Example of research paper on technology and transport

Business, Industries

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INTRODUCTION

Economies of various countries around the world are composed of businesses, individuals, communities and government agencies. All these elements of economies rely on freight movement to satisfy their varied needs. Therefore, transportation of both people and goods is a vital part of human existence. There are various modes of transport adopted by different individuals and nations, depending on their different needs. These modes of transports include air, truck, maritime and rail transport. Each of the transportation option is constantly facing challenges resulting from the environment and socio-political events. As a result of emerging challenges, each mode of transport has adopted technologies with the aim of overcoming the challenges and increasing efficiencies. Moreover, the different transport options acquire technologies due to the availability of the technologies and their benefits. When the transport sector adopts the new technology, it experiences advantages that would not exist in the absence of the technologies. As in other sectors of life, adoption of various technologies in the transport industry must have tremendous effects on the industry. This research paper will undertake to find out these effects by exploring various sources and studies. The literature reviewed will lead to the answers of the research question below.

RESEARCH QUESTION

- What are the effects f adopting different technologies on various modes of transport?

TECHNOLOGY AND THE AIR TRANSPORT

Technological innovations in the air transport sector have been motivated by several factors. These factors include the following:

- Increased competition from airline players that has resulted from deregulation (United States Congress, 2012). This high demand places high demand for aircraft performance that is cost effective. Moreover, the competition has led to more demand for enhanced passengers' facilities.

- Increased environmental concerns regarding emissions of gases by air transport engines. Due to the high growth rate of air transport, the amount of emissions from engines has been on the rise. Increased gases in the upper atmosphere leads to global warming. Moreover, the amount of noise injected into the atmosphere has also increased with the growth of the air transport industry. Concerns about global warming have become a major concern for all governments in the world. Technological advancement has been viewed as one of the breakthroughs that could help reduce emissions into the atmosphere and consequently, global warming. Technology in engine building can help in efficient energy use, which will result to less gases being released into the atmosphere. Secondly, technology can lead to alternative sources of energy that are environmental friendly such as hydrogen. Various technologies adopted in the air transport sector are examined in the following section.

Advanced air traffic control systems

Technological innovations have enabled airports to install traffic controls systems with more capabilities. This installation has affected the air

transport industry in a massive way. First, with the advanced air traffic control, airports are able to handle more aircrafts at a given time (IATA & TCIA, 2007). Secondly, delays that are normally caused by bad weather are eradicated since the technology allows the crew and control officers to communicate and navigate the aircraft despite the bad weather. Thirdly, due to the precision of the advanced air control technology, airports are able to handle more aircrafts. This capability is enabled by the advanced air control technology's ability to direct aircrafts within proximity of 1-3 meters of each other.

New systems are under installation in various airlines where the concept of free freight will be implemented. In this concept, aircraft location will be a preserve of the crew on board. This is a deviation from the previous technology applications where the aircraft location was determined by radar facilities on the ground. The implication of this new technology on the air transport industry is that the crew has increased flexibility in determining the route to take.

Collision Avoidance and Traffic Alerts Systems

These systems are designed to detect and warn the pilot of other aircraft within its proximity. When there is a possible collision the system sends a warning to the pilot indicating the position of the other aircraft. As a result, though the pilot is able to make vital decisions which may avert a likely collision. The availability of this technology has positively impacted on the air transport industry. As a result of the collision avoidance capabilities, the number of aircraft collisions has reduced considerably. These systems not

only reduce the chances of accidents, but also provide pilots with assistance in decision making.

Online Reservation and Booking Systems

With the emergence of the internet, many businesses have benefited from the chances the internet offers, which range from marketing to service delivery (Donohue, 2007). The air transport industry has not lagged behind in utilizing the capabilities offered by the internet. Online booking systems allow travelers to book their air tickets from the comfort of their homes or offices. The online booking system has made air travel to be cheap and easy to use. Websites that allow passengers to book their tickets online provides them with a chance to decide the airlines fitting their pockets. Different airlines list prices for their various flight classes and departure times. Providing these options enables passengers to compare prices and make major decisions that may affect their satisfaction from the travel. The effects of having an online booking system to the air transports is that it has been made easier, convenient and cheap. The processing of tickets that have been booked online is fast and saves the customers' time. The systems have also added a twist in the competitiveness of the air travel sector. Airlines have increased their attention to details regarding customers' tastes and preferences. Dissatisfied customers have been given an option of seeking services and products from competitor airlines. As a result, airlines have increased their effort to satisfy their customers to avoid losing them to competitors. The overall effect of these technologies is that the air transport efficiencies are improved due to high competition and available options.

Social Media

Social sites such as Facebook and Twitter have offered the air transport a boom due to their wide variety of users. When customers are searching for convenient airfares, they may not access a specific airline's website. However, with the existence of social sites, information about a variety of airlines offering convenient fares can spread very fast. Information regarding discounts that a specific airline may have spread fast, attracting new clients. Airlines have also embraced these social sites to communicate directly to their customers. On their side, the customers give feedback to the airlines regarding products and services. The airline is, therefore, able to build a loyal customer base through accurate dissatisfaction resolution. Therefore, social sites have revolutionized the air transport sector by offering a communication platform. The airlines are able to build a customer base through proper client engagement over the social site, thereby increasing revenues and profits.

TECHNOLOGY IN THE RAIL TRANSPORT

Railway transport has been widely used around the world to transport bulky goods to both long and short distances (Gilbert and Pearl, 2012). Like other transport modes, the rail transport has been affected by the increasing fuel prices and technological innovations. Moreover, the global concerns of global warming, caused by emissions have also affected the rail transport. Several factors have influenced the use of advanced technology in the rail transport sister. These factors include the need to use fuel efficiently, emission

reduction and security concerns. Some of the technologies used specifically in the rail transport mode are discussed in the following sections.

Positive Train Control

Positive train control is a system that increases train safety by controlling and monitoring train movements. This technology monitors train separation using a locomotive GPS system. Generally, positive train control provides the train with information regarding its current position and the places it is allowed to safely travel. Some equipment found inside the train then enforces the information, preventing the train from travelling to unsafe locations. The effects of this technology on the rail transport are efficient fuel usage and locomotive diagnostics.

Trip Optimizer Technology

Trip optimizer is software that controls freight trains. This software has calculation capabilities to determine the optimal speed for efficient fuel consumption (Bruinsma, 2008). These calculations are based on the route and type of the train. Once the software has determined the optimal speed, it controls the throttle so that the train maintains that speed for the whole journey. As a result, fuel is efficiently utilized, leading to conservation of energy.

Real-time Train Information System

Real-time train information system provides information to the general public about the whereabouts of specific train (Profillidis, 2006). The public receives the information either through SMS messages or the internet. The

information provided by this technology synchronizes the punctuality of the train and passengers. Passengers are able to save their time by arriving at the appropriate time coinciding with the arrival of the train.

TECHNOLOGY AND THE MARITIME TRANSPORTATION

Maritime transportation is one of the oldest means of transport. Trade involving bulky cargo over wide geographic areas is carried out using maritime transportation (Asariotis and Benamara, 2012). Over the years, maritime transport has faced many challenges. First, the safety of passengers and cargo has been at risk of theft and attack from pirates. Secondly, environmental concerns have been raised concerning the ecological impact of a ship or tank wreckage. This concern is genuine especially because crude oil is usually transported through maritime means. Oil spillage into the ocean has far-reaching consequences on the oceanic ecosystem. The speed of shipping and efficient oil usage has also become a challenge to the maritime transportation. Technological advancement in this sector has the potential to mitigate these changes and, therefore lead to the transportation's success.

Technology in the maritime transport has mainly been utilized in increasing the size of vessels, dredging ports to accommodate large vessels and automation of vessels. Current dredging technology has allowed baking of dredged material into construction material. Initially, dredging of ports had become a concern because the waste material dredged had no place for disposal. As a result, he material had to be piled up leading to pollution of the environment. Automation of vessels is meant to increase their efficiency.

Specific technologies have been utilized in the maritime transport mode and are discussed below.

Ship Motion Monitoring, Forecasting and Decision Support

This technology measures ship motions, accelerations, and velocities. These measurements are carried put with high flexibilities and degree of accuracy. Moreover, the technology is also used to prevent cargo shift, slamming warning and monitoring crane tips (Peters, 2003). The consequent of using this technology is that optimal speed for efficient use of fuel is established.

Marine Automation System

This automaton system is composed of a vessel's surveillance and alarm system. This system relays information to the operators regarding the ancillary machinery, power plants and other equipment. This system is a safety measure that ensures that the controller is aware of any abnormalities with the vessel. This technology has affected the maritime transport by ensuring that operators take proactive measures to prevent abrupt occurrence of accidents.

Oil Mist Detection Systems

Accumulation of oil mist in the ocean is hazardous to vessels passing by. This detection system is a safety measure that detects and reports oil mist build-up so that the operator can take necessary measures in preventing fire breakouts (Marcus, 2007). The system is fitted with detectors that have a fan to allow free air circulation. The detectors are located over the equipment that is being monitored. This technology has positively impacted on the

maritime transport by preventing outbreaks of fires. Consequently, the numbers of maritime accidents are reduced.

TECHNOLOGY AND TRUCK TRANSPORTATION

Truck transport accounts for the largest cargo transport on land. Trucks provide transport in both short and long distant cargo transfer. Due to the large number of trucks used in transporting cargo, they have a large negative impact on the environment in terms of pollution. To reduce the impact of pollution to the atmosphere, truck transportation has adopted various technologies that have enabled vehicles to efficiently utilize fuel efficiently. Just like other transportation modes, truck transport faces security threats. These threats are directed at the drivers and the cargo being transported. To counter these threats, various technologies have been developed. These technologies have positively impacted on the way the truck transport business is being conducted. These varying technologies are discussed below.

Global Positioning System (GPS)

GPS is a navigation technology system based on satellite signals. This technology has been widely used in truck transportation industry. This technology provides the truck industry with real time location of the vehicles (Nakanishi and Bekiaris, 2004). When trucks have been installed with GPS technology, the operators and other stakeholders are able to locate the position of the vehicle at all time. incase of carjacking or theft, the authorities are able to trace the stolen vehicle sing this technology.

Automatic Vehicle Location

This technology has the capacity to track trucks and relay the location information to a central position. Trucks that have been fitted with the technology capabilities and belong to a fleet, the managers of the fleet are able to manage it more efficiently. The cost of installing this system has declined over time. This has enabled many truck owners to install the technology. This technology has made truck location very easy. As a result, providers can make modifications of routes to take care of late requests for drop-offs and pickups. Before the emergence of this technology, these simple requests had to be made early in advance. The availability of these technologies has enabled truck managers to build capacities to manage customer requests at short notices (Schorpp, 2011). Consequently, customer satisfaction is high and communication is efficient.

Smart Cards

Smart cards are fixed with a silicon chip with the ability to receive and transmit data. These cards have different forms, with some being contactless while others are contacting. This technology has varied uses in the transport sector. First, the card can be used for vehicle identification. These cards are very favorable in the truck transportation industry because the reduce money handling processes. Consequently, expenses of paying attendants are eliminated, making the business more profitable. Smart cards are also used as a security precaution. Truck drivers transport cargo to airports. As they wait for their cargo to be offloaded, they may loiter within the port. Airport authorities use smart cards to track the drivers and their cargo. This

technology has made transaction easy and fast. Consequently the growth and efficiency of the truck transport have grown faster than before the introduction of the smart cards.

Travel Information Services

This technology helps people to utilize transport systems efficiently. The technology provides the truck transportation industry with information regarding real-time and predicted conditions (Lay, 2009). This information enables users to select the best routes, departure times and best models. As a result of using this technology, truck drivers are able to save time and fuels used in the route. Utilizing this technology has impacted positively on the improvement of cargo delivery and fuel consumption efficiency.

Collision Warning Systems

Collision warning systems purports to reduce property damage, injuries and accident fatalities by proactively detecting objects and warning the truck drivers. Moreover, this technology enables the vehicle to have automatic control of vital systems such as brakes, steering wheel and throttle. When truck drivers are enabled to reduce accident occurrences, they save life and property. This averts losses and damages the truck owners would have incurred in case the accidents happened. By reducing accident chances, this technology contributes to the growth of the truck transport industry.

Conclusion

The use of technology in truck, air, maritime and rail transport system has yielded numerous benefits to the stakeholders of the transport industry.

Although the many technologies available for every mode of transport differ, their effects and benefits are relatively similar. Most of these benefits include better fuel efficiency, reduction of emissions, greater satisfaction, increased profits, improved safety and accident avoidance. The air transport sector has experienced further effects such as increased customer base due to social sites. It is indisputable that the absence of these technologies in the transport industry can pose challenges to all stakeholders. Although various effects of technology on the transportation industry have been identified, more research needs to be done. This research should embark on determining the actual impact of the various technologies on each transport mode. Investigating the real impact of each technology adoption in the transport sector can be used as a tool to legitimize the effects that have resulted with the biggest effect and the probable reason for the result. The results of this further research can inform players in the transport industry in other ways of optimizing the use of technology to achieve maximum results.

References

Asariotis, R., & Benamara, H. (2012). Maritime Transport and the Climate Change Challenge. London: Routledge.

Bruinsma, F. (2008). Railway Development: Impacts on Urban Dynamics. New York: Springer.

Donohue, G. L. (2007). Air transportation systems engineering. California: American Institute of Aeronautics and Astronautics.

Gilbert, R., & Pearl, A. (2012). Transport Revolutions: Moving People and Freight without Oil. New Jersey: Earthscan.

IATA & TCIA. (2007). Factors affecting air traffic control: a record of discussions of factors affecting air traffic control held during the Ninth Annual Technical Conference of IATA, San Remo, May 1956. Michigan: University of Michigan Press.

Lay, M. G. (2009). Handbook of Road Technology. New York: Taylor & Francis.

Marcus, H. S. (2007). Marine Transportation Management. New York: Taylor & Francis.

Nakanishi, Y. J., & Bekiaris, E. (2004). Economic Impacts of Intelligent Transportation Systems: Innovations and Case Studies. New York: Elsevier.

Peters, H. J. (2003). The Maritime Transport Crisis, Parts 63-220. New York: World Bank Publications.

Profillidis, V. A. (2006). Railway Management And Engineering. New York; Ashgate Publishing.

Schorpp, S. (2011). Dynamic Fleet Management for International Truck Transportation: Focusing on Occasional Transportation Tasks. New York: Springer.

United States Congress. (2012). Impact of Advanced Air Transport Technology. New York: General Books.