



## Management of an open pit mine – state of the art

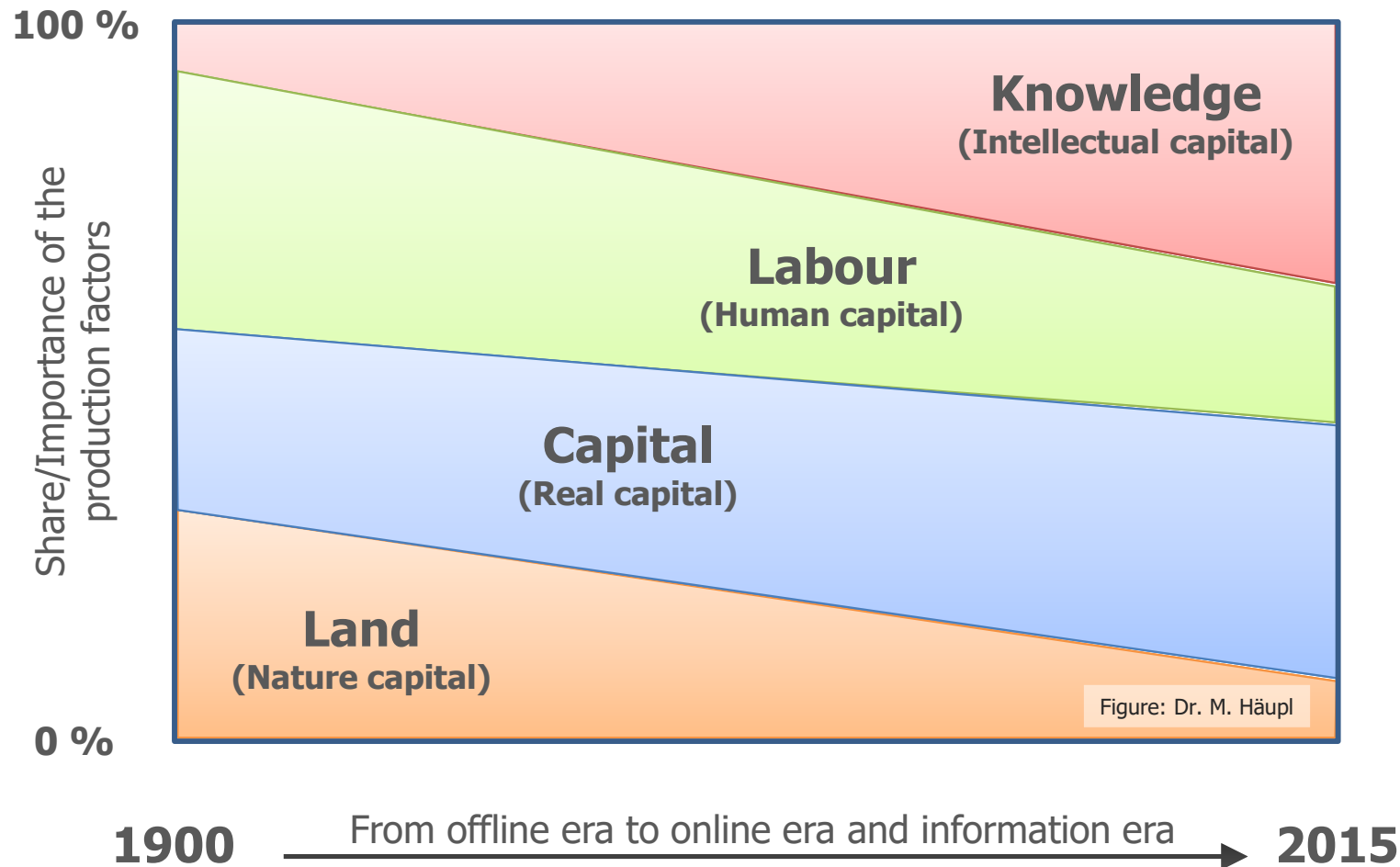
IZ - ROHSTOFFE

- ➔ Knowledge as a factor of production
- ➔ Business processes – resources to product
- ➔ Enterprise and operational organisation
- ➔ Data management and data analysis
- ➔ Automation of business processes



# 1 Knowledge as a factor of production

## Change of economic production factors

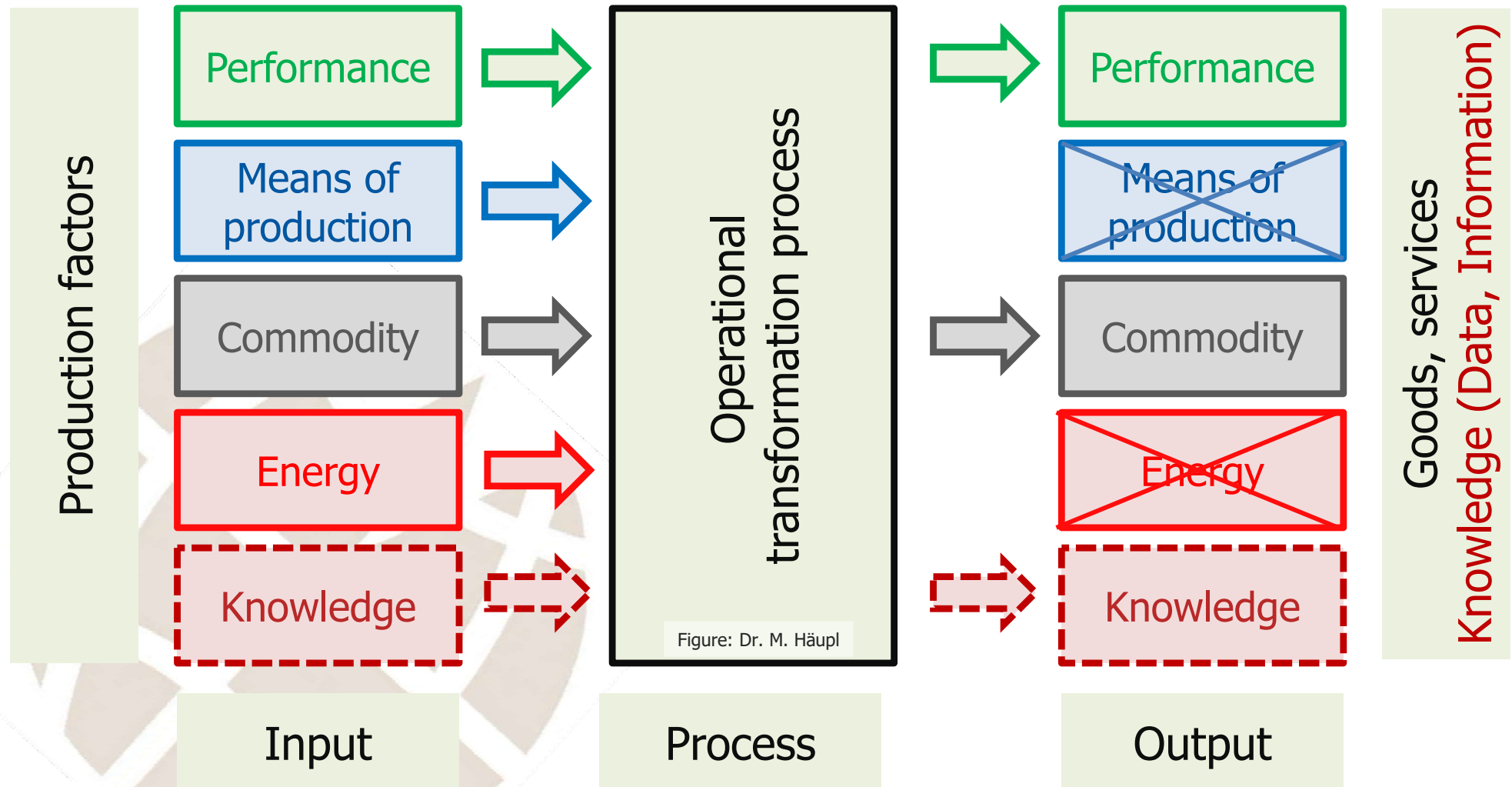


## Business economic production factors

- ➔ Performance (Work of human / + machine)
- ➔ Means of production (machinery, facility site, supplies)
- ➔ Commodity (= deposit + products)
- ➔ Energy (more and more important – CO<sub>2</sub>)
- ➔ Knowledge (from data, then information)

# Knowledge within the production process

Combination of production factors → Business processes





2

Business processes  
from resources to product

## Raw material and production plant: Operating company & site information



## Raw material and production plant: Resources & Products

Approved resources: 29 Mio. t

Raw material: Solid rock

Amphibolitbreccie – green and red  
Intermediate shale (Limestone stratum with fossils)

Yearly production: approx. 500.000 t  
thereof:

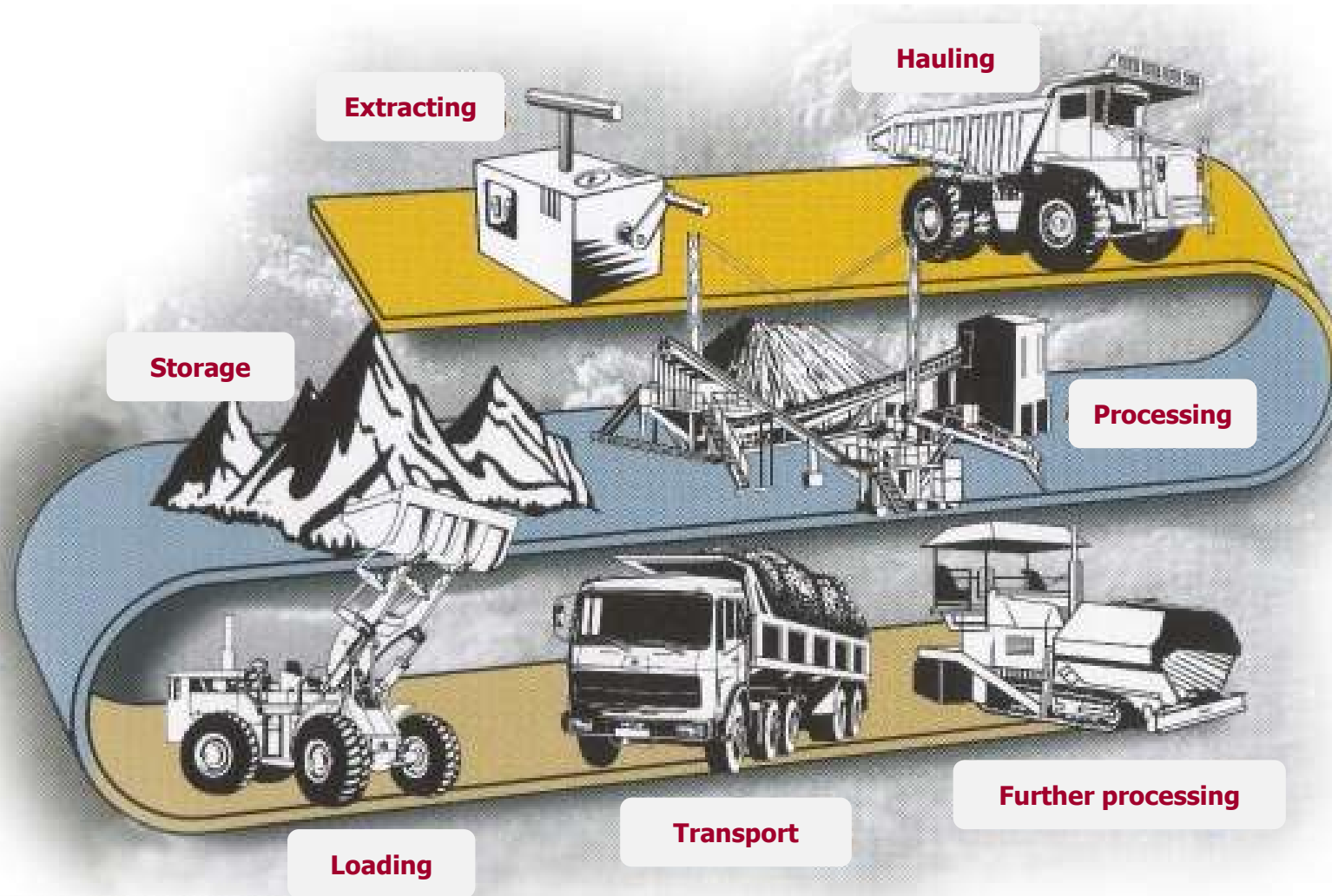
High-quality stone chippings:	150.000 t
Macadam:	100.000 t
Railway ballast:	75.000 t
Aggregate for production of mineral wool:	60.000 t
Grädermaterial, filter gravel, bulk material:	90.000 t
Armourstones:	25.000 t

Picture: Mineral Abbau GmbH

## Raw material and production plant: Persons, mobile units & facilities



## Business processes: Typical description



### Processes

Extracting

Hauling

Processing

Storage

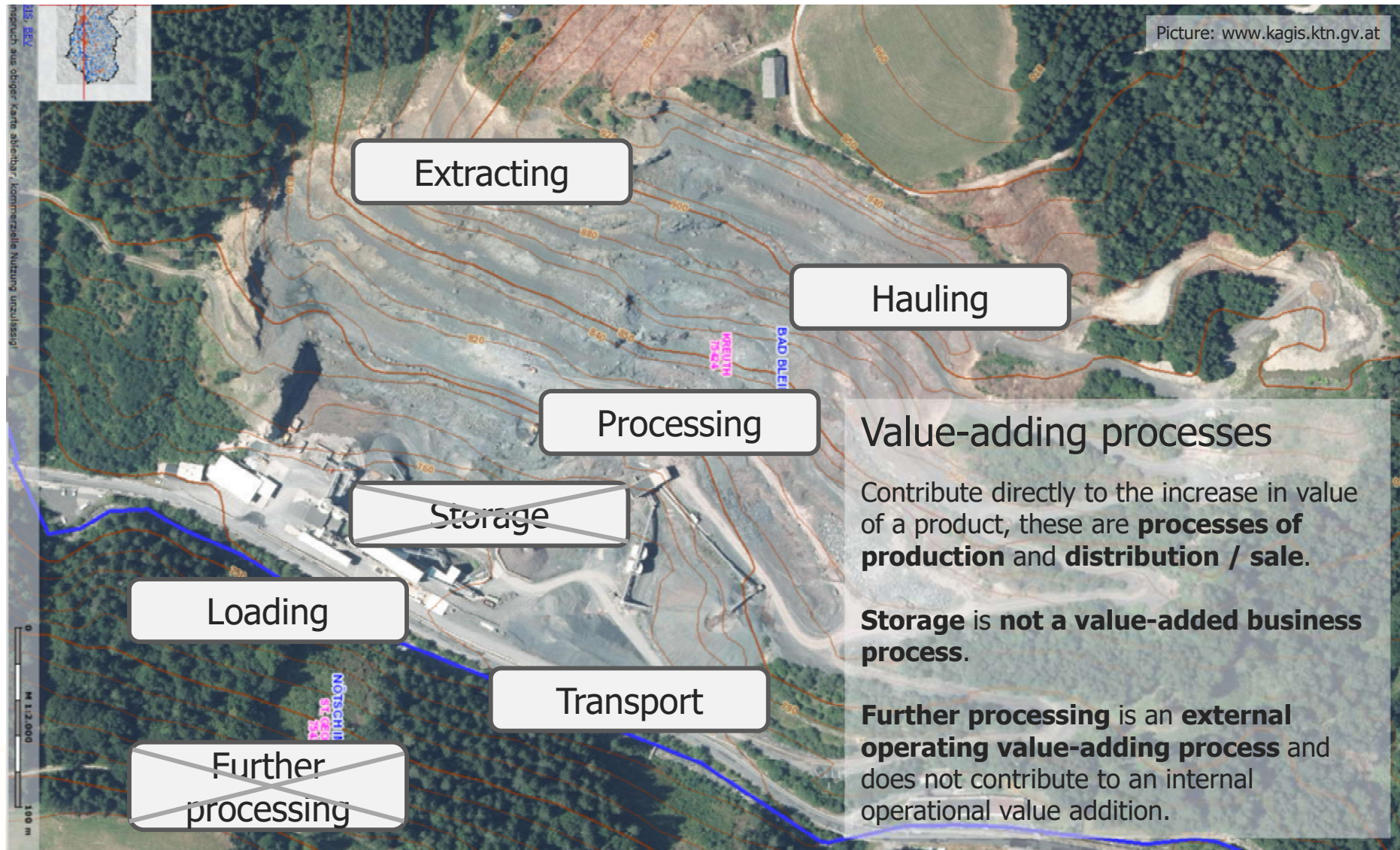
Loading

Transport

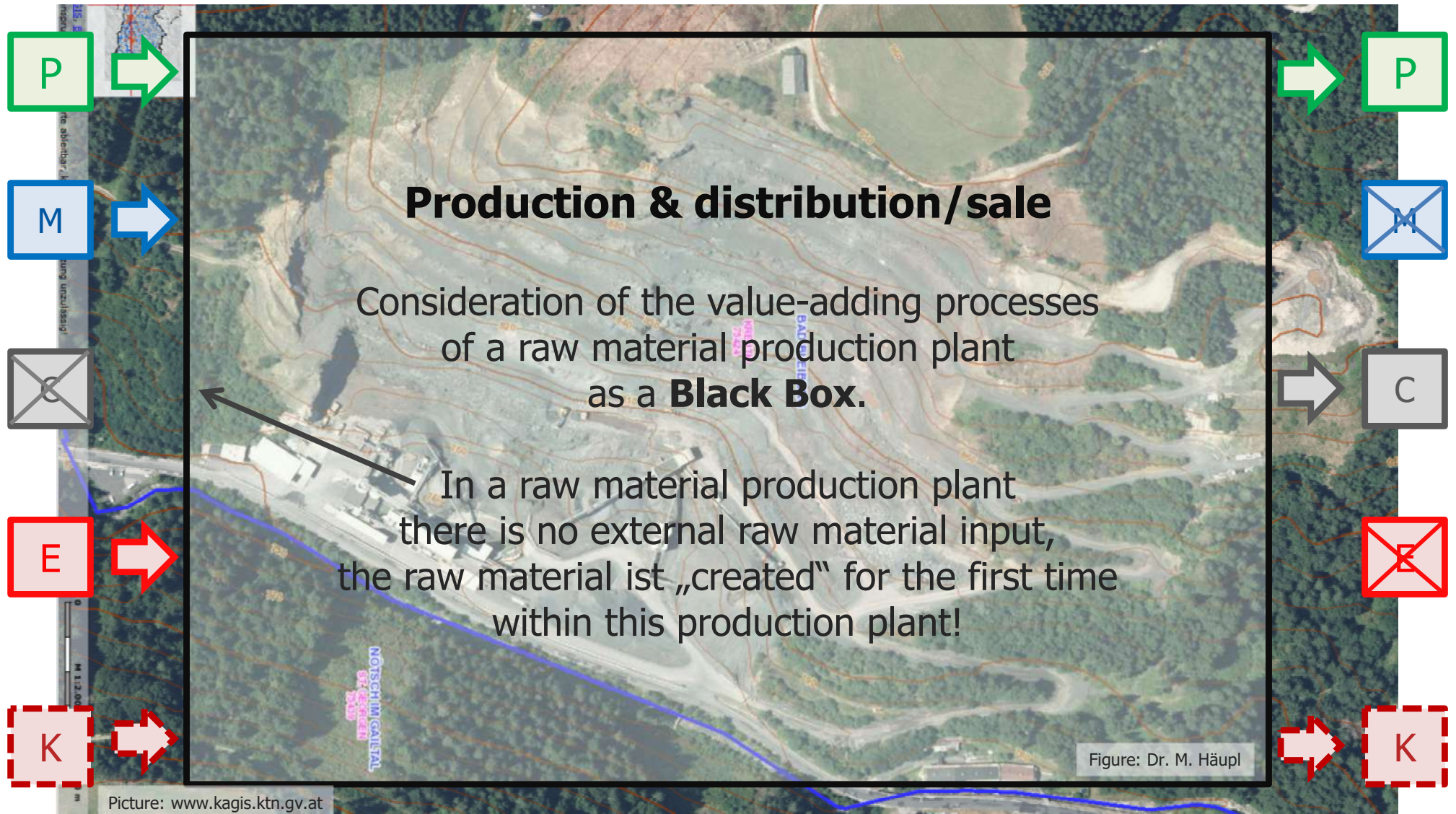
Further  
processing

Figure: Forum Rohstoffe

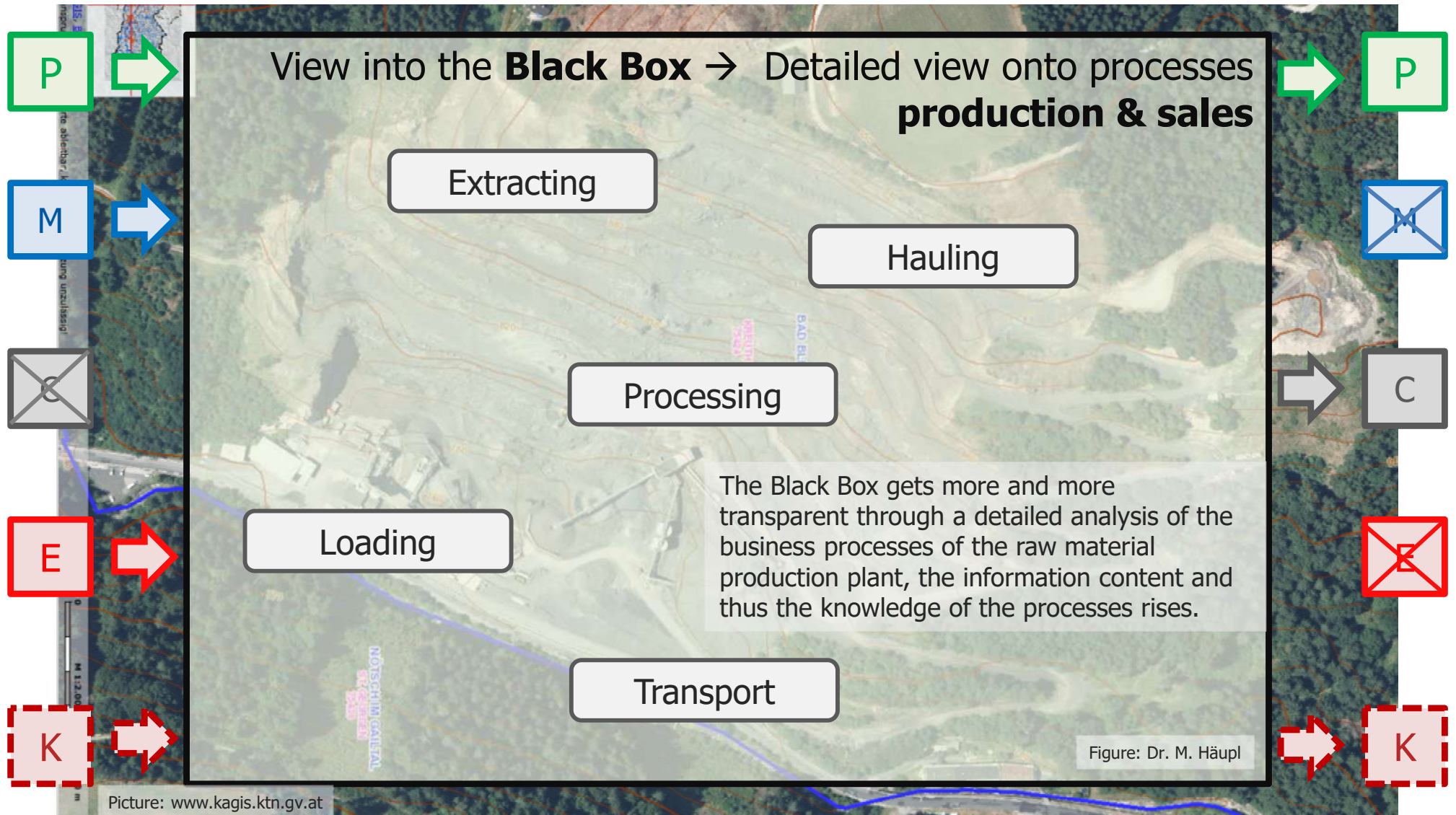
## Business processes: Processes in real operation



## Business processes: Value-adding processes & production factors

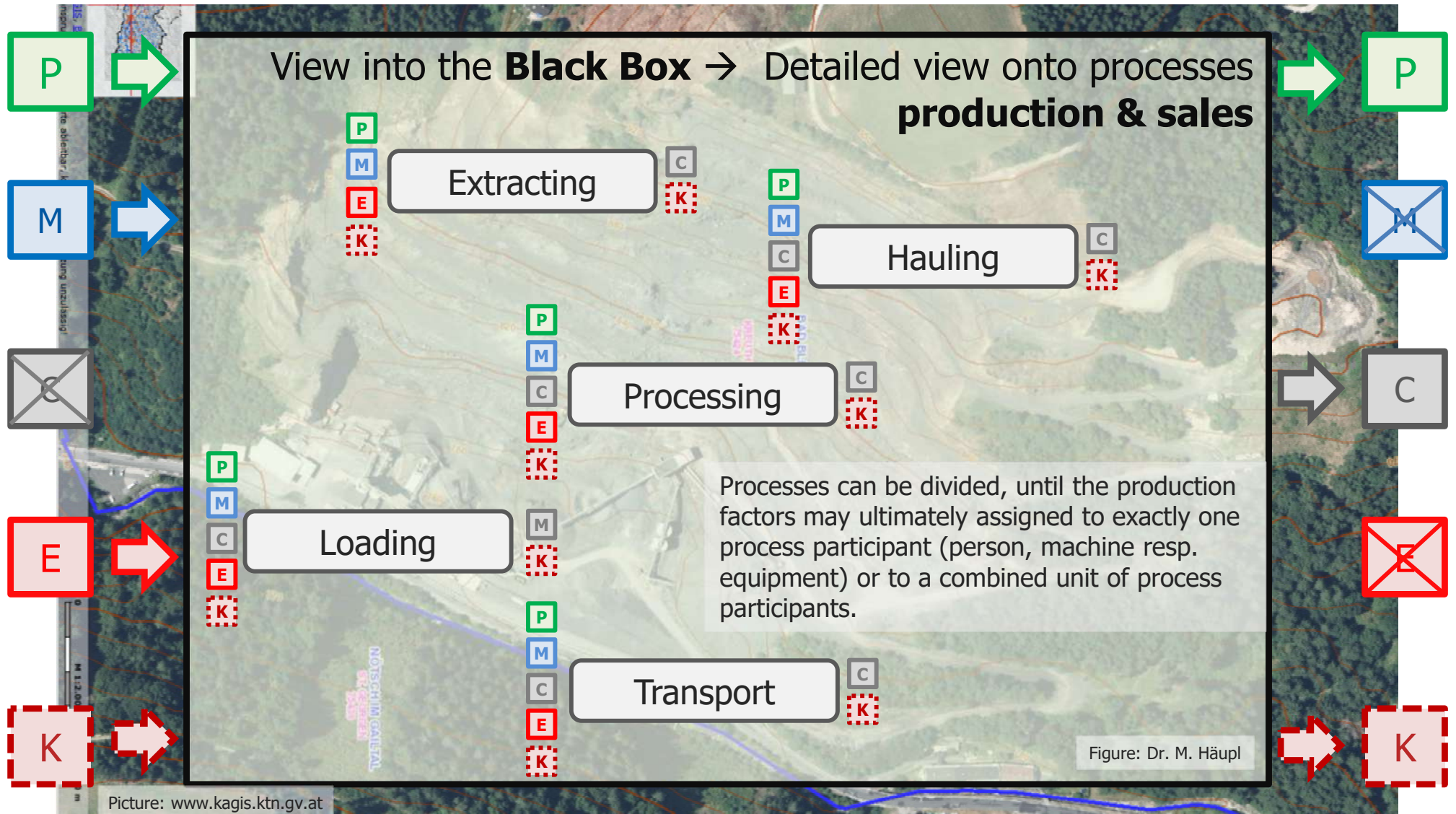


## Business processes: Value-adding processes & production factors

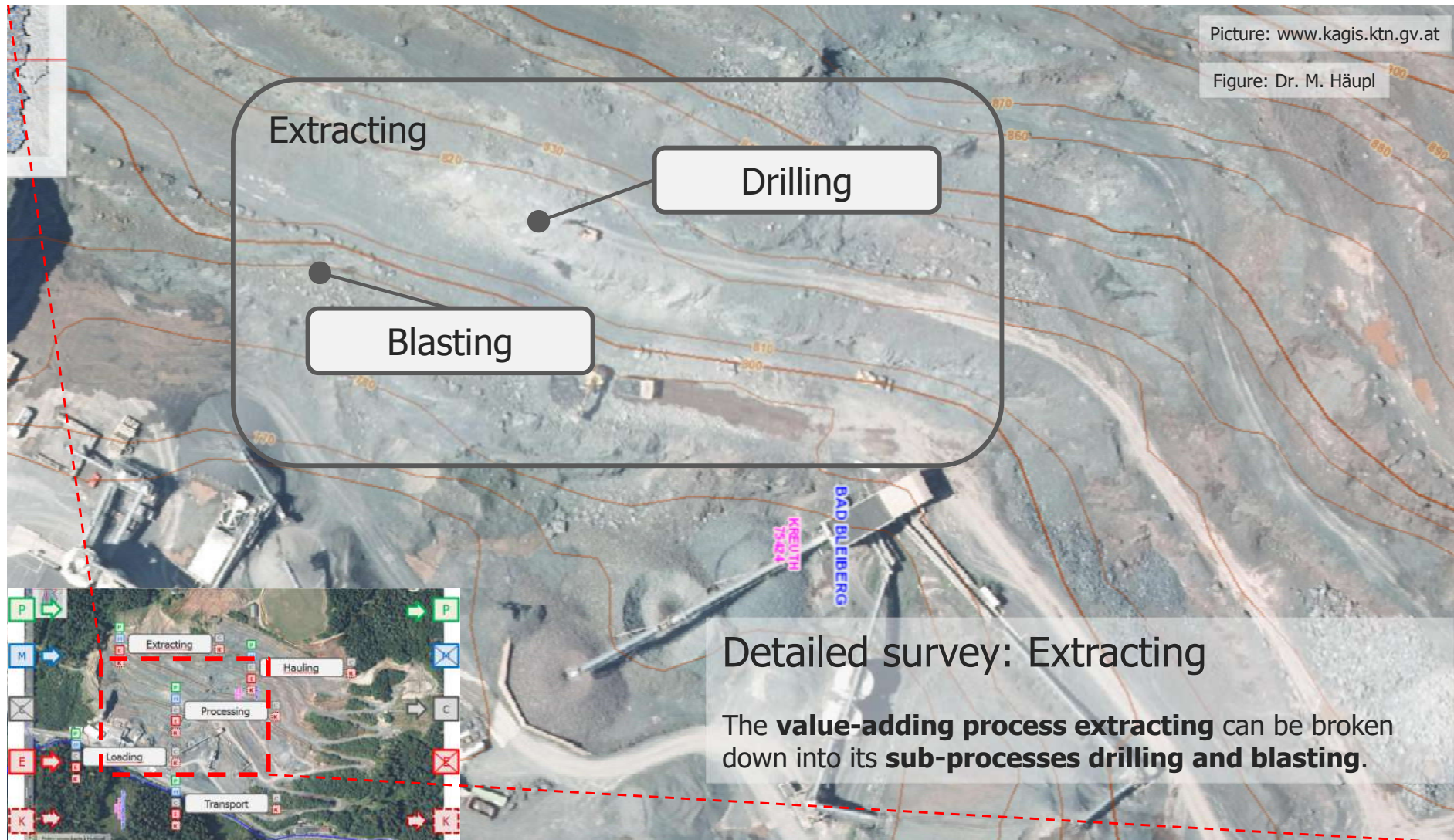


# Processes: Structuring

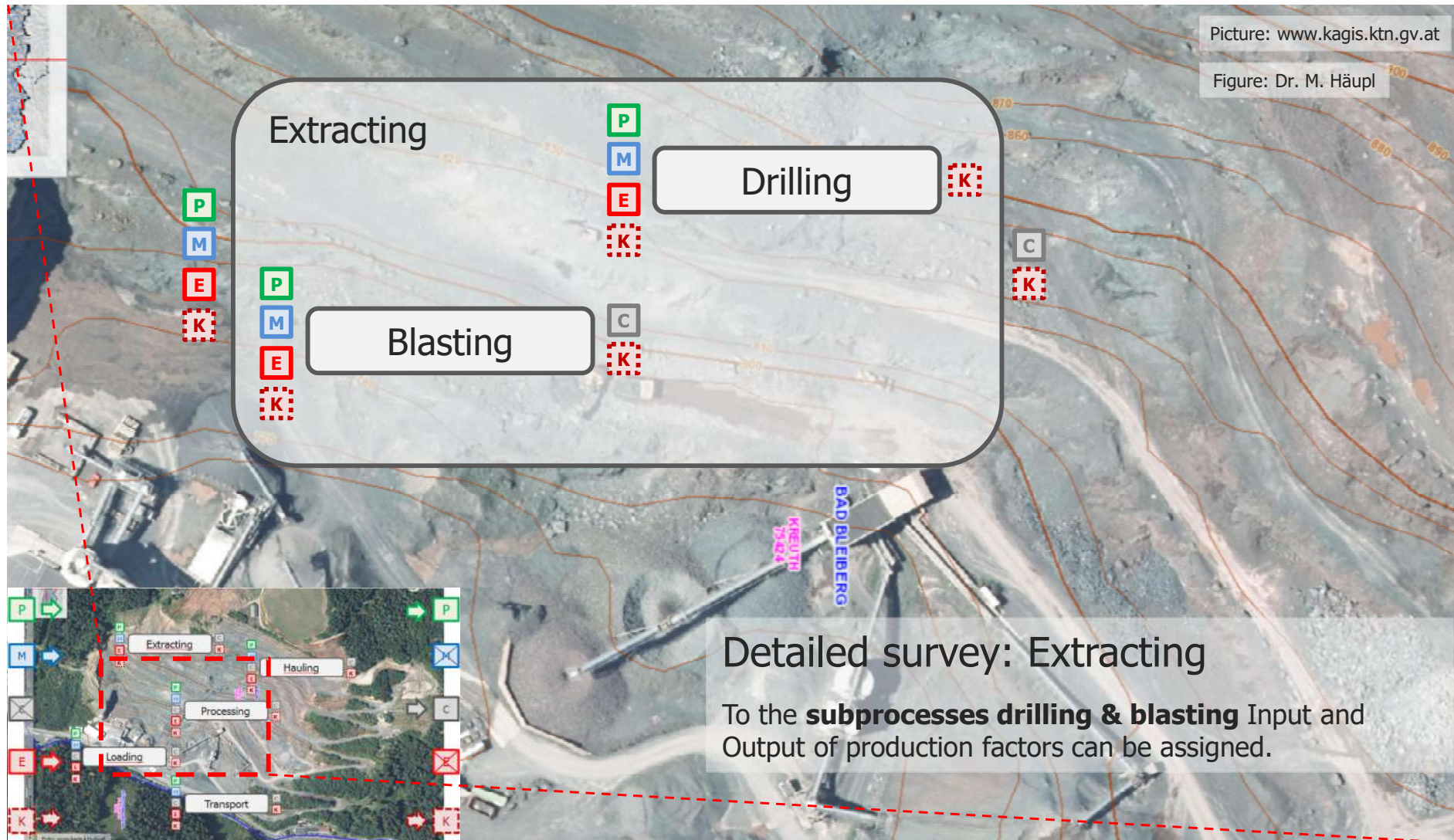
**Business processes:** Value-adding processes & production factors



## Business processes: Value-adding processes & production factors

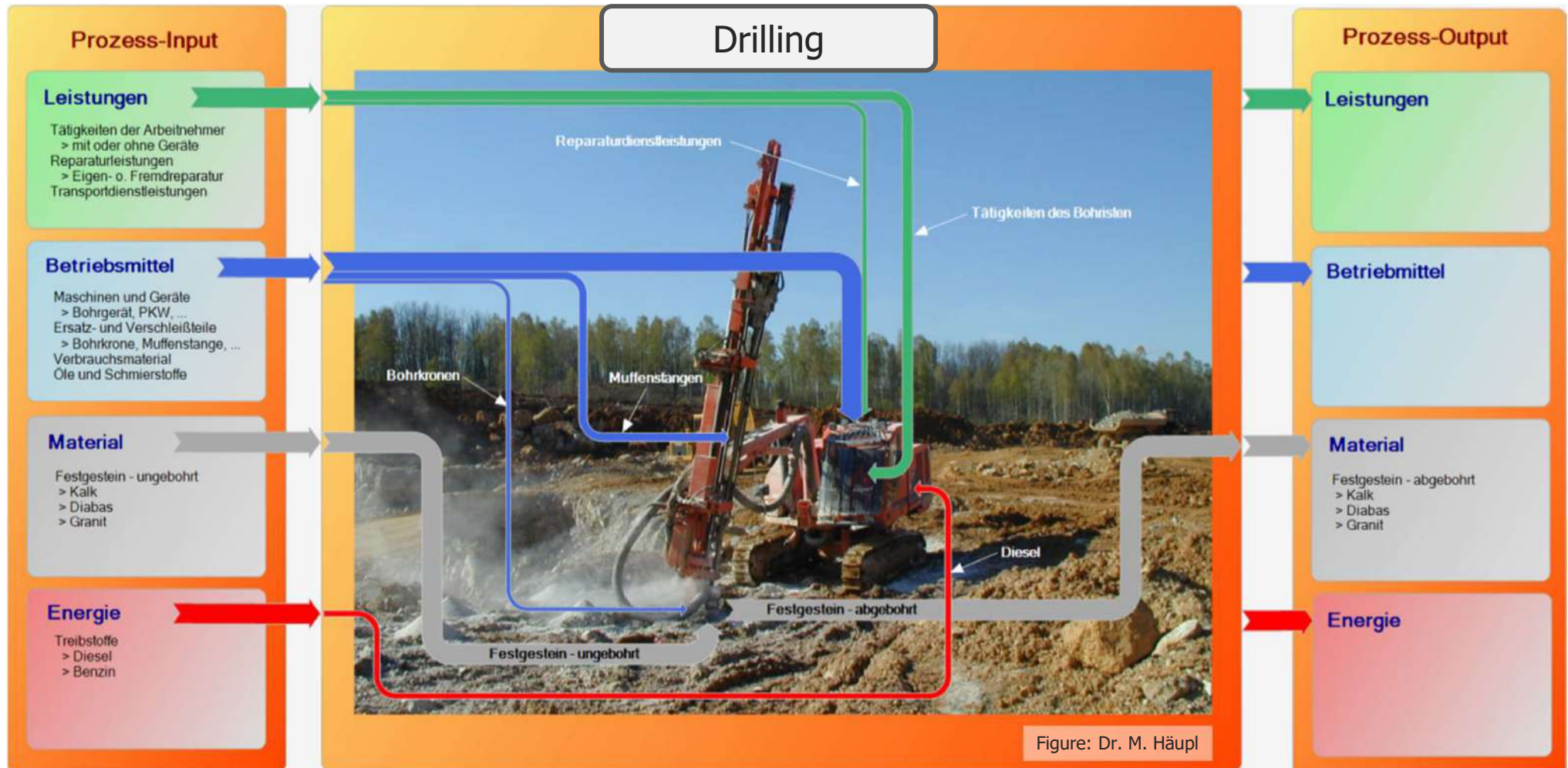


## Business processes: Value-adding processes & production factors



# Processes: Structuring

## Business processes: Sub processes and production factors



## Business processes: Sub processes and production factors



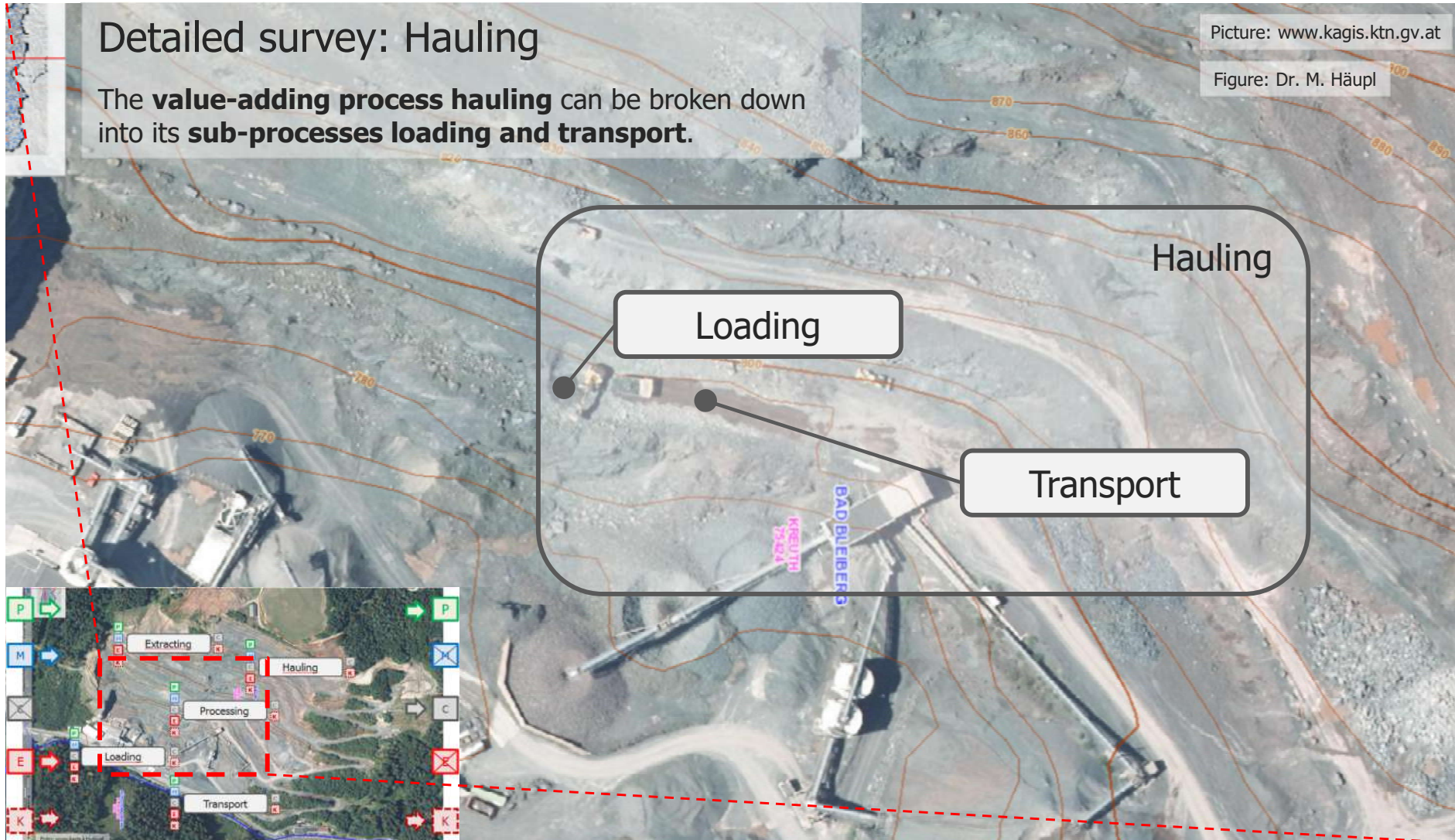
## Business processes: Value-adding processes & production factors

### Detailed survey: Hauling

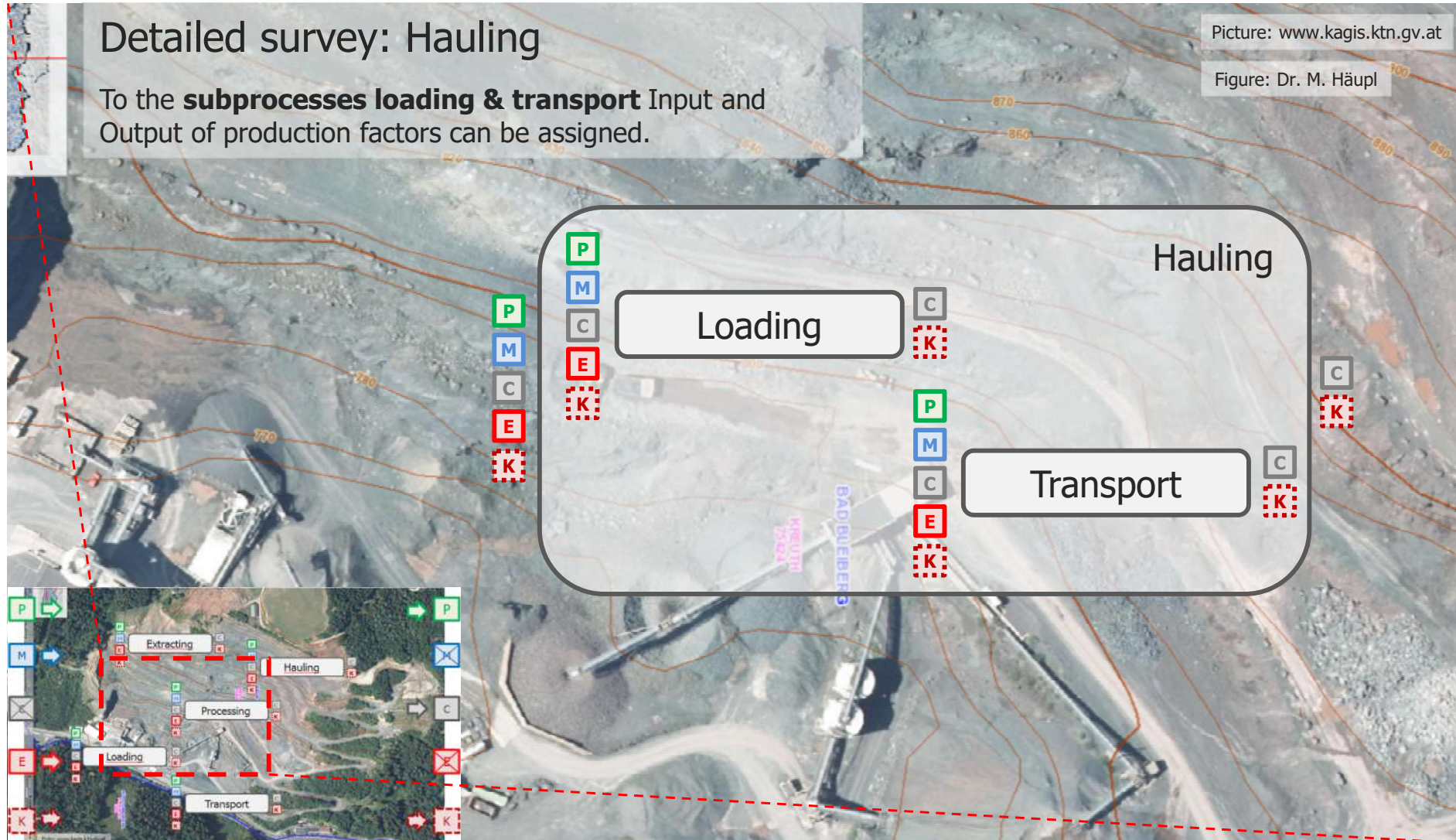
The **value-adding process hauling** can be broken down into its **sub-processes loading and transport**.

Picture: [www.kagis.ktn.gv.at](http://www.kagis.ktn.gv.at)

Figure: Dr. M. Häupl

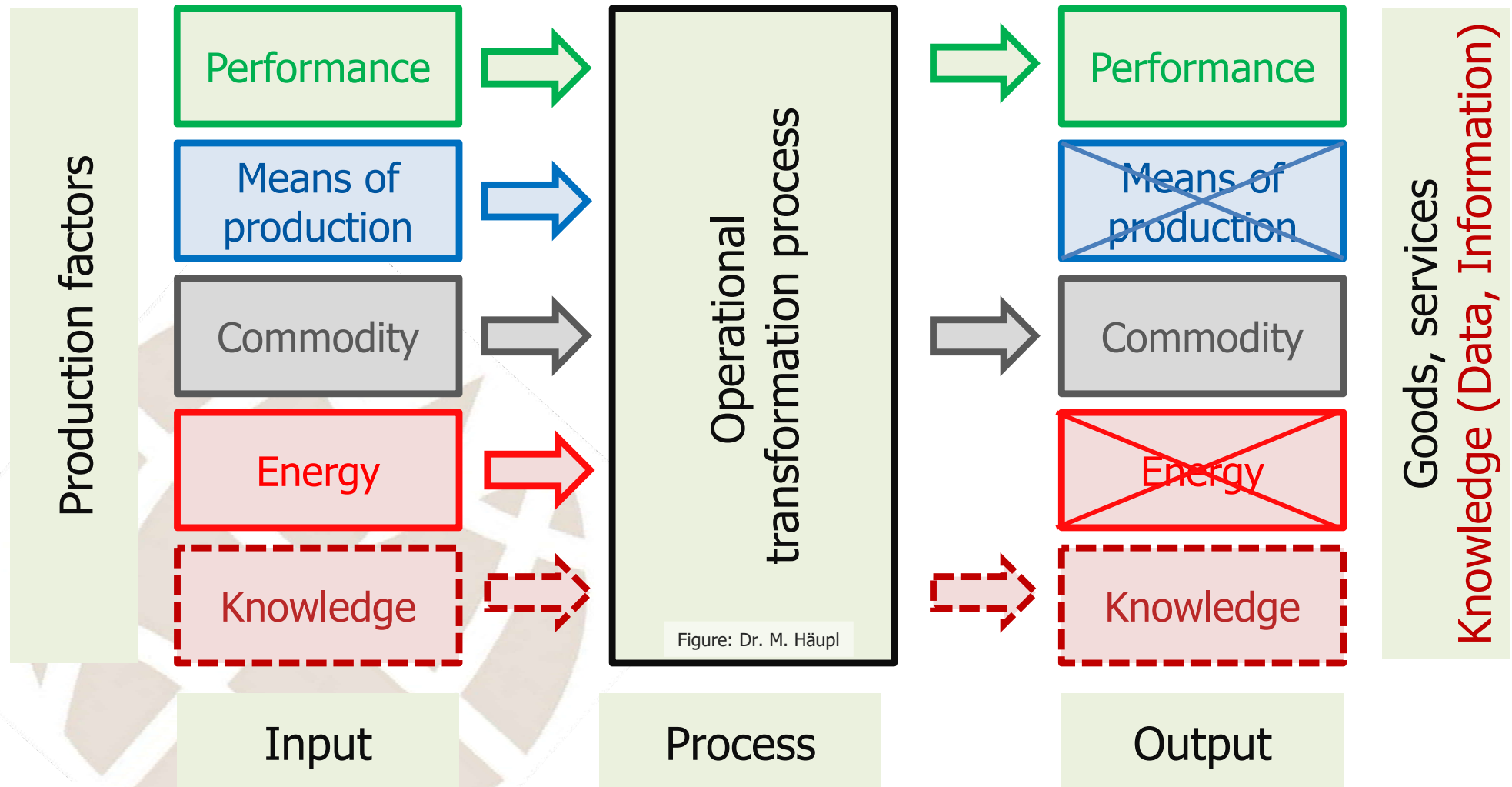


## Business processes: Value-adding processes & production factors



# Knowledge within the production process

Combination of production factors → Business processes



# Processes: Combination

## Business processes: Combination through production factors

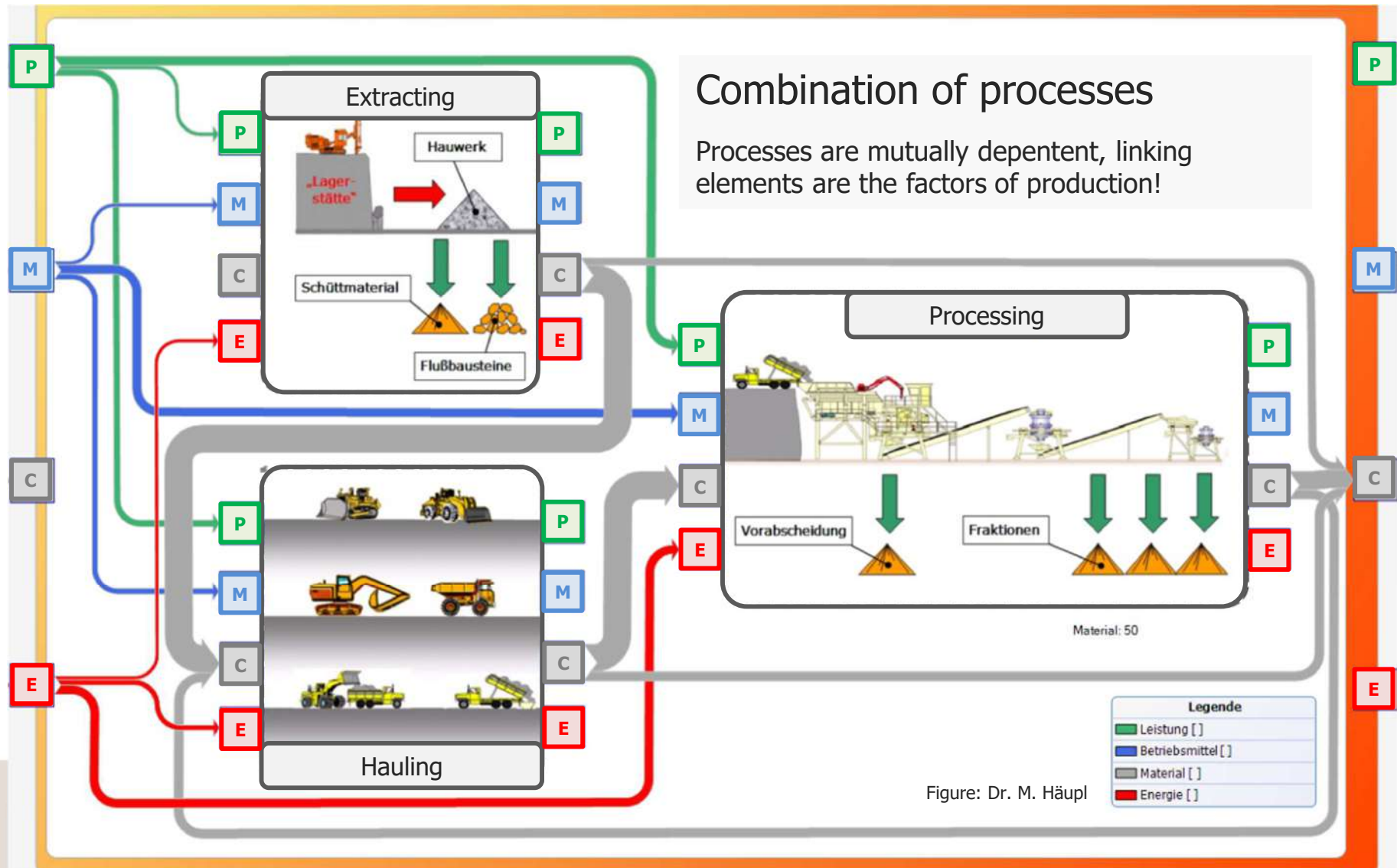
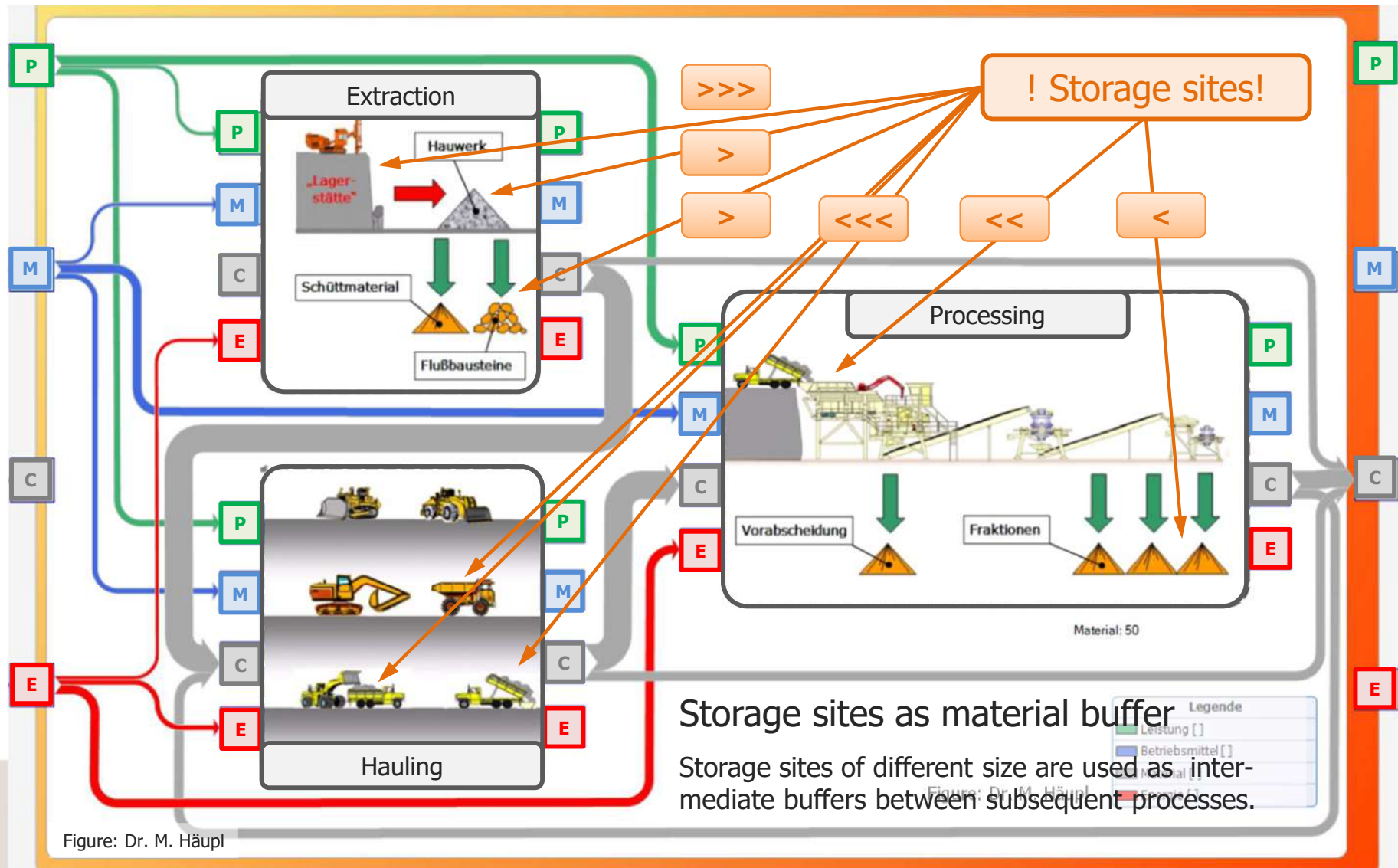


Figure: Dr. M. Häupl

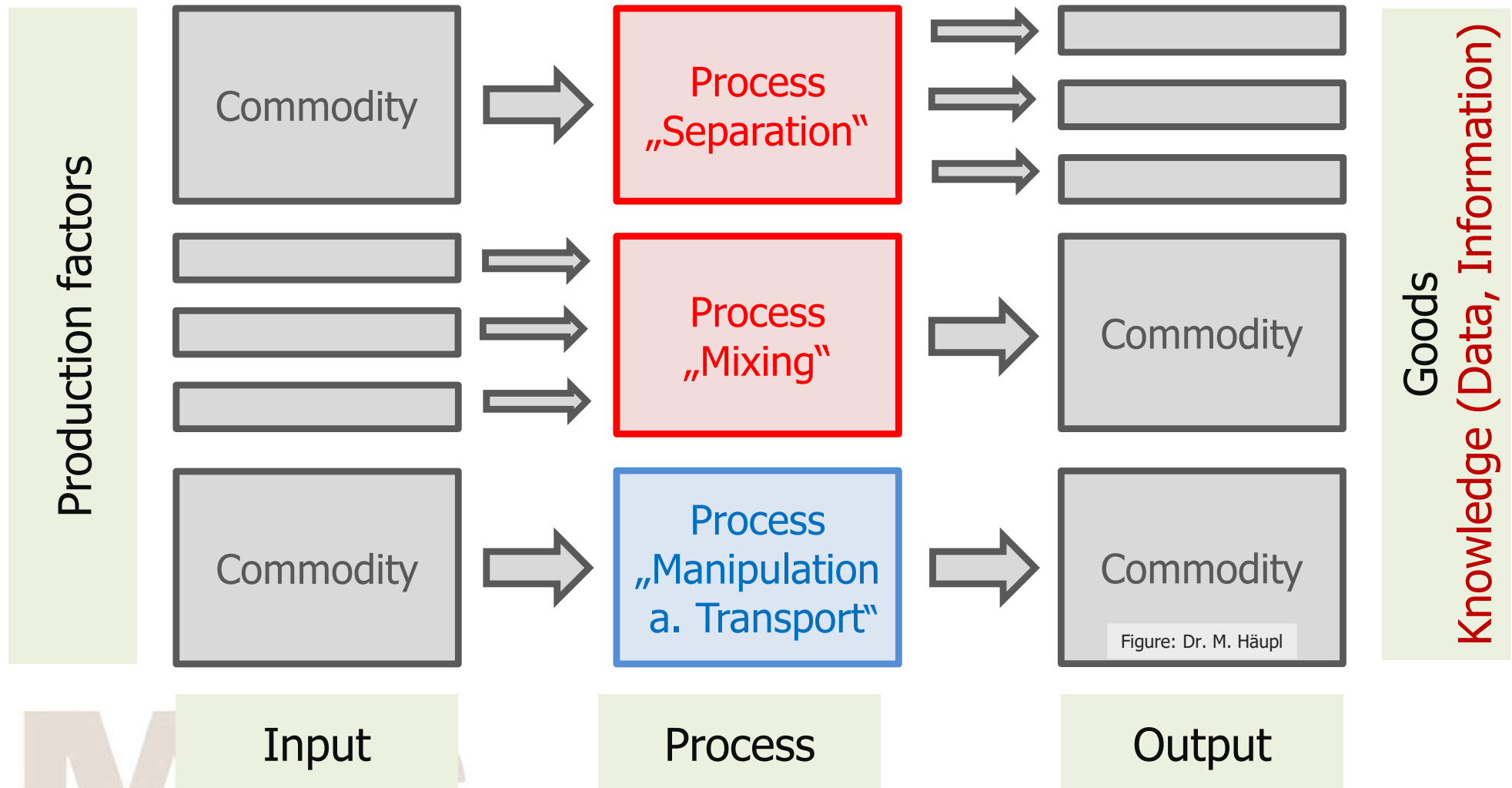
# Processes: Storage sites

## Business processes: Value-adding processes & production factors



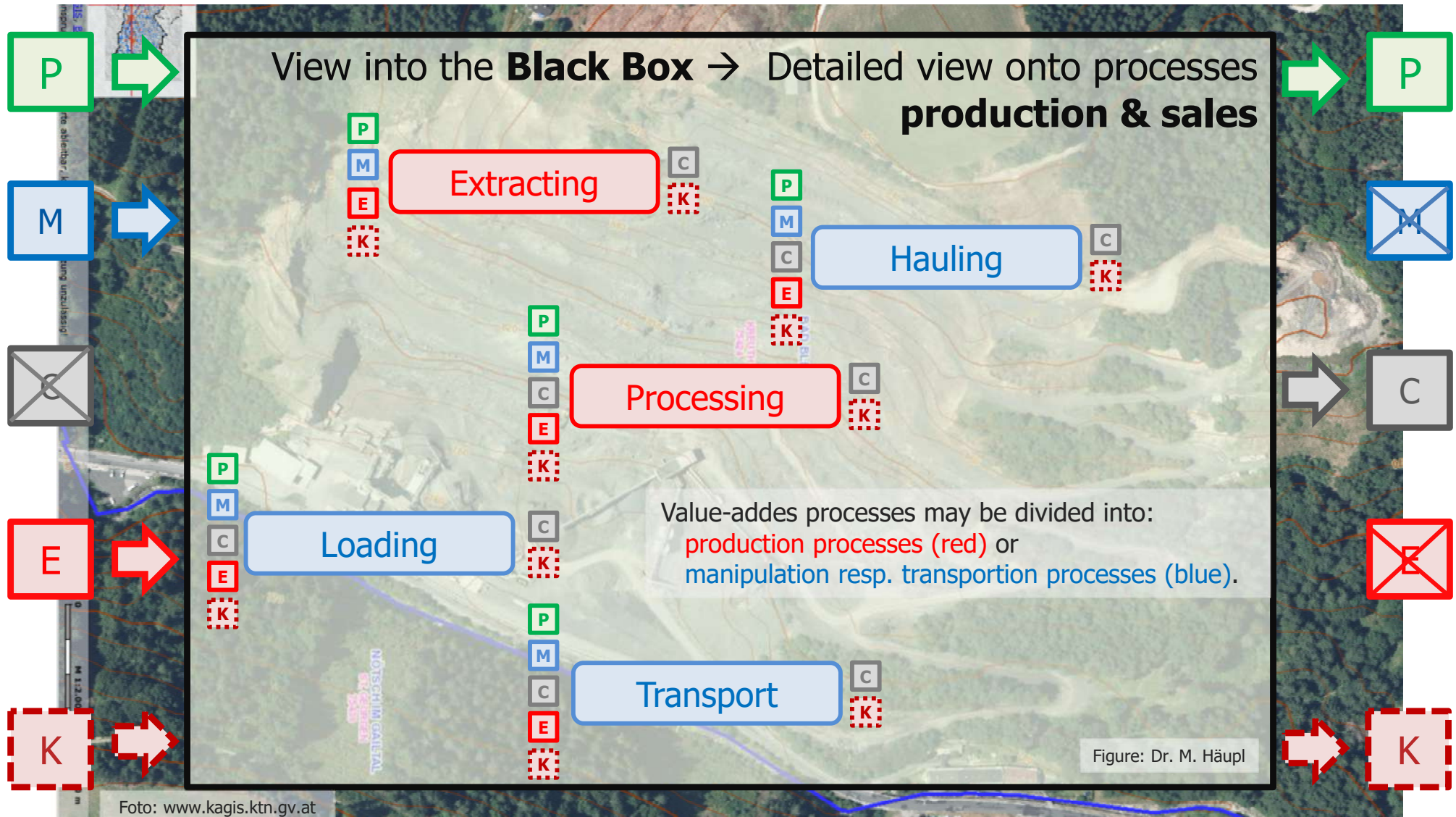
# Processes: Typs of processes

## Production processes vs. Manipulation- resp. transportation processes

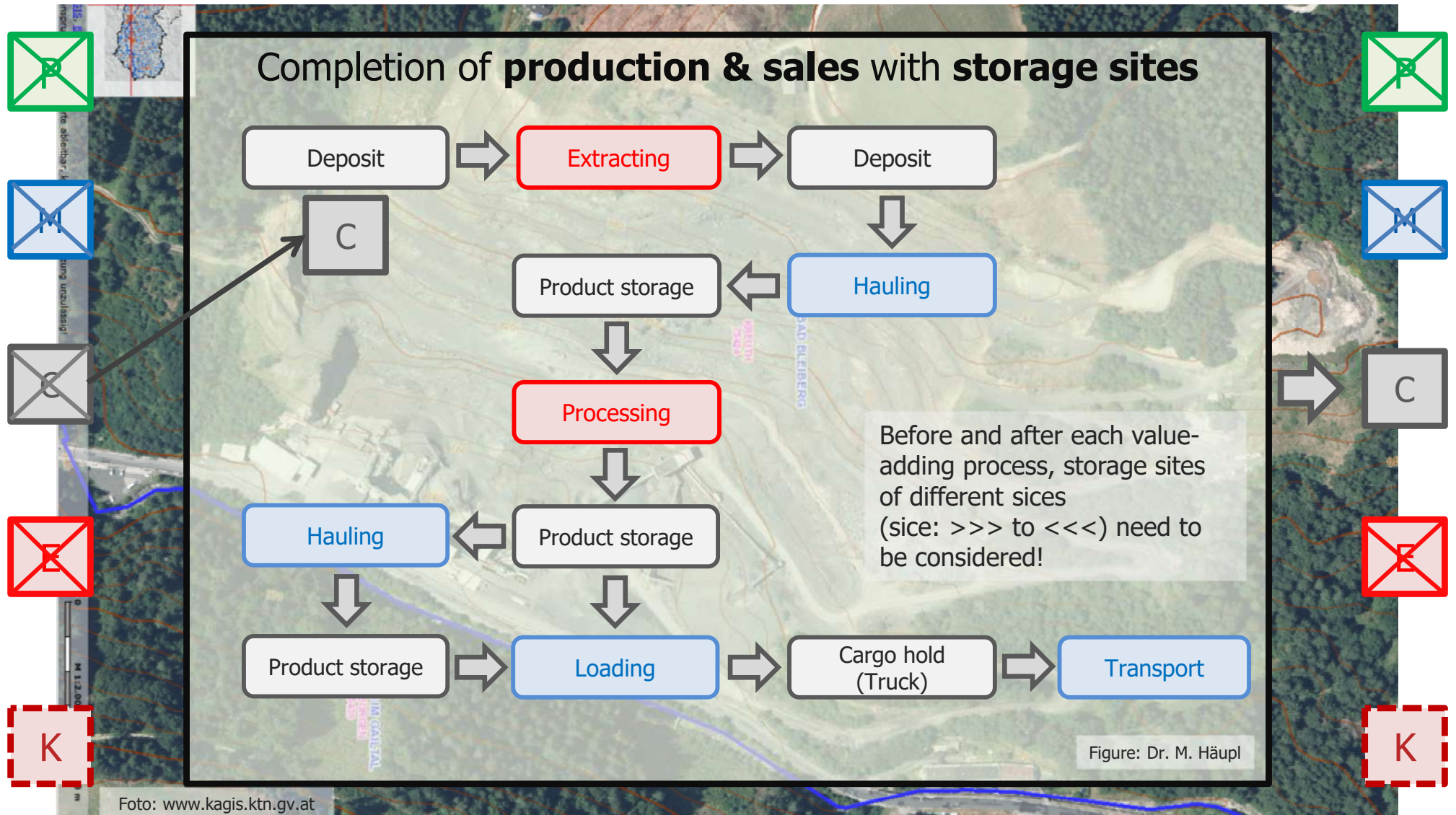


# Processes: Types of processes

## Business processes: Types of processes & production factors



## Business processes: Value-adding processes & storage sites



## Raw material to product: Processes & storage sites in real operation

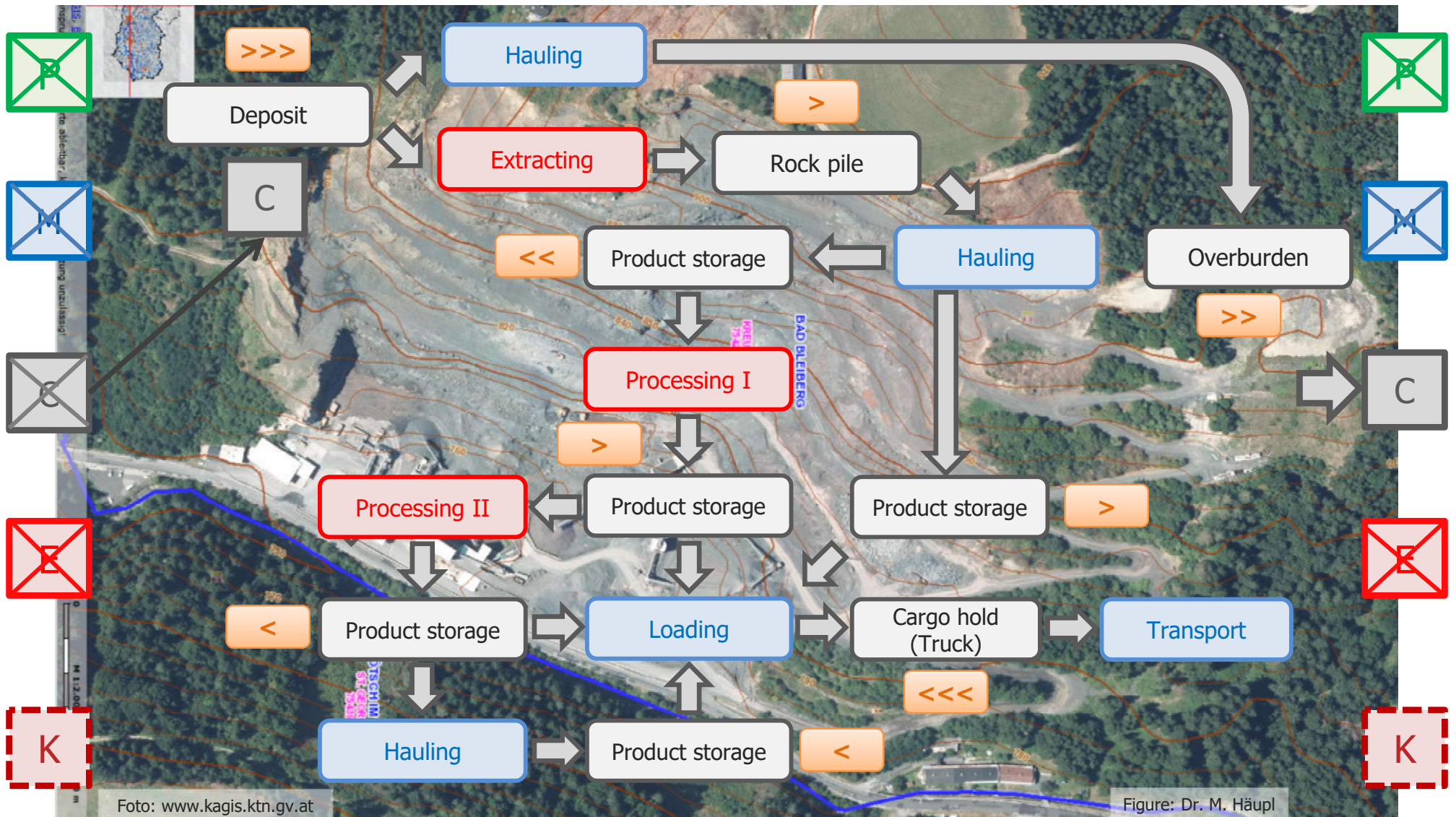


Foto: www.kagis.ktn.gv.at

Figure: Dr. M. Häupl

# Processes: Energy flow

**Raw material to product: Processes & storage sites in real operation**

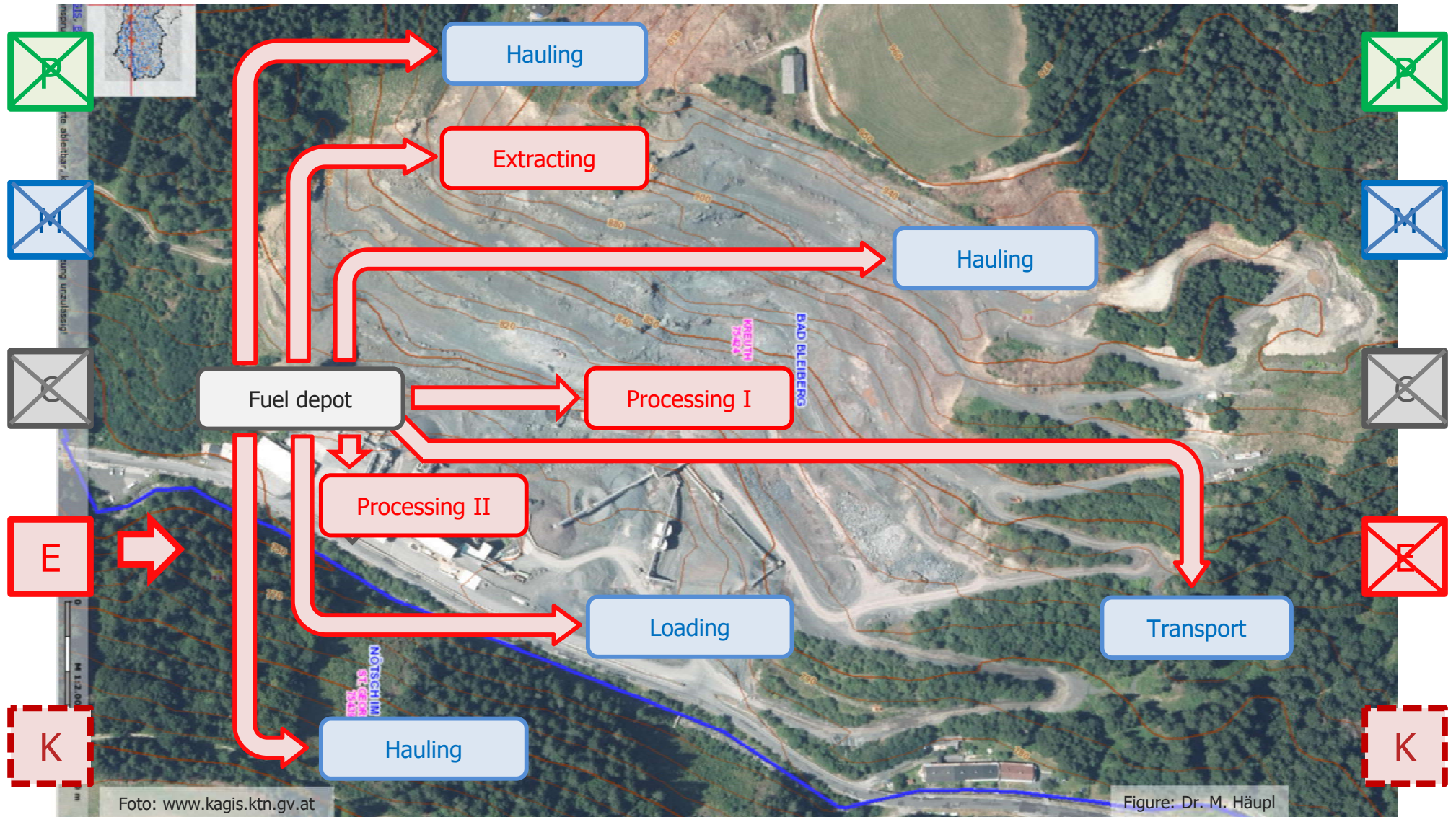


Figure: Dr. M. Häupl

## Commodity delivery chain – from raw material to construction site

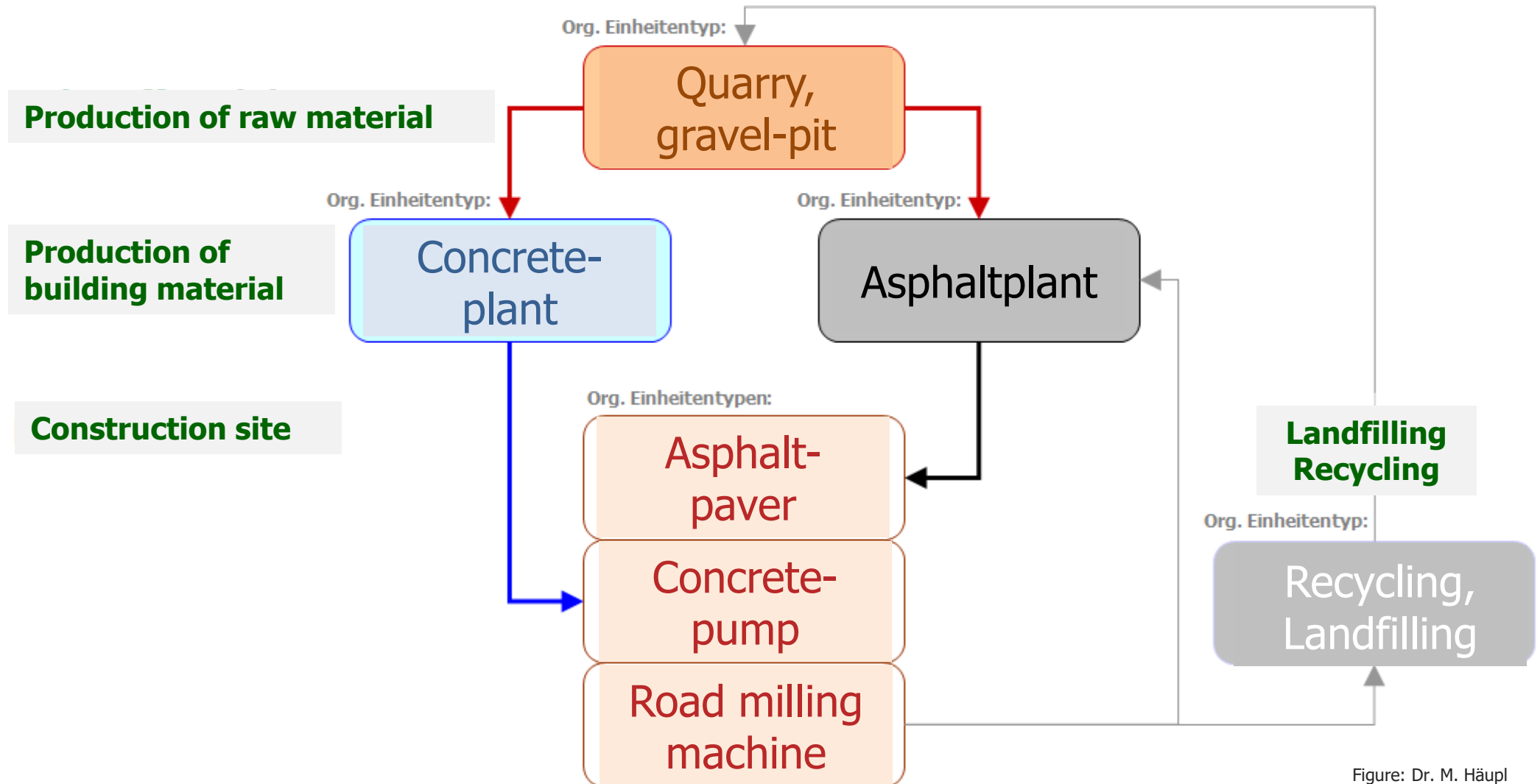


Figure: Dr. M. Häupl

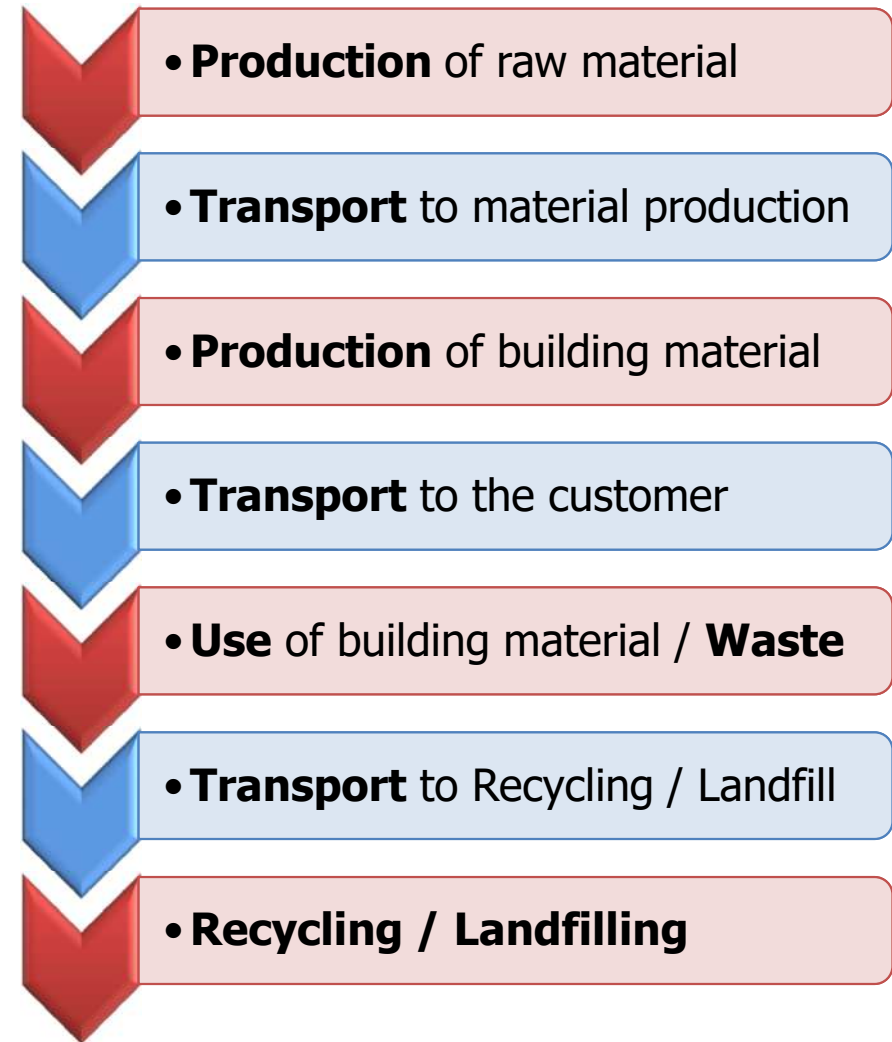
Value chain within raw material and construction industries:

Sequence of

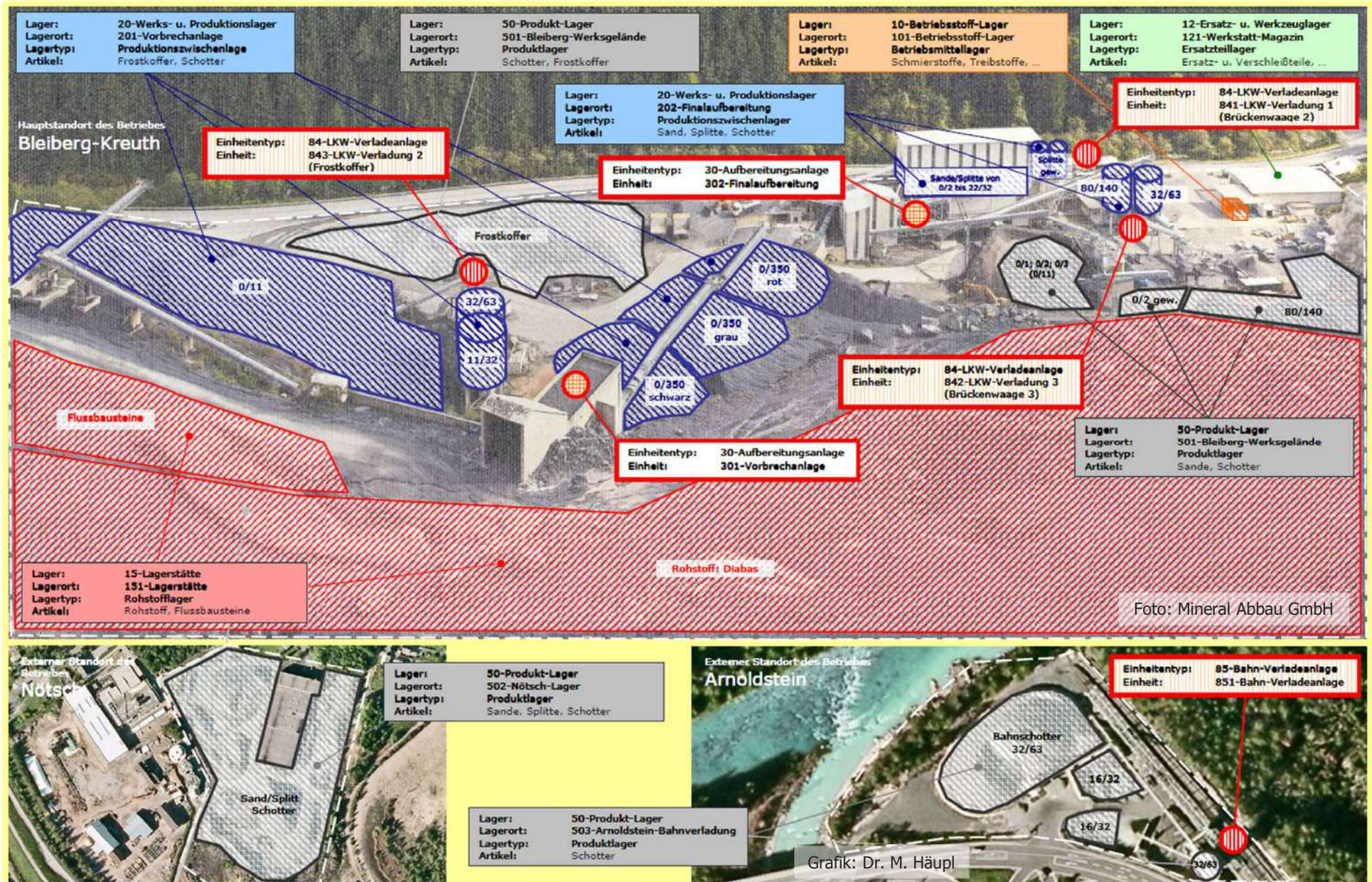
**Production processes**

as well as

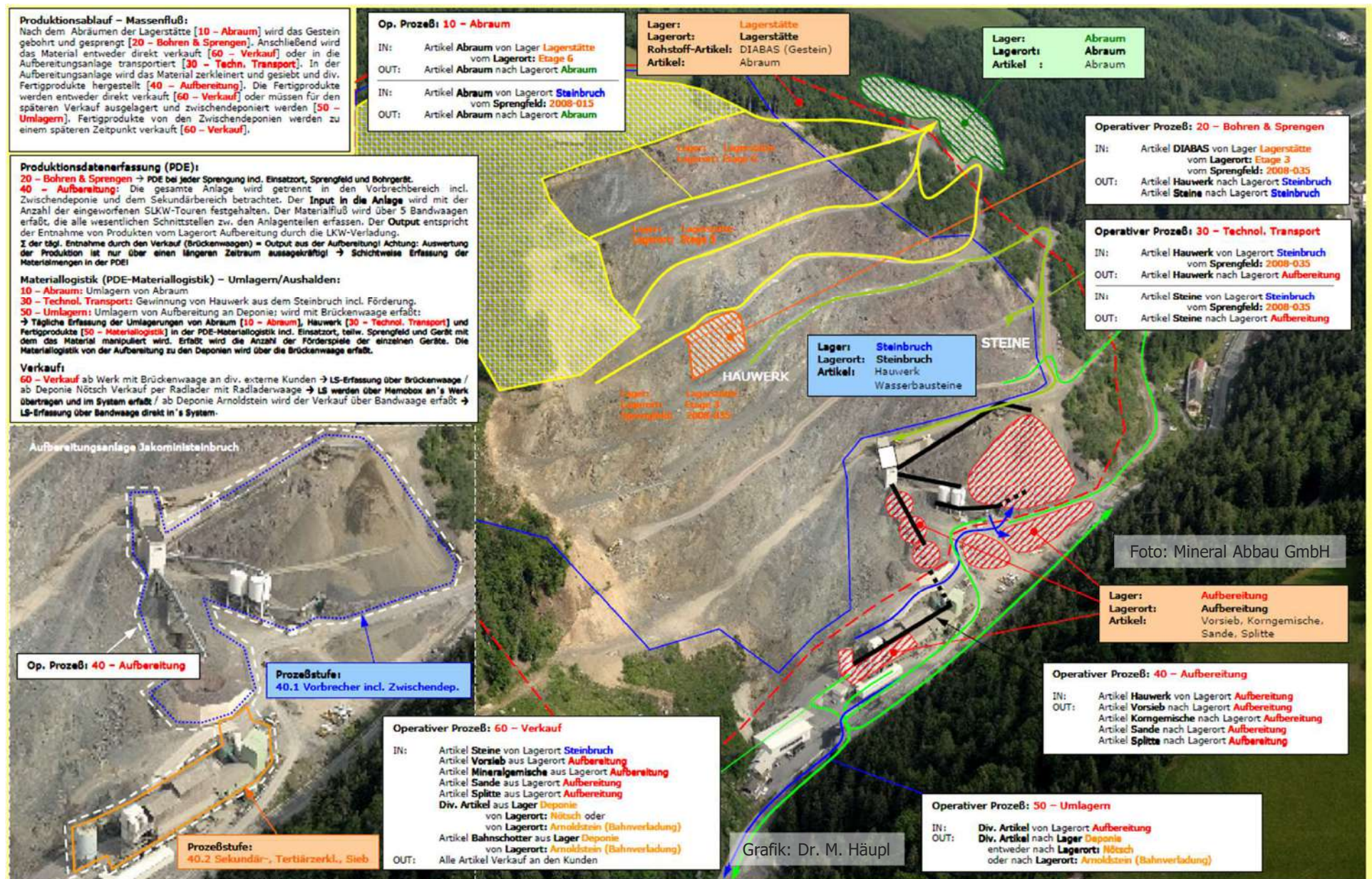
**Manipulation- resp.  
transportation processes**



# Processes: Example



# Processes: Example





# 3 Enterprise and operational organisation

# Organisation

Enterprise and operational organisation



Organisation of resources of

Person & Knowledge

Machine / plant & Energy,

Commodity (= deposit + products)

and their interaction within the business processes  
(process organisation) as well as their conditions, which are  
determined by the organizational structure.



# Operational organisation

## Supply chain within the company: General consideration in the literature

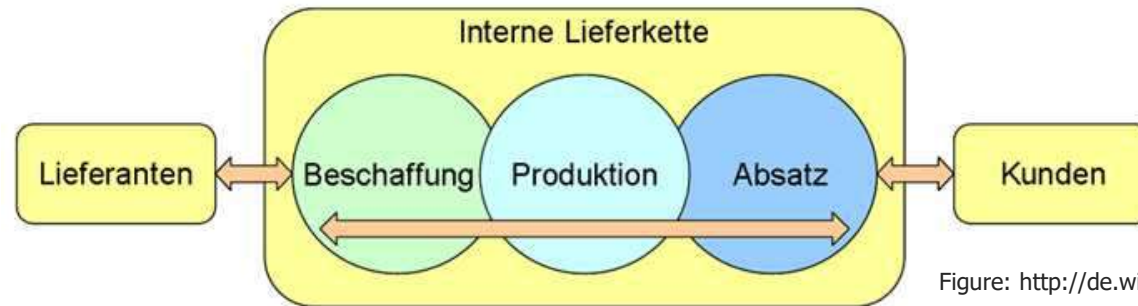


Figure: [http://de.wikipedia.org/wiki/Supply\\_Chain\\_Management](http://de.wikipedia.org/wiki/Supply_Chain_Management)

## Supply chain within the company: Modified and extended display

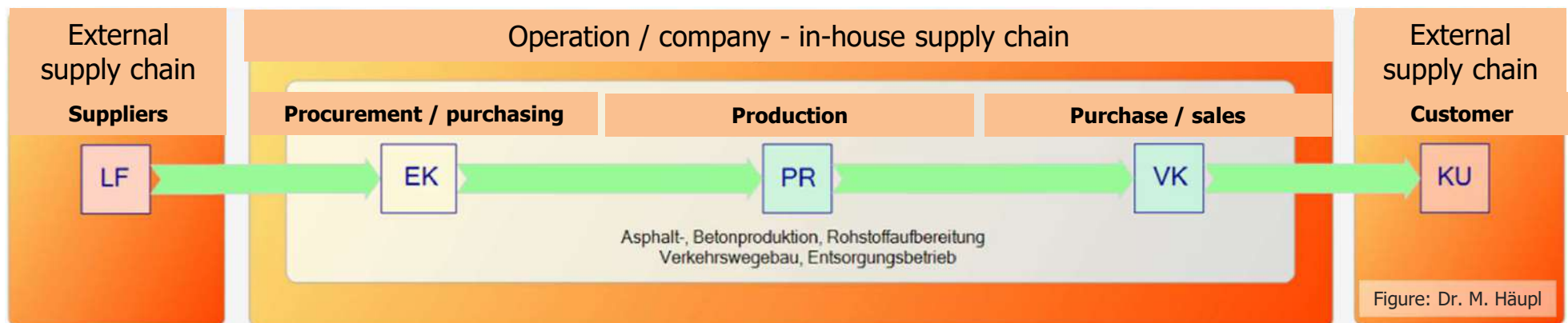
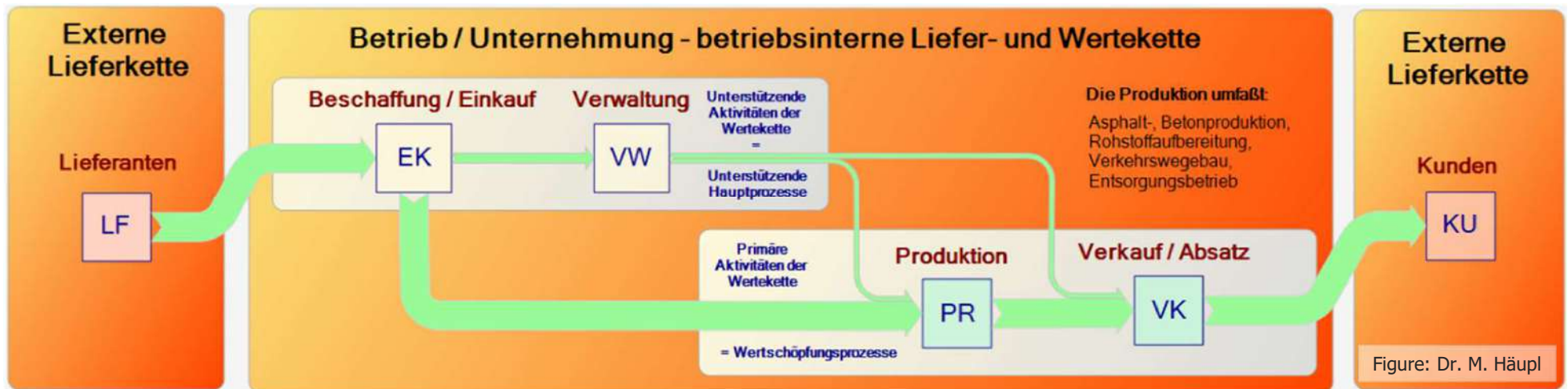


Figure: Dr. M. Häupl

# Operational organisation

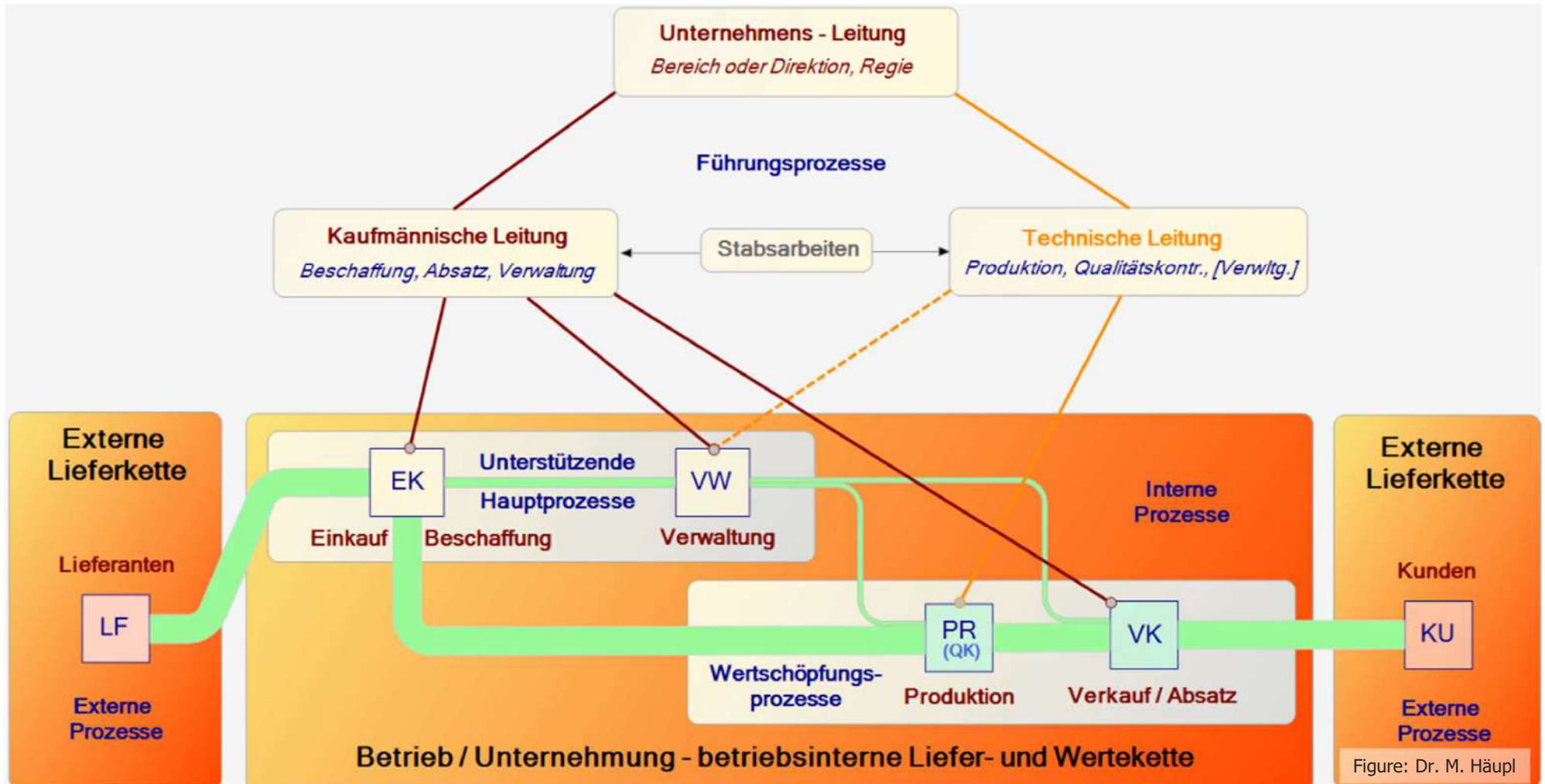
## Supply chain: Value-adding processes & supporting processes



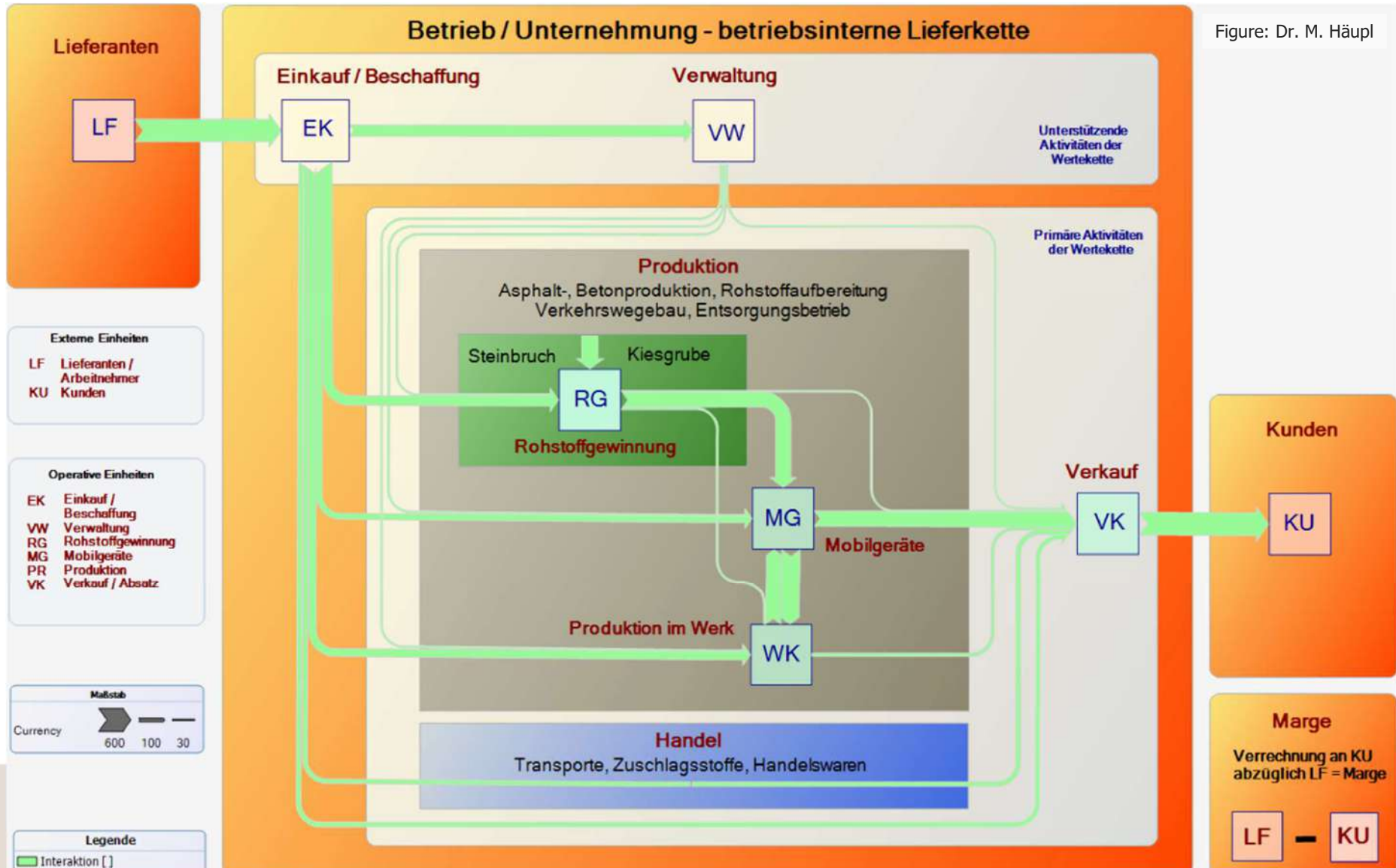
## Value chain: Illustration by Michael E. Porter



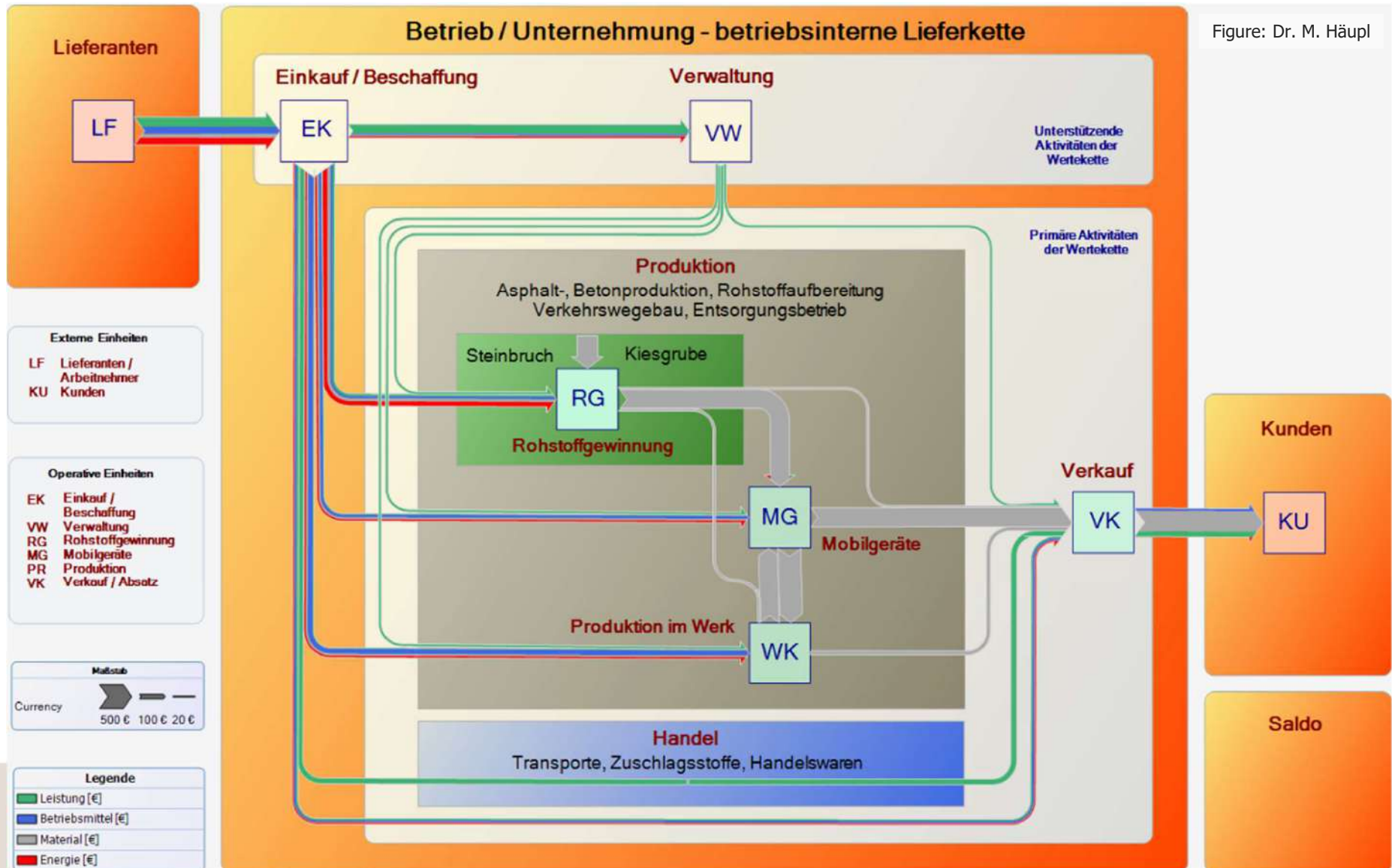
## Organisational structure: Extension with management processes



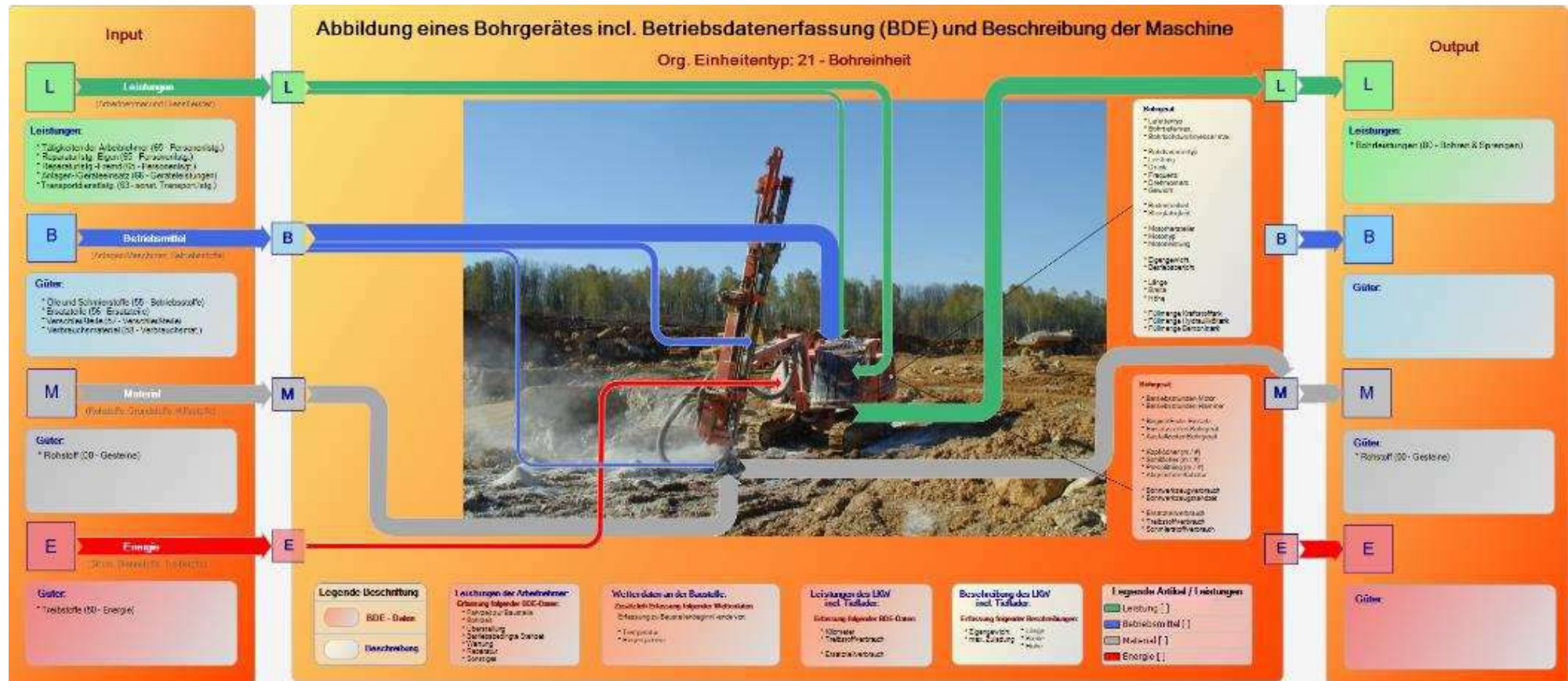
## Main processes: Structure with interaction



## Main processes: Structure with interaction of production factors



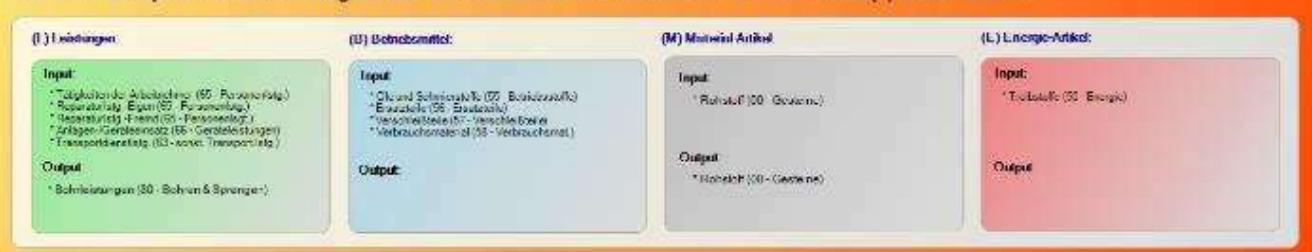
## Business processes: Definition of process participants / information needs

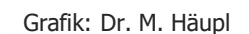


### Personen- und Gerätegruppen einer Bohreinheit



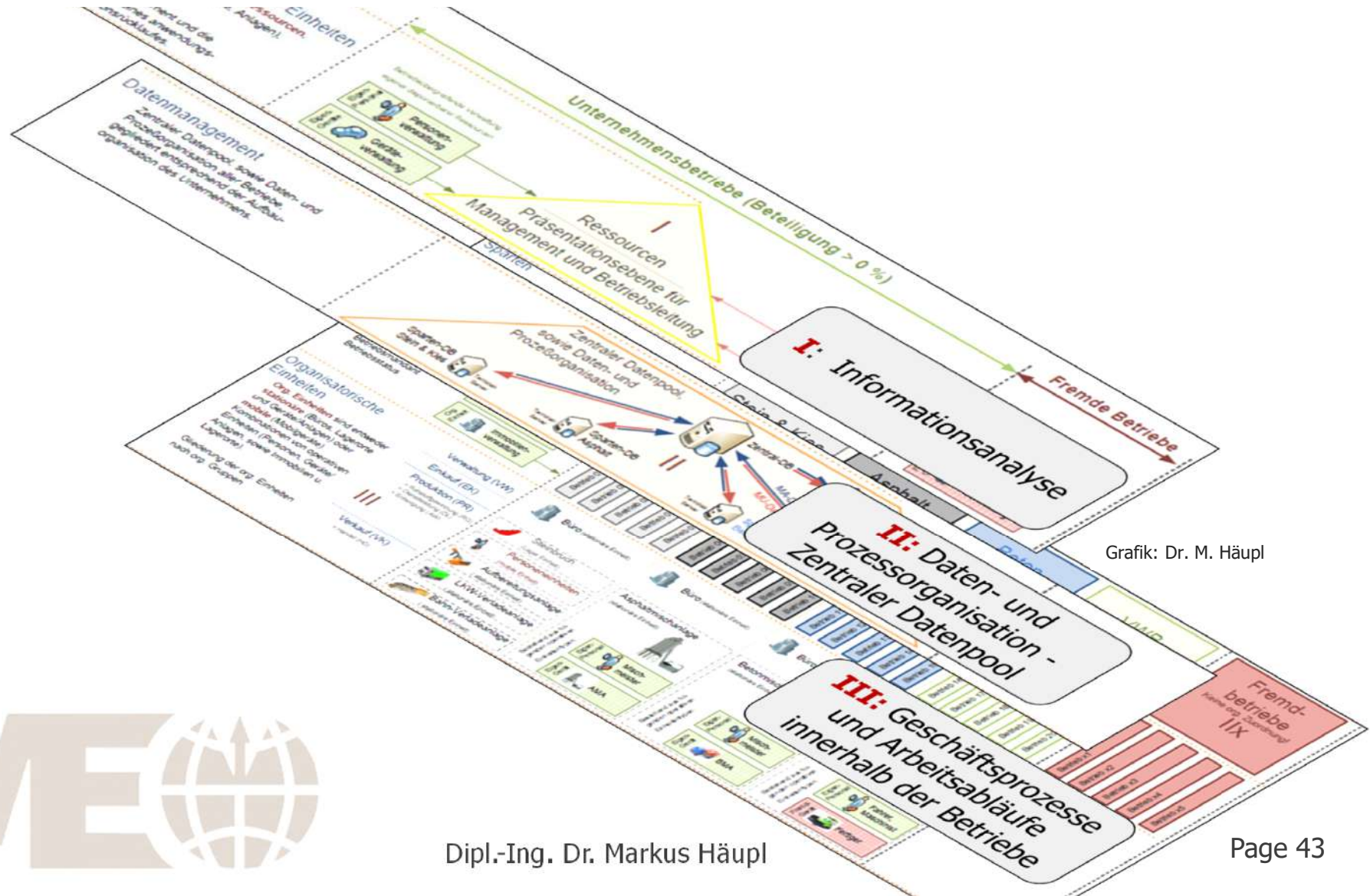
### In- und Output von Leistungen bzw. Artikeln und Produkten in/von eine(r) Bohreinheit





# Organisational pyramid

**Organisational pyramid:** Structured implementation in similar operations / plants



Grafik: Dr. M. Häupl



4

# Data management and data analysis

Data management and –analysis (**Knowledge**)



Management of all accumulated data and structured assignment to the process participants

**Person**

**Machine / plant & Energy,**

Commodity (= deposit + products)

and their analysis in the context of their interaction within the business processes (process organisation) as well as their conditions, which are determined by the organisational structure.



**Data structure:** According of company structure resp. Business processes

## Strukturing of the data by **Master Data References** in terms of

- \* the **organisational structure** through **organisational groups** (= divisions / business units)
- \* the **organisational departments resp. plants / storage sites** in **org. unit types**
- \* the **process organisation** by mapping of **business processes** (= functionality of software)
- \* the **process participants** (**operational types**) on business processes / work flows
  - > People, grouped by **functions**
  - > Equipment, grouped by **device groups** and **-types** (= **reference devices**)
- \* the **factors of production**, that are consumed / produced within the business processes
  - > **Services** – from people excl./incl. devices (**reference services**)
  - > **Goods** – Commodity, supplies, energy (**reference article**)
- \* the **storage** of goods, referenced by **reference storage sites** and **storage types**
- \* many other defined **references** within the system (vehicle types, addresses, ...)

Master data references



## **Virtual Data Layer – Data References**

Establishment of an industry-specific, cross-company, international (multi-lingualism!) and especially physically distinct (observable) operating and corporate data structure. These structure already represents an operational business process model itself.

### **Physical data layer:**

An assignment of all real operational data towards the virtual data layer must be possible, the operational data is referenced.



## Master data references: Example of reference articles for stone & gravel

Referenzartikel Stein & Kies  
incl. Verrechnungsarten

➤ in Anlehnung an die Normen EN 12620, EN 13043, EN 13242, EN 13265, EN 13383-1 und EN 13450.  
➤ alle **Produktgruppen in roter Farbe** sind als **Produktgruppen** auf dem **BAB** (Betriebsabrechnungsbogen) anzuführen.

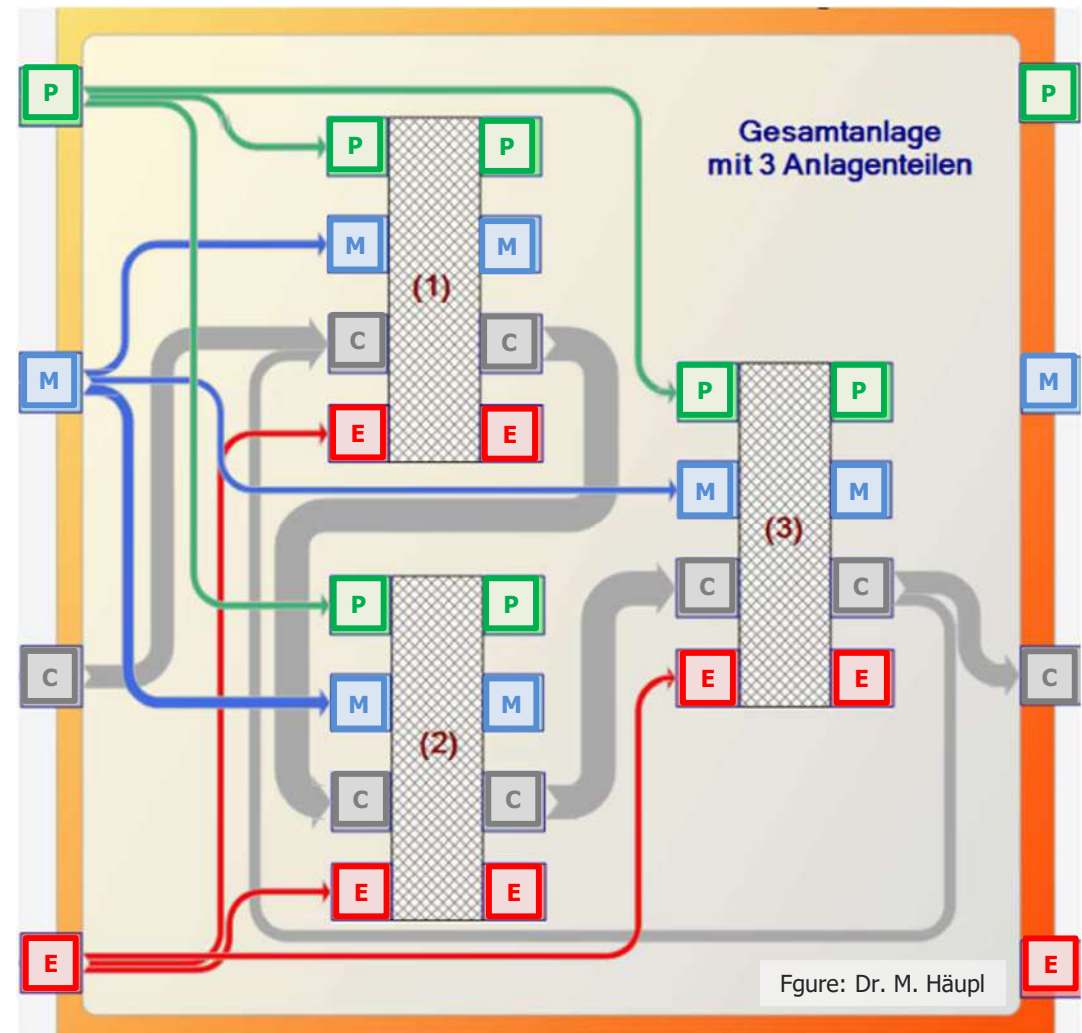
Produktgruppen	Verrechnungsart	Korngröße		Zusätzliche Bezeichnung der Korngruppen					
		Obere	Untere	natürlich (nicht gebrochen)		gebrochene Gesteinskörnung			
				Definition	Referenzartikel	Definition	Referenzartikel	Definition	Referenzartikel
<b>Füller <sup>1)</sup></b>	KS	0,063 mm	0 mm	---	Füller	---	Füller		
<b>Sande</b>	NA	≤ 2 bis ≤ 6,3 mm	0 mm	Sand	Natursand 0/1	Brechsand	Brechsand 0/1	Asphalubrechsand	
Bezeichnung lt. EN: Feine Gesteinskörnungen					Natursand 0/2		Brechsand 0/2	Betonbrechsand	
					Natursand 0/3		Brechsand 0/3	Bauwerksbrechsand	
					Natursand 0/4		Brechsand 0/4		
<b>Kiese, Splitte</b>	NB	≤ 32 mm	≥ 2 bis ≥ 4 mm	Kies	Kies 2/4	Splitt	Splitt 2/4	Asphaltsplitt	
Bezeichnung lt. EN: Grobe Gesteinskörnungen				(Rundkies)	Kies 2/5		Splitt 2/5	Betonsplitt	
					Kies 4/8		Splitt 4/8	Bauwerksplitt	
					Kies 5/8		Splitt 5/8		
					Kies 8/11		Splitt 8/11		
					Kies 8/16		Splitt 8/16		
					Kies 11/16		Splitt 11/16		
					Kies 16/22		Splitt 16/22		
					Kies 16/32		Splitt 16/32		
					Kies 22/32		Splitt 22/32		
					Kies 22/45		Splitt 22/45		
<b>Kiese, Splitte veredelt</b>	NC	≤ 32 mm	≥ 2 bis ≥ 4 mm	Kies erh. Anf.	Kies veredelt 2/4	Splitt erh. Anf.	Splitt veredelt 2/4	Asphaltsplitt	
Bezeichnung lt. EN: Grobe Gesteinskörnungen				(gebr. Rundkies)	Kies veredelt 2/5	(Edelsplitt)	Splitt veredelt 2/5	Betonsplitt	
					Kies veredelt 4/8		Splitt veredelt 4/8	Bauwerksplitt	
					Kies veredelt 5/8		Splitt veredelt 5/8		
					Kies veredelt 8/11		Splitt veredelt 8/11		
					Kies veredelt 8/16		Splitt veredelt 8/16		
					Kies veredelt 11/16		Splitt veredelt 11/16		
					Kies veredelt 16/22		Splitt veredelt 16/22		
					Kies veredelt 16/32		Splitt veredelt 16/32		
					Kies veredelt 22/32		Splitt veredelt 22/32		
					Kies veredelt 22/45		Splitt veredelt 22/45		
<b>Schotter</b>	ND	≤ 45 mm	≥ 32 mm	Grobkies	Grobkies 32/45	Schotter	Schotter 22/50		
					Grobkies 32/X		Schotter 22/63		
					Grobkies 50/X		Schotter 32/45		
					Grobkies 63/X		Schotter 32/50		
							Schotter 32/63		
							Schotter 32/80		
							Schotter 50/63		
							Schotter 22/X		

Tabelle: Dr. M. Häupl



## Business processes: Analysis by means of Sankey-Diagramms

- ➔ Analysis with Sankey-Diagrams
- ➔ Predestined for mass fluxes, as the connection arrows are shown quantities-proportional,
  - > thick arrow → large amount,
  - > thin arrow → small amount
- ➔ Energy waste may be recognized easily, as large consumers will have thick red arrows.
- ➔ Requirement is a process-oriented definition of the operational processes.



## **Reporting system:** Pre-definition of the required analyses

### **Pre-definition of standardized analyses** (main processes!)

- ➔ Sales, Procurement / Purchasing
- ➔ Inventory management, Inventory
- ➔ Production and operating data
- ➔ Commercial evaluations

### **Other requirements of the analyses** (System)

- ➔ Adaption to hierarchy (reporting level)
- ➔ Multilinguale Design

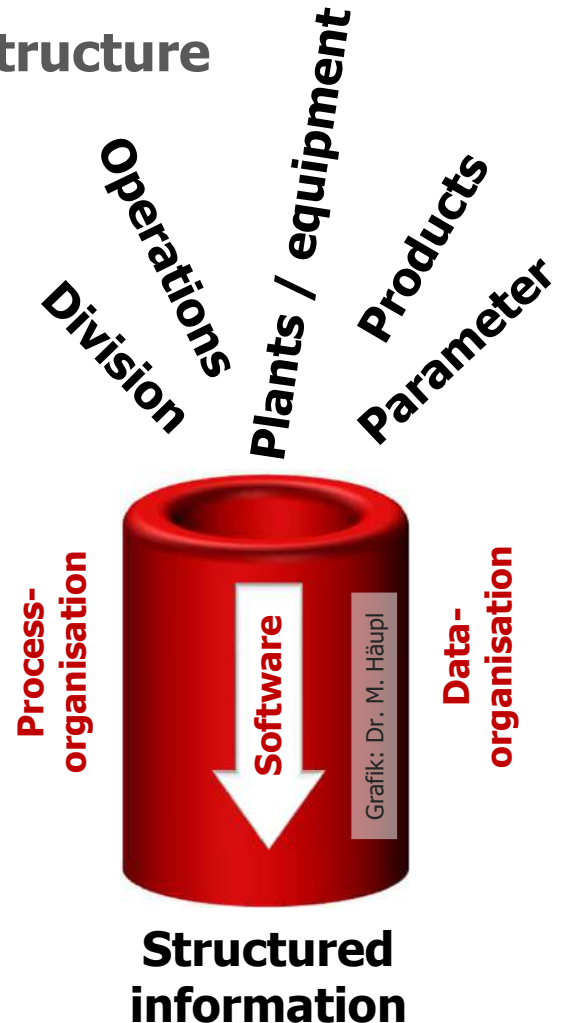
### **Interactive and flexible reporting**

- ➔ Interactive reporting can be done by business intelligence tools (BI-Tools)
- ➔ A well-structured database is required (Data references!)

## Data & Processes: advantages of a transparent structure

### Transparent structuring of the company by

- \* an extensive **process organisation** by
  - > a homogeneous / comparable business process landscape
  - > enforcement of an uniform working method of employees
  - > comparable and transparent work flows
  - > simple dissemination of well-functioning processes
- \* a sophisticated **data organisation** through
  - > extensive **master data references** under
  - > compliance of physical laws and
  - > compliance of the organisational enterprise framework
- \* a flexible **software strategy** in terms of
  - > operational complexity,
  - > company size and
  - > information needs



## Structured data and processes: advantages for the management

### Advantages for the management in the following respects:

- \* Company-wide **standard** for all types of operations
- \* Uniform **transnational** and **inter-enterprise information**
- \* Design of an inter-enterprise indicator system
- \* Measures to increase productivity are verifiable
- \* Technical and commercial controlling grow together
- \* An **efficient controlling of operations** is ensured





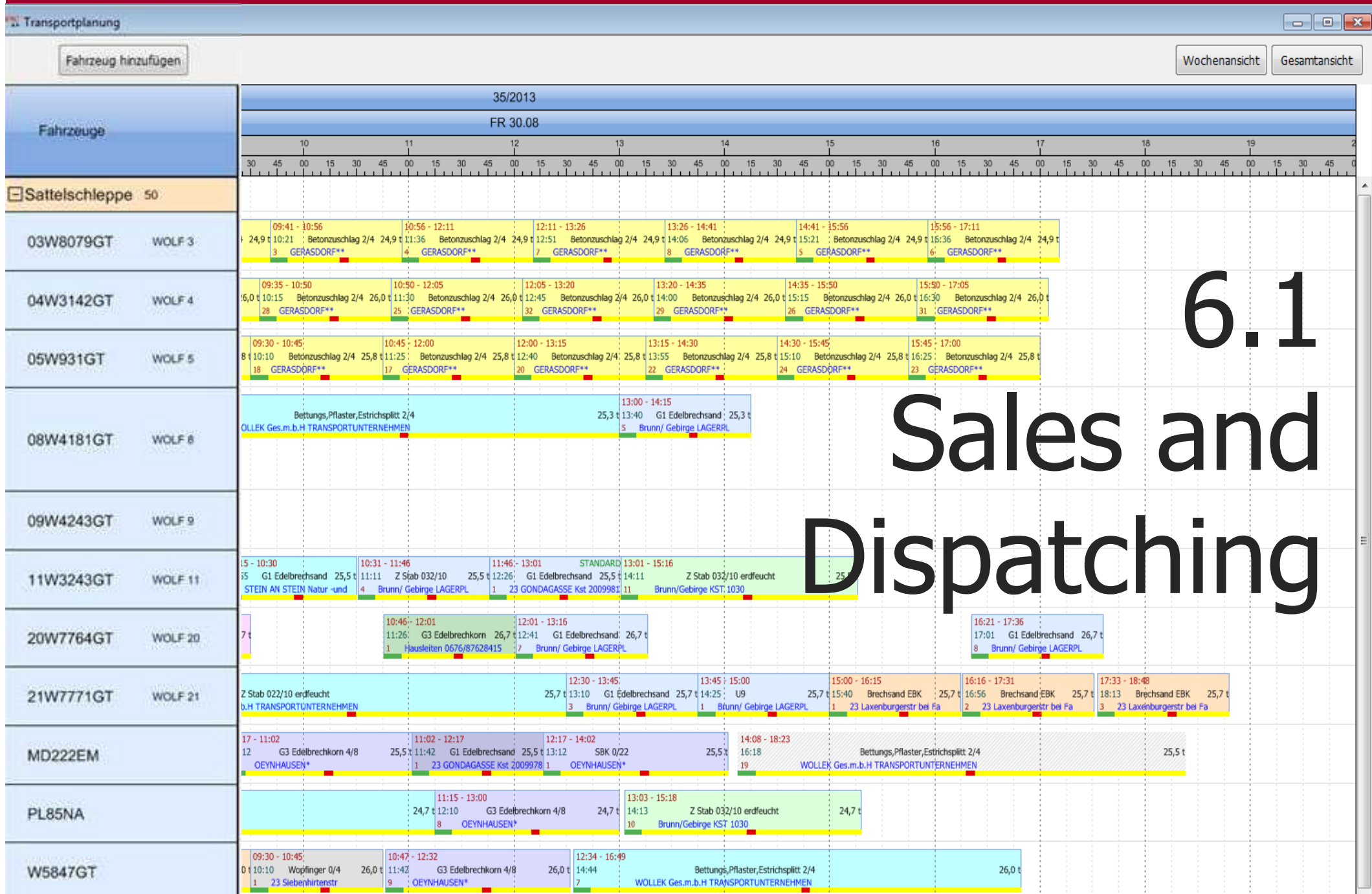
5

# Automation of business processes



Automation of business processes are shown on the basis of the following examples:

- ➔ Sales and dispatching (of commodities)
- ➔ Truck-Selfservice-Terminal  
(Inbound and outbound deliveries)
- ➔ Fully automated truck-loading plant
- ➔ Wheelloader-Terminal  
(Outbound deliveries / internal manipulation of commodities)



## 6.1 Sales and Dispatching

## Commodity delivery chain – from raw material to construction site

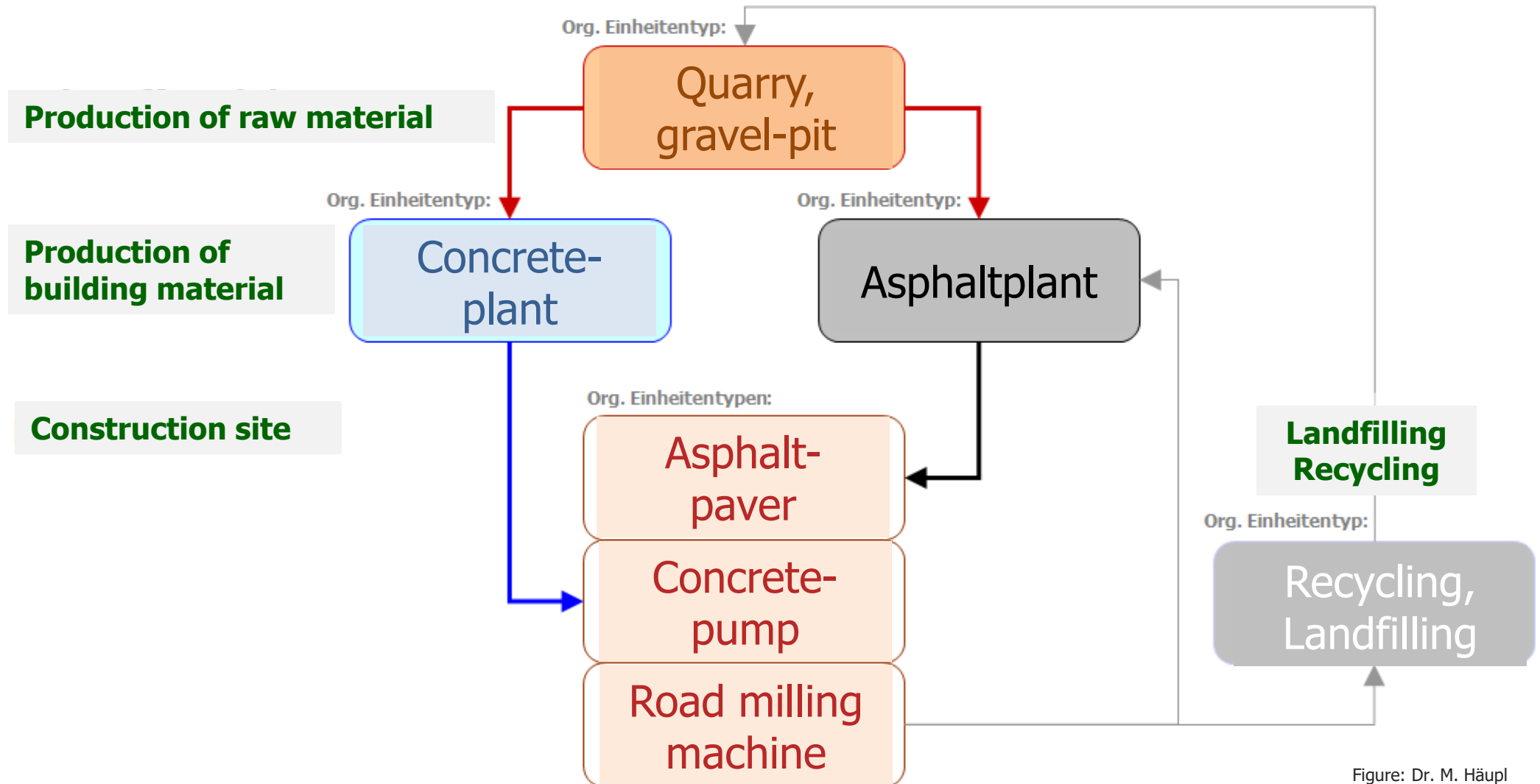


Figure: Dr. M. Häupl

## Sales: Creating of offers / processing of contracts

matDOC Stein & Kies Terminal Admin 2.0

Mineral Sachsen/Thüringen  
DE4254

**Auftrag**  
5253  
Auftrag Nr. **27241** Angebot Nr. 17574  
Datum: 11-11-2013  
Leistungszeitraum: 01-11-2013 bis 30-05-2014  
Options: ☒ Preise inkl. Transport ☐ Auftrag gesperrt

**Artikel Auftrag Nr. 27241**

Pos	Dtl	Alt. zu	Code	Produkt	Richtung	Termin Knd.Referenz	Standort	Menge Lademittel	Mindestmenge Gesamtmenge	Menge geliefert Menge offen	Preis Durchschnitt	Rab Skt	Rabatt Rabatt %	MwSt	AW Pa	ID Dd	AB	st
1			240045 45172	BG f. FSS 0/45-UF 5 TL SoB-StB (1)	Auslieferung	prompt	G Gutendorf	1.170,000 t	t	t 1.170,000 t		<input checked="" type="checkbox"/>		B	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
2			241045 45177	BG f. FSS 0/45-UF 5 TL SoB-StB m.NS(1)	Auslieferung	prompt	G Gutendorf	25,000 t	t	t 25,000 t		<input checked="" type="checkbox"/>		B	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
3			204016 42129	Mineralgemisch 0/16 (2)	Auslieferung	prompt	G Gutendorf	60,000 t	t	t 60,000 t		<input checked="" type="checkbox"/>		B	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
4			203016 40129	Vorabsiebung 0/16 (2)	Auslieferung	prompt	G Gutendorf	25,000 t	t	t 25,000 t		<input checked="" type="checkbox"/>		B	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
5			0/16 42139	Sand-Splitt-Gemisch 0-16	Auslieferung	prompt	G Gutendorf	25,000 t	t	t 25,000 t		<input checked="" type="checkbox"/>		B	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
6			40179 40179	Vorabsiebung 0/45 (2)	Auslieferung	prompt	G Gutendorf	250,000 t	t	t 250,000 t		<input checked="" type="checkbox"/>		B	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
7			40/80 40409	GK 40/80 (2)	Auslieferung	prompt	G Gutendorf	150,000 t	t	t 150,000 t		<input checked="" type="checkbox"/>		B	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Text Transport Staffelpreise Abrufaufträge Schließen

Verwendung/Norm  
Verkäufer: ELENMTMIK Mike Elendt

Artikel Preisgrp.Rabatte Transport Ok Abbrechen

Preisgrp.Rabatte AB erstellen Abrufaufträge erstellen Lieferungen Schließen

Mineral Sachsen/Thüringen [DE4254] SUPERVISOR Modifiz. En

## Dispatch: Processing of call orders

**Abrufauftrag**

Abrufauftrag Nr **TKB12953** Status ☐ erledigt ☐ storniert ☐ gebucht ☐ gedruckt

Datum **06-04-2013** 21:57

Knd. Bestellung Nr  Knd. Referenz

Lieferung von **07-04-2013** 06:00 bis **08-04-2013** 16:00

Kunde **GALABAU & ERDEI** Galabau & Erden Tuschke GmbH, D-03226 Vetschau, Lobendorfer Weg 24

Ansprechpartner

Lieferadresse

Ansprechpartner

Baustelle **VETSCHAU** Vetschau

Artikel **BIT13GWROT** bit. Abstreusplitt 1/3 70/100 Grauwacke + Bayferro

Richtung **Auslieferung** Bereitstellung

Zuordnung zu Auftrag

Auftrag Nr  ... x

gültig von  bis

☐ manuell zugeordnet

Lieferbedingungen

Ab Werk

Abrufmenge

Menge

Bestellt  400,000 t

Disposition

	Menge	
Geplant	921,200 t	38
Offen	0,000 t	0

Bedarf

60,000 t/h

Optionen

☒ autom. Dispo

Lieferung

	Menge	
Geliefert	0,000 t	0
Offen	400,000 t	38

Info

Optionen Auftrag Lieferungen F6 Empfänger Ok Abbrechen

## Dispatch: Dispatching of trucks (vehicles)

matDOC Logistik Center

Hofliste

Abrufaufträge

Disposition

220448510040786240

Disoplan Fahrzeuge

Disoplan Baustellen

Alle

Offen

Erledigt

Storniert

	Datum	beladen	entladen	Fzg Nr	Fahrzeugart	Menge	Artikel	Bezeichnung	Kunde	Baustelle/Lieferadresse	st
	08-10-2013	15:45	16:25	ZE343AJ(S)	Sattelschlepper	39.984,550 t	110002	Edelbrechsand 0/2 GS	AMA SIGGERWIES	AMA Siggerwiesen Asphaltmischanlage, A-5101 Bergheim bei Salzburg	
	09-10-2013	08:05	08:45	ZE823GK	LKW 4-Achser	0,000 t	550408	Filterkies 4/8	STRABAG ZELL	Aufschliessung Högmoos, A-5660 Taxenbach	
	10-10-2013	11:07	12:00	KB120CB	Sattelschlepper	10.000 t	710070	Frostkoffer 0/63 114	SCHERNTHA BRUK	Salzburg AG Mastenlager Bruck, A-5671 Bruck an der Großlocknerst	

Transportplanung (Fahrzeuge)

Fahrzeug hinzufügen

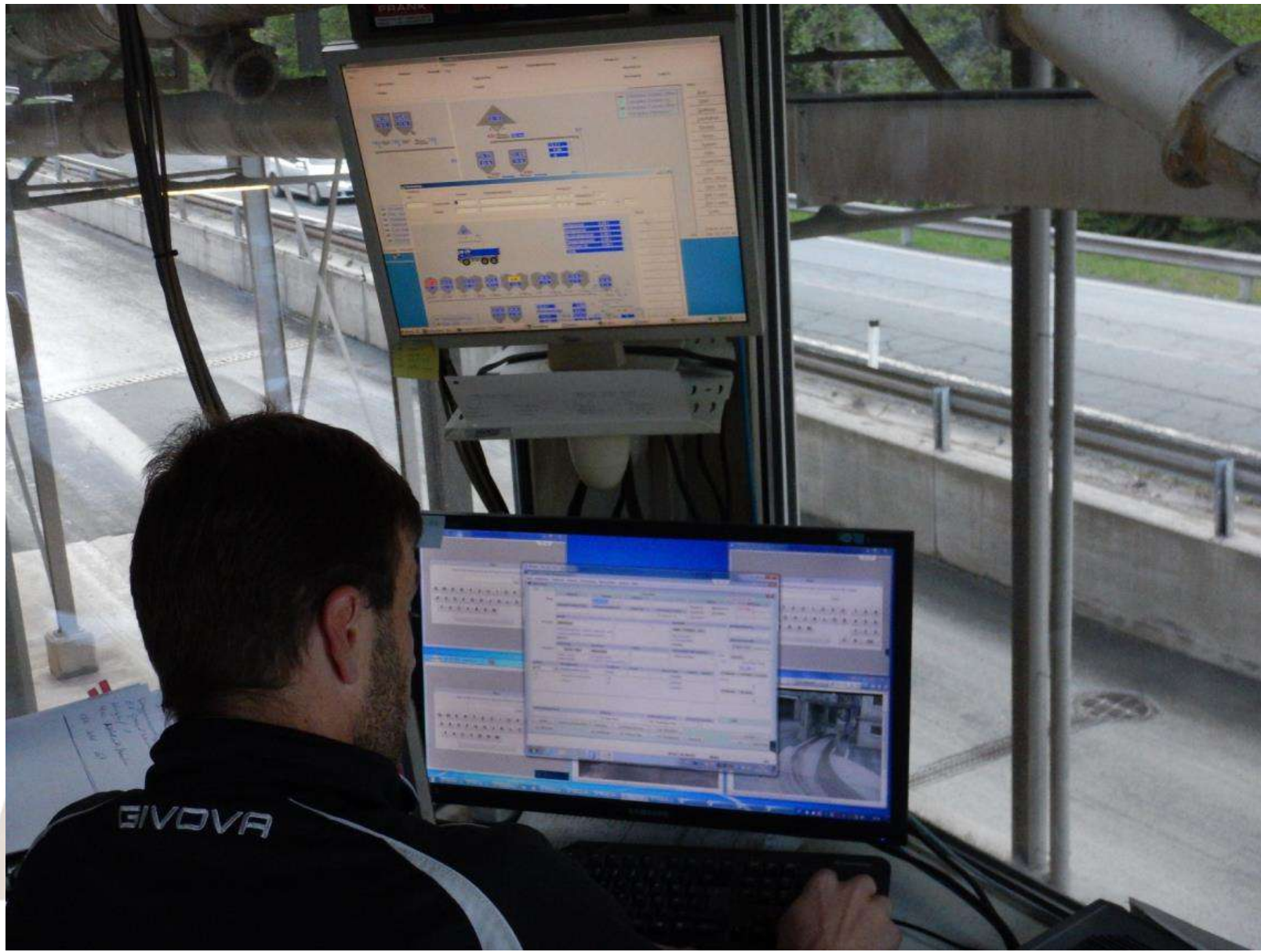
11.10.2013

Wochenansicht

Gesamtansicht

Fahrzeuge		FR 11.10																							
		05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20								
<input type="checkbox"/> LKW 4-Achser 40																									
JO265FZ																									
ZE825GP		<div>07:01 - 08:38 - 10:16 - 12:19 - 14:45 - 17:10 -</div> <div>07:5 Frostkoff ** 09:3 Frostkoff ** 11:0 Frostkoff ** 13:1 Frostkoff ** 15:3 Frostkoff ** 18:0 Frostkoff **</div> <div>5 Salzburg AG 5 Salzburg AG 4 Salzburg AG 4 Salzburg AG 5 Salzburg AG 5 Salzburg AG</div>																							
ZE162ID		<div>07:03 - 08:42 - 10:20 - 12:21 - 14:00 - 15:36 - 17:14 -</div> <div>07:5 Frostkoff ** 09:3 Frostkoff ** 11:1 Frostkoff ** 13:1 Frostkoff ** 14:5 Frostkoff ** 16:2 Frostkoff ** 18:0 Frostkoff **</div> <div>3 Salzburg AG 3 Salzburg AG 3 Salzburg AG 3 Salzburg AG 3 Salzburg AG 4 Salzburg AG 3 Salzburg AG</div>																							
ZE671EK		<div>07:00 - 08:36 - 10:14 - 12:21 - 13:58 - 15:35 - 17:13 -</div> <div>07:5 Frostkoff ** 09:2 Frostkoff ** 11:0 Frostkoff ** 13:1 Frostkoff ** 14:5 Frostkoff ** 16:2 Frostkoff ** 18:0 Frostkoff **</div> <div>5 Salzburg AG 5 Salzburg AG 5 Salzburg AG 5 Salzburg AG 5 Salzburg AG 6 Salzburg AG 6 Salzburg AG</div>																							
ZE716FC		<div>08:48 - 10:30 - 12:11 - 13:47 - 15:24 -</div> <div>09:4 Frostkoff ** 11:2 Frostkoff ** 13:0 Frostkoff ** 14:4 Frostkoff ** 16:1 Frostkoff **</div> <div>1 Unionweg/Krapfs 7 Salzburg AG 7 Salzburg AG 6 Salzburg AG 7 Salzburg AG</div>																							
		<div>05:05 - 11:19 - 13:02 - 14:40 - 16:16 - 17:52 -</div> <div>06:0 Frostkoff 16, 12:1 Frostkoff ** 13:5 Frostkoff ** 15:3 Frostkoff ** 17:0 Frostkoff ** 18:4 Frostkoff **</div> <div>2 Unionweg/Krapfs 7 Salzburg AG 7 Salzburg AG 7 Salzburg AG 7 Salzburg AG 7 Salzburg AG</div>																							

## Workplace sales & dispatch



## Truck-Selfservice-Terminal: Registration of truck

Start

[2]

Geben Sie bitte das Kennzeichen ein!

VL363CM

...

Q	W	E	R	T	Z	U	I	O	P	Ü	7	8	9
A	S	D	F	G	H	J	K	L	Ö	Ä	4	5	6
	Y	X	C	V	B	N	M				1	2	3
											0	Ok	

## Truck-Selfservice-Terminal: Choice of planned deliveries

Aktuelle Fuhre
3.3

Kunde

**STRABAG AG**  
A-9800 SPITTAL/DRAU, ORTENBURGERSTRASSE 27

Baustelle

Villach Seebach Außenanlage GPS Ausbildungszentrum

Artikel

Edelbrechkorn 11/16

Nächste Fuhren (2)

Kunde	Baustelle	Artikel	Ladestelle	Art
STRABAG AG	Villach Seebach	Edelbrechkorn 11/16	Autoverladu	
STRABAG AG	Villach Seebach	Edelbrechkorn 11/16	Autoverladu	

< Zurück

Anmelden >

## Truck-Selfservice-Terminal: Confirmation of delivery and start of loading

**Verladung**

**VL363CM**

Beleg Nr **LS** 2 1

Kunde **STRABAG AG**  
A-9800 SPITTAL/DRAU, ORTENBURGERSTRASSE

Baustelle **Villach Seebach Außenanlage GPS Ausbildungsze**

Referenz

Artikel **Edelbrechkorn 11/16**  
ZB05

Tara **23,820 t**

Brutto **27,480 t** Netto **3,660 t**

**Abbrechen** **Verladung starten**

**Verladung**

**VL363CM**

Beleg Nr **LS** 2 1

Kunde **STRABAG AG**  
A-9800 SPITTAL/DRAU, ORTENBURGERSTRASSE

**Verladung** TOUCH

Status **57**

Tara	Verladegewicht NETTO	Gesamtgewicht BRUTTO
<b>14,42</b>	<b>0,00</b>	<b>0,00</b>
	2,80	17,22

Tara **14,420 t**

Brutto **t** Netto **t**

**Abbrechen** **Verladung starten**

## **Truck-Selfservice-Terminal:** Closure of dispatch and loading process

- ➔ Display of data of delivery notes
- ➔ Sign at Touchscreen / Sign-pad
- ➔ Printing of the delivery note for truck driver
- ➔ Filing of electronical delivery note within the archiv of documents via Adobe pfd-file
- ➔ As an option pictures of the loading process may be made (loading area, licence plate, ...)

mat Logistik Center X

Dispoplan Baustellen

	Datum	beladen	entladen	Fzg Nr	Fahrzeugart	Menge	Artikel	Bezeichnung	Kunde	Baustelle/Lieferadresse	st	
●	08-10-2013	15:45	16:25	ZE343AJ(S)	Sattelschlepper	39.984,550 t	110002	Edelbrechsand 0/2 GS	AMA SIGGERWIES	AMA Siggerwiesen Asphaltmischanlage, A-5101 Bergheim bei Salzburg		
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●	10-10-2013	11:07	12:00	KB120CB	Sattel-schlepper	10.000 t	710070	Frostkoffer 0/63,114	SCHERNTHA BRUC	Salzburg AG Mastenlager Bruck, A-5671 Bruck an der Großlocknerst		

— □ ×

11.10.2013

Gesamtansicht

FR 11.10

ZE716FC

[illegible]

07:01 -	08:38 -	10:16 -	12:19 -	14:45 -	17:10 -
07:5 Frostkoff	** 09:3 Frostkoffe	** 11:0 Frostkoff	** 13:1 Frostkoff	** 15:3 Frostkoffe	** 18:0 Frostkoff
5 Salzburg AG	5 Salzburg AG	4 Salzburg AG	4 Salzburg AG	5 Salzburg AG	5 Salzburg AG

07:03 -	08:42 -	10:20 -	12:21 -	14:00 -	15:36 -	17:14 -
07:5 Frostkoffe **	09:3 Frostkoff **	11:1 Frostkoffe **	13:1 Frostkoff **	14:5 Frostkoff **	16:2 Frostkoff **	18:0 Frostkoffe *
3 Salzburg AG	3 Salzburg AG	3 Salzburg AG	3 Salzburg AG	3 Salzburg AG	4 Salzburg AG	3 Salzburg AG

07:00 -	08:36 -	10:14 -	12:21 -	13:58 -	15:35 -	17:13 -
07:5 Frostkoff	09:2 Frostkoff	11:0 Frostkoffe	13:1 Frostkoff	14:5 Frostkoffe	16:2 Frostkoff	18:0 Frostkoffe
5 Salzburg AG	5 Salzburg AG	5 Salzburg AG	5 Salzburg AG	5 Salzburg AG	6 Salzburg AG	6 Salzburg AG

08:48 -	10:30 -	12:11 -	13:47 -	15:24 -
09:4 Frostkoffe **	11:2 Frostkoffe **	13:0 Frostkoffe **	14:4 Frostkoffe **	16:1 Frostkoffe *
1: Unionweg/Kraps	7 Salzburg AG	7 Salzburg AG	6: Salzburg AG	7 Salzburg AG

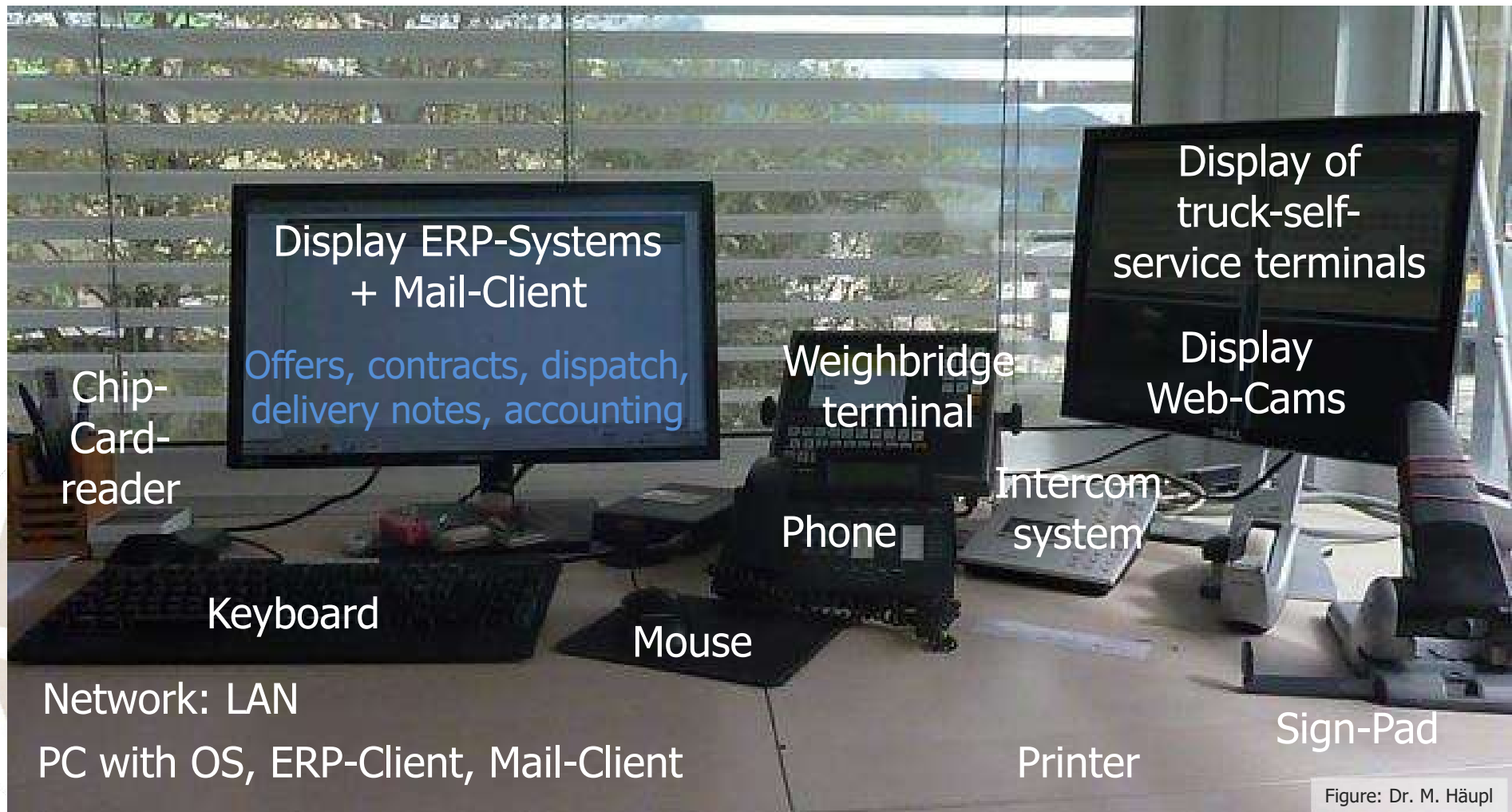
05:05 -			11:19 -	13:02 -	14:40 -	16:16 -	17:52 -
06:0 Frostkoffe 16,			12:1 Frostkoffe **	13:5 Frostkoff **	15:3 Frostkoffe **	17:0 Frostkoff **	18:4 Frostkoff **
2 Unionweg/Krafts			7 Salzburg AG	7 Salzburg AG	7 Salzburg AG	7 Salzburg AG	7 Salzburg AG



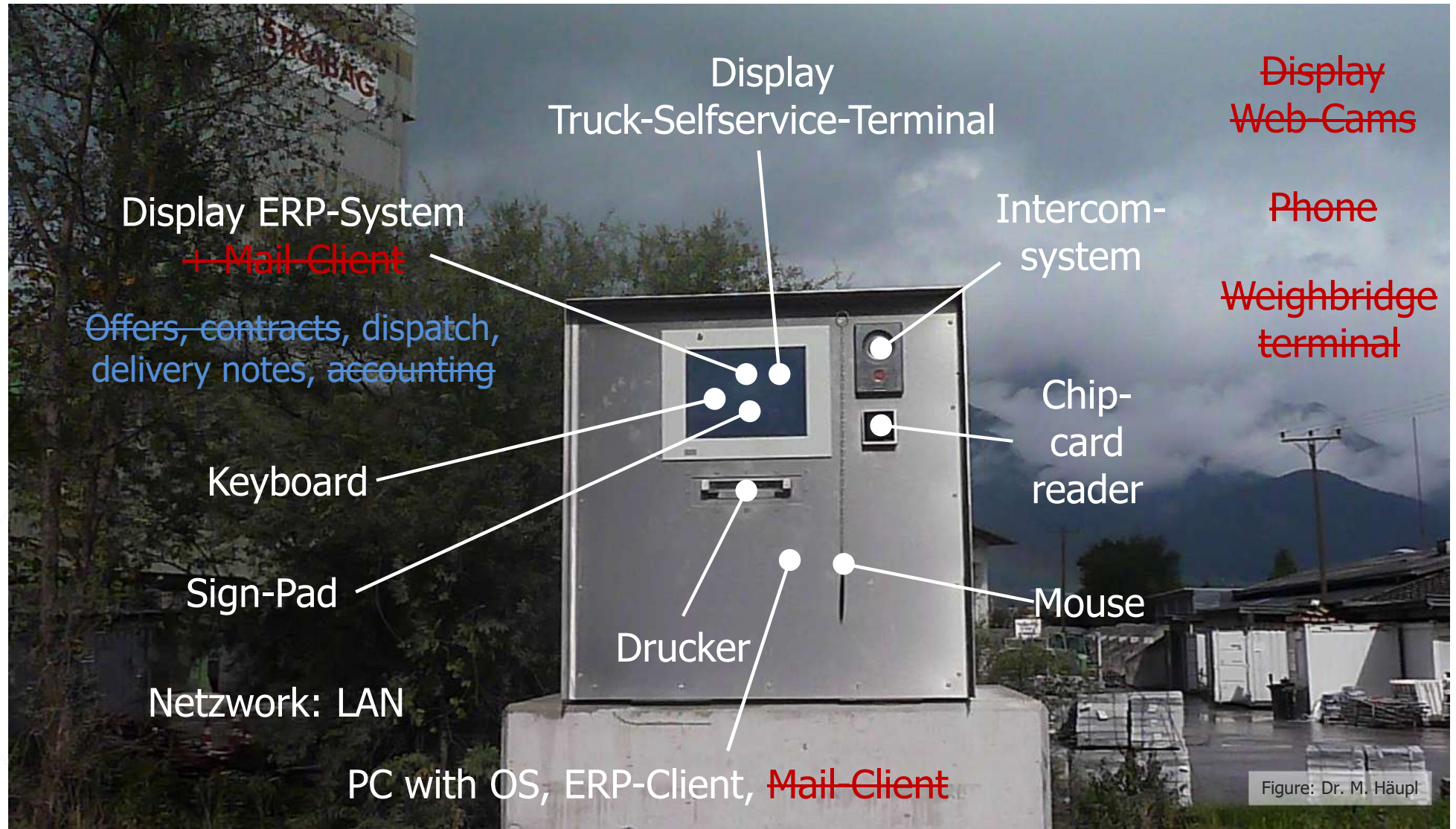
## 6.2 Truck- Selfservice- Terminal

# Truck-Selfservice-Terminal

„Office-workplace“ Sales, dispatching, delivery notes, accounting



## Workplace **Truck Selfservice Terminal** vs. „Office-workplace“



# Truck-loading plant



6.3

Fully automated  
truck-loading plant

# Truck-loading plant

Overview on truck loading plants and weighbridges in use

**Terminal: Frostkoffer**

**Wöhwa-Verladung 2**  
Verladeanlage für: Frostkoffer

**Terminal: Waage 2**

**Wöhwa-Verladung 1**  
Verladeanlage für: Sand, Splitt,  
Gemische

**Brückenwaage 2**

**Bandwaage**

**Terminal: Waage 1**

**Brückenwaage 1**

**Terminal: Waage 3**

**Wöhwa-Verladung 3**  
Verladeanlage für: Schotter,  
Material für Steinwollenproduktion

**Brückenwaage 3**

# Truck-loading plant

A loading plant has been fully automated:

- ➔ Weighbridge (Truck-Targetweight)
- ➔ Conveyor scale (material-targetweight)
- ➔ Movable Conveyor belt
- ➔ Loading nozzle (Minimizing emissions)
- ➔ Loadout system
- ➔ Truck-Selfservice-Terminal
- ➔ Traffic light (Truck-positioncontrol)
- ➔ Connection to ERP-System



# Truck-loading plant

Overbuilt and movable  
conveyor belt:

- ➔ Truck stands still during the whole loading process
- ➔ Conveyor belt moves to truck-specific loading position
- ➔ Loading nozzle rises and lowers
- ➔ Control of material weight via belt scale
- ➔ Control of truck weight via weighbridge



# Truck-loading plant

**Loadout system:** Delivers chosen material(-recipe) und controls the loading belt + loading nozzle acc. maindata out of ERP-System



# Truck-loading plant

**Loading belt + nozzle:** Loading happens fully automated

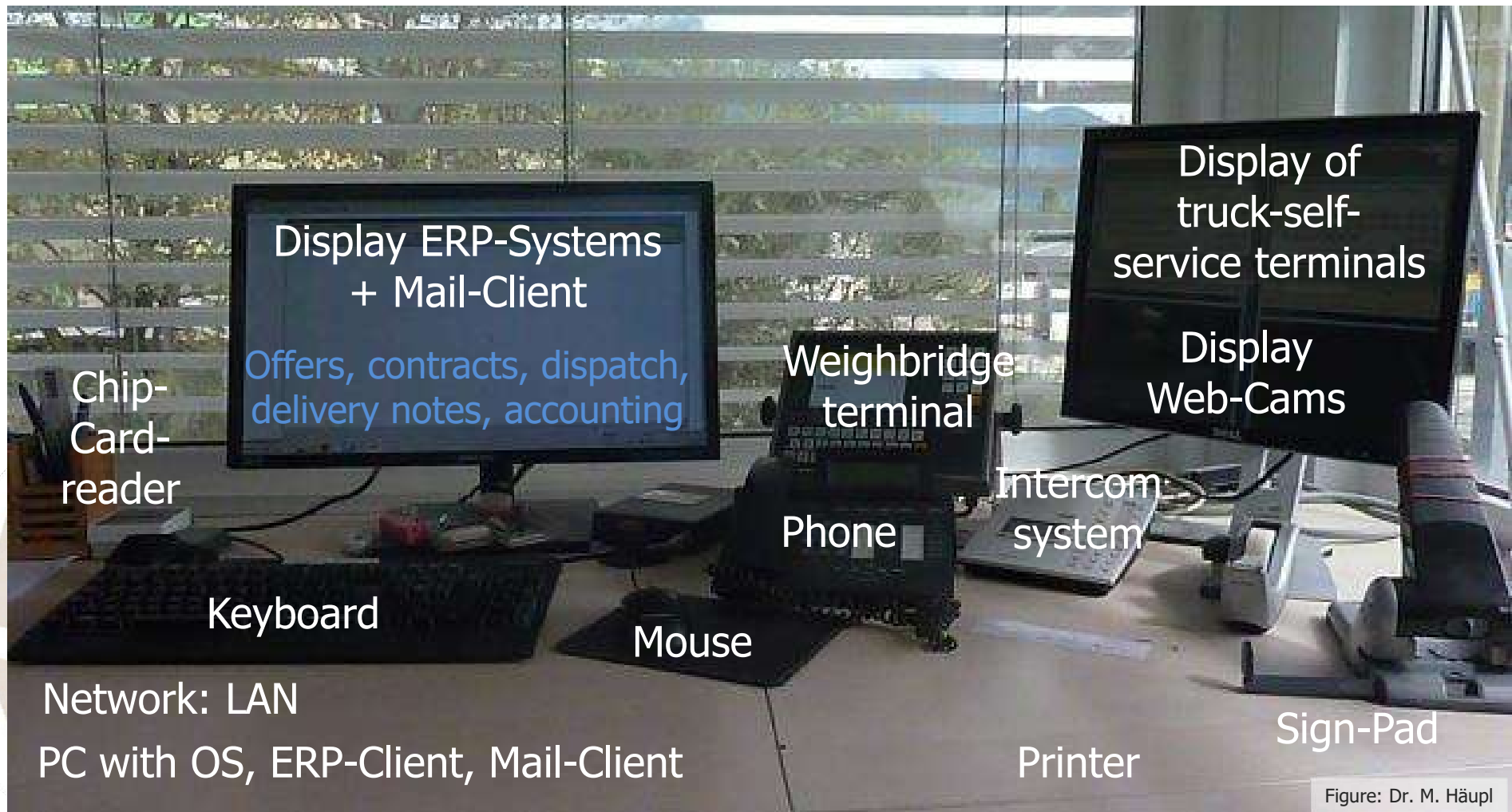


## 6.4 Wheelloader terminal



# Wheelloader-Terminal

„Office-workplace“ Sales, dispatching, delivery notes, accounting



## Workplace **Wheelloader-Terminal** vs. „office-workplace“

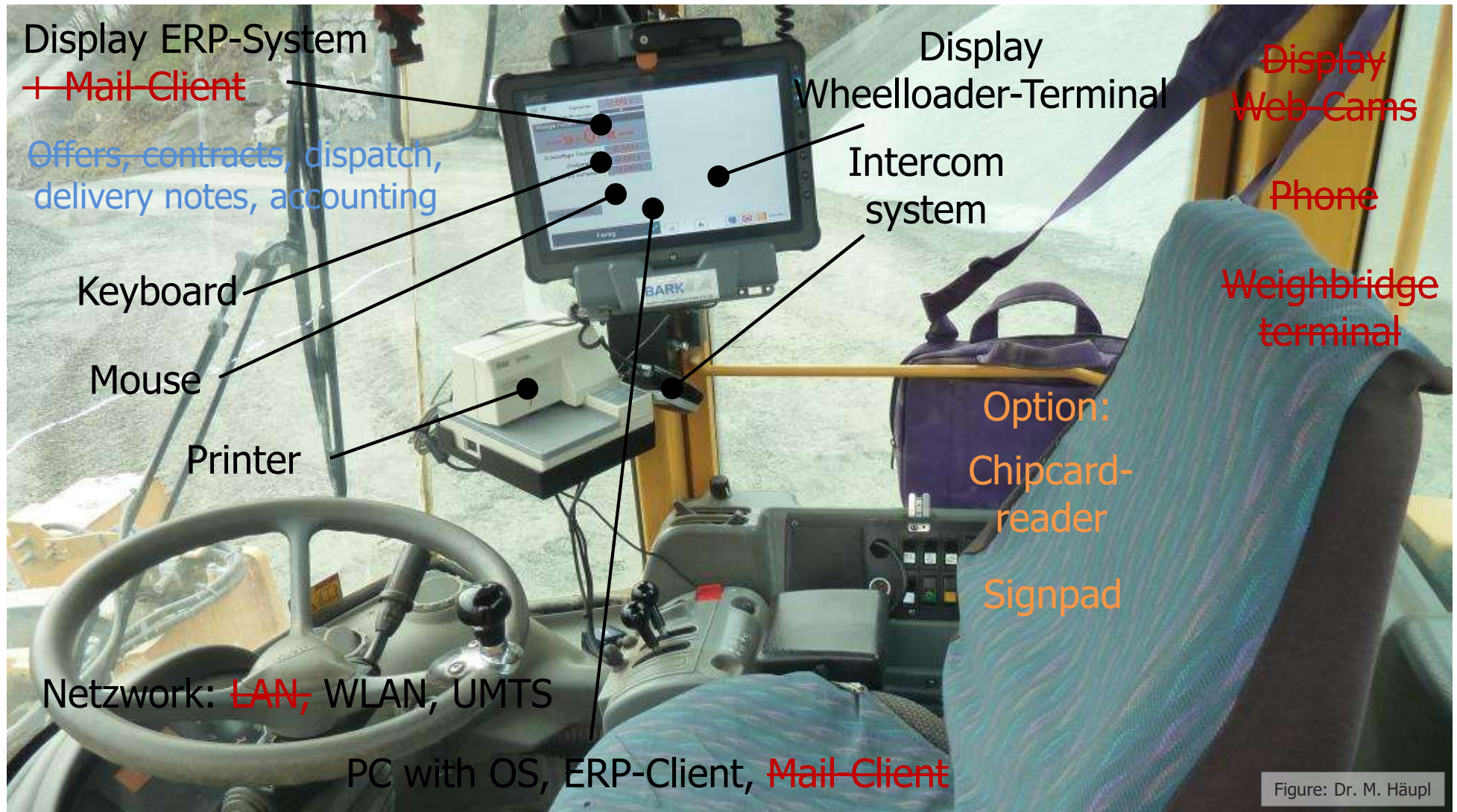


Figure: Dr. M. Häupl

Thank you for your attention!

