Lean Methods

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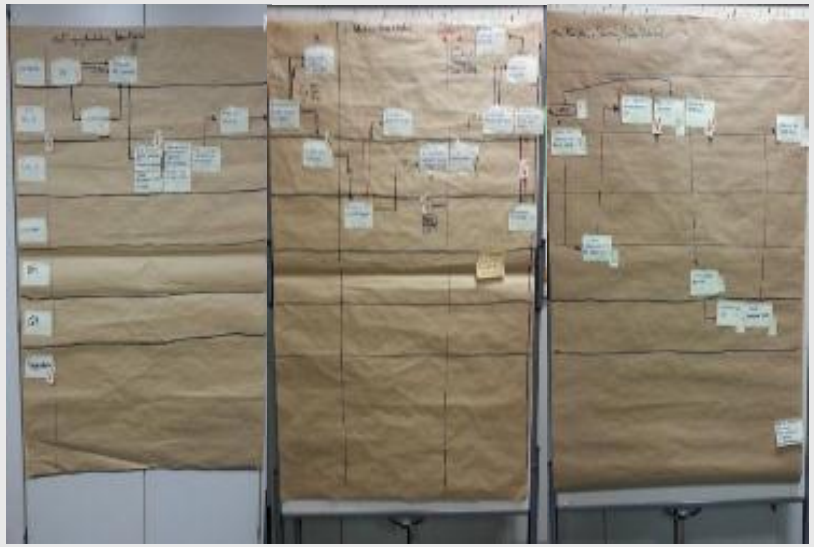
Value stream mapping maps flows and connections between elements.

Value stream mapping (2/2)

Gathering of workflow data along the value chain to identify the value-adding vs. non-value adding working hours and use of resources

Pragmatic data gathering by simple means "at the place where value is created"



Source: Kearney

Focus on gathering data on the

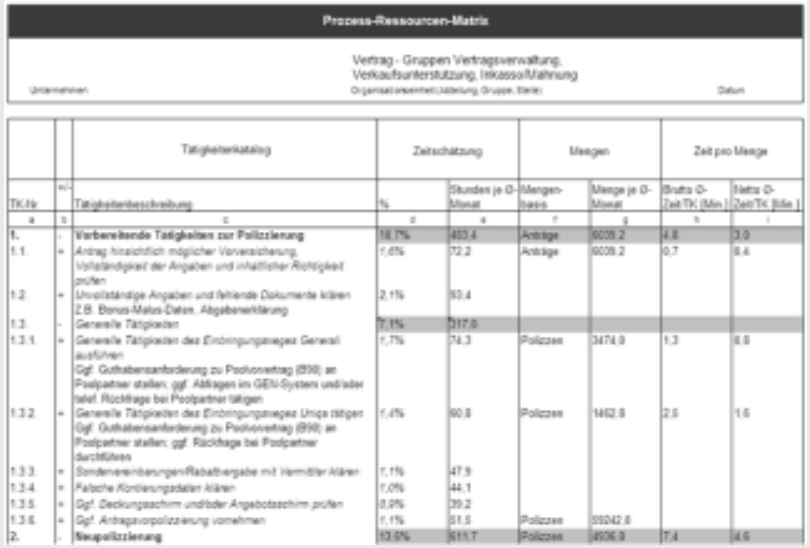
- steps of the workflow
- value-adding and waiting times
- use of resources
- inventory
- information and materials
- root cause and process loops

The process resources analysis identifies weaknesses in the process flow.

Process resources analysis

Determining the time requirement and quantity structure in the process to identify weaknesses with respect to lead time, quality or costs

Supplementing value stream mapping by estimating times and quantities



Prozess-Ressourcen-Matrix

Vertrag - Gruppen Vertragsverwaltung, Verkaufsunterstützung, Inkasso/Mahnung

Unternehmen | Organisationseinheit (Abteilung, Gruppe, Stelle) | Datum

TK-Nr.	+/-	Tätigkeitenbeschreibung	Tätigkeitenkatalog	Zeitschätzung %	Zeitschätzung Stunden je O-Monat	Mengen Mengen-basis	Mengen Menge je O-Monat	Zeit pro Menge Brutto O-Zeit/TK (Min.)	Zeit pro Menge Netto O-Zeit/TK (Min.)
a	b	c		d	e	f	g	h	i
1.	-	**Vorbereitende Tätigkeiten zur Polizzierung**		18,7%	403,4	Anträge	6039,2	4,0	3,0
1.1.	+	*Antrag hinsichtlich möglicher Vorversicherung, Vollständigkeit der Angaben und inhaltlicher Richtigkeit prüfen*		1,6%	72,2	Anträge	6039,2	0,7	0,4
1.2.	+	*Unvollständige Angaben und fehlende Dokumente klären (z.B. Bonus-Malus-Daten, Abgabenerklärung*		2,1%	93,4				
1.3.	-	*Generelle Tätigkeiten*		7,1%	317,6				
1.3.1.	+	*Generelle Tätigkeiten des Eindringungsweges General ausführen* Ggf. Guthabensanforderung zu Poolvertrag (B90) an Poolpartner stellen; ggf. Abfragen im GEN-System und/oder telef. Rückfrage bei Poolpartner tätigen		1,7%	74,3	Polizzen	3474,0	1,3	0,8
1.3.2.	+	*Generelle Tätigkeiten des Eindringungsweges Unipa tätigen* Ggf. Guthabensanforderung zu Poolvertrag (B90) an Poolpartner stellen; ggf. Rückfrage bei Poolpartner durchführen		1,4%	60,8	Polizzen	1462,8	2,5	1,6
1.3.3.	+	*Sondervereinbarungen/Rabattvergabe mit Vermittler klären*		1,1%	47,9				
1.3.4.	+	*Falsche Kontierungsdaten klären*		1,0%	44,1				
1.3.5.	+	*Ggf. Deckungsschirm und/oder Angebotsschirm prüfen*		0,9%	39,2				
1.3.6.	+	*Ggf. Antragsvorpolizzierung vornehmen*		1,1%	51,5	Polizzen	103242,8		
2.	-	**Neupolizzierung**		13,6%	611,7	Polizzen	4606,8	7,4	4,6

Source: Kearney

How does it work?

- First of all, the individual process steps are listed one after the other.
- Optional: Then, the people/departments involved are listed next to one another and a responsible person assigned to each individual process step.
- The time and quantity for each process step is then estimated.
- Other important information can also be recorded, such as: process input, process result, KPIs, etc.

Documentation of value stream results, especially for quantitative measurements and estimates

The RASIC matrix illustrates all activities that are necessary to achieve the goal in the process.

RASIC matrix

Increase process performance by identifying weaknesses (e.g. unclear/unassigned responsibilities in the existing process) and clarifying responsibilities

Clearly laid-out comparison of activities/decisions and persons

RASIC matrix													
Process description/name													
Process steps		**Department/sector**								**In-puts**	**Out-puts**	**Comm-ents**	
No.	**Description of process step**	**Dept. 1**	**Dept. 2**	**Dept. 3**	**Dept. 4**	**Dept. 5**	**Dept. 6**	**Dept. 7**					
1	Process step 1		A		C		I						
2	Process step 2	R		C	I			S					
3	Process step 3		C	I		R	A						
4	Process step 4			R		A		S					
5	Process step 5			A	C								
6	Process step 6	A	I		R		C						

Source: Kearney

Designations and roles

- **R=Responsible –** Person ultimately responsible for delivering the project
- **A=Accountable –** Person with ultimate accountability and approval authority
- **S=Supporting –** Person(s)/team actively involved in activity/decision-making
- **I=Informed –** Persons who must be informed of results/actions taken but are not involved in final decision-making
- **C=Consulted –** Persons who influence decisions but do not take them
- Only one person accountable (A) per process step
- **In the event of confusion regarding R and A, a process will be weak and process performance (quality) decrease**

On-site analysis of work processes along the value stream is necessary to identify value-adding activities.

On-site analysis ("Go to the gemba")

Analysis of workflows and processes at the place where the real value is created – “gemba”

Visits to actual sites of operations – identification of optimization actions supported by simple templates

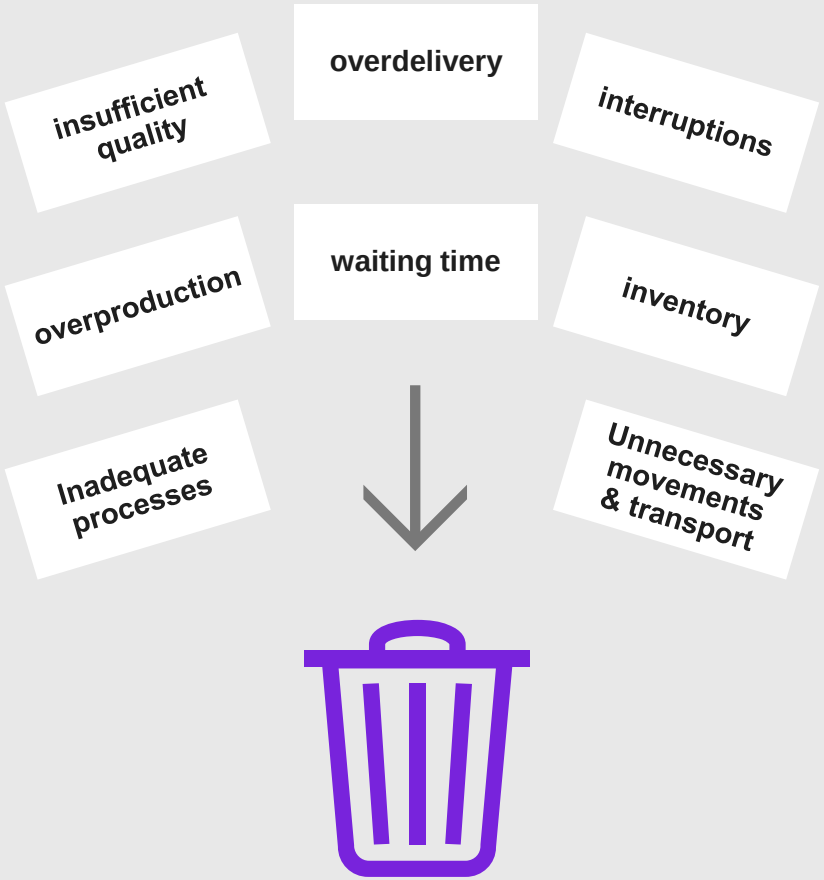
Source: Kearney

- Search for **waste** and **opportunities**
- Understand **full impact of problems and make them visible**
- Gather real **data** from **staff directly involved**
- **Template-based** but **open analysis**
- **Time-consuming** but **very effective**

Avoid: 7 kinds of waste can be identified and eliminated to avoid unnecessary actions and simplify the process.

7 kinds of waste[1] and interruptions[2]

Systematic identification and elimination of the seven kinds of waste

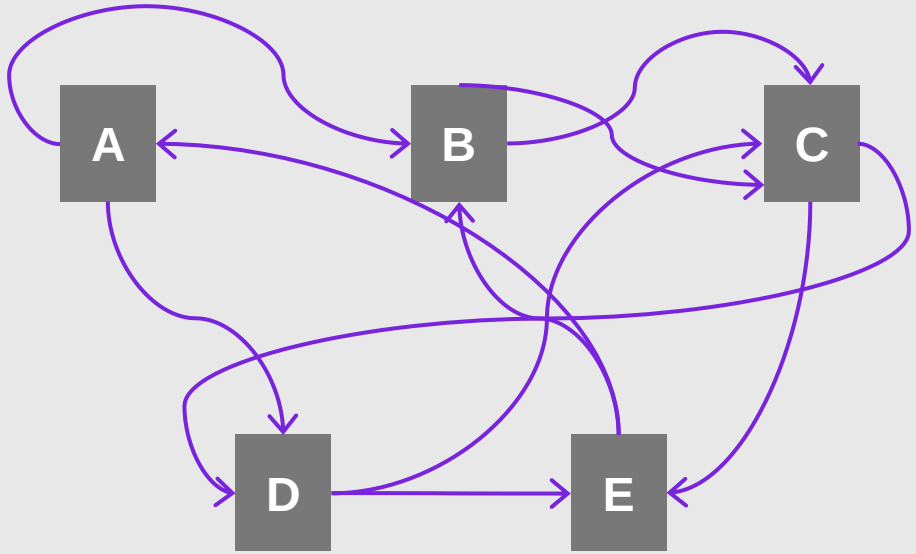


- **Insufficient quality:** High post-production and failure ratio
- **Overdelivery:** E.g. overachievement of the customer's demands or processes
- **Overproduction:** Creating more value or creating it earlier than necessary
- **Inventory:** E.g. order before/in progress or inventory
- **Unnecessary movements & transport:** E.g. unnecessary routes in the office/at the construction site, travel time of employees, transport of materials
- **Waiting time:** E.g. for material, order, information, persons; sometimes concealed by overproduction during waiting times
- **Inadequate processes:** E.g. unclear/ complicated processes/interfaces or inappropriate equipment/tools
- **Interruptions[2]:** E.g. telephone calls unrelated to the area of competence

1. "Interruptions" as an addition to the 7 kinds of waste based on experience in a lean project for a utility company
Source: Kearney

Spaghetti diagrams visualize the flow of process steps and help to identify improvements.

Mapping of employees and departments involved as well as material and information flows between them within each process step



Spaghetti diagram: Example

Source: Kearney

Way to detect movements:

1. **Mapping the work environment**

   Plan of the relevant area, incl. plant, warehouses and tools, persons responsible and departments, etc.

2. **Monitoring the actual movements**

   Record and identify the movement of employees, documents, information, material nad tools

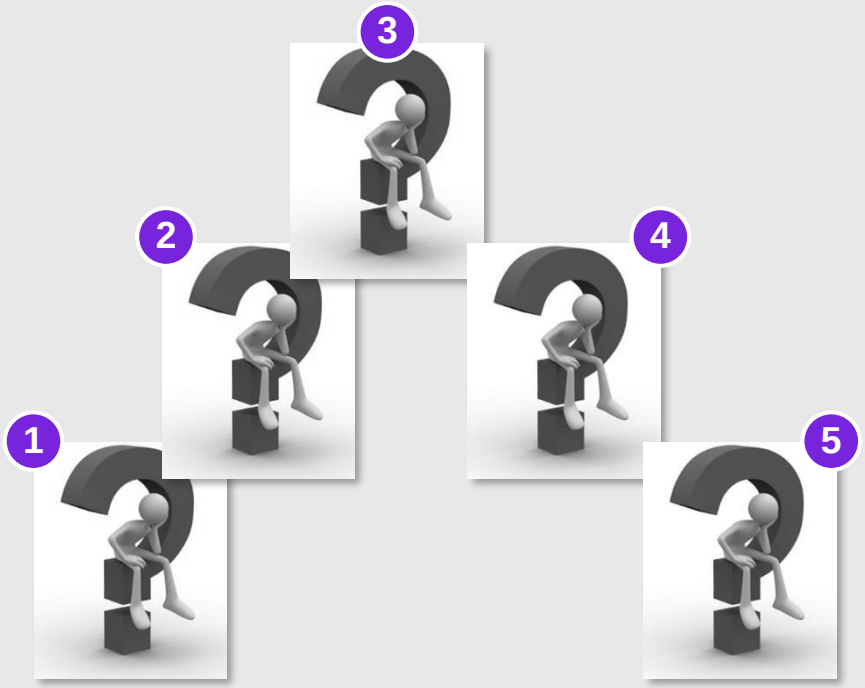
3. **Drawing the target movements**

   Eliminate redundant routes and unnecessary interfaces

The 5 Whys is an iterative questioning technique used to explore the cause-and-effect relationships of a problem.

Root cause analysis: 5 Whys method

Breaking a chain of symptoms by persistently asking questions to get to the root cause of a problem



„Ask five Whys, then you will realize the root cause of problems!“

Taiichi Ohno, Toyota

Source: Kearney

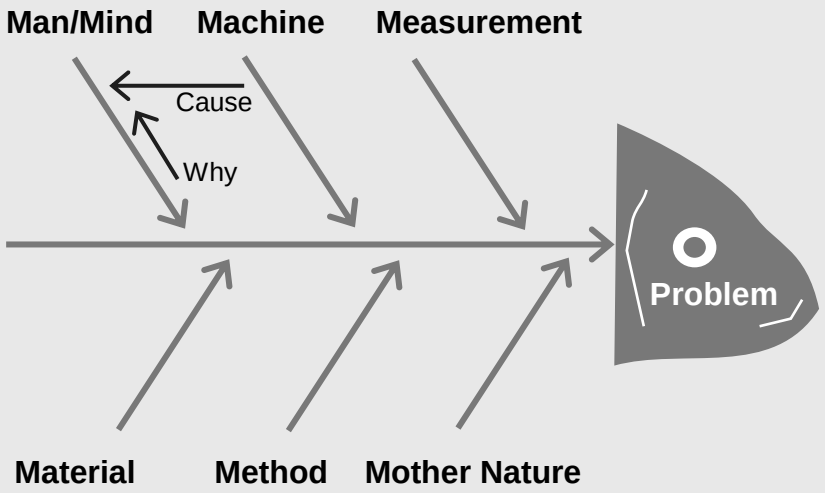
Problem: The machine will not start.

Why?	The battery is dead.
Why?	The alternator is not functioning.
Why?	The alternator belt has broken.
Why?	The alternator belt was well beyond its useful service life and not replaced.
Why?	The machine was not maintained according to the recommended service schedule.

Solution: Start maintaining the machine according to the recommended service schedule.

The "Ishikawa" diagram is used to explore the cause-and-effect relationships underlying a particular problem.

Systematic and multi-step structuring of problems and issues into a cause-and effect diagram



Root cause analysis: "Ishikawa" diagram[1]

- **"Ishikawa" or "fishbone" diagrams** are causal diagrams that show the causes of a specific problem
- Causes are usually grouped into major categories: **personnel, machines, measurements, materials, methods and environment**
- **Combining these diagrams with the 5 Whys method can be useful:** Every cause of a problem can be questioned with "5 Whys" to identify the root cause

1. Created by Kaoru Ishikawa, Japanese chemist and pioneer of quality management
Source: Kearney

Standard processes define how processes should be implemented in a standardized way in all business units.

Simplify: Standard processes

Exact definition of an optimum standard work process, which is binding for all workers in this sector

Preparing hamburgers as an example of consistent work standardization

Source: Kearney

Steps toward work standardization:

- **Identification** of future **standard processes** based on best practices or work process improvements
- **Clear definition** of reference process
- Adoption **across all sites**

Result striven for:

- Procedure to prepare, employee and material allocation **in an identical was globally**
- Customers all over the world are provided with the product in **the quality they expect, every time**

Visual management is usually applied after optimization actions have been identified.

Visual management

Graphic representation of information to achieve transparency over objectives, activities and their status

Source: Kearney

Typical instruments:

- Information boards
- Poster/display boards
- Status displays
- Brochures and films

Benefit:

- Immediate information of employees and greater motivation
- Transparency about value performance
- Presentation of progress for common improvements
- Faster training of new employees

The workplace can be greatly improved through 5S methodology.

Work organization in accordance with 5S

Systematically creates order at the workplace: minimizes waste, secures quality, enables visual management

Example for 5S

Markings on floor

Sorting and labeling

Tool board with silhouettes

Storage of similar parts

Source: Kearney

Method of organizing a work space for efficiency and effectiveness based on **five principles – 5S**

Seiri	**S**orting all unnecessary tools and parts
Seito	**S**etting in **order** to **flow**
Seiso	**S**ystematic **Cleaning** of workplace and equipment
Shitsuke	**S**tandardize procedures and setups
Seiketsu	**S**ervice **(Sustain)** to ensure disciplined adherence to rules and procedures

Poka-yoke is all about developing optimization actions that render errors impossible.

Avoid: Poka-yoke

Fault-resistant processes and systems designed to stop error from occurring or to detect errors immediately and facilitate their immediate rectification

Examples of poka-yoke

Automatic transmission

Height control system for entrances

SIM card

Lawnmower brake

Source: Kearney

Poka-yoke in practice

- **Avoid errors:** If possible, design the process such that no errors can occur
- **Detect errors:** Some errors can be easily detected as soon as they occur. Prevent them from reaching the next process step
- **Facilitate immediate rectification** so that errors aren't repeated

- **Take the pressure off people** so that they can focus on more creative and value-adding activities

Non-productive time can be minimized using the Single Minute Exchange of Die method.

Single Minute Exchange of Die method (SMED)

Radical reduction of non-value adding time by avoiding/optimizing work steps, tools and qualification of employees

Formula 1 as an example of how to accelerate set-up times by streamlining processes

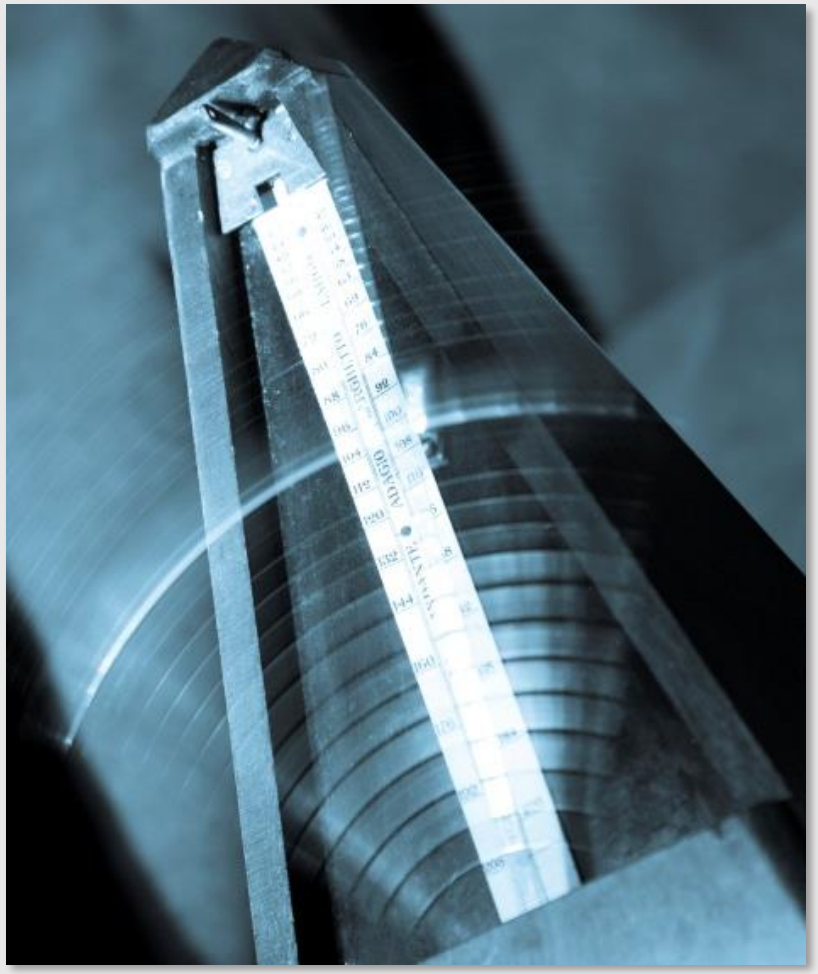
Source: Kearney

Steps:

- **Observe** the **current process** (“Go to the gemba“)
- Separate preparatory and value-adding activities
- **Convert** (where possible) preparatory **activities** into **value-adding ones**
- Streamline remaining preparatory activities by simplifying them
- **Streamline value-adding activities**
- **Document** the **new procedure** and actions that are to be completed
- **Standardize** the **new workflow** (e.g. training)
- Do it again: For each iteration of the above process, set-up times should improve

The Yamazumi board is used to balance the line for varying takt times and numbers of operators.

Flexing manpower per customer demand, which is divided into individual tasks per employee, representing the time that they take



Source: Kearney

- Takt time is the demand rate required by your customers, expressed as the number of minutes per part. It is calculated by dividing your total available work time by the average number of parts required by the customer. Example: 15 renewable energy connections/day
- A Yamazumi chart or Yamazumi board is a visual tool used as an aid in cell design and continuous improvement. It helps to visualize the various work elements within a process and compare them to the required customer output or takt time.
- The Yamazumi board is used to balance the line for varying takt times and numbers of operators.

Cost-benefit analyses help to prioritize and select (solution) alternatives.

Cost-benefit analysis

Optimization actions are evaluated on the basis of simple criteria in order to be able to prepare for decisions

The Pugh matrix for simple and fast comparison of solution alternatives

Gewichtete Matrix "Transportmittel"		Konzepte							
		Referenz: Eisenbahn		Flugzeug		PKW		Motorrad	
Selektionskriterien	Gewichtung in % Summe=100%	Bewertung	Gewichtete Bewertung	Bewertung	Gewichtete Bewertung	Bewertung	Gewichtete Bewertung	Bewertung	Gewichtete Bewertung
Geschwindigkeit	10%	0	0	3	0,3	0	0	1	0,1
Sicherheit	10%	0	0	1	0,1	-1	-0,1	-3	-0,3
Komfort	10%	0	0	0	0	-1	-0,1	-3	-0,3
Flexibilität	25%	0	0	-1	-0,25	3	0,75	1	0,25
Zuverlässigkeit	5%	0	0	0	0	1	0,05	-1	-0,05
Pünktlichkeit	10%	0	0	0	0	2	0,2	1	0,1
Kosten	20%	0	0	-2	-0,4	-1	-0,2	0	0
Spaßfaktor	10%	0	0	1	0,1	1	0,1	3	0,3
		0	0		0		0		0
		0	0		0		0		0
Gewichtete Summe		0		-0,15		0,7		0,1	
Rang		3		4		1		2	

Legende: +3 erfüllt die Kriterien sehr viel besser als das Referenzkonzept
+2 erfüllt die Kriterien viel besser als das Referenzkonzept
+1 erfüllt die Kriterien besser als das Referenzkonzept
0 erfüllt die Kriterien genau so wie das Referenzkonzept
-1 erfüllt die Kriterien schlechter als das Referenzkonzept
-2 erfüllt die Kriterien viel schlechter als das Referenzkonzept
-3 erfüllt die Kriterien sehr viel schlechter als das Referenzkonzept

Source: Kearney

Alternative solutions are compared and evaluated on the basis of selected criteria

- **Examination of the selected solution:**
  - Are the main problems addressed effectively by the solution?
  - Would the solution achieve what the customer wants?
  - Can the solution be controlled/monitored?
- **"Must" criteria must be met:**
  - Customer's demands are met
  - Business requirements are met
  - The solution is binding, measurable and realistic

Thank you

Elena Siegel
Partner, Kearney
elena.siegel@kearney.com
+971 50 2414467

Debashish Mukherjee
Partner, Kearney
debashish.mukherjee@kearney.com
+971 54 9980408

Nils Duelfer
Managing Director, IMP^{3}rove, Kearney
nils.duelfer@kearney.com
+49 175 2659265

Daniel Stengel
Director, Kearney
daniel.stengel@kearney.com
+41 79 4519409

Hannah Leighton
Manager, Kearney
Hannah.Leighton@kearney.com
+49 175 2659746

Philipp Muender
Manager, Kearney
Philipp.Muender@kearney.com
+49 175 2659638

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