

# SUPPLY CHAIN AND MODERNIZATION OF CUSTOMS REGULATIONS

**Sompoch Pakdeesuparit, and Chayakrit Charoensiriwath\***  
Department of Industrial Management, Assumption University of Thailand

## ABSTRACT

*The key activities of a supply chain are the systems that facilitate and make efficient delivery to end users. This is the foundation of international customs systems which tend to facilitate the movement of goods and services globally in the most effective way. Thus, openness in trade and customs facilitation would have a direct impact on supply chain activities.*

*This paper explores the important role of liberalization of customs regulation around the world, which commands the level of supply chain activities. The objective is to understand trade liberalization which will help to speed up supply chain processes and create benefits for nations. The research explores the key regulatory elements that can expand supply chain activities.*

*The findings of this research are very positive about the easing of customs regulation, as a single data transmission to other government agencies, lower duty rate, and efficiency of customs system are somewhat correlated to supply chain activities. Therefore it is important for nations to implement customs liberalization in order to expand supply chain activities. That would bring prosperity to nations and the global economy.*

## INTRODUCTION

Supply chain is all about producing and moving goods and services to the end users in the most efficient way, which is essential to the world economy, as stated by Fletcher (2006). Many factors have a direct and indirect impact on this flow of goods and services. One of the main factors to increase or decrease the efficiency of supply chains is customs regulations. Therefore, in general, it is significant to understand the customs

---

\*This article is a highly condensed version of the thesis which Ms. Pakdeesuparit produced as a requirement to graduate as MSc in Supply Chain Management from Assumption University in January 2009. Dr. Charoensiriwath was the advisor, and also works for the Thailand National Electronics and Computer Centre.

role, and for policy makers to realize the benefits and risks in their actions on trade measurement levied upon importers and exporters.

At present there is an opportunity to expand international trade and world supply chains. Customs regulatory modernization is the key focus point and attention needs to be paid in order to improve the supply chain activities globally. Nevertheless, customs regulation appears to be a bottleneck in supply chain activities globally and has a major impact on the entire supply chain process. Therefore, the objectives of this research are to identify benefits to organizations and customs authorities. First it shows that the implementation of trade modernization will increase production capacity, improve the supply chain process and reduce the production cycle.

Secondly, the need for Thai customs to be proactive in terms of trade facilitation is a must. Thai customs needs to view national supply chain activities as a major driving competitive advantage for the country and not merely duty and tax collection.

The scope of the study is four variables:

- X1. supply chain expansion in relation to customs system efficiency;
- X2. Lower import duty rate;
- X3. Simple connectivity of data transmission between government agencies;
- X4. Ease of customs regulation.

A survey was conducted to prove the relationship of these variables and supply chain activities.

This research cannot influence the political agenda or any other political variables issues. It is merely a framework for policy makers to use as a tool in order to suggest the right direction for the country.

## RESEARCH STRUCTURE

The structure of the research is derived from a literature review of the supply chain concept, which is defined by Lovejoy (2001) as all activities associated with the flow and transformation of goods from the raw materials stage, through to the end user, as well as the associated information flows.

The methodology and data analysis will be applied to the survey result. Pearson's correlation is used to analyze the supply chain activities correlated to the four variables. In addition ANOVA is also used to determine if the result of each five target groups would be similar or different.

## LITERATURE REVIEW

This section is an insight into the theories that support the findings of the research. It covers supply chain management definition, value chain concept, economic theory, international trade process, the expansionary trend of free trade areas, supply chain and lead time concepts, a Customs modernization system in Thailand and the relationship of supply chains to customs liberalization.

### Supply Chain Theory

Christopher (2005) defined supply chain management as the management of upstream and downstream relationships between suppliers, distributors and customers in such a way that greater customer value is achieved at lower cost.

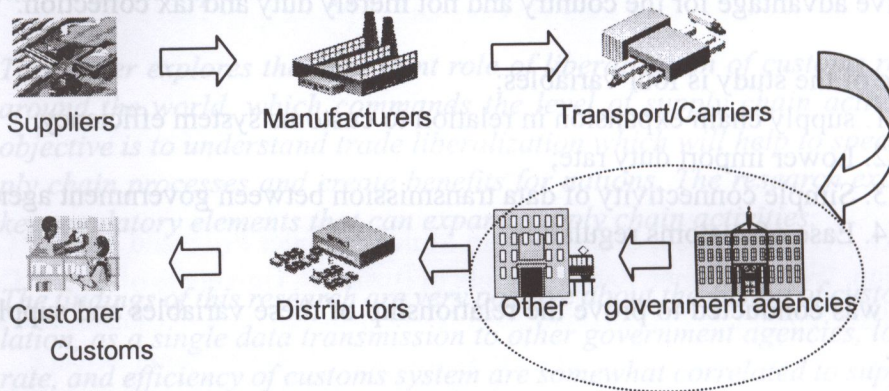


Figure 1 Simple Supply Chain Process

### Value Chain Concept

Brown (1997) defined the value chain as a tool to divide a business into strategically relevant activities. Therefore it becomes an integral component in the business strategy process. The evaluation of the firm's core competencies, processes and assets and their response to the opportunities and threats, are produced by the business environment such as the stringency of customs clearance procedures.

Nordas (2006) stated that the travel time of merchandise exports from factory gate to ship loading has been estimated to average 49 days in Sub Saharan Africa and 34 days in South Asia, as compared to 14 days in high income OECD countries. This comparison shows that the competitiveness of moving freight from and to OECD countries is much greater than the rest of the group. Hence its supply chain activities tend to be expanding as the lead time of moving products in and out of these countries is much shorter.

## Needs in the Supply Chain

When supply chain management involves the minimization of time-to-market within such a sequential production process, timeliness of delivery becomes crucial also at the early stages of production (Nordås (2003).

Goh and Pinaikul (1998) stated in their research that Thailand has a high cost of acquiring and installing automated logistics equipment, which is perceived by firms as a barrier to logistics development in Thailand. Such logistics problems threaten continued foreign investment which in turn denies badly needed capital and technology.

## International Trade Transaction Process

Jean (2005), in Figure 2, outlines the process of international trade in three steps: Buy, Ship and Pay. The three are interlinked, in the core of the international transaction process. The customs authorities come into play during the shipping process. They are the ones who determine the speed of the movement of goods traveling across borders.

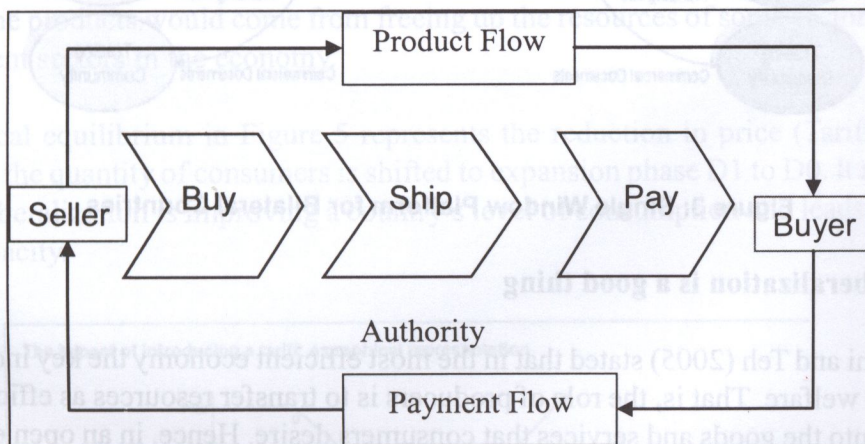


Figure 2: International Trade Process

Each of the processes (buy, ship and pay) involves business activities and transactions. This is outlined in the trade involvement with government authorities as well as the payment flow.

Payment can be made through electronic means. This can speed up the payment process and reduce time consumed for traders, importers, exporters and government agencies. In addition the study had explored a platform for integrated information sharing between two countries, which involve importers, exporters, banks, government agencies,

carriers, and customs brokers (see Figure 3). The transaction will run on this link without a pile of paperwork flowing around all the supply chain members, (and some papers likely to be lost or missing in between). This link prevents unnecessary workload and trade costs. Thus traders can enjoy a free flow of information and physical movement of goods in the most efficient and effective way.

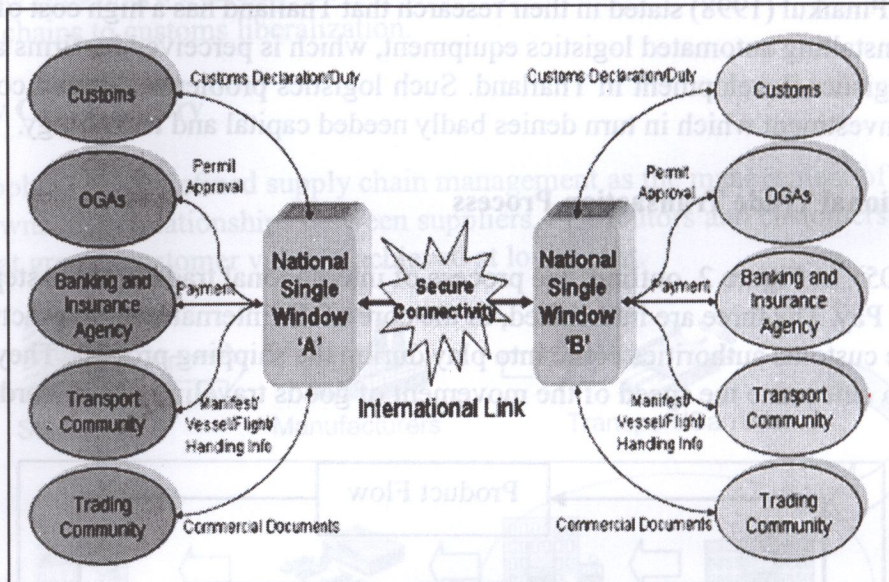
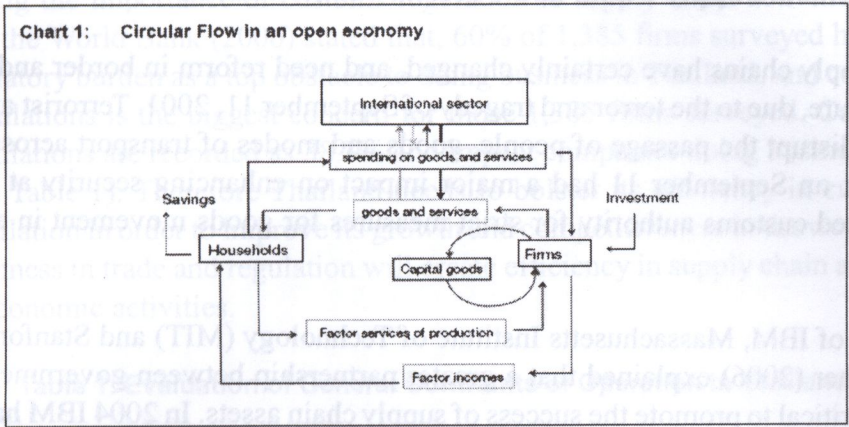


Figure 3: Single Window Platform for Bilateral Countries

### Trade Liberalization is a good thing

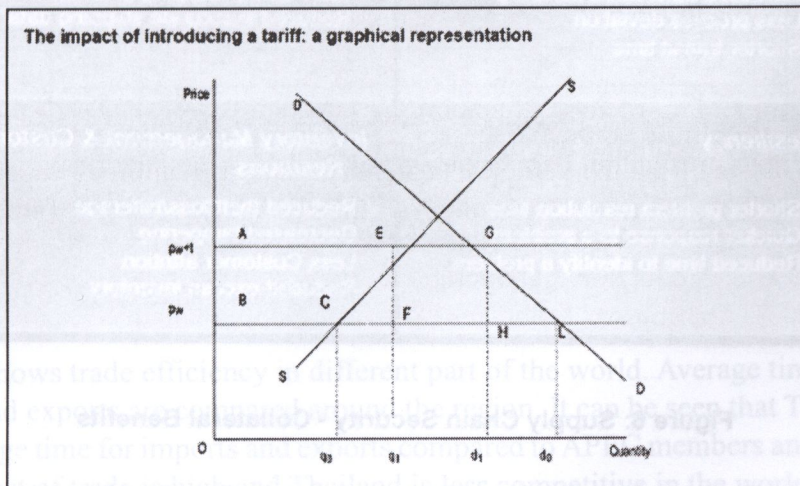
Piermartini and Teh (2005) stated that in the most efficient economy the key indicator is consumer welfare. That is, the role of producers is to transfer resources as efficiently as possible into the goods and services that consumers desire. Hence, in an open economy shown in Figure 4, the households/consumers represent the ultimate consumption in determining the level of economic activities.



**Figure 4: Circular Flow in an Open Economy**

Jomini et al. (1991) said that the general equilibrium approach is ideal for analyzing the effects of multilateral trade liberalization. This is because the markets are involved, and tariffs would be changing in all markets. For example, the gain of reduction in tariff rates of some products would come from freeing up the resources of some sectors to the most efficient sectors in the economy.

The graphical equilibrium in Figure 5 represents the reduction in price (Tariff) from  $P_{w1}$  to  $P_w$ ; the quantity of consumers is shifted to expansion phase D1 to D0. It appears that trade liberalization is improving a country's level of consumption and leads to production capacity.

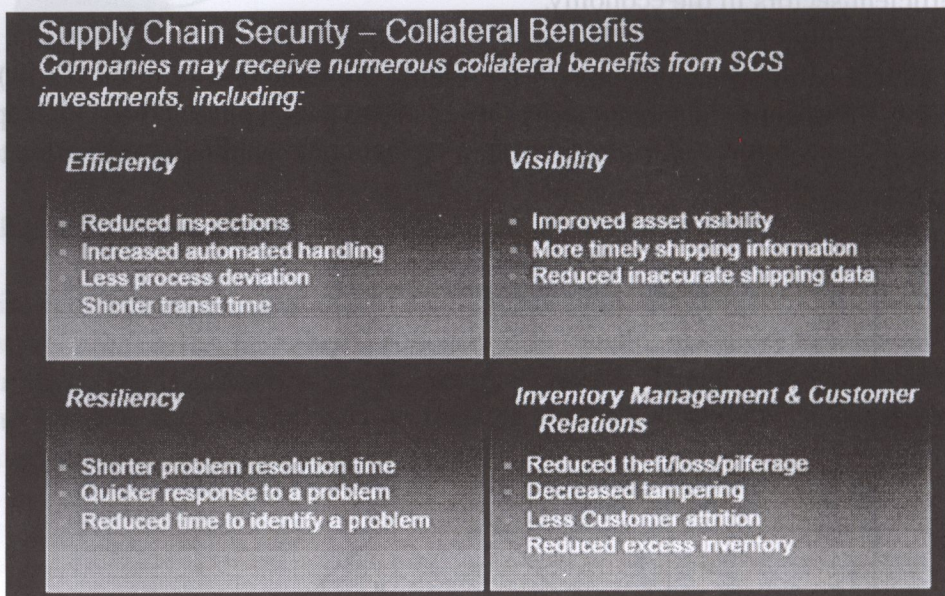


**Figure 5: Tariff Impact on Equilibrium**

## Modern Global Supply Chain and Customs Modernization

Global supply chains have certainly changed, and need reform in border and transport infrastructure, due to the terror and tragedy of September 11, 2001. Terrorist attacks can seriously disrupt the passage of people, goods and modes of transport across borders. The attack on September 11 had a major impact on enhancing security at ports and strengthened customs authority for strict measures for goods movement in and out of countries.

In a study of IBM, Massachusetts Institute of Technology (MIT) and Stanford University, Fletcher (2006) explained that a greater partnership between government and industry is critical to promote the success of supply chain assets. In 2004 IBM had a major meeting with key government officials on implementation of the WCO framework to secure and facilitate global trade in various countries such as Australia, China, Japan, Mexico, Taiwan, Thailand, United States, Canada and Singapore. This meeting has produced a great result in improving supply chain efficiency, better customer satisfaction, improved inventory management, and reduced cycle and shipping times. The key benefits are demonstrated in Figure 6.







**Figure 6: Supply Chain Security - Collateral Benefits**

**Source:** Investing in Supply Chain Security Collateral Benefits-Massachusetts Institute of Technology (MIT) White Paper, 2005.

Concerning the importance of customs regulation to supply chain activities, a recent report of the World Bank (2006) stated that, 60% of 1,385 firms surveyed have identified regulatory burden as a top obstacle to doing business in Thailand, and customs and trade regulations is the biggest concern for those 1,385 firms surveyed. Customs and trade regulations are recorded as 38.3% and impact companies doing business in Thailand (see Table 1). Therefore Thailand needs to bolster its efficiency in customs and trade regulation in order to improve its growth and competitiveness in the world market. This openness in trade and regulation will create efficiency in supply chain activities as well as economic activities.

**Table 1: Evaluation of General Constraints of Operation in Thailand**

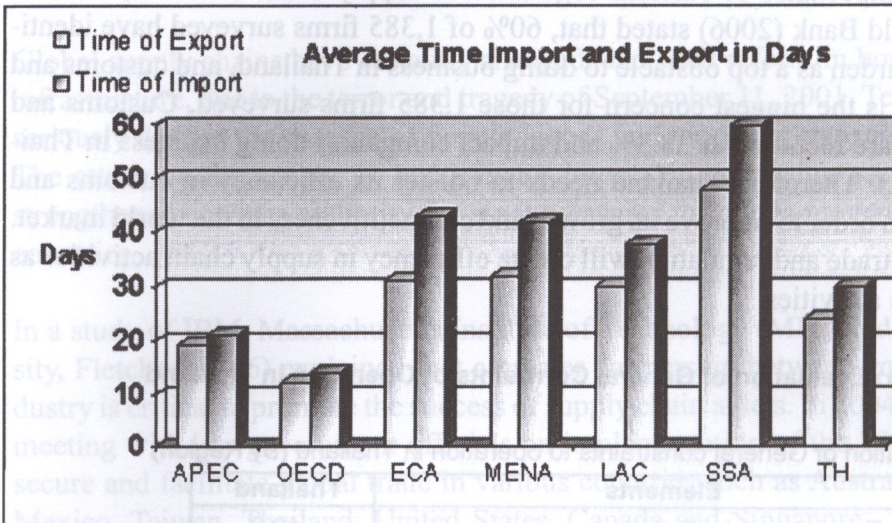
Evaluation of General constraints to operation in Thailand (By Region)

Elements	Thailand
Telecommunication	12.6
Electricity	25.6
Transport	13.8
Access in Land	13.2
Tax Rate 	<b>24.4</b>
Tax Administration	22.3
Customs and Trade Regulation 	<b>38.3</b>
Labor Regulation	11.4
Skills and Education of workers	30
Business Licensing	7.4
Access to Domestic credits	22.6
Cost of Financing	25
Economic Policy Uncertainty 	<b>29.1</b>
Macroeconomic instability 	<b>37.4</b>
Corruption	18.3
Crime, Theft	10.3
Anti Competitive Law	20.1
Number of Plants Survey	1385

**Source:** World Bank Report, 2006

Figure 7 shows trade efficiency in different part of the world. Average time in days for imports and exports are compared around the region. It can be seen that Thailand has a high average time for imports and exports compared to APEC members and OECD, and thus the cost of trade is high and Thailand is less competitive in the world market.



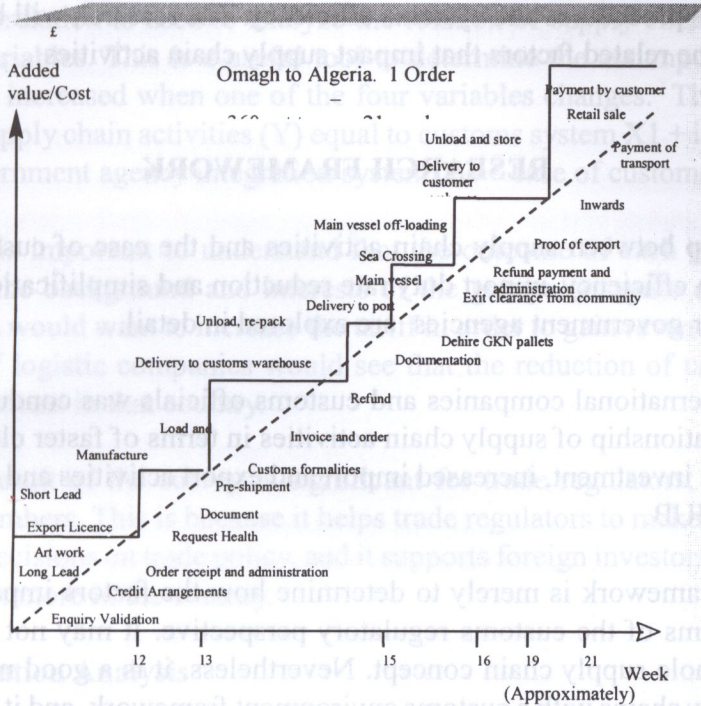


**Figure 7 Average Time import and export in days**

**Note:** ECA = Economic Commission of Africa, MENA = Middle East and North Africa, LAC = Latin America and Caribbean, SSA = Sub Saharan Africa

**Source:** www.doingbusiness.org 2008

Lead time is an important factor. The relationship of supply chain and global customs activities is obvious. Supply chain activities can be halted because of long lead time from customs clearance and rigid customs regulations and the inefficiency of process flow. For instance, goods shipped from Omagh (U.K.) to Algeria takes 21 weeks to complete the journey to the end customer (Figure 8).



**Figure 8: Long Lead Time**

**Source:** UN/CEFACT, 2005 Apr 21

Tariffs have cost and benefits. Magee (1972) studied the costs against benefits in the reduction of tariff rates, finding that the adjustments costs represent 12% of gains from trade in the first five years and less than 2% in the long run. This means there are costs associated with open trade, such as unemployment from cheaper imported goods of that sector. However those unemployed could move to other sectors that produce competitive goods in the world markets.

Baldwin, Mutti and Richardson (1980) also conducted similar research on whether reducing 50% of US tariffs would have some adjustment costs but that eventually the gain of open trade would benefit the economy. Their findings were that some groups of industries would suffer negative welfare effects during the first year of adjustment, but for all industries combined the new welfare effect is positive even in the first year.

That may not be conclusive that tariff rate reduction will have the same impact on supply chain activities. This is because there are other factors that need to be considered such as customs procedures and systems efficiency. The research will be looking at the correlation of the related factors that impact supply chain activities

## **RESEARCH FRAMEWORK**

The relationship between supply chain activities and the ease of customs regulatory, customs system efficiency, import duty rate reduction and simplification of data transmission to other government agencies are explored in detail.

A survey of international companies and customs officials was conducted in order to find out the relationship of supply chain activities in terms of faster clearance process, leading to more investment, increased import and export activities and consideration of Thailand as a HUB.

However the framework is merely to determine how the factors impact supply chain activities in terms of the customs regulatory perspective. It may not be a conclusive study of the whole supply chain concept. Nevertheless, it is a good model for further studies in supply chains with a customs environment framework, and it helps to develop the thinking of policy makers in developing nations in order to compete in the world market.

## **METHODOLOGY**

In this section two tools are used to analyze the level of supply chain activities: correlation analysis and ANOVA methodology. First, a survey is conducted in five different groups, namely freight forwarder managers, CEOs in logistics, customs officers, express carrier managers and other government agency officers. These groups were selected as they are involved in making decisions on the direction of their respective disciplines. Moreover it reduces the homogeneity of the responses in which each of the members has views on supply chain activities from their perspective, and most importantly the groups have knowledge of supply chains and logistics.

Secondly, questionnaires were created to assess the four variables' impact on the level of supply chain activities. There are 25 questions in relation to the importance of supply chain activities and four customs variables namely import duty rate, customs system efficiency, other government agency data integration and ease of customs procedures. Questionnaires address the assumption of supply chain activities equal to four customs

related variables.

The Pearson correlation is used to analyze the relation of supply chain activities and four customs variables. This is a useful tool to determine the assumption that supply chain activity is increased when one of the four variables changes. This supports the framework as supply chain activities (Y) equal to customs system X1 + import duty rate X2 + other government agency integration system X3 + ease of customs procedure X4

In this result it is important to understand that the outcome of each group would be different when the background and interests of the groups are quite opposite, hence customs officers would want to increase the tariff in order to gain revenue for the country but CEOs of logistic companies would see that the reduction of tariffs would increase the investment in that country.

Moreover, the result of the survey is significant for trade regulators, traders and all supply chain members. This is because it helps trade regulators to make right decisions before making decisions on trade policy, and it supports foreign investors in considering whether to invest more in the country.

### **Pearson Correlation Analysis**

Pearson Correlation Analysis is used to determine the relationship of independents variables Xs and dependent variable Y. Galton(1880) was the first to introduce a quantitative index, a standard statistical measurement of the degree of relationship or association between two sets of variables to describe how closely they track or are related to one another.

Cohen et al.(2003) stated that the Pearson correlation is a number between -1 and +1 that measures the degree of association between two variables (call them X and Y). A positive value for the correlation implies a positive association (large values of X tend to be associated with large values of Y and small values of X tend to be associated with small values of Y). A negative value for the correlation implies a negative or inverse association (large values of X tend to be associated with small values of Y and vice versa).

In this research context, the Pearson Correlation is used to find out the relationship between the customs system, other government agent's integration systems, customs procedure and import duty rate which may affect supply chain activities.

However the interpretation of the result cannot imply the causation of each independent variable. This is true as the easing of customs regulation will not lead to a lower import

duty rate, or improve customs systems or improve other government agent's integrated systems. Cohen et al. (2003) stated that interpretation of correlation coefficient depends on the context and purposes. That is, correlation can be taken as evidence for a possible causal relationship but cannot indicate what the causal relationship might be.

Hence the result of the research will not test the relationship of X variables. It merely measures the relationship of supply chain activities and the ease of customs regulatory, efficiency of customs system, other government agencies system integration and lower import duty rate. It cannot determine if the easing of customs regulations will lead to improved customs systems, improved other government agencies' systems, or lower import duty rate.

Another limitation of Pearson correlation analysis is that if the group in the sampling is too homogeneous it will affect the validity of the result as the variation will tend toward zero. Therefore the sample of population should have a variation or heterogeneity of respondents in order to have a more accurate relationship between the variables (as in the study by Savannah State University Office of Institutional Research & Planning, Summer, 2002).

Hence, the sample size is carefully selected to avoid such homogeneity as it divides into five different groups which have a background in supply chain knowledge or the logistics field, namely customs officers, express carriers, freight forwarders, foreign investors and other government agencies officers. The total number is 150 respondents, which consists of 30 respondents for four of the groups and 30 people in the express carriers group.

## **ANOVA**

ANOVA is a collection of statistical models and their associated procedures, in which the observed variance is partitioned into components due to different explanatory variables, as defined by Ferguson et al. (2005). One way ANOVA is conducted in this research is when it is basically tested on two or more independent groups. Moreover, it is used for repeated measures. It means that the same subjects are used for each treatment. Furthermore, Conover and Iman (1981), state that in many cases when the data does not meet the assumptions of ANOVA, one can replace each original data value by its rank from 1 for the smallest to N for the largest, and then run a standard ANOVA calculation on the rank-transformed data.

King et al. (2003) pointed that the interpretation of ANOVA analysis focuses on the "Sig." column where if the value found in the column is less than the critical value ( $\alpha$ ) set by the experimenter, then the effect is said to be significant. Basically this value is set at .05, and any value less than this will result in significant effects, while any value

greater than this value will result in non significant effects. In other words, if the effects are found to be non significant, then the differences between the means are not great enough to allow the researcher to say that they are different. In this case, there is no further attempt to analyze the value or number.

In this research ANOVA is used to study the opinion of each group on supply chain activities, whether they have the same or different views on the subject. The questionnaires were distributed via electronic mail in order to have a high level of confidentiality.

The groups were asked about supply chain activities in relation to the four customs variables, and the result is tabulated in order to know whether different occupations will have the same thinking on supply chain activities.

Furthermore, ANOVA can help to determine whether different occupations would have different opinions on the impact of the ease of customs regulation, import duty rate, other government agency integration system and customs system to the level of supply chain activities.

### **DATA ANALYSIS**

The correlation between supply chain activities and the four variables will now be demonstrated. This section uses the survey of 150 respondents to interpret the outcome of findings which include the analysis of the survey itself.

There are six most important questions addressed in the survey which are 1. Supply chain is important to the organization 2. Do the four customs factors help in expansion of the supply chain? 3. Does the customs system efficiency help in expansion of the supply chain activities 4. Low import duty would impact the supply chain activities 5. Integration of other government agencies systems helps in supporting the expansion of supply chain activities 6. Ease of customs regulation helps in supply chain activities expansion.

Answers are tabulated and analyzed in order to find out whether supply chain activities are important and link with the four variables factor.

Correlation and ANOVA analysis are conducted in order to analyze the data in the most effective way. This helps to identify the correlation of supply chain activities and four variables, and most importantly the result will be tested as to whether the five groups have different opinions or assumptions.

One observation is that all respondent's backgrounds and interests are different but they have the same background in logistic and supply chain knowledge. This is important because it reduces homogeneity in terms of different background but retains the correctness of a true understanding of supply chain theory.

### ***Importance of Supply Activities to Organizations***

The survey of 150 respondents shows that 113 people or 75.3% of total sample size strongly agree that a supply chain is important to their organizations. 13.3% or 22 people only agree that supply chain activities are important to their organization, and 11.3% or 17 people feel neutral on the importance of supply chain to their organization.

84.7% or 127 out of 150 respondents strongly believe that the ease of customs regulation, lower import duty rate, better customs systems and ease of other government agencies procedure will help to expand supply chain activities. However, 15.3% or 23 people only agree that four regulatory factors will impact supply chain activities. None of the respondents scored for disagreement in the relationship of four regulatory factors and supply chain activities.

107 respondents strongly believe that customs efficiency systems would support the expansion of supply chain activities or 71.3%, and 40 people or 26.7% agree that it is the case. However only 3 people or 2% feel indifferent to whether customs system efficiency would help supply chain activities.

In addition, 61.3% or 92 people strongly agree that low import duty rates would help the expansion of supply chains, and 36.7% or 55 people of 150 respondents also agree the same. However there are 2 people who feel that low import duty rates do not increase nor decrease supply chain activities, and 1 person out of all 150 respondents disagrees that low import duty would support supply chain expansion.

62% of respondents strongly feel that if other government agencies have their system integrated, it would help support supply chain activities expansion, and 37.3% agree with that. However 0.7% or 1 person disagrees.

Lastly 70.7% or 106 of the total 150 respondents strongly agree that ease of regulation would help the expansion of supply chain activities, and 29.3% or 44 people also agree the same.

### ***Correlation***

Implicitly respondents were asked if the ease of customs procedures, the efficiency of customs system, integration of other government agencies system and lower import duty rate will impact supply chain activities. The result of Pearson correlation analysis

shows that there is a strong correlation of four regulatory factors and supply chain activities.

Final Analysis concludes that the efficiency of customs system, low import duty rate, the integration of other government agencies system and the ease of customs procedures are strongly correlated with supply chain activities by having r-value 0.403, p-value 0.000, r value 0.316, p-value 0.000, r value 0.349, p-value 0.000, and r value 0.498, p value 0.000 respectively. Thus it can be said that when there is change in each of the four regulatory factors, there will be a shift in supply chain activities.

Respondents were asked about supply chain activities in four areas. The result of analysis shows that there is a strong correlation between the efficiency of customs system and speed-up of customs clearance, and Thailand as a HUB for supply chain activities by having r value 0.96, 0.314 and p value equal to 0.000 respectively. However more investment in Thailand, and increase in import and export activities are not correlated with customs system efficiency, by having r value as 0.149, 0.12 and p-value is 0.069 respectively.

The conclusion is that when customs system efficiency improves, the supply chain activities in terms of clearance performance and having Thailand as a distribution center will be positive. One of the observations from the respondents is that once comparison of the old EDI system and Paperless system comes into the picture, most respondents strongly agree that a paperless system helps the transit time improvement in terms of the customs clearance process. In addition, CEOs from logistic companies also view Thailand as a Hub due to better customs system compared to other countries in the region.

Furthermore, supply chain activities of the four areas, will be increased by low import duty rate. The result of analysis determined that there is a correlation of supply chain activities in terms of more investment and opening a HUB in Thailand as the r value of 0.242 and -0.267 respectively with the p value of 0.003 and 0.001. However, low import duty rate does not impact on speeding up customs clearance and has no relationship with import and export activities, and as r value is -0.141 and -0.072 with the p value of 0.086 and 0.384 respectively.

Thus it can be observed that the import duty rate has the impact of leading to more investment in Thailand and Thailand as a Hub for distribution centers. The respondents agree that if there is a change in import duty rate, they can import raw material and goods at the same quantities but lower costs, and goods can be produced and re exported to other countries, which increases value-added to the country.



In addition, the integration of other government agencies system would have a correlation with the four supply chain activities. The outcome of analysis indicates that there is a strong relationship between supply chain activities in terms of speeding up customs clearance, leading to more investment in Thailand, increasing import and export activities by having integration of other government agencies system, having r value as 0.774, 0.350, 0.744 respectively with an even p value as 0.000. However the integration of other government agency systems does not have a relationship with viewing Thailand as a Hub.

Thus it can be seen that the integration of other government agencies system supports an increase in most supply chain activities except seeing Thailand as a Hub. The respondents agree that the integration of other government agencies system will help to speed up customs clearance, increase import and export activities and lead to more investment in Thailand. However it does not support Thailand as a Hub for distribution centers.

Lastly, the ease in customs procedure would increase supply chain activities in the four areas. The ease of customs regulation has a positive impact on all the four supply chain activities, by having r value as 0.500, 0.431, 0.718 and 0.224 and p value of 0.000 for the first three and 0.006 for the last.

The observation on the ease of customs procedure does help to support an increase in supply chain activities in all factors. It helps better customs clearance, leads to more investment in Thailand, more import and export activities and views Thailand as a logistic Hub.

## **ANOVA**

ANOVA was conducted in order to test the outcome of the result between the five groups, whether the finding of each group would be different from others. The questions were sent to each group and tabulated using the ANOVA method.

The method of scoring is applied in order to measure how each group views that change in the four customs variables would impact on supply chain activities. This will help to determine whether each occupation would have the same or different idea on the topic. Hence, the data analysis is consolidated by giving the score as such: The scoring process is: strongly Agree is 5 points, agree is 4 points, neutral is 3 points, disagree is 2 points, strongly disagree is 1 point. Moreover, the data is tabulated and the scoring averaged which can be translated as an average score of 4.51-5.00, means strongly agree, an average Score of 3.51-4.50 means agree, an average score of 2.51-3.50 means neutral, an average Score of 1.51-2.50 means disagree, and an average Score of 1.00-1.50 means strongly disagree.

Five questions were distributed to each group: 1. Does customs system, import duty rate, other government agency integrated system and ease of customs system impact supply chain activities? 2. Does the efficiency of customs system support the supply chain activities expansion? 3. Does low import duty rate help to expand supply chain activities? 4. Does integration of other government agencies help to increase supply chain activities? 5. Does the ease in customs regulation help to expand supply chain activities?

Then the questions and answers were tabulated according to significance numbers in the ANOVA methodology. The significance level of each question is 0.860, 0.565, 0.653, 0.785 and 0.979 respectively. This significance level number can be explained as the different groups of the people having very similar opinions towards supply chain activities as a result of changing the four customs variables.

Put simply, the interpretation of the analysis is that each group has no different opinion on the theory that expansion of supply chain activities would result from the change to a better customs system, low import duty rate, integration of other government agencies and the ease of customs procedure. Thus it can be seen from the data tabulated that the significance level between groups is less than 0.05. Hence, it supports the theory that supply chain activities do expand if there is a change in each of the four variables: this is consistent across the entire sector of respondent backgrounds namely freight forwarders, customs, other government agencies, express carriers and chief executives officers.

## RECOMMENDATIONS

This study concluded that easing of customs regulation, lower import duty, integration of other government agencies systems and a more efficient customs system are quite important to supply chain activities expansion. That will contribute benefits to the country as a whole. That is, it will increase import and export activities, lead to more investment in Thailand, more efficiency of customs clearance process and consideration of opening a HUB in Thailand. Therefore regulators need to consider increasing the supply chain activities in order to improve the competitiveness of the country, and it may lead to social welfare for the economy.

Firstly, Thai customs has not yet signed the WCO. Therefore, the Thai government needs to review its position in the world trade arena in order to become one of the best trade regulators in the world. WCO guidelines give benefits to trade regulators in how to operate more efficiently and effectively in the dynamic world of business. It is critical to business in Thailand to have streamlined administrative procedures in response to faster customs clearance of both imports and exports. Nonetheless, this task is not solely for the Thai government, rather it involves all supply chain members to create a better

supply chain channel.

Moreover the single window scheme needs to be looked at in order to reduce the time taken for service delivery and inspections by government officials. In addition, improving efficiency and streamlining work processes by using IT is critical to expand supply chain activities. Thus, the establishment of a one stop service center is needed and E-government systems should become a vital tool to business, trade regulators, importers and exporters, freight forwarders and carriers, in order to reduce costs and eliminate delays in physical shipments and speed up financial payment.

Tariff reduction may not be the final solution for Thai government to boost supply chain activities. It may make a faster clearance process as no formal clearance is done. However, it needs to be looked at carefully as it may even hurt the economy. That is, foreign investment tends to be reduced as foreign investors can produce goods in their own countries without moving a production line to Thailand. This is because if products are imported at the lowest price there is no incentive to invest in Thailand. As a result, supply chain activities in Thailand would not be increased.

Hence it is left to the government and regulators to consider all the possibilities for increasing supply chain activities, and it is for supply chain members to work closely with regulators in order to improve supply chain processes. As a result, the country will benefit as a whole.

## ACKNOWLEDGEMENTS

The author is most grateful for the cooperation of the Thai Customs Bureau, and that of the following executives of DHL Express Thailand: Mr. Dennis Grover (Hub and Gateway General Manager), Ms. Naowarat Ountha (Customs Affair Manager); and also Mr. Withanya Ceetantivech (Import Manager) FedEx Express Thailand.

## BIBLIOGRAPHY

- Baldwin R., Robert E., Mutti J., and Richardson D J., (1980), "Welfare Effects on the United States of a Significant Multilateral Tariff Reduction", *Journal of International Economics* 10, pp 405-423.
- Brown L., (1997), *Competitive Marketing Strategy*, Nelson Melbourne.
- Christopher M (2005), *Supply Chain Management*, 2<sup>nd</sup> edition, Mcgraw-Hill.
- Cohen, J., Cohen P., West, S.G., & Aiken, L.S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences*. (3<sup>rd</sup> ed.)

- Conover, W. J., Iman, R. L. (1981). Rank transformations as a bridge between parametric and nonparametric statistics. *American Statistician*, 35, 124-129.
- Engman, M., (2005), "The economic impact of trade facilitation", OECD Trade Policy Working Paper No.21.
- Ferguson, George A., Takane, Yoshio. (2005). "Statistical Analysis in Psychology and Education", Sixth Edition. Montréal, Quebec: McGraw-Hill Ryerson Limited
- Fletcher T (2006), The Benefits of Investing in Supply Chain Security: The IBM Experience, Submitted to the APEC Total Supply Chain Security Symposium Singapore July 2006, Singapore.
- Galton F (1880), *Statistics of Imagery*, *Mind*, 5, 301-308.
- Goh M and Pinaikul P., (1998) "Logistic Management Practices and Development Thailand", *Logistic Information Management*, Vol. 11 No. 6, pp 359-369.
- Jean E K., (2005), *Trade Facilitation: A Tool for Development*, United Nations Economic Commission for Europe, WTO.
- Jomini P., Zeitsch F., Mcdougall R., Welsh A., Brown S., Hambley J., and Kelly J (1991): A General Equilibrium Model of the World Economy, Volume 1, Model Structure, Database and Parameters, Canberra: Industry Commission.
- King, Bruce M., Minium, Edward W. (2003). *Statistical Reasoning in Psychology and Education*, Fourth Edition. Hoboken, New Jersey: John Wiley & Sons, Inc.
- Lovejoy J., L, (2001): Principles of Supply Chain Management, Textile Clothing Technology Corp, DAMA-G-2-01 July Version 1.1.
- Magee Stephen P. (1972): The Welfare Effects of Restrictions on US Trade, Brookings Papers on Economy Activity 3, pp 645-701.
- Nordas H. K (2003), "Vertical Specialization and quality of infrastructure" *World Trade Organization*, P 4.
- Nordas H K (2006), Enrico Pinali and Massimo Geloso Grosso, Logistics and Time as a trade Barrier, OECD Trade Policy Working Paper no. 35, TD/TC/WP p13
- Piermartini R and Teh R (2005), Demystifying Modeling Methods for Trade Policy, *World Trade Organization*, Discussion P10.
- Savannah State University Office of Institutional research and Planning Summer (2002)
- Singh M., (2004), A Review of the Leading Opinions on Future Supply Chains, Supply Chain 2020 Project.
- United Nations Center for Trade Facilitation and Electronic Business (UN/CEFACT), Economic Commission for Europe, "Recommendation on data Rationalization and Standardization for International Trade", No. 34, (2006).
- World Bank, Thailand Investment Firms, Competitiveness and Growth (2006), Poverty reduction and Economic Management Sector Unit East Asia and Pacific Region, Report number 36267 TH.