Will environmental friendly products be preferred? – Lesson from a Delphi study in Europe

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Abstract
In recent years, environmentally friendly products have attracted much attention from various stakeholders. In this paper, we explore if such products are being preferred or not. We have applied a Delphi study, including an online survey and interviews with a panel of experts in Europe. The analysis of data reflects that despite the increased awareness consumers are still reluctant to pay more for them. Technologies are expected to facilitate cheaper and greener products in the middle term. Finally, stakeholders such as governments, service providers, and retailers can play more active roles in promoting the products.

Keywords: environmental friendly products, Delphi study, stakeholders, consumers

Introduction
In the recent years, it became conventional wisdom that environmental sustainability is critical for our society. As a part of the wisdom, this is true for products and services as well, we buy. Let's recall your visit to a super market a decade or two ago, for example. There were only few environmental friendly products (EFPs) available on the shelves. Most of the products were competing with price or brand focusing on high quality. However, if you go to a super market these days, you can find many products labelled as EFPs. These EFPs also contain information about carbon footprints they will leave on the environment. This shift in availability of EFPs in super markets implies that various stakeholders such as consumers, manufacturers and retailers show more concerns towards environmental sustainability.

Existing research related to environmental friendly products have addressed multiple issues and aspects. For example, a stream of research have found that consumers have raised their awareness towards environmental friendly products and services (see e.g. (Krystallis et al., 2012; Lebeau et al., 2013)). Another stream have focused on governments' roles in implementing new policies favouring green products (Chaabane et al., 2012; McKinnon et al., 2015). Last but not the least, research related to business concerns have found that a number firms are marketing for green products (see e.g. (Albino et al., 2009; Dangelico and Pujari, 2010; Dey et al., 2011; McKinnon et al., 2015)).

In Europe, special concerns have been placed on the attitude towards environment-friendly products (products with less carbon footprints). It is not uncommon to observe carbon footprint tag with some products in supermarkets or restaurants. A range of policies have already fostered environmental friendly products and awareness (European Commission, 2018). According to a survey, 80% of Europeans are concerned about the environmental impact of products (European Commission, 2013).

A complete shift towards environmental friendly products, however, might be unlikely. Many greener products are more expensive than the normal ones and some consumers might not want to pay for the extra sustainability from their own pocket. In addition, the role of other stakeholders, such as manufacturer, retailer, government, etc., also needs to be considered. In this paper, we try to answer the following research questions:

1. To what extent, will consumers' buying behaviour be impacted by the carbon footprints of a product or service?
2. Who will be the major driving force of greener products?

We limit the scope of our research within Europe only because much concern has been placed on green products within this geographic area. The rest of the paper is structured as follows. In the next section, we explain research method including description of survey and interviews as data collection activities for this study. After research method section, we report the main findings from the survey and interview with analysis followed by a short discussion on our findings. Finally, we conclude the paper with future work in the last section.

Research Methodology

This study has used a Delphi approach (Rowe & Wright, 2001; Skinner et al., 2015) to explore the environmental sustainability trends in logistics based on experts' opinion. The reasons for using Delphi study include the following: to gain deeper understanding and knowledge about EFPs; capture the holistic picture at national and international levels; and getting experts' opinion.

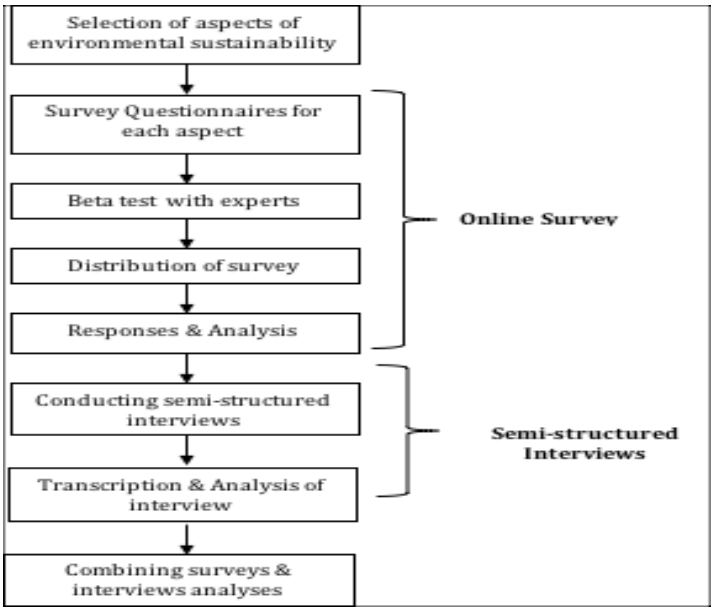

Figure 1 - An overall Delphi Approach

The overall Delphi approach has been conducted in an iterative manner consisting of (i)

an online survey including beta test, sampling strategy, selection of experts for the survey, record of total number of contacts for the survey, with responses; and (ii) two rounds of semi-structured interviews with a panel of experts considering their experiences, industries, focus areas, gender and geographic locations. In the second round, the results from the first round is collected and reviewed by the experts again, so that the experts have the chance to take positions on their opinions. Both the data collection activities were conducted with the experts in the field from business, research and authorities. This study maintains the anonymity of the participants during both activities of data collection. The overall process has been shown in *Figure **1*** above.

Online survey

The questionnaire about sustainability were divided into 3 distinct yet related aspects as consumers' attitude towards sustainable logistics, role of technology in enabling sustainability, and roles of different logistics players towards accomplishing sustainability. Each of the aspects contained description and 1-2 key questions along with their potential impact along the time. After making necessary adjustment, the survey questionnaires were then distributed to 200 experts working within the logistics field. The experts selected for the survey included shipper and consignees, model transport operators from all transport modes, freight forwarders, logistics platforms and terminals managers, IT professionals, associations concerned with environmental issues in transport, research and innovation organizations, and trade unions among others. These respondents were divided into four main categories: Business sector, Authorities, Research and Others. For the survey, this study used a snowball sampling strategy with 200 participants. At the end of the survey, a total of 54 responses were collected and analysed from the experts. Most of the survey respondents were on the professional level, at least.

Semi-structured interviews

The analysis of survey provided useful information about the environmental sustainability future trends in logistics and freight transportation. However, the results were of descriptive nature and lack insights on why would a specific key area will follow a particular direction. Therefore, this study conducted semi-structured interviews in order to gain insightful information. For the semi-structured interview, a panel of 7 experts were chosen considering their experiences (more than 10 years), gender (50/50), area of expertise (multidisciplinary) and geographic distribution across Europe. All the interviewees were provided with the summary of survey responses to give them idea about the topics to be discussed. Each interview lasted for about an hour. All the interviews were recorded and transcribed for later analysis. The overall summary of interview results was communicated with the interviewees to cross-check the interpretations made during the analysis.

Data Analysis

Data from both sources were analysed through a four-stage process including data transformation, typology development, case analysis and data consolidation (Caracelli and Greene, 1993). A summary of data analysis has been presented in

*Table **1*** below:

Table 1 - Data analysis strategy

Stage	Description
Data Transformation	Data from survey was transformed into narrative and semi-structured interviews data were included. These data were divided into 3 themes: consumers attitude; technology for EFPs; and stakeholders roles for EFPs
Typology Development	For each theme, two sub-categories were made: description of trends for each theme with different viewpoints and various opinions on time frame for the adoption of each theme.
Extreme Case Analysis	The initial explanations from these themes were further refined during the interviews by asking experts to make opinions and justify why their opinions will hold in the future.
Data consolidation	Joint data from survey and interviews were reviewed and consolidated in the form of narrative.

Findings

Based on the data collected and analysed in this study, green logistics and sustainability emerges as the key driver with the highest impact in shaping the future of logistics and freight transportation. This study has identified three important areas for sustainable logistics future: consumers' attitude toward environmental friendly products; role of technology in facilitating environmental friendly products; and roles of different stakeholders in supporting environmental friendly products.

Consumers' attitude toward environmental friendly products

Over the years, consumers in various parts of the world have shown sign of an increased awareness related to the environmental sustainability in logistics (also referred as greening of logistics). This awareness is reflected in tangible as well as intangible purchases, that is, both products and services. The results show that almost all the experts tend to agree that concerns about environmental aspects will affect consumers' buying behaviours. This implies that greening of logistics is not a concern of government and businesses merely, rather individual consumers are also interested in carbon footprints of the products or services they buy. The following *Figure **2*** shows the trend of greening of logistics according to experts' point of view:

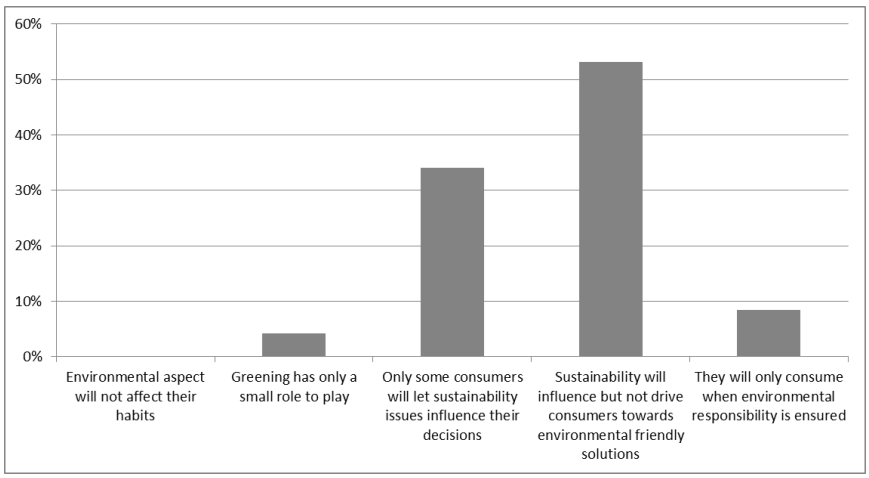

Figure 2 - Consumers' behavior and carbon footprints

According to more than 80% of the experts, consumers will show concern about sustainability but it will not become a deciding factor in buying various products

(Figure 1 above). The findings can be divided for two types of markets – Business to Business, and Business to Consumers. Consumers within business to business environment show seriousness towards environmental-friendly products. They use these environmental-friendly products or ingredients as the part of their branding and marketing strategy. However, this in opposite in case of business to consumer environment. The findings reflect that sustainability is not among the top priorities of consumers to buy green products, despite the fact that sustainability concerns are gaining public attention. This holds mostly true in business to consumers settings.

The main reason for this observation is, according to experts' interview, is that greener products are in general more expensive than the normal ones. This explains why the northern Europeans, who are in general richer, are more concerned on the environmental friendly products. Another reason is that consumers still lack sufficient information towards greener products. They are not aware to what extend their "nice behaviour" of buying greener products will be able to contribute to environmental sustainability.

Although an increased interest towards eco-friendly products is visible, the time of adoption plays a critical role in deciding the future of greening of logistics. This time factor will probably decide the pace at which business sectors will put environmental concerns as one of the basics features of their offerings. According to more than 60% of the experts, it may take 3-10 years where consumers (b2b or b2c) will put greening of logistics as one of the main factors while buying products (see *Figure **3*** below). However, one-fifth of the experts do not consider it as a deciding factor. Only 10% think it has already been a key driver. However, this is true mostly in b2b environments.

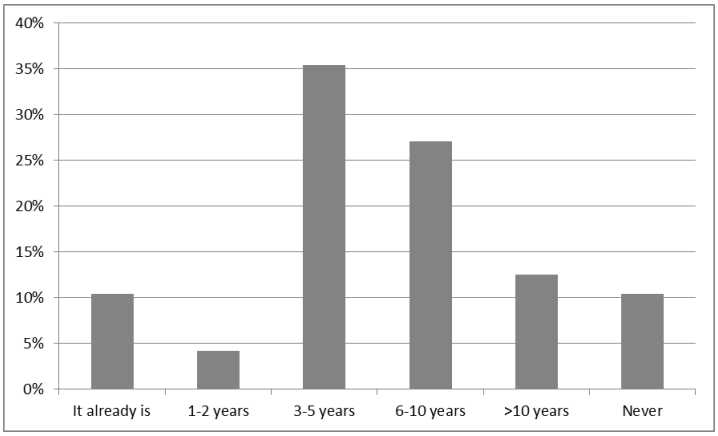

Figure 3 - Timeline for environmental sustainability as a key driver

The study further probed the reasons for delayed or slow adoption of greening of logistics. These reasons can be summarized as follows:

- *Difference in behaviour towards sustainability in different geographic areas across Europe:* consumers living in different parts of Europe show variations in levels of sensitivity towards environment-friendly products. For example, consumers with higher income (such as in Scandinavia and Germany) take environmental impacts associated with products more seriously than those in lesser income (such as in Mediterranean countries).
- *Lack of structured program:* The interviews also highlighted that consumers are overwhelmed by the information in the current age of internet. However, there is a lack of well-planned program or campaigns motivating consumers towards environmental friendly products.

- *Higher price of eco-friendly products:* Experts also mentioned that eco-friendly products have higher price than their counterparts. This higher price is inversely proportional to the chances of consumers with less buying power.
- *Personal preferences:* Last but not the least, consumers even within the same geographic region has different personal preferences towards buying green products.

Technology enabling/supporting cheap and environmental friendly offerings

In addition to consumers' attitude towards eco-friendly products, the role of technology in enabling eco-friendly offerings was explored. Technology, in general, can serve as (i) an enabler – technology plays a 'modest' role in transforming industry; or (ii) a disrupter – technology plays a 'critical and vital' role in solving green logistics problems. These roles of an eco-friendly products technologies are dual in nature - reducing cost and improving the quality of products or services. In our case, it is likely that technology will be able to make products greener and cheaper, so that they are favoured by consumers.

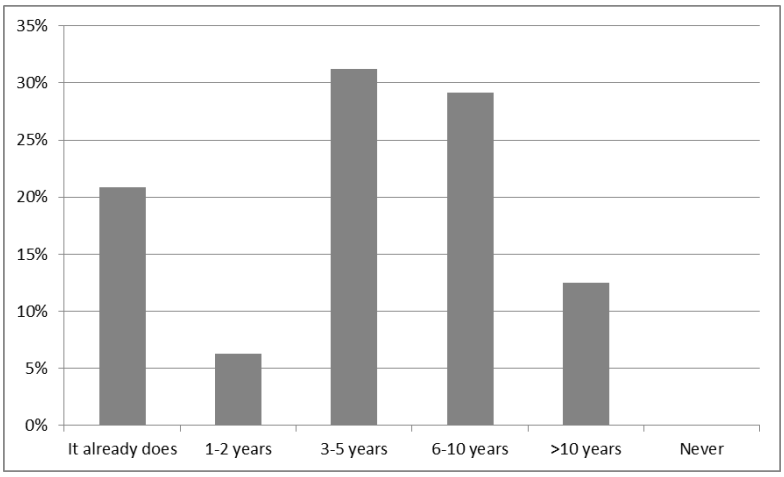

Figure 4 - Technology role in enabling greening of logistics at low cost

The above *Figure 4* shows the results of experts' views on enabling technologies to accomplish this dual role. Like consumers attitude, more than 60% of the experts agree that eco-friendly products related technologies will take 3-10 years to accomplish the dual role. While one-fifth think that technology has already achieved this dual role. There are a little over 10% of experts who are not very optimistic or hopeful about the pace and think it may take over 10 years. It is worth noting here that none of the experts think that technologies are not capable of achieving cheap and environmental friendly offerings.

Roles of various actors in environmental friendly offerings

In logistics, different stakeholders have their own interests depending upon their nature of business and concerns. Some of key stakeholders include manufacturers, logistic service providers, retailers, end-consumers and governments. This study probed for their roles in enforcing or gearing towards environment friendly products. The reason to incorporate logistics service providers is that logistics sector discharges one of the largest proportion of carbon emissions across all industrial sectors and they are still be expected to increase their emissions in the future (Dong et al., 2018).The survey shows that all stakeholders could play a critical role to support as shown in

Figure *5* below.

This study further probed how these stakeholders are contributing with their roles in providing green logistics. The findings reflect that government authorities support sustainable solution both directly and indirectly. These authorities have a number of reasons to support greening of logistics including 'their own societal concerns and interests', and complying with EU and UN regulations and guidelines. The authorities then use different 'steering mechanisms' such as taxes, congestion charges to enforce these practices. However, the concerned laws and regulations varies in different countries across Europe and even within different regions within the country – some local authorities implement stricter environmental policies than others within the same country.

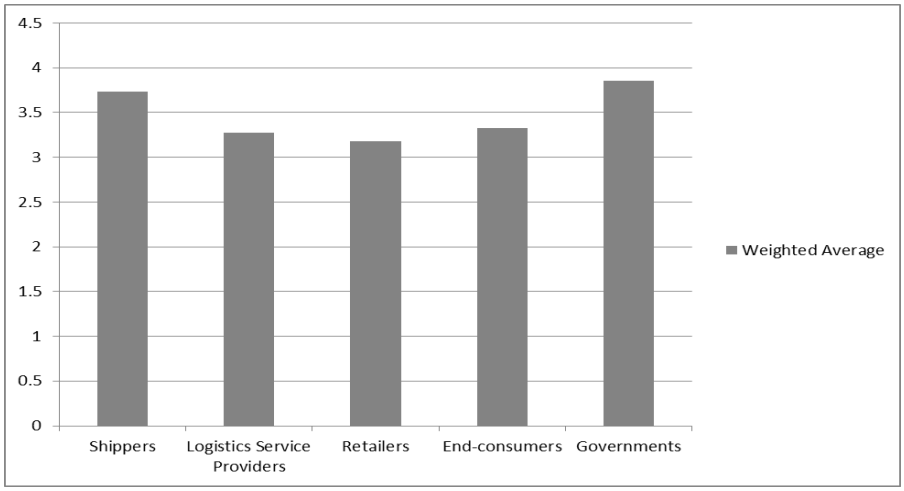

Figure 5: Roles of various actors in greening of logistics

Logistics service providers are naturally supposed to reduce emissions in logistics activities to reduce emissions. These could be implemented in various ways (McKinnon, 2018). Manufacturers are expected to produce greener products (some citations here). The role of consumers themselves cannot be ignored. Although they are not involved in any carbon-cutting activities, they could indirectly impact the manufacturers and logistics service providers to implement green manufacturing/logistics to save emissions.

Discussion

In general, the analysis of the data shows the followings trends:

- Consumers are showing a greater concern towards environmental-friendly products. However, these concerns vary depending upon the users' attitudes towards sustainability within different regions in Europe.
- More than 80% of the respondents suggest that sustainability will influence consumers' attitude towards green products. But not all of them will take sustainability as a single driving force in choosing green products or services.
- Consumers choosing sustainable products as top priority will still take time. This will take 3-10 years for consumers to prioritize sustainable products, despite the fact that many have increased their awareness about sustainable products.
- In this regard, technology will help increasing sustainability on one hand, and reducing cost, on the other hand. However, it will again take 3-10 years to happen this through technology.

- Last but not the least, various stakeholders including manufacturers, logistics service providers, retailers, end-consumers and government will be a major driving force of logistics sustainability. It is worth noting here that the government is considered as playing equal role towards sustainability as other stakeholders, against the perception of transcending others.

The findings would help firms and governments understand the purchasing behaviour of consumers toward green products, and support them in designing relevant strategies and policies. The study has collected data from the experts in the field in the form of first-hand information. For the purpose of this study, a close collaboration between academics and industry professional has resulted in useful insights for logistics future in the digital era.

Conclusion and Future Work

This study provides initial findings from the trends related to environmental friendly products including their adoption time frame. The results suggest that EFPs will become one of the key choices for consumers and play a big role in shaping the future of logistics. While consumers will still take time in purchasing EFPs, various related technology will continue to play their roles in providing such products at the affordable rates. Last but not the least, various stakeholders will be playing more active roles in driving various segments of society and business sectors to use environmental friendly products. However, these stakeholders especially governments and business sectors have to launch steering mechanisms and organized campaigns towards environmental friendly solutions.

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