

2010


# Utilisation of foreign trade zones in the global supply chain: an exploratory study

Hokey Min

*Bowling Green State University - Main Campus*, [hmin@bgsu.edu](mailto:hmin@bgsu.edu)

Thomas E. Lambert

Follow this and additional works at: [http://scholarworks.bgsu.edu/management\\_pub](http://scholarworks.bgsu.edu/management_pub)

 Part of the [International Business Commons](#), and the [Operations and Supply Chain Management Commons](#)

---

## Repository Citation

Min, Hokey and Lambert, Thomas E., "Utilisation of foreign trade zones in the global supply chain: an exploratory study" (2010). *Management Faculty Publications*. Paper 6.

[http://scholarworks.bgsu.edu/management\\_pub/6](http://scholarworks.bgsu.edu/management_pub/6)

This Article is brought to you for free and open access by the Management at ScholarWorks@BGSU. It has been accepted for inclusion in Management Faculty Publications by an authorized administrator of ScholarWorks@BGSU.

---

## The utilisation of foreign trade zones in the global supply chain: an exploratory study

---

Hokey Min\*

James R. Good Chair in Global Supply Chain Strategy  
Department of Management, BAA 3008C  
College of Business Administration  
Bowling Green State University  
Bowling Green, Ohio 43403, USA  
Fax: 419-372-6057  
E-mail: hmin@bgsu.edu  
\*Corresponding author

Thomas E. Lambert

Economics Department  
School of Business  
Indiana University Southeast  
New Albany, Indiana 47150, USA  
E-mail: tlambert@iupui.edu

**Abstract:** Foreign Trade Zones (FTZs) are considered duty-free areas and, thus, not governed by the usual customs and tariff controls. In other words, the merchandise permitted in the FTZ may be stored, sold, exhibited, labelled, repacked, assembled, distributed and mixed with other merchandise without paying customs duty until merchandise is released from the zone. Deferred customs duties in the FTZs can contribute significantly to the profitability of the Multinational Firms (MNFs) that get involved in global supply chain activities. Thus, the utilisation of FTZs is believed to have a positive impact on export/import operations and the location decisions of MNFs. Despite such benefits, many MNFs still have not fully explored the possibility of utilising FTZs. Through an exploratory study, this paper identifies the factors that facilitate or hinder the usage of FTZs in the USA. Also, this paper examines the impact that FTZs have on the selected manufacturing and logistics industry and determines how significantly FTZs affect the MNFs' decisions on locating their facilities.

**Keywords:** foreign trade zones; FTZ; global supply chain; international trade.

**Reference** to this paper should be made as follows: Min, H. and Lambert, T.E. (2010) 'The utilisation of foreign trade zones in the global supply chain: an exploratory study', *Int. J. Services and Operations Management*, Vol. 6, No. 2, pp.110-125.

**Biographical notes:** Hokey Min is the James R. Good Chair of Global Supply Chain Strategy at the Department of Management of Bowling Green State University, USA. He was a Professor of Supply Chain Management, a Distinguished University Scholar and the Founding Director of the UPS Centre for World Wide Supply Chain Management and the Centre for Supply Chain

Workforce Development at the University of Louisville. He earned his PhD in Management Sciences and Logistics from the Ohio State University. His research interests include global logistics strategy, e-synchronised supply chain, benchmarking and supply chain modelling. He has published more than 110 articles in various refereed journals, including the *European Journal of Operational Research*, the *Journal of Business Logistics*, the *Journal of the Operational Research Society*, *Transportation Journal*, the *Journal of Transportation Management* and *Transportation Research*.

Thomas E. Lambert is a Lecturer in Economics with the Department of Economics at Indiana University Southeast. He was a Visiting Assistant Professor of Political Science with the University of Louisville during the 2007–2008 school year. He has also taught Urban and Public Affairs and Management at the University of Louisville and was a Research Manager at the UPS Centre for World Wide Supply Chain Management. He received his PhD in Urban and Public Affairs from the University of Louisville. His research interests include public policy, logistics and local government issues and his articles have appeared in *Economic Development Quarterly*, the *Journal of Economic Issues*, the *Journal of Transportation Management*, *Social Science Quarterly*, *State and Local Government Review* and *Transportation Journal*.

---

## 1 Introduction

The Foreign Trade Zone Act of 1934 established Foreign Trade Zones (FTZs) in the USA in the hopes of stimulating US exports and export related jobs during the depths of the Great Depression. In other words, the FTZ programme was developed as an incentive to encourage Multinational Firms (MNFs) to keep their investment and jobs in the USA and not move production/distribution operations offshore by removing unnecessary costs and hassles that do not exist in foreign locations. In general, a FTZ is referred to as a designated secure area under the supervision of US Customs and Border Protection (CBP) that is considered outside US territory for the purpose of duty payment (Evans and Snow, 2005). A FTZ is the US version of what is internationally known as a free trade zone or an Export Distribution Center (EDC) in Canada. FTZs are approved and regulated by the FTZ Board, a branch of the US Customs Department. FTZs are designed to provide competitive advantages for US-based MNFs by lowering supply chain costs associated with foreign trade. For example, a FTZ can stimulate the growth of cross-border trade between Canada and the USA by allowing the importers to bypass a congested port infrastructure and time-consuming inspection process. In addition, FTZ status improves the cash flow of the MNFs utilising it by waiving customs, duties, taxes, and restrictions on goods until they actually enter either the US or the Canadian market.

Originally FTZs were located at seaports, but now include airports and other ports of entry along rivers and lakes in the USA as well as facilities that are not located at or near traditional ports of entry. There are basically two types of FTZ. General Purpose Zones (GPZs) are the original type of zones located at or near ports of entry (ports at waterways, airports, lakes, *etc.*). Beginning in 1963, special sub-zones were allowed that did not have to be located at a port of entry but have to be tied to a GPZ within the same state. For example, General Electric's Appliance Park in Louisville, Kentucky is a sub-zone that is

miles away from the Louisville GPZ that is located in an industrial park along the Ohio River, a port of entry. The growth of sub-zones was dramatic in the 1980s as US manufacturers sought ways to effectively compete against foreign imports. Today most sub-zones consist of heavy manufacturers (especially automotive), pharmaceutical producers, oil refineries, and electronic manufacturers, and the merchandise they receive makes up approximately 85% to 90% of all FTZ merchandise received, both foreign and domestic. As of 2003, in the USA, there were 155 general purpose FTZs and 246 sub-zones which consisted of 2767 firms and around 330 000 employees.<sup>1</sup> The combined value of shipments into FTZ totalled \$204 billion in 2002 and increased to \$247 billion in 2003. Among these, general-purpose zones received \$36 billion in merchandise and sub-zones handled \$211 billion and accounted for 85% of FTZ activities, and this reflected the typical pattern of FTZ activities for the last 15 years (Evans and Snow, 2005).

Firms that participate in FTZ programmes do not pay customs or duties on imported goods, parts, or materials from foreign suppliers if finished goods are in turn exported, which means that FTZ firms do not have to apply for customs drawbacks (or refunds) for duties on the imported materials, *etc.* Duty exemptions also apply to returned merchandise from foreign markets shipped directly to FTZs. Exploiting such cost saving opportunities, US firms exported approximately \$19 billion worth of their products from FTZs in 2003 (Evans and Snow, 2005). In addition, firms located in a FTZ realise the other benefits listed below (see, *e.g.*, Carver, 1999; Grant, 2004):

- ‘Inverted tariff’ relief allows any FTZ importer or manufacturer to pay the duty rate applicable to either the imported components or the finished good itself – whichever is lower.
- Increased flexibility and expedited customs clearance through a FTZ facilitates just-in-time delivery.
- Tougher customs security requirements and federal criminal sanctions imposed by a FTZ can work as deterrents against product pilferage that may lead to lower insurance costs and fewer incidents of cargo loss. Thus, a FTZ may reduce supply chain risk involving global sourcing (Handfield and McCormack, 2008; Pavlou and Manthou, 2008).
- FTZ users can avoid quota restrictions since they are allowed to store most merchandise until a quota is opened.
- Improved quality inspection at the FTZ site reduces a risk of quality failures for the FTZ manufacturers since only the products that meet the buyer’s specifications will be imported through a FTZ.
- With a FTZ in place, imported goods are shipped ‘in bond’ directly to the FTZ firm’s local warehousing or manufacturing site, without going through time-consuming customs inspections and paperwork procedures required by the US customs offices. Thus, the use of a FTZ may reduce lead time and smooth out the product flow in the global supply chain.

- The Trade and Development Act of 2000 allows the use of the weekly entry procedure for FTZ users which allows them to file only one customs entry per week rather than filing for entry for each and every shipment being imported into the FTZ. As a result, the FTZ users can save a substantial amount of import processing expenses.

Despite the aforementioned potential benefits, many MNFs still have not fully utilised FTZs due in part to their lack of understanding and experiences with FTZs.

## **2 Relevant literature**

Due in part to a lack of understanding and experiences with FTZs, the published literature studying the role of FTZs in the global supply chain has been non-existent. However, some attempts were made to assess the impact of FTZs on regional economic development and subsequent employment opportunities. For instance, Calabro (1983) is one of the first to assess the economic benefits of utilising FTZ status and the impact of a FTZ on regional employment opportunities in an area where a FTZ is situated based on hypothetical scenarios. However, Calabro (1983) never used actual data to support his premise that a FTZ increased regional employment. Later, Hakims and Blackstone (2000) discovered that the greater the use of FTZ benefits by firms in a zone, the greater the spillover effect was on the regional income and employment opportunities, because every job in a FTZ often created two additional jobs in the region. An analysis of the Rickenbacker International Airport FTZ found a job multiplier slightly greater than two and a capital investment multiplier of around two (Economics Research Group, 2001). In addition, Swenson (2000) observed that FTZs caused manufacturers to outsource materials, parts, components, and supplies if the US dollar was strong relative to the currencies of nations from which parts and supplies can be purchased. The same pattern can be found in the Canadian EDCs, given the rising value of Canadian currency (Corporate Information, 2008). As the US dollar declines in value relative to these other currencies, more items could be sourced from domestic suppliers. More recently, Lydon (2008) observed that Sony Electronics reduced supply chain costs while improving security, throughput, and customer response time by utilising FTZs in the USA. Hanback (2008) also found that FTZs allowed Crate and Barrel to file its customs entries electronically after goods had been physically shipped, received, and verified, and this consequently helped Crate and Barrel improve customs reporting accuracy, facilitate just-in-time deliveries, and reduce post-entry adjustments and amendments. None of these prior studies investigated how significantly FTZs affect the global supply chain (see Table 1). In other words, none examined whether FTZs, by saving the participating firms' duties, taxes, and fees on imported parts and supplies, helped facilitate the flow of imported products within the supply chain.

To go beyond the existing FTZ studies, we attempt to answer the following research questions:

- What is the typical profile of a FTZ participating firms? Which industry (*e.g.*, automobile, consumer electronics) is most influenced by increased FTZ activities? Which type of FTZs (*i.e.*, general purpose FTZs versus sub-zones) is commonly used by which firms?

- What are the most important incentives for utilising FTZs in the global supply chain? What are the potential benefits of FTZs in the global supply chain?
- Once a MNF decides to utilise a general purpose FTZ, what are the most important determinants for selecting a specific location of the general purpose FTZ?
- What are the lessons from the best practice FTZ users?

**Table 1** The prior FTZ literature

<i>Author(s)</i>	<i>Year</i>	<i>Data collection</i>	<i>Methodology</i>	<i>Key findings</i>
Calabro	1983	Not applicable	Expository	<ul style="list-style-type: none"> <li>• FTZs can facilitate international trade and logistics activities</li> </ul>
Tansuhaj and Jackson	1989	Mail survey of FTZ users and non-users	Discriminant analysis	<ul style="list-style-type: none"> <li>• FTZ users are more aware of zone benefits</li> <li>• FTZ users are more active in importing and exporting</li> </ul>
Mathur	1990	Mail survey of FTZ and non-FTZ export manufacturers	Discriminant analysis/factor analysis	<ul style="list-style-type: none"> <li>• Export manufacturers with relatively high level of foreign contents and high import costs are likely to utilise FTZs</li> <li>• The tough requirements for FTZ status became hindrance to FTZ usage</li> </ul>
Hall	1992	Secondary sources	Cost/Benefit analysis	<ul style="list-style-type: none"> <li>• Subzones have come to dominate FTZ</li> <li>• FTZ activities are dominated by the imports of autos, oil, electric, photo, and equipment industries</li> </ul>
Swenson	2000	FTZ board annual reports	Nonlinear regression analysis	<ul style="list-style-type: none"> <li>• Firms in subzones tend to reduce their reliance on foreign inputs when dollar depreciates</li> </ul>

### 3 Research methodology

To address the aforementioned research questions, we conducted an exploratory study via mail/online questionnaire surveys primarily targeting FTZ participating firms. Given the paucity of FTZ studies and a number of ‘what’ questions raised in the prior section, an exploratory study is justified and favoured over other research methodologies (see, *e.g.*, Yin, 2003 for a rationale for an exploratory study). A five-page questionnaire was mailed in early September of 2007 to 200 randomly selected FTZ participating firms listed in:

- the 2007 American Association of Port Authorities (AAPA) Industry Service Directory
- the National Association of Foreign Trade Zones (NAFTZ) membership directory.

The typical respondent to the questionnaire held the title of President/CEO, Vice President, Director of Supply Chain Management, Logistics, Operations, or Purchasing. The survey instrument was developed from a review of the literature dealing with FTZ issues and focus-group interviews with FTZ administrators, port authorities, and five company representatives who had been utilising FTZ status. The instrument was pre-tested with these representatives and then later modified using their feedback. To increase variability in the data and generalisability of the survey results, the instrument was targeted for various sectors of industry involving FTZ operations (see Table 2). These industries included logistics (40.9% of the responding firms), light manufacturing (13.6%), fabrication (13.6%), wholesale trade (9.1%), heavy manufacturing (4.5%), and others (18.2%).

**Table 2** Sample profiles

<i>Ownership type</i>	<i>Frequency</i>
Primarily domestic with some foreign ownership	1 firm
Foreign and domestic joint venture	1 firm
Domestic (USA)	18 firms
Foreign	2 firms
<i>Primary activities</i>	
Heavy manufacturing	1 firm
Light manufacturing	3 firms
Fabrication	3 firms
Wholesale trade	2 firms
Logistics	9 firms
Others	4 firms
<i>Secondary activities</i>	
Light manufacturing	2 firms
Fabrication	1 firm
Wholesale trade	3 firms
Retail trade	3 firms
Logistics	4 firms
Chemical processing	1 firm
Others	7 firms
<i>Annual sales</i>	
Less than \$25 million	9 firms
\$26 million–\$100 million	3 firms
\$101 million–\$175 million	3 firms
\$176 million–\$500 million	3 firms
\$500 million or more	2 firms
	(2 firms did not respond)
<i>Total number of employees at the establishment</i>	
Less than 50	7 firms
50–99	3 firms
100–499	8 firms
500–999	2 firms
1000 or larger	2 firms

Of the 200 questionnaires, 13 were returned as undeliverable and 22 valid responses were received. These responses produced a total response rate 11.8% which had not reached the targeted overall response rate of over 20% for a valid assessment. For example, Malhotra and Grover (1998) observed that a response rate over 20% was needed for a positive assessment of mail survey results. However, a response rate below 20% for a mail survey is not uncommon in the supply chain literature (Mentzer *et al.*, 1990; Murphy and Daley, 1994; Mentzer and Gandhi, 1995; Pedersen and Gray, 1998; Wood and Nelson, 1999; Lieb and Miller, 2002; Min and Lambert, 2002; Autry *et al.*, 2005; Koh *et al.*, 2005; Min, 2006; Singh *et al.*, 2006). Low response rates are an ongoing concern in conducting mail surveys (Greer *et al.*, 2000; Hager *et al.*, 2003; Larson and Poist, 2004; Wagner, 2008). In general, for mail surveys, response rates in the neighbourhood of 10% to 20% are considered satisfactory (Yu and Cooper, 1983; George and Mallery, 2001).

The questionnaire contained various questions related to the size (*e.g.*, number of employees at the FTZ establishment) and annual sales volume of the responding firms, FTZ activity profiles (*e.g.*, primary and secondary areas of FTZ activities, the FTZ ownership, the type of zones), the FTZ location, the years of FTZ operations, the relative importance of potential benefits/incentives to FTZ operations, and the relative importance of factors for the location of general purpose FTZs, and the potential impact of FTZ on the FTZ participating firm's competitiveness. The questionnaire has 9 to 21 items scored on seven-point Likert scales ranging from *extremely important* (1) to *not at all important* (7). The *Statistical Packages for Social Sciences (SPSS) for Windows* (2008) was used to analyse the data collected from the sample.

More than half of the responding firms (60%) reported an annual sales volume below \$100 million. Slightly less than half of the responding firms (45.5%) had fewer than 100 FTZ employees; 91% had less than 1000. This response implies that FTZ status is not necessarily the exclusive domain of large firms. A majority (83.3%) of the responding firms were in the general purpose zones. Also, a vast majority (94.7%) of the responding firms has been utilising a FTZ for at least the past five years. This fact indicates that a majority of the responding firms were very familiar with FTZ operations and their managerial implications.

## **4 Data analysis and discussions**

### *4.1 FTZ incentives and benefits*

The MNF which engages in manufacturing activities in a FTZ is often treated like it is located outside the USA. Thus, US import duties do not have to be paid on imported components/parts used for manufacturing finished products. If your finished product is ultimately shipped to the US market, you may have the option of paying the finished product duty rate rather than the component duty rate. As a matter of fact, many finished products have lower duty rates – or are duty-free – than their components. If you re-export the finished product to other countries, you do not ever have to pay any duties on the component materials. There are other potential savings such as duty exemption for imported materials that become scraps, sub-standards, or defects and possible administrative cost savings resultant from minimal customs formalities (Gutierrez and Paulson, 2007). Considering these benefits, incentives, and cost saving potentials, many MNFs may want to utilise a FTZ. However, before jumping onto the FTZ bandwagon,



potential FTZ users need to examine whether FTZ status is right for their company or determine which aspects of a FTZ should be exploited to justify the FTZ designation. In other words, a FTZ implementation plan should start with the proper cost/benefit analyses that were supported by solid evidence and realistic performance measures. In an effort to identify the most important and appealing benefits of a FTZ, we asked the respondents to indicate the benefit and incentive features of a FTZ that they are most appreciative of on a seven-point Likert scale (1 = extremely important, 7 = not at all important). The six most important benefits that were most frequently cited by the respondents were:

- 1 US duty waiver on foreign materials
- 2 opportunity to increase foreign sales
- 3 not having to apply for drawbacks
- 4 duty and excise tax exemptions on goods exported from the FTZ
- 5 ability to receive merchandise imported under bond
- 6 ability to choose to pay duties on foreign materials you bring into the FTZ, or finished products you ship from the FTZ (see Table 3).

From the above, it is apparent that duty deferrals or duty-related savings seem to be primary drivers of FTZ utilisation. On the other hand, it is intriguing to note that many FTZ users have not fully recognised a changing role of FTZ as a security buffer zone, an outsourcing experimental site, and a (both federal and state) tax shelter. Such sentiment is evidenced by the FTZ users' responses indicating that potential benefits/incentives such as:

- state and local tax waivers and incentives
- greater/cheaper access to foreign suppliers
- customs security requirements which lower insurance costs
- excise tax waiver on foreign materials
- other federal tax waivers
- opportunity to outsource some functions previously performed in-house are considered least important for utilising a FTZ.

Regardless of the perceived importance of FTZ benefits, it is worth noting that nearly half (45%) of the respondents believed that FTZ benefits/incentives helped them retain their employees' jobs due to cost savings resultant from FTZ utilisation, although the FTZ did not necessarily spur new job growth as shown in Figures 1–2. As displayed in Figure 3, more than half (56%) of the respondents also believed that their FTZ spurred capital investment in the FTZ region. Thus, a FTZ can be a potential boost for regional economic development.

**Table 3** The importance of incentives for FTZ utilisation

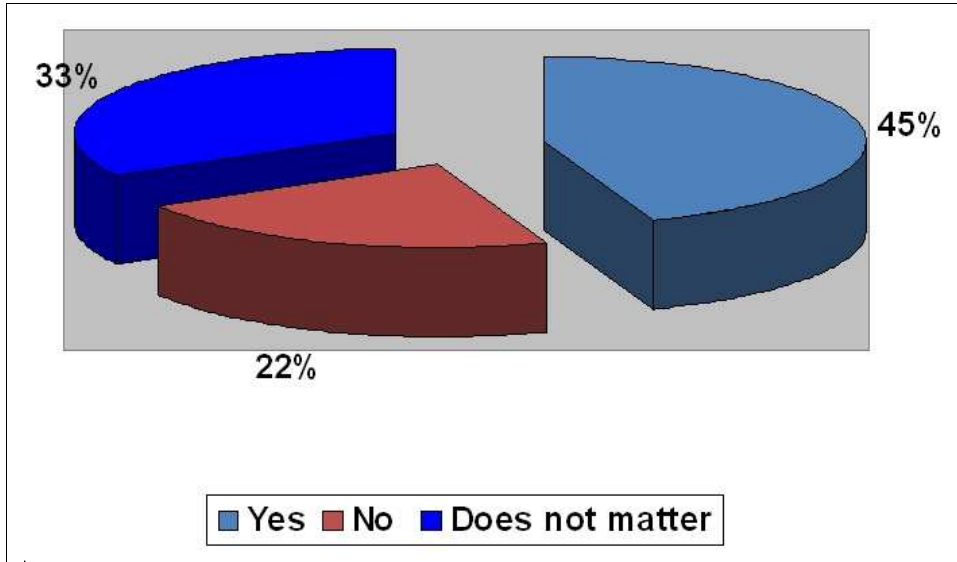
<i>Incentives</i>	<i>Average degree of importance</i> <sup>1</sup>	<i>Rank</i>	<i>Adjusted rank</i> <sup>2</sup>
US duty waiver on foreign materials	5.71 (1.490)	1	1
Opportunity to increase foreign sales	5.57 (1.284)	2	1
Not having to apply for drawbacks	5.50 (2.103)	3	1
Duty and excise tax exemptions on goods exported from the zone	5.43 (1.742)	4	1
Ability to receive merchandise imported under bond	5.43 (1.742)	5	1
Ability to choose to pay duties on foreign materials you bring into the zone, or on finished goods you ship from the zone	5.36 (1.216)	6	1
No duties on scrapped, damaged, or returned merchandise/materials	5.33 (1.397)	7	1
Merchandise can be stored indefinitely without paying duties	5.27 (1.668)	8	1
Opportunity to increase domestic sales	5.14 (1.657)	9	1
Lower inventory costs	5.14 (1.703)	10	1
Greater working capital while duties are deferred	5.13 (1.995)	11	1
Scrap or waste allowances	4.87 (1.246)	12	1
Cost savings in production and/or distribution	4.87 (1.995)	13	1
Economies of bulk shipping	4.85 (1.772)	14	1
Ability to avoid quota restrictions	4.71 (2.054)	15	1
State and local tax waivers and incentives (if applicable)	4.67 (1.952)	16	1
Greater/Cheaper access to foreign suppliers	4.64 (1.985)	17	1
Customs security requirements which lower insurance costs	4.57 (2.102)	18	1
Excise tax waiver on foreign materials	4.53 (1.995)	19	2
Other federal tax waivers	4.29 (1.816)	20	2
Opportunity to outsource some functions previously performed in-house	4.14 (1.834)	21	2

Notes: <sup>1</sup> Numbers in parentheses are standard deviations.

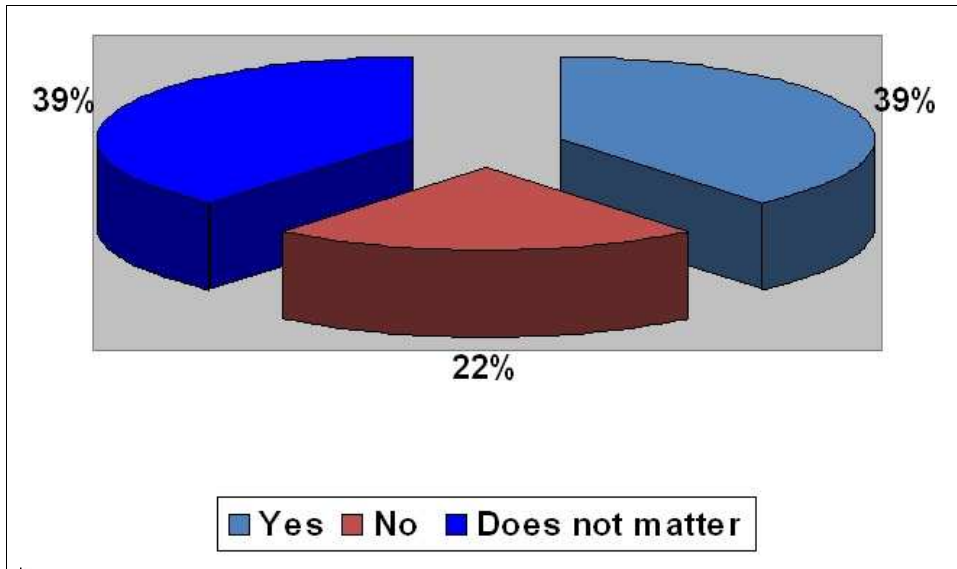
Scale: 1 = not at all important, 7 = extremely important.

<sup>2</sup> The same adjusted rank indicates no statistically significant difference in means at  $\alpha = .05$  based on the result of the Wilcoxon signed ranks test.

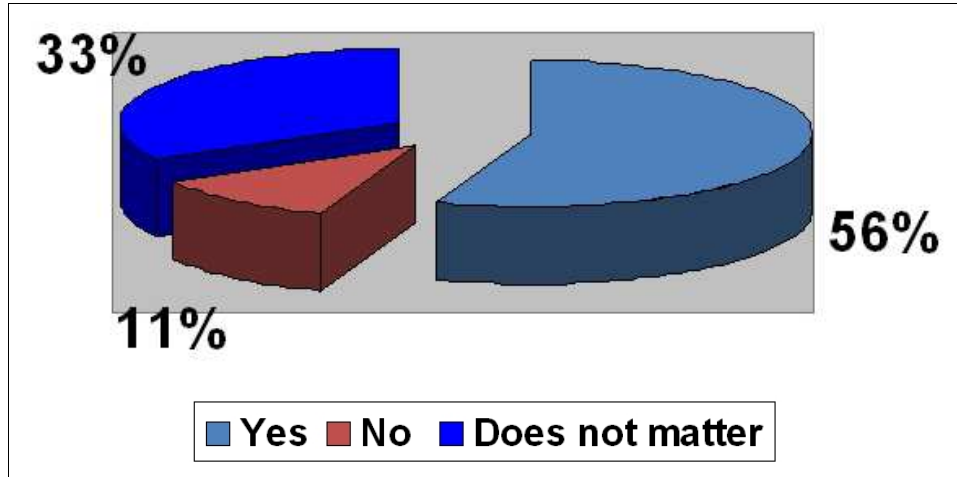
**Figure 1** The effect of FTZ incentives/benefits on employee retention (see online version for colours)



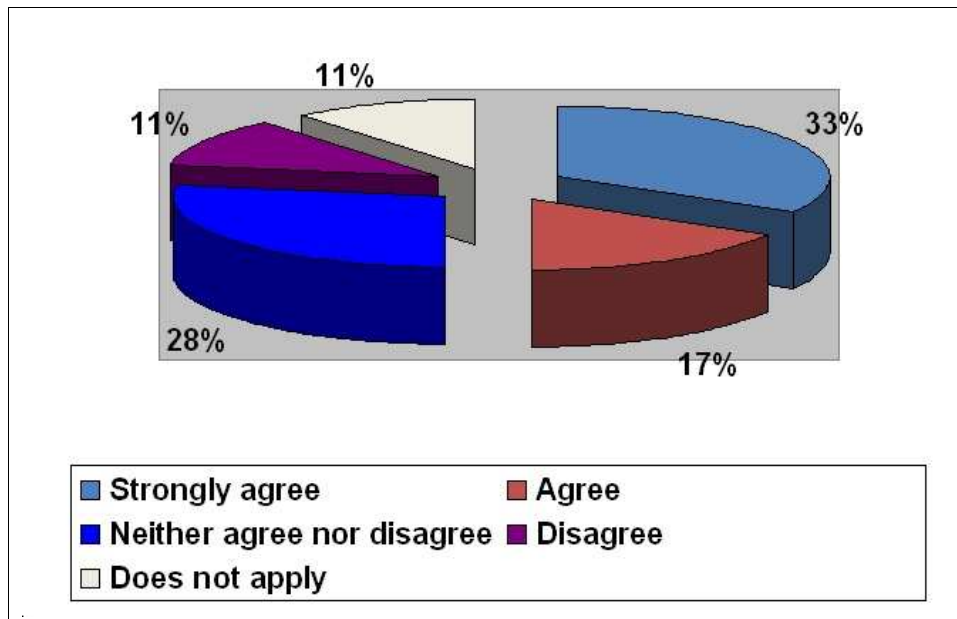
**Figure 2** The effect of FTZ incentives/benefits on new hires (see online version for colours)



**Figure 3** The effect of FTZ incentives/benefits on capital investment (see online version for colours)



**Figure 4** The enhanced competitiveness after utilising the general purpose FTZ (see online version for colours)



#### 4.2 Location factors for the general purpose FTZ

As shown in Figure 4, half of the respondents (50%) indicated that the use of general purpose FTZs enhanced their company’s competitiveness. To further leverage the general purpose FTZ, more than half (57%) of the responding firms newly built their manufacturing/logistics facilities in the general purpose FTZ sites. Given the large number of general purpose FTZ sites all across the USA, we asked the respondents to rate

the perceived importance of different location factors to their FTZ site selection decision on a seven-point Likert scale (1 = extremely important, 7 = not at all important). The three most important factors are:

- 1 proximity to interstates, rail lines, and/or air freight shipment
- 2 availability of warehouse facilities
- 3 available space for future expansion (see Table 4).

It is intriguing to learn that proximity to interstates, rail lines, and/or air freight shipment is a top priority for selecting a particular FTZ location. The rationale may be that many FTZ users have begun to understand how the FTZ works as part of the extended global supply chain. In other words, the general purpose FTZ users realised that FTZ benefits could be easily offset by high logistics costs and thus they tend to locate FTZ facilities near to major transportation networks and hubs. Similarly, the availability of warehousing facilities in the area turned out to be crucial for the general purpose FTZ location decision. This finding is somewhat congruent with the fact that two-fifths (40.9%) of the responding firms primarily engaged in logistics activities in the FTZ. On the other hand, it is somewhat surprising to find that, despite the state/regional government’s increasing effort to induce FTZ investment, state or local workforce and/or economic development assistance was not considered important. Perhaps, most of the respondents still believed that such assistance was not significant enough to offset the FTZ investment expenditure although other benefits were.

**Table 4** The importance of factors for general purpose FTZ location

<i>Determinants</i>	<i>Average degree of importance<sup>1</sup></i>	<i>Rank</i>	<i>Adjusted rank<sup>2</sup></i>
Proximity to interstates, rail lines, and/or air freight shipment	6.25 (1.612)	1	1
Availability of warehouse facilities	5.73 (1.751)	2	1
Available space for future expansion	5.44 (1.504)	3	1
Availability of qualified labour supply	5.20 (1.699)	4	2
Low local property taxes	4.93 (1.668)	5	2
Proximity to customers	4.53 (2.167)	6	2
Proximity to domestic suppliers	4.40 (1.724)	7	3
Location in an enterprise zone	3.93 (2.433)	8	3
State or local workforce and/or economic development assistance	3.71 (2.016)	9	3

Note: <sup>1</sup> Numbers in parentheses are standard deviations.  
 Scale: 1 = not at all important, 7 = extremely important.  
<sup>2</sup> The same adjusted rank indicates no statistically significant difference in means at  $\alpha = .05$  based on the result of the Wilcoxon signed ranks test.

## 5 Major findings and implications

This section summarises key findings of our FTZ study and their practical implications for MNEs who must cope with the challenges of global supply chain operations in an era of free trade movements.

First, although a majority of FTZ users are domestically owned US firms, they indicated that their production inputs (*e.g.*, raw materials, parts, components) were comprised of foreign/imported goods to some extents. This finding makes sense because the presence of foreign contents for the FTZ users' production inputs would allow them to defer duty payments for those foreign contents. However, defying our common sense, typical FTZ users who participated in our survey were not foreign-based firms, but domestically based firms. Through site visits and interviews, we also discovered that many current FTZ users represented the automobile, consumer electronics, crude and petroleum, and pharmaceutical industries where production inputs imported from foreign suppliers were subject to heavier duties due to their high value and consequently cost savings from inverted tariff would be greater. In addition, such industries were in a better position to create economies of scale than the others due to their worldwide customer/supplier bases and thus their cost savings from duty deferral would be greater.

Second, we found that most FTZ users seemed to be aware of the FTZ's traditional benefits such as duty waivers and duty exemptions for goods exported from the FTZ, whereas they did not seem to take advantage of the FTZ's improved security and local/state/federal tax incentives. FTZ is often known to be the most-heavily promoted, but the most underutilised initiative due in part to the public's general misconception. This misconception seems to stem from the fact that local/state government agencies or FTZ administrators have failed to educate potential FTZ users about a myriad of FTZ benefits and incentives. For example, our survey respondents indicated that only about a quarter (27.8%) of them was contacted by either local/state government agencies or FTZ administrators about the FTZ programme. A majority (72.2%) of the respondents said that they learned about FTZ programmes and their benefits from either their business associates or other professional circles. In other words, a lack of understanding of the FTZ benefits/incentives might have contributed to the underutilisation of FTZs. Indeed, Tansuhaj and Jackson (1989) once observed that non-FTZ users had unnecessarily negative perceptions of the quality of service offered by FTZs relative to other alternatives.

Third, we reaffirmed the importance of access to logistics infrastructure such as transportation hubs, arteries, and warehousing facilities to FTZ location given that FTZ-related activities typically involve global logistics operations. As a matter of fact, major distribution hubs such as Atlanta, Houston, Chicago, and Dallas have seen significant growth in FTZs for the last few years (Spencer, 2004). This finding implies that a FTZ would continue to play its role as an important logistics link to the global supply chain, and its success may depend heavily on its logistics efficiencies.

Finally, half of the responding firms believed that their operations in the FTZ designated areas helped their competitiveness, because firms located in FTZs could enjoy lower costs of production, faster processing time, and greater security, and can accordingly offer higher wages to more productive workers than can similar firms outside the FTZ areas. However, there are some skeptics who do not believe the competitive advantage of locating their firms in the FTZ areas, since ongoing free trade movements such as the North American Free Trade Agreement (NAFTA) and the General Agreement

on Tariffs and Trade (GATT) have begun to eliminate tariffs gradually among the USA, Canada, and Mexico and subsequently might have mitigated the FTZ's duty saving potentials (National Association of Foreign Trade Zones, 2005). We also investigated the potential impact of FTZs on regional job growth, since some past studies (PR Newswire, 2004) indicated that FTZs contributed to increases in local jobs by 6%. However, based on our survey responses, we cannot draw a firm conclusion as to the impact of FTZs on job creation or growth.

## **6 Conclusions and future research directions**

This study is one of the first attempts to investigate the role of FTZs in the global supply chain and identify important determinants influencing the FTZ utilisation and selection decisions. Some premises regarding FTZ benefits and impediments were made and then tested to see if those are true using the exploratory study. However, the current study is confined to a relatively small sample of FTZ users in the USA. Thus, the premises made by the current study have to be further examined later by conducting a large-scale empirical study and analysing secondary data sources. The verification of such premises would be a key subject of our future research. Also, a comparative study that compares and contrasts the impact of FTZs (or EDCs) on the regional economy in the USA and Canada would be intriguing. Another line of future research may focus on the effects of FTZs on supply chain security or supply chain risk management in global sourcing environments.

## **Acknowledgements**

The authors would like to thank Mr. Daniel Abele of the *Canadian Embassy* and Mr. Dennis Moore of the *Consular General of Canada* for their financial support for this research. Actually, this research was completed with the assistance of the Government of Canada. Special thanks go to all the survey participants who willingly responded to the mail questionnaire. Also, the authors owe a debt of gratitude to Mr. Randy Campbell, FTZ Administrator at the Port of Toledo, and Ms. Christine Drennen, Director of the *Canadian Studies Center* at the Bowling Green State University for providing valuable insights into this study. Last, but not least, the authors would like to thank anonymous referees for making invaluable comments and suggestions on the earlier version of this paper.

## **References**

- Autry, C.W., Griffis, S.E., Goldsby, T.J. and Bobbitt, L.M. (2005) 'Warehouse management systems: resource commitment, capabilities, and organizational performance', *Journal of Business Logistics*, Vol. 26, No. 2, pp.165–183.
- Calabro, P.J. (1983) 'Foreign trade zones – a sleeping giant in distribution', *Journal of Business Logistics*, Vol. 4, No. 1, pp.51–64.
- Carver, J.R. (1999) *Understanding Foreign Trade Zones*, Los Angeles, CA: Collier.

- Corporate Information (2008) 'Exchange rate of the Canadian dollar versus all currencies', <http://www.corporateinformation.com/currency-exchange-rates.aspx?c=124> (accessed 23 July 2008).
- Economics Research Group (2001) *Research Update: The Economic Impact of Rickenbacker International Airport and Foreign-Trade Zone 138*, University of Cincinnati, Cincinnati, OH: Center for Economic Education.
- Evans, D.L. and Snow, J.W. (2005) *65th Annual Report of the Foreign Trade Zones Board to the Congress of the United States*, Springfield, VA: National Technical Information Service.
- George, D. and Mallery, P. (2001) *SPSS for Windows Step by Step: A Simple Guide and Reference*, 3rd ed., Boston, MA: Allyn and Bacon.
- Grant, B. (2004) 'Discover how your company can save big \$\$\$ by qualifying as a foreign trade zone', *CLM Logistics Comment*, Vol. 38, pp.14–15.
- Greer, T.V., Chuchinprakarn, V. and Seshardri, S. (2000) 'Likelihood of participating in mail survey research', *Industrial Marketing Management*, Vol. 29, No. 2, pp.97–109.
- Gutierrez, C.M. and Paulson, H.M., Jr. (2007) *68th Annual Report of the Foreign Trade Zones Board to the Congress of the United States*, Springfield, VA: National Technical Information Services.
- Hager, M.A., Wilson, S., Pollack, T.H. and Rooney, P.M. (2003) 'Response rates for mail surveys of nonprofit organizations: a review and empirical test', *Nonprofit and Voluntary Sector Quarterly*, Vol. 32, No. 2, pp.252–267.
- Hakims, S. and Blackstone, E.A. (2000) 'Description and evaluation of free trade zones', Unpublished white paper, Privatization Research Center, Philadelphia, PA: Temple University.
- Hall, E.B. (1992) 'A comprehensive, locational approach to the utilization of foreign trade zones', Unpublished PhD dissertation, Miami, FL: Nova University.
- Hanback, B. (2008) 'FTZ distribution centers encourage US investment', Washington, DC, <http://naftz.org/docs/news/FTZs%20as%20Facilitators%20of%20US%20Investment.pdf>.
- Handfield, R.B. and McCormack, K. (2008) *Supply Chain Risk Management: Minimizing Disruptions in Global Sourcing*, Boca Raton, FL: Auerbach Publications.
- Koh, S.C.L., Gunasekaran, A. and Saad, S.M. (2005) 'An empirical study of the effects of uncertainty on SME manufacturers', *Int. J. Services and Operations Management*, Vol. 1, No. 4, pp.395–425.
- Larson, P.D. and Poist, R.F. (2004) 'Improving response rates to mail surveys: a research note', *Transportation Journal*, Vol. 43, No. 44, pp.67–74.
- Lieb, R. and Miller, J. (2002) 'The use of third-party logistics services by large US manufacturers, the 2000 survey', *International Journal of Logistics: Research and Applications*, Vol. 5, No. 1, pp.1–12.
- Lydon, S. (2008) 'Foreign trade zones: fostering US competitiveness in a global economy', Washington, DC, <http://naftz.org/docs/news/Manufacturing%20Electronics%20in%20FTZs.pdf>.
- Malhotra, M.J. and Grover, V. (1998) 'An assessment of survey research in POM: from constructs to theory', *Journal of Operations Management*, Vol. 16, No. 4, pp.407–425.
- Mathur, L.L. (1990) 'Foreign trade zones and U.S. export manufacturing: a comparison of zone and non-zone export manufacturers', Unpublished PhD dissertation, Columbus, OH: The Ohio State University.
- Mentzer, J.T. and Gandhi, N. (1995) 'Microcomputers versus mainframes: use among logistics and marketing professionals', *International Journal of Physical Distribution and Logistics Management*, Vol. 25, No. 4, pp.80–92.
- Mentzer, J.T., Schuster, C.P. and Roberts, D.J. (1990) 'Microcomputer versus mainframe usage in logistics', *Logistics and Transportation Review*, Vol. 26, No. 2, pp.115–131.



- Min, H. (2006) 'The applications of warehouse management systems: an exploratory study', *International Journal of Logistics: Research and Applications*, Vol. 9, No. 2, pp.111–126.
- Min, H. and Lambert, T. (2002) 'Truck driver shortage revisited', *Transportation Journal*, Vol. 42, No. 2, pp.5–16.
- Murphy, P.R. and Daley, J.M. (1994) 'A comparative analysis of port selection factors', *Transportation Journal*, Vol. 34, No. 11, pp.15–21.
- National Association of Foreign Trade Zones (2005) 'Frequently asked questions, Question 11: How have various trade agreements affected the need for the foreign-trade zone program?', [http://www.naftz.org/index\\_categories.php/ftzs/7#Q11](http://www.naftz.org/index_categories.php/ftzs/7#Q11) (accessed 16 April 2008).
- Pavlou, S. and Manthou, V. (2008) 'Identifying and evaluating unexpected events as sources of supply chain risk', *Int. J. Services and Operations Management*, Vol. 4, No. 5, pp.604–617.
- Pedersen, E.L. and Gray, R. (1998) 'The transport selection criteria of Norwegian exporters', *International Journal of Physical Distribution and Logistics Management*, Vol. 28, No. 2, pp.108–120.
- PR Newswire (2004) 'Foreign trade zones pack big economic punch to U.S. economy: detailed impact on annual volume, dollar value of exports and jobs', *PR Newswire*, [http://www.prnewswire.com/?utm\\_source=google&utm\\_medium=cpc&utm\\_term=PR+Newswire&utm\\_campaign=Branding&gclid=CMDpk4rX2JICFQEoPQod3FCGkg](http://www.prnewswire.com/?utm_source=google&utm_medium=cpc&utm_term=PR+Newswire&utm_campaign=Branding&gclid=CMDpk4rX2JICFQEoPQod3FCGkg), 25 October.
- Singh, A., Narain, R. and Yadav, R.C. (2006) 'Benchmarking and performance measurement of supply chain management practices: a survey of Indian organizations', *Int. J. Services and Operations Management*, Vol. 2, No. 4, pp.313–334.
- Spencer, C. (2004) 'How the FTZ program can improve logistics', *Journal of Commerce*, 8–14 March, pp.36–37.
- SPSS Base 16.0 User's Guide (2008) Chicago, IL: SPSS Inc.
- Swenson, D.L. (2000) 'Firm outsourcing decisions: evidence from U.S. foreign trade zones', *Economic Inquiry*, Vol. 38, No. 2, pp.175–189.
- Tansuhaj, P.S. and Jackson, G.C. (1989) 'Foreign trade zones: a comparative analysis of users and non-users', *Journal of Business Logistics*, Vol. 10, No. 1, pp.15–30.
- Wagner, S.M. (2008) 'Cost management practices for supply chain management: an exploratory analysis', *Int. J. Services and Operations Management*, Vol. 4, No. 3, pp.296–320.
- Wood, D.F. and Nelson, R.S. (1999) 'Industrial transportation management: what's new?', *Transportation Journal*, Vol. 39, No. 9, pp.26–30.
- Yin, R.K. (2003) *Case Study Research: Design and Methods*, 3rd ed., Thousand Oaks, CA: Sage Publications, Inc.
- Yu, J. and Cooper, H. (1983) 'A quantitative review of research design effects on response rates to questionnaires', *Journal of Marketing Research*, Vol. 20, pp.36–44.

## Note

- 1 [www.ia.ita.doc.gov/ftzpage/annual-report.html](http://www.ia.ita.doc.gov/ftzpage/annual-report.html)