ISSUES ON ELOGISTICS APPLICATIONS AND PLATFORMS

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ABSTRACT
A concise and precise definition of eLogistics is proposed in this paper, as follows: 'a set of activities based on using ICT systems and tools, as well as the Internet, as the main communication medium in order to maintain logistics processes'. The acceptance and applicability of the proposed definition in the transport and logistics field is explored through a comprehensive online survey. The knowledge and understanding of eLogistics among different stakeholders is also examined. The research explores in particular how small and medium enterprises view eLogistics. Throughout this research, we attempt to analyse the usage of eLogistics applications and hardware platforms, and identify the current trend and possibilities of eLogistics system. It is an interim paper and further research is ongoing which will explore the issues and questions raised.

Key words: eLogistics, Information and Communication Technologies, ICT, logistics, transport, trends;

Introduction

eLogistics is a definition of systems that use Information and Communication Technology (ICT) in the logistics processes of internal and external supply chains. The term has been widely used in EU policy documents and research calls. It is not clear if the term has wide acceptance and is written in many different ways. This paper adopts the terminology 'eLogistics' and a definition developed by the EU funded KOMODA project.

Online sources show little use of the term: this may indicate the recent emergence of eLogistics, or that is is simply not in common parlance outside the European Commission. Also some recent books such as Mangan et al, 2008; Rushton et al, 2009; Langley et al, 2008 that are highly referred in taught courses in logistics and supply chain fields have not yet included e-logistics. Rushton et al, 2009 discusses e-commerce, e-fulfilment, e-procurement, e-tailing; Mangan et al 2008 discusses e-procurement and Langley et al 2008 discusses e-commerce. The definitions, largely from online sources[1], equate e-commerce to eLogistics, and vice versa, as they show eLogistics as an external economic transaction realized electronically (online references). But the current research does not equate e-commerce with eLogistics, even though they have numerous overlaps functionally and systematically. The data flows in the basic and supporting logistics processes between supply chain partners and inside a company can be defined as eLogistics.

[1] http://www.research.ibm.com/people/b/bth/OOWS2001/zhang.pdf; http://www.elogistics-guide-dortmund.de/en/home/; http://www.elogistics-ltd.com/en/ueberuns.asp

The current research proposes a definition of eLogistics as 'a set of activities based on using ICT systems and tools, as well as the Internet, as the main communication medium in order to maintain logistics processes'. This definition was developed by discussions within the KOMODA project, interviews with external experts. This paper reports on the degree to which this definition is acceptable to logistics experts and whether it is widely used in the sector. A literature review (books and online sources) suggests that the data flows include ordering, inventory management, transporting, co-packing, co-manufacturing, vendor managed inventory (VMI), supplier managed inventory (SMI), planning, distribution, etc. Whilst large companies have either developed bespoke applications or platforms or have invested in 'off the shelf' solutions, many micro, small and medium enterprises (SMEs) may not have the financial and technical resources and abilities to implement and maintain such a system. The literature review suggests that there is a research gap to identify the eLogistics related issues for SMEs. The current research addresses this research gap with an online survey among the stakeholders.

To address the research gap, the current paper has the following objectives: a) verify the proposed definition of eLogistics and its acceptance; b) obtain a comprehensive picture of available eLogistics applications, sources, functionality and use in companies and c) provide a synthetic view of trend and possibilities of eLogistics.

Research approach

In line with the research objectives, an in-depth literature review (on limited online sources and books) resulted in a survey questionnaire for an online survey. The Bristol Online Survey tool was used for this research. The questionnaire included investigations of stakeholders' profile in terms of:

SME or not;

company involvement in the provision or regulation of freight transport and logistics (logistics and transport service provider, terminal operators, academic and researcher, shippers, and authorities);

expertise in ICT (basic understanding, competent user, expert and none);

and geographical coverage (Central, Northern, Southern, Western European and Non-European) of company operation.

The main research questions were in two categories. The first category was the 'eLogistics definition' which was divided into the has sub-questions of

a) agreement or disagreement on the given definition,

b) applicability of the definition in the freight transport and logistics sector, and

c) understanding of eLogistics in the freight transport sector.

The second l category asked about the Trends and Possibilities' of eLogistics; this had has seven statements to explore the degree of agreement or disagreement on these trends.

More than 1000 global 'potential respondents' were requested to participate, by email, from 15th August to 30th December 2008. This pool was drawn from experts in the logistics, ICT sectors, academia and consultancy. A total of 99 responses were received of which 17 were invalid due to duplications and missing of essential information. So, the total number of valid response was 82 (response rate about 8.2%) of which ten are from outside EU-27 (from Australia, Mexico, Norway, Serbia

and Turkey). The majority of the respondents belonged to SMEs, however 38.64% of all SMEs were academics, consultants and government, and 32.53% of the whole response came from academics and consultants. The highest number of participants was from operational management level followed by senior management and very senior management. About half of them were competent with ICT and about 83% of them stated they had either expert or competent level of experience in the logistics area.

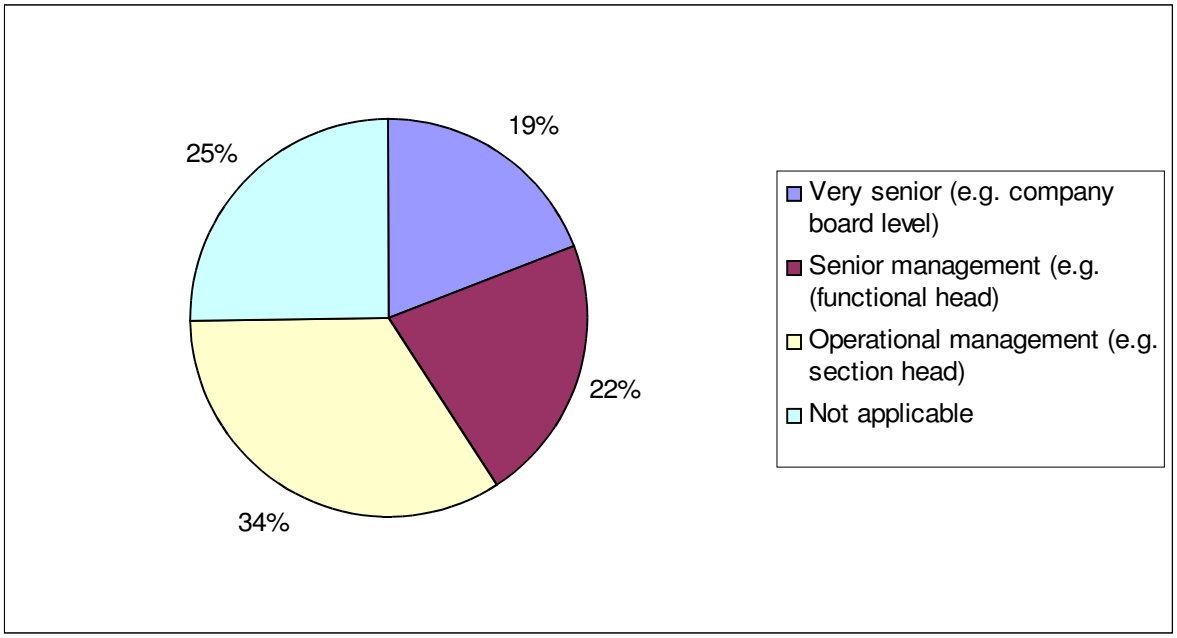

Illustration 1: Seniority of Respondents

Major Findings

Opinion on the definition of eLogistics

General findings: A significant[2] majority (89%) of the panel agreed with the definition (see table 1). They also agreed in a significant majority (87%) with the notion that this definition was widely applicability' of the definition. There is a simple majority agreement (66%) with the notion that eLogistics is poorly understood or defined in the freight transport and logistics sector. There are some differences among different types of participants that are discussed below.

Agreement / Disagreement	I agree with the definition	This definition is widely applicable in the freight and logistics sector	eLogistics is poorly understood or defined in the freight and logistics sector
Agree	64 (89%)	63 (87%)	47 (66%)
Disagree	9 (11%)	9 (13%)	24 (34%)
Total	72 (100%)	72 (100%)	71 (100%)

Table 1: General opinion on the definition of the eLogistics

SMEs versus non-SMEs: Both SME and non-SME participants have significant agreement (88% and 90% respectively) with the definition. But there is a difference in the level of agreement on the notion that *This definition is widely applicable in the*

[2] >80% is defined as significant majority is and >50 ≤80 is defined simple majority

freight and logistics sector. The SMEs have significant majority agreement (92%) but the non-SMEs have simple majority agreement (71%). Both groups have simple majority agreement (65% and 67%) on the notion that *eLogistics is poorly understood or defined in the freight transport and logistics sector*.

Provision or regulation of freight transport: Of the five groups (Academic-Researcher, Authorities, Shipper, Logistics service provider, and Terminal operator) the participants of Authorities group disagreed with the definition and its wide applicability in the transport and logistics sector. But they agreed on the notion that eLogistics is poorly understood or defined in the freight transport and logistics sector. There are differences of the majority agreement among the remaining groups. The terminal operator group has a lower level of agreement whereas the remaining three groups have significant majority on the definition. In terms of the wide applicability of the definition the Logistics operator, Academic-Researcher, and Shipper groups have similar significant majority agreement (83%, 95%, and 100% respectively). On the other hand the Terminal operator group has simple majority agreements (78%) on the wide applicability of the definition in the transport and logistics sector. The notion that *eLogistics is poorly understood or defined in the freight transport and logistics sector* achieved a simple majority and there is little variation amongst the five groups.

Geographical opinion: All five groups (Western EU, Central EU, Northern EU and Southern EU and non-EU) have majority agreement with the definition. But there are differences among the agreements. The Northern EU and non-EU groups have simple majority agreement (69% and 67% respectively) whereas the remaining groups have significant majority (two hundred per cent and one 92%) agreement. On the other hand, in terms of wide applicability of the definition, the non-EU, Southern-EU and Western-EU groups have hundred percent agreements, and the Central-EU group has significant majority (88%) whereas the Northern-EU group has simple majority (75%) agreement.

ICT expertise wise opinion: All three groups (basic, competent and expert) have significant majority agreement with the definition. There was a little difference of significant majority agreement among the group in terms of wide applicability of the definition. Similarly there is a little difference of simple majority agreement on the notion that eLogistics is poorly understood or defined in the freight transport and logistics sector.

Trends and Possibilities of eLogistics systems

Seven statements were included in the statement (or questionnaire) to explore the trend and possibilities of eLogistics systems.

Significant majority agreements

Table 2 shows three questions that have achieved significant (above 80%) agreement.

The statement *'Open source will allow smaller companies access to better quality applications'* has highest (significant) majority agreement by all types participants except the Terminal operator and ICT-Expert groups. None of the participant groups has majority disagreement.

The statement *'Standardised eLogistics system interfaces can increase efficiency along the supply chain'* has achieved significant majority agreement by all types of participants except the Terminal operator, SME, ICT Basic understanding and ICT Expert groups. None of the participant groups has majority disagreement.
The statement *'In a fragmented market like road freight open standards will allow integration'* also has achieved significant majority agreement by all types of participants groups except the Terminal operator, SME, ICT basic understanding and ICT Expert groups. None of the participant group has majority disagreement.
It can be noted that there is a similarity in terms of level of agreement between the last two statements.

Simple majority agreements

Table 3 shows three statements that have achieved simple majority agreements.
The statement *'It is too difficult to integrate multiple modes of transport in ICT'* has achieved simple majority agreement by all types of participants groups expect the Academic-Research and Northern EU groups. They have majority disagreement with the statement.
The statement *'Small operators will be forced to use bigger operators' ICT systems'* also has achieved simple majority agreement by all types of participants groups expect the ICT-Expert group. They have majority disagreement with the statement.
The statement 'Integration between rail operators will be easier since there are fewer actors' also has achieved simple majority agreement by all types of participants groups expect the ICT-Competent group. They have majority disagreement with the statement.

Majority disagreement

Table 4 shows two statements that have achieved majority disagreements.
The statement *'Rail is so monolithic that ICT integration with other modes will fail'* has achieved simple majority disagreement by all types of participants groups expect the Northern-EU and Southern-EU groups. The Northern-EU participants group have divided opinion whereas the Southern-EU participants have majority agreement.
The statement *'German ICT will dominate eLogistics in Europe as German logistics continues to dominate'* has achieved simple majority disagreement by all types of participants groups expect the Terminal operator and Southern-EU groups. The Southern-EU participants have significant majority agreement whereas the Terminal operators have simple majority agreement with the statement.

Summary and Conclusions

eLogistics is an emerging definition within the logistics field. There is not yet a widely accepted definition. The current research attempted to define it firstly by literature reviews of books and online sources in collaboration with the KOMODA project, and then seeking opinion on it through an online survey. The online survey finds that the proposed definition *('a set of activities based on using ICT systems and tools, as well as the Internet, as the main communication medium in order to maintain logistics processes*) has significant majority agreement. The statement *The definition is widely applicable in the freight and logistics sector'* has also achieved significant majority agreement. But the statement *'eLogistics is poorly understood or defined in the*

freight and logistics sector' has achieved simple majority agreement. We conclude from this that the term and definition is workable in the logistics sector, but not that it is widely accepted or used. Other terms such as eFreight have emerged in the EU policy area, and also existing terms such as e-commerce or e-business seem to have wider use. It is too early to conclude that the term will become used, although the survey suggests it has utility.

To explore the current trends and possibilities of eLogistics systems and applications seven statements were asked to the panel. Three statements (*'Open source will allow smaller companies access to better quality applications', 'Standardised eLogistics system interfaces can increase efficiency along the supply chain'* and *'In a fragmented market like road freight open standards will allow integration')* have achieved significant majority agreement. We conclude from this that there is a clear belief from across the experts and practitioners that open source, open standards and standardised system interfaces will support increased supply chain efficiency through integration and with access to smaller as well as larger players. This supports the EU policy objectives in the Freight Logistics Action Plan and elsewhere to promote such open standards and interfaces. This work has been developed in such projects as Freightwise, Smart-CM, Smartfreight, eFreight and elsewhere.

Three more statements (*'It is too difficult to integrate multiple modes of transport in ICT'* , *'Small operators will be forced to use bigger operators' ICT systems'* , and *'Integration between rail operators will be easier since there are fewer actors')* have achieved simple majority agreement. We conclude from these responses that integration in ICT and Transport Logistics will face similar problems to the physical interoperability of modes: although we don't know if this difficulty is systematic within ICT itself or a cultural or organisational one. Integration through dominance, e.g. absorption into bigger operator systems seems logical, but we can also suggest that this may lead to a burden to SMEs who wish to trade with multiple bigger organisations and therefore support multiple platforms. Lastly there is an optimism that ICT integration will be easier in rail due to the limited number of players. Certainly projects such as RETRACK have shown that ICT integration in the smaller railway undertakings sector is a complex and dynamic one, it has yet to be shown if large scale integration such as that proposed by the INEGRAIL project can be achieved, fewer players or not.

But two statements (*'Rail is so monolithic that ICT integration with other modes will fail'* and *'German ICT will dominate eLogistics in Europe as German logistics continues to dominate')* have achieved simple majority disagreement. The respondents seem confident that rail ICT can integrate with other modes (which is somewhat at odds wit previous statements, and also that as German dominance in EU logistics grows, that the German ICT industry will not dominate similarly. We suggest that quantitative research looking at the ICT platforms in use across the sector may be best placed to answer the final statement.

This paper has explored a small subset of the subject of ICT and Transport Logistics. It is an interim paper and further research is ongoing which will explore the issues and questions raised. We commend this paper as a small contribution to the knowledge in the field and wish to thank the European Union Framework Programme for the part funding of this research.

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Selected Related Research Projects

- KOMODA, http://www.komodaproject.com/
- Freightwise, http://www.freightwise.info
- Smart-CM, http://www.smart-cm.eu/
- Smartfreight, http://www.smartfreight.info/index.htm

Tables

	Standardised eLogistics system interfaces can increase efficiency along the supply chain			In a fragmented market like road freight open standards will allow integration			Open source will allow smaller companies access to better quality eLogistics application		
Type of participants	**Total Participants**	**Agreed %**	**Disagreed %**	**Total Participants**	**Agreed %**	**Disagreed %**	**Total Participants**	**Agreed %**	**Disagreed %**
Logistics operator	32	84	16	32	84	16	32	100	0
Terminal operator	9	78	22	9	78	22	8	75	25
Academic-Research	22	86	14	22	86	14	22	91	9
Total opinions of different service provisions	**63**	**84**	**16**	**63**	**84**	**16**	**62**	**93**	**7**
SME	24	79	21	24	79	21	23	100	0
Non-SME	20	90	10	20	90	10	20	90	10
Total opinions of different company sizes	**44**	**84**	**16**	**44**	**84**	**16**	**43**	**95**	**5**
Western EU	12	83	17	12	83	17	12	83	17
Central EU	32	81	19	32	81	19	31	93	7
Northern EU	15	87	13	15	87	13	15	93	7
Southern EU	6	83	17	6	83	17	6	100	0
Non-EU	4	83	17	4	100	0	4	100	0
Total opinions of different Geography	**69**	**84**	**16**	**69**	**84**	**16**	**69**	**91**	**9**
ICT Basic	26	77	23	26	77	23	25	92	8
ICT Competent	33	91	9	33	91	9	33	97	3
ICT Expert	9	78	22	9	78	22	9	78	22
Total opinions of different expertise in ICT	**68**	**84**	**16**	68	84	16	67	92	8

Table 2: Significant majority agreement on the trend and possibilities of eLogistics systems

	It is too difficult to integrate multiple modes of transport in ICT			Small operators will be forced to use bigger operators' ICT systems			Integration between rail operators will be easier since there are fewer actors		
Type of participants	**Total Participants**	**Agreed %**	**Disagreed %**	**Total Participants**	**Agreed %**	**Disagreed %**	**Total Participants**	**Agreed %**	**Disagreed %**
Logistics operator	33	64	36	32	75	25	33	52	48
Terminal operator	9	56	44	9	56	44	9	56	44
Academic-Research	20	40	60	22	82	18	22	68	32
Total opinions of different service provisions	**62**	**55**	**45**	**63**	**75**	**25**	**63**	**59**	**41**
SME	24	62	38	23	70	30	23	52	48
Non-SME	20	65	35	21	77	23	21	52	48
Total opinions of different company sizes	**44**	**64**	**36**	**44**	**73**	**27**	**44**	**52**	**48**
Western EU	12	58	42	12	75	25	12	58	42
Central EU	30	57	43	32	78	22	31	55	45
Northern EU	16	44	56	15	73	27	16	50	50
Southern EU	6	67	33	6	83	17	6	67	33
Non-EU	3	100	0	4	75	25	4	100	0
Total opinions of different Geography	**67**	**57**	**43**	**69**	**77**	**23**	**69**	**58**	**42**
ICT Basic	25	60	40	26	85	15	25	60	40
ICT Competent	23	60	40	33	79	21	34	47	53
ICT Expert	8	75	25	9	44	56	9	89	11
Total opinions of different expertise in ICT	**56**	**66**	**34**	**68**	**76**	**24**	**68**	**57**	**43**

Table 3 : Simple majority agreement on the trend and possibilities of eLogistics systems

	German ICT will dominate eLogistics in Europe as German logistics continues to dominate			Rail is so monolithic that ICT integration with other modes will fail		
Type of participants	**Total Participants**	**Agreed %**	**Disagreed %**	**Total Participants**	**Agreed %**	**Disagreed %**
Logistics operator	31	45	55	33	45	55
Terminal operator	9	56	44	9	11	89
Academic-Research	20	30	70	22	36	64
Total opinions of different service provisions	**60**	**42**	**58**	**64**	**42**	**58**
SME	24	42	58	24	46	54
Non-SME	19	47	53	21	43	57
Total opinions of different company sizes	**43**	**44**	**56**	**45**	**44**	**56**
Western EU	10	20	80	12	42	58
Central EU	31	39	61	32	41	59
Northern EU	15	33	67	16	25	75
Southern EU	6	83	17	6	50	50
Non-EU	4	25	75	4	75	25
Total opinions of different Geography	**66**	**38**	**62**	**70**	**40**	**60**
ICT Basic	26	31	69	26	35	65
ICT Competent	31	48	52	34	44	56
ICT Expert	8	25	75	9	33	67
Total opinions of different expertise in ICT	**65**	**38**	**62**	**69**	**39**	**61**

Table 4 : Simple majority disagreement on the trend and possibilities of eLogistics systems