mobility chains Processes

CHANGING TRANSPORT

TRANSPORTING CHANGE!

ÖSTERREICHISCHE VERKEHRS-WISSENSCHAFTLICHE GESELLSCHAFT

www.oevg.at

Qualitätsmerkmale, -kriterien und -management im Kombinierten Verkehr

ÖVG Kombiverkehrstagung 2015

Wien, Wirtschaftskammer

26.02.2015

Martin Posset, Mag.

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Agenda

Qualität im Kombi-Verkehr:

- Notwendigkeit
  - Wohin geht die Reise und Warum ist die Qualität wichtig?
- Merkmale
  - Welche Aspekte gibt es?
- Kriterien
  - Worauf kommt es wirklich an?
- Management
  - Wie können wir sie messen und ändern?
  - verstehen, zuordnen, aufbereiten, berechnen

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Wer aufhört, besser zu werden,
hat aufgehört, gut zu sein!

Philip Rosenthal

http://www.tis-gdv.de/tis/foto/2003/2003_12.htm

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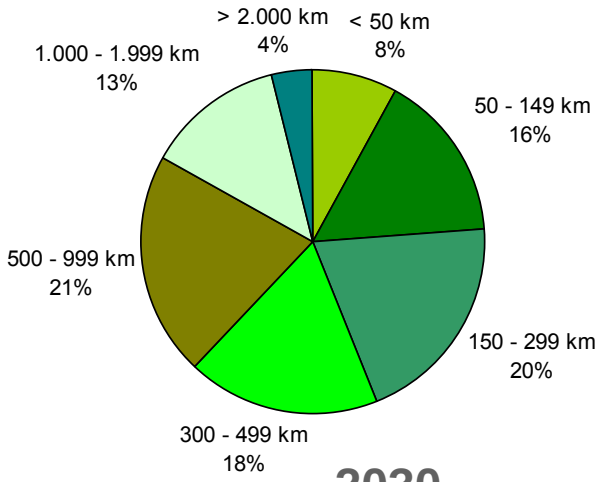
Wohin geht die Reise?

- Globalisierung
- Liberalisierung
- Containerisierung
- eCommerce
- Öl

EU-Straßengütertransport (tkm) nach Distanz (Eurostat, 2012)



- Infrastrukturinvestitionen
- Kostenwahrheit
- Sharing/Entstofflichung
- Arbeitszeiten und Gehälter im Straßengüterverkehr
- Standards
- Door-to-door
- Recycling
- Demographie
- Population

2015 — **2030** — **2050**

30% Straßengüterverkehr > 300km auf Schiene oder IWW verlagern

50% Straßengüterverkehr > 300km auf Schiene oder IWW verlagern

Weissbuch (2011) Transforum (2015)

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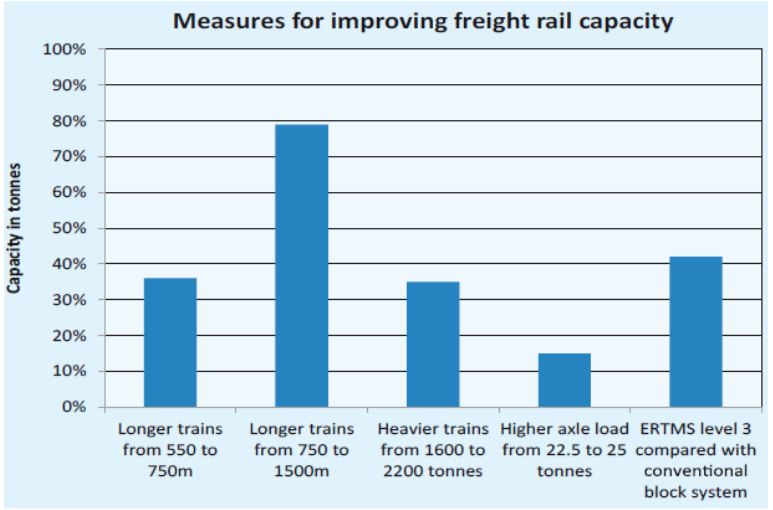
Qualität als Option für die „Track to 2030“

- Güterverkehrskorridore
- Kontinuierliche Instandhaltung
- Modernes und multifunktionales rollendes Material
- Einheitliche Lichtraumprofile
- Achs- und Meterlasten anpassen
- Terminalnetzwerk
- Informationsdurchlässigkeit
- Informationsverfügbarkeit
- Zweigleisiger Ausbau und
- längere Ausweichen
- Zuglänge
- HSR, um Kapazität im konventionellen Netz zu schaffen
- ERTMS für geringere Abstände



Transforum (2015)

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Qualitätsmanagement

- Messung der Leistung der Realisierungsprozesse und Kundenzufriedenheit. Anforderungen der Kunden besser verstehen und wirksamere Ergebnisse erzielen.

- Zur Verwirklichung ist eine Organisationsstruktur, die Verantwortlichkeiten, Verfahren, Prozesse und Mittel vorgibt mit allen Einrichtungen und Maschinen sowie die Dokumentation aller qualitätsrelevanten Maßnahmen einschließlich der Mess- und Prüfergebnisse, vorgibt

Schmelzer, H./ Sesselmann, W.: Geschäftsprozessmanagement in der Praxis, München, Wien, Carl Hanser Verlag, 2003 [3]
Brauer, J., P., Horn, T.: DIN EN ISO 9000:2000 ff. umsetzen, Gestaltungshilfen zum Aufbau Ihres Qualitätsmanagementsystems, München, Wien, Carl Hanser Verlag, 2002 [3].

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Merkmale und Kriterien der Qualität

- Sicherheit
- Pünktlichkeit
- Laufzeiten/Transportgeschwindigkeit/Transportzeit in Kombination mit Pünktlichkeit
- Zeitliche und räumliche Flexibilität
- Frequenz/Häufigkeit
- Informationsverfügbarkeit
- Standort/Anbindung/Netzbildungsfähigkeit
- Zusatzdienstleistungen
- Sicherheit (Ware und/oder Umwelt)
- Schadensquote

Was können wir?

- Laufzeiten
- Öffnungs- und Betriebszeiten
- Vorstaukapazitäten
- Terminzuverlässigkeit
- Pünktlichkeit
- Verfügbarkeit der Ware
- Volumen
- Lagerkapazitäten
- One-Stop-Shop
- Beitrag der Kette zum Gesamt-Footprint
- Vorauseilende Information
- Subjektive Wahrnehmung

Was wollen die Kunden?

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Management als Brücke

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Management: wir müssen es smart machen

- **S**pezifisch **(Specific)**: Ziele möglichst detailliert und spezifisch. Exakte Definition und eindeutige Formulierung erlauben eindeutige Zuordnung der Verantwortung.
- **M**essbar **(Measurable):** Mehrdeutigkeit vermeiden. Ziel muss messbar (qualitativ oder quantitativ) und einem Leistungsziel oder einem Standard gegenüberstellbar sein.
- **A**ttainable **(Erreichbar)**: Ziel muss erreichbar sein. D.h., angemessen, aber dennoch herausfordernd.
- **R**ealistisch **(Realistic):** Erweiterung des “Attainable Kriteriums”. Ziel, das erreichbar ist, muss nicht zwangsläufig auch realistisch sein. Eentsprechende Ressourcen müssen vorhanden und auch verfügbar sein.
- **T**ime-sensitive **(Zeitbezogen):** Zeitrahmen für Erreichung der Ziele, der Stuktur gibt, und Fertigstellungszeitpunkt. Realisitische Meilensteine (Zwischenziele) und entsprechende Aktionspläne für nächste Schritte.

Shahin and Mahbod (2007)

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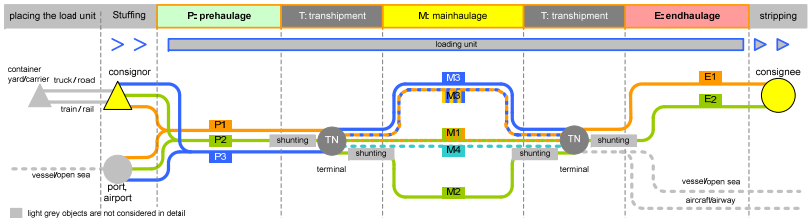
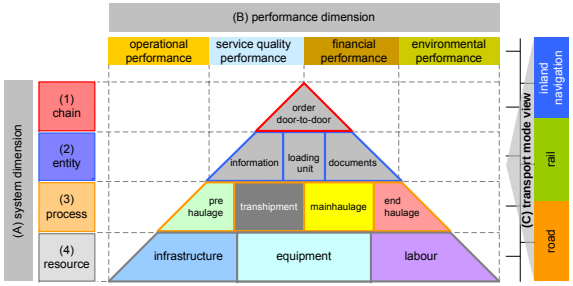
Management als Zugang zur Qualität

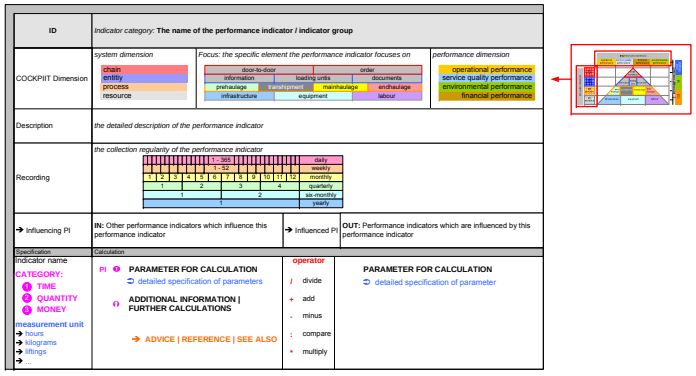
- **Verstehen:**
  Standard PROZESSE



- **Zuordnen:**
  Kennzahlen FRAMEWORK



- **Berechnen:**
  Kennzahlen TABLES



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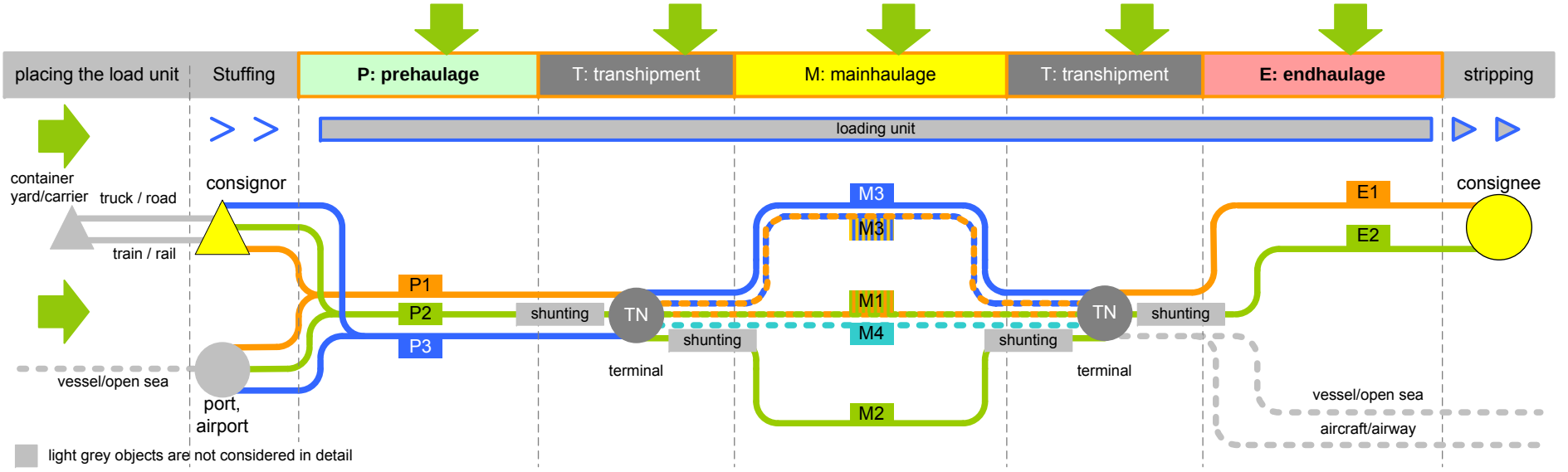
Verstehen



Posset und Gronalt (2014)

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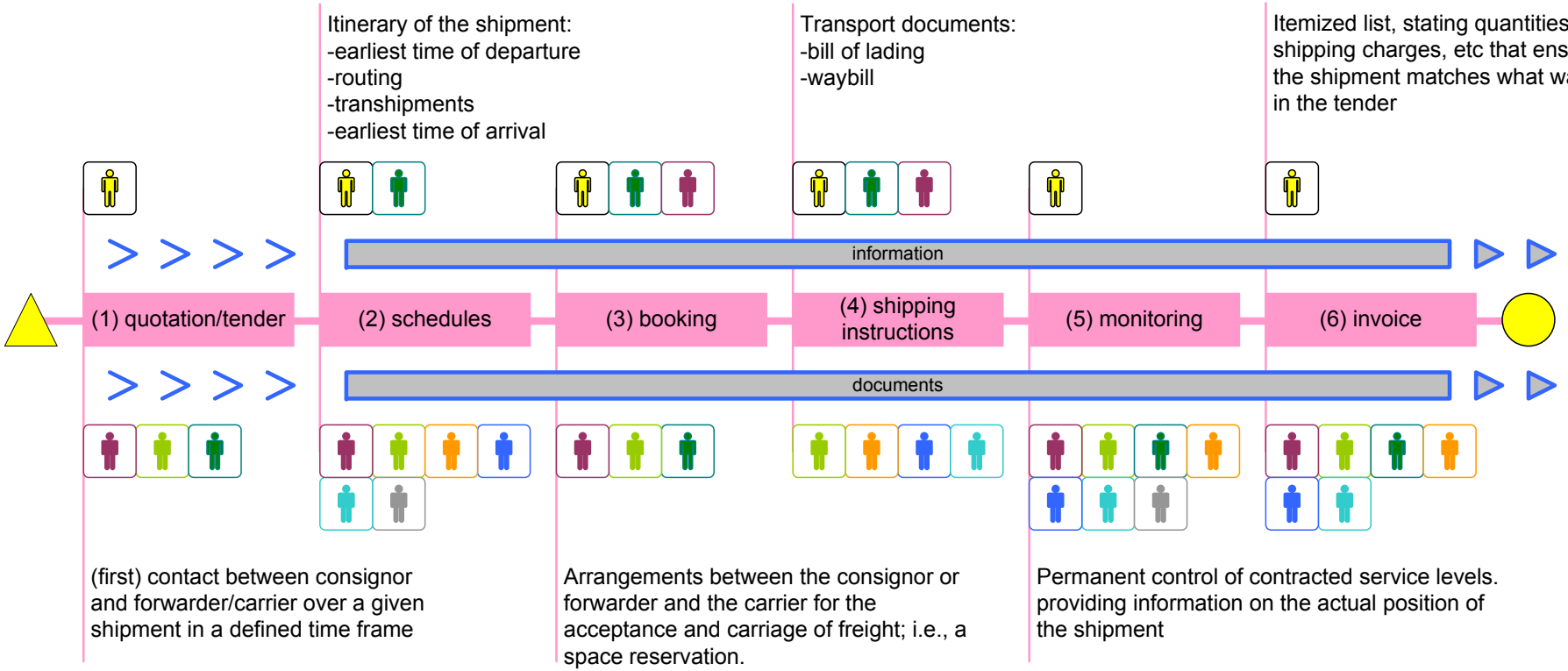
Verstehen



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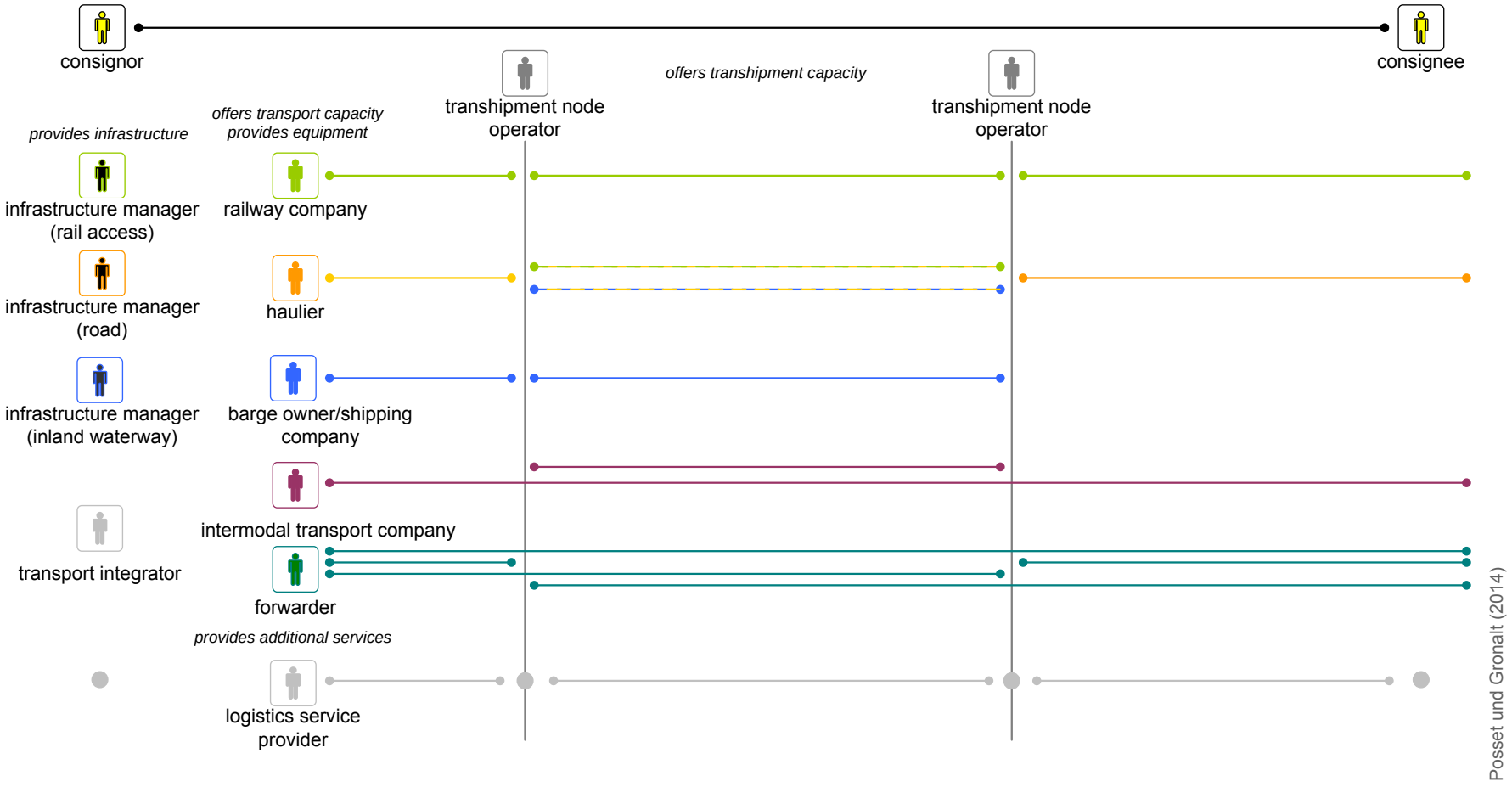
Zuordnen: Einflussbereiche und Verantwortlichkeiten



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Zuordnen: Dimensionen

Posset und Gronalt (2014)

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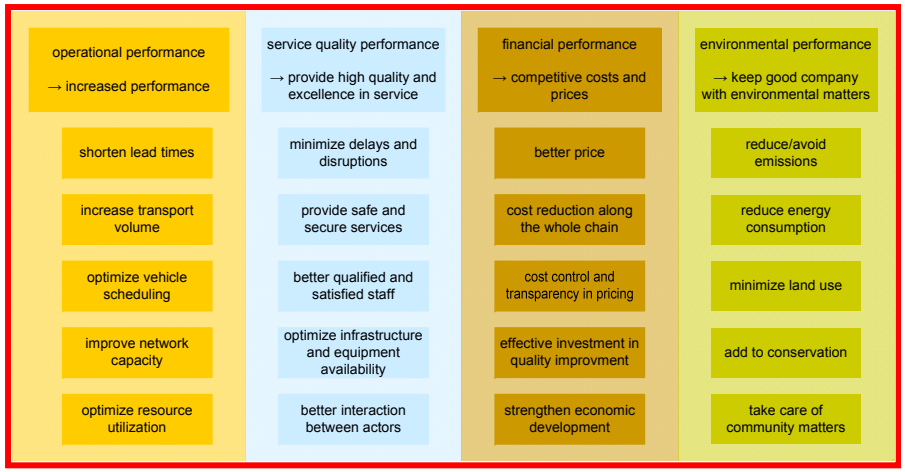
Zuordnen: Perspektiven

operational performance	service quality performance	financial performance	environmental performance
lead time	flexibility	investment and funding	emissions
utilization	*schedulability* *accessibility* *connectivity* *compatibility*	maintenance	noise
throughput	reliability and service care	costs and pricing	consumption
productivity	*timeliness* *completeness* *availability* *qualification*		land take
	safety and security		conservation
	accidents *injuries* *fatalities* *damage* *theft* *loss* *precaution*		

TARGETS



Posset und Gronalt (2014)

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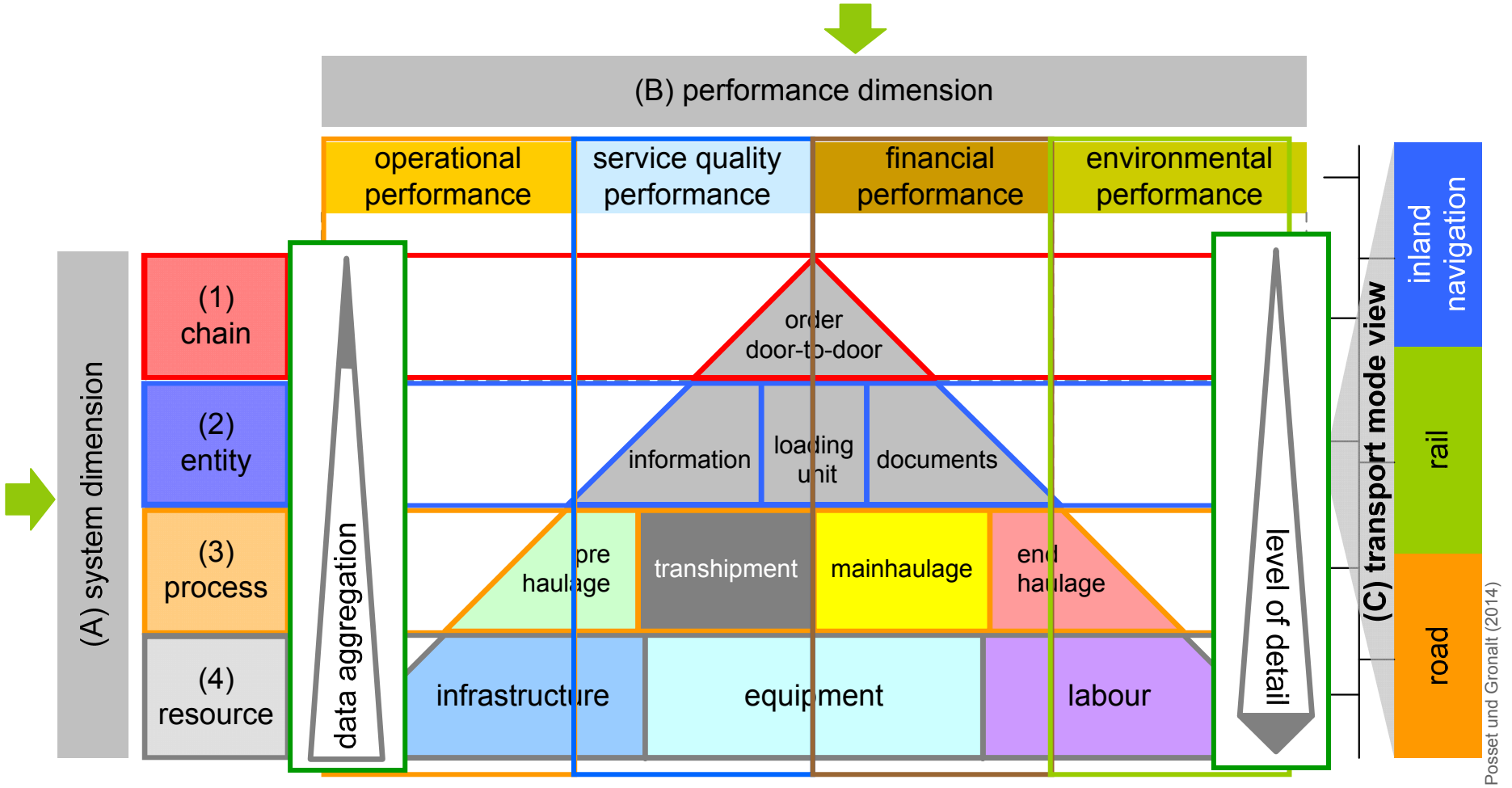
Zuordnen: systematisieren



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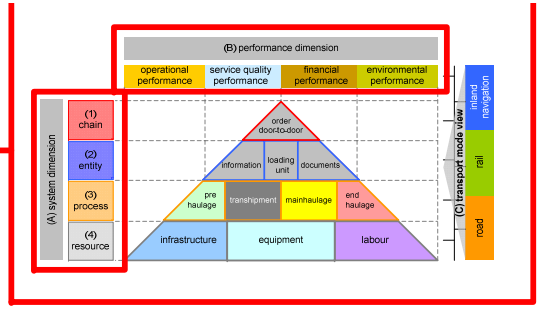
Aufbereiten



ID	*Indicator category:* **The name of the performance indicator / indicator group**		
COCKPIIT Dimension	*system dimension* chain entitiy process resource	*Focus: the specific element the performance indicator focuses on* door-to-door | order information | loading untis | documents prehaulage | transhipment | mainhaulage | endhaulage infrastructure | equipment | labour	*performance dimension* operational performance service quality performance environmental performance financial performance
Description	*the detailed description of the performance indicator*		
Recording	*the collection regularity of the performance indicator* 1 - 365 daily 1 - 52 weekly 1 2 3 4 5 6 7 8 9 10 11 12 monthly 1 2 3 4 quarterly 1 2 six-monthly 1 yearly		
➔ Influencing PI	**IN:** Other performance indicators which influence this performance indicator	➔ Influenced PI	**OUT:** Performance indicators which are influenced by this performance indicator
Specification	Calculation		
Indicator name **CATEGORY:** 1 TIME 2 QUANTITY 3 MONEY **measurement unit** ➔ hours ➔ kilograms ➔ liftings ➔ ...	PI 1 **PARAMETER FOR CALCULATION** ➲ detailed specification of parameters **ADDITIONAL INFORMATION | FURTHER CALCULATIONS** ➔ **ADVICE | REFERENCE | SEE ALSO**	**operator** / divide + add - minus : compare * multiply	**PARAMETER FOR CALCULATION** ➲ detailed specification of parameter

Posset und Gronalt (2014)

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Berechen

1.1.1	Total order lead time		
COCKPIIT Dimension	chain	order	operational performance
Description	The total order lead time covers the time interval from the first inquiry to the final delivery of all transport documents at the consignee. The PI records the complete order process. To allow for complete comparability it is recommended to specify the exact starting and endpoint of the measurement. Therefore the very first and the very last activity have to be specified (e.g. call to ask | handover of transport documents). The order lead time provides additional information to the transport lead time as it also covers administrative processes which are not included in the transport lead time. Comparing the total order lead time of different actors allows for a better insight into the „quality“ of cooperation.		
Recording	weekly		
➔ Influencing PI	1.2.1 | 1.2.3 | 2.1.1 | 2.2.1 | 3.1.1 | 3.1.2 | 3.1.3 | 4.1.1 | 4.3.1 | 4.3.2 | 4.3.3	➔ Influenced PI	

Specification	Calculation		
Average order to invoice time TIME minutes | hours | days	❶ **Sum of all time intervals from quotation until final transit of transport documents and invoice of completed orders** ➲ specify **STARTING** and **ENDPOINT** ➲ specified partner | operator ➲ specified time unit: hours | days	/	**Total number of completed orders** ➲ specified partner | operator ➲ specified time period
Order to invoice time development TIME %	❷ **Average order to invoice time of actual time period** ➲ specified partner | operator ➲ specified time unit: hours | days ➲ specified time period	/	**Value of previous time period * 100** ➲ specified partner | operator ➲ specified time unit: hours | days ➲ specified time period
	❸ **Standard deviation from average order lead time**		

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Berechnen

1.2.1	**Transport lead time**				
COCKPIIT Dimension	chain	door-to-door	operational performance		
Description	The transport lead time covers the net transport time from the consignor to the consignee (source to destination) without any up- and downstream administrative activities. It also includes possible temporary storage times during transhipment in terminals and enroute waiting times due to congestion or driving bans. The PI records the total time span from the moment when the loading untits leave the point of origin until the loading units arrive at the final destination. As this PI covers a lot of activities taking place in different locations it is difficult to illustrate the complete PI within the standardized COCKPIIT table – therefore a detailed overview of the PI and its components is given in the appendix (see 6.4.5 COCKPIIT Transport Lead Time Calculation).				
Recording	weekly				
➔ Influencing PI	1.2.3 | 3.1.1 | 3.1.2 | 3.1.3 | 4.1.1 | 4.3.1 | 4.3.2 | 4.3.3		➔ Influenced PI	1.1.1 | 1.1.2	
Specification	Calculation				
Total origin-destination lead time TIME minutes | hours | days	❶ **Sum of all times that pass from the moment when the transport starts (shipment leaves the source point: consignor) to the moment the transport finishes (shipment reaches the destination point: consignee)** including: ❶ prehaulage lead time incl. pickup time at consignor ❷ cut-off time ❸ mainhaulage lead time ❹ cut-off time ❺ enhaulage lead time incl. delivery time at consignee ➲ specify **STARTING** and **ENDPOINT** ➲ specified transport sections ➲ specified terminal locations ➲ specified type and amount of loading units: container | swap body | semi trailer		➔ **A detailed table of the transport lead time is given in the appendix** **6.4.5 COCKPIIT Transport Lead Time Calculation** **6.4.6 COCKPIIT Transport Lead Time Performance Tables**		
Average origin-destination lead time TIME minutes | hours | days	❷ **Sum of all total origin-destination lead time** ➲ specified transport mode: road | rail | inland navigation ➲ specified partner | operator ➲ per specified time period	/	**Total number of transports** ➲ specified transport mode: road | rail | inland navigation ➲ specified partner | operator ➲ per specified time period		

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Berechnen

2.1.2	**Easiness of inquiry**				
COCKPIIT Dimension	entitiy	information	documents	service quality performance	
Description	The usage of transport modes quite often depends on the availability of offer and the knowledge of acting decision makers. Especially the usage of intermodal transport strongly depends on the availability of appropriate information. The PI provides a general overview about the number of operators **|** intermodal operators offering intermodal door-to-door transport services or terminal-to-terminal transport services. It is recommended to use this PI at the strategic level in the point of view of both, providers and governmental departments, for setting intermodal promotion measures and analyzing the effectiveness of such measures.				
Recording	yearly				
➔ Influencing PI	4.1.2		➔ Influenced PI	1.2.6	

Specification	Calculation		
Percentage of intermodal door-to-door operators QUANTITY %	❶ **Number of operators offering intermodal door-to-door services** ➲ specified service and type operator and main operating area ➲ specified reiogn: district | country	/	**Total number of operators offering intermodal services** * **100** ➲ specified region: district | country ➲ specified transport mode
Number of intermodal operators compared ot total cargo tranported QUANTITY **operator cargo ratio**	❷ **Number of operators offering intermodal door-to-door services** ➲ specified service and type of operator and main operating area ➲ specified reiogn: district | country	:	**Total transported cargo** ➲ specified unit: TEU | ITU | tons ➲ specified region: transport section | district | country ➲ per specified time period
Number of intermodal operators compared to total ton-kilometers QUANTITY **operator ton-km ratio**	❸ **Number of operators offering intermodal door-to-door services** ➲ specified service and type of operator and main operating area ➲ specified reiogn: district | country	:	**Total kilometers of all trips** * **Total tons of transported loading units** ➲ specified region: transport section | district | country ➲ per specified time period
Number of intermodal operators compared to road-only operators QUANTITY **intermodal road ratio**	❹ **Number of operators offering intermodal door-to-door services** ➲ specified service and type of operator and main operating area ➲ specified reiogn: district | country	:	**Number of operators offering road-only door-to-door services** ➲ specified service ➲ specified reiogn: district | country

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Berechnen

3.1.2	**Effective riding time**				
COCKPIIT Dimension	process	prehaulage / mainhaulage	transhipment / endhaulage	operational performance	
Description	The effective riding time PI reflects the pure riding time of a transport mode between point A and point B. In contrast to the haulage time, the effective riding time is the net driving time without any delay due to congestions, driving bans, etc enroute. Combining the results of PI 3.1.2 with the results of PI 3.1.1 allows for a better comparison of the performance of different transport modes, as transport mode related circumstances can be analyzed more in detail. The effective riding time depends on several factors: infrastructure conditions **|** utilization	legal reglementations	skilled staff. The PI can be used for both: intra- and inter-transport mode comparison and improvement. See also 6.4.5 COCKPIIT Transport Lead Time Calculation and 6.4.6 COCKPIIT Transport Lead Time Tables.			
Recording	daily				
➔ Influencing PI	4.1.1 | 4.1.2 | 4.1.6 | 4.1.7 | 4.3.1 | 4.3.2 | 4.3.3		➔ Influenced PI	1.1.1 | 1.2.1 | 3.1.1	

Specification	Calculation		
Effective riding time TIME minutes | hours | days ➔ see also lead time in appendix	❶ **Total riding time from point A to point B** ➲ specified point A and point B: prehaulage | mainhaulage | endhaulage ➲ specified measurment unit: hours ➲ specify **STARTING** and **ENPOINT**	-	**Sum of all waiting times due to congestion en route** + **Sum of all waiting times due to intermediate stop en route** + **Sum of all waiting time due to driving bans en route** + **Sum of all times due to maximum driving time en route**
Average effective riding time TIME minutes | hours | days	❷ **Sum of all effictive riding times** ➲ specified transpoort section ➲ per specified time period	/	**Number of trips** ➲ specified transport section ➲ specified time period
Effective riding speed QUANTITY km | miles	❸ **Effective riding time** ➲ specified measurment unit: hours	/	**Total distance travelled** ➲ specified measurement unit: kilometers | miles ➲ specified trip: haulage
Haulage productivity QUANTITY ratio	❹ **Effective riding speed** ➲ specified measurment unit: hours	:	**Total distance travelled** ➲ specified measurement unit: kilometers | miles ➲ specified trip: haulage

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Berechnen

4.1.2	Distance to market		
COCKPIIT Dimension	resource	infrastructure	service quality performance
Description	In the point of view of the customer the distance to market of intermodal transport infrastructure is an important sales argument. The better the accessibility and connectivity the more customers will include intermodal transportation into their decision making process. Therefore several parameters are included in the distance to market PI. The PI is intended as well as for the customer decision making level as for strategic infrastructure planning at a national or European level. The attractivity of a transport network depends on both, high ranking transport links and an adequate terminal network which allows for competitive prehaulage and endhaulage via short distances.		
Recording	monthly		
➔ Influencing PI	4.1.1 | 4.1.6 | 4.1.7 | 4.3.3	➔ Influenced PI	1.1.1 | 1.2.1 | 1.2.1 | 1.2.3 | 1.2.7 | 2.1.2 | 2.2.1 | 2.2.3 | 3.1.1 | 3.1.3 | 3.1.4 | 3.1.6

Specification	Calculation		
Connection to transport network QUANTITY km	❶ **Driving time | distance from terminal to main transport network** ➲ specified time unit ➲ specified measurement unit: kilometers | miles ➲ specified service provider: shippers | transport- and logistics service providers		
Substitutability of connetions QUANTITY connections	❷ **Number of redundant terminal connections to main transport network** ➲ specified transport mode ➲ specified number		
Destination density QUANTITY connections	❸ **Total number of train connections** ➲ differentiate in private and public connections ➲ differentiate in ingoing and outgoing | import | export ➲ specify scheduled connections ➲ per specified time period		
Terminals per netowrk kilometer QUANTITY terminals	❹ **Total number of terminals** ➲ specified area: country	/	**Total network kilometers** ➲ specified network ➲ specified area: country

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4.3.3	Training activities and performance appraisals		
COCKPIIT Dimension	resource	labour	service quality performance
Description	Skilled employees are the backbone of each company. Continuous improvement and state-of-the-art knowledge are absolutely essential preconditions for long-term success. Further it is important to understand employee's needs and expectations to work out tailored carrier possibilities. By comparing the intensity of training activities and performance appraisals with the performance of employees over time it is possible to analyze the effectiveness of training measures. The motivation and the skills of employees have a determining influence on the performance of most processes and other PIs.		
Recording	quarterly		
➔ Influencing PI	1.1.2 | 1.2.3 | 1.2.1 | 1.2.2 | 1.2.3 | 2.1.1 | 2.1.2 | 2.2.1 | 3.1.1 | 3.1.3 | 3.1.6 | 4.1.1 | 4.1.5 | 4.1.8 | 4.2.2 | 4.2.3 | 4.3.1 | 4.3.4	➔ Influenced PI	1.1.1 | 1.1.3 | 1.2.1 | 1.2.2 | 1.2.3 | 1.2.5 | 1.2.7 | 2.1.1 | 2.1.2 | 2.2.1 | 2.2.2 | 2.2.3 | 3.1.1 | 3.1.3 | 3.1.5 | 3.1.6 | 4.1.5 | 4.1.8 | 4.2.1 | 4.2.3

Specification	Calculation		
Average appraisals per employee QUANTITY appraisals	❶ **Number of performance appraisals** ➲ frequency: semiannually | yearly | ... ➲ per specified time period	/	**Total number of employees** ➲ per specified time period ➲ specified location: business unit | office | location | type of function
Average training days per employee QUANTITY training days	❷ **Total number of training days** ➲ specified type of training: ecodriving | incident handling | dangerous goods handling | customer relationship management ➲ specified time period	/	**Total number of employees** ➲ per specified time period ➲ specified location: business unit | office | location | type of function
Damage training effectiveness QUANTITY training days	❸ **Number of damages to loading units caused by employees** ➲ specified time period ➲ specified value [x] in currency for recorded damages	:	**Number of specific training days per employee**
Service training effectiveness QUANTITY depature ratio	❹ **Number of delayed train departures caused by employees** ➲ specified minimum threshold value [x] for recorded train departures ➲ specified time period	:	**Number of specific training days per employee**
Haulage training effectivenss QUANTITY haulage ratio	❺ **Average number of haulages per day** ➲ specified haulages | length | partner ➲ specified time period	:	**Number of specific training days per employee**
Fuel | Co2 training effectiveness QUANTITY fuel | Co2 ratio	❻ **Total fuel consumption | Co2 emissions per time period** ➲ specified equipment or fleet: terminal equipment | transport equipment ➲ specified time period	:	**Number of specific training days per employee**
Turnaround training effectiveness QUANTITY turnaround time ratio	❼ **Average turnaround time** ➲ specified transport mode and ITU mix: container | swap body | semi trailer ➲ specified load factor and number of loading units ➲ specified time period	:	**Number of specific training days per employee**

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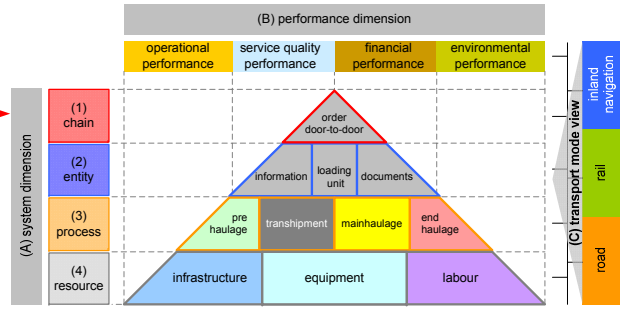
Systematisieren



CHAIN	(1.1) order	operational	1.1.1	Total order lead time | cycle time	- Average order to invoice time - Order to invoice time development
		service quality	1.1.2	On-time service	- Percentage of transports on-time
		service quality	1.1.3	Order completeness	- Percentage of consignments received as contracted - Percentage of loading units received as contracted - Physical accounting correspondence
ENTITY	(2.2) loading untis	service quality	2.2.1	On-time pick-up | delivery	- Percentage of transports carried out at the time agre
		environmental	2.2.2	Loading unit greenhouse gas emissons (CO2)	- Diesel Co2 per loading unit - Equipment electricity Co2 per loading unit - Infrastructure electricity Co2 per loading unit
		financial	2.2.3	Cost per loading unit	- Average haulage cost | price per loading unit - Average transhipment cost | price per loading unit - Total average transport | transhipment cost | price
PROCESS	prehaulage endhaulage mainhaulage	operational	3.1.1	Haulage lead time	- Haulage lead time - Average haulage lead time
		operational	3.1.2	Effective riding time and speed	- Effective riding time - Average effective riding time - Effective riding speed - Haulage productivity
RESOURCE		operational	4.1.1	Efficient infrastructure utilization	- Ton-kilometers per kilometer of transport network - Liftings per square meter - Liftings per track meter
		service quality	4.1.2	Distance to market	- Connection to transport network - Substitutability of connections - Destination density - Terminals per network kilometer
		environmental	4.1.3	Modal shift	-Modal shift development

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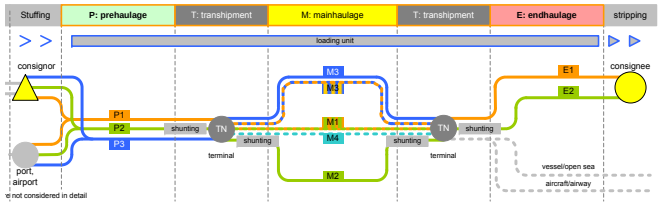
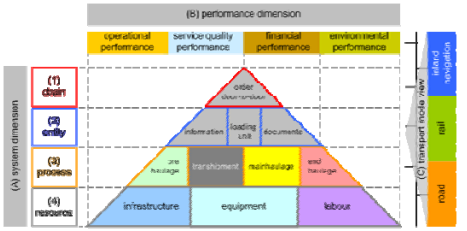
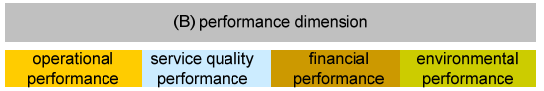
COCKPIIT: clear operabale and comparable key performance indicators for intermodal transportation

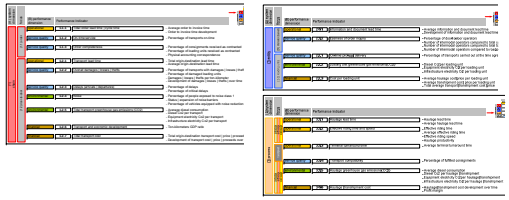
- **3 Standard-Prozesse und 1 Framework:**

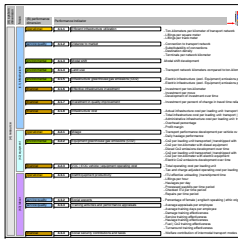




  - **3 Transportmittel:**
    - Bahn | Lkw | Bischi
  - **4 System-Dimensionen:**
    - chain | entity | process | resource
  - **4 Performance-Dimensionen:**
    - operational | service quality | environmental | financal
  - **36 Performance-Tables mit**
    - **96 Kennzahlen**
      - 24 chain PIs
      - 13 entiy PIs
      - 14 process PIs
      - 45 resource PIs







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Philip Rosenthal

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