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The impacts of relocating a logistics facility on last food miles – The case of Melbourne's fruit & vegetable wholesale market

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ABSTRACT

The distribution activities of fresh produce by retail and wholesale trade industries generate a large volume of freight movements in urban areas. Recently, the local government in Melbourne, Australia have relocated the fruit & vegetable wholesale market from a centrally located suburb: West Melbourne to Epping, a suburban area on the fringe of Greater Melbourne. This paper investigates the impacts of the market relocation on the freight activities for fruit and vegetable retailers and wholesalers that source fresh produce directly from the wholesale market. This study utilised a telephone questionnaire with retailers to identify their delivery schemes and evaluate the impact of the market relocation on their freight trips. The analysis of the responses indicated that the market relocation has led to a significant increase (31%) in distance travelled (VKT) by retailers compared with the former site in West Melbourne. It is estimated that this additional distance contributes 830 tonnes of CO₂-e per year for all the freight trips by the retailers. Furthermore, nineteen fruit & vegetable wholesalers participated in the semi-structured interviews to evaluate the impacts of the market relocation on their freight activities with respect to additional vehicle-km and explore any changes to their freight trips. It is estimated that wholesalers have to drive on average an additional 14.1 km to distribute the fresh produce to their customers due to the market relocation. Analysis for the wholesalers revealed that the market relocation complicated their ability to sustain their customer base and geographical coverage due to the additional vehicle-km.

1. Introduction

Many metropolitan areas are surrounded by highly productive agricultural regions. These regions act as the primary source of fresh produce that are transported daily to assure the continuous supply of food requirements for metropolitan areas. For instance, Melbourne, Australia is located within a highly productive food-bowl of regional areas that supply Melbourne with 82% and 13% of the metropolitan's daily requirements of fresh vegetables and fruit (Sheridan et al., 2015). Government authorities and urban planners are starting to pay more attention to the efficiency and sustainability of fresh food distribution networks in urban areas (Morganti, 2011). They are concerned about the environmental and social impacts on the environment and traffic conditions within dense urban areas. One of the widely implemented policies to efficiently manage and distribute the fresh produce has been the establishment of wholesale markets in metropolitan areas.

Fruit & vegetable wholesale markets serve as a centralized platform for the grouping and gathering of farmers, growers, wholesalers and retailers. Cadilhon et al. (2003) and Tollens (2000) suggested that these wholesale markets offer several economical and logistical benefits for

the distribution of fresh produce. Centralisation of producers, growers, wholesalers and retailers in a single facility improves transparency and reduces demand uncertainty. Moreover, Argenti (2000) emphasised that local governments have to carefully select the location of wholesale markets in urban areas to facilitate efficient flow of deliveries from the market to retailers and minimise distances travelled. Green et al. (1997) and Cadilhon et al. (2003) argued that the relevant literature on fresh produce distribution networks have paid more attention to supermarket and convenience stores. Consequently, it can be argued that there is a limited number of studies investigating the urban distribution activities associated with fruit & vegetable retailers and wholesale markets compared with other food distribution studies.

Local authorities in many urban areas have implemented policies to relocate various facilities and services away from dense and crowded inner areas. On August 31, 2015, the Melbourne wholesale market was relocated from its previous location in West Melbourne (Inner area of Melbourne) to Epping, which is located 26 km north of Melbourne's CBD (Piper, 2015). The market includes two major markets: the fruit and vegetable market and the flower market as well as supporting logistics facilities. The Melbourne Market Authority (MMA) is responsible

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for controlling, maintaining and managing the site and the operations of the Melbourne Wholesale Market (Melbourne Market Authority, 2015). More than 4000 businesses use the market daily as a hub for selling and buying fresh produce as well as 1800 individual fruit and vegetable buyers representing specialised retailers, supermarkets and restaurants (Melbourne Market, 2015).

Several of these buyers act as wholesalers that distribute fresh fruit and vegetables to various food service outlets, retailers and institutional customers especially in Central Melbourne where there is large number of food outlets. Aljohani and Thompson (2017) reported in their observational study of deliveries to Melbourne CBD that about 34% of the number of freight trips to food outlets with large volume being fresh produce. It can be argued that the last food mile for F&V retailers would be impacted by the relocation to the city's fringes. Dablan and Rakotonarivo (2010) and Aljohani and Thompson (2016) warned that relocation of logistics facilities from inner urban areas to suburban areas contribute to increasing the vehicle-km of delivery activities.

This paper analyses local government decision-making with respect to logistics land-use planning and its impact and interrelationship with last mile freight stakeholders in Melbourne by conducting a case study on the Melbourne Wholesale Market. The paper investigates the impacts of the relocation of Melbourne Wholesale Market on the last food mile for F&V retailers and wholesalers in Melbourne with respect to changes in distances travelled and freight trips. Moreover, an evaluation of the transportation emissions in terms of CO₂ emissions resulting from the additional vehicle-km is presented. The case of Melbourne wholesale market relocation is utilised to highlight the outcomes of implemented local policies in various metropolitan areas with respect to relocating logistics facilities to suburban areas. The F&V retailers have been selected as the case study for this research as they hold about 23% market share of the sales of fruit & vegetables in Melbourne (Spencer and Kneebone, 2012). These retailers usually operate older and smaller commercial vehicles on an own-account transport to pick up and deliver fruit and vegetables from the Wholesale market. The exemplary study by Marquez et al. (2010) focused on fruit and vegetable transportation from major producers in Victoria to Melbourne wholesale market to both major supermarket chains and grocery retailers. Their study provided valuable insights in fresh produce distribution activities including all major supply chains. However, they did not pay the same attention to the link between the Melbourne Market and only F&V retailers. This highlighted a research gap and called for further investigation into the last mile distribution activities for F&V retailers.

The results and analysis of this research will better inform scholars and decision makers with up-to-date knowledge about the last food mile of fruit & vegetable retailers in terms of their delivery scheme and structure within urban areas. The remaining of the paper is organised as follows. Section 2 starts with developing an overview of the relevant literature with respect to food distribution in urban areas. Section 3 provides a detailed description of Melbourne's metropolitan freight movement followed by a detailed description of the case study under investigation (Melbourne Wholesale Market) highlighting its context, freight movements at the market and issues that were indicated by market stakeholders. Section 4 describes the applied methods approach that conducted a telephone questionnaire with retailers and semi-structured interviews with selected wholesalers. Section 5 highlights the main findings of this research with full analysis of the transportation impacts resulting from the relocation of the market. Section 6 provides a concluding summary and policy recommendations.

2. Literature review

2.1. Overview of fresh food distribution in urban areas

Recently, the field of food transport has received growing attention due to its increasing volume and environmental impacts. One prominent concept has been the discussion of food miles. Food mile seeks to

estimate the total transport distance travelled by food products from point of production to point of consumption (Saunders et al., 2006). This concept takes into account the environmental impacts resulting from freight transport of food products. Furthermore, Morganti (2011) defined last food miles as the final delivery of perishable goods to urban food outlets and retailers, which are mostly carried on own-account commercial vehicles. Morganti and Gonzalez-Feliu (2015a) expressed their concern regarding the impacts of last food miles on the environmental and social sustainability of urban areas as it involved large number of inefficient deliveries of food products.

In the only study to estimate food miles impact for an Australian city, Gaballa et al. (2007) estimated that in a typical shopping basket of food for a customer in Melbourne, the fruits and vegetables would travel a total of 8730 km on the roads from growers and farmers to be delivered to Melbourne CBD. Consequently, the total greenhouse gas emissions resulting from transporting food this road distance was reported to be 7038 tonnes of CO₂-e, which includes CO₂, CH₄ and N₂O. Furthermore, The FoodMap report, which analysed the major food distribution channels in Australia in 2012, reported that supermarket and convenience stores held 72% total share of the sales of fresh fruit and vegetables (Spencer and Kneebone, 2012). Moreover, the report indicated that F&V retailers held 23% share in Australia at an estimated annual sales volume of 282,600 tonnes of fruit and 487,200 tonnes of vegetables.

Transport researchers and urban planners need to carefully study this impact to analyse and enhance the efficiency of last food mile activities. A study conducted in 2007 by the Australian Food Chain Intelligence estimated that the refrigerated transport of vegetables in Australia contributed about 1.24 megatonnes of CO₂-e (Estrada-Flores, 2009). Furthermore, Marquez et al. (2010) indicated that the transport link between Melbourne Market to supermarkets and retailers represented the highest contribution to GHG emissions compared to transport from producing regions to the Melbourne Market. However, Rama and Lawrence (2008) criticised the narrow focus of food mile studies on emissions only from distance travelled and failing to take into consideration other environmental impacts associated with food production as well. Similarly, Estrada-Flores and Larsen (2010) warned that food miles should not be used as the only main indicator for sustainable fresh produce freight transport. They described that promoted sustainable transport systems should encourage using eco-friendly vehicles, encouraging the load utilisation and reducing the travelled distance.

Morganti and Gonzalez-Feliu (2015b) suggested that wholesale markets should be also evaluated from a logistics perspective as they operate similar to a large logistics facility such as a warehouse or distribution centre. Etemadnia et al. (2015) asserted this analogy as they compared wholesale markets to consolidation centres that group fresh produce deliveries from various growers in large trucks to the wholesale market. Fruit & vegetable wholesale markets generate a substantial number of freight movements in urban areas especially in the delivery activities to retailers using various classes of trucks and commercial vehicles. For instance, the average daily number of vehicles movements in the Paris Rungis Wholesale Market, Rotterdam Wholesale Market and New Covent Garden Market of London are 25,000 vehicles, 10,000 vehicles and 4500 vehicles, respectively (Cadilhon et al., 2003). Similarly, the daily average vehicle movements at the Melbourne wholesale market in 2009 was estimated to be 4416 commercial vehicles, including 1926 trucks (Cardno, 2013).

Different local and regional authorities in Europe have implemented various measures and strategies to consolidate and optimise food deliveries from wholesale markets in order to minimise the environmental impacts in urban areas. One of the most successful projects has been the urban food delivery platform: Ecocity that was implemented at Parma's fruit and vegetable market (Morganti, 2011). The market's authority manages the distribution of 40 tonnes of food products to 250 food businesses and services in Parma via 16 transport operators and carriers

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