

**EFFECTS OF PIRACY ON SUPPLY CHAIN PERFORMANCE ON ORGANIZATIONS:
A CASE OF MOTOR VEHICLE INDUSTRY IN KENYA****Charles Kiptanui Boen**

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ABSTRACT

Piracy is a crime that preys upon the cargo supply-chain, slowly feeding off its network of intricate transportation systems. The vulnerability of the maritime sector has been noted in several prominent private and public government documents, both domestic and worldwide. In addition to maritime terrorism, the maritime region harbors many other threats to countries sovereignty, natural resources, environment, economic prosperity, and social welfare. Statistics from republic of Kenya shows that the country lost billions on maritime piracy. Further statistics shows that Toyota Kenya incurred losses of billions when a ship was hijacked by pirates of Somali origin. This Study seeks to determine the effects of piracy on supply chain in Kenya with reference to Motor Vehicle Industry in Kenya and contribute to other studies by ascertaining if piracy affects supply chain. The researcher used descriptive research design in collecting the data from respondents. The target population was from Toyota Kenya, the population was divided into several groups with distinct characters as Management, sales staff and customers. The sample size of the study was 104 which represent 15% of the population size and consist of senior management, middle management and support staff. Descriptive statistics especially, frequencies and cross tabulation will be applied to help establish patterns, trends and relationships and to make it easier for the researcher to understand and interpret implications of the study. Presentation of data was in form of Tables, Pie-charts and Bar graphs only where it provide successful interpretation of the findings. Descriptive data was provided in form of explanatory notes. Inferential statistics was used to establish the relationship between value chain and piracy. The study found that commodities which were lost through piracy do affected the supply chain performance to a greater extent, that the quantity of goods lost affects revenues for the company through, loss of customers, increased insurance premium, increase lump sum and also via loss of merchandise. The study revealed that piracy brought about rise in transportation costs, and at the same time it made the competition to be stiff them. The study found that there are fears that if the price of shipping, including insurance premiums, continues to rise, regional trade will also go down. The study found that piracy affected the company lead time through

increased route of transportation, delay in delivery of stock, holding of ships with consignments, lateness of the merchandise and theft of stock in transit and throughout this time the company lost some of its customers. The study recommends that risk assessment should be done when establishing the transportation routes which is synonymous with the uncertainties expected which can be assessed by objective information and probability distribution for relevant supply chain risks or consequences which can be derived.

Key Words: *piracy on supply chain performance, motor vehicle industry, Kenya*

Introduction

Piracy networks abuse the maritime environment for their own illicit purposes, primarily for financial gain, often disrupting the free flow of commerce (Choi, 2007). Unsecured and ungoverned waters are potential havens for pirate activity, providing relatively cheap and inconspicuous movement (Krause, 2006). In essence, piracy is a crime that preys upon the cargo supply-chain, slowly feeding off its network of intricate transportation systems (Saad, 2005). The sheer importance of maritime trade makes it a lucrative market for piracy groups to engage in high profit margins while maintaining a low cost structure.

The vulnerability of the maritime sector has been noted in several prominent private and public government documents, both domestic and worldwide (Thomas, 2003). In addition to maritime terrorism, the maritime region harbors many other threats to countries sovereignty, natural resources, environment, economic prosperity, and social welfare (Manuj, 2008). While perhaps not as devastating as a maritime terrorism event, maritime piracy challenges not only maritime security itself, but also cargo supply-chain security Marcouiller, (2005).

On average, more than 6.8 billion tons of commerce move across the world's oceans, with a worth over \$7.4T USD (Rae, 2006). Increasing worldwide maritime piracy and the growing power and influence of organized maritime crime groups are significant threats to democratic institutions and free market systems in many countries and regions (Paulsson, 2004). It is imperative that seafaring governments take steps to increase supply-chain security through the mitigation of piracy networks and engagement in wide-ranging maritime security improvements in order to maintain sovereignty and a free market economy (Peats, 2008).

Global Perspective

Because of globalization, unrestricted international trade, expansion of global markets and exponential growth in the world's user's population, domestic and international trade is expected to more than double in the next 20 years (United States Maritime Administration, 2001). As estimated by the International Maritime Organization, "\$30 billion in worldwide annual losses makes the theft of cargo one of the most serious property crimes in the entire world" (Edward, 2008).

The International Chamber of Commerce estimates that financial losses incurred by piracy attacks against the supply-chain average \$8 to \$16B USD annually. Losses such as this create an enormous burden upon vessel owners/operators, shippers, suppliers, and consumers (Burchett, 2003). A series of piracy attacks directed at several seafaring nations in 2008 have forced many governments to adopt a new perspective towards piracy and armed robbery at sea, and to take a new approach to better deter piracy acts (Mak, 2008).

Major maritime trading nations such as Spain, the Philippines, Denmark, and Indonesia have experienced serious acts of piracy that continue to signal future threats to their maritime industries. To these and other nations, it is widely understood that the human and material cost of these acts is far greater than the cost of preventing them (Burchett, 2003). If maritime piracy attacks were to escalate to the point that major shipping traffic must alter its trade routes, the effects would be staggering. Astronomical freight rates and merchandise costs would result, producing undesirable ripple effects to consumers (Mitropoulos, 2005). As an example, certain computer transportation carriers have had to redirect their delivery routes because of a substantial increase in cargo theft over past years. This has caused some companies to add an additional \$150 to the average price of a laptop (Chubb, 2006)

Piracy has both economic and political effects. Due to the frequency and often severity of piracy events against ships, the relative security cost equivalent is often factored into the insurance risk premiums for marine operators and owners (Singer, 2006). This is something which needs to be handled with a lot of responsibility because the insurance market reacts to this based on the best information it has, as stated by a spokesperson from Lloyd's Marine Intelligence Unit (Rae, 2006). It is also no secret that the market impacts from piracy can have detrimental effects that can be spread across the entire cargo supply-chain, creating local and regionalized economic dislocations (Cavinato, 2004).

Trade (2003) states that it creates the need to carry higher levels of inventory due to the potential for piracy to cause bottlenecks in delivery systems undermining supply-chain (Mentzer, 2011). While there has been much progress in the maritime security arena in identifying and thwarting piracy and other forms of illicit activity, significant piracy events continue to occur, especially in the Gulf of Aden area and off Somalia. Two disturbing trends are on the rise and have created sizeable impacts upon shipping companies: the increased levels of violence used in piracy attacks in order to secure a ship's profitable cargo and the downrange effect piracy events have on the cargo supply-chain (Goedhart, 2009).

Regional Perspective

Piracy off the Somali coast has threatened international shipping heading to Kenya since the beginning of Somalia's civil war in the early 1990s. Since 2005, though, pirates have threatened and seized many ships (Zsidisin, 2006). Since 2005, many international organizations, including

the International Maritime Organization and the World Food Programme, have expressed concern over the rise in acts of piracy (Zsidisin, 2006). Piracy has contributed to a rise in shipping costs and shipping insurance premiums, and impeded the delivery of food aid shipments. The UN Security Council adopted a resolution on November 20, 2008, proposed by Britain, introducing tougher sanctions against Somalia over the country's failure to prevent a surge in sea piracy.

The Somali government is struggling for control of the country against an Islamic insurgency and its navy is currently in development, leaving it almost powerless to stop piracy. Kenya has received notable attention for its rampant increase in reported piracy attacks since September 2008. For example, a Ukrainian freighter called the MV Faina carrying weapons was hijacked. Kenya Companies have altered and canceled passenger tours, with some companies disembarking passengers in a safe port prior to entering piracy prone waters and flying them to meet back up with the ship once it is safe again. Therefore, the number of piracy events that occur may be greater than what is actually reported. Despite worldwide maritime authorities' outreach efforts to shipping companies; it is quite common for company management to pressure shipmasters into not reporting a piracy event (Starr,2009).

Motor Vehicle Industry In Kenya

The motor vehicle sector in Kenya is competitive, comprising of established dealers who face intense competition from imported second-hand vehicles, mainly from Japan and United Arab Emirates (Schoenherr, 2008). Apparently Kenya is turning out to be a lucrative market for automobiles and going by automobiles growth forecasts, the current situation looks is set to improve further (Bonyo, 2009). Hence motor companies track shifts in the consumer preferences or choices so that they can be able acquire a substantial market share.

The rise of piracy in 2008 , where more than 90 cases were reported, has severely impacted the security of the Red Sea being a strategic water passage for most of the value chains dealing with motor vehicles. With the rise in risks of navigation in the region, many companies began to use alternative routes such as the Cape of Good Hope, even though it is more costly to do so (Peats, 2008). The risks that are imposed by piracy are the weakening of the economies that benefit from the Red Sea trade routes; the potential that the Red Sea region could transform into a battle field where other countries impose themselves politically and drug dealing could blossom under such chaotic circumstances. Because governments have struggled to contain the spread of piracy in the Indian Ocean, shipping companies have turned to private military security companies to guarantee the safety of their crews and cargo. Private armed teams have proliferated on commercial shipping and several private armed vessels are operating in the region (Milena, 2010). Meanwhile, some governments are hiring out their own national militaries as security guards onboard ships.

Statement of the Problem

Global supply chains faced over 2,500 disruptions in the last decade, (Zsidisin, 2011). Disruptions include natural disasters, labor strikes, lead time variability, fires etc. According to Nick (2011), Somali piracy was disrupting and threatening supply chain security around the globe. Somali piracy is a major scourge in some important trade routes along the Indian Ocean, Gulf of Aden, South China Seas, (Risto, 2012). Somali pirates, equipped with potent weapons like AK-47s and hand grenades, attack civilian ships, capture crew members, resell high-value cargo goods and hold hostages for ransom, (Milena, 2010). Statistics shows that in the Horn of Africa alone, piracy has caused losses amounting to almost \$6 billion, (Badasha, 2012).

Statistics from republic of Kenya shows that the country lost billions on maritime piracy (ROK, 2013). Further statistics shows that Toyota Kenya incurred losses of billions when a ship was hijacked by pirates of Somali origin (World Bank 2013).

Due to piracy there have financial flows in the region, particularly the legal/illegal movement of goods and capital, including piracy money from Somalia to Kenya since 2008, (GoK, 2012). There is limited Empirical study in Kenya on the effects of piracy on supply chain in Kenya. This Study seeks to determine the effects of piracy on supply chain in Kenya with reference to Motor Vehicle Industry in Kenya and contribute to other studies by ascertaining if piracy affects supply chain in Kenyan motor vehicle industry.

General objective

The general objective of the study was to investigate effects of piracy on supply chain in Kenya with reference to Motor Vehicle Industry in Kenya

Specific objectives

1. To determine the effects of piracy on loss of goods on Motor Vehicle supply chains in Kenya
2. To assess the effects of piracy on transportation costs on Motor Vehicle supply chains in Kenya
3. To establish the effects of piracy on lead times on Motor Vehicle supply chains in Kenya
4. To analyze the effects of piracy on insurance premiums on Motor Vehicle supply chains in Kenya

Literature Review

Resource Management Theory

Resources play a vital role in supply chain partnerships. It is no surprise that service-oriented supply chains research is often firmly grounded in the RBV of the firm (Barney, 2009) and more recently the offshoot marketing perspective called service-dominant logic (Lusch, 2004). Resources like people and technology are often defined as drivers of firm capabilities particularly relative to supply chain management functions (Christenson, 2003). When resources

are matched to strategic initiatives in disaster and crisis situations, they may become firm and supply chain specific, and key to initiative performance.

Conceptualizations of the RBV assume firms develop differential competitive advantage through: asset and resource heterogeneity, imperfect mobility of assets firm assets are not easily transferred between firms, and ex post and ex ante limits on competition. These assumptions allow for the comparison of resource bundles valued on the basis of convertibility, rarity, imitability, and substitutability (Srivastava et al., 2008). Supply chains dealing with disaster and crisis situations will need to correctly manage valuable, rare, inimitable, and organizationally specific resources to accomplish goals.

Relationship Management Theory

Because there are always multiple players in supply chain disaster and crisis situations it should be no surprise that collaboration is an important issue. Collaboration is defined as two or more companies sharing the responsibility of exchanging common planning, management, execution, and performance measurement information (Min et al., 2005). As such, collaboration fits neatly into relationship management theory. There is debate as to whether there actually is a theory of relationship management. There may also be disagreement as to whether collaboration is relationship management or relationship management is collaboration.

Relationship management is in many ways synonymous to collaboration as that many of the key constructs are discussed. These include commitment, trust, loyalty, opportunism, (Heide, 1994) long-term orientation (Ganesan, 1994), relationship magnitude (Golicic, 2006), etc. In crisis situations, collaboration will likely be the glue that holds organizations together. Additionally, Stewart et al. (2009) point out the broadness of the web that forms the extended supply chain in disaster and crisis situations. There is little doubt that such a tangled web will provide a huge opportunity for not only new research, but also to challenging the existing assumptions of relationship management logic.

Trade Theory

The new trade theorists (Krugman, 1998) develop theories of trade based on equilibrium under monopolistic competition and on the assumption that there are economies of scale internal to the firm and/or external to it. The resultant agglomeration tendencies have implications for the geography of production. Theoretical results predicting agglomeration patterns would seem to militate against the reality of spread of production into different countries via the foreign direct investment (FDI) activities of MNCs.

The researchers make a series of assumptions to explain FDI in either developing or developed countries. As regards location in developing countries (Krugman, 1985) the assumptions relate to internal economies; they can be considered to be at the plant level and the firm level. The efficient outcome from such a model leads to the prediction of vertical fragmentation of production across several countries: the location of labour intensive components will take place

in developing countries while the developed countries will specialize in capital intensive components.

A different set of assumptions is made in order to explain international production of the horizontal type: a situation in which similar types of products/components are located in countries at similar stage of development i.e. in developed countries (Markusen, 1995). The assumptions made relate to fixed joint inputs particularly in the area of R&D as well as to high costs of transportation.

Communication Theory

Supply chain disaster and crisis situations demand effective communication. Local television, the national weather service, and public media are heavily used. Many people overlook that in the private arena, company specific technology also facilitates communications. Intranet and extranets, electronic data interchange, video conferencing, global positioning system, and even private ham radio all provide assistance while likely creating a network of immense confusion (Richey et al., 2010). A grim reality is that during Katrina, radio-frequency identification was actually used to tag dead bodies. With all of the technological communication options combining with the classic approaches, the point is clear that we need to know who is managing these networks.

There are a number of different approaches that researchers would take in studying communication. Examining the logistics literature reveals that with a very few exceptions (Large, 2005), most of the literature focuses on information exchange (Daugherty et al., 2002) and communications technology (Skipper et al., 2008) rather than the full range of strategic communications issues. Perhaps, researchers examining supply chain disaster and crisis situations would consider returning to the Mohr and Nevin (1990) and Mohr and Sohi (1995) classics on communication theory in marketing channels. Examining issues such as bi-directionality, formality, modality, and frequency could be of serious importance as public and private entities attempt to understand what, when, and how much to communicate.

Conceptual Framework

Conceptual framework is a scheme of concept (variables) which the researcher operationalizes in order to achieve the set objectives, Mugenda & Mugenda, (2003). A variable is a measure characteristic that assumes different values among subject, Mugenda & Mugenda, (2003). Independent variables are variables that a researcher manipulates in order to determine its effect of influence on another variable, (Kombo & Tromp 2006), states that independent variable also called explanatory variables is the presumed change in the cause of changes in the dependent variable; the dependent variable attempts to indicate the total influence arising from the influence of the independent variable Mugenda & Mugenda, (2003). This is illustrated in figure 2.1 below showing the two types of the variables.

Independent variables

Dependent variable

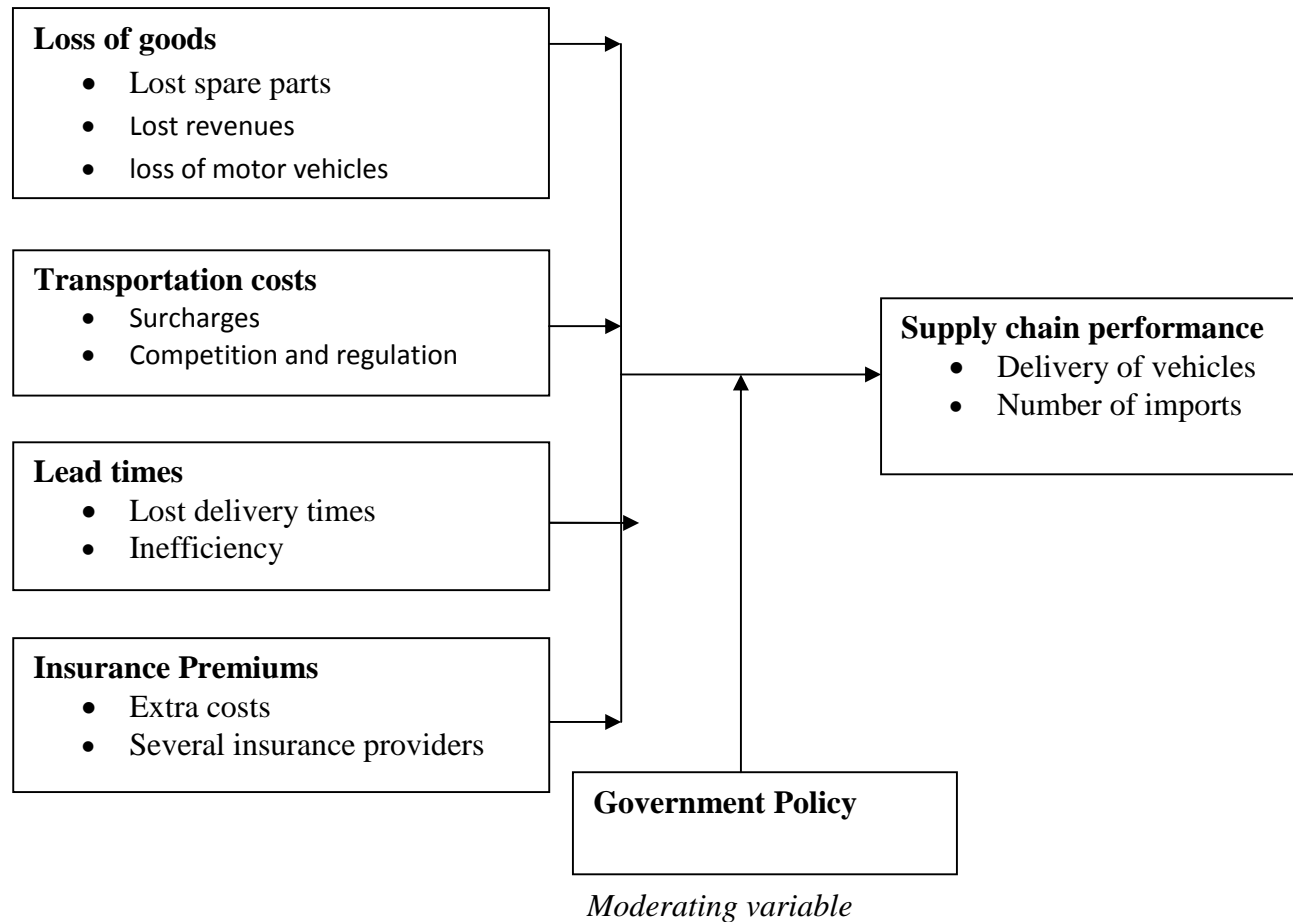


Figure 1: Conceptual framework

Loss of Goods

Unlike most of the other organized crime, maritime piracy is not a trafficking issue. No contraband is moved, no illicit market serviced. Rather, it is a violent, acquisitive crime (Tummala, 2009). It is transnational because a ship is considered the sovereign territory of the nation whose flag she flies. It is organized because commandeering a ship at sea requires considerable planning and some specialized expertise (Story, 2007).

There has been a devastating surge of piracy in the wake of Somalia's civil war. As a result, the Gulf of Aden-or "pirate alley" has turned into the world's most dangerous waterway. In 2008, there were 111 pirate attacks in the Gulf of Aden and off the east coast Somalia, including 42 vessel hijackings. By mid-May, there had already been more attacks in the area in 2009 than during all of 2008, including 29 successful hijackings (Srivastava, 2008). In November 2008, the Sirius Star, carrying two million barrels of crude oil from Saudi Arabia to the United States

worth approximately \$100 million became the largest oil tanker to be seized by pirates. It was held for two months until being released upon payment of a ransom (Srivastava, 2008).

Somalia is not the only area of the world affected by maritime piracy, however. The Gulf of Guinea in West Africa has long been a high risk area, as are the waters along Bangladesh and the South China Sea. But in 2009, more than half the global piracy attacks were ascribed to Somali pirates (Milena, 2010). The term piracy encompasses two distinct sorts of offences: the first is robbery or hijacking, where the target of the attack is to steal a maritime vessel or its cargo; the second is kidnapping, where the vessel and crew are threatened until a ransom is paid. The Somali situation is unique in that almost all of the piracy involves kidnapping for ransom (Halgamuge,2008)

Twenty-first century piracy was first seen in the South China Sea and in the Malacca Straits. Attacks peaked at roughly 350 to 450 reported attacks per year during the period 2000-2004, and then dropped by almost half in 2005. This reduction was attributed to effective and coordinated international action against the pirates (Karim, 2008). But in 2008-2009, piracy again skyrocketed, due almost entirely to the dramatic increase of piracy off the Coast of Somalia. Piracy is once again on the forefront of the international community's attention, as maritime trade is threatened and ransom payments to Somali pirates have risen to the millions of dollars.

Even though the assessment and management of cargo in supply chains is more of a recent phenomenon, studies exist that explored risk management approaches from a variety of angles (Whipple, 2009). Building on these studies, Tummala *et al.* (2009), by following Raiffa (2009) and Hertz and Thomas (2003), developed a structured Risk Management Process (RMP) consisting of the five phases risk identification, risk measurement, risk assessment, risk evaluation, and risk control and monitoring. This RMP framework has been successfully applied to identify potential risk factors and to assess their likelihood of occurrence.

In addition, the seriousness of associated consequences can be identified, and appropriate risk mitigating strategies can be developed (Tummala, 2009). While the RMP has proven to be useful when applied to such individual project decisions, for example the risk involved in an extra high voltage transmission line project (Burchett, 2009), it has yet to be applied to the much broader context of the supply chain. Additional risk management approaches are included in the works of, Zsidisin and Ellram (2003).

Transportation Costs

The Gulf of Aden is one of the most important trading routes in the world. Thousands of ships pass through the Gulf en route to or from the Suez Canal every year. The US Department of Energy estimated that, as of 2006, as many as 3.3 million barrels of oil per day were transiting the Bab el Mandab strait between the Gulf of Aden and the Red Sea. To compound the problem, there are few alternatives to the Gulf of Aden (Grose, 2007). The longer route to Europe and North America around the Cape of Good Hope Significantly increases the cost of shipping.

Canal authorities have reported declines in shipping traffic and resulting revenue loss recently, due both to decreased economic activity and the piracy threat in the Gulf of Aden. If international shipping continues to avoid the Gulf area's oil and gas exporting facilities, the world may see an increase in commodity and energy prices from Asia and the Middle East (Hauser, 2003). Furthermore, it is feared that if the price of shipping, including insurance premiums, continues to rise, regional trade for countries like Egypt, Sudan, Saudi Arabia, Eritrea, Ethiopia, Djibouti and Yemen will decline as well (Finch,2004).

More than 10% of all seaborne oil passes through the Gulf of Aden to the Suez Canal. The alternate route, traveling around the southern tip of Africa, is significantly longer and more expensive (Grose, 2007). Routing a single tanker from Saudi Arabia to the United States around the Cape of Good Hope adds approximately 2,700 miles to each voyage and about \$3.5 million in annual fuel costs.

Risk assessment should be done when establishing the transportation route which is synonymous with the Uncertainties can be assessed by objective information, and probability distributions for relevant SC risks or consequences can be derived. If, however, objective information is not available, subjective information, beliefs and judgment can be used to approximate distributions. Techniques such as the Delphi method or expert focus groups can aid in the derivation of probabilities. Other approaches include parameter estimation, five point estimation, probability encoding, or Monte Carlo simulation (Tummala,2004). Alternatively, probability categories, as suggested in the US Military Standard 882C (Grose, 2007) can be applied.

Lead Times

Most ships that are successfully captured by Somali pirates in the Gulf of Aden are brought to Eyl, Hobyo or Haradheere (Cooper, 2003). There are also reports that Bargaal and Garaad are used as anchorage sites. As mentioned above, since the pirates are not concerned about concealing the vessel from public sight, negotiations are usually done with the ship visibly anchored off the Somali coast (Marcouiller, 2005). In the first part of 2009, the average time that crews were held hostage was approximately two months, with the shortest time being six days and the longest six months. Negotiations for ransom are usually done directly between the pirates on the seized vessel and the ship-owners or head companies, although sometimes third-party intermediaries in Somalia and abroad are also used. The negotiations are generally conducted via satellite telephones and the captured ship's communication equipment (Paulsson, 2004)

In most instances, ransoms are paid in cash and are delivered to the pirates aboard the seized ship. The method of payment may be direct transportation of the money to the pirates by a representative of the ship-owner or even the parachuting of the ransom money. In a few cases, ransoms have been paid to a trusted third party representative outside Somalia. Upon receipt of the money, the pirates release the hostages and usually leave separately to avoid tracking and capture.

Insurance Premiums

Since late 2008, most of the value chain companies had to pay higher insurance premiums; shipments also required an escort from European Union or Canadian navies (Rae, 2006). While some Somali pirates have consented not to target vessels carrying humanitarian aid and other supporting commercial vessels, attacks on humanitarian aid shipments have yet to stop. For example, in April 2009, Somali pirates hijacked the MV Maersk Alabama and attacked the MV Liberty Sun, both US-flagged and crewed cargo vessels contracted by the WFP to deliver food assistance off the south-east coast of Somalia (Singer, 2006).

The dramatic rise of piracy in the Gulf of Aden is changing the insurance landscape. While piracy is not a new insured risk, the increase in pirate attacks along the Gulf has affected premiums and coverage. According to a recent report, insurance premiums for ships traveling through the Gulf have rose from between 0.05% and 0.175% of the value of their cargo, compared to between 0% and 0.05% in May 2008, an increase of 350%. Premiums for kidnap and ransom coverage have reportedly increased by as much as 1,000% (Halgamuge, 2008)

Large ships typically carry three separate types of insurance. Hull insurance covers physical risks to the insured vessel, machinery and provisions. Cargo insurance covers transported goods or merchandise. Protection and indemnity (P&I) insurance covers liability to crew, passengers and other third parties. Some shippers also carry business interruption (loss of hire) insurance to cover lost earnings due to delays (Paulsson, 2004).

Historically, coverage for piracy has been a mixed story. Clause 2.1.5 of the International Hull Clauses, for example, covers piracy as an included peril: "This insurance covers loss of or damage to the subject-matter insured caused by piracy." The American Institute Hull Clauses, which were established in 1977, list pirates as a covered peril. In 2005, however, marine underwriters in London began a transition from covering piracy under hull policies to covering it under separate war risk policies (Mak, 2008).

Some cargo policies expressly cover damage to cargo as a result of piracy. The most common London form of marine cargo insurance, Institute Cargo Clauses (A), covers "all risks of loss of or damage to the subject matter insured except as provided in Clauses 4, 5, 6 and 7." Clause 6.2 excludes coverage for "capture, seizure, arrest, restraint or detainment," but expressly accepts piracy from this exclusion (Trade, 2003). Other London and American cargo clauses, however, expressly exclude piracy. Some P&I policies also expressly cover piracy. Others exclude it, and some are silent.

If all this was not confusing enough, Somali piracy has added some new wrinkles. Given that the pirate attacks are a consequence of civil war and often carried out by heavily armed paramilitary groups, policyholders are beginning to fear that, even where policies promise to cover piracy, insurers may invoke the various "war," "civil war" and "riot" clauses in their policies to deny

coverage (Cavinato, 2004). It is not clear that this approach will be successful, but the uncertainty has led many brokers and insurers to urge policyholders to purchase war risk policies just in case.

Unlike hull policies, premiums for war risk policies are typically paid per transit and underwriters often charge extra for trips through high-risk areas. (The Gulf of Aden has been on the high-risk list of the London Market Association's Joint War Committee since May 2008.) While other policies tend to allow ships to move freely around the world, war risk policies require policyholders to contact their insurer if they intend to trade in dangerous areas. In these ways, war risk policies can help insurers contain their exposure to piracy risk while pricing it more accurately (Upton, 2007).

Empirical Review

It is a widely accepted assumption that insecurity decreases trade opportunities. As noticed by Anderson (2008) most of us lived in a more or less 'predatory world', which makes it surprising that few papers have tried to determine to which extent trade is lowered by insecurity. Anderson and Marcouiller (2008) have modelled theoretically the conditions under which endogenous transactions costs, due to criminal activities like piracy, will destroy trade.

Anderson and Marcouiller (2005) show how difficult it is for countries to abandon autarky and open up to trade when no institutions are available to protect transactions. Anderson and Bandiera (2006) developed a simple model for contract enforcement carried out by an exogenous agent, such as the mafia or private police forces. Anderson (2008) applies the same conceptual framework to show how merchants can organize through guilds or granted monopolies to protect their transactions. Marcouiller (2005) and Anderson and Marcouiller (2002), have used the gravity model of trade to research empirically the extent to which insecurity deters trade.

Anderson and Marcouiller (2003) used institutional measures to determine the degree of security enjoyed by a particular country. They differentiate between transparency (measures declared to be taken to fight insecurity) and enforceability (the measures, among the former, which are actually carried out). They found that the more transparency the highest the trade volume.

Marcouiller (2005) investigates whether insecurity problems affect all type of goods in the same fashion. Using Rauch's classification (1999) that splits goods into homogenous, price-referenced goods and differentiated goods, the author finds that insecurity affects trade whatever the type of good. When differentiating between contract insecurity and the prevalence of crime and theft, however, trade in homogeneous goods appears to be more vulnerable to crime and theft, whereas trade in differentiated goods is more sensitive to contract insecurity.

Marcouiller (2000) defines piracy and hijacking as stealing merchandise in order to sell it illegally. But this kind of criminal activity, in spite of being frequent in many ports, is only weakly related to the type of piracy we are concerned with in this paper, which mainly involves the hijacking of a ship and its crew. The chief economic motive behind these hijackings is to obtain a substantial ransom for the crew, the ship and its cargo, not to sell the looted goods.

The variables used by Marcouiller (2000) and Anderson and Marcouiller (2002) measure merchandise security at the start and end points of the journey. They do not deal with security failures during the course of the journey, such as those involving acts of piracy. Blomberg and Hess (2004), distinguish several types of violent acts: terrorism, civil wars, external conflicts, riots and uprisings. They find each of these to have a significant negative impact on bilateral trade.

Nitsch and Schumacher (2004) find bilateral trade to drop by 4% if a country experiences a 100% rise in terrorist activity, while Bloomberg and Hess (2004) find that a single terrorist attack leads to a 7.6% decline in that country's bilateral trade. Both studies conclude that external and internal armed conflicts have a greater impact on trade than terrorism does. Verdier (2008) and De Sousa, Mirza and Verdier (2009) focus exclusively on terrorist activities. The first of these studies highlights the specificities of terrorism and their relevance for the strategy used to estimate its effect on bilateral trade.

Modern maritime piracy differs from terrorism in several respects. Attacks occur on route instead of being directed against a particular country. According to Mejia and al (2009) pirates do not choose their targets according to the origin of the ships. They do, however, try to avoid ships sailing under the flag of a country with a naval force in the area (Coutroubis, 2010). Piracy may have a significant impact on GDP of the trading countries through a drop in trade, but its impact through asset destruction or enhanced security measures is minimal. Conversely, the latter do have an impact on the amount and nature of piracy.

Research Methodology

Research Design

A research design refers to a detailed plan of how a research study is going to be conducted or how it was conducted from data collection to analysis of the research (Fouché, 1998). The researcher used descriptive research design in collecting the data from respondents. The design is preferred because it is concerned with answering questions such as who, how, what which, when and how much (Cooper and schindler, 2001). A descriptive study is carefully designed to ensure complete description of the situation, making sure that there is minimum bias in the collection of data and to reduce errors in interpreting the data collected.

Target Population

A population is the total collection of elements about which inferences are made (Cooper and Schindler, 2003). The target population was from Toyota Kenya, the population was divided into several groups with distinct characters as Management, sales staff and customers. The total population is six hundred and ninety one (691).

Sampling Design

A sample is the element of the population who are considered for inclusion in a research study, while Sampling means selection of individuals from the population in such a way that every individual has the equal chance to be taken into the sample population (Strydom 1998).The researcher used simple stratified random sampling procedure to select a sample that represented

the entire population because the sample population is heterogeneous. The stratification was made with utmost care so that observations in each group comprised of homogenous elements. This procedure ensured that the various strata have an equal chance of being selected. The sample size of the study was 138 which represent 20% of the population size and consist of senior management, middle management and support staff.

Instrumentation

The researcher used both primary and secondary sources to collect data. The Primary data was collected using Questionnaires and interviews Kirakowski (1998) defines a questionnaire as a method for the elicitation, recording and collecting of information. The researcher chose the self-administered questionnaire method for all correspondents as it is inexpensive and allowed the respondents to complete the questionnaire at a convenient time (Kuter and Yilmaz, 2001). Further, Kothari (2003) argues that questionnaires generate data in a very systematic and ordered fashion.

A structured interview refers to a context in which the interviewer has a series of questions that are in the general form of an interview schedule but where one is able to vary the sequence of questions. Also, the interviewer usually has some latitude to ask further questions in response to what are seen as significant replies (Bryman, 2004: 113). This method was used to ensure the flow of interview so that they could be used for comparison during the data analysis process. This technique was considered appropriate for this study because it increases the likelihood that respondents in the sample would agree to respond by the interviewer explaining to them the importance of the interview and assuring them of its confidentiality. Face-face interviews also gave the interview a human face and allowed the interviewer the opportunity to make questions easier.

Data Collection Procedure

The primary data was used due to its nearness to the truth and ease for control over errors (Copper and Schindler, 2003). The Primary data was collected using Questionnaires and interviews. The researcher administered questionnaires containing mainly closed ended questions to the sample respondents. Each respondent received the same set of questions in exactly the same way. The researcher used “drop and pick” method in the collecting data by use of questionnaires. Thus the questionnaires were dropped by the research assistants and personally by the researcher and later collected upon filling by the respondents. This method created provision for personal contacts between the researcher and the interviewees.

Face-face interviews were arranged with respondents at a convenient time and place so as to allow both the respondent and interviewer the opportunity to create rapport and facilitate the process of interviewing to be done in a relaxed atmosphere. During interview it was made clear in the introduction the purpose of the research. By clarifying the academic purpose and that they would not experience negative affects when contributing to the research.

Secondary data was sourced to supplement the primary data. This was collected from the relevant sources which included reports, newsletter and unpublished data on consumer choices in motor vehicles industry.

Data Analysis and Presentation

Data analysis is a process of inspecting, cleaning, transforming, and modeling data with the goal of highlighting useful information, suggesting conclusions, and supporting decision making. It involved breaking down existing complex factors into simpler parts and putting the parts together in new arrangements in order to determine/ interpret inherent facts or meanings.

This involved qualitative and quantitative analysis. The data collected by use of the various instruments was thoroughly edited and checked for completeness and comprehensibility. The edited data was summarized and coded for easy classification in order to facilitate tabulation. The tabulated data was analyzed by calculating various percentages where possible. Descriptive statistics especially, frequencies and cross tabulation was applied to help establish patterns, trends and relationships and to make it easier for the researcher to understand and interpret implications of the study. Presentation of data was in form of Tables, Pie-charts and Bar graphs only where it provide successful interpretation of the findings. Descriptive data was provided in form of explanatory notes. Inferential statistics was used to establish the relationship between value chain and piracy. In addition, the study conducted a multiple regression analysis. The regression equation was :

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$$

Whereby Y = Supply chain performance, X_1 = Loss of goods, X_2 = Transportation costs, X_3 = Lead times and X_4 = Insurance Premiums, while β_1 , β_2 , β_3 and X_4 are coefficients of determination and ε is the error term. This generated quantitative reports through tabulations, percentages, and measures of central tendency.

Reliability Analysis

A pilot study was carried out to determine reliability of the questionnaires. The pilot study involved the sample respondents from employees of Toyota. Reliability analysis was subsequently done using Cronbach's Alpha which measures the internal consistency by establishing if certain item within a scale measures the same construct. Nunnally (1978) established the Alpha value threshold at 0.6 which the study benchmarked against. Cronbach Alpha was established for every objective in order to determine if each scale (objective) would produce consistent results should the research be done later on. Findings show that loss of goods had the highest reliability ($\alpha=0.831$) followed by transport cost ($\alpha=0.801$), then insurance premium ($\alpha = 0.793$) and lead time ($\alpha=0.713$). This illustrates that all the four scales were reliable as their reliability values exceeded the prescribed threshold of 0.6.

General Information

The study sought to determine the gender of the respondent and therefore requested the respondent to indicate their gender. The study found that majority of the respondent as shown by 61.5% were males whereas 38.4% of the respondent were females, this is an indication that both genders were involved in this study and thus the finding of the study did not suffer from gender biasness.

The study requested the respondent to indicate their age category, from the findings, it was found that most of the respondents as shown by 23.1% of the respondents were aged between 41 to 44 years, 19.2% of the of the respondent were aged between 31 to 34years, 18.5% were aged between 35 to 40 years, 16.9% of the respondents indicated that they were aged 45 to 50 years, 15.4% of the respondents indicated that they were aged between 25 to 30 years 4.6% of the respondents indicated that they were aged above 51years, and finally 2.3% of the respondents indicated that they were aged between 18 to 24years. This is an indication that respondents were well distributed in terms of their age.

The study requested respondents to indicate their highest education level, from the findings, 47.69% of the respondents indicated their highest education level as collage, 40.76 % of the respondents indicated their highest education level as Bachelors' degree whereas 11.53% of the respondents indicated their highest education level as Secondary. This is an indication that majority of the employee in Toyota Kenya held collage diplomas as the highest level of education.

The study sought to establish the period which the employee had served for in the company , from the findings, 42.3% of the respondents indicated that they had worked for a period of between 6 to 10 years, 30.8% of the respondents indicated that they had worked for a period of between 1 to 5 years, 15.4% of the respondents indicated that they had served for a period which exceeded 10 years whereas 11.5% of the respondent indicated that they had served in that company for a period which is less than a year, this is an indication that majority of the respondent hereby had been employed for considerable time and thus they had vast knowledge which can be relied upon in this research.

On the respondent designation, the study established that respondent held various designations in their organization which were managers, supervisor, junior staff, clerk, accountant, internal auditor, marketing staff and administrators. This shows that various level of management in the organization was well represented.

Loss of Goods

The study sought to establish the extent do loss of goods affected the supply chain performance, from the findings 49.2% the respondents indicated that to a greater extent, 35.4% of the respondents indicated to a very great extent, 11.5% of the respondents indicated to a moderate extent and finally 3.8% of the respondents indicated to a less extent, this is an indication that piracy being experienced affected the supply chain of the company to a greater extent. The

finding hereby concurs with the report by Srivastava, (2008). In November 2008, the Sirius Star, carrying two million barrels of crude oil from Saudi Arabia to the United States worth approximately \$100 million became the largest oil tanker to be seized by pirates

The study sought to investigate whether the quantity of goods lost have in any way affected business revenues for the company. From the findings 94.6% of the respondents were of the opinion that goods lost affected business and revenues for the company, whereas only 5.38% of the respondents were of contrary opinion. This is an indication that piracy contributed to reduced turnover of the company. The study further revealed that quantity of goods lost affected business revenues for the company through losses made, loss of customers, increased insurance premium, increase lump sum and also loss of merchandise.

The study sought to establish the level at which respondents agreed or disagreed to the above statements relate on piracy, from the findings it was established that majority of the respondents agreed that: The term piracy encompasses two distinct sorts of offences: the first is robbery or hijacking, where the target of the attack is to steal a maritime vessel or its cargo as shown by a mean of 1.55, when establishing a price for a product or service, a company must first assess several factors regarding its potential impact as shown by a mean of 1.62, the study also revealed that respondents disagreed that RMP framework has been successfully applied to identify potential risk factors and to assess their likelihood of occurrence as shown by a mean of 4.19, the findings above concurs with Tummala, (2009). While the RMP has proven to be useful when applied to such individual project decisions, for example the risk involved in an extra high voltage transmission line project, it has yet to be applied to the much broader context of the supply chain.

Transportation Costs

The study sought to establish whether Piracy had brought about rise in transportation costs, and at the same time making the competition stiff, from the findings it 48.15% of the respondents agree that piracy brought about rise in transportation costs, and thus affected their competitive advantage, 38.46% of the respondents strongly agreed that that piracy brought about rise in transportation costs, and thus affected their competitive advantage and finally 15.38% of the respondents were moderate that of the opinion that piracy has brought about rise in transportation costs making other companies compete with them. This is an indication that piracy to some extent contributed negatively on market share of the Toyota Kenya company. In order to minimize transportation costs transportation managers consolidated shipments to settle at fewer trips, transportation managers reduced the number of its carriers, where total volume was divided among the few selected carriers, the packaging format was changed, this was aimed at utilizing the container space to the companies advantage.

The study sought to determine the level at which respondents agreed with the above statement, from the findings the study established that majority of the respondents agreed that it is feared that if the price of shipping, including insurance premiums, continues to rise, regional trade will

also go down as shown by a mean of 1.76, respondents also agreed that Risk assessment should be done when establishing the transportation route which is synonymous with the Uncertainties can be assessed by objective information, and probability distributions for relevant SC risks or consequences can be derived as shown by mean of 1.91, the finding concurs with the study by Finch,(2004).that it is feared that if the price of shipping, including insurance premiums, continues to rise, regional trade for countries like Egypt, Sudan, Saudi Arabia, Eritrea, Ethiopia, Djibouti and Yemen will decline as well.

Lead Times

The study revealed that piracy affected the company lead time through increased route of transportation, delay in delivery of stock, holding of ships with consignments, lateness of the merchandise and theft of stock in transit. The study sought to establish whether long lead times has made companies lose a lot of customers, from the findings, 50% of the respondents strongly agreed that they had lost a lot of their customers 41.5% of the respondents agreed that they have lost some of their customers, whereas 8.5% of the respondents were moderate that they have lost a lot of their customers. This is an indication that piracy affected the companies lead time.

The study revealed that the methods used by the company to reinforce and maintain customers even after the long lead times were importation of their good through longer route to avoid pirates, enhancing customer relationship skills , increasing customer awareness on the effects of piracy and importing more than the required vehicle and stock to always have stock for sale.

Insurance Premiums

The study revealed that piracy affected the value chain; through the cost of insuring the vehicles being transported from the manufacturers went higher after the insurance companies increased their premiums. The study sought to determine whether insurance companies have increased the insurance premiums upon the increase in the piracy along the travel route, from the findings, 50.0% of the respondents agreed that majority of the insurance companies have increased the insurance premiums upon the increase in the piracy along the travel route, 33.8% of the respondents strongly agreed that insurance companies have increased the insurance premiums, whereas 16.2% of the respondents appeared to be undecided, this indicates that the due to piracy companies incurred extra insurance costs .

The study sought to determine respondents level of agreement on the above statement which relate on the insurance premiums the study established respondents agreed that Since late 2008, most of the value chain companies had to pay higher insurance premiums; shipments also required an escort from European Union or Canadian navies as shown by a mean of 1.45, the dramatic rise of piracy in the Gulf of Aden is changing the insurance landscape as shown by a mean of 1.57 and final respondents agreed that Large ships typically carry three separate types of insurance as show by a mean of 1.85, all cases were supported by low mean of standard deviation an indication that respondents were of similar views . The findings above concurs with the report by Halgamuge, (2008). According to a recent report, insurance premiums for ships

traveling through the Gulf have rose from between 0.05% and 0.175% of the value of their cargo, compared to between 0% and 0.05% in May 2008, an increase of 350%. Premiums for kidnap and ransom coverage have reportedly increased by as much as 1,000%

Regression Analysis

Table 1: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.891(a)	.794	.787	.03125

Adjusted R² which is termed as the coefficient of determination which tells us how the corporate financial performance varied with customer capital, social influence, and innovativeness and reputation management. According to the findings in table above, the value of adjusted R² is 0.787. This implies that, there was a variation of 78.7% of on supply chain due to changes in loss of goods, transport cost, lead-time and insurance premium at a confidence level of 95%. R is the correlation coefficient which shows that there was a strong correlation between the study variable as shown by the correlation coefficient of 0.891.

Table 2: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	0.744	2	0.372	3.131	.021 ^b
Residual	3.683	127	0.029		
Total	4.427	129			

From the ANOVA statics in table above, the processed data, which is the population parameters, had a significance level of 2.1% which shows that the data is ideal for making a conclusion on the population's parameter as the value of significance (p-value) is less than 5%.

Table 3: Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.961	.892		2.198	.006
Loss of good	-.493	.220	-.161	-2.240	.016
Transport cost	-.314	.145	-.017	-1.166	.024
Lead time	-.267	.319	-.054	-.836	.033
Insurance premium	-.453	.173	-.054	-.309	.019

From the finding in table the established regression equation was

$$Y = 1.961 - 0.493 X_1 - 0.314 X_2 - 0.267 X_3 - 0.453 X_4$$

From the above regression model, holding loss of goods, transport cost, lead-time and insurance premium to constant zero supply chain would be at 1.961. It was established that a unit increase in loss of good would cause a decrease in supply chain by a factor of 0.493, unit increase in transport cost would also cause a decrease in supply chain by a factor 0.314, unit increase in lead-time would lead to decrease in supply chain by a factor of 0.267, also a unit increase in insurance premium would cause a decrease in supply chain by factors of 0.453. All the significance value was found to be less than 0.05 and indication that all value were statistically significant to make study conclusion.

Summary of Findings

The study established commodities which were lost through piracy affected the supply chain performance, to a greater extent. The study further revealed that quantity of goods lost affected business revenues for the company through losses made, loss of customers, increased insurance premiums, increase lump sum and also loss of merchandise. This contributed to reduced turnover of the company.

The study revealed that, the term piracy encompasses two distinct sorts of offences: the first is robbery or hijacking, where the target of the attack is to steal a maritime vessel or its cargo, that when establishing a price for a product or service, a company must first assess several factors regarding its potential impact, the study also revealed that respondents disagreed that RMP framework has been successfully applied to identify potential risk factors and to assess their likelihood of occurrence.

The study established that piracy had brought about rise in transportation costs, and at the same time making the competition stiff, them. This indicates that piracy to some extent piracy contributed negatively on market share of the Toyota Kenya company. Further the study established that transportation managers consolidated shipments to settle at fewer trips, transportation managers also reduced the number of its carriers, the packaging format was changed in order to effectively utilize the container space. The study noted that if the price of shipping, including insurance premiums, continues to rise, regional trade will also go down, that Risk assessment should be done when establishing the transportation route which is synonymous with the Uncertainties can be assessed by objective information, and probability distributions for relevant SC risks or consequences can be derived,

The study revealed that piracy affected the company lead time through increased route of transportation, delay in delivery of stock, holding of ships with consignments, lateness of the merchandise and theft of stock in transit. Throughout this time it was noted that companies lost some of its customers, In order to reinforce and maintain customers after the long lead times the company started importing goods through loner route to avoid pirates, enhancing customer

relationship skills, increasing customer awareness on the effects of piracy and importing more than the required vehicle and stock to always have stock for sale.

The study established that insurance companies have increased the insurance premiums due to the increase in the piracy along the travel route the study established that Since late 2008, most of the value chain companies had to pay higher insurance premiums; shipments also required an escort from European Union or Canadian navies that the dramatic rise of piracy in the Gulf of Aden is changing the insurance landscape that Large ships typically carry three separate types of insurance.

Conclusions

The study concludes that commodities which were lost through piracy do affected the supply chain performance to a greater extent, that the quantity of goods lost affects revenues for the company through, loss of customers, increased insurance premium, increase lump sum and also via loss of merchandise. This contributes to reduced turnover of the company.

The study concludes that piracy brought about rise in transportation costs, and at the same time it made the competition to be stiff, them. This implies that piracy contributed negatively on market share of the Toyota Kenya company.

The study concludes that there are fears that if the price of shipping, including insurance premiums, continues to rise, regional trade will also go down, that Risk assessment should be done when establishing the transportation route which is synonymous with the Uncertainties can be assessed by objective information, and probability distributions for relevant SC risks or consequences can be derived,

The study concludes that piracy affected the company lead time through increased route of transportation, delay in delivery of stock, holding of ships with consignments, lateness of the merchandise and theft of stock in transit and throughout this time the company lost some of its customers.

The study concludes that insurance companies have increased the insurance premiums due to the increase in the piracy along the travel routes.

Recommendations

From the findings the study concludes that there was need for motor vehicle companies in Kenya to insure their imports to ensure that they are compensated in case of losses due to piracy. There is need for motor vehicle companies in Kenya to use other methods of transport to avoid high cost of premium caused by maritime piracy.

In order to reduce the effects piracy there is need for motor vehicle companies in Kenya to use other method of transport which have low cost of transportation and low cost of insurance premium, this will help in reduce the lead time and delays.

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