Barriers to E-commerce Policy in Logistics – an Exploratory Study of the Pearl River Delta, China

Abstract *With the help of the information and communication technology market and the continual ingress of foreign direct investment, the use of the Internet in the Pearl River Delta (PRD) has developed rapidly. While physical infrastructure is a key factor for successful world trade, government policy relating to e-commerce is also a critical element to success. This study, based on the feedback of questionnaires and interviews with practitioners in the logistics industry in the PRD, has collected empirical evidence and confirmed causes of the barriers related to e-commerce policy in logistics operations in the PRD. These included availability and interpretation of rules and regulations, interface between the Chinese law and international law, execution of law and policy and electronic payments in e-commerce in the PRD. The impact of the observed barriers to e-commerce policy may result in reduced competitiveness for the logistics operations of multinational enterprises in China.*

Keywords: Barriers, e-commerce policy, logistics, Pearl River Delta, China.

Introduction

*Correspondence: Jim Mi Jimmy Ng, Department of Logistics, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, Tel: (852) 2766 7418; Fax: (852) 2330 2704; E-mail: lgtjng@polyu.edu.hk

The Pearl River Delta (PRD) is a major world manufacturing base which demands effective logistics management for the flow of raw materials and goods. China's accession to the World Trade Organisation (WTO) has further supported the transformation and globalisation of the region. The Guangdong Province, where the PRD is situated, has remained the country's top province in international trade since 1995 (National Bureau of Statistics of China, 2006). China has attracted a significant amount of foreign direct investment (FDI) since its launch of an open-door policy in the late 1970s and is expected to intensify its efforts to attract FDI (UNCTAD, 2004a). International expansion of production activities is anticipated to remain prominent, but distribution and sales and logistics and/or support functions are also expected to continue their international expansion (UNCTAD, 2004b). FDI received by China in 2005 amounts to US$72.4 billion (People's Daily Online, 2006a). One major reason for foreign-funded enterprises bringing FDI into China is that they can maintain their profitability in the country and statistics show that more than US$200 billion in post-tax profits has been recorded among foreign-funded enterprises in China since the 1990s (People's Daily Online, 2006b).

Trend of E-commerce in China

E-commerce is the general term for Internet and non-Internet computer-to-computer processing of a growing variety of transactions, ranging from electronic data interchange ('EDI') – the well-established handling of business-to-business purchase orders, invoicing, remittance notices and other routine documents – to electronic payment systems, credit cards and consumer sales of goods and services (Anil, 2001). In a paper discussing China's Internet market and its

regulation, e-commerce is defined as the term used for commercial transactions involving the creation, advertising, sale and distribution of products or services conducted by processing and transmitting digitalized data – including text, sound, and visual images – over open e.g. Internet or closed e.g. Intranet networks. The term generally includes transactions conducted through the Internet, Intranet, electronic data interchange, electronic mail, etc (Baker & McKenzie, 2000).

China is quickly embracing information and communication technology (ICT) including the Internet. By July 2005, China had 103.3 million Internet users, 45.6 million computer hosts and 622,534 domain names registered under ".cn" (China Internet Network Information Center, 2005). Domain names registered under .cn have increased to 1,100,480 as at 31 January 2006 (China Internet Network Information Center, 2006). The accumulated growth between January 2002 and July 2005 is 206% in Internet users, 263% in computer hosts and 388% in .cn domain names (China Internet Network Information Center, 2006). The momentum of China's continual growth of information and communication technology is thus apparent. A positive trend of e-commerce can assist the sustainability of growth in the country's international trade. Based on a survey conducted by the Ministry of Commerce, China has revealed promising prospects for e-commerce in China's import and export business (Retail Asia, 2005). Meanwhile the level of sustainability of growth in international trade in the Pearl River Delta will depend on, among other success factors, the effectiveness of logistics and e-commerce management in the region. E-commerce together with the Internet has become an important tool in logistics and supply chain management, from vendor catalogs to shipment and order tracking to scheduling

handled electronically (Lancioni *et al.*, 2000). It is likely that problems will arise as the logistics industry increasingly adopts the fast growing e-commerce in its operations.

E-commerce Policy

Bureaucracy is primarily intended to resolve conflicts through the creation of policy and rules among different interest parties, i.e. consumers, entrepreneurs, labour, other producers and the environment. However, in some cases, it only creates more hurdles. Multinational logistics operators in China may spend months, if not years, applying for the necessary operating licenses and permits, which are issued by different government ministries, departments, or bureaus (Ng, 2004). Another issue is that because a large number of Chinese government bodies have authority to formulate and promulgate e-commerce policy, it has further complicated the procedure. Some examples of these bodies are, the National People's Congress (NPC), the NPC Standing Committee, State Council, relevant ministries, Provincial People's Congresses, autonomous regions, municipalities directly under Central Government, People's Congresses of cities and Special Economic Zones (Wang, 1999). The complex hierarchy of bureaucracy in China in many cases has hindered the development of e-commerce policy in the country's logistics management.

The Internet has also posed a new challenge to China's continued progress towards the rule of law. It can be argued that a weak rule of law can constrict the

growth of Internet associated industries. The State cannot appropriately protect its commercial interests under a weak rule of law, which is more or less out-of-date and adhering to rule of law restricts the State to address dissent or objection in whatever way the State wants to (Liu, 2004). Policies relating to logistics are enforced by more than one government ministry or bureau in China (Economist Intelligence Unit, 2001), making change cumbersome. For foreign investors, the many layers in the hierarchy of the administrative system in China act as a serious barrier to logistics management. FDI will continue to be introduced into China only if foreign investors are protected from bureaucratic red tape and the uncertainty of political risks by an increasingly improved policy framework (Chan, 2001).

A gap in identifying the barriers to e-commerce policy in the logistics industry in the PRD is apparent (Peng *et al.*, 2001). In summary, there is a compelling need for the issues of policy infrastructure in relation to logistics to be addressed and implemented specifically in terms of the use of internet technology. The remainder of this paper explores the nature of the issues confronting logistics operators in the region and their management consequences. In general, this study seeks to answer the following six broad questions:

- Which areas of logistics operations in the PRD are perceived to be difficult?
- To what extent will logistics operations become more efficient if the policies of the government in the PRD are improved?

- How e-commerce, in terms of information and communication technology, is used in the business processes of your company in the PRD?
- To what extent will logistics operations become more efficient if the policies of the government in e-commerce in the PRD are improved?
- What are the causes of barriers to an e-commerce policy in logistics in the PRD?
- What are the consequences of barriers to an e-commerce policy in logistics in the PRD?

Methodology

This study seeks to find and analyze the empirical evidence of barriers to e-commerce policy of logistics in the PRD in order to respond to the above questions. Survey questionnaires supplemented by focus group discussion were used to gather data in the study. The attributes of the questionnaire are found from the literature reviews. Logistics companies, which were publicly available in seven databases in Hong Kong, were randomly requested to join the focus groups. The participants of the focus groups were asked to rank the factors of the questionnaire on a 7-point Likert scale and the results were then discussed in the focus groups to produce the related factors in the tables below.

A copy of the survey questionnaire together with an invitation letter, a consent form and an information letter in respect of the purpose of the study were sent directly to the potential participants. All participants of the focus groups were

assured that their participation was completely voluntary and they might withdraw at any stage of the focus group. A series of focus groups, which had their operations relating to logistics in the PRD, were conducted to solicit and explore the views and opinions of logistics management in the PRD about barriers in e-commerce policy. Focus groups (Ronen *et al.*, 2001) were employed because more in-depth perceptions about the topic were more possible through a focus group process than through direct mailing of a survey questionnaire (Sink *et al.*, 1996). The use of focus groups also enabled a better understanding of the basis on which participants contributed, i.e. it was possible to invite and obtain the contribution of participants with known involvement and expertise. If the study had opted for either a mail survey, or internet survey, it would have been more difficult to guarantee the relevant background of contributors. The size of sampling to be involved in research study varies in accordance with the objectives, methodology and designs of data collection in the study. In the past, a larger sample size was adopted in a survey questionnaire of freight forwarding industry with 221 responses (Lai, & Cheng, 2004) while a study of information technology in a textile apparel chain was based on data and opinions gathered from only 38 firms (Forza *et al.*, 2000). In a study of a case company, only 19 in-depth interviews in a service company were included (Olsson & Karlsson, 2003). In other examples: one company, Lawrence Automotive Ltd. was used to illustrate how the e-business planning model was applied in a practical context (Tang *et al.*, 2003); and only one automotive component supplier, Trico, and its strategic supply base were involved in another study (Esain, 2000). In this study,

35 participants in 12 focus groups participated in the survey questionnaire and in-depth interviews in the focus group. The multiple-category design was adopted for the focus groups (Fern, 2001) which involved, not only managers who dealt with e-commerce directly but also other categories such as managers of operations, sales, marketing, business development, risk management and legal departments in logistics companies.

Application of Questionnaire and Focus Group Methodology

The background of the study was explained to the participants in the focus groups. Participants in the focus groups were first asked to respond to a questionnaire of six statements in connection with the possible barriers to e-commerce in the PRD. The participants provided feedback to the statements on a 7-point Likert Scale, where '1' stands for 'Strongly Disagree' and '7' stands for 'Strongly Agree'. The same statements were used as the leading questions for the discussion among the participants of the focus groups. A liberal meaning was adopted for the terminology 'policy' or 'law' which in the study covered areas of policy, law, rule, regulation, directive, notice and/or instruction issued by the central and local government in China. The compilation of the questionnaire was completed with reference to studies in literature (Speece & Kawahara 1995, Yam *et al.* 1996, Pollitt 1998, Ta *et al.* 2000, Chan, 2002). The content of the questionnaire was further revised after piloting with an experienced logistics operator.

The discussion in the questionnaire and focus groups started with a broad question regarding general barriers to logistics operations in the PRD and the second question was related to policy dimensions of those barriers mentioned in the first question. In order to analyze the extent of e-commerce being used in the logistics industry, the participants of the focus groups were requested to respond to what types of e-commerce were being used in logistics management in their own companies. After asking the participants to look into e-commerce deployment in their companies, discussions were focused on the barriers to e-commerce policy in their day-to-day logistics management in the PRD. Further discussions on causes and consequences of barriers to e-commerce policy in logistics management were conducted by the focus groups.

Results

There were a total of 12 focus groups, of which 7 focus groups had 3-4 participants while the remaining 5 focus groups had less than 3 participants. The participants in the focus groups had substantial work experience in the logistics industry in the PRD. Table 1 shows that among the 35 participants, 24 (69%) have more than 5 years experience and 4 (11%) have more than 20 years experience in the logistics industry.

Table 1: Experience of Participants in Logistics

	Frequency	***(Percentage)***
less than 5 years	***11***	***(31.4)***

6-10 years	***10***	***(28.6)***
11-15 years	***5***	***(14.3)***
16-20 years	***5***	***(14.3)***
more than 20 years	***4***	***(11.4)***

The experience of the participants was spread across several major disciplines of logistics industry. As shown in Table 2 of the 35 participants, 8 (23%) have experience in sale and marketing, 7 (20%) have experience in strategy and management, 6 (17%) have experience in information technology and system, 5 (14%) have experience in legal and claims, 4 (11%) have experience in operation, 3 (9%) have experience in warehousing, and 2 (6%) have experience in human resource management.

Table 2: Field of Experience of Participants in Logistics

	Frequency	***(Percentage)***
Sale & Marketing	***8***	***(22.9)***
Strategy & Management	***7***	***(20.0)***
IT & System	***6***	***(17.1)***
Legal & Claims	***5***	***(14.3)***
Operation	***4***	***(11.4)***
Warehousing	***3***	***(8.6)***
HR Management	***2***	***(5.7)***

General Barriers to Policy in Logistics in the PRD

The participants were first asked to respond to the question about which areas of logistics operations in the PRD were perceived to be difficult, in terms of frequency of occurrence of the barriers in general, i.e. barriers of all types. Respondents provided a relatively uniform spread of responses. As shown in Table 3, among the 17 general barriers in logistics, transaction with Customs was perceived as the greatest general barriers by the participants (mean = 5.67), followed by rules and regulations (mean = 5.62), and payment of all taxes to government (mean = 5.24). The top three general barriers are all closely related to the policies, rules, regulations and/or directives promulgated and administered by government organisations in the PRD. The barriers due to strategic issues had the lowest scores.

Table 3: General Barriers in Logistics in the PRD

	Mean	***SD***	***n***
General barriers in Customs	***5.67***	***1.242***	***33***
General barriers in rules & regulations	***5.62***	***1.371***	***34***
General barriers in government payments	***5.24***	***1.062***	***33***
General barriers in qualified logistics staff	***4.94***	***1.368***	***33***
General barriers in track & trace	***4.82***	***1.507***	***34***
General barriers in unfair competition with local firms	***4.67***	***1.614***	***33***
General barriers in inventory management	***4.55***	***1.227***	***33***
General barriers in fleet management	***4.32***	***1.199***	***34***
General barriers in IT hardware	***4.24***	***1.562***	***33***
General barriers in IT software	***4.21***	***1.591***	***34***
General barriers in warehouse	***4.16***	***1.221***	***32***
General barriers in choice of air carrier	***4.15***	***1.877***	***34***
General barriers in rail	***4.15***	***1.760***	***34***

General barriers in the Internet	***4.09***	***1.815***	***34***
General barriers in email	***3.74***	***1.912***	***34***
General barriers in road	***3.39***	***1.580***	***33***
General barriers in choice of sea carrier	***3.09***	***1.694***	***34***

The second question asked for the strength of the relationship between general barriers in logistics and government policy in the PRD, i.e. to what extent logistics operations would become more efficient if the policies of the government in the PRD were improved. The following table (Table 4) summarizes the participants' responses. It reveals that, among the 17 general barriers in logistics, improved policy in the operation of Customs, and rules and regulations in the PRD (mean = 5.82) were considered to be most important for the logistics industry in the region. This is followed by payment of all taxes to government (mean = 5.41), and availability of qualified logistics staff (mean = 5.18) in the PRD. The lowest ranked barriers relating to policy were all related to ICT.

Table 4: General Barriers related to Policy in Logistics in the PRD

	Mean	***SD***	***n***
General policy barriers in Customs	***5.82***	***1.359***	***34***
General policy barriers in rules & regulations	***5.82***	***1.380***	***33***
General policy barriers in government payments	***5.41***	***1.438***	***34***
General policy barriers in qualified logistics staff	***5.18***	***1.290***	***34***
General policy barriers in fleet management	***5.12***	***1.066***	***34***
General policy barriers in warehouse	***5.12***	***1.297***	***34***
General policy barriers in road	***5.12***	***1.175***	***34***

General policy barriers in unfair competition with local firms	***5.06***	***1.556***	***34***
General policy barriers in track & trace	***5.00***	***1.231***	***34***
General policy barriers in choice of sea carrier	***4.94***	***1.179***	***34***
General policy barriers in inventory management	***4.94***	***1.127***	***34***
General policy barriers in choice of air carrier	***4.91***	***1.083***	***34***
General policy barriers in rail	***4.79***	***1.149***	***34***
General policy barriers in IT software	***4.74***	***1.463***	***34***
General policy barriers in Internet	***4.74***	***1.483***	***34***
General policy barriers in email	***4.68***	***1.512***	***34***
General policy barriers in IT hardware	***4.50***	***1.285***	***34***

Utilization of E-commerce

The participants were asked to respond to the issue of how e-commerce, in terms of the ICT, was used in the business process in their companies in the PRD. The results show that e-commerce in the form of ICT is widely used in the participants' companies, of which 7 are multinational enterprises (MNEs), and all the participants' companies have logistics operations in the PRD and Hong Kong. As can be seen from Table 5, among the 12 forms of e-commerce, electronic communications with their overseas branch offices is perceived to have the widest scope of utilization of e-commerce (mean = 5.79) by the participants, followed by electronic communications within companies (mean = 5.29), and provision of information to customers via websites (mean = 5.00). Utilization of e-commerce in logistics in the PRD, i.e. electronic correspondence with overseas branch offices, had a significant margin from the second factor. Utilization of e-commerce was used the least in conclusion of contracts.

Table 5: Utilization of E-commerce in Logistics in the PRD

	Mean	*SD*	*n*
Electronic correspondence with overseas branch offices	***5.79***	***1.274***	***34***
Electronic correspondence in company	***5.29***	***1.508***	***34***
Electronic enquiry	***5.00***	***1.633***	***34***
Electronic ordering or booking	***4.76***	***1.577***	***34***
Business-to-Business	***4.71***	***1.605***	***34***
Electronic tracking and tracing	***4.56***	***1.727***	***34***
Business-to-Customers	***4.56***	***1.691***	***34***
Electronic correspondence in post-contract process	***4.24***	***1.615***	***34***
Business-to-Government	***4.06***	***1.650***	***34***
Online payment	***3.29***	***1.715***	***34***
Online dispute resolution	***3.24***	***1.558***	***34***
Conclusion of contract via electronic correspondence	***3.06***	***1.575***	***34***

Barriers to E-commerce General policy in Logistics in the PRD

The participants were then invited to indicate to what extent logistics operations would become more efficient if the e-commerce policies of the government in the PRD were improved. As logistics operators utilize e-commerce in one form or other, they may encounter different difficulties at different levels in relation to e-commerce policy in the PRD. The results show that (see Table 6) among the 12 barriers to e-commerce policy, online payment acted as the greatest barrier in connection with the general policy in e-commerce in the PRD (mean = 5.41), followed by Business-to-Customers (mean = 5.21), and Business-to-Business

(mean = 5.21). The deviation between the values was not very large and the policy barrier in electronic correspondence was the least likely to be improved.

Table 6: Barriers to E-commerce Policy in Logistics in the PRD

	Mean	***SD***	***n***
Policy barriers in online payment	***5.41***	***1.328***	***34***
Policy barriers in Business-to-Customers	***5.21***	***1.193***	***33***
Policy barriers in Business-to-Business	***5.21***	***1.269***	***33***
Policy barriers in Business-to-Government	***5.21***	***1.083***	***33***
Policy barriers in conclusion of contract via electronic correspondence	***5.06***	***1.536***	***34***
Policy barriers in online dispute resolution	***5.06***	***1.516***	***34***
Policy barriers in electronic tracking and tracing	***4.94***	***1.496***	***34***
Policy barriers in electronic correspondence in post-contract process	***4.88***	***1.387***	***34***
Policy barriers in electronic correspondence with overseas branch offices	***4.76***	***1.458***	***34***
Policy barriers in electronic ordering or booking	***4.68***	***1.512***	***34***
Policy barriers in electronic correspondence in company	***4.52***	***1.395***	***33***
Policy barriers in electronic enquiry	***4.44***	***1.561***	***34***

Causes of Barriers in E-commerce Policy in the PRD

Next the participants were asked to specify the possible causes of barriers to government policy in e-commerce in logistics in the PRD. As shown in Table 7, among the 9 causes of barriers to e-commerce policy in logistics, the participants indicated that the content of rules and regulations of government has become the main cause of barriers to e-commerce policy in logistics in the PRD (mean = 5.71), followed by the interface between the Chinese law and international law (mean = 5.69), and the execution of the law and policy (mean = 5.69). The top four causes of barriers to e-commerce policy in logistics operations in the PRD were clearly the four main causes in the logistics industry in the PRD.

Table 7: Causes of Barriers to E-commerce Policy in Logistics in the PRD

	Mean	***SD***	***n***
Content of rules and regulations	***5.71***	***1.274***	***35***
Interface between Chinese law and international law	***5.69***	***1.510***	***35***
Execution of law and policy	***5.69***	***1.367***	***35***
Government policies	***5.60***	***1.311***	***35***
Uncertainty of judgments of courts	***5.18***	***1.817***	***34***
Quality of people in public sector	***5.17***	***1.485***	***35***
Complexity of the law	***5.06***	***1.571***	***35***
Quality of people in private sector	***4.91***	***1.443***	***34***
Unavailability of details of law	***4.89***	***1.586***	***35***

Consequences of Policy Barriers in E-commerce in the PRD

Finally the participants were asked to answer the question about possible consequences of barriers to e-commerce policy in logistics in the PRD. The results (see Table 8) show that among the 7 consequences, 'affecting efficiency of logistics operations in the PRD' ranks the highest (mean = 5.71), followed by 'prolong delay' (mean = 5.36), and 'reduce customer satisfaction' (mean = 5.18). The top "consequence of barriers to e-commerce policy in logistics in the PRD" had a clear margin from the second one, showing that the issue of efficiency was very important to the logistics operations of the participants. The remaining mean scores were all rather similar.

Table 8: Consequences of Barriers to E-commerce Policy in Logistics in the PRD

	Mean	***SD***	***n***
Affect efficiency	***5.71***	***1.031***	***34***
Prolong delay	***5.36***	***1.084***	***33***
Reduce customer satisfaction	***5.18***	***1.267***	***34***
Hamper validity of electronic contract	***5.09***	***1.444***	***33***
Affect further investment in the PRD	***5.06***	***1.347***	***34***
Threaten market entry	***5.03***	***1.291***	***34***
Increase total costs	***5.00***	***1.181***	***34***

Discussions and Implications

The feedback and responses of the participants from the interviews are summarized in five areas, i.e. general barriers to general policy in logistics in the PRD, utilization of e-commerce in logistics, barriers to e-commerce policy in logistics in the PRD, and causes and consequences of barriers to e-commerce

policy in the PRD. All companies involved in this study, whether they are MNEs or small and medium enterprises, have business connections, or have set up branch offices in the PRD. Under the impact of globalisation, many MNEs have established branch offices in different countries and they employ e-commerce technology as a pivotal role in fulfilling the demand within branch offices (Michaelides *et al.*, 2003). More than half of the Fortune 500 companies already had operations in China in 2001 (Arambulo, 2001). Up to 2006, China has approved the establishment of over 500,000 foreign-financed enterprises who import over US$560 billion of goods into China annually. Foreign investors have established more than 700 research and development centres in China and over 40 multinational corporations have set up regional headquarters in the country (People's Daily Online, 2006b). MNEs open branch offices in major cities in the PRD in order to take advantage of the expanding bases of production in China either for the procurement for their own market or consumption in the Chinese market. Although these companies wish to comply with the policies in the PRD, they find that the actual operation is extremely complex.

General Barriers to General Policy in Logistics in the PRD

In response to the question of general barriers to logistics operations in the PRD specifically to do with general policy matters, the response was broadly ranged. The participants of the focus groups explicitly stated that ”Logistics operations in the PRD will become much better if the general policy of government in the PRD is improved in three main areas Customs, rules and regulation, and government

payments. These are all closely related to the policies of the central or local government". 'Problems with Customs' was the most commonly reported response given by the participants. Part of this problem stems from the structure of control for Customs in China. The policies are set by the Customs General Administration, People's Republic of China from Beijing and extended to all twenty three provinces, five autonomous regions, four centrally-administered municipalities and two special administrative regions (China Internet Information Center, 2004). However, the day-to-day administration of Customs control rests with much smaller territorial jurisdictions of Customs all over the country. Some participants of the focus groups pointed out that "Different interpretations of Customs regulations occur in different Customs districts in the PRD and create uncertainty to the logistics companies operating in the region".

Customs has always been a concern for the logistics operators in the PRD except for one participant who felt that the electronic customs declaration was a success. The participants of the focus groups explained that "Logistics operators, who are required to declare information regarding imports and exports to Customs officials in the PRD, have to do it electronically because no other alternatives are available". The Central Government wanted to consider that the electronic Customs declaration was a success as it was a policy being pushed down from Beijing. Participants reported that "They have encountered many problems in the rules and policies in relation to Customs". One reason for this was that the rules and policies of import and export were very complex and the interpretations of

these rules and policies were not open to the general public in the PRD. Although electronic Customs declarations were implemented in Dongguan (TDC, 2000) then Shenzhen (TDC, 2002) in the PRD, one participant of a focus group commented that ”The PRC Customs officers tend to resist the electronic customs declaration because it reduces the existing power they currently enjoy”. Customs is a vital partner in supply chains and, as one study reveals, an important factor which affects the flows of information in a supply chain is the level of trust between all partners in the chain (Riddalls *et al.*, 2002). Hence enhancement or modification of Customs procedure is sometimes impossible without the mutual trust between the partners in a supply chain.

The results also show that almost all the participants were concerned with the complicated system of rules and regulations of government in logistics in China including the PRD. At present, logistics operations in the PRD involve different sectors of logistics in moving, storing and handling commodity. In the regulatory framework of logistics in the PRD, the authority for approval of licenses in international freight forwarding is the Ministry of Foreign Trade and Economic Cooperation (MOFTEC); air freight forwarding and airlines are regulated by the Civil Aviation Administration of China and MOFTEC; logistics centres, domestic trucking, consolidation of cargo, warehousing and shipping lines are regulated by the Ministry of Communication and MOFTEC; and Customs brokerage is regulated by the Customs General Administration of China and MOFTEC (Ho & Lim, 2001).

Another issue raised by the participants of the focus groups is that many government offices possess administrative power over logistics operations in the PRD (China Hand, 2001) and they equally have power to collect government payments from the logistics operations in the region. This has created problems for the logistics industry because in some cases, such payment has not been anticipated and thus, included in the operation costs. One participant of a focus group reflected (with considerable emphasis) that ”There are many inter-related policies, rules, regulations, directives and instructions of government, and more than one government agency has the power to interpret them”.

Utilization of E-commerce

The results show that e-commerce is most widely used in electronic communications with companies overseas branch offices, electronic communications within companies and provision of information to customers via websites. Many MNEs, if not all, are involved in markets of extensive geographic coverage and need to maintain effective networks to carry out appropriate governance across borders and continents. ICT is naturally adopted by these companies as a tool in networking their headquarters, regional offices and local offices (Ng & Li, 2003). When they set up operations in the PRD, it is expected that they will bring along their ICT standards, experience and systems into the country. One participant of a focus group thought that ”E-commerce is a must under globalisation”. These MNEs felt that they could not afford to construct a

distinctly ‘backward’ ICT system in the PRD and then try and match to other ICT systems in other branch offices or headquarters outside China. Otherwise they would suffer from reduced efficiency, delays and deterioration of customer satisfaction throughout the whole business.

“The situation of ICT competence of the people in the PRD”, according to one participant of a focus group, “is similar to that of Hong Kong 15 years ago”. Having some clusters of high capability in computers along the coastal cities in China did not help the logistics operations of the MNEs to expedite the flow of information in China as a whole because they sourced different commodities all over the country and factories had moved further inland. E-commerce is more commonly used among large firms in the U.S.A. where more than 70% of them are involved in purchase through e-commerce (Min & Galle, 2001). While bandwidth has been increased in the PRD, it is not the same for places further inland in the north or west. Most of the participants reported that “Their counterparts in the PRD, or in the major coastal cities in China, can be dealt with efficiently through fax or even email”. However, with dial-up Internet connections still being used in many provinces in the far north and west of China, the infrastructure could not cope with the required transfer of large volumes of data in a short time.

The second area in which e-commerce is most widely used is electronic communications within companies. As far as utilization of e-commerce within a

company was concerned, there was much variation in the responses among the participants about the amount of utilization of e-commerce in logistics operations in the PRD. One reason for this was the nature of different business. Logistics companies that had a limited number of transactions, for example a consultant in the logistics industry, might have little use of e-commerce whereas other companies with large volume of transactions found that they could not cope effectively without the assistance of e-commerce technology. Where use of e-commerce was commonplace, typically it was to provide customers and potential customers with information whenever they accessed a site. This access allowed simultaneous service information to multiple customers, 24 hours a day. Customers could also access private information through the use of tracking and tracing about their consignments such as location of the goods, inventory level of stock, arrival time of the next batch of supply or accounting status with the logistics company.

The third area in which e-commerce is most widely used is in the provision of information to customers via websites. Members of a focus group responded that “Except for finalization of contracts, they use e-commerce extensively in their logistics operations such as booking, enquiry, correspondence and confirmation of instructions”. They also noticed that “The dial-up system is commonly used in China and some parts of the PRD while logistics operators use broadband or dedicated broadband channels”. One participant commented that ”E-commerce is adopted in most of the business processes and the company is increasing its

investment in e-commerce". The area in which the logistics companies employed e-commerce the least was the conclusion of contracts. The logistics industry is so competitive in the PRD that some participants of the focus group commented that "It is important to save dollars and cents when the volume handled is high in everyday operations".

Barriers to E-commerce Policy in Logistics in the PRD

The first three common barriers to e-commerce policy in logistics perceived by the participants are online payment; e-commerce for different target groups e.g. Business-to-Customers (B2C), Business-to-Business (B2B), Business-to-Government (B2G); and conclusion of contract via electronic correspondence. In order to have a successful logistics operation, a company needs to maintain effective flows in physical commodity, information and finance. Online payment was perceived by the participants as the greatest barrier to a successful e-commerce policy in logistics in the PRD. According to the National Small Business Poll, cash flow is a 'continuing' problem for one in five, small business owners (The National Federation of Independent Business, 2004). Electronic payments speed up the whole process of collecting receivables as well as dispatching payables and improving the turnaround time of financial resources. "The infrastructure of electronic payment was not there in China" pointed out one participant, "and the future of electronic payments does not look bright because credit cards are not popular in China". Some participants of the focus groups felt that "It is not a suitable time for using electronic payment in China because of the

lack of a reliable and affordable Internet infrastructure and mutual trust between the people and business community". The willingness of the participation of banks or financial institutions was crucial to the success of Internet payments. One participant of a focus group stated that "In view of the progress and promotion of the use of electronic payments, commercial banks have moved quite slowly and we believe that a government initiative may help".

Secondly, e-commerce in B2C, B2B, and B2G has different target groups and hence different issues in these business models, of which some have similar functions of e-commerce discussed in the study. The participants of the focus groups perceived that "There are barriers to e-commerce policy in logistics and it is premature to start any mode of B2C, B2B or B2G nationwide in China". In B2C, B2B or B2G, the Chinese government aims to promote e-commerce although its e-commerce policies have the potential to inhibit business innovation (Martinsons, 2002). It is not uncommon to encounter problems when e-commerce is introduced in an economy in particular an emerging economy. Emerging economies such as China present a significantly different business context as compared with developed economies, owing largely to their less developed financial, legal, and physical infrastructures. Emerging or non-western economies also have different business philosophies and cultures, which influence the relationship between companies and the marketplace (Hempel & Kwong, 2001). The personal nature of business relationships, the informality of information, and the lack of separation between political and economic actors are some of the

factors inhibiting and shaping the development of B2B e-commerce in China (Martinsons, 2002). At a corporate level, Chinese firms have started to build up e-commerce technology infrastructure and create a Web presence. However, they fall behind other countries in conducting actual e-commerce transactions, mostly because barriers in business, legal and cultural perspectives fail to accommodate the technology progress. A healthy e-commerce infrastructure need to be supported both by advanced technologies and by a friendly business, legal and cultural environment (Tan & Wu, 2004).

The third barrier to e-commerce policy in logistics in the PRD is the conclusion of contract via electronic correspondence. In China, a logistics company using a traditional contract in paper form has the advantage over an electronic contract in the requirement of submission to a court in China because the court accepts only the paper form. Although e-commerce is not clearly defined in the Chinese legislation, transactions using data messages are legally recognized under the PRC Contract Law, which took effect from October 1, 1999 (PRC Contract law, 1999). The PRC Contract Law has more flexible requirements on contractual form, i.e. contracts may be made orally, in writing or in other forms (Zhong & Yu, 1999). The next important development in e-commerce policy in the PRD was when the Guangdong Province promulgated the Rules on Electronic Transactions of Guangdong Province (the Guangdong Rules) on February 2003 (Liu, 2003). The Chinese government decided not to formulate a nationwide legislation on electronic transactions but to undertake a trial in Guangdong

Province which is a major industrial and commercial centre in Southern China, adjacent to Hong Kong. The Central Government might extend the coverage to other provinces if the trial in Guangdong Province is successful. The enactment of the Guangdong Rules meant that for the first time logistics firms could formally use electronic contracts in transacting business in Guangdong Province, including the Pearl River Delta.

Nevertheless, participants in the study have shown explicit reservations on the use of electronic contracts. Trust plays a critical role in e-commerce. The experience of developed countries demonstrates that trust in e-commerce can be established effectively through the application of technology, privately and publicly provided mechanisms. The lack of privately provided institutions and the long absence of relevant law in this area have seriously thwarted the commitment (Han, 2005). Although the enactment of the Electronic Signature Law is an important step forward, more actions are required to combine the forces of law, technology and private bodies in order to create a trusted online environment for e-commerce in China (Han, 2005).

Another concern to e-commerce policy in logistics in the PRD is information sharing within company and with vendors as well as customers which is critical for competitive advantage. There is a shift from competition between organisations towards competition between supply chains (Christopher, 1998) through to competition between business webs (Van Der Vorst *et al.*, 2002).

Some participants in a focus group mentioned that “Their companies have developed IT applications in the international logistics field for 40 years and the uniform approach of IT application in different countries provides consistency and anticipated standardization throughout the whole group”. They further commented that “On the other hand, some sectors in some places require modification to their universal IT systems and they have spent considerable efforts in localizing the IT system for the PRD”. The unique requirements of Customs in the PRD were a contributing factor for this. One participant of a focus group commented that ”Although we have extensive experience in the use of IT application, such experience will have little value in real life if the system could not be adjusted, e.g. the customs declaration in the Pearl River Delta”. During the discussion, cost was raised as an important issue in maintaining a stable and reliable Internet network in the sense that it created a barrier to the development of e-commerce in the entire PRD given the average living standard of Chinese in Guangdong. The situation was allegedly even worse in many under-developed provinces in Northern and Northwestern China.

One participant of a focus group who had much experience in IT observed that “The centres of networking are either situated in Hong Kong or overseas and very few centres are based in the PRD, or elsewhere in China which make the interchange of different systems in communication more difficult”. “For example, people in China cannot receive Short Message Service (SMS) sent from mobile phones in Hong Kong because of the issue of compatibility of such systems.

While more and more tracking, tracing, enquiries or notification in logistics operations adopt SMS, it constrains the application of SMS of mobile phone in the flow of information within the process of logistics operations between Hong Kong and the PRD", commented the participant. China is currently the largest mobile phone market with 400 million mobile phone users in 2006 (Pace, 2006) and has great potential in sending messages through SMS in logistics operations in the PRD. The participants also observed that the most common methods of communication between Hong Kong and the PRD were fax and telephone which gave much room for improvement especially given that the size of the mobile phone market has grown substantially in China over the years.

A general contributing cause of these barriers to e-commerce policy in logistics operations, commented on by three participants of the focus groups in different focus groups, was that "The development of computer infrastructure throughout China is relative to the rules and regulations and the process through which the policies were developed". This means that the policy is not keeping up with the pace of technology change and as such companies are unable to utilize the technology as effectively as they could have. The participants revealed in the discussions of the focus groups that "The policies in the PRD constitute the major obstacles to logistics operations in the region".

Causes of Barriers in E-commerce Policy in the PRD

The first major cause of barriers in e-commerce policy is the content of rules and regulations in the PRD**.** One participant of a focus group noted that “The rules and regulations in the PRD are of such diversity that people feel as if they are dealing with different jurisdictions in one state”. The lack of standardization of requirements by government departments as remarked by some participants is consistent with the work of Ratnasingham and Kumar (2000), who pointed out that the lack of standards and government policies were two of the general perceived risks of e-commerce. It is suggested, therefore, that the establishment of standards in e-commerce policy might be best built through consensus in the PRD between the government, practitioners of e-commerce including those from the logistics industry, representatives of users, and independent organisations which propose and maintain industry standards.

The second major cause of barriers in e-commerce policy is the interface between Chinese law and international law in the PRD. As China becomes more involved in international trade and more foreign direct investors come to the PRD, the interoperability of Chinese international law is one of the main concerns in the region. China's entry into the WTO has inspired a wave of reforms in existing laws and regulations (Cheung, 2001). As a member of the WTO, she is obliged to issue rules and regulations which comply fully with the approach of the WTO. Legislative reform in China is not an easy task but compliance with the WTO legal system will definitely proceed (Ho, 2001). Since then, China has taken steps to repeal, revise or enact more than one thousand laws, regulations and other

measures to bring its trading system into compliance with WTO standards (United States Trade Representative, 2004).

The third major cause of barriers in e-commerce policy is the execution of law in the PRD. More than one participant in different focus groups stressed the weight of the regulations of the Customs in logistics operations in the PRD. It was a matter of the execution of law. One participant pointed out that ”Logistics operators in the PRD employ Customs agents to clear the import and/or export goods from the Customs. One might not know how to clear Customs, even if the rules and regulations of Customs are understood, because it is more than merely understanding the rules and regulations. The Customs agents normally have close relationship with the Customs staff and were well trained on Customs rules and regulations. They have to pass an examination in order to get a license. The Customs rules and regulations are often changed or modified, making it difficult for the general public to follow”.

Other causes of barriers in e-commerce policy are the enactment of government policies, uncertainty of judgments of courts and unavailability of details of law in the PRD. One of the participants in a focus group remembered that “One rule related to Customs lasted for only three months before it became ineffective” while another participant felt that “The Customs agency is more or less a closed-shop discipline because people without ‘good’ connections cannot get into the sector even if one has passed the examination. Customs officers normally did not

want to talk about the Customs rules and regulations in great depth openly". In a recent incident, it was reported that a trade association in Hong Kong invited Customs in the PRD to talk about the recent development in Customs rules but this was rejected by the latter. It was perceived by the participants that the transparency of operation of the Customs was very much restricted.

Availability of policies, rules, regulations, directives and instructions of government is also an issue and inconsistent interpretations of the courts in different cities pose even greater uncertainty to the logistics community. The uncertainty of judgments of courts is a problem to MNEs in connection with the logistics industry in the PRD. Courts should have sweeping formal authority and ability to minimize the amount of "noise" in policy transmission but it seems that courts in China are not capable of making general rules stick as currently structured (Clarke, 1991). The Chinese court system cannot effectively resolve disputes and enforce its judgments nationwide because there is no functional separation of judicial and administrative or executive powers inherent in the Chinese system (Blumental, 1998).

Another problem is that logistics practitioners could not find one comprehensive Internet database in which Chinese law and policy are both updated regularly by the government and made available to the general public. Many countries, such as Australia, Hong Kong, the U.K. and the U.S.A., provide such a legal database, including recent judgments of courts. It is suggested, therefore, that consideration

should be given to setting up a user-friendly legal database available to the general public in the PRD and later in the entire country.

During one of the focus group discussions, the participants mentioned that “The traditional requirement for hard copy documents still prevails in corporations and government departments in the PRD. The reason for this is that it is easier to approve a document or submission by putting a stamp on a piece of paper and signing it, a long-standing practice by Chinese companies and officials, than to devise a new system since the document or submission might have to be stamped and signed by more than one party in a corporate or government department”. Unless the law permits the use of electronic copies as official submissions or records; or the adoption of electronic signatures as official signature, logistics operators have to follow the current traditional way of signing, recording, retaining and keeping the documents.

Consequences of Barriers to E-commerce Policy in Logistics in the PRD

The most serious consequences of barriers to e-commerce policy in logistics in the PRD perceived by the participants are “affected efficiency”, “prolong delay” and “reduced customer satisfaction”. Lower efficiency implies increasing costs and is especially significant given the low profit margins in the logistics market. Avoidance of double entry of data into the ICT system helps a great deal in improving cost effectiveness and also avoids manual errors in data entry. A participant of a focus group stressed that ”If turnaround time of feedback was

highly shortened, subsequent stages of the whole process in logistics operations in the PRD could be performed faster". It is critical to eliminate the possibility of delays by maintaining a free flow of information via a reliable ICT system. Some participants commented that "The logistics operators suffer because of the lack of e-commerce in logistics operations and many processes have to rely on manual operations in which accuracy, reliability and efficiency are worse".

Prolonged delay between supply chain logistical processes is also a concern to logistics operators in the PRD. Speed in exchange of information between vendor and customers is perceived as one of the success factors in logistics and the growth of e-commerce opens new venues for companies to create flexible logistics and supply chains by offering high-speed communication and tight connectivity (Keskinocak *et al.*, 2001). Relying on general communication systems for critical logistics systems is not considered to be an option for MNEs who have developed and maintained their own communications infrastructure. Similarly, the reliability and accuracy of available data is often poor. Significant managerial time and effort must be brought to bear on the importance of reliable, accurate and accessible data (Daly & Cui, 2003).

Intervention of government departments in a form of Internet filtering which hampers the efficiency of, and triggers delays in, logistics operations is also not uncommon in China including the PRD (Zittrain & Edelman, 2003). Officials taping information in communication networks, without the approval of a court,

has deterred the use of the Internet. One participant of a focus group noted that ”A logistics firm cannot do anything once a government department has decided to block messages which contained certain words or phrases”.

Effective e-commerce systems have been adopted by logistics operators to meet the expectations of customers who have become increasingly demanding. Customer satisfaction is one of the key performance indicators in retail business including the logistics industry (Arbor, 2004) because many service products in the industry are similar and it is difficult to differentiate one logistics provider from another. One participant pointed out that ”Without the use of e-commerce, customer satisfaction will definitely be reduced”. Logistics operators generally believed that the greater the customer satisfaction, the higher the chance for customers to return for their service.

Although there were problems in the policy system in connection to the logistics operations in the PRD, participants of the focus groups generally believed that China was moving in the right direction in the development of the logistics industry in the PRD and other parts of China. One participant said, ”The PRC central government has always had a sense of direction at macro level and they point to the correct direction”. Given adequate time to modify the existing policies and the policy framework of e-commerce, the PRD could build up a much closer tie with those from the outside world.

During the focus group discussions, some participants explained that “In some cases, the use of e-commerce is not a matter of reduced efficiency, delay or deterioration of customer satisfaction but of survival. Use of e-commerce is essential for the process of track and trace; the employment of time sensitive spare parts or goods in a just-in-time strategy; inventory control of large number of goods or places which have high operational costs such as Hong Kong, Europe or the U.S.A.”.

Conclusions and Future Research

The development of the use of e-commerce in the PRD has grown rapidly with the help of the ICT market in China and the continual ingress of foreign direct investment. Taking advantage of the above phenomenon, MNEs have continued to adopt global strategies in e-commerce to a wider and deeper extent in the logistics operations in the PRD. Problems in the utilization of e-commerce, operations of Customs, electronic payment, conclusion of important documents and/or electronic contracts through the Internet revolve around a lack of a comprehensive infrastructure in government policy. The interpretation and implementation of existing policies in e-commerce in the PRD have created dilemmas in further developing e-commerce as well as logistics operations in the PRD and other parts of China. In summary, the competitiveness of the logistics operations of the MNEs in China will suffer from the consequences of the barriers to e-commerce policy unless changes are made swiftly to the infrastructure of related policy.

The relatively small sample size in the PRD in this study would limit the capability to generalise findings as representative to the logistics industry in the PRD or other parts of China. Nonetheless, the study has contributed to, and provided in-depth knowledge about barriers to e-commerce policy in logistics in the PRD. It relates to the theories and previous studies of other authors which explain the adoption of the commercial use of the Internet in the logistics industry.

This study has identified some barriers in e-commerce policy in the PRD which can be recommended to government departments for future research. Although it may be difficult for China to change its mindset overnight during its transition from a completely centrally planned economy into a partially market driven economy with a Chinese socialistic flavour, there is a foreseeable need to explore ways of engendering closer collaboration between governments and markets in the development of e-commerce policy in logistics in the PRD and other parts of China. Future research should focus on collaboration among all stakeholders including the government, labor unions, trade associations and even professional organisations in the logistics industry in modifying the e-commerce policy in logistics.

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