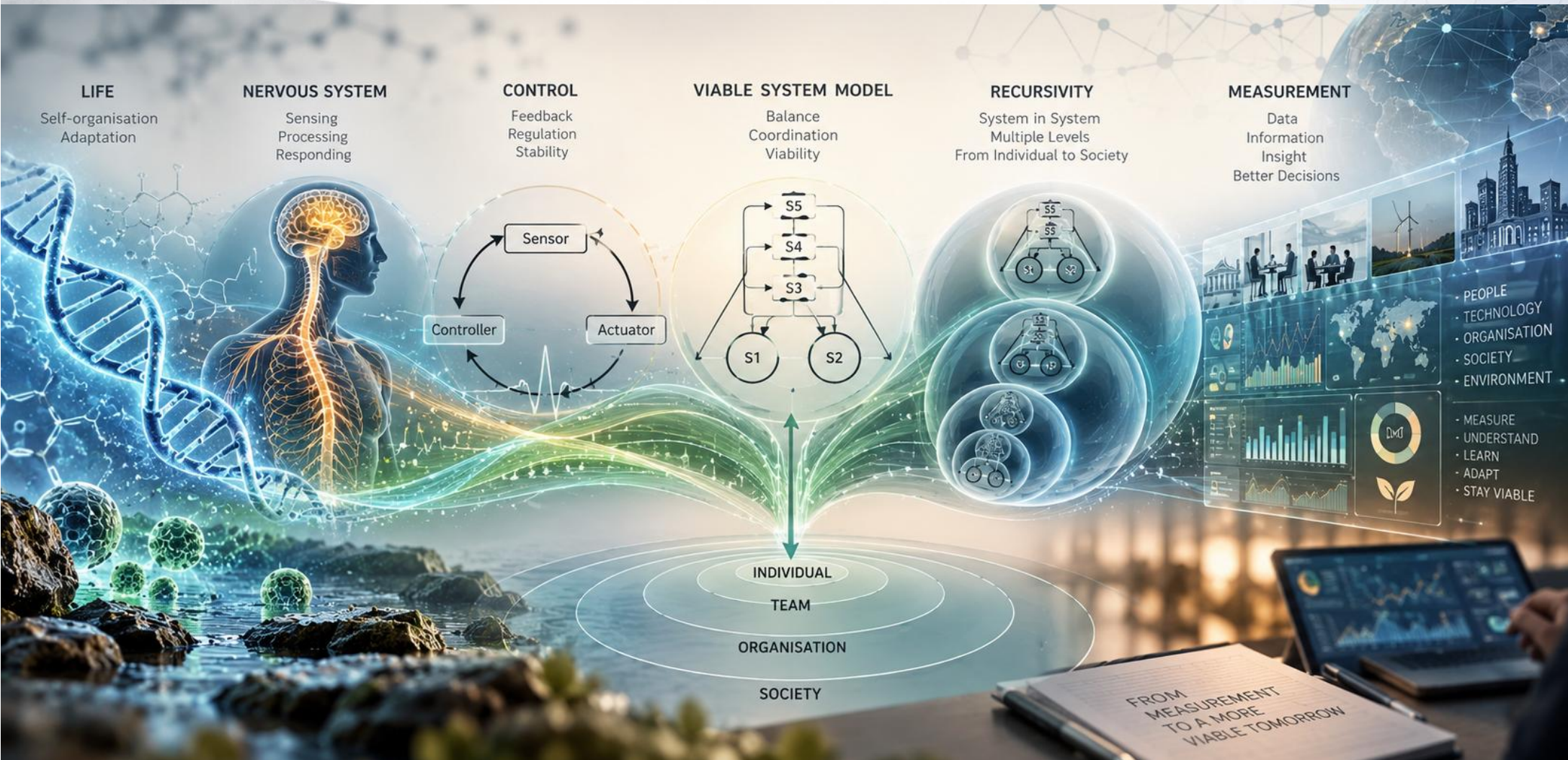


From Viability to Measurability

Designing Viable Governance in Highly Complex,
Dynamic and Regulated Organisational Contexts



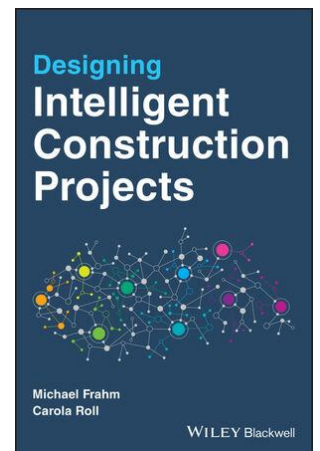
Conceptual illustration: C. Ritzinger-Roll; generated with OpenAI ChatGPT, 2026

22.09.2026

Speaker:
Carola
Ritzinger-Roll (MBA)

Brief introduction: Carola Ritzinger-Roll

- **Strategy and Sustainability Manager** Master Professional of Technical Management, Quality and Environmental Manager, Strategic Business Developer, Health and Safety and Radiation Protection Officer, Internal Auditor)
- **Professional experience:** Railway engineering – motorsport/automotive – mechanical engineering
- Since 2013, part-time lecturer at the Chamber of Industry and Commerce (IHK) of Lower Bavaria alongside my professional role
- **Degrees:** ‘Lean Operations Management’ (M.Sc.) and ‘Integrated Management Systems’ (MBA) at the University for Continuing Education, Krems
- **External PhD project** at the University of Stuttgart on the topic: “Organisational control using cybernetic key performance indicator systems”
- Co-Director of the DACH regional group of SCiO (Systems and Complexity in Organisations), and also a member of: the Society for Economic and Social Cybernetics (GWS), the Cybernetics Society and the European Forum for Construction Cybernetics



What is complexity?

- Ashby´s Law – Law of requisite variety:

$$V(C) \geq V(S)$$

The diversity (**number of possible states or responses**) of a controller or system (C) must be greater than or equal to the diversity of the environment or situation (S) that it is attempting to control.

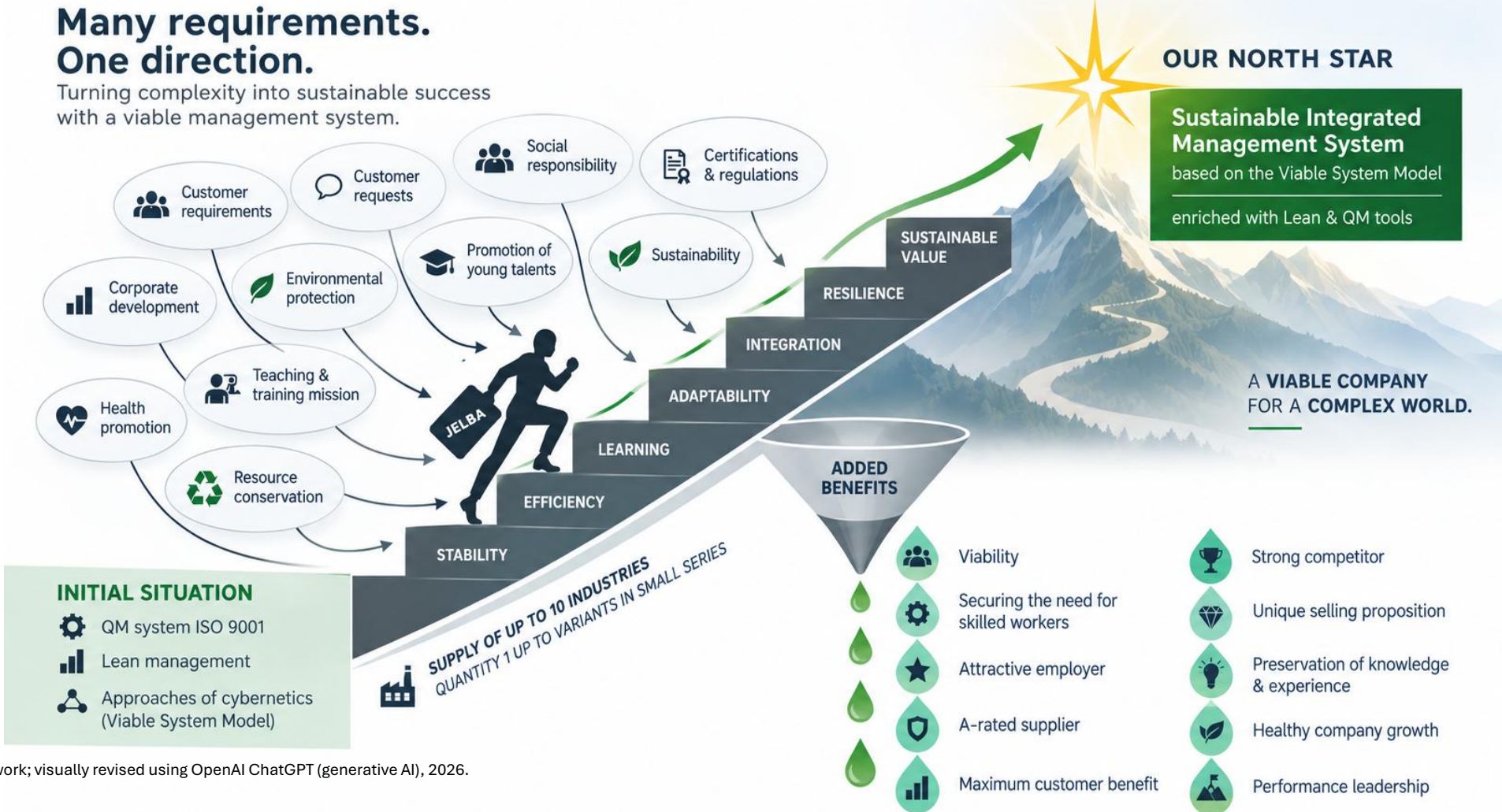
- „Variety is a measure of complexity,
because it counts the **number of possible states of a system.**“

Beer, S. (1985). Diagnosing the System for Organizations

- „Complexity is a system’s ability to **assume a large number of different states within short periods of time.**“

Ulrich, H. (1991), former Professor of Business Administration (University of St Gallen)

What does complexity mean in a business context? In general



Source: Author's own work; visually revised using OpenAI ChatGPT (generative AI), 2026.

What does complexity mean in a business context? Products



C. Ritzinger-Roll



Supplier of individual components, assemblies and complete systems for:

- Mechanical and plant engineering
- Steel industry
- Plastics industry
- Food industry
- Test bench construction
- Automotive industry
- Aerospace industry
- Nuclear industry
- Defence technology
- Semiconductor industry

What does complexity mean in a business context? Regulation

An internal quantitative inventory of applicable general and project-specific regulatory and customer requirements yielded the following result:

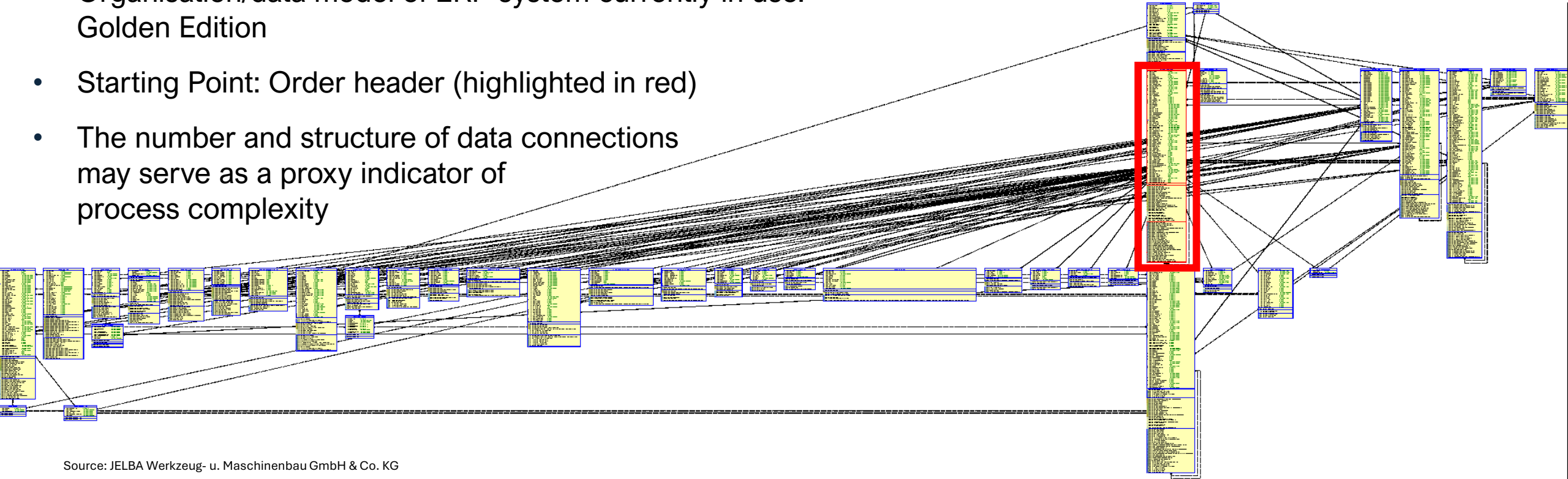
**6 Acts, 14 regulations, 282 standards, 7 rules, 9 guidelines,
323 customer-specific standards***

*(Different versions of a document were not counted more than once).

Roll, C. (2023). *Vereinbarkeit externer (Kunden-)Anforderungen und zukunftsfähiger Organisationsentwicklung: Gestaltung eines betrieblich nachhaltigen Integrierten Managementsystems für branchen-übergreifend agierende Lohnfertiger*“ (Master’s thesis). Danube University Krems: Department of Knowledge and Communication Management; Centre for Cognition, Information and Management.

What does complexity mean in a business context? Processes

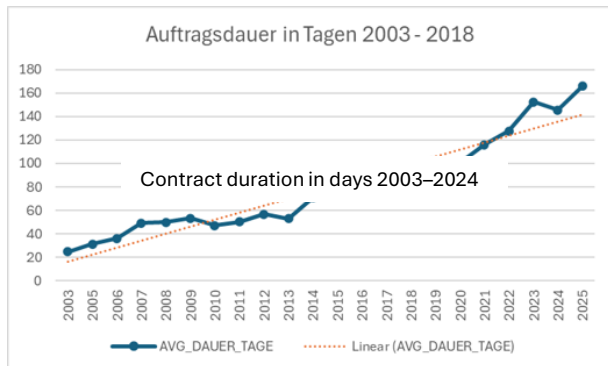
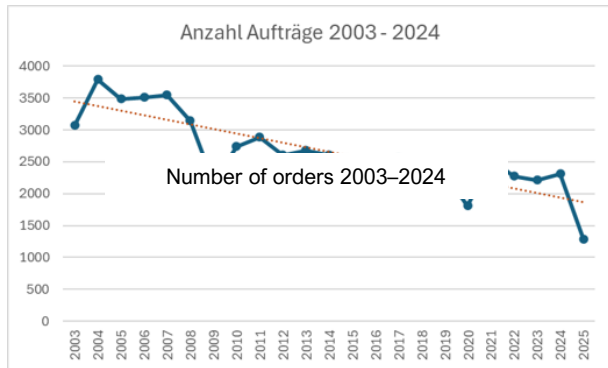
- Organisation/data model of ERP system currently in use: Golden Edition
- Starting Point: Order header (highlighted in red)
- The number and structure of data connections may serve as a proxy indicator of process complexity



Source: JELBA Werkzeug- u. Maschinenbau GmbH & Co. KG

Managing complexity within an organisation

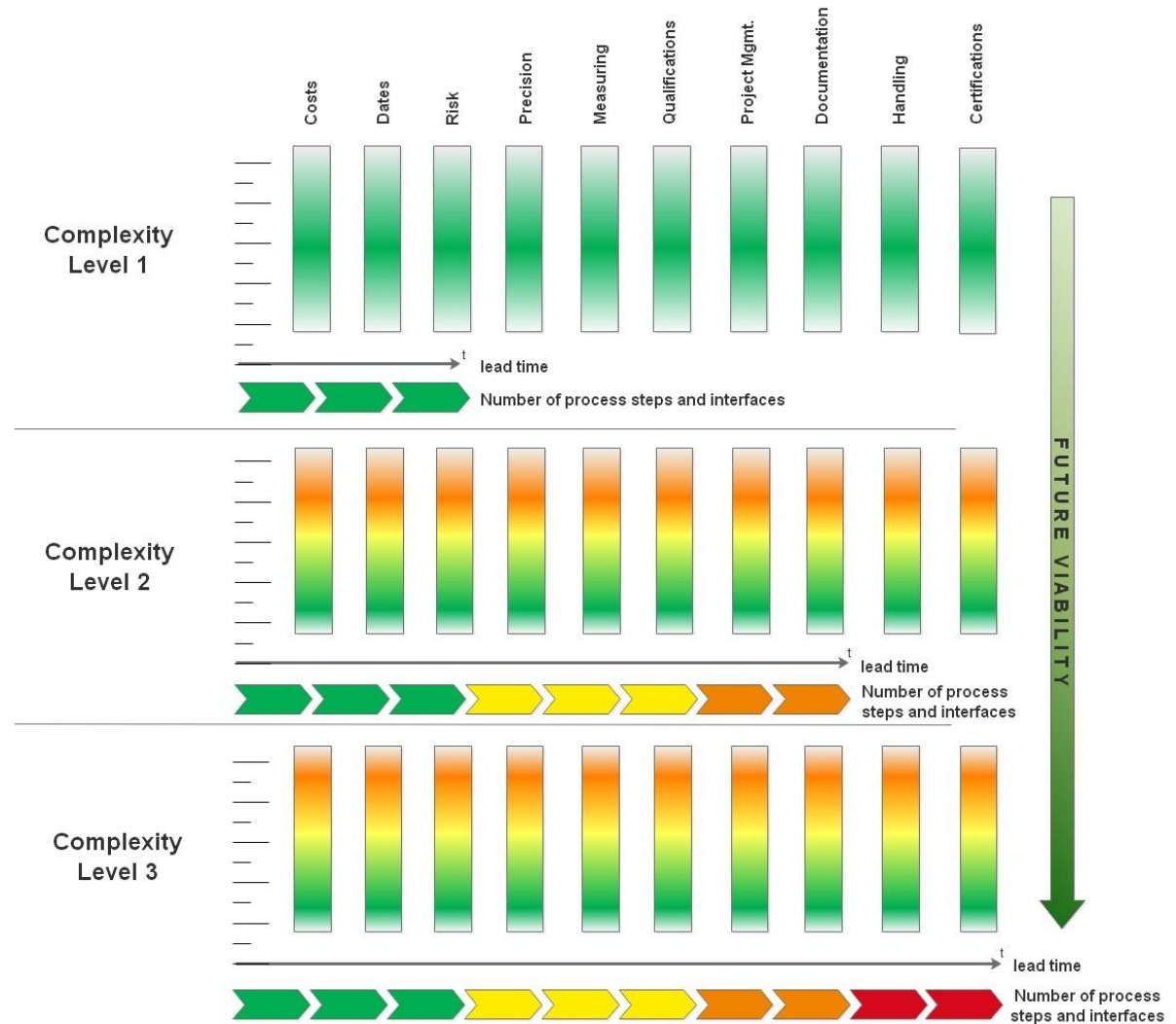
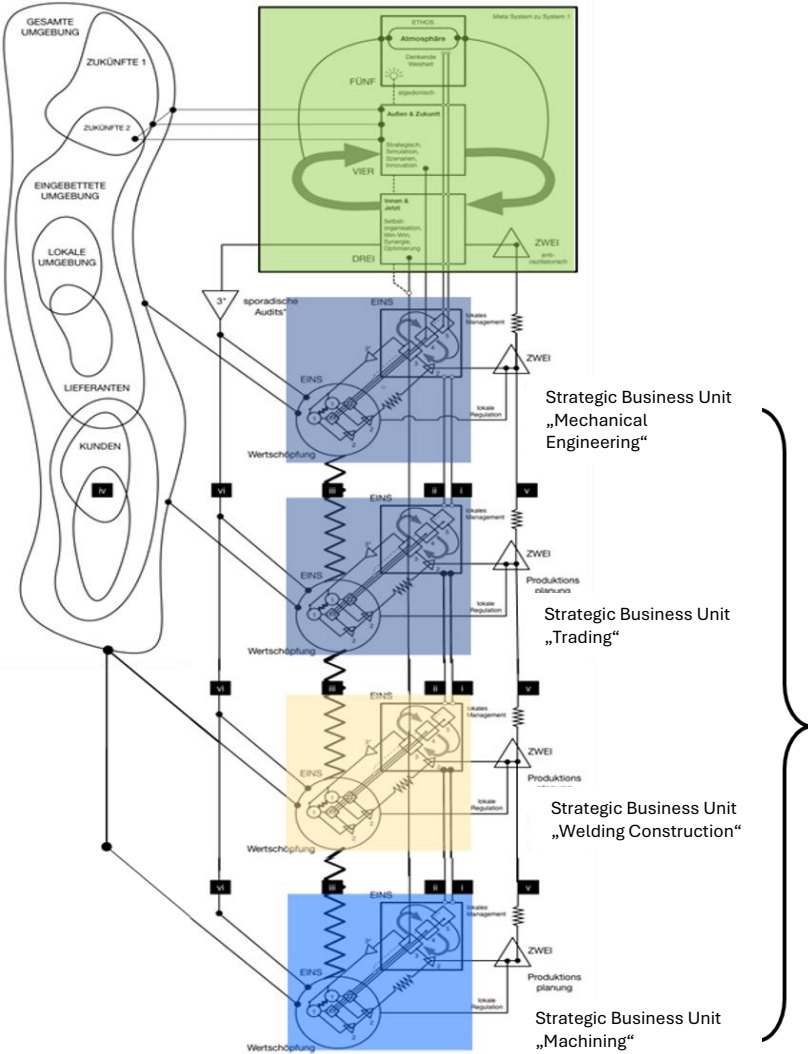
Analysis of 15 key business indicators:
Analysis period: 2003–2024 (where available)



The indicator set suggests increasing complexity per individual contract despite a declining number of orders.

Name of KPI	Time period	Decrease	Increase
Number of orders	2003 - 2024	●	
Number of customers	2003 - 2024	● (slight)	
Number of orders per customer	2018 - 2024		●
Number of orders per industry	2018 - 2024		●
Order duration in days	2003 - 2024		●
Order duration per industry	2018 - 2024		●
Resources per order	2018 - 2024		● (slight)
Resources per order per industry	2018 - 2024	● (slight)	
Bill of materials depth per customer	2018 - 2024		●
Notes per industry	2018 - 2024		●
Number of revision statuses	2018 - 2024		●
Number of bill of materials levels	2018 - 2024		● (slight)
Turnover	2002 - 2024		●
Turnover per customer	2018 - 2024		●
Turnover of the 10 customers with highest turnover	2003 - 2024		●

Managing complexity within an organisation



Managing complexity within an organization (extract)

Criterion	Characteristic / Indicator	Complexity Level 1	Complexity Level 2	Complexity Level 3
Costs	Total project turnover	1 - 50.000 €	≥ 50.000/100.000 €	≥ 1.000.000 €
	Total project costs	1 - ... €	≥ ... €	≥ ... €
	Requirements for materials	standard material possible exclusion of individual countries of origin	standard material, batch material	standard material, batch material, special materials,
Dates	Total project duration	standard project duration		> 5 months
	Deadline	buffer time ≥ 5-6 weeks	buffer time < 5 weeks	time-critical at project start
	Number of internal interfaces	< 10	10 - 19	> 20
	Number of external interfaces (service providers)	none	1 - 2 external standard procedures	> 2 external standard procedures, time-critical external procedures, new external service provider
Risk	Part type	noncritical part	critical part	safety-related part
	Production frequency	repeat part	new part	new part
	Occurrence of production errors	no/uncritical previous errors	previous errors	previous critical error event
	Project clarity	technical clarity	technical questions open	technical uncertainties
	Risk of accidents	low	medium	high
Required level of precision	Defect rate			≤ 1.5%
	Internal deviations	not to be expected	to be expected,	expectable,
	Industry	mechanical engineering	mechanical engineering,	mechanical engineering,
	Process complexity	simple	medium	high

JELBA Model of Operational Complexity

Integrating Cynefin, Requisite Variety and Viability

Contract complexity, predictability and organisational control capability in the state space

Z Organisational Control Capability

Ability of the organisation to manage complexity (effective regulation)

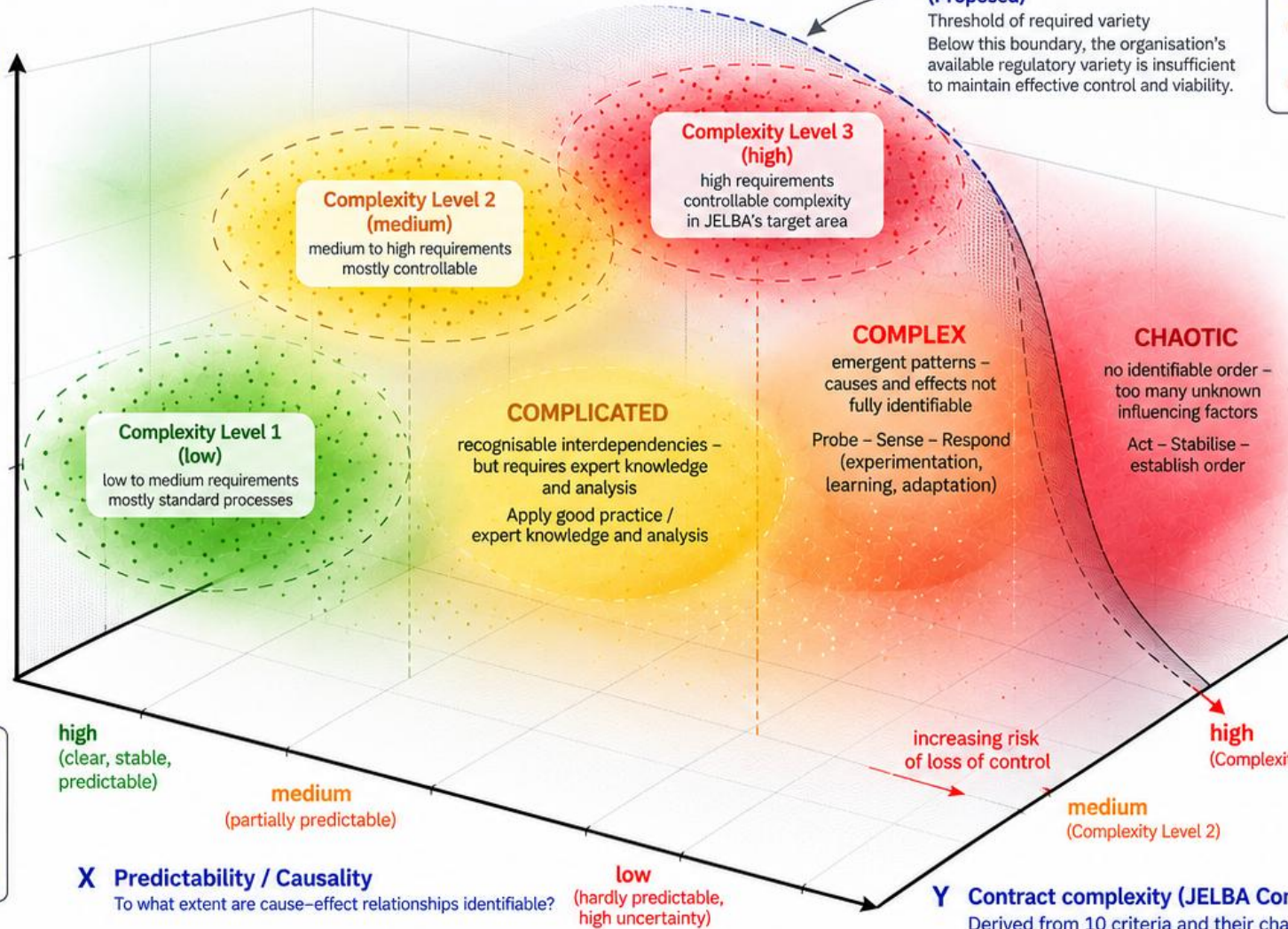
high
(system under effective control)

medium
(partially controllable)

low
(loss of effective control)

Legend Complexity Levels (CL)

- CL 1 – low
- CL 2 – medium
- CL 3 – high
- = individual contracts / projects



Viability Boundary (Proposed)

Threshold of required variety
Below this boundary, the organisation's available regulatory variety is insufficient to maintain effective control and viability.

Cynefin Domains

- **CLEAR** – recognisable, predictable
- **COMPLICATED** – analysable
- **COMPLEX** – emergent, not fully predictable
- **CHAOTIC** – no discernible order

JELBA Complexity Criteria (10 Dimensions)

- € Costs
- 📅 Schedule
- ⚠️ Risk
- 🎯 Precision / Quality
- 🔧 Measurement effort / accuracy
- 👤 Qualification level
- 🏢 Project management effort
- 📄 Documentation effort
- 👮 Handling effort
- 🏆 Certifications / Standards

Each criterion can have its own complexity level (1–3).
Not all 10 criteria must be on the same level.

X Predictability / Causality

To what extent are cause–effect relationships identifiable?

low
(hardly predictable, high uncertainty)

Y Contract complexity (JELBA Complexity Index)

Derived from 10 criteria and their characteristics



Our Position

JELBA consciously operates in the area of higher complexity (CL 3), combined with a high degree of controllability. We continuously improve our processes – even with maximum complexity.



Principle

The higher the contract complexity (Y) and the lower the predictability (X), the greater the controllability (Z) required to remain within the viability boundary.



Continuous Development

Through experience, process maturity, qualification and suitable management systems, we continuously increase our controllability (Z) and push the viability boundary further upwards and to the right.



Tipping Points (Boundary)

When the required variety is exceeded, the system leaves the controllable area and risks losing its viability.

Literature

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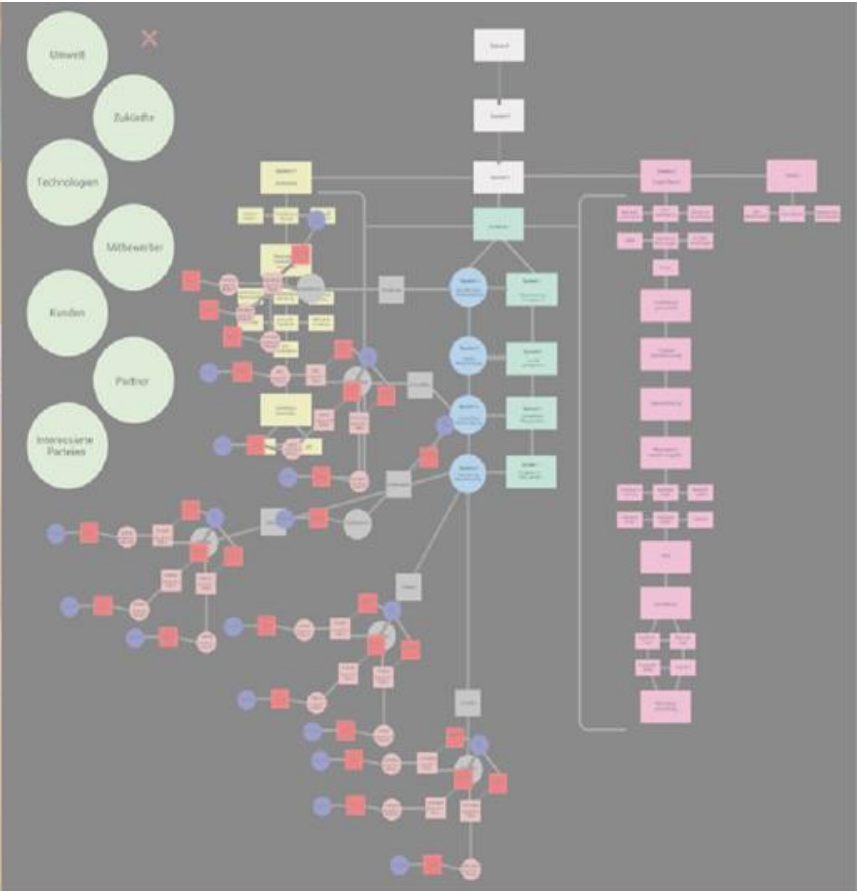
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Connect with me on LinkedIn



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Thank you very much for your attention!