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Do we really need a new logistics quality standard? Findings from an online survey

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Abstract
The research was identified by the European Commission to support or refute the need for new mandatory or voluntary quality standards in logistics. The main objectives of this research are to examine the existing logistics quality standards and then to suggest whether there is a necessity of developing new or modified standards or not. To achieve this objective, a two-stage (literature reviews supported by face-to-face interviews and two rounds of Delphi study) research is conducted. The current research reports the findings of first round Delphi. The study finds that there are some quality standards specifically developed for transport and logistics services, but they are not known to service providers and users and have a low market uptake as opposed to the general quality standard ISO9001 and the environmental standard ISO14001. We feel that it is immature to suggest that we need new or modified standards. The panel has provided important feedback that will contribute to develop the questionnaire for second round.

Keywords: standards, quality, transport logistics, elements, Delphi study

Objective of Research
The European Union has previously looked to improve standards of service and customer rights in the air sector by the utilisation of mandatory standards: Air Passengers Rights Charter (Regulation (EC) No 261/2004). Following this market intervention and the development of a freight focus, the European Commission started to explore the use of mandatory or voluntary standards in logistics. This research was commissioned to evaluate the need for, nature of and method of implementation of such logistics standards.

Introduction to Logistics Quality Standards
A standard is generally recognized as a document, being a set of rules or method, describing a definitive procedure, giving a set of instructions for performing operations or functions, controlling products, services, technologies, processes, production, etc. According to ISIC (2005), the role of standards is to provide requirements (technical, organizational, etc.), definitions, guidelines, codes of best practice and measurement methods. Standards are intimately connected with quality and vice versa. Quality is always relative to a set of inherent characteristics and a set of requirements. Quality may be seen as a question of degree to which the product or service meets the customer's stated requirements however an emerging view of quality in many sectors is that quality should exceed customer's expectations.

The ISO 8402-1986 standard defines quality as "the totality of features and characteristics of a product or service that bears its ability to satisfy stated or implied needs." On the other hand, the Quality Manual for Combined Transport (UIC, 2001) defines quality as "an underlying part of each product that we identify as a service; it is a guarantee of adherence to what was agreed upon. Indeed the concept actually goes one step further; quality implies a match between the customer's requirements and the service-provider's technical capacity".

‘Logistics quality is defined in terms of performance “gaps” and is measured as the ability to distribute a product or materials in conformance with customer requirements and standards’ (Morash et al, 1997 p 350). This definition focuses on the gaps of performance and ability to distribute goods. This definition is in not comprehensive as logistics encompasses other aspects as well. So the current research aims to explore the definition of logistics quality. Another area of research is examined what the elements of the logistics quality standard are. For this the following elements are assumed as essential:

Individual Service Quality Provisions/Criteria;
Standardization in Segments of the Supply Chain;

1 Corresponding author
Quality Contract;
Quality Labeling;
Standard combined transport product;
Quality Management along Supply Chain;
Quality Management along Transport Corridors;
Standards of Professional Competence;

One central theme of this research is whether we need a new or modified logistics quality standard or not. To examine this, we need to identify the current logistics quality standards. Accordingly the current research identified, through literature reviews and interviews with the stakeholders and --, the following quality standards for transport and logistics services:

- EN 13876: 2002 Code of practice for the provision of cargo transport services.
- EN 12798: 2006 Quality management system requirements to supplement EN ISO 9001 for the transport of dangerous goods with regard to safety.
- ISO 14001 Environmental management systems—Requirements with guidance for use.

In brief this paper has been developed with the purpose of: first, verifying the definition of transport logistics quality, second, identifying elements of logistics quality standards subject to existing quality standards at large; third, exploring the importance of the identified standards and analysing whether these standards are known to the experts concerned; and fourth, exploring the usage of such standards among the stakeholders, fifth to understand whether a new or modified logistics quality standard is needed or not and sixth, how should such a new standard be facilitated.

Research Approach
A two-stage qualitative research approach was adopted to fulfil the purposes of this study. In the first stage, existing standards were identified through literature reviews of sources including journals, websites (e.g. of different standards developing organization (SDO) and published literature (Rixer et al 2001; Morash et al, 1997) and structured interviews with key experts to identify and confirm the key logistics quality standards. In the second stage, the opinions of different types of stakeholders (e.g. small and medium sized enterprises (SME) versus non-SME; level of management— senior, middle, operational; provision of service— transport or logistics operator, transport of logistics service user, research, policy maker) on the logistics quality standards were collected from a pan-European expert panel using online Delphi surveys. This research reports the findings of the first round Delhi study.

Delphi Study
A Delphi technique has been used for both quantitative and qualitative data (Wellington, 2003). A Delphi technique is an approach to collecting, aggregating and analysing the informed judgments of a group or panel of experts on previously identified issues. It is a method for ‘systematic solicitation and collation of judgements on a particular topic through a set of carefully judged sequential questionnaires interspersed with summarised information and feedback of opinions derived from earlier responses’ (Delbecq et al., 1975 p.10). McKinnon and Foster (2005) noted the following advantages of Delphi studies: They elicit the views of panels of experts. They employ an iterative process of summarising, averaging and recycling panel members’ views to encourage convergence on a consensus view. Panellists are given the opportunity to revise earlier answers in the light of the general opinions expressed by the panel as a whole. Information is collected by questionnaire and does not involve interviews or discussion. Members of the panel are guaranteed anonymity.

Convergence of consensus view
The overall aim of the study is to achieve a consensus among the participants. To determine whether a consensus has been achieved or not an arbitrary figure (e.g. more than 50%) could be used, although some justification should be made. Some recent study (Saldanha and Gray (2002); Hwang, 2004;Islam et al (2006)) used the following formula of Average Percent of Majority Opinion (APMO), which is used in the present research as well, to find out the cut-off point for a consensus.
**APMO** = \( \frac{\text{Aggregate of Majority Agreements} + \text{Aggregate of Majority Disagreements}}{\text{Total opinions expressed}} \times 100 \)

**Questionnaire**

A meeting with the participation of experts in the field, including the Union Internationale des sociétés de transport combiné Rail-Route (UIRR) was held in Vilnius, Lithuania on 09-12-2009. The first round Delphi questionnaire was prepared through discussion in this meeting. The questionnaire was piloted by competent volunteers. The questionnaire was designed to meet the following objectives: Verify some logistics quality related ideas; identify the elements of logistics quality standards, review the usage of these standards, and to examine whether there is a need to develop one or more quality standards for logistics.

The questionnaire (available on request) had 23 main research questions that can be seen in Annex 1. Question 1 to 10 classifies the Delphi Panel profile (e.g. country, level of management, experience in the transport logistics sector, SME or not, type of organisation, etc.). The statements 11 to 16, 18 and 23 were in line with Delphi methodology and were intended to verify the logistics quality related statements in terms of three options: agree, disagree and no comments. The analysis of these questions is conducted using APMO formula discussed in previous section. A box below each statement was provided to accommodate additional opinion expressed by the panel for use in evaluation and development of the second round.

The statements were intended to elicit opinions on:

- the definition of logistics quality (11);
- who should set the logistics quality standard requirement (12);
- how logistics quality standards can be implemented (13);
- the role of the state in the improvement logistics service quality (14);
- the necessity of free and fair competition to improve logistics service quality (15);
- the role of quality contracts (16);
- whether quality labels are only a marketing tool (17);
- the necessity of a new or modified logistics standard (18).

The remaining questions were designed to get feedback:

- on the utility of different key performance indicators (KPIs) as part of a useful contract for reliable logistics services (17);
- on the ranking of existing standards (19);
- on whether the standards are known to the expert panel or not (20);
- on the level of market usage of each standard (21);
- on the strength and weakness of the existing standards (22).

Thus these questions were analysed differently using, for example, ranking methods.

**Delphi Panel**

Some 200 experts were emailed with links to the online first round Delphi survey. A total of 100 participants took part in the first round Delphi survey of which 90 are valid.2 The valid participants were: 45.5% senior, 40% middle and 14.5% operational management. Of them, 61% had more than ten years experience, 59% belong to SMEs and 40% are transport or logistics service providers. Figure 1-3 detail the panel profile from different aspects. It can be noted that the Delphi panel is highly dominated by The Netherlands, UK, Belgium, Germany and Austria. This is probably due to these countries having strong roles in the logistics field in Europe, and are proactive in trade associations3 and research activities. The dominance may not be problematic, as the panel has extensive and long experience of the sector and as such can be seen as qualified experts. (Figures 2-3)

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2 The reasons for invalid responses were: fictitious emails, duplications and test responses from colleagues.

3 Most responses from Belgium were from trade associations representing the whole of Europe.
Findings of the First Round Delphi study:

The APMO (formula in previous section) of the first round Delphi study was calculated as follows:

<table>
<thead>
<tr>
<th>Type of opinion</th>
<th>opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Majority Agreements for all APMO Questions/Statements</td>
<td>315</td>
</tr>
<tr>
<td>Total Majority Disagreements for all APMO Questions/Statements</td>
<td>124</td>
</tr>
<tr>
<td>Total Opinions for all APMO Questions/Statements</td>
<td>699</td>
</tr>
<tr>
<td>APMO</td>
<td>63%</td>
</tr>
</tbody>
</table>

Table 2: APMO for first round Delphi

Applying the APMO formula, a total of four statements achieved consensus. The definition of the transport logistics quality (Transport logistics quality can be defined as the degree in which the performance of the freight transport operations across modes in the supply chains meets stated service criteria) proposed by the current research has achieved consensus. In this regard, the Delphi panel added the following statements:

*Transport logistics quality means to what degree the performance of a product or service meets the expectations of the customer/client.*
Transport logistics quality means a perfect combination of reasonable price, transit time, punctuality and reliability.
Transport logistics quality should take into account of sustainability, reliability, efficiency and cost.
Transport logistics quality means the level required by the market and reached by using a complete supply chain of services.
Transport logistics quality optimizes transport efficiency across all modes.
Transport logistics quality means meeting service criteria agreed between client and service provider across modes in the supply chains effectiveness.

![Figure 3: Delphi panel according to the field of work](image)

The Delphi panel showed consensus on the idea that Logistics quality standard requirement should be set by the market (in contrast to by the regulator or government). In this regard, the Delphi panel added the following statements:
Quality standards should be set by service provider and user (shipper/consignee). Legislators cannot be involved in devising standards to which the logistics industry should perform. This should include the externalities of transport and logistics services for the wider community. So the regulatory authority needs to determine the externalities and hence the framework for operation and within this the market should then set the quality standard. If the market does not succeed to set appropriate, measurable and realistic standards, the government should take this responsibility. Logistics quality standard requirement should be set contractually between partners. However, in the case of substantial disparity between partners (supplier/client) regulatory interference might be advisable to secure common base standards.

The Delphi panel had consensus that the Logistics quality standard should be implemented by voluntary agreement between parties (rather than by mandatory by state legislation). In this regard, the panel added the following statements:
Logistics quality standards are already implemented in terms and agreements between service providers and users. The issue is not implementation, but awareness of what may be demanded by users, particularly small ones. The big ones know what to demand. The voluntary agreement should be defined by the provider. There should be a minimum level implemented by European legislation and the extra need of customers should be dealt with by voluntary agreement. Some standards regarding security and environment should have a minimum level set by state legislation to create an even market level playing field.
The Delphi panel had consensus on the notion that free and fair competition is the only way to improve logistics service quality. In this regard, the panel added the following statements:

- The most important issue is to ensure a common level playing field for all participants in the market.
- The market does not necessarily respond to provide the best solutions when unfettered free and fair competition is important and a prerequisite, but not the 'only' way.
- Fairness has to be stressed e.g. regarding internalisation of external cost.
- State incentives should be allowed to enhance sustainable transport.
- The market ought to be fair and reflective of least externalities.

The Delphi panel had no consensus on the notion that the logistics industry needs state intervention to improve logistics service quality. In this regard, the Delphi panel added the following statements:

- State intervention is a strong expression - national governments and the European Commission could play a role in facilitating quality improvements through projects.
- If state intervention is invoked, more effort will be spent fighting the issue than improving service quality.
- Direct state intervention often results in distortion of competitive market. Indirect state intervention (e.g. transport infrastructure improvements, addressing modal imbalances through internalisation of external costs) can result in improvements without market distortion.
- Let the State focus on crime, maximum loading weight, working hours etc, but not on quality.
- State intervention may be needed to protect the SMEs and prevent severe externalities of transport and logistics services.
- Infrastructure provision is a monopoly and therefore requires state intervention.
- In the case of substantial disparity between partners (supplier/client) regulatory interference might be advisable to secure common base standards.
- The markets should regulate themselves.

They also did not have consensus on the notion that Quality labels are only marketing tool.

The Delphi panel added the following statements:

- Quality labels and indicators (e.g. carbon footprints) can result in behavioural change.
- Quality labels have to be cared for/ renewed - this is forcing the company to constantly monitor their processes.
- They can be used as requirements when sourcing services.
- With an effective audit system in place, it can be proven as ‘capable and in control’.
- Clients could ask to have quality label as mandatory, especially in high volume tenders.
- Useful indicator, but not the single determinant. All too often a certificate is relatively easy to obtain, while day to day operations are not fully reflected by what these certificates promise.
- Marketing is a dominant aspect. But quality label can play an important role.

The Delphi panel was divided on the notion that we can only trust transport logistics system through quality contracts. In this regard, the Delphi panel added the following statements:

- Contracts should include key performance (quality) indicators (KPIs).
- Don't be chained by contracts, use the freedom to provider or receive better transport logistics systems.
- At the end of the day it is the actual level of quality that is provided which counts and not the content of individual contracts.
- Quality can not only be managed by KPI’s. It mainly has to do with the service and response you get when something out of the ordinary happens. How flexible and willing is a party at that time to deliver service and quality. Outside the contract occurrences give you a much better insight.
- Trust is very important but remains unstated in a contract.
- Quality must be a philosophy of work. It is not possible to put all quality requirements in a contract.
- Quality contracts must be in place for all and every transport mode.

The panel was also divided on the notion that there is a need of a new or modified standard in the transport and logistics field. In this regard, the Delphi panel added the following statements:

- A new or modified standard is necessary; the best practice example is supply chain security ISO 28000.
A new or modified standard is not necessary; ISO and maybe other standards have a very static approach and rarely encourage new standard developments. One single set of (aligned) standards would be good. Yes a new or modified standard specifically focused on transport that enables companies to show their commitment to sustainable solutions. Yes a new or modified standard with well defined public KPIs would ensure the service level. No need of a new or modified standard. There are already too many rules. The problems are not the rules but the application beyond the image game.

The statements or notion that have achieved consensus will not be included in the second round study. The statements that did not achieve consensus will be included in the second round Delphi questionnaire. Also the above feedbacks will be included in the second round Delphi study. This is one of the novelties of Delphi study that the Delphi panel generates new notions or ideas that are explored in the subsequent round.

**Findings using non-APMO methods**

Apart from the Delphi statements the survey included some questions that are designed to be analysed by other methods. For example there was a question on the elements of logistics quality standards. Table 1 shows the eight elements of logistics quality standards are ranked by the Delphi panel. A total of eight elements of standards for ensuring logistics quality (shown in table 1) were identified of which ‘Individual service quality provision/criteria’ was top and ‘Quality labelling’ was at the bottom of the ranking scale with 1 representing highest and 8 representing lowest.

<table>
<thead>
<tr>
<th>Elements of Standards</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Service Quality Provisions/Criteria</td>
<td>1</td>
</tr>
<tr>
<td>Quality Management along Supply Chain</td>
<td>2</td>
</tr>
<tr>
<td>Quality Contract between provider and user</td>
<td>3</td>
</tr>
<tr>
<td>Standard combined transport product</td>
<td>4</td>
</tr>
<tr>
<td>Quality Management along Transport Corridors</td>
<td>5</td>
</tr>
<tr>
<td>Standards of Professional Competence</td>
<td>6</td>
</tr>
<tr>
<td>Standardization in Segments of the Supply Chain</td>
<td>7</td>
</tr>
<tr>
<td>Quality Labelling</td>
<td>8</td>
</tr>
</tbody>
</table>

Table 3 Important elements of standards to ensure logistics quality,

![Figure 4: Proportion of panellists aware of standards](image-url)
A total of eight (listed in the introduction section) quality standards (of which six international logistics quality standards) were examined. The study finds that out of the six logistics quality standards, two: EN12507: 2005 (Guidance notes on the application of EN ISO 9001:2000 to the road transportation, storage, distribution and railway goods industries) and EN 12798: 2006 (Quality management system) are known (see figure 4) at a higher level than the others. They also have a comparatively higher usage as well. But the most of the Delphi panel did not know these all six logistics quality standards. On the other hand the general standards are far more widely known and have a much higher usage than the logistics standards. ISO9001, which is a general purpose quality management standard and ISO140001 which is a environmental management standard are widely known, used and rated highly.

**Conclusion:**
The findings of the research suggest that although there are some logistics quality standards developed over the period of 2000 through 2007, they are not widely known or used by the stakeholders and, by inference, the logistics industry. The panel supports the voluntary and market led adoption of standards. The Delphi panel has provided some important feedbacks which will be used to develop the questionnaire for second round Delphi. So, before suggesting any new or modified logistics quality standards further examination of the utility and relevance of the existing standards should be done by experts, policy makers and the transport and logistics industry. For this a further (second round) study is ongoing.

**References**

- ISIC, 2005, Integrated Services in the Intermodal Chain, final report Task D Improving quality of intermodal terminals, Rapp Trans AG for EC DG TREN 2005