8

Introduction
to Management
Cybernetics

Coping with dynamic complexity

The Consumer Goods FORUM

End-to-End Value Chain

Dr. Boysen Management + Consulting

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

Index VIII

In economics, **dynamic complexity** is increasing.

Development of the Basic Conditions

Advancing Globalization

Global supply chains which are continuously being re-defined

Highly volatile global markets and capital flows

Progressive Cross-linking

Increasing modularization

Dispersed R&D teams, enabled by the availability of information and communication technology

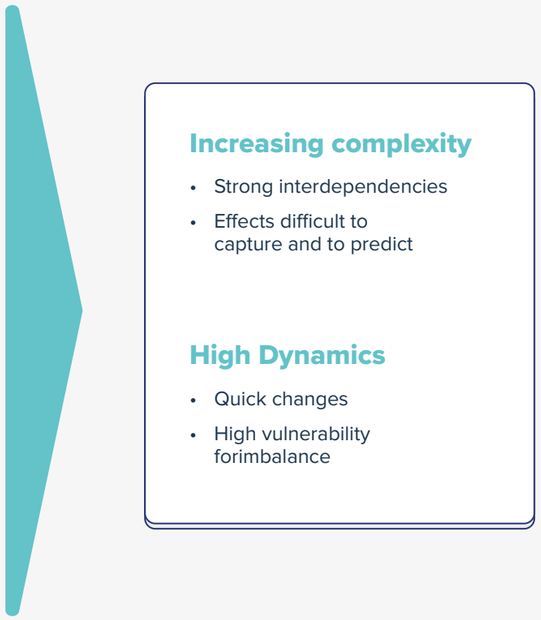
Industry-wide requirement management process in R&D

Increasing Variety

Increasing variety of models and variants, more specific applications

Market-specific legal requirements and guidelines

Shorter model cycles



Coping with Complexity

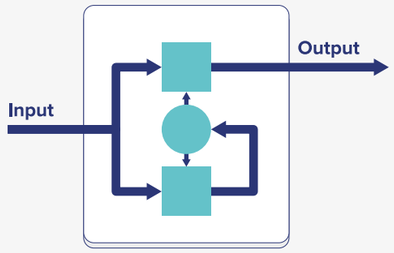
- Organizations are operating in increasingly dynamic-complex environments.
- Dynamic complexity is not understood by many managers, who tend to act with mental models of improperly reduced complexity.
- As a consequence, decisions taken often do not lead to the desired results. Deviations are perceived 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?

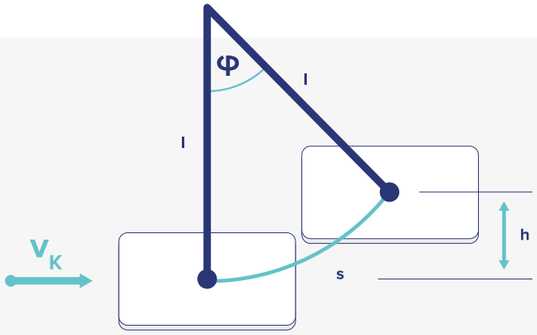
Trivial Machine

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



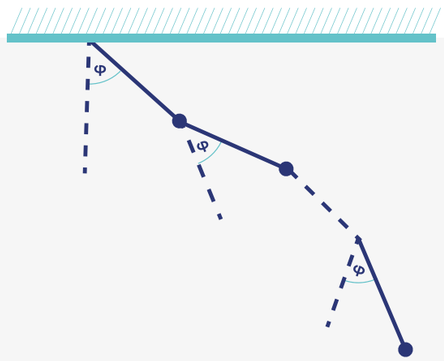
Non-trivial Machine

- 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



Complex, networked relationship

- 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)!

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!

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

Paradigm with linear-causal relationships

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

Paradigm with complex relationships

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

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

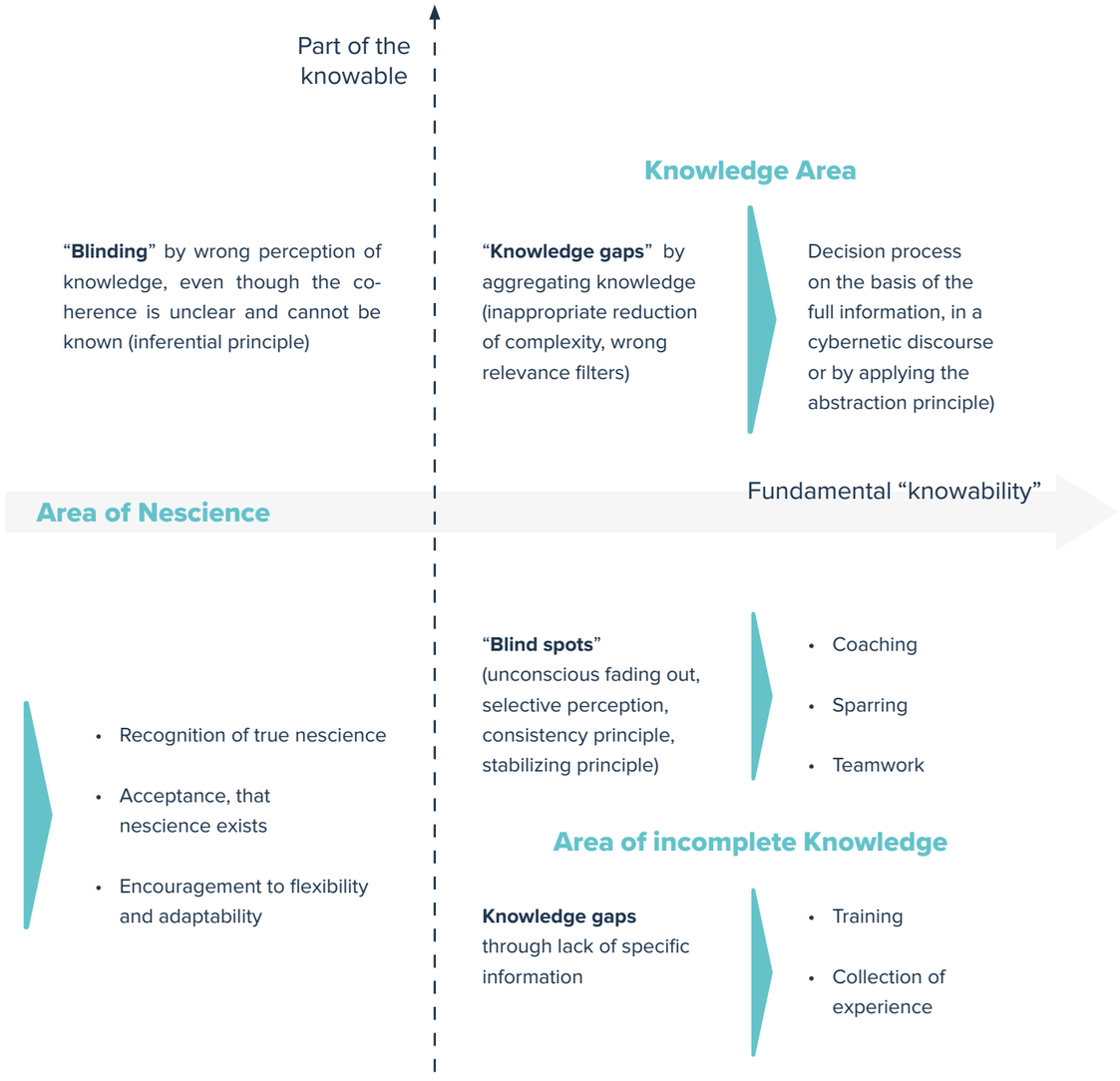
Inner Complexity			
	value creating	**Adaption of processes, structures and services to the environment** Internal networking, decentral decision structures	**Influencing the external Complexity** Business model, innovation, price model, cooperations, Mergers & Acquisitions
	value destroying	**Reduction of value destroying Inner complexity** Reduction of unnecessary variety of variants, simplification of decision structures	**Reasonable limiting of the internal complexity** Behavior rules, clear corporate objectives, value-orientated incentives, stabilizing circuits
		not influenceable	influenceable
		External Complexity	

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	Implement an effective complexity management
Methods and Measures			
• 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	• 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 • 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
Results			
• Raising awareness of the topic “complexity” • Self-reflection • Awareness of your own possibilities of influence • Commitment to personal responsibility	• 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 • Improved sustainable profitability

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



Acknowledge complexity as an opportunity.

d. Rules of Thumb

Rules of Thumb
Do not try to reduce complexity.
There is no prediction of uncertainty. Try to recognize the interrelations and interactions relevant to decisions.
Accept and welcome uncertainty as a necessary pre-condition for evolution.
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).
Don’t be satisfied with simply recognising the present situation, but rather try to recognize in which direction the “picture” is going.
Always tend to decide in a way that the number of possibilities is maximized by your decision (Heinz von Foerster).
In an interrelated and interacting system, you cannot do just one thing. You always influence more than one thing. Therefore, also consider new problems which might arise from solving existing ones.
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.
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)
Adapt the internal complexity and the complexity of the leadership system to the (often given) external complexity.
Check whether you can influence and shape the external complexity by co-operations, by contracts and/or by your business model or innovation.
Make sure that the degree of your internal complexity at least equals the external complexity.
Reduce value-demolishing complexity.
Increase value-creating complexity.
Make sure that your leadership system precisely captures the essential complexity drivers – and that it does not become a complexity driver itself.
Design complexity by means of cost and benefit aspects, including opportunity cost effects.
Focus your attention on organizational capabilities and relationships instead of the functional excellence of individuals.
Acknowledge interdependencies – leave the “island” view.
Design self-regulating processes
Eliminate weak points in the process architecture, e.g.: partially involved elements
Incorporate feedback mechanisms to stabilize the processes.
Create robust product structures, using the modularization potential.
Optimize the complexity for your relevant 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?**
4. **Which complexity drivers can you influence?**
5. **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 practice-proven 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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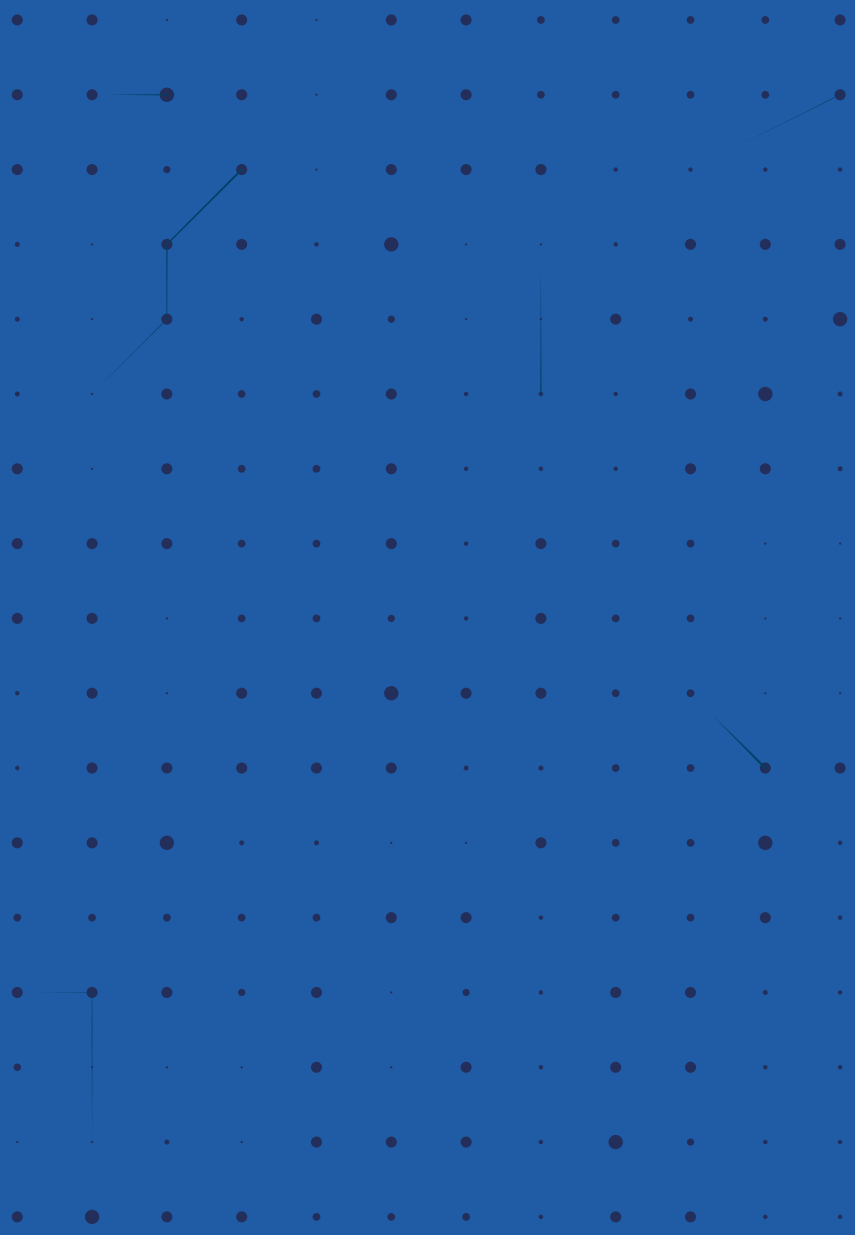

9

Introduction
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Cybernetics

Best-practice leadership in cybernetic organizations

The Consumer Goods FORUM

End-to-End Value Chain

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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

Index IX

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.

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

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."

Jay Wright Forrester

Leaders need to start thinking in terms of cybernetic behavior.

c. Cybernetic Leadership

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

Complex tasks in complex environments require managers with special skills.

d. Summary

VUCA

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.**

You should learn to **think in probabilities instead of in uncertainty.** You should know complexity-appropriate leadership methods and you should know **how to organize self-regulating interaction.**

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 and constructive discourse and choose an iterative path to solutions.**

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.

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 carried out in a networking form**. Top-down leadership does not cope with the dynamic complexity.

Consequently, complex environments require **leadership with the aim of self-regulating teams**. The success factors for such leadership are the **capability to initiate self-regulation** and to contribute experiences from complex environments.

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

As a leader you should **recognize early signal for important changes** and **make sure that these changes are considered in the proceedings**.

As an experienced leader you know that **it is easier to move within the natural stream that against the stream**. Therefore, you create awareness in your team that **the future natural stream should constantly be monitored**.

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**.

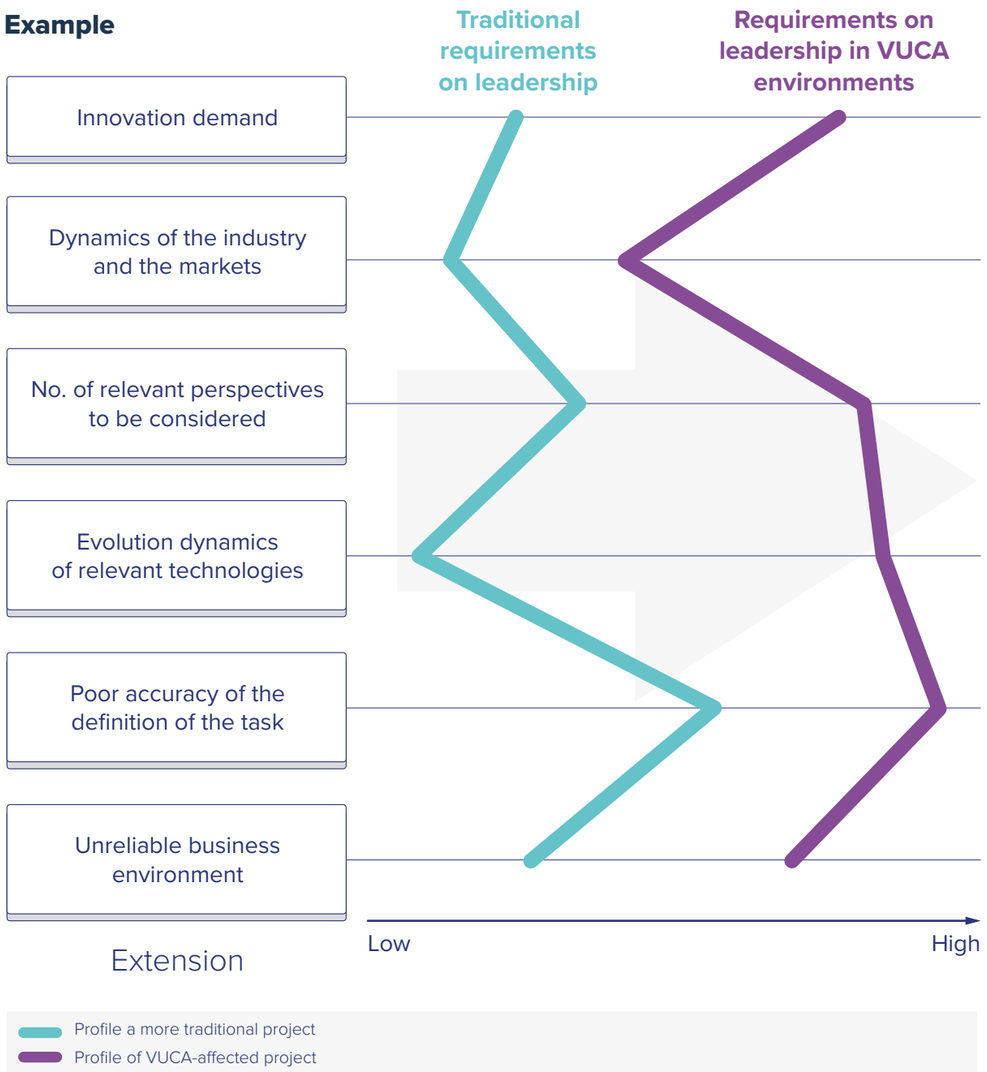
In business, the "one single truth" is often not available. However, **several – at first glance opposing – perspectives to the same matter help to disclose approaches to solutions which were previously hidden**.

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

Example



Complex tasks in complex environments require managers with special skills.

j. Basic Leadership Skills

Under normal conditions...

- You are capable of leading challenges in a non-VUCA environment in a successful way fulfilling the agreed time-line and the agreed cost frame by appreciating the performance and treating people fairly and attentively with a situational leadership style
- You can organize and manage technical skills without necessarily possessing them yourself
- You understand the business, including its strategic aspects
- You are able to lead an organization in line with compliance
- You understand “diversity” and are capable of inter-cultural communication and multi-lingual leadership
- You lead projects with a focus on their benefit
- You understand the performance level and the limits of the “new media”
- You can develop strong relationships with your business stakeholders and with your teams
- 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 conditions...

- On the basis of a solid methodical skills set, you can **think freshly as well as keeping an open mind towards methods and result**
- You possess a certain “**hyper-awareness**”: You continually search for information, you have a good power of observation and a pronounced attentiveness for changes. You especially **look out for exponential progressions and possible tipping points**
- You have the willingness and the ability to **analyze existing data with applications of Artificial Intelligence and to identify patterns supporting rational decision making** instead of deciding based on experience
- You **trust in the power of the interaction within and among your teams:** You know that they act as managers for the benefit of your organization better than you ever could
- You show intellectual modesty: You do not hesitate to **involve acknowledged experts with their specific knowledge**
- You lead by means of “**visionary pictures**” of the target situation and fostering and supporting a creative, iterative approach, oriented towards moving targets
- The willingness, the attitude and the ability to involve all interests and perspectives relevant to the outcome and to **concurrently work on mutually linked tasks to avoid “island solutions”** and to **find self-supporting solutions** (the willingness and the capability of holistic and simultaneous approaches)
- The willingness and the ability to **seek for open and constructive discourses independent of hierarchy** (“Delphi circles”)

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

- Comprehension of the **essential cybernetic principles**
- Knowledge of the **essential game-theoretical approaches** to better anticipate third-parties‘ decisions
- Experience with the **introduction of regulation mechanisms in organizations** (installation of **effective feedback loops**) also involving the relevant environment
- VUCA-orientated handling of targets: Decentral contributions to the result keeping in mind “mission” and “purpose“ (**subsidiary principle**) instead of top-down; on-the-run evaluation of contributions and agile re-adjustments by means of short-term action-plans (**here and now!**), staying as flexible as possible
- You strive to **create or maintaining alternative options for action (variety)** to be called on in the case of changes (**hedging scenarios**)
- You are used to **hands-on management, “living cases”** instead of writing detailed concepts to be subsequently implemented
- You are known for quickly **starting with the implementation** (speed beats perfection!)
- You justify your decisions and your actions by means of their direct and indirect effects (**circular-causal thinking**)
- You make sure that **solutions are applied adaptably to keep them open for further development**
- You have a pronounced **ambition to learn**
- You are capable of managing (not avoiding) risks

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

- You lead your teams in a way that the team members understand the basic idea, but you do not operatively intervene
- 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 disposition to lead:** You have got the disposition to perform as a leader in VUCA environments, the willingness to take responsibility and the courage to take decisions in uncertainty
- **The possibility to lead:** You are capable of creating the pre-conditions for your unconditional responsibility and to call in the required authority
- **The ability to lead:** You have **“leadership genes”**, are **skilled in leadership** and have already collected **leadership experience in VUCA environments**
  - You can **lead interdisciplinary teams with quite diverse members**
  - You **attentively listen, observe, inform, visualize and communicate**
  - **You take the role as the “enabler” and bridge-builder** instead of the “man of action”
  - You become **effective by influence instead of by applying hierarchical power**
  - You r**ecognize “nescience”** (to be distinguished from insufficient knowledge) and handle it openly and constructively
  - You **tap into the groups’ intelligence** and use the resulting internal complexity as a stabilizer
  - You **leading in a lean way**: Deploy capacity for the search for 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)

"De-freezing" by dashing down

- **Create a discrepancy experience** (Problem/ target situation)
- **Raise responsibility**
- **Destroy** inconvenient routines and dissolve non-appropriate structures
- **Overcome the perception of loss** by good communicative monitoring of the changes

"Moving" with the momentum

- **Exploit the momentum** freed up by dissolving no longer required mechanisms
- **Encourage own initiatives:** Make affected people to involved people!
- **Common developing and prioritizing of alternative solutions**
- **Formal decisions on future processes and structures**

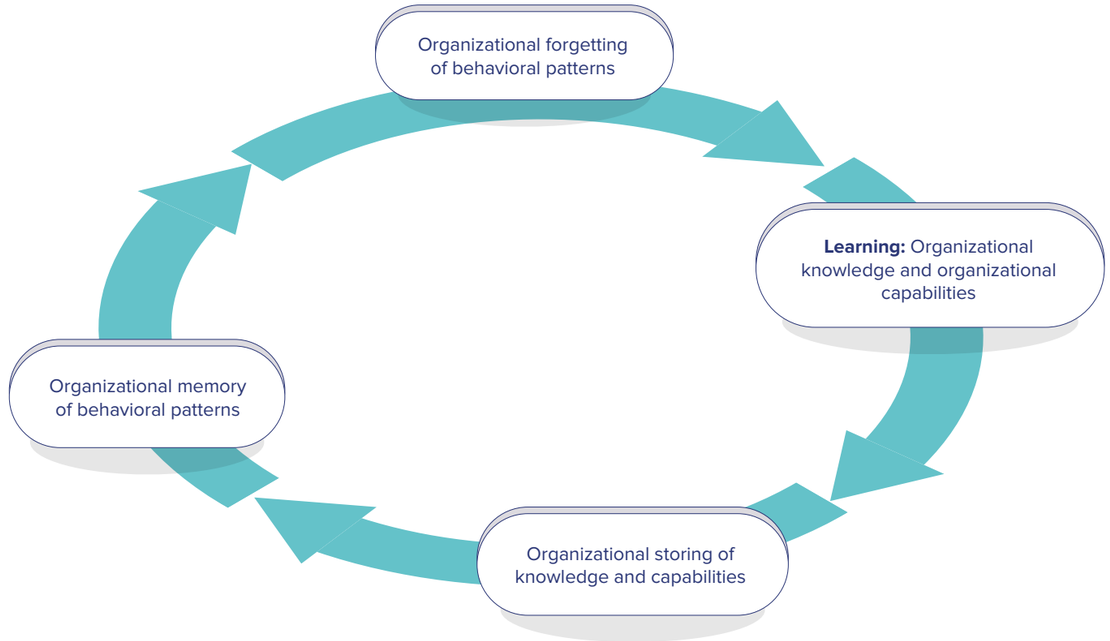
"Re-freezing" while staying flexible

- **Documentation and implementation** of the agreed option
- **Review the effectiveness:** Will fine-tuning or corrective measuresbe necessary?
- **Simultaneous improvement of the adaptability** to enable the organization to more easily find new solutions when new problems occur (double-move)

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

Elements of organizational learning



Pre-conditions for organizational learning:

- Tolerance, especially failure tolerance
- Open co-existence of diverse opinions
- Constructive discourse
- Knowledge management
- Organizational self-reflexion (Audits)

Questions for Reflection

1. 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 decision-making process?

4. Is your management aware of potential “Tipping Points”?

5. 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?

9. 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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