	0	0,0	0	0,0	10.000	0,4	_					
	externe Beratung	0	0,0	0	0,0	70.000	2,9	_					
	rechtzeitige Information und flüssige Kommunikation	0	0,0	0	0,0	40.000	1,7						
	Lieferantenaudits	0	0,0	0	0,0	10.000	0,4	_					
								_					
	Summe der Qualitätskosten [EUR]	2.313.867	100,0	2.359.167	100,0	2.398.333	100,0						
	Umsatz [EUR]	12.060.000		10./00.000		12.000.000							
	auf den Umsatz [%]	19		22		20							

Internal errors and reworking are only a part of the system cost. The objective is the optimization of the total system cost.

Internal Errors and Reworking

System Cost

		Las	t Year	Obje Pre Y	ective sent ear	P Nex	lan t Year
		[kEUR]	[%]	[kEUR]	[%]	[kEUR]	[%]
Α	Internal blunder and rework because of systemic deficiency	0	0	0	0	0	0
	Material cost of waste, due to systemic deficiency						
	Transformation cost of waste, due to systemic definiency						
	Capital cost of avoidable stock-keeping, due to missing alignment						
	Cost of parallelly carried out work, due to missing alignment						
	Cost of rework, caused by systemic deficiency						
	Cost of "blind performance, due to not sufficiently defned processes and objectives						
	Cost of the implementation of illusive solutions (symtom treatment)						
	Troubleshooting cost related to systemic deficiencies						
	Cost of missed out operative performance, due to a motivation deficit						
	Cost of individual capabilities and ideas						
	Cost of too little variety (incapability of homeostasis)						
	Cost of missing networking (incapability of emergence)						
	Subsequential cost of an inappropriate reduction of the complexity						
	Cost of organizational incapability to spontaneously recognize patterns						
	Cost of missing feedback mechanisms						
	Cost of missing orientation in potential effects						
	Cost of inside-out planning (missing orientation in scenarios)						
	Subsequential cost of missing hedging measurements						
	Cost of not having recognized the systems (markets, organizations) behaviour						
	Cost of avoidable internal meetings						
	Cost of re-scheduling orders (additional setup times, delays) that is usually not reflected in the post-calc.						

First, internal errors and resulting rework, tolerance exceedance and commercial loss should be registered.

Tolerance Exceedance, Commercial Loss

в	Tolerance exceedance (avoidable reserve), due to systemic deficits
	Cost of arbitrary relations (unnecessary complexity)
	Cost of avoidable diversity (e. g.: assortment, options), missing mod
	Cost of overdrawn reporting routines
	Cost of complicated decision structures
	Cost of unnecessarily complex information systems
	Cost of avoidable material reserve, due to missing specs or proces
	Cost of avoidable over-production, due to missing process reliabili
	Cost of avoidable material quality, due to missing experience or pr
	Cost of avoidable over-qualification of personnel
	Cost of avoidable overspecification of machines or equipment
	Cost of avoidable personnel, due to exeggerated flexibility or ame
С	Commercial loss with customers and with suppliers due to syszemic
	Price reductions, due to justified claims/comlaints
	Credit vouchers to customers, due to justified claims/complaints
	Cost of customer visits needed die to claims/complaints
	Cost of lawyers and court proceedings, caused by disputable perfe
	Missed out margin, die to lost orders
	Cost of consequences, due to missing end-to-end contracts
	Cost of insufficient involvement of suppliers in the definition of contracts with customers

Then, well-coordinated preventative measures should be defined and implemented to reduce the cost of failure and to optimize the total system cost.

Preventative Measures, Total System Cost

D	Effort for preventative measurements for systemic meaningful proceeding							
	Cost of functional qualification measurements							
	Cost of training in cybernetics principles							
	Cost of system analysis							
	Cost of designing and implementing end-to-end processes							
	Cost of designing and implementing stabilizing feedback mechanisms							
	Cost of adequate process-oriented re-allocation of personnel resources							
	Cost of adequate process-oriented machinery and equipment							
	Cost of integrating of information systems							
	Cost of end-to-end contracts with customers/suppliers							
	Cost of deriving and communicating clear objectives							
	Cost of developing and implementing value-oriented incentives							
	Total system cost	0	0	0	0	0	0	
	Organizational turnover							
	System cost, referred to the turnover [%]							

dularization	
ss reliability	
ty or professionality	
ofessionality	
ndable planning	
deficiency	
ormance	

By means of strategic and operational risk self-assessment, all risk becomes evident and an effective risk management will be possible.

Operational Risk Self-Assessment

The probability of the risks and the associated costs should be quantified by everyone.

- Address your analysis • towards the whole system
- Observe variables that can easily be captured .
- Try to recognize changes, fluctuation, trends, • leaps, thresholds and trend-reversions
- Try to understand the relationships • between the observed changes and the constellation of the variables
- Carefully adjust and bundle these variables

The self-assessment can be structured (standard report)

...according to the involved entities (e.g. sales, engineering, production planning, finance and others) ...or according to process phases (e.g. acquisition, order confirmation, order execution, settlement)

The single inputs should be aggregated for top management. The risk reporting should be updated in monthly cycles, involving all functions.

Questions for Reflection

- **1** How are performance and success measured in your organization?
- **2** Is enough attention paid to the 'big picture' or is the focus on details?
- **3** How is the quality of interface communication evaluated?

4 How are system costs determined? What measures are derived from the evaluations?

5 How are strategic and operative risks registered in your organization? How are they dealt with?

Summary of Section

- **Performance KPIs are pure indicators** and are often optimized without considering their mutual relationships.
- **KPI systems only aggregate** performance indicators without optimizing the interactions between the performance-creating areas.
- The more we focus on details, the less we **understand the big picture.**
- Therefore, analyze complex systems by observing the system's behaviour and influence it by coordinating the key variables. The behaviour of complex systems can only be understood with a holistic view.
- Under VUCA conditions, selected controlling methods and instruments are useful to lead companies.

- With regards to the recording and optimizing of quality cost, the system cost can be managed. The objective is the optimization of the total system cost.
 - First, internal errors and the resulting reworking, tolerance exceedance and commercial loss caused by a lack of cybernetic quality should be registered.
 - Then, well-coordinated preventative measures should be defined and implemented to reduce the cost of failure and to optimize the total system cost. This bundle usually consists of process optimization, training and leadership.
- By means of a strategic and an operational risk self-assessment, all risk becomes evident and an effective risk management will be possible.

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Introduction to Management Cybernetics

The cybernetic consulting approach







Learning Objectives Session XII

In this section...

- You will learn that a cybernetic consulting process only succeeds when the pre-conditions for a cybernetic working-mode are created in the organization.
- You will learn how a cybernetic consulting process is executed and what the expectations should be.

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A consultant should deliver input and ensure the organization develops cybernetic behaviour by itself.

a. The Nature of **Cybernetic Consulting**

"Cybernetic consulting" is ambiguous - and it must be ambiguous:



To be successful, a consultant should ensure the customer and the organization's management support cybernetic behaviour.

b. Pre-Conditions for Successful Cybernetic Consulting

The consultant should ensure the customer wants to achieve cybernetic behaviour within the organization, as the consultant clearly understands the advantages compared to classic behaviour.

The consultant should initiate the process to organizational selfregulation with industry background and methodological input.

c. Self-Conception of **Cybernetic Consulting**

I do not support the often-cited systemic approach where consultants should not supply any solution-related input, but only trigger the customer's ability to bring up questions and solutions with the help of question techniques and active listening.

I am convinced a consultant must also supply industry competence to the projects to equip the organization with professional grounding that allows for cybernetic initiatives.

The consultant should also ensure management is both ready and capable of 'systems thinking' (see learning session IV). The customer should be prepared to carry out changes at management level.

Management is an important aspect to be analysed when cybernetic projects are carried out.

d. Proceeding in the Project

A good cybernetics consultant will act on the quality of the interactions at the interfaces between the organization and its environment. (cf. Part VI).

The consutant will stimulate the adaptability and viability of the organization.

Many organizations control the daily business based on basic conditions, but they do not perceive environmental changes (observation skills, selfreflection) and they are unable to react adequately (readiness and capability to change). A good consultant will foster the comprehension of recursive-circular behaviour.

A good consultant will foster the comprehension of recursive-circular behavior.

The consultant will show managers they are not only observers, but parts of the system. Management should become an element to be analysed and questioned (Second Order Cybernetics, according to Heinz von Foerster). Clients' systems can only do what is within their possibilities. Projects are destined to end if management does not cooperate.

A good consultant becomes effective in an "enzymatic" way to ensure there is a sustainable benefit from their support.

ceeding "enzymatic management". Only this way can The competence of a consultant can be recognised in the way support is delivered. A pragmatic, probthe consultant achieve stability that is independent of their personal presence – becoming sustainable. lem-oriented approach has proven to be of value, rather than lecturing methods.

Critical to success is that agreed measures are implemented in a disciplined way. The consultant often Despite all operative support, the consultant should not get involved in the daily business, but rather cannot avoid calling for a binding commitment until the become effective without becoming "a part of their involved parties notice the benefit of the measures. product" - like an enzyme. Therefore, I call this pro-

To push the readiness to change, the intrinsic factors of those involved should be triggered.

An important pre-condition for the readiness to change is for those involved to understand what is the benefit expected from the measures. Start harvesting "low-hanging fruits" and issues with large levers simultaneously.

The readiness to change is a function of...



In cybernetically-led organizations decisions are prepared, weighed up, taken, accepted and supported on a working basis.

f. Cybernetic Decision-Making



Cybernetic management is about changing from the administration of a given business to managing current adaptability, agility and innovation.

e. Organizational Learning Process



A cybernetics project is sustainable when it is ensured that once the project ends, adaptability is achieved.

g. Sustainability of a Change Project



 Overcome loss perception by good communication about the change



Introduced measures have to be further monitored and accompanied in the stabilization phase.

"After organizational changes, a reaction in the direction of former patterns is probable, if the pressure of the change declines."

(Becker, Horst; Langosch, Ingo: Produktivität und Menschlichkeit – Organizationsentwicklung und ihre Anwendung in der Praxis, de Gruyter Verlag, Oldenburg, 2002, p. 57)

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- Develop and prioritize approaches to solutions together
- Formal decision-





- Documentation and implementation of the decided option
- Verify the effectiveness: are fine-tuning or corrections necessary?
- Simultaneously increase the capability to change and to adapt to enable the organization to find new solutions if new difficulties appear



Cybernetics has evidently not arrived everywhere in practice – perhaps because of lack of skills or customer acceptance – or it is called something else for marketing and communication purposes (complementary consulting).

h. Consultants with Cybernetic Background and Approach

Where can you find consultants who help the change to cybernetic work?

Although cybernetics offers effective levers for noticeable improvements, there are only a few consultants who promote themselves as applying cybernetics methods. What is the reason?

References on the side of the client and the consultant are indicators for the project success to be expected.

i. References

The purchase or sale of a consulting project cannot be compared with the purchase or sale of an industrial investment asset.

The latter can be completely specified ex ante. Generally, comparable investment assets are already installed in other companies where customers can scrutinize the benefit.

Hypothesis 1

Despite the available theory, cybernetics has not yet arrived in broad consulting practice because it is not understood and/or "it is burning in the daily business" of customers who do not find the patience "to get on the bike, instead of continuing to push it".

Hypothesis 2

Cybernetics has already become a usual toolset that is no longer placed in the foreground – similar to "e-business", which has become just another facet of normal business.

Hypothesis 3

Cybernetics "does not sell". What sells are result improvements, new customers, personnel reduction etc. Commercially oriented consultants are aware of this and sell these topics. Some consultants apply the principles of cybernetics to achieve results, but they do not call it "cybernetics", at best they call it "complementary consulting".

Pre-conditions for organizational learning:

- Tolerance, especially fault tolerance
- Open co-existence of different views and opinions

Consulting projects take shape while they are being implemented. The result cannot be fully described before a project starts. Cybernetics consulting projects in particular have to be carried out with the on-going development in mind in order to meet the requirements in terms of adaptability and to reach the aim of "injecting" organizations with the ability to develop.

- Constructive discourse
- Knowledge management
- Organizational self-reflection (Audits)

Questions for Reflection

- **1** How do you ensure your project is cybernetic, that it can further develop and that it 'survives' without external intervention?
- 2 How do you ensure management continuously questions its actions and that it considers itself a part of the system - and possibly a part of the system's problem?
- 3 Do you feel well when decisions are taken at the lower levels of your organization?

- 4 How do you ensure projects in your organization not only deliver immediate results, but that these are sustainable?
- **5** Can you provide examples of projects that delivered better capability to change?
- **6** What measures do you consider to foster capability of organizational learning?

Summary of Section

- · A cybernetics consultant should both deliver input and ensure the organization is able to develop cybernetic behaviour on its own.
- To be successful, a consultant should ensure the customer and the organization's management want and support cybernetic behaviour.
- The consultant should initiate the process to organizational self-regulation with industry background and methodological input.
- Management is an important item to be analyzed Cybernetics has evidently not reached when cybernetic projects are carried out. everywhere in consulting practice – perhaps because of a lack of skills or customer acceptance - or it is called something else for in an "enzymatic" way to ensure a marketing and communication purposes.
- A good consultant becomes effective sustainable benefit of their support.
- To push the readiness to change, intrinsic factors of everyone involved should be triggered.
- In cybernetically-led organizations, decisions are prepared, weighed up, taken, accepted and supported on a working basis.

- · Cybernetic management is about changing from the administration of a given business to managing current adaptability, agility and innovation.
- A cybernetics project is sustainable when after a project ends, adaptability is achieved.
- Introduced measures have to be further monitored and accompanied in the stabilization phase.

- **References from client and consultant** are indicators of the expectations for the success of the project.
- There are only a few consultants who understand the principles of cybernetics and apply them successfully in their consulting practice.

Relevant Sources for Further Reading

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Summary

Introduction to Management Cybernetics





Organizations are systems, and systems seek for survival. Survival in dynamic-complex environments requires adaptation.

Management attitudes are crucial for survival in complex-dynamic environments. Organize an open strategic and operative discourse.

- The objective of any organization is to survive, and thus, they are **constantly** in search for a sustainable financial result.
- Management cybernetics offers methods to achieve organizational stability in dynamic-complex environments.
- It is important to realize we are a part of **our world and we** cannot 'outsmart' it without suffering the consequences.
- Organizations led by a cybernetics approach develop sustainability against disturbance and disruption. They always find new dynamic stabilities.

- Organization's should be provided with the necessary tools to become self-regulated.
- The task for management is to initiate self-regulation and maintain it by ensuring enough information and energy are added.
- To improve the resiliance of your organization, build a cybernetic management setup and identify and operate the effective flow parameters.

- The sustainability of organizations strongly depends on management's awareness for reciprocal effects and their leadership attitude. Therefore, always start with the management readiness for a cybernetic approach. **Specially** focusing on management's capability and willingness to understand the system.
- Stop believing you can solve problems because you are in a management position. Try to understand and use your system.

- In dynamic-complex environments, the complexity of your organization is the basis for survival. Increase the degree of possibilities for action (variance).
- Use the competence of your staff in **cybernetic discourses** to reach well-aligned and sharpened solutions.
- In a world characterized by uncertainty, your 'Inner **Form'** becomes increasingly relevant for orientation and good decision-making.

Establish a 'System Thinking', aligning processes at interfaces and with staff.

Seek for a market-oriented strategy and ensure it is executed. Stay alert and attentive to environmental changes.

- A demand-oriented strategy is always the first step to embed your organization in markets. Focus on solutions for customers.
- Feed your business with descriptions of 'future spaces' with highly probable and consistent parameter values by means of a corporate foresight dialogue.
- Use cross-border relationships to increase the intellectual capital by sharing it.
- Include the 'blue oceans' approach in your considerations, equipping your organization with an 'osmotic skin' and a continuous open discourse.

- Ensure weak signals are perceived by your organization, opportunities are capitalized and risk is actively managed rather than being avoided.
- Establish a strategy-driven innovation process, involving the whole organization.
- Be attentive to changes in strategic partnerships. Careful observation and game theory help operate rationally in a dynamic system.
- By means of a strategic and an operational risk self-assessment, all risk becomes evident and effective management will be possible.

- System Thinking' sensitizes our minds to the relevance of interrelations and interactions, and improves our effectiveness in complex-dynamic systems.
- Computer-supported system dynamics have successfully been applied to meaningful complex topics and have led to significant insights.
- Processes bear tremendous unreleased potential for financial results and stabilization.
- Performance can considerably be improved by wellaligned dynamic-complex interactions between the operational functions and the business processes.

- Picture and design processes in the stressfield of expectations and possibilities at the interfaces.
- Avoid 'waste' by carrying out a thorough alignment at interface-level, designing processes starting from customer expectations.
- Install all five core functions of living systems in the processes.
- Cybernetics-oriented processes allow for organizational 'rightsizing', but should be done carefully, creating value without losing flexibility.

Under VUCA conditions, attentively observe, think probabilities and proceed iteratively. Manage the systems cost.

Overall complexity cannot be reduced, but there are effective means to cope with it.

While the level of complexity should be accepted, the distribution of internal and external complexity can be distributed throughout the organization.

Understand and design complexity in your organization using a practiceproven procedure model.

The more conscious people are regarding the limits of their knowledge, the better the capability to find sustainable solutions. Self-regulation requires an initial drive from top-management.

Complex tasks in complex environments require managers with special skills. VUCA sets new, additional requirements towards the leadership. Information, findings and cognition become more volatile.

- In uncertain environments, try to think about probabilities and protect different possible outcomes by completing simultaneous initiatives.
- With increasing dynamic complexity self-regulating teams should be created.
- Consider ambiguity as a key to the solution.

Under VUCA conditions, you should attentively observe, think probabilities and iteratively proceed.

- Rather than only managing a particular business, you take up the challenge to drive the organizational change towards adaptability, agility and innovation.
- The IT applications should best support the aligned processes and reflect the process quality.
- The IT applications should be flexible to adapt to changing processes.
- Ideally, the IT applications are fully integrated.

IT should dynamically provide the most relevant management information.

Under VUCA conditions, special controlling and methods instruments are useful to lead companies. The system cost should be managed.

> First, internal blunder and resulting rework, tolerance exceedance and commercial loss caused by a lack of cybernetic quality should be gathered.

 Then, well-dosed preventative measurements should be defined and implemented to reduce the cost of failure and to optimize the total system cost. This bundle usually consists of process optimization, training and leadership.

Extract of the Summary

- Organizations are systems, and systems seek for survival.
 Survival in dynamiccomplex environments requires adaptation.
 Adaption depends on feedback.
- 2 Management attitude is crucial for survival in complex-dynamic environments. Organize an open strategic and operative discourse.

3 Seek for a marketoriented strategy and ensure it is executed. Embed your organization in the market. Stay alert and attentive to environmental changes. Establish 'System Thinking', align your processes, specially at interface-level. System Dynamics method can help identify and understand patterns in system behaviour.

Accept complexity, understand it and cope with it. G Under VUCA conditions, attentively observe, think probabilities and proceed iteratively. Manage the systems cost.

In a world characterized by uncertainty, your 'inner form' becomes increasingly relevant for decision-making.

About



The Consumer Goods Forum

The Consumer Goods Forum ("CGF") is a global, parity-based industry network that is driven by its members to encourage the global adoption of practices and standards that serves the consumer goods industry worldwide. It brings together the CEOs and senior management of some 400 retailers, manufacturers, service providers, and other stakeholders across 70 countries, and it reflects the diversity of the industry in geography, size, product category and format. Its member companies have combined sales of EUR 3.5 trillion and directly employ nearly 10 million people, with a further 90 million related jobs estimated along the value chain. It is governed by its Board of Directors, which comprises more than 50 manufacturer and retailer CEOs.

For more information, please visit: www.theconsumergoodsforum.com



About

Dr. Boysen Management + Consulting

Dr. Boysen Management + Consulting, led by Dr. Werner Boysen, is a first-class management consultancy specializing in the performance improvement of medium-sized industrial companies.

Dr. Werner Boysen is an industrial engineer and holds a PHD in economics. With his broad industry expertise and his practice-proven skills, Dr. Boysen helps his clients to improve their operational professionality.

For more information on his latest book, **"45 Perspectives on Cybernetics"**, please contact: **bestellung@dr-boysen-management.de** (available in german)



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