GREEN FREIGHT & CLIMATE-FRIENDLY TRAFFIC MANAGEMENT:

Experiences from Germany, Thailand and Vietnam

Why travelling conference?

Eight days - three countries, ten flights, dozens of new contacts, and a lot of new ideas. The concept of the travelling conference allows to save plenty of time and CO2 emissions.

Hosts

During the fourth time, the tour visited three different countries in South East Asia. Two of them fulfilled interdependent events, the results of those are given in the following. They are the Mae Fah University in Thailand and University of Transport and Communications in Vietnam.

Organizer

A young and international association „Asian-German Knowledge Network for Transport and Logistics e.V." organized this traveling conference for the 4th time. Altogether more than 5 countries and 10 universities in Asia have offered an international podium for discussions and knowledge transfer.

ASIAN-GERMAN KNOWLEDGE NETWORK FOR TRANSPORT AND LOGISTICS

1. What is green freight?

Green freight is commonly associated with a higher degree of logistics performance, minimized costs and local footprint [1]. It encompasses the use of smart environment (ICT) as its enabler [2]. Figure 1 shows these criteria altogether.

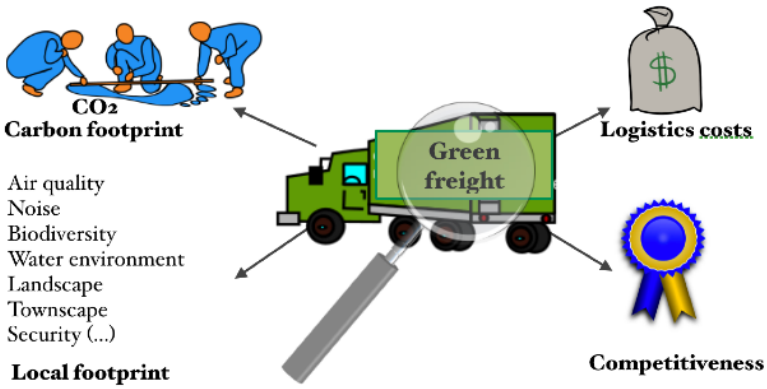

Figure 1 Criteria of green freight

Covering the latest transport policies and benchmarks the conference discusses a framework to weigh measures for surface green freight, based on three interrelated dimensions: transport costs, local footprint and global footprint. The result of the conference is a weighted overview of measures in line with the status-quo of logistics performance in Thailand and Vietnam and its local and global impacts.

The newest estimation of the International Transport Forum (ITF) says that the surface freight via road is expected to triple from 9.681 trillion tonne-kilometers and to double from 2.323 trillion tonne-kilometers in Asia Pacific and Europe respectively in 2015-2050. [3] In doing so, road freight related CO2 emission will grow by 70 % [ebd.].

All contributions of the travelling conference were concentrated on road freight.

Participating institutions

Universität Bremen

TUHH Hamburg University of Technology

HOME Hochschule Merseburg University of Applied Sciences

Technische Hochschule Ingolstadt

Hochschule Fresenius University of Applied Sciences

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Speakers (Thailand and Vietnam)

Dr. Nguyen Thi Binh
Prof. Dr. Kosin Chamnongthai
Assoc. Prof. Dr. Somsak Choomchuay
Dr. Irina Dovbischuk
Prof. Dr. Hans-Dietrich Haasis
Dr.-Ing. Le Thu Huyen
Prof. Dr. Carlos Jahn
Prof. Dr. Andreas Jattke
Prof. Dr. Martin Kreeb
Dr. Teeravisit Loahapensaeng
Dr. Phoommhiphat Mingmalairaks
Mr. Tuan Nguyen
Dr. Boonsub Panichakarn
AVM. Thanapant Raicharoen
Prof. Dr. Dirk Sackmann
Mr. Friedel Sehlleier
Dr. Dawei Zhang

2. Local footprint

For the local footprint PM particles were taken as an example. All three countries suffer from PM particles. Due to the lack of air quality measurement stations in Thailand a comparison was not possible.

Around 90% of people living in cities in Europe are exposed to pollutants at concentrations higher than the air quality levels deemed harmful to health. Fine particular matter (PM2.5) in air has been estimated to reduce life expectancy in the EU by more than 8 months [4]. In Thailand, the assessment of PM2.5 levels at 19 air quality measurement stations in 14 provinces across the country showed that every station recorded levels higher than the WHO recommendation of less than 10 milligrams per cubic meter of air [5]. With an average PM2.5 concentration of 54,6 µg/m3 the air quality in Hanoi is slightly decreasing in the first quarter of 2017 and remains “unhealthy for sensitive groups” [6].

3. Logistics costs

Methodologies on how to measure logistics costs are country-specific in Germany, Thailand and Vietnam. All three are shortly described in the following, before a comparative overview is given.

In Germany, there is no national logistics costs estimation based on GDP to the author’s knowledge but the German Logistics Association fulfilled a questionnaire-based study of industry, trade and service-oriented companies in 2008 and 2011 [7,8]. The first study was based on responses of 897 respondents from Germany and 155 from Europe and covered five industry sectors: iron and metal industry, chemical industry, electronics / high tech, automotive, and plant engineering. The scope of the second study was larger in terms of both: respondents’ feedback and cross-industry coverage. It was based on 1757 responses from different continents and covered five additional industry sectors: retail, fast moving consumer goods (FMCG), textile, materials / mining, and energy [8, p. 13]. Both studies consider transport costs with the help of six components: administrative costs, costs of value-added services, packaging, transportation costs, warehousing costs, and inventory costs [8, p. 29]. Table 1 shows the share of logis-

tics costs as percentages of overall revenues in four industries: automotive, FMCG, textile, and plastics [8, p. 19].

In Thailand, two methods of transport costs estimation could be found in the literature: as a share to GDP and as a share of sales in a cross-industrial comparison. The first method is conducted by the Office of the National Economic and Social Development Board (NESDB), which developed the statistics-based model to quantify logistics costs since 2003. The latest report was made in 2010 [9]. The Thailand report has three components: transportation, inventory holding and logistics administration costs.

Furthermore, a questionnaire-based study on the Development of a Supply Chain Performance Tool was proposed and fulfilled in Thailand using the date of the supply chain performance database of different providers in 2011 [10]. The logistics cost structure was similar to the German study but had four instead of six cost components: administration, transportation, warehousing, and inventory [10, p. 26], which were further measured for different industry sectors. Table 2 shows exemplarilly the shares for the sectors food, textiles, automotive, and plastic [11].

A special problem in the model split of Thailand is the unattractiveness of the rail transportation system for business, due to their unreliability, insufficient locomotives and carriages and frequency lower than the given demand. Furthermore, most of the double-track railways for major trade routes are still under construction [9, p. 14]. As a result, domestic transport relies on roads (97.68% in 2015, [12, p. 5]) while international transport relies on waterways and roads (86% and 13%).

Table 1 Quantifying logistics costs in Germany, Thailand and Vietnam

	Germany	Thailand	Vietnam
Logistics costs 2009 | **2016** | 2021 (% of GDP)	No data	16.8 | **14** | 12 (7)	22.5 | **20.8** | 18
Methodology		Statistics-based	No data
Industry-specific logistics costs automotive | FMCG | textiles | plastic (% of all sales/revenues, year)	6 | 8 | 9 | 10 (2012)	8.5 | 6.6 | 6.6 | 8.8 (2011)	No data
Methodology	Questionnaire- based	Questionnaire-based	
Inland road freight (% of total inland tkm, year)	**72** (2014)	**97.68** (2015)	**75.28** (2012)

FMCG - Fast moving consumer goods

In Vietnam, there is to date no established method how to measure national logistics costs but an ongoing World Bank project exists to develop standardized trade logistics indicators and the methods for collection, processing and reporting trade logistics data on an annual basis [13]. JICA estimated logistics costs, based on a combination of the own survey and the World Bank statistics, to 20-25 % of the GDP in 2010 [14, p. 4-47], showed as average in Table 1. The actual share and future goal were stated in the Vietnam logistics market report as 20.8 % and 18 % respectively [15, 16]. Road freight accounts for the highest share in the domestic cargo modal split of around 75 % (see Table 1 above), fol-

lowed by the second-highest mode of inland waterways (17.56 %). The coastal sea share (6.41), railroad cargo (0.73 %), and air cargo (0.02%) round up the picture dated to 2012 [17].

4. Impact measurement methodology

The travelling conference was encompassing twenty contributions from German, Thai, Vietnamese and Chinese authors during stop-overs in Hanoi and Chiang Rai. Each speaker was informed in advance to conclude their presentation with up to three proposals on what can be done to contribute to the surface green freight. The audience were asked to give their feedback about the impact of the proposed measures using the following assessment framework shown in Figure 2.

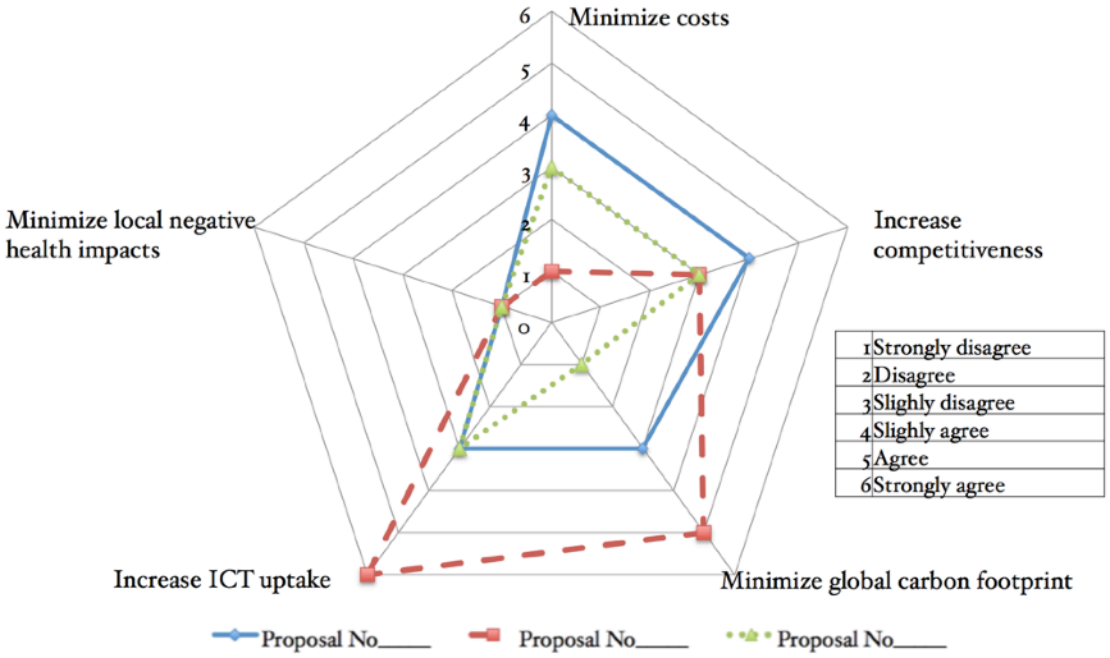

Figure 2: Radar chart to measure the impacts of the proposed measures

The framework provided an even number of choices, which didn't allow any neutral feedback from the audience, forcing respondents to choose a positive or negative evaluation of the proposed measures. Another possibility to measure the proposals could be in line with the categories as acceptability, implementation complexity, costs of implementation, effectiveness in the addressing marginal externalities, and finally, how close the proposed measures are to the Pigouvian taxes [18, 19]. During the travelling conference, not the measures itself but their impacts were evaluated in the first step. Taking into account the country-specific characteristics, each dimension of the radar chart can be differently weighted to compare transport policy measures with each other.

5. Measures for surface green freight and their impacts

Summarizing all twenty proposals made in Vietnam and Thailand, four groups are identified: proposals encompassing the idea of using different ICTs to enhance logistics performance, proposals on the supply chain and corporate level, and proposals addressing the political frameworks.

Taking into account the frequency of proposals (shown in brackets in Figure 3) and the quantity, most of the speakers have concluded that ICTs are the only (or in combination with others) enabler of surface green freight. Special technology applications were given in presentations about vehicle distance

measurement, automatic number-plate recognition, contactless payments as well as general demand forecasting and data analytics, as shown in Figure 3 below.

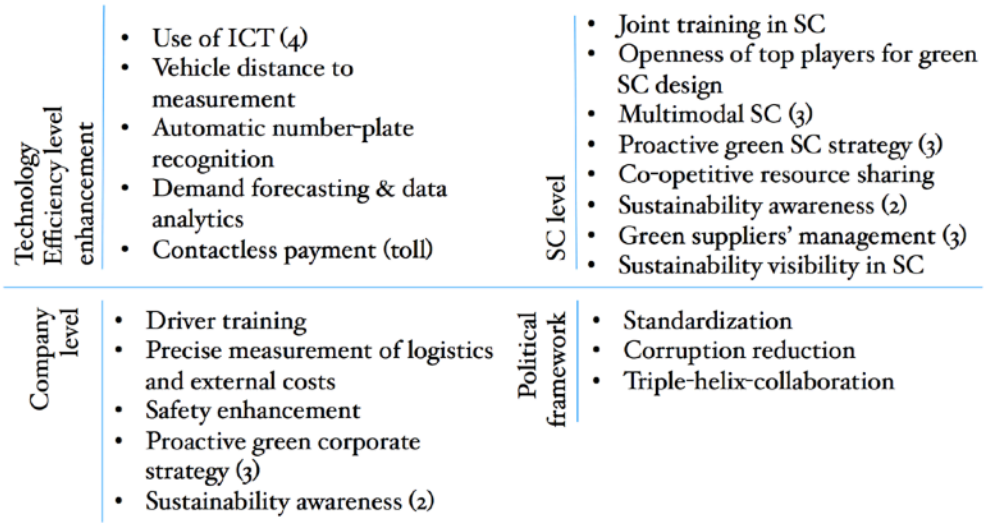

Figure 3: Speakers' proposals on what can be done to contribute to surface green freight

The measures at corporate and supply chain (SC) level are partly overlapping each other. They are mechanisms for the precise measurement of logistics and external costs, proactive green corporate and SC strategies as well as sustainability awareness, safety management, driver and joint SC training, multimodal design of SC, co-opetitive resources sharing (for example depot sharing), green suppliers' management, sustainability visibility as well as the interest from the top players for green SC design.

Last but not least important were the proposals from the speakers for the political decision makers: support of transport markets in terms of standardization, corruption reduction as well as strengthening of collaboration with academia and business also known as a triple-helix collaboration, which is decisive for the site appeal of logistics clusters. [20]

With the help of the feedback charts and continuous moderation of the event with a flip chart or directly on the venue's walls the audience were asked to evaluate the speakers' proposals using the radar chart framework, as shown in Figure 2 on page 4. The feedback was voluntary and required the comprehensive knowledge of English as there was no translation of the events into Thai or Vietnamese. Altogether, 53 people filled out feedback sheets, which were collected at both sites. The distribution of academia, business and government representatives is shown in Figure 4 on page 6.

Going back to the definition of green freight and taking into account the fact that a very small number of evaluation feedback sheets were collected in Hanoi (less than 5), a representative comparative analysis of feedbacks at both sites was not possible. Nevertheless, three proposals of twenty are considered to have the most balanced impact on the five criteria, decisive for the definition of the green freight as shown in Figure 4 on the next page. They are the usage of ICT, sustainability and green SC visibility, and green suppliers' management.

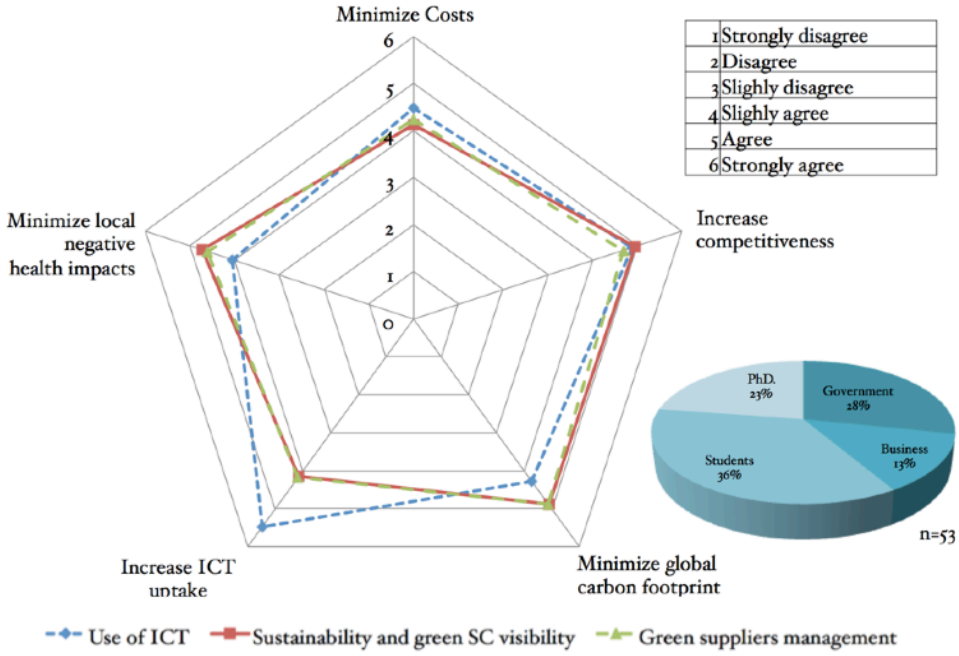

Figure 4: TOP 3 proposals in terms of their impact on green freight

Additional to the discussions on the intelligent ways to contribute to the surface green freight, the fourth travelling conference offered a podium for future collaboration ideas exchange during tea and coffee breaks. Especially in Thailand, the host and the organizer of the travelling conference had a balanced overview of funding possibilities and open calls for the near future. For example, the representatives from the University of Bremen and the host's team have agreed to intensify the initiated cooperation by a working meeting in 2018!

The organizer of the fourth travelling conference thanks all hosts, participants, and audience members for their valuable contributions!

Bibliography

[1] World Bank 2010/2012/2014/2016: Connecting to compete 2010: Trade Logistics in the Global Economy.
[2] International Transport Forum (ITF) (2017): Decarbonising Transport: Helping decision makers establish pathways to carbon-neutral mobility.
[3] International Transport Forum (ITF) (2017): ITF Transport Outlook 2017.
[4] European Environment Agency (EEA) (2016): Air quality report - 2016 report.
[5] Rujivanarom, P. (2017): Air pollution alert in 14 Thai provinces. Online: Link, retrieved on 25.09.2017.
[6] Vietnam Sustainable Energy Alliance (VSEA) (2017): Air quality Update on 1st quarter 2017 for Hanoi and Ho Chi Minh City. Online: Link, retrieved on 24.09.2017.
[7] Straube, F. & Pfohl H.-C. (2008): Global networks in the Era of Change - Environment, Security, Internationalisation, People. BVL Bremen.
[8] Handfield, R.S. F., Pfohl H.-C., Wieland, A. (2013): Trends and strategies in logistics and supply chain management, BVL Bremen.
[9] NESDB (2010): Thailand Logistics Report, Office of National Economic and Social Development Board.
[10] Banomyong, R., Nucharee, S.(2011): Developing a supply chain performance tool for SMEs in Thailand. Supply Chain Management: An International Journal. 16 (1), pp. 20-31.
[11] Banomyong, R.S. (n.y.): Developing capacity & network in Thailand.
[12] Thaoland Board of Investment (2016): Thailand tipped to emerge as a key ASEAN logistics hub, Thailand Investment Review, 26(09).
[13] Word Bank (2016): Integrated safeguards data sheet identification, Project „Vietnam Logistics Statistical System".
[14]Japan International Cooperation Agency (JICA) (2010): The comprehensive study on the sustainable development of transport system in Vietnam.
[15] Biinform (2017): Vietnam logistics market report.
[16] n.a. (2017): MoIT to lower logistics costs, Viet Nam News, 16/ February/2017. Online: Link, retrieved on 11.12.2017.
[17] Bamoyong, R. (2017): Vietnam at a Crossroads: Engaging in the Next Generation of Global Value Chains, Ed. Hollweg C.H., Smith, T. & Taglioni, D., World Bank, Washington, pp. 69-80.
[18] Kocak, N.A., Jones, P. & Whibley, D. (2005): Tools for road user charging scheme option generation. Transport Policy, 12 (5), pp. 391-405.
[19] Schade, J., Baum M. (2007): Reactance or acceptance? Reactions towards the introduction of road pricing. Transportation Research Part A, 41 (1), pp. 41-48.
[20] Dovbischuk, I (2015): Sustainable regional development through the establishment of innovation-oriented cluster management, Kovač, Hamburg.