Integrated IT workflow applications
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
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, real-time and “single truth” (Oracle claim) are key.

- Process-oriented, well channeled reporting (task-related 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.

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 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 decision-making 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.
- 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.
End-to-End Value Chain

The Consumer Goods Forum

Metaphorically speaking, a company can be seen as a factory that needs to produce the best possible goods with the minimum effort. IT applications are like the infrastructure of the factory, which need to be designed in such a way that they work in harmony with each other.

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

**IT Applications for Networked Thinking**

- **Avoid IT “point solutions” and silo cultures;** the handling of interface problems which might arise can become challenging and expensive.

- **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-by-side without coordinated information. Centrally managed data avoids data incongruity and mismatch.**

IT as Enabler and Supporter of the system “Corporation”

**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 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?
5. Is your IT really 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.
- Ideally, the IT applications are fully integrated.
- IT should dynamically provide the most relevant management information for each individual situation.

Relevant Sources for Further Reading

Measuring cybernetic excellence

Introduction to Management Cybernetics
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 cybernetics-oriented reporting systems
- You will gain practice-proven means for an effective risk management

Index XI

Classic Key Performance Indicators (KPIs) PAGE 174
- Aggregation in a KPI System PAGE 175
- Understanding Complex Systems PAGE 177
- ...Versus Integration PAGE 177
- Integrated Leadership Concept PAGE 178
- Quality Cost Record PAGE 179
- Internal Errors and Reworking PAGE 180
- Tolerance Exceedance, Commercial Loss PAGE 181
- Preventative Measures, Total System Cost PAGE 181
- Operational Risk Self-Assessment PAGE 182

Questions for Reflection PAGE 183

Summary of Section PAGE 184

Relevant Sources for Further Reading PAGE 185
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 does not optimize the total result, but only “shows” it.
- It leaves unsolved interest conflicts.
The more we focus on details the less we understand the big picture.

ANALYSIS VERSUS HOLISTIC APPROACH AND INTEGRATION

- 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

Recognize patterns from holistic view, even though it might be “out of focus

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

Understanding Complex Systems

- 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

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

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

### Integrated Leadership Concept

#### Corporate foresight
- **Concept**: Scenario technique, Analysis of strategic risks
- **Effect**: Strategic flexibility and adaptability

#### Innovation management process
- **Concept**: Creativity techniques, Initiative portfolio
- **Effect**: Capability of developing and adapting

#### Holistic approach to business processes
- **Concept**: Business process modeling, Capturing and molding effect networks, Operational risk self-assessment (ORSA) process
- **Effect**: Process stability while improving the efficiency, accepted and enforceable solutions

#### Complexity management
- **Concept**: Internalization of risks, balanced scorecard concept, beyond budgeting approach
- **Effect**: Cybernetically meaningful decision-making, follow-up of measures, multi-dimensional view regarding results

#### Corporate policies
- **Concept**: Corporate mission statement, Leadership statement
- **Effect**: Orientation, providing meaning

#### Cybernetic leadership approach
- **Concept**: Self-organization, cybernetic discourse, recursively designed structures, trust as the basis of business, triggering of intrinsic motivation factors
- **Effect**: 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

<table>
<thead>
<tr>
<th>Qualitätskostenentwicklung in Unternehmen xyz</th>
<th>Stand 2008</th>
<th>Stand 2009</th>
<th>Ziel 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>(EUR)</td>
<td>(%)</td>
<td>(EUR)</td>
<td>(%)</td>
</tr>
<tr>
<td><strong>A Interner Ausschuss</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Materialkosten des Ausschusses</td>
<td>1.528.657</td>
<td>65,1</td>
<td>1.498.877</td>
</tr>
<tr>
<td>Mängelkosten des Ausschusses</td>
<td>65.000</td>
<td>2,6</td>
<td>425.000</td>
</tr>
<tr>
<td>Funkenkosten des Ausschusses</td>
<td>410.000</td>
<td>17,3</td>
<td>340.000</td>
</tr>
<tr>
<td>Kapitalkosten für laufende Lagerhaltung durch Ausschuss</td>
<td>1.687</td>
<td>0,3</td>
<td>5.687</td>
</tr>
<tr>
<td>Abfallkosten</td>
<td>10.000</td>
<td>0,4</td>
<td>8.500</td>
</tr>
<tr>
<td>Doppellieferungen</td>
<td>20.000</td>
<td>0,8</td>
<td>20.000</td>
</tr>
<tr>
<td>falsche oder ineffiziente Planung</td>
<td>90.000</td>
<td>3,5</td>
<td>105.000</td>
</tr>
<tr>
<td>Streubesorgung</td>
<td>40.000</td>
<td>1,7</td>
<td>40.000</td>
</tr>
<tr>
<td>Trennung</td>
<td>85.000</td>
<td>3,5</td>
<td>81.800</td>
</tr>
</tbody>
</table>

#### B Kundenreklamationen
- **Concept**: Corporate foresight, Analysis of strategic risks
- **Effect**: Strategic flexibility and adaptability

#### C Toleranzüberschreitung
- **Concept**: Business process modeling, Capturing and molding effect networks, Operational risk self-assessment (ORSA) process
- **Effect**: Process stability while improving the efficiency, accepted and enforceable solutions

#### D Qualitätssicherung und Vorbeugung
- **Concept**: Business process modeling, Capturing and molding effect networks, Operational risk self-assessment (ORSA) process
- **Effect**: Process stability while improving the efficiency, accepted and enforceable solutions
XI. Measuring cybernetic excellence

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

### Tolerance Exceedance, Commercial Loss

<table>
<thead>
<tr>
<th>B</th>
<th>Tolerance exceedance (avoidable reserve), due to systemic deficits</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Cost of arbitrary relations (unnecessary complexity)</td>
</tr>
<tr>
<td>B</td>
<td>Cost of avoidable diversity (e. g. assortment, options, missing modularization)</td>
</tr>
<tr>
<td>C</td>
<td>Cost of overdrawn reporting routines</td>
</tr>
<tr>
<td>D</td>
<td>Cost of complicated decision structures</td>
</tr>
<tr>
<td>E</td>
<td>Cost of unnecessarily complex information systems</td>
</tr>
<tr>
<td>F</td>
<td>Cost of avoidable material reserve, due to missing specs or process reliability</td>
</tr>
<tr>
<td>G</td>
<td>Cost of avoidable over-production, due to missing process reliability or professionality</td>
</tr>
<tr>
<td>H</td>
<td>Cost of avoidable material quality, due to missing expertise or professionality</td>
</tr>
<tr>
<td>I</td>
<td>Cost of avoidable over-qualification of personnel</td>
</tr>
<tr>
<td>J</td>
<td>Cost of avoidable overspecification of machines or equipment</td>
</tr>
<tr>
<td>K</td>
<td>Cost of avoidable personnel, due to exaggerated flexibility or avoidable planning</td>
</tr>
</tbody>
</table>

Internal Errors and Reworking

The objective is the optimization of the total system cost.

#### Internal Errors and Reworking

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

### Tolerance Exceedance, Commercial Loss

<table>
<thead>
<tr>
<th>B</th>
<th>Tolerance exceedance (avoidable reserve), due to systemic deficits</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Cost of arbitrary relations (unnecessary complexity)</td>
</tr>
<tr>
<td>B</td>
<td>Cost of avoidable diversity (e. g. assortment, options, missing modularization)</td>
</tr>
<tr>
<td>C</td>
<td>Cost of overdrawn reporting routines</td>
</tr>
<tr>
<td>D</td>
<td>Cost of complicated decision structures</td>
</tr>
<tr>
<td>E</td>
<td>Cost of unnecessarily complex information systems</td>
</tr>
<tr>
<td>F</td>
<td>Cost of avoidable material reserve, due to missing specs or process reliability</td>
</tr>
<tr>
<td>G</td>
<td>Cost of avoidable over-production, due to missing process reliability or professionality</td>
</tr>
<tr>
<td>H</td>
<td>Cost of avoidable material quality, due to missing expertise or professionality</td>
</tr>
<tr>
<td>I</td>
<td>Cost of avoidable over-qualification of personnel</td>
</tr>
<tr>
<td>J</td>
<td>Cost of avoidable overspecification of machines or equipment</td>
</tr>
<tr>
<td>K</td>
<td>Cost of avoidable personnel, due to exaggerated flexibility or avoidable planning</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>B</th>
<th>Effort for preventative measurements for systemic meaningful proceeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Cost of functional qualification measurements</td>
</tr>
<tr>
<td>B</td>
<td>Cost of training in cybernetic principles</td>
</tr>
<tr>
<td>C</td>
<td>Cost of system analysis</td>
</tr>
<tr>
<td>D</td>
<td>Cost of designing and implementing end-to-end processes</td>
</tr>
<tr>
<td>E</td>
<td>Cost of designing and implementing stabilizing feedback mechanisms</td>
</tr>
<tr>
<td>F</td>
<td>Cost of adequate process-oriented re-allocation of personnel resources</td>
</tr>
<tr>
<td>G</td>
<td>Cost of adequate process-oriented machinery and equipment</td>
</tr>
<tr>
<td>H</td>
<td>Cost of integrating of information systems</td>
</tr>
<tr>
<td>I</td>
<td>Cost of end-to-end contracts with customers/suppliers</td>
</tr>
<tr>
<td>J</td>
<td>Cost of deriving and communicating clear objectives</td>
</tr>
<tr>
<td>K</td>
<td>Cost of leveraging and implementing value-oriented incentives</td>
</tr>
</tbody>
</table>

Total system cost

<table>
<thead>
<tr>
<th>Organizational turnover</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

System cost, referred to the turnover [%]
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 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 probability of the risks and the associated costs should be quantified by everyone.

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.

Relevant Sources for Further Reading
