

**THE STUDY OF CARGO CRIME DURING ROAD
TRANSPORTATION IN MALAYSIA:
APPLICATION OF ROUTINE ACTIVITIES
THEORY**

CHING ENG LEONG

UNIVERSITI SAINS MALAYSIA

2019

**THE STUDY OF CARGO CRIME DURING ROAD
TRANSPORTATION IN MALAYSIA:
APPLICATION OF ROUTINE ACTIVITIES
THEORY**

by

CHING ENG LEONG

**Thesis submitted in fulfillment of the requirements
for the degree of
Doctor of Philosophy**

April 2019

ACKNOWLEDGEMENT

First, I would like to express my sincere gratitude and heartfelt appreciation to my supervisor, Associate Professor Dr. P. Sundramoorthy of University Sains Malaysia, a well-known criminologist in Malaysia. Without his support, advice and guidance, this research would have never been completed. He deserves recognition for his expertise in criminology and has provided me with insightful theories and methods in criminology from a social science perspective. My co-supervisor, Associate Professor Dr. Azrina Husin, has also provided me with valuable advices and a continuous support for the completion of my PhD programme. I am grateful to them for their understanding of my status as a ‘warga emas’ (senior citizen) and as part-time candidate, which is far more challenging than the younger and full-time candidates. Many logistics and security professionals, government agencies, private companies, organizations and fellow researchers have provided me with valuable information and data that have assisted me to overcome many of the obstacles encountered. Ironically for security reasons, I could not disclose them all. The support, intelligence and information provided have also helped me to produce a valuable research to enhance security management and a continuous fight on cargo crime in Malaysia. Finally, my greatest gratitude goes to my wife Diong Moi Leng, my daughters; Ching Siu Jeen, Ching Siu Ru and my son Ching Yi Xin, for their support and understanding. This thesis is dedicated to all of them and hopefully will provide the encouragement and set an exemplary path in gaining more knowledge on their journey to excel in life.

TABLE OF CONTENTS

Acknowledgement	ii
Table of Contents	iii
List of Tables	ix
List of Figures	x
List of Abbreviations	xiv
List of Appendices	xviii
Abstrak	xix
Abstract	xxi

CHAPTER 1 – INTRODUCTION

1.1	Transportation Security	1
1.2	Cargo Transportation in Malaysia	6
1.2.1	The Role of Cargo Transportation in Malaysia	10
1.2.2	Growth of Cargo Transportation in Malaysia	15
1.3	Cargo Crime in Malaysia	17
1.3.1	Cargo crime legislation in Malaysia	22
1.3.2	Penal code – Act 574 Law of Malaysia	23
1.4	Scope of the Study	24
1.5	Problem Statement	26
1.6	Research Questions	30
1.7	Research Objectives	30

CHAPTER 2 – LITERATURE REVIEW

2.1	Introduction	32
-----	--------------	----

2.2	Studies on cargo crime	34
2.2.1	Studies on crime in Malaysia	42
2.3	Theoretical discussion on routine activities theory	44
2.3.1	General Discussion	44
2.3.2	Discussion on absence of guardian or controller in routine activities theory	48
2.3.3	Discussion on motivated offenders and opportunities	60
2.3.4	Discussion on available targets	64
2.4	The strength of routine activities theory	68
2.5	The weakness of routine activities theory	70
2.6	Implications of routine activities theory	71
2.7	Situational crime prevention technique	74
2.8	Secured truck parking facilities in combating cargo crime	76
2.9	Impact of security monitoring system (CCTV) on crime prevention	79
2.10	Studies on street lighting impact on crime prevention	85
 CHAPTER 3 – RESEARCH METHODOLOGY		
3.1	Introduction	91
3.2	Research Framework	92
3.3	Conceptual Model	94
3.4	Research Methodology	96
3.5	Ethical Issues	99
3.6	Questionnaire Construction	101
3.7	Subject Matter Experts Review	109

3.8	Pre-Test Questionnaire	114
3.9	Sampling Methodology	116
3.9.1	Determination of Sample Size	122
3.9.2	Sampling Criteria Adopted	127
3.9.3	Inclusion and Exclusion Criteria	130
3.10	Survey Instrument	131
3.11	Data Collection	133
3.12	Data Analysis	135
3.13	Qualitative Research	137
3.13.1	Purpose of Interview	138
3.13.2	Security Survey	141

CHAPTER 4 – DATA ANALYSIS

4.1	Introduction	145
4.2	Statistical Analysis	145
4.3	Theft Incidents	152
4.4	Data Reliability Analysis	153
4.4.1	Scale Reliability Analysis – Cronbach’s Alpha	155
4.4.2	Correlational Analysis Result	156
4.4.3	Correlations Between Security Budget and Security Control	163
4.4.4	Correlations Between Security Administrative Control and Security Control	164
4.4.5	Correlations Between Security Physical Control and Security Control	165

4.4.6	Correlations Between Transportation Operation Control and Security Control	165
4.4.7	Correlations Between Trucking Security Control and Security Control	165
4.5	Levene's Test for Equality of Variances	166
4.6	Analysis of Covariance (ANCOVA)	172
4.7	Security Survey	177
4.7.1	Truck Secured Parking Survey Result	177
4.7.2	Lighting Survey Result	181
4.7.3	Relationship between Lighting and Crime	188
4.7.4	Analysis on Qualitative Research	190

CHAPTER 5 - DISCUSSION

5.1	Introduction	210
5.2	Discussion on Relationship Between Security Control and Cargo Crime	211
5.2.1	Discussion on Relationship Between Security Certification and Cargo Crime	215
5.2.2	Discussion Relationship Between Security Budget and Cargo Crime	217
5.2.3	Discussion on Relationship Between Security Administrative Control and Cargo Crime	219
5.2.4	Discussion on Relationship Between Security Physical Control and Cargo Crime	220

5.2.5	Discussion on Relationship Between Transportation Operational Control and Cargo Crime	221
5.2.6	Discussion on Relationship between Trucking Security Control and Cargo Crime	224
5.3	Discussion on Security Control Influencing Cargo Crime	225
5.4	Discussion on Security Control Measures between Foreign and Local Road Transportation Companies in Malaysia	229
5.4.1	Difference of Security Budget Between Foreign and Local Road Transportation Companies	235
5.4.2	Difference Level of Security Administrative Control Between Foreign and Local Cargo Road Transportation Companies	236
5.4.3	Difference Level of Security Physical Control Between Foreign and Local Cargo Road Transportation Companies	237
5.4.4	Difference Level of Transportation Operational Control Between Foreign and Local Cargo Road Transportation Companies	238
5.4.5	Difference Level of Trucking Security Control Between Foreign and Local Cargo Road Transportation Companies	239
5.5	Discussion on Security Control Measures implemented at PLUS Highway Malaysia	240
5.6	Significance of this Study	243

CHAPTER 6 – CONCLUSION

6.1	Conclusion	247
6.2	Challenges	253
6.3	Recommendations for Future Study	255
6.4	Limitations of Study	257

REFERENCES	258
-------------------	-----

APPENDICES

LIST OF TABLES

		Page
Table 1.1	Number of transportation business establishment in Malaysia	17
Table 3.1	List of Subject Matter Experts (SME)	112
Table 4.1	Company Ownership	147
Table 4.2	Respondent Position in Company	148
Table 4.3	Company Operating in States of Malaysia	149
Table 4.4	Number of Employee in Company	150
Table 4.5	Type of Trucks	150
Table 4.6	Size of Truck Used	151
Table 4.7	Number of Fleet in Company	151
Table 4.8	Types of Vehicles	152
Table 4.9	Theft Incident from Year 2008 to 2013	152
Table 4.10	Malaysia Cargo Crime Statistics	203
Table 4.11	Comparison of Malaysia Cargo Hijacking Cases between Trunk Road and Highway	204

LIST OF FIGURES

	Page	
Figure 1.1	Cargo Movement out of Malaysia	6
Figure 1.2	Cargo Movement into Malaysia	7
Figure 1.3	Total Cargo Movement in Malaysia	8
Figure 1.4	Total Import and Export Cargo at Malaysian Sea Ports 2004 - 2013	8
Figure 1.5	Handling of Import and Export Containers 2004 - 2013	9
Figure 1.6	Domestic and International Cargo Handled by Malaysians Airports	9
Figure 1.7	Malaysia Cargo Movement by Modes	10
Figure 1.8	Growth in Revenue and Earnings of Local Transportation Companies	13
Figure 1.9	Cargo Crime Statistics by States of Malaysia	18
Figure 1.10	North-South Expressway (PLUS) Malaysia	25
Figure 2.1	Routine Activities Theory: The Interaction of Three Factors	33
Figure 2.2	Summary of Guardianship and Crime Studies	52
Figure 2.3	Crime Triangle	60
Figure 2.4	Situational Crime Prevention Techniques	75
Figure 3.1	Research Framework	93
Figure 3.2	Conceptual Model of Quantitative Research	96
Figure 3.3	Conceptual Model of Qualitative Research	99
Figure 3.4	List of Documents used for Questionnaire Construction	109
Figure 3.5	Total survey questionnaire received	120
Figure 3.6	Status of questionnaire received	120
Figure 3.7	Survey questionnaire accepted breakdown by state in Malaysia	121

Figure 3.8	Table for Determining Minimum Returned Sample Size for a Given Populations Size for Continuous and Categorical Data	124
Figure 3.9	List of Organization Participated in the Survey	129
Figure 3.10	Exclusion and Inclusion Criteria	131
Figure 3.11	Data Analysis Flow	136
Figure 3.12	Recommended Levels of Lighting for Outdoor Car Park	144
Figure 4.1	Pie Chart of Respondents' Position in Company	148
Figure 4.2	Rule of thumb for interpreting the size of a correlation coefficient	154
Figure 4.3	Scale Reliability Analysis - Cronbach's alpha	156
Figure 4.4	<i>t</i> -Test - Total Crime over 6 Years	157
Figure 4.5	Correlations Analysis	161
Figure 4.6	Significant Relationships among Variables	162
Figure 4.7	Multiple Regression Analysis	163
Figure 4.8	<i>t</i> -Test - Total Level of Security Control	167
Figure 4.9	<i>t</i> -Test – Security Certification	168
Figure 4.10	<i>t</i> -Test – Security Budget	169
Figure 4.11	<i>t</i> -Test – Security Administrative Control	170
Figure 4.12	<i>t</i> -Test - Facility Security Physical Control	170
Figure 4.13	<i>t</i> -Test – Transportation Operational Control	171
Figure 4.14	<i>t</i> -Test - Trucking Security Control	172
Figure 4.15	Test for the Equality of Error Variance - Coefficients	174
Figure 4.16	Levene's Test of Equality of Error Variances	175
Figure 4.17	Tests of Between-Subjects Effects	176
Figure 4.18	Pairwise Comparisons Test	176

Figure 4.19	PLUS Highway (Malaysia) - Security System Installation at RSAs	180
Figure 4.20	PLUS Highway (Malaysia) - Security System Installation at Lay-by	181
Figure 4.21	PLUS Highway (Malaysia) Lighting Survey at RSAs	184
Figure 4.22	PLUS Highway (Malaysia) Lighting Survey at Lay-by	186
Figure 4.23	Analysis of Lighting Survey at PLUS Highway	187
Figure 4.24	Lay-by Areas Installed with LED lighting at PLUS Highway Malaysia	188
Figure 4.25	Respondents Company Ownership	191
Figure 4.26	Respondents Position in Company	191
Figure 4.27	Criminal Behavior and Security Preventive Measures	192
Figure 4.28	Company Investment on Security	193
Figure 4.29	Security Administrative Control Implemented	194
Figure 4.30	Facility Physical Security Control Implementation	195
Figure 4.31	Trucking Security Control Implementation	196
Figure 4.32	Police Effort in Combating Cargo Threats	196
Figure 4.33	Cargo Crime Preventive Measures by Police	197
Figure 4.34	Speed of Police Responding to Cargo Crime	197
Figure 4.35	Security Control Measures Implemented by Highway Authority	198
Figure 4.36	Cargo Crime Preventive Measures by Highway Authority	199
Figure 4.37	Cargo Criminal Aggressiveness	200
Figure 4.38	Cargo Crime due to Insider's Job	200
Figure 4.39	Respondents' Views Related to Cargo Crime	201
Figure 4.40	Summary of Respondent View Related to Cargo Crime	202
Figure 4.41	Cargo Hijacking Cases – 2010	206

Figure 4.42	Cargo Hijacking Cases – 2012	207
Figure 4.43	Cargo Hijacking Cases - 2014	208
Figure 4.44	Cargo Hijacking Cases – 2015	209
Figure 5.1	Relationship between security control measures implemented and cargo crime	213
Figure 5.2	Security Control Measures between Foreign and Local Trucking Companies	232
Figure 5.3	Security Certification between Foreign and Local Trucking Companies	233
Figure 5.4	Security Budget Allocation between Foreign and Local Trucking Companies	235
Figure 5.5	Security Administrative Control between Foreign and Local Trucking Companies	236
Figure 5.6	Facility Physical Security Control between Foreign and Local Trucking Companies	237
Figure 5.7	Transportation Operational Control between Foreign and Local Trucking Companies	238
Figure 5.8	Trucking Security Control between Foreign and Local Trucking Companies	239
Figure 5.9	Cargo crime theory	245
Figure 6.1	Summary of research hypotheses testing between variables	250

LIST OF ABBREVIATIONS

AEO	Authorized Economic Operator
AFTA	Asean Free Trade Area
AMH	Association of Malaysian Haulers'
AMS	Automated Manifest System
ANCOVA	Analysis of Covariance
ANOVA	Analysis of Variance
ASEAN	Association of South East Asia Nations
ATA	American Trucking Association
BRE	Building Research Establishment
BS	British Standard
CAGR	Compounded Annual Growth Rate
CCTV	Closed Circuit Television
CEO	Chief Executive Officer
CPU	Computer Processing Unit
CR	Construct Reliability
CSI	Container Security Initiative
CTPAT	Custom Trade Partnership against Terrorism
DCA	Department of Civil Aviation
EC	European Commission
ECE	East Coast Expressway
ECER	East Coast Economic Region

EP	European Parliament
ETP	Economic Transformation Program
EU	European Union
fc	Foot Candle
FDA	Food and Drug Administration
FDI	Foreign Direct Investment
FY	Fiscal Year
FIA	FIA International Research Ltd
FMFF	Federation of Malaysia Freight Forwarders
FSR	Freight Security Requirements
GIS	Geographic Information Systems
GDP	Gross Domestic Product
GPS	Global Positioning System
ICAO	International Civil Aviation Organization
ICS	Import Control System
ICT	Information and Communications Technologies
IFS	International Financial Statistics
IMF	International Monetary Fund
IMO	International Maritime Organization
IRDA	Iskandar Regional Development Authority
IRU	International Road Union
ISPS	International Ship and Port Facility Security

ITF	International Transport Forum
JIT	Just In Time
JOFFA	Johor Freight Forwarders Association
KLIA	Kuala Lumpur International Airport
LED	Light Emitting Diode
lx	Lux
MAA	Motor Accidents Authority, Australia
MLC	Malaysia Logistics Council
MTSA	Maritime Transportation Security Act
MYR	Malaysia Ringgit (Malaysia Currency)
NCER	Northern Corridor Economic Region
NDC	New Deal for Communities
NGO	Non-Governmental Organization
NSE	North-South Expressway
OTS	Office of Transport Security
PFFA	Penang Freight Forwarders Association
PLUS	Pengurusan Lebuhraya Utara Selatan
PMLOA	Pan Malaysia Lorry Owners Association
PTP	Port of Tanjung Pelepas
RAR	Regulated Agent Regime
RAT	Routine Activities Theory
RSA	Rest and Service Areas

SCORE	Sarawak Corridor of Renewable Energy
SDC	Sabah Development Corridor
SFFLA	Selangor Freight Forwarders and Logistics Association
SME	Subject Matter Expert
SOLAS	International Convention for the Safety of Life at Sea
STP	Secured Trade Partnership, Singapore
TAPA	Technology Asset Protection Association
TEU	Tons Equivalent Units
TSR	Truck Security Requirements
UDOT	United State Department of Transportation
UICR	Union International des Chauffeurs Routiers
UNCJIN	United Nations Crime and Justice Information Network
UK	United Kingdom
USA	United States of America
USD	United States Dollar
US CBP	United States Custom and Border Protection
WCO	World Customs Organization

LIST OF APPENDICES

Appendix 1	Human Research Ethics Committee Approval Letter
Appendix 2	Sample Questionnaire
Appendix 3	Sample Structured Interview Format
Appendix 4	Photographs of Truck Rest Areas

KAJIAN JENAYAH KARGO SEMASA PENGANGKUTAN JALANRAYA DI MALAYSIA: APLIKASI TEORI AKTIVITI RUTIN

ABSTRAK

Kajian pencegahan jenayah, akibat jenayah dan teori-teori berkaitan dengannya merupakan aspek yang amat penting dalam kajian kriminologi. Teori aktiviti rutin merupakan suatu yang asas bagi majoriti teori kriminologi. Walaupun ia mempunyai beberapa kekurangan tetapi teori yang kukuh ini tetap memberikan menafaat kepada ahli-ahli teori dan pengamal pencegahan jenayah. Kajian ini menjelaskan aplikasi teori aktiviti rutin dalam pencegahan dan pengurangan jenayah kargo dalam rangkaian pengangkutan kargo jalanraya di Malaysia. Objektif kajian ini adalah membekalkan maklumat bersabit dengan teori ini dan siasatan perhubungan dengan pencegahan jenayah kargo. Ancaman sekuriti dan risiko dalam rangkaian pengangkutan kargo jalanraya di Malaysia amat membimbangkan industri ini. Kajian ini telah di jalankan untuk mengenalpasti langkah-langkah pencegahan jenayah kargo yang telah dilaksanakan oleh syarikat-syarikat pengangkutan kargo jalanraya di Malaysia. Perhubungan pembolehubah telah diutarakan dan dikenalpasti untuk mengetahui bagaimana jalinan perhubungan antara pembolehubah bebas dengan pembolehubah yang tidak bebas. Analisis korelasi telah dijalankan untuk mengenalpasti hubungan antara syarikat pengangkutan negara asing dengan syarikat pengangkutan tempatan dalam pelancaran langkah-langkah pengawalan keselamatan. Kaji selidik keselamatan telah dijalankan di sepanjang Lebuhraya PLUS Malaysia untuk mengenalpasti langkah-langkah kawalan keselamatan di kawasan rehat bagi menilai kemudahan parkir trak yang selamat seperti keadaan pencahayaan, ketersediaan perkhidmatan pengawal keselamatan dan pemasangan peralatan

keselamatan. Temuduga telah dijalankan keatas kakitangan pengurusan syarikat pengangkutan untuk mengumpul maklumat berkaitan dengan pelaksanaan langkah-langkah kawalan keselamatan di syarikat mereka, pelaburan untuk operasi keselamatan, inisiatif agensi kerajaan untuk mengurangkan jenayah kargo dan peranan pihak Lebuhraya PLUS Malaysia dalam menyediakan kemudahan parkir yang selamat untuk trak. Hasil kajian ini amat berguna kepada pengamal polisi dan syarikat pengangkutan jalanraya untuk memperkenalkan polisi keselamatan dan amalan yang sesuai bagi memastikan keselamatan keseluruhan aktiviti pengangkutan kargo jalanraya di Malaysia. Para pengamal keselamatan dan pengurus pengangkutan kargo jalanraya boleh meneliti semula model keselamatan pengangkutan masing-masing serta unsur-unsur keselamatan pengangkutan yang telah dipraktikkan.

THE STUDY OF CARGO CRIME DURING ROAD TRANSPORTATION IN MALAYSIA: APPLICATION OF ROUTINE ACTIVITIES THEORY

ABSTRACT

The studies on crime prevention, causes of crime and the theories associated with it are very essential in criminology. Routine Activities Theory is also the basis for many criminological theories. Although it has some shortcomings, it is still a strong theory that the theorists and practitioners on crime prevention can benefit from. This study explained the use of routine activities theory in preventing and reducing cargo crime on road transportation in Malaysia. The objectives of this study were to provide information related to this theory and investigate its relationship with the prevention of cargo crime. Security threats and risk on road transportation in Malaysia are the pressing concerns that are currently being faced by the industry. This study was conducted to identify the security control measures implemented by cargo transportation companies in Malaysia to prevent cargo crime. The relationships between the variables were addressed and established to find out how the independent variables are related to the dependent variables. Correlation analysis was conducted to determine the relationship between foreign and local cargo road transportation companies on the implementation of security control measures. Survey was conducted along PLUS Highway Malaysia to identify security control measures on truck parking facilities by measuring the level of the lighting condition, the availability of guarding services and the installation of security equipment. Interview were conducted on the management staff of the cargo road transportation companies to examine the data on security investment and control measures implemented in their companies, government agencies initiatives in combating cargo crime and the role played by PLUS

Highway in providing secured parking facilities. The outcome of this study will be useful for policy makers and road transportation companies to in establishing appropriate security policies and practices to ensure a secured environment for road transportation activities in Malaysia. Security practitioners and cargo road transportation managers can re-examine their existing road transportation security model by considering the transportation security elements identified.

CHAPTER 1

INTRODUCTION

1. Introduction

There are many criminological theories developed to explain how and why crimes take place and one of which is the routine activities theory. Routine activities theory is a theory which presented a clear explanation of why crimes occur and has clarified the specific circumstances where crime can happen. It is found that this theory can be applied to the study of cargo crime in Malaysia. At the beginning of this study, routine activities theory was used to explain changes in crime trends over time. It has been progressively used generally to determine and define the strategies in preventing cargo crime problem. Routine activities theory has some very practical implications for crime prevention and thus security practitioners and cargo transportation industries would find it very useful.

The value of this theoretical advancement was explored and a study was conducted through a survey across peninsular Malaysia. Incorporating individual measures of security control and measures within the cargo transportation of routine activities dynamics as well as industry based measures of cargo crime prevention, a statistical analysis was used to explain the relationship and variation in different crime control measures. There are some security control measures that are strongly paired with some types of cargo crime control preventive actions than the others. The relationship strongly predicted offenders who are significantly associated with targets, guarding and place managing or control. It was also found that routine activities of

crime can be better understood by delineating the process of cargo crime prevention strategies and they should be modelled on a wider range to prevent cargo crime.

Versatile methods have been used to test the hypotheses derived from the theory. This study explained the routine activities theory by relating it to cargo crime within the road transportation in Malaysia. Then, it was further applied to find out how the routine activities theory was related to cargo crime in the context of cargo transportation in Malaysia. A survey was conducted at truck parking facilities to evaluate the robustness of security control measures implemented in minimizing or preventing cargo crime. Lastly, there are discussion and a conclusion section on the relationship of security control measures within cargo road transportation that help to summarize this study.

1.1 Transportation security

Transportation security is vital to support business in achieving its goal and objectives (Sarathy, 2006). Closs and McGarrell (2004) defined transportation security as the application of security policies, procedures and systems in protecting their cargo and assets from theft, damages, or terrorism, and preventing the insertion of contraband, people, or weapons of mass destruction into the supply chain. Deloitte (2005) found that organizations are giving greater attention to security by spending more money, time, and resources in ensuring that security existed in their transportation as unexpected incidents could cause tangible and intangible damages in terms of property, product, infrastructure, people, reputation, market position and brand. Although many transportation companies are devoting increased resources and attention to security efforts, very little guidance was available for companies which

are trying to minimize their exposure to unexpected and potentially damaging or disruptive occurrences which could affect their operation. It may well be the case that cargo crimes are some of the great challenges for multinational companies in ensuring their products flow globally. Malaysia is one of the countries in Asia Pacific that has recorded the most frequent incidents of cargo crime with violence and security threat as used in cargo hijackings (Gooch, Liz, 2011). This has threatened the country's image and reputation as an industrial country and it will threaten potential investors from coming to Malaysia. As transportation companies faced many drawbacks due to a fragile cargo security, transportation security is very essential for organizations to ensure the continuity of their business (Sarathy, 2006). Transportation security is a concern for all business organizations including Malaysia. The conventional supply chain involved has limited perspectives for protection of cargoes and factories such as risk management, natural disasters, equipment and facilities failure, issues relating to employees, loss prevention, geopolitical events, and personnel strikes (Li and Ye, 2008). In contrast, the modern supply chain includes broader protection for supply chain service providers and partners, supply chain facilities, freight carriers, transportation, people and information. The success of modern cargo security depends on various critical success factors including organizational security cultures and security control measures implemented in the company. Williams, Leug and Lemay (2008) stressed that security culture is not only important as part of governmental initiatives, it also has significant effects on the company's strategic, operational and tactical objectives. The security control measures are very important and they can provide appropriate protection from attacks against cargo within the transportation companies.

Most of the literature on cargo transportation and supply chain security practices have been written from the perspective of developed countries like USA and Europe and very few studies have been conducted in the context of emerging countries like Malaysia. Most the companies and countries generally has low priority for cargo security and normally losses were included as the cost of doing business whenever there are incidents of cargo theft or losses (EU, 2003). Cargo transportation industry needs to implement cargo security control measures to deter the continuous risk of cargo crime as they are closely related to the management of security control and the preventives measures of their companies. Cargo security needs to be implemented across the entire cargo transportation chain to reduce cargo crime. It can only be considered secured when the security control measures are implemented across the entire supply chain. Cases related to hijacking of goods from trucks, or even stealing from trucks at any intersection within the cargo transportation are considered as cargo crime. Most of the cargo transportation companies in Malaysia do not want to report such security incidents to the authority as the management does not want to jeopardize their company's reputation. The company may need to pay higher insurance premium for the following year if they reported cargo security incident to the authority and made claim from insurance company.

The study on cargo crime on road transportation in Malaysia has not been corroborated despite its importance. There is very few research conducted to understand how transportation security control measures are related to cargo crime in Malaysia. Except for the study conducted by Yang and Wei (2013), no other studies have been found that empirically investigate the security control measures of security performance in Malaysia or the Asia Pacific region. Thus, little is known about how

security control measures influenced the scope and deployment of transportation security activities and thereby differentiate companies' security performances. We need to bear in mind that the organizational culture or behaviours for companies in Malaysia were different from companies in other region or developed countries. Because of the continuing increased in global competition, regardless whether manufacturing companies acted proactively or reactively, a study on the cargo transportation security control measures within road transportation companies may refine our conceptual understanding of the linkages on security control measures and cargo crime.

This study was targeted to explore cargo crime on road transportation in Malaysia with the application of the routine activities theory. This study hoped to provide primary guidelines to government agencies responsible in developing cargo security policies and strategies to ensure that Malaysia becomes a secure location for managing cargo. This study will provide the assurance to the local and international investors to continue their investment on cargo transportation in Malaysia. This study has somehow contributed to the literature by using a theoretical foundation of criminology theory. Routine activities theory has been identified to test empirically for the propositions developed from the past studies on cargo crime. The scope of this study focussed on the security control measures implemented by road transportation companies to deter or prevent cargo crime. The following sections discussed the theoretical foundation and road transportation security literature where the research propositions were derived. Next, the survey research methodology and research model used to test the propositions will be discussed. Finally, the research findings and study implications of this thesis are presented.

1.2 Cargo transportation in Malaysia

The flowchart in Figure 1.1 and Figure 1.2 illustrated the process of importing and exporting of cargo in Malaysia. This may vary slightly depending on whether the cargoes; from seaport or airport and those delivered to customers' premises or from port to a restricted area such as bonded warehouse, are required to go for Custom clearance.

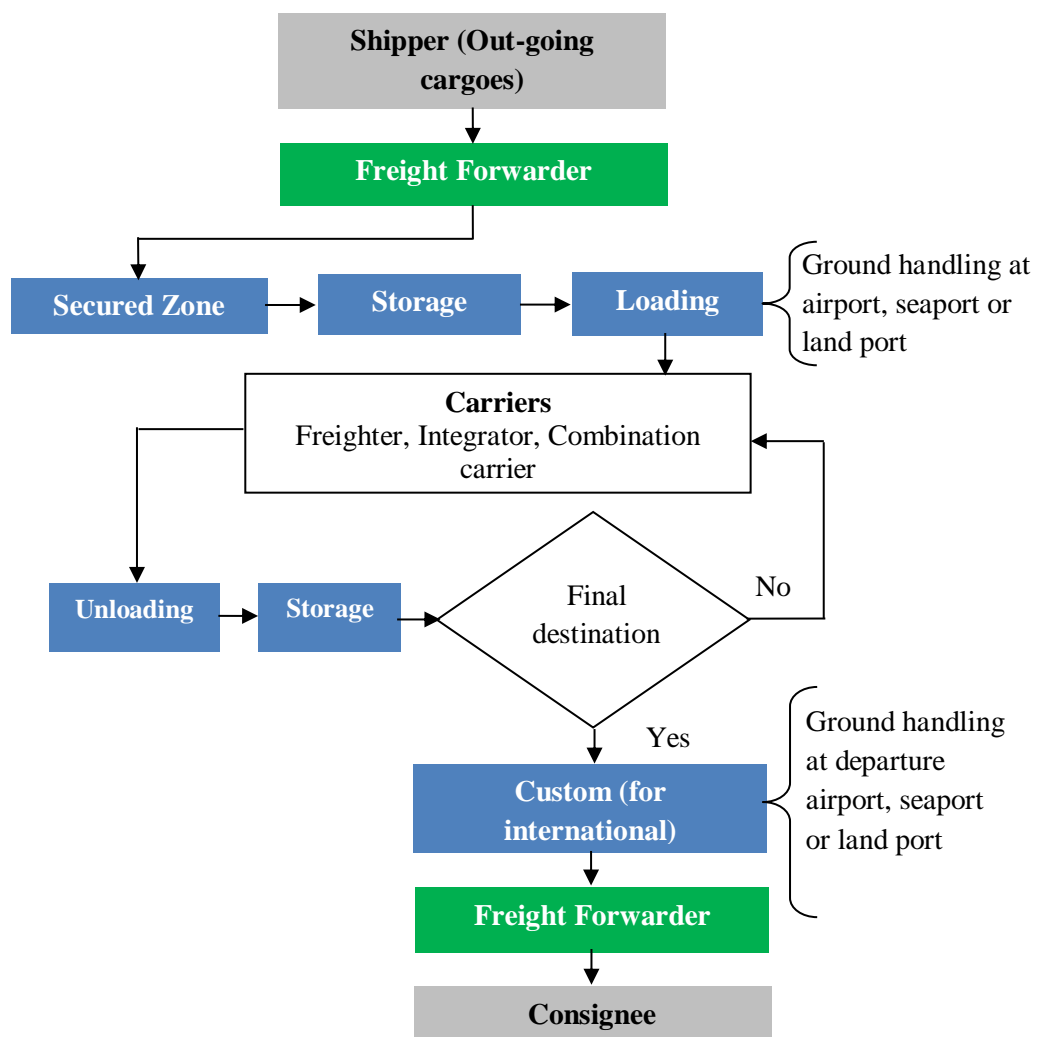


Figure 1.1: Cargo movement out of Malaysia

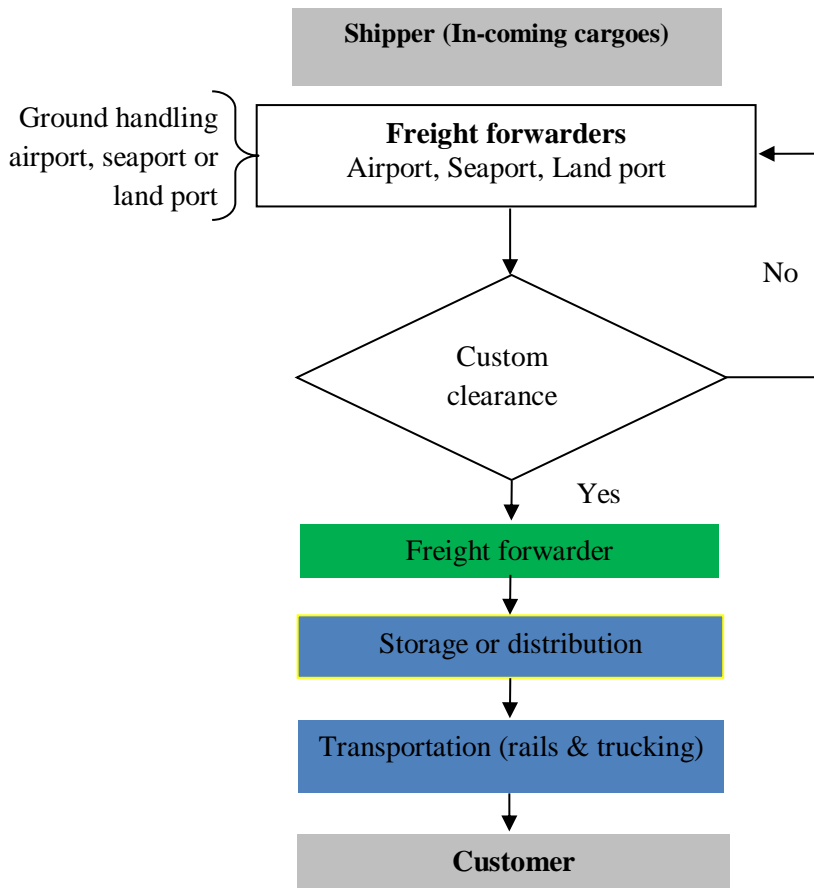


Figure 1.2: Cargo movement into Malaysia

Figure 1.3 revealed the growth of cargo exported from Malaysia and it continued to grow year by year since 2004 except in 2009 where a worldwide economy downturn affected the growth especially in airport sectors. The volume of containers at sea port was very consistent as illustrated in Figure 1.4 and Figure 1.5. In Figure 1.6 showed the volume of cargoes being handled in airport sector where international cargo continued to grow from year 2001 to 2006 and peaked at 861,709 metric tons (Malaysia Ministry of Transportation, 2014). Figure 1.7 indicated that transportation of cargoes using air mode showed the highest volume. The volume of cargo from road transportation sector in Malaysia was not reported separately here because eventually all incoming or outgoing cargoes from seaport, airport and railway must use road transportation mode. In a 2014 report taken from Ministry of Transport Malaysia, there were more than 1,400,000 tons’ metric of cargoes using road transportation after the cargoes arrived through seaports or vice versa (Malaysia Ministry of

Transportation, 2014). Due to a high volume of cargo on the road, security risk was extremely high and it can be an easy target for criminals to strike the cargoes. Therefore, road transportation companies in Malaysia must implement good security control measures to ensure their cargoes are secured while on the road en-route to their destination.

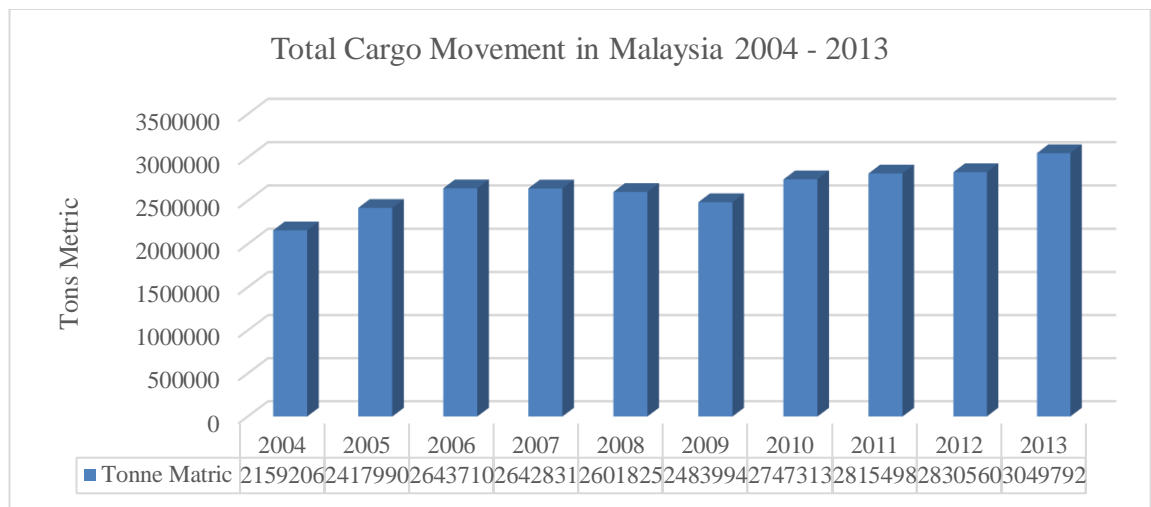


Figure 1.3: Total cargo movement in Malaysia
 Source: Statistics from Malaysia Ministry of Transportation 2014

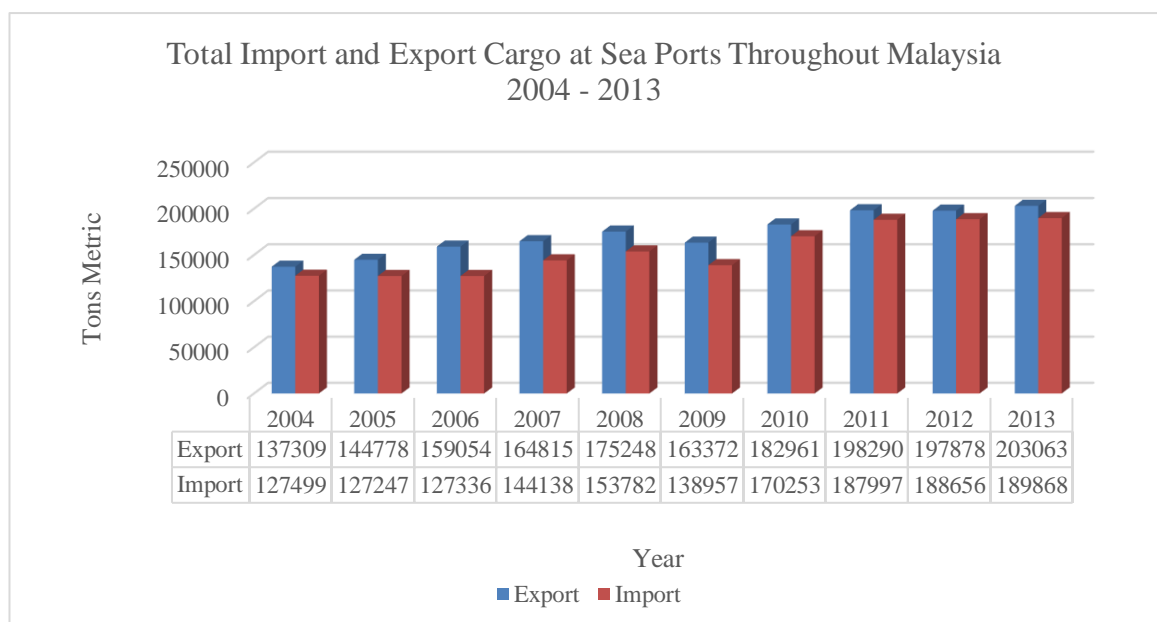


Figure 1.4: Total import and export cargo at all Malaysian sea ports
 Source: Statistics from Malaysia Ministry of Transportation 2014

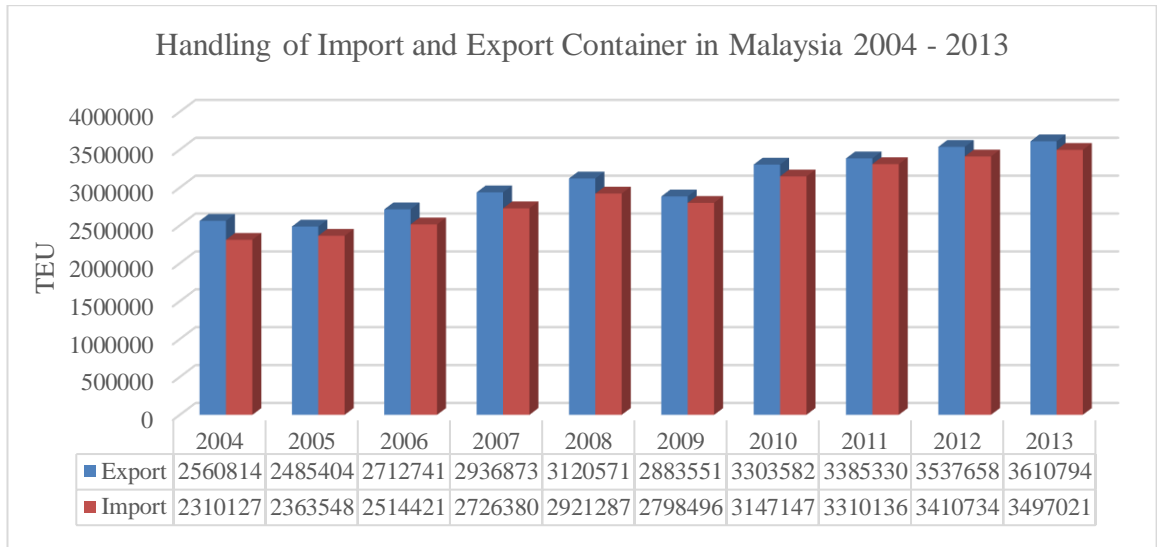


Figure 1.5: Handling of import and export containers 2004 - 2013
 Source: Statistics from Malaysia Ministry of Transportation 2014

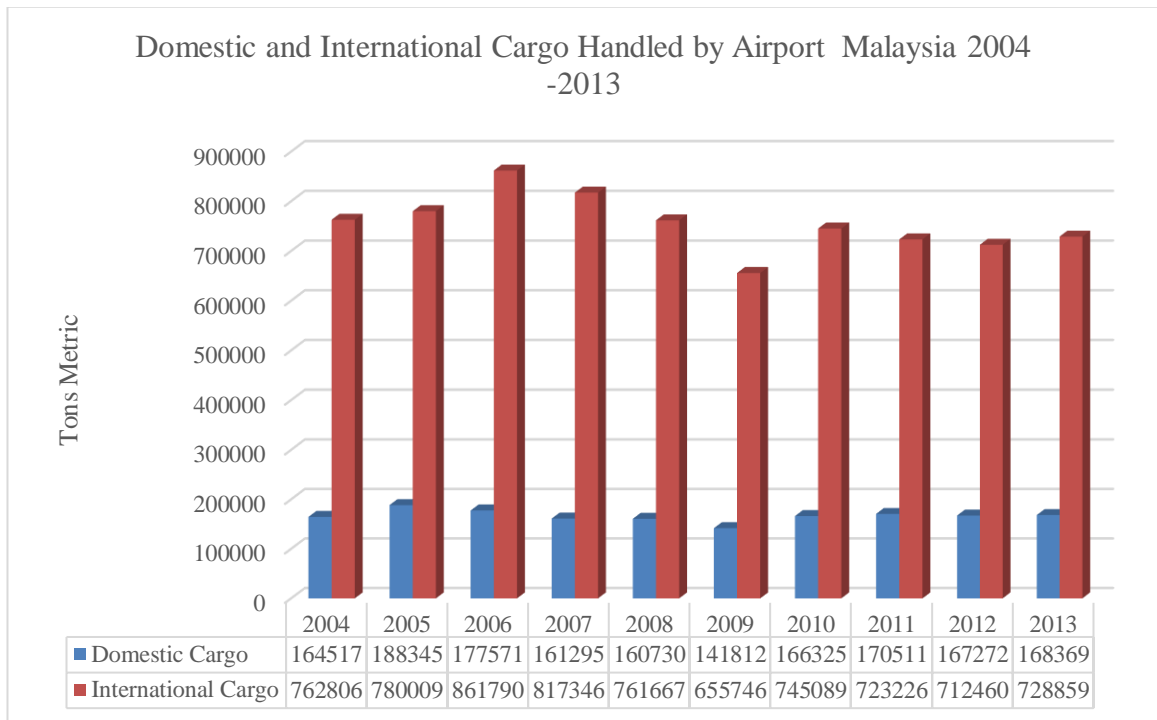


Figure 1.6: Domestic and international cargo handled Malaysians airports
 Source: Statistics from Malaysia Ministry of Transportation 2014

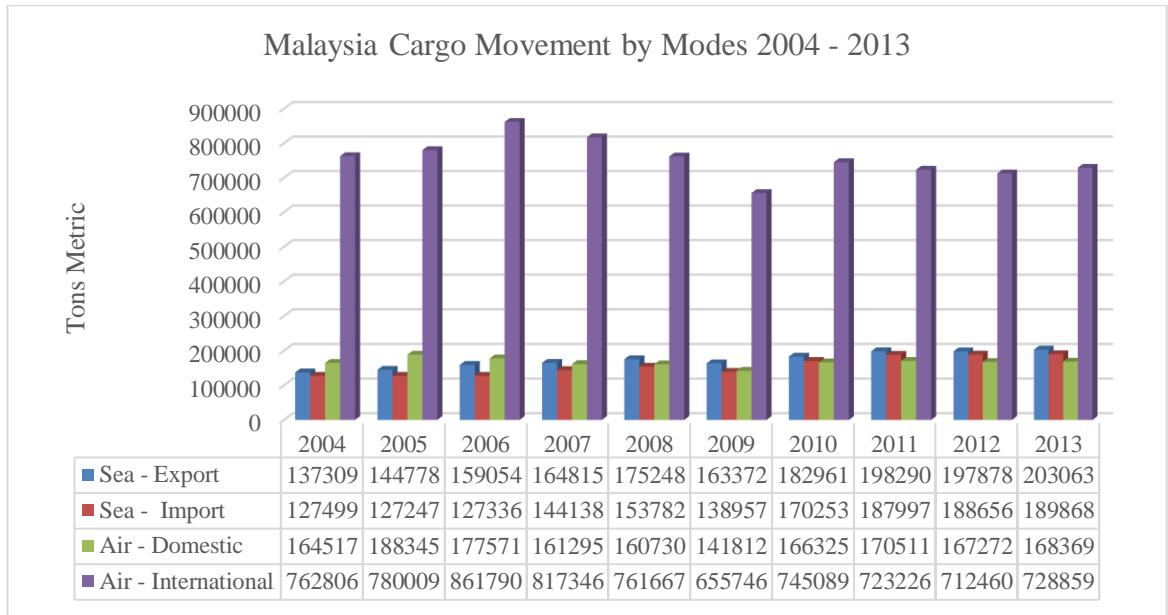


Figure 1.7: Malaysia cargo movement by modes
 Source: Statistics from Malaysia Ministry of Transportation 2014

1.2.1 The role of cargo transportation in Malaysia

Trucking is one of the critical events during transportation of cargoes which includes products movement from one area to another before reaching the customers. Trucking is a very critical activity for companies as it functions to deliver the product to customers, which is normally manufactured in different parts of the world and delivered to various countries. The manufacturing industries depend heavily on transportation to move their cargoes around for distribution and it is considered as one of their major costs or investment. In fact, transportation activities represented more than 10% of Malaysia GDP (Kamarul, 2012). The responsibilities of transportation are even more critical within the global supply chain. Transportation enables company to transfer their products across the globe and supports retailers in selling products around the world. International trading has become an important factor in this modern economy. Kamarul (2012) reported that in 2012, Malaysia's transportation industry grew 10.3% to RM129.93 billion, an increased from RM117.8 billion in 2011. In

2012, external trade for Malaysia increased by 5.9% to RM1.42 trillion compared to RM1.24 trillion in 2011.

Transportation and logistics industries played a major role in the growth of Malaysia external trade. Gopal (2012) indicated that Malaysia's strategic advantage can be fully utilized due to its strategic location and the focus of government to increase the supply chain efficiencies. This will also help to accelerate the growth of local logistics and transportation industry. Gopal expected our country logistics industry to have a compounded annual growth rate of 11.6% exceeding RM203.71 billion in 2016.

Cargo transportation is a vital element in the economic prosperity of any country. A large variety of products and cargo need to be efficiently transported within and among the consumer markets, industry sectors and international trade networks; while at the same time addressing as much adverse impacts as possible on congestion, environment and cargo security. Bryan, Glen and Carl (2007) revealed that the people involved in planning transportation must consider the different costs of road transportation. This includes environmental, maintenance, security and congestion costs to formulate or offer practical solutions. As businesses increasingly adopted sophisticated supply chain management strategies, cargoes shipment decision-making process is becoming ever more complicated.

Transportation operation has been the pillar and base of international business for Malaysia to become competitive. When Asean Free Trade Area (AFTA) becomes fully effective, Malaysia will be an ideal location for transportation and regional

distribution centres. Malaysia can leverage the strong Internet connectivity and good education system that are currently available. AFTA is a trade block agreement by Association of Southeast Asian Nations (ASEAN) supporting local manufacturing in all ASEAN countries.

As shown in Figure 1.8 below were the performance of local cargo road transportation companies. Both companies, Freight and Century enjoyed double digit compounded annual growth rate (CAGR) of revenue in the last five years (2010 to 2014) with Freight achieving the highest at 15% a year and Century at 11%. Tasco's growth was not too bad. It achieved 7%. However, Tasco recorded a remarkable growth of 26% amounting to RM560m of revenues due to the improvement of its local and international divisions, compared to Freight's 11% achieving RM365m revenues and the flattish growth of Century at RM256m revenues. Earning wise, Century has the most remarkable CAGR of 40% for the last 5 years, followed by 20% and 14% respectively for Freight and Tasco as shown in the figure below. Although revenue was flattish, Century achieved an earnings growth of 40% with a net profit of RM21.6m, Freight's net profit improved by 11% to RM24.8m, and Tasco's 5% to RM30.5m. Thus, road transportation network in Malaysia has become a very important element in supporting the business.

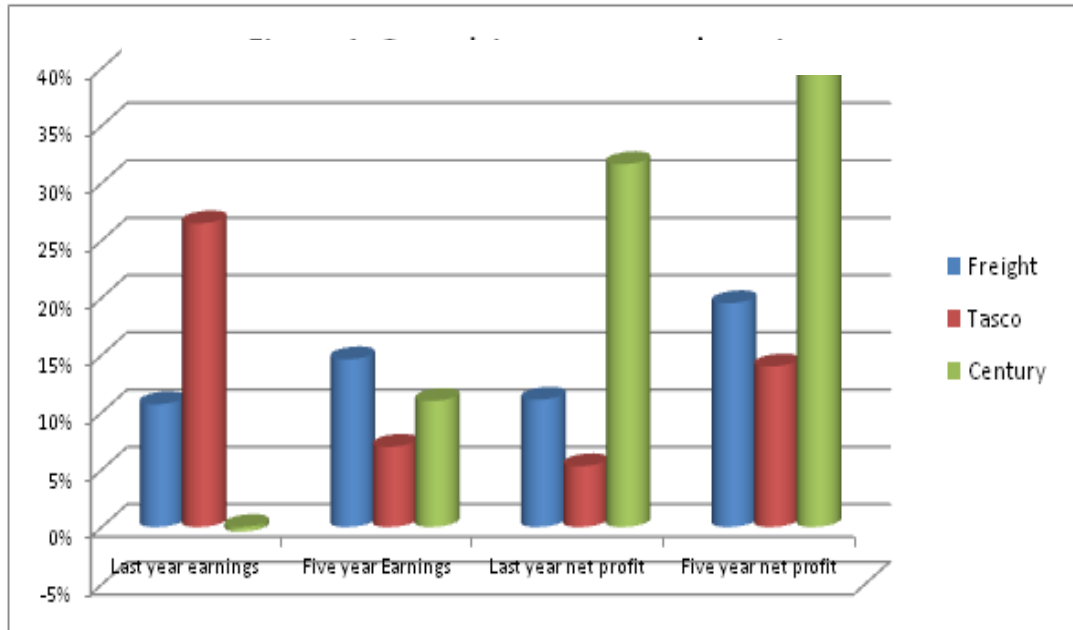


Figure 1.8: Growth in revenue and earnings of local road transportation companies
 Source: Investor.com (2014) <https://klse.i3investor.com/blogs/kcchongnz/57483.jsp>

The cargo transportation industry is crucial for cost effectiveness and efficient international trade and therefore it is important for it to become a competitive advantage of a country. It is important to note that Malaysia is situated in a strategic region which is along one of the busiest shipping routes (the Straits of Malacca). Malaysia has successfully developed sea ports to become an important transshipment hub for Asia where Port Klang and the Port of Tanjung Pelepas (PTP) played major roles in supporting the business. As for air freight, Kuala Lumpur International Airport (KLIA) caters the central region and Penang International Airport supports the northern region where major electronics manufacturers are based. The southern region is catered by Senai Airport (Chang, 2012). These are key cargo airports, which are expected to be further developed into regional air cargo hubs over the coming years under the development of the five economic growth corridors namely:

- Iskandar Malaysia in Southern Johor (IRDA);
- NCER - Northern Corridor Economic Region;

- ECER - East Coast Economic Region;
- SDC - Sabah Development Corridor; and
- SCORE - Sarawak Corridor of Renewable Energy.

Sea and road transportation have also been identified as major modes of transportation for cargoes in Malaysia. Chang (2012) shared the following locations identified as follows:

- Five major ports namely Port Klang, Tanjung Pelepas, Penang, Kuantan and Bintulu supported by 24 main ports which are anticipated to handle 36 million TEUs by 2020;
- PLUS Highway (North-South highway) which is the longest highway in Malaysia from north to south spanning 772 kilometres;
- East Coast Expressway (ECE) linking west coast to east coast peninsular Malaysia;
- ECE III which has not yet been completed and eventually connecting Kuala Terengganu and Kelantan;
- Phase IV of ECE connecting Kuantan and Johor Bahru;
- Road transport comprises of 187 haulier companies; 819 general cargo, 7,256 registered prime movers and 36,413 trailers.

Air transportation includes:

- i. air cargo carriers and integrators;
- ii. airport and cargo terminal operators;
- iii. airport ground handlers;
- iv. freight forwarders;

- v. air cargo agents;
- vi. airport regulators;
- vii. international airports which include KLIA, Bayan Lepas, Senai, Kuching and Kota Kinabalu) and;
- viii. Domestic airports.

KLIA contributed about 74.8% of the total cargo shipped by air in 2011 and air freight has been targeted to handle 2.4 million tons by 2020 (Chang, 2012). In line with the growth of global mobility, the aviation industry in Malaysia has been growing at more than 10% a year leading to a positive outlook on air transportation as reported in Malaysia DCA 2011 annual report (Azharuddin, 2011). Air transport is measured through mail, cargo, passengers and all forms of aircraft movement at airports. Ministry of Transport Malaysia (2014) reported that in 2011 more than 32,000 metric tons of mails were sent by air, compared to 26,500 metric tons in 2010. The volume of cargo handled at airports decreased by 2.09% in 2011 after recording a strong growth of 14.3% in 2010, noting a drop from 924,964 in 2010 to 905,654 metric tons in 2011.

1.2.2 Growth of cargo transportation in Malaysia

Transportation, storage and communication services contributed 8.5% of Malaysia's GDP in 2005 (Chang, 2012). Malaysian government has established Malaysia Logistics Council - MLC (2007) to provide more support to transportation sector. These initiatives guaranteed the coordination between the transportation industries and the government. There are more than 22,000 companies from different industries supporting transportation industry in Malaysia. They have different

initiatives to support the transportation industries and the expected compounded annual growth rate (CAGR) was 12.6 per cent (Chang, 2012). This was the result of activities within the industries where high technology, capital intensive projects and business are planned for the 10th Malaysia Plan under the Economic Transformation Program (ETP). The reason for setting up this plan is to ensure that it acts as a catalyst for generating opportunities for transportation market in Malaysia. It is also expected that there would be foreign direct investments are expected in the electronics and electrical, oil and gas, healthcare and solar industries. Malaysia as said before has the competitive advantage due to our strategic geographical location.

There was also an effort in improving transportation effectiveness and efficiency as Malaysia transportation industry was expected to have a compounded annual growth rate of 11.6% and hit RM203.71 billion in 2016 (Gopal, 2012). External business expansion has helped to spur the growth of transportation industry. For the first 11 months in 2011 trade was valued at RM1.156 trillion and this has moved up by 8.7% for the same period in 2010. Export was valued at RM633.81 billion. An increased by 9% while imports hit 8.4% to RM521.81 billion with a surplus of RM112 billion during that same period. The total cargo volumes are expected to increase and in 2011, sea freight which hit 90% of total freight, was the most popular mode of transport for cargoes in Malaysia. Both ports namely Port Klang and Port of Tanjung Pelepas contributed 39.2% and 22.7% in 2011. Good infrastructure in Malaysia such as roads, railways and ports contributed to this growth. Malaysia efficient border management and effective coordination of transportation agencies for cargo clearance are vital in supporting the business growth.

Prior to the liberalization of container haulage industry in Malaysia, there were only five operators with insufficient capacity causing port congestion and delays in the delivery of containers to their destinations. This prompted Malaysian government to introduce policies to liberalize haulage industry. The resulting competition is expected to bring about service rationalization, reduction in delays and rate adjustments that benefit containers users as well as encouraging greater containerization in future. The information in Table 1.1 retrieved from statistic department reported that there are 2474 business entities in 2013 which support the transportation business in Malaysia.

Table 1.1: Number of transportation business establishment in Malaysia

Logistics Sub Segments	Number of Business Establishments
Road Freight Transport	1,898
Sea Freight Transport	306
Air Freight Transport	8
Towing and Pushing Services (Sea Ports)	37
Support Activities for Transportation	41
Courier Services	184

Source: Malaysia Logistic Directory 2012/13 (16th Edition)

1.3 Cargo crime in Malaysia

Figure 1.9 reported the number of cargo crime cases in Malaysia. Statistics on cargo crime gathered from Malaysian police indicated that in 2006 there are 357 cases; 2007 with 245 cases; 2008 with 182 cases and 2009 with 65 cases. As the number was not too high or alarming, we need to find out why cargo crimes continued to happen in Malaysia. There was no total or absolute reduction even though Malaysian authorities have implemented preventive measures to curb cargo crime. Hence, studies

need to be conducted to find out how cargo transportation companies are coping with this crime situation that is harmful from an economic or social point of views. More specifically, studies should be conducted to find out the factors determining cargo crime within road transportation operation in Malaysia.

State/Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016 Nov
Selangor	106	97	83	22	26	5	30	39	37	12	13
Johor	26	68	31	12	12	4	9	5	16	6	0
Perak	28	22	15	10	9	4	5	4	11	2	0
N/Sembilan	9	18	16	9	2	4	7	6	5	4	0
Melaka	18	13	17	5	1	1	0	3	2	1	1
Penang	6	8	11	1	1	0	6	3	1	0	0
K/Lumpur	8	5	3	2	3	0	0	1	0	0	0
Kedah	7	10	4	0	1	0	0	0	2	1	0
Pahang	14	2	1	3	4	2	3	3	1	0	0
Sarawak	0	1	1	1	0	0	0	0	0	0	0
Sabah	0	0	0	0	0	0	1	0	0	0	0
T'ganu	0	1	0	0	1	1	0	0	0	0	0
Kelantan	0	0	0	0	0	0	0	0	0	1	0
Total	357	245	182	65	60	21	61	64	75	30	14

Figure 1.9: Cargo crime statistics by states of Malaysia
Source: Retrieved from Police Diraja Malaysia (Royal Malaysia Police)

Gooch (2011) reported that cargo crime in Malaysia was once the second highest crime in Asia-Pacific region due to the increased of cargo from Singapore. More than US\$22.7 million worth of cargoes in Malaysia were reported missing or stolen from year 2007 to 2010 (Gooch, 2011). Singapore is one of the world's busiest port and high volume of cargoes is routed overland through Malaysia. It has been a major concern for the transportation industries as Malaysia is located within the international trading routes. Cargo crime incident has great impact on industries due to the high value of cargoes. The losses from cargo crime can also have an impact on

Foreign Direct Investment (FDI) into Malaysia and a continuous cargo crime incidents may force investors to move away from Malaysia.

ASIS (2014) reported that insider threats existed within many organizations where employees colluded with criminals outside the organization to commit crime. Insiders have access to sensitive information and when disclosed can cause severe damage to organization interests as well as monetary lost. Cargoes stolen in Malaysia are disposed through fences for local market (ASIS, 2014). In most cases, high value and high technology cargoes are smuggled out of Malaysia within a short period to prevent detection by police. Cargo criminals have also heist truck load of merchandize costing millions of dollars depending on the type of cargoes being transported.

Cargo crimes have been reported frequently in Malaysia for many years. After an investigation, it was found that most of the cases revealed crimes are committed with the assistance of an inside person. A snapshot review on some reported cargo crime cases related to an insider job in Malaysia are as follows:

- i. April 24th 2014 – The police believed the pirates who attacked the Singapore owned oil tanker in the Straits of Malacca near Pulau Ketam had an insider's help. This was based on several events when pirates boarded the oil tanker carrying five million litres of diesel, siphoning off part of the cargo and kidnapping three Indonesia crew members. The police believed the heist pulled through possibly with an 'inside help' from a certain crew members. Senior crew members of the ship did not raise the alarm or send out distress signal when the incident occurred at 1:00 a.m. or when the captain, first officer and chief engineer were taken away.

- ii. December 22nd, 2013 – In this hijack case the criminals took away microchips worth RM800000 by driving off a truck in Bayan Lepas Penang, Malaysia. The truck was later recovered, not far away, with 12 out of 22 boxes reported missing. The police detained the driver to find out if it could have been an insider's job. Eventually, two employees believed to be involved in this case were arrested.
- iii. October 9th, 2013 - Five men were charged at the Sessions Court in Shah Alam for hijacking a trailer loaded with shampoo worth RM49,000. An unemployed man, lorry drivers, a security guard and a lorry attendant pleaded not guilty to the armed gang robbery.
- iv. October 20th, 2012 - Malaysian police arrested 12 people for theft of 1,400 Samsung Galaxy Note 2 devices worth a total of RM3.23 million (US\$1.05 million). The incident took place just a day after the product became available in the country and about 70 devices were recovered.
- v. October 2nd, 2012 - Nine individuals pleaded not guilty at the Session Court in Butterworth after being charged for stealing 268 cartons computer microprocessor (CPU) worth RM22 million. The criminals were armed with samurai swords when they held up a supervisor and six guards by entering the premises through the back entrance.
- vi. July 7th, 2012 - A trailer carrying soft drinks was reported stolen in Penang and was stopped in Bidor (more than 70km south of Penang). After two hours, the truck was spotted and a 32-year-old suspect had been detained about the stolen vehicle and shipment of drinks.
- vii. October 19th, 2011 - Penang police detained three suspects related to the microchip robbery worth hundreds of thousands of dollars from cargo terminal

at Bayan Lepas International Airport in Penang. Three suspects aged between 20 and 23, and an employee of a courier company were detained. The theft was spotted by an employee inside the cargo terminal.

- viii. September 21st, 2011 - A container loaded with computers worth about RM2mil was hijacked by a group of armed men near Putra Height toll plaza. When the driver passed the toll plaza, his vehicle was blocked by another lorry. Several men armed with 'parang' (long knife) confronted the driver and threatened to harm him if he resisted. The police arrested the driver and co-driver and believed the hijackers had inside help.
- ix. February 11th, 2011 - It was mid-afternoon when workers at a factory in Perak finished loading more than 700,000 pieces of condoms into a shipping container. By the time the ship docked at Yokohama port at the end of the month, it was found that the condoms were missing from the containers.
- x. September 29th, 2010 – The police suspected an inside job where RM4 million worth of hard disk was heist at KLIA cargo terminal. Most of the employees have been working there for a long time, colluded with crime syndicate members and providing them inside information relating to the cargo in the premises. These crimes are committed by organized crime syndicates partnering with officials within the cargo terminal. Security guards were not available inside the warehouse premise and this enable the criminals to drive out the truck easily without detection. There are 542 boxes with 10,800 units of hard disks worth RM4 million were taken away easily.

Source: Information retrieved from local newspapers

1.3.1 Cargo crime legislation in Malaysia

In Malaysia, cargoes are classified as movable properties in the Law of Malaysia. The criminal act by committing cargo crime involves the stealing of vehicle and the contents. For example, removing cargo within the vehicle can be considered as committing a theft of the laden cargoes or the vehicles itself whereas in a more serious situation the act can be classified as robbery whether committed by a single person or a gang.

During a gang robbery if the victims are injured or hurt then the punishment can become more severe. The offender shall be punished with imprisonment for a term which may extend to 20 years, and shall also be liable to a whipping. If the robbery was not a gang robbery and without hurting the victim, then the offenders can be punished with imprisonment for a term which may extend to 10 years and shall also be liable to a fine. The robbery that was committed between sunset and sunrise, then the imprisonment may be extended to 14 years, and the offender shall also be liable to a fine or to a whipping. The punishment was not severe if it was committed by less than five persons if the crime did not injure the victim and it was committed in a daytime. This would not deter crime as the punishment was only an imprisonment for a term which may extend to 10 years and shall also be liable to a fine.

Malaysia, laws on cargo crime cannot be used as a deterrence to reduce or evade cargo crime. The punishment hardly hit the maximum and thus the criminals received a less severe punishment for the serious crime they have committed.

1.3.2 Penal code – Act 574 Law of Malaysia

Per this act, if a crime is done and it is done with a criminal knowledge or intention, and it is done by several persons, then each of such persons who joins in the act with such knowledge or intention, is liable for the act in the same manner as if the act was done by him alone with that knowledge or intention.

Section 378 of the Penal Code stated that whoever, intending to take dishonestly any movable property out of the possession of any person without that person's consent, moves that property from such taking is considered to have committed a theft. A theft shall be punished with an imprisonment for a term which may extend to seven years or with a fine or both, and for a second or subsequent offences it shall be punished with an imprisonment and shall also be liable to a fine or to a whipping.

Section 390 stated that there is either a theft or an extortion if in committing the theft, or in carrying away or attempting to carry away property obtained by the theft, the offender, for that reason, voluntarily causes or attempts to cause to any person a death, or a hurt, or a wrongful restraint, or a fear of an instant death, or of an instant hurt, or of an instant wrongful restraint then that person is liable for a punishment.

Section 391 of the Penal Code on a gang robbery in a situation where five or more persons co-jointly commit or attempt to commit a robbery, or where all the persons co-jointly committing or attempting to commit a robbery, and the number of persons present and aiding such commission or attempt, amount to five or more, then every person so committing, attempting, or aiding, is said to commit a "gang-robbery".

Whoever commits robbery shall be punished with an imprisonment for a term which may extend to ten years and shall also be liable to a fine; and if the robbery were to be committed between sunset and sunrise then the imprisonment may be extended to fourteen years, and he shall also be liable to a fine or to a whipping. Section 395 stated that whoever commits gang-robbery shall be punished with an imprisonment for a term which may extend to twenty years, and shall also be liable to a whipping.

1.4 Scope of the study

It is very important to conduct cargo crime studies in Malaysia to assist road transportation industries and government agencies in combating cargo crime. The outcome of these cargo crime studies should be used by our government agencies to implement cargo crime prevention strategies to minimize cargo crime. Cargo crimes or security incidents considered in this study are those occurring within the premises and road transportation operation in Malaysia. This is where the products, finished goods, components, raw materials that are kept temporarily in any location or transfer between one company to another or even from one place to another place within the transportation chains.

A cargo crime usually occurred in a different theft situation that will always be present in the road transportation even though there are many modes of transportation for cargoes in Malaysia; either by road, rail, air or sea. Basically, road transportation is always the victim of cargo crime as it is very vulnerable to crime when the cargoes are moved on the road. This study focused on the following:

1. Cargo crime on road transportation. This type of crime is defined as any theft on cargo committed during its transportation by trucks including internal theft