

UNIVERSITI TEKNOLOGI MARA

**INTERNALIZATION OF THE SOCIAL
COSTS OF THE LOGISTICS PLAYERS IN
GAME THEORY TOWARDS GREEN
LOGISTICS**

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ABSTRACT

Greening the logistics services is an eminent factor that could reduce the excessive used of fossil fuel by the logistics industry. In Malaysia, particularly the logistics industry covers all types of transportation mode such as air, land and sea. Besides the positive economic growth, the side effect of logistics activities is a negative externality with a recent issue of the Global Warming is the inevitable growth of Greenhouse gases (GHG). These activities have given an impact to the environment that has caused major catastrophic. This research is to realise the Strategies and Action Plan of Logistics and Trade Facilitation Masterplan (2015-2020) and 11th Malaysia Plan; Towards a First-World Mentality Nation. Since, inconsistencies in the operation of logistics services between the “*green*” and “*logistics*”, thus the logistics players focus on the greener the operation of logistics services. The fact is that “*greenness*” is a cost-saving strategy in which the logistics players could benefit from Internalization the Social Cost. Green Logistics has been implemented over 40 countries and there are many research related to this study. However, this research is a continuation of current research and focuses on the internalization of the social costs using Game Theory. This research has explored the use of analytical tool of Congestion Game by studying the congestions in the road network. The study of Price of Anarchy for understanding the cost involved in congestion and resolving the congestions in the road network. This is through identifying the internal and external costs as well the overall cost function i :

$ui(\sim a) = P_{j \in ai} c_j(n_j(\sim a))$. This study has suggested that the diversion of vehicles could reduce the congestion in the road network by using other available route to the same destination. For the internalization of the social cost, the most important factor is to identify the strength or weakness of the monetary valuation method to be adopted for implementation. Thus, the study of the decision making analysis of the logistics players used the Extensive Form or Game Tree represented as a vector of probabilities:

$= (p(Sa), p(Sb), p(Sc), \dots)$. This study could gauge the players strategic action for Willingness to Pay and Willingness to Accept for improving the Pareto Efficiency. The finding of this research could be adopted in the policy by incorporating suitable monetary valuation method into the policy for achieving the social optimality. This cost could be converged for the compensation (Kaldor Hicks) theory for the social benefit. Overall, this study explores the use of Congestion Game and Extensive Form or Game Tree as the strategic action of multi players in making the decision for the benefit outcome. This study provides the solution concept to resolve the research problem statement and objectives. Thus, it's providing the understanding of the beneficial outcome of the players in the logistics sector and achieving the equilibrium for social optimality and sustainability.

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

The logistics industry is a significant service in economic development and important service to move people, material, resources, equipment, etc. around the world. (Gundlach et al.,2006) the logistics industry generally is a flow of inbound and outbound of goods, services and information between organizations. In earlier stage, the research in logistics focused on the management of transport and warehouse. (Lin and Ho, 2008) the research become evolves and strategic activities in managing the flows of the goods, services and information from the point of origin to the point of consumption link to customer and suppliers.

Mainly in Malaysia, logistics industry covers all types of transportation mode such as air transport, land transport, sea and railway. The research and development of logistics in Malaysia started within the year of 1980s to 2000s. The concerned on the physical distribution of outbound flow of finished goods and services and warehouse management (Ali, Jaafar & Mohamad, 2008).The logistics sector as referred to (Mustafa and Potter, 2009) concentrating on the outsourcing of the logistics activities and growth of 3rd Party Logistics (3PL). (Sohail, 2006) in the study founded that 67.7% companies in Malaysia use the logistics contract focus on domestic trade if compared to Singapore use for International trade. (Sohail and Sohal, 2003) claimed on the effectiveness utilization of human resource, better delivery of goods and cargo handling as well to enhance and the use of IT system with external parties. The targeted 8.6% by 2020 growth of 22,000 logistics companies in various area with contribution of 12.1% GDP, (Jumadi & Zailani, 2010).

MIDA (2012) a supply chain management process involve the plans, implements and controls the efficient and effective flow and storage of goods, services and related information between origin point to consumption point in order to meet customer's requirements". The main services are in the area of warehousing, transport services, freight forwarding, Integrated Logistics services (ILS), International Integrated Logistics Services (IILS) and Cold Chain Facilities.