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
Example: Peculiarities of logistics service providers’ strategic decisions

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.
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)*

Specific characteristics of logistics services (e.g., integration of external factors) and markets (e.g., non-transparency)

Environment

Logistics market

Shipper (customer)

LSP (supplier)

Customer-information*

Market-information*

Competitor-information*

* 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
Research questions

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.

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 LSP. 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).
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Identification of LSPs’ information needs

Survey sample size

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

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

Performing logistics activities on behalf of others (no further distinction)
For the analysis, six information categories and four strategic directions are investigated.

### Information categories

<table>
<thead>
<tr>
<th>Category</th>
<th>Monetary measure</th>
<th>Non-monetary measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market</td>
<td>E.g., fuel prices, GDP</td>
<td>E.g., infrastructure, labor, market situation, legislation</td>
</tr>
<tr>
<td>Customer</td>
<td>E.g., EBIT, logistics cost, turnover</td>
<td>E.g., potential customers, outsourcing quote, service requirements</td>
</tr>
<tr>
<td>Competitor</td>
<td>E.g., EBIT, turnover, market share</td>
<td>E.g., customer service, number of competitors, quality</td>
</tr>
</tbody>
</table>

### Strategic decisions in general

- **Current and new markets**
  - E.g., an LSP strives for growth by entering new markets with established services
  - E.g., an LSP strives for growth by offering new services in newly entered markets

- **Current markets**
  - E.g., an LSP strives for growth in its known environment with current services

- **Current services**
  - E.g., an LSP strives for growth by offering new services in its known environment

- **Current and new services**
  - E.g., an LSP strives for growth by entering new markets with established services

**Strategic directions A-D**

- **A**
  - Current services
  - Current and new services

- **B**
  - Current markets
  - Current and new markets

- **C**
  - Current markets

- **D**
  - Current and new markets
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).

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; )
Design

In total, every respondent had to make 120 pairwise comparisons.
Multiple Grey-based DEMATEL approach
Further development

<table>
<thead>
<tr>
<th>Market-information</th>
<th>Current services in current markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monetary</td>
<td>I1 Example</td>
</tr>
<tr>
<td>Non-monetary</td>
<td>I1 Example</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Customer-information</th>
<th>Current services in current markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monetary</td>
<td>I4 Example</td>
</tr>
<tr>
<td>Non-monetary</td>
<td>I4 Example</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Competitor-information</th>
<th>Current services in current markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monetary</td>
<td>I5 Example</td>
</tr>
<tr>
<td>Non-monetary</td>
<td>I5 Example</td>
</tr>
</tbody>
</table>

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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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.
Aggregated prominence and net effect values for all LSPs
Importance and relationships

The higher $P_i$, the higher the importance of an information category within a strategic direction.

<table>
<thead>
<tr>
<th>IC</th>
<th>Current services in current markets</th>
<th>Current and new services in current markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>I2</td>
<td>4.231  2.734  6.965  1.497</td>
<td>4.748  2.781  7.529  1.967</td>
</tr>
<tr>
<td>I3</td>
<td>3.410  4.657  8.067  -1.246</td>
<td>3.728  4.900  8.629  -1.172</td>
</tr>
<tr>
<td>I5</td>
<td>3.952  4.062  8.014  -0.110</td>
<td>4.018  4.349  8.368  -0.331</td>
</tr>
<tr>
<td>I6</td>
<td>3.252  4.114  7.366  -0.862</td>
<td>3.544  4.392  7.936  -0.848</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IC</th>
<th>Current services in current and new markets</th>
<th>Current and new services in current and new markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>I1</td>
<td>8.229  7.069  15.298  1.159</td>
<td>10.404  8.890  19.294  1.514</td>
</tr>
<tr>
<td>I3</td>
<td>7.797  7.620  15.416  0.177</td>
<td>9.842  9.773  19.615  0.069</td>
</tr>
</tbody>
</table>

Notes

$P_i$ is Prominence - importance of information
$E_i$ is Net effect

$>0$: cause factor
$<0$: effect factor

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

Most important IC in strategic direction B

IC strongly influences others

IC is strongly influenced by others

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

<table>
<thead>
<tr>
<th>All strategic directions</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I1</td>
<td>6.266</td>
<td>4.718</td>
<td>10.984</td>
<td>1.548</td>
</tr>
<tr>
<td>I2</td>
<td>6.143</td>
<td>4.257</td>
<td>10.401</td>
<td>1.886</td>
</tr>
<tr>
<td>I3</td>
<td>4.998</td>
<td>6.443</td>
<td>11.441</td>
<td>-1.446</td>
</tr>
<tr>
<td>I4</td>
<td>4.810</td>
<td>5.929</td>
<td>10.739</td>
<td>-1.118</td>
</tr>
<tr>
<td>I5</td>
<td>5.622</td>
<td>5.715</td>
<td>11.336</td>
<td>-0.093</td>
</tr>
<tr>
<td>I6</td>
<td>4.981</td>
<td>5.758</td>
<td>10.739</td>
<td>-0.777</td>
</tr>
</tbody>
</table>

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

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).
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.
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.

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.

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.
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.
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.
Thank you.
Literature


