Chair of Logistics Management

University of St.Gallen

Information Needs of Logistics Service Providers in Strategic Decisions

An Outside-In Perspective



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Agenda

1. **Paper background**
2. Methodology
3. Results
4. Conclusion: Implications, limitations, and outlook

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Example: Peculiarities of logistics service providers' strategic decisions

Manufacturer of consumer goods (Shipper) ⟷ **Long-term business relationship** ⟷ **Provider of pooling solutions (Logistics service provider)**



1. Expansion into new geographical markets (CHEP – offering established services), to meet requirements of one of the most important customers (P&G).

2. Chance to acquire new customers in new geographical markets, supported by appropriate information.

Strategic decisions of LSPs are often customer-driven.
Processing appropriate information may help to grasp new opportunities.

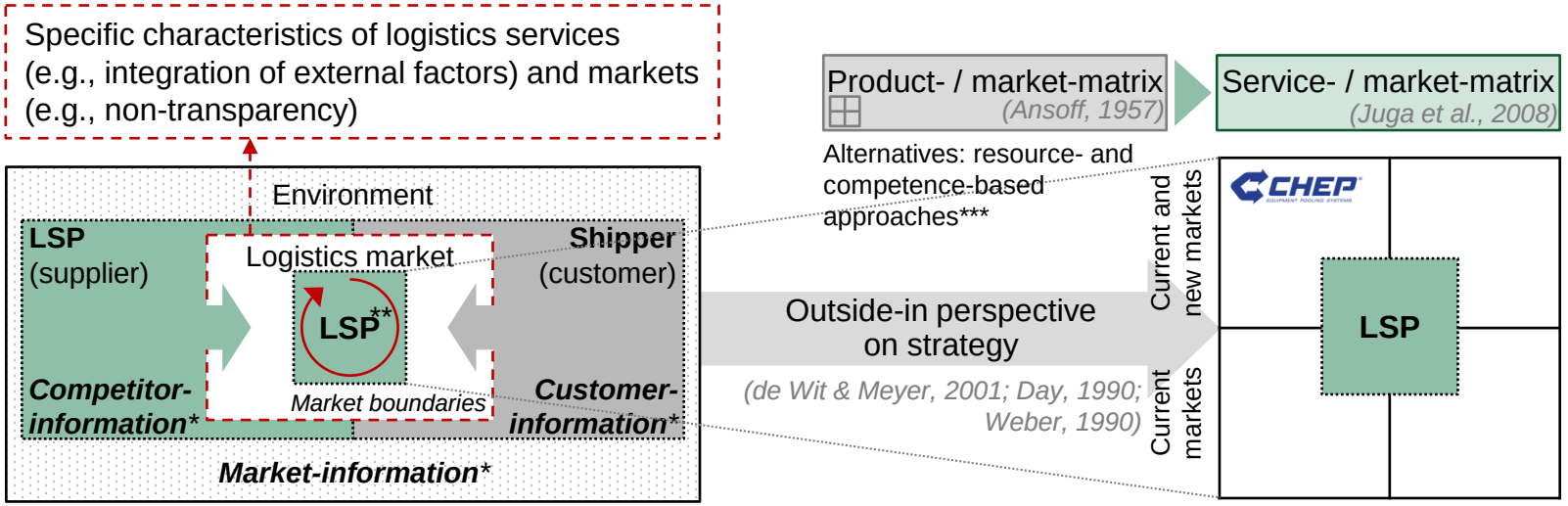
(CHEP, 2012)
Note: CHEP realized step 1 depicted in the illustration. Step 2 shows a possible further option that could be pursued by an LSP.

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Strategic decision-making of LSPs: an outside-in perspective

Strategic decisions of LSPs require the analysis of information on their external and internal environment; balanced in terms of monetary and non-monetary information.

(Rajesh et al., 2012; Bhimani & Langfield-Smith, 2007)



* external information, ** internal information

(Citroen, 2011; Hitt et al., 2003; Choo, 2007; McNeilly, 2002)

The relevance of information in strategic decisions of LSPs in undisputed and of central importance for achieving business objectives (e.g., growth and profitability) and to survive competition.

(Picot et al., 2009; Baumgarten & Thoms, 2002; Zöllner, 1990)

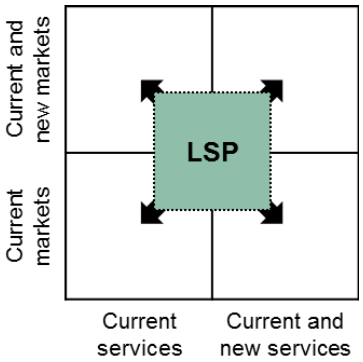
Nevertheless LSPs often do not know on which type of information to focus.

The external information needs of LSPs in strategic decisions are in focus of the present research.

**** e.g., Dornier et al., 2008; Hertz & Alfredsson, 2003; Bask, 2001; Berglund et al., 1999; Africk & Calkins, 1994*

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Research questions



What information needs to be collected?

Market-information:
Reflects the economic, social, and political environment of an LSP. This information, among other types, refers to the overall economic development (e.g., GDP) or infrastructural aspects (e.g., expansion of the road network).

Customer-information:
Concerns the (potential) customers of a This information, among other types, refers to customer requirements (e.g., quality aspects) or the overall demand for logistics services (e.g., logistics market volume).

Competitor-information:
Regards the (potential) competitors of a LSP. This information, among others types, refers to the number of competitors within a market as well as their scope of services and key performance indicators (e.g., turnover).

RQ1: What are the most important external information categories for strategic decisions of LSPs, and do they distinguish in different strategic directions?

RQ2: How does the size of LSPs influence their external information needs?

RQ3: What are the interrelationships among the most important external information categories?

In recent logistics research, information needs have particularly been investigated from a shipper's perspective.

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Identification of LSPs' information needs

Survey sample size

Performing logistics activities on behalf of others (no further distinction)

LSP	Legal structure	Turnover (ca., in million €)	Employees (ca.)	Countries operating in
a	PLC	750	3'325	D, IT, CH
b	Corp.	490	1'500	worldwide
c	PLC	6'680	29'240	D, IT, CH
d	PLC	15	30	worldwide
e	PLC	200	450	worldwide
f	PLC	20	265	26 countries
g	PLC	300	1'895	CH, B, IT, L, SE, SK
h	PLC	155	800	CH, D
i	PLC	60	210	Europe
j	PLC	20	55	CH, IT
k	PLC	130	125	CH, IT, D
l	PLC	150	20	worldwide
m	Ltd.	(n.a.)	160	worldwide, focus East-Europe
n	Ltd	2	10	F, B, L, NL, IT, AT, CH, E, DK, SE, FIN, N
o	Ltd	(n.a.)	(n.a.)	AT
p	PLC	15	100	D, CH
q	Ltd	155	270	worldwide

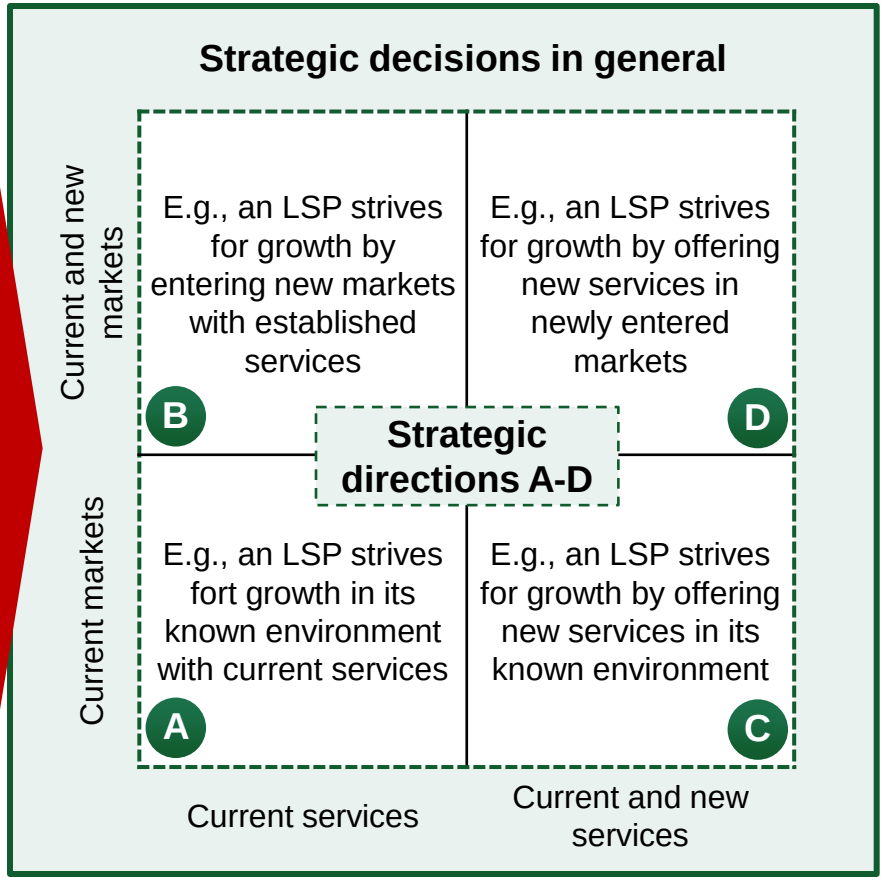
In total, 17 LSPs from Germany, Austria and Switzerland filled in a DEMATEL-questionnaire.

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Different information categories and strategic directions

What is analyzed?

Information categories	Monetary measure	Non-monetary measure
Market	E.g., fuel prices, GDP (I1)	E.g., infrastructure , labor market situation, legislation (I2)
Customer	E.g., EBIT, logistics cost, turnover (I3)	E.g., potential customers, outsourcing quote, service requirements (I4)
Competitor	E.g., EBIT, turnover, market share (I5)	E.g., customer service, number of competitors, quality (I6)



For the analysis, six information categories and four strategic directions are investigated.

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Decision-making trial and evaluation laboratory (DEMATEL)
Methodology

- DEMATEL is a **multi-criteria decision-making model** (MCDM)
- Multi-criteria decision-making is characterized by multiple criteria (attributes or objectives) that may conflict with each other and have diverse measurement units; MCDM **aims at finding the most suitable alternative(s) among existing**
- The assumption of the DEMATEL approach is a system with related **elements that can be assessed pairwise**
- Assessment of the importance of **different information categories** in strategic directions or decisions of LSPs,
- Identification of the **interrelationships between different information categories**
- DEMATEL also helps to **minimize the number of elements to be collected** in decision-making
- Appropriate for **small sample sizes and discrete data**
- The result of the DEMATEL approach is a **visual depiction** of complicated **causal relationships**, the **strength of interrelationships** is illustrated
- Integration of **Grey-systems** theory to generate satisfactory results despite a small sample size
- Difference of Grey-systems towards fuzzy sets: **low requirements on sample data and flexible capability in pattern identification**

(Fu et al., 2012; Zhu et al., 2011; Yang et al., 2008;)

Contrary to other approaches, such as the Analytic Hierarchy Process (AHP) or the Interpretative Structural Modeling (ISM), DEMATEL allows for “a broader discrimination of measures and multiple directional relationships” (→ more network oriented).

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DEMATEL-questionnaire
Design

		Current services in current markets A	Current services in current and new markets B	Current and new services in current markets C	Current and new services in current and new markets D
Market-information	monetary I1	**Example**	*According to the example*	*According to the example*	*According to the example*
	non-monetary I2	*According to the example*	*According to the example*	*According to the example*	*According to the example*
Customer-information	monetary I3	*According to the*	*According to the*	*According to the*	*According to the*
	non-monetary I4				
Competitor-information	monetary I5				
	non-monetary I6				

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Strategic direction
Current services in current markets A

Compared to… **monetary market-information** has I1

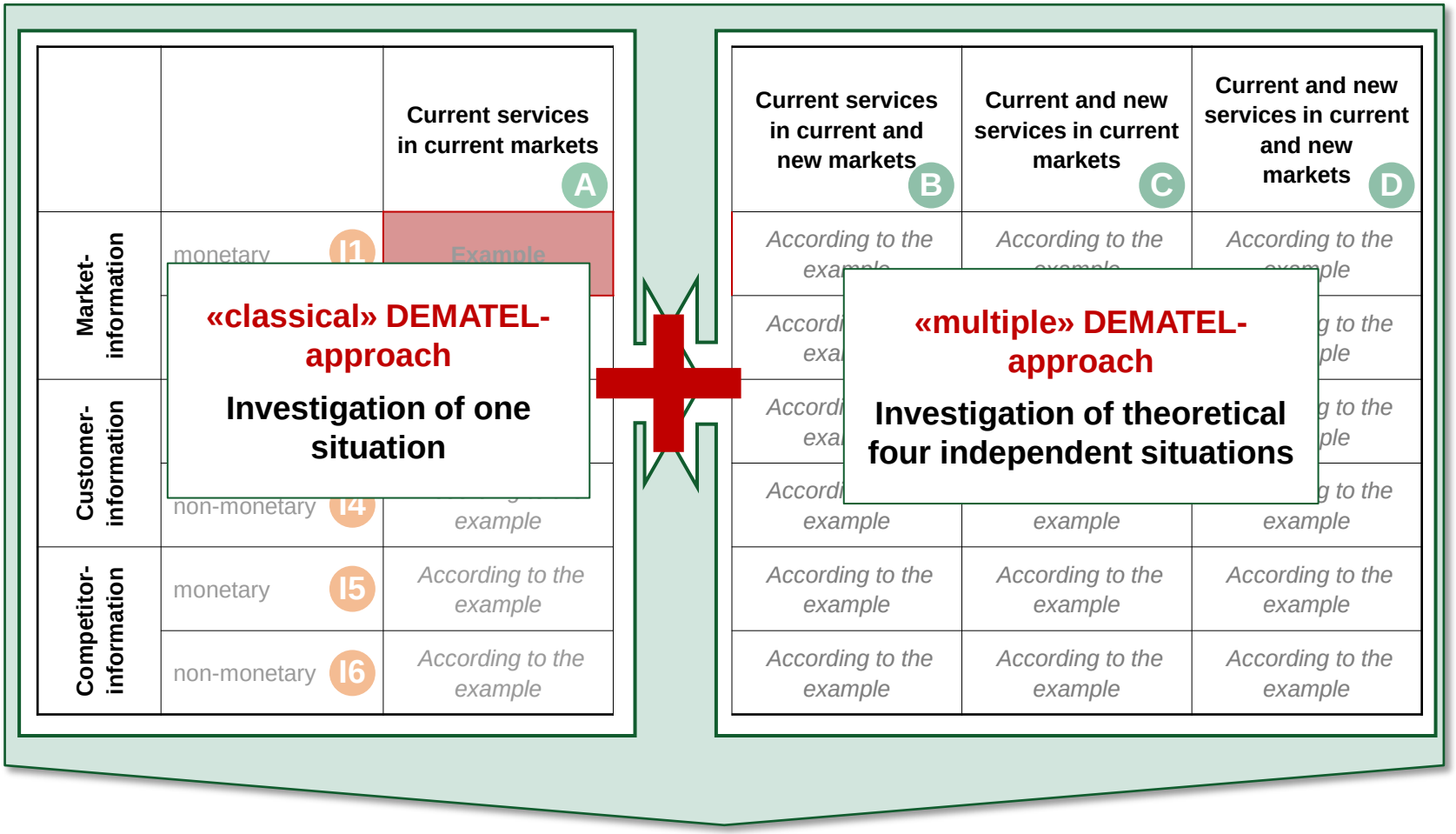
	No importance	**Very low** importance	**Low** Importance	**High** importance	**Very high** importance
…**non-monetary market**-information I2					
…**monetary customer**-information I3					
…**non-monetary customer**-information I4					
…**monetary competitor**-information I5					
…**non-monetary competitor**-information I6					

In total, every respondent had to make 120 pairwise comparisons.

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Multiple Grey-based DEMATEL approach

Further development



Combination of all results → strategic decisions in general

By combining the four independent situations (aggregating the single results), strategic decisions in general can be investigated by enlarging the sample size at the same time.

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Example of the linguistic direct-relation matrices for LSP q

Results of the filled in questionnaire

Current services in current markets (A)

IC	I1	I2	I3	I4	I5	I6
I1	N	VH	H	H	L	L
I2	N	N	L	L	L	H
I3	L	L	N	H	L	VH
I4	L	L	H	N	L	VH
I5	H	H	H	VL	N	H
I6	H	H	H	VL	L	N

Current and new services in current markets (C)

IC	I1	I2	I3	I4	I5	I6
I1	N	H	L	L	H	H
I2	VL	N	L	L	H	H
I3	L	H	N	VH	VH	VH
I4	VL	H	VH	N	VH	VH
I5	VL	L	VH	H	N	H
I6	VL	L	VH	H	H	N

Current services in current and new markets (B)

IC	I1	I2	I3	I4	I5	I6
I1	N	VH	H	H	H	H
I2	H	N	H	H	H	H
I3	L	H	N	VH	H	H
I4	L	H	L	N	H	H
I5	H	H	H	H	N	H
I6	L	H	H	H	H	N

Current and new services in current and new markets (D)

IC	I1	I2	I3	I4	I5	I6
I1	N	H	H	L	H	H
I2	H	N	L	L	H	H
I3	H	H	N	H	H	H
I4	H	H	L	N	H	H
I5	H	H	L	H	N	H
I6	H	H	L	H	H	N

Notes

IC is **information category**

N is **no** importance

VL is **very low** importance

L is **low** importance

H is **high** importance

VH is **very high** importance

I1 is monetary market-information

I2 is non-monetary market-information

I3 is monetary customer-information

I4 is non-monetary customer-information

I5 is monetary competitor-information

I6 is non-monetary competitor-information

The linguistic values are then transformed into grey numbers, normalized, transformed into crisp values and finally, the overall importance and net effect of information categories are determined.

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Aggregated prominence and net effect values for all LSPs

Importance and relationships

The higher Pi, the higher the importance of an information category within a strategic direction

	Current services in current markets (A)				Current and new services in current markets (C)			
IC	R_i	D_j	P_i (R+D)	E_i (R-D)	R_i	D_j	P_i (R+D)	E_i (R-D)
I1	4.535	2.812	7.347	1.722	4.869	3.326	8.195	1.543
I2	4.231	2.734	6.965	1.497	4.748	2.781	7.529	1.967
I3	3.410	4.657	8.067	-1.246	3.728	4.900	8.629	-1.172
I4	3.063	4.064	7.126	-1.001	3.522	4.680	8.202	-1.158
I5	3.952	4.062	8.014	-0.110	4.018	4.349	8.368	-0.331
I6	3.252	4.114	7.366	-0.862	3.544	4.392	7.936	-0.848
	Current services in current and new markets (B)				**Current and new services in current and new markets (D)**			
	R_i	D_j	P_i (R+D)	E_i (R-D)	R_i	D_j	P_i (R+D)	E_i (R-D)
I1	8.229	7.069	15.298	1.159	10.404	8.890	19.294	1.514
I2	8.291	6.257	14.537	2.024	10.473	8.258	18.730	2.215
I3	6.829	8.467	15.297	-1.638	8.800	10.840	19.640	-2.039
I4	6.681	7.554	14.235	-0.874	8.989	10.511	19.500	-1.523
I5	7.797	7.620	15.416	0.177	9.842	9.773	19.615	0.069
I6	6.874	7.723	14.597	-0.849	9.417	9.653	19.070	-0.236

Most important IC in strategic direction B

IC strongly influences others

IC is strongly influenced by others

Notes

P_i is **Prominence** - importance of information

E_i is **Net effect**

>0: cause factor

<0: effect factor

I1 is monetary market-information
I2 is non-monetary market-information
I3 is monetary customer-information
I4 is non-monetary customer-information
I5 is monetary competitor-information
I6 is non-monetary competitor-information

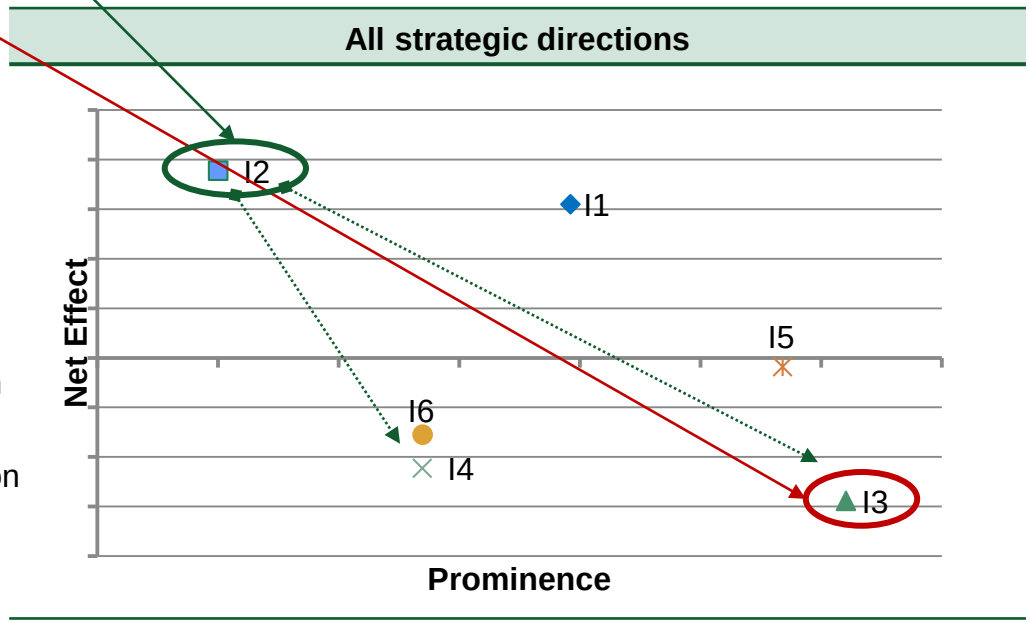
By combining the results of the four strategic directions (based on mean values of the grey values), strategic decisions in general can be investigated → multiple approach.

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Aggregated prominence and net effect values for all LSPs and all strategic directions and the prominence causal digraph

	All strategic directions			
IC	R_i	D_j	P_i (R+D)	E_i (R-D)
I1	6.266	4.718	10.984	1.548
I2	6.143	4.257	10.401	1.886
I3	4.998	6.443	11.441	-1.446
I4	4.810	5.929	10.739	-1.118
I5	5.622	5.715	11.336	-0.093
I6	4.981	5.758	10.739	-0.777

Based on the prominence an net effect values, the prominence causal digraph can be derived.



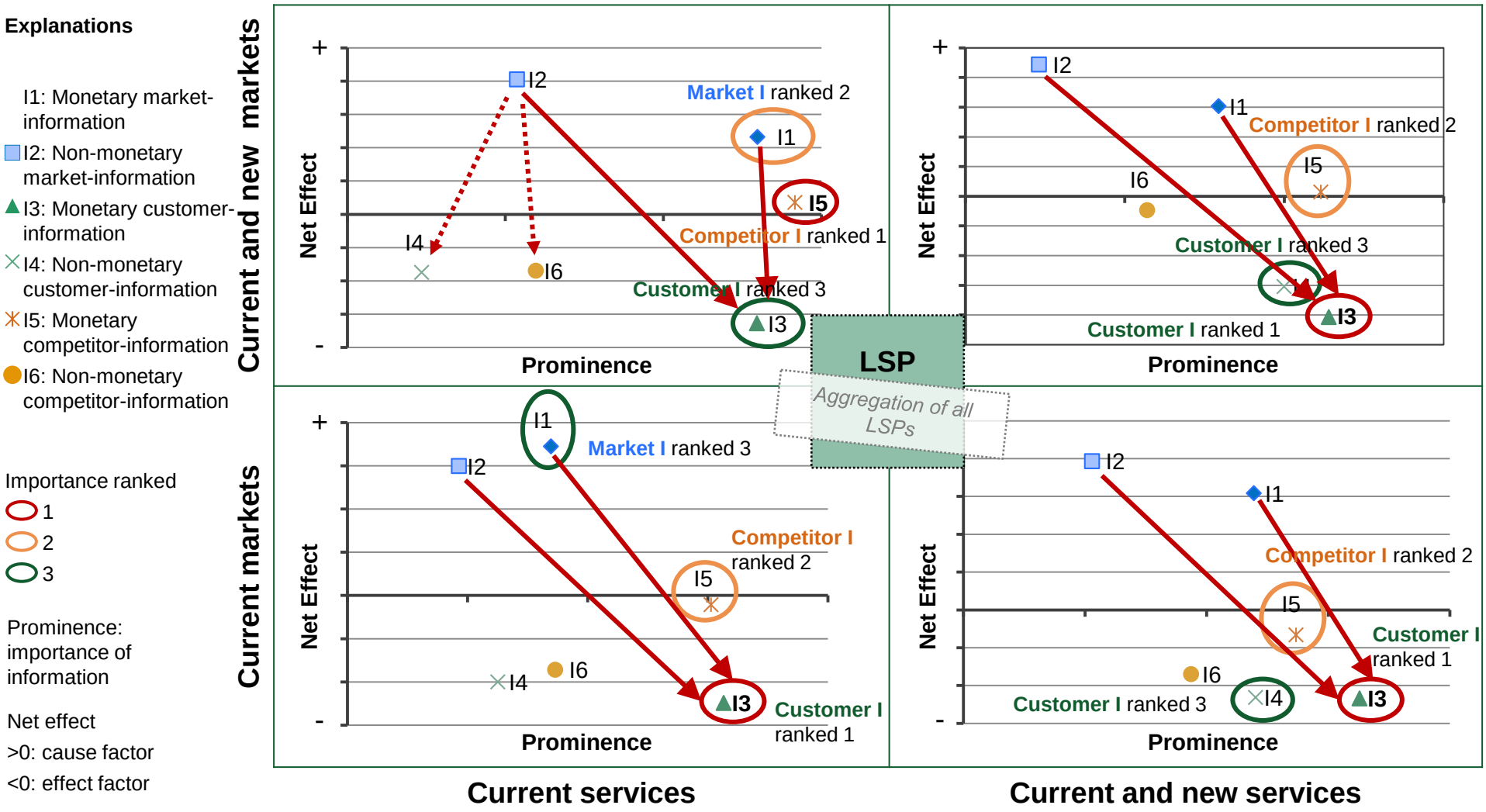
I1: Monetary market-information
I2: Non-monetary market-information
I3: Monetary customer-information
I4: Non-monetary customer-information
I5: Monetary competitor-information
I6: Non-monetary competitor-information

Answer to RQ1

The most important categories for strategic decisions of LSPs are monetary customer-, competitor-, and market-information, followed by non-monetary competitor-, customer-, and market-information (in that order).

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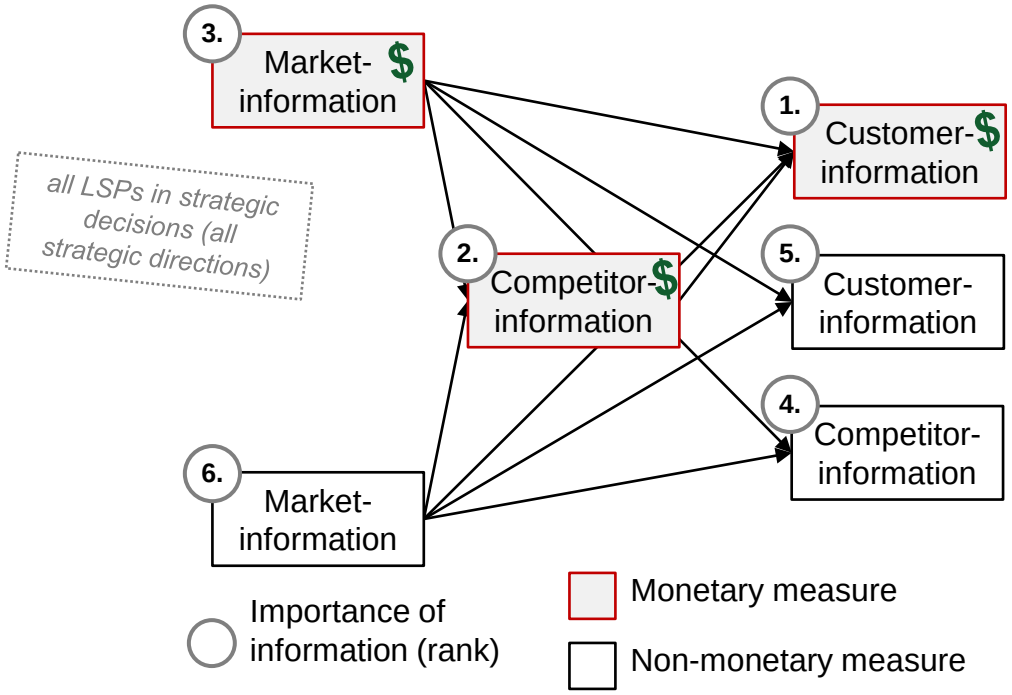
Prominence causal digraph for the four strategic directions



Apart from the dependency on which strategic direction to follow, the information needs of LSPs in strategic decisions vary according to the size of the LSPs and the market segment(s) they are operating in.

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Interrelationships of information categories of the aggregated results



- E.g., if customer-information is processed, also market- and competitor-information should be acquired.
- This can be ascribed to the fact that logistics markets, which implies LSPs and shippers, are embedded in an overall economic context.

Answer to RQ3

Further results

- **Small LSPs** (according to turnover) rather focus on non-monetary information.
- **Medium** and **large LSPs** (according to turnover) both focus particularly focus on monetary information – but differing between the four strategic directions.

Answer to RQ2

Despite the importance of monetary information for strategic decisions of LSPs, also non-monetary information should be considered.

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Summary of the results

- The most important information categories in strategic decisions of LSPs are **monetary customer-, competitor-, and market-information** (in that order), hence, monetary information is more important than non-monetary information.
- The importance of each information category is largely **dependent on the strategic direction** to be followed as well as the size of LSPs.
- **Large LSPs** focus on monetary competitor-information when entering new markets. **Medium LSPs** focus on monetary-information, but the specific information category significantly depends on the strategic direction to be followed. **Small LSPs** generally focus on non-monetary information.
- There are **strong relationships amongst the information categories**. Even if one information category is considered to be most important in strategic decisions or for pursuing a specific strategic direction, other influencing information categories also should be taken into consideration.
- Similar to the overall importance of information categories, their **relationships are largely dependent on the strategic direction** to be followed as well as the size of LSPs.

Information about the general market environment, both in monetary and non-monetary measures, should generally be taken into consideration when taking a strategic decision.

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Managerial and theoretical implications

Managerial implications

- Overview on the **information needs of LSPs**.
- Guidance for LSPs on **which information to focus** in strategic decisions or when pursuing a specific strategic direction.
- LSPs who are already processing specific information category, may interpret the (inter)relationships between the information categories as a kind of **decision guidance regarding the necessity of acquiring further information**
- The results may especially encourage **small LSPs to structure their strategic decision-making processes**.
- **Providers of logistics-related information** become more **familiar** with the information **needs of LSPs**.

Theoretical implications

- Results **close** existing **gap in logistics-related literature** on the information needs of LSPs.
- First general **overview** and **structuring** of LSPs' **information needs**.
- Development of the "**multiple**"-Grey-based DEMATEL approach

The results give an overview on the information needs of LSPs taking strategic decisions.

Logistics-related strategic management research has been extended – taking an LSPs' perspective.

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Limitations and future research (→)

Methodology-related

- Relatively small sample size, limited to Germany, Austria, and Switzerland.
  →Conduction of a similar study with a larger sample size, optionally LSPs located globally.
- LSPs were clustered according to their size (and the market segment they are operating in).
  →Other cluster groups are conceivable.

Content-related

- Focus is on external information needs.
  →Internal information may not be disregarded, future research could focus on specific aspects.
- Information needs of LSPs were analyzed on a much aggregated level (in order to structure the field).
  →In-depth investigations (e.g., focus on specific information / variables) on the basis of this results.

In further analyses conducted, the dependency of LSPs' information needs on the market segment they are operating in has been investigated – which also revealed several differences in LSPs' information needs.

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Thank you.

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