Influence of Traffic Congestion in Business Development: A Literature Review

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Abstract:
The growing population combined together with rapid urbanization that is currently being experienced in different population centers. This is putting a strain on the infrastructure of population centers that are not prepared for rapid population increase and urbanization. With these in mind the easily recognizable effect is traffic congestion. This in turn has an influence in business development. This objective of this paper is to understand how traffic congestion has an influence in business development through examined research articles and journals online from the year to with the focus on the understanding of its effects and how it is being managed. Several key terms and concepts used in the literature to describe it.

Business Development: In simplest terms, business development can be summarized as ideas, initiatives, and activities aimed towards making a business better. This includes increasing revenues growth in terms of business expansion.

Economics: This is a social science concerned with the production, distribution, and consumption of goods and services. It studies how individuals, businesses, governments, and nations make choices about how to allocate resources.

Transportation: The movement of goods and persons from place to place and the various means by which such movement is accomplished.

Traffic: Refers to all the vehicles that are moving along the roads in a particular area.

Traffic Congestion: This refers to the way the movement of vehicles is delayed by one another because of limited road capacity. In simpler terms, road congestion occurs when the demand for traffic nears or surpasses the capacity of the road network (Raheem et al., 2015).

Urban Transportation: Refers to the system of transportation that provides access and mobility for people and goods within cities. Elements of urban transportation include public transit (collective transport); non-motorized transport (pedestrians, cyclists) and freight. Effective urban transport systems are essential to economic activity and quality of life.

I. INTRODUCTION

This literature review focuses on the influence of traffic congestion in business development. Transportation system is an important part of a modern day society, designed to provide efficient and economical movement between the component parts of a country and offer maximum possible mobility to all citizens (Leshem and Ritov, 2007). Transport is so vital to all economic activity – in moving raw materials to factories, labor to worksites, inputs and outputs along supply chains, consumers to services, and products to consumers (Andrew, Taner, Brian and Trevor 2015). Road transport is a substance of urban, rural and national development. It is a compound by facilitating the movements associated with urban and national development and providing the means by which goods and services are made available to industry and consumers, creating opportunities for social and economic interaction and employment. Without transport, access to these facilities would not be possible and the services they provide not consumable. Transport is what springs life to development (Gunnarson, 1998; Speathing 1999; Oni, 2001; Atubi, 2006). The Metropolitan Manila Development Authority (MMDA) has reported that Metro Manila’s everyday traffic led to a Php 3.5 billion daily economic loss in 2018. This figure went up by more than Php 1 billion from 2016’s figure of Php 2.4 billion. MMDA traffic czar Bong Nebrija ascribes the heavy traffic to lacking road infrastructure coupled with the rising number of vehicles in the region. Alarmingly, this economic loss may increase to Php 5.4 billion per day by 2035 if no changes are made. Metro Manila’s traffic congestion negatively impacts the economy this way due to the Philippines’ economic cost of transportation. According to wheels.ph this refers to: “the vehicle operating cost and time spent by both drivers and passengers along Metro Manila’s busiest thoroughfares.” According to Anthony Downs, an Economist, rush hour traffic congestion is unavoidable. It is the direct consequence of having the standard work schedule that we all know too well. He also says that roads are like goods in a capitalist economy. They can either be had by paying or through a first-come first-serviced policy. According to researchers from London School of Economics and University of Toronto, there exists a “fundamental law of road congestion” wherein building and widening new roads will also cause traffic density to rises up once again to previous levels. This was done by determining the number of vehicle-kilometers traveled or VKT which they saw increases proportionally to the lane-kilometers available on roads.

II. RESULTS

Transport is a key sector in the Philippine economy, linking population and economic centers across the islands. The transport system of the Philippines consists of road, water, air, and rail transport. Water transport plays an important role due to the archipelagic nature of the country, but road transport is
by far the dominant subsector accounting for 98% of passenger traffic and 58% of cargo traffic. While the transport infrastructure has been developed and spread across the country (about 215,000 kilometers [km] of roads, 1,300 public and private ports, and 215 public and private airports), the level of service has not been sufficient due to the lack of sustainable financing. Improving transport infrastructure is critical for strengthening the investment climate and enhancing economic growth. The Philippines has seen modest improvement in the quality of its transport services, but a large part of the road network remains in poor condition and intermodal integration is generally weak. Poor sector governance also impedes efficient operation of the sector. 

As of 2011, the country’s road system comprised about 215,000 km, of which about 15% were classified as national roads, thereby falling under the jurisdiction of the Department of Public Works and Highways (DPWH). The remaining 85% of the network is defined as local roads and falls under the jurisdiction of a variety of local government units. As of November 2011, 79% of national roads and only 18% of local roads were paved with either asphalt or concrete. The percentage of national roads that are paved has risen only slowly from 71% in 2001 and remains well below the government’s original target of 95% by 2010. Of the 31,400 km of national roads in the system, only about 45% (14,200 km) were assessed as being in good or fair condition in November 2011. This figure is lower than the percentages in 1982 (about 52%) and 2001 (about 47%). For local roads, the 2009 figure was much lower, at about 20% (about 35,300 km of 176,300 km). Annual investment in the road system has remained at about 0.6% of gross domestic product (GDP), which is much lower than the comparable figure for most other countries in Southeast Asia. As a result, efforts to upgrade or expand the network have been limited. The extent of the road network in the Philippines, when measured in terms of road km per square km, road km per capita, and road km per dollar of GDP per capita, is comparable with or better than many neighboring developing members countries. However, when the quality of the road system is considered—both in terms of the percentage of paved roads and the percentage of roads in good or fair condition—the Philippines lags well behind nearly all of its regional neighbors and competitors. The major cause of the overall low quality of the road network is poor and inadequate maintenance. This is the result of (i) insufficient financial resources being made available for maintenance, and (ii) inadequate institutional capacity of agencies responsible for road maintenance. The high prevalence of overloading of trucks also contributes to the low quality of the network. Axle-load surveys conducted by the DPWH in 2005 showed that 11%--12% of all trucks were overloaded. Lack enforcement of axle-load regulations compounds this problem. In addition to the low quality of the road network, the poor state of repair of much of the vehicle fleet and inadequate enforcement of traffic regulations are also major contributors to the unsatisfactory status of road transport in the Philippines. The government has developed a network of tolled expressways in central Luzon to address transport constraints on economic development by (i) linking the major economic and transport centers in Metro Manila and adjacent provinces, from Tarlac in the north to Batangas in the south; and (ii) facilitating multimodal transport. The expressway network, developed through public–private partnerships (PPPs) and with bilateral development assistance, links industrial parks and special economic zones, the ports at Subic and Batangas, and Diosdado Macapagal International Airport in Pampanga. While the development of this network has reduced travel times significantly, additional efforts to increase port capacity and improve management are necessary to realize fully the benefits of an integrated multimodal transport system. The Philippines is experiencing rapid urbanization, and by 2030, about 77% of the population will live in urban areas. There are 120 cities in the country, including 16 in Metro Manila, which is the only metropolitan area in the Philippines. Other major urban agglomerations exist, including in Davao, Cebu, and Iloilo, but they lack formal metropolitan organizations. Transport systems in these cities are almost entirely road based, with the exception of Metro Manila. Transport services consist mainly of jeepneys (public utility vehicles), taxis, tricycles, and pedicabs that are privately owned and operated. In 2010, taxis comprised 667,424 (35%) of the 1.9 million vehicles in Metro Manila, and half of the 6.6 million vehicles in the country were motorcycles. Motorcycle users are vulnerable to road crashes and contribute significantly to traffic congestion. In Metro Manila, the urban transport infrastructure consists of a network of roads and railways. A functional classification system of roads has been established with the arterial roads forming a radial circumferential pattern of 10 radial roads and 5 circumferential roads. Two circumferential roads are incomplete and a sixth is in the planning stage. While some of the principal road corridors in Metro Manila have high capacities, traffic volumes are also extremely high. As a result, the movement of people, goods, and services is becoming increasingly difficult. Although restrictions on vehicle usage are in place, their effectiveness is decreasing as rates of motorization increase; consequently, congestion in Metro Manila is increasing rapidly and is estimated to cause economic losses equivalent to about 4.6% of GDP. While congestion in urban areas outside of Metro Manila is less severe, increasing urban populations combined with higher rates of motorization suggest that traffic congestion in those urban areas will worsen in the near future. As in other urban areas, road-based public transport in Metro Manila is provided entirely by the private sector. There are an estimated 433 bus companies operating 805 routes. The majority of bus companies own more than 10 units, with only 7 bus companies owning 100 units or more. Jeepneys serve 785 routes in Metro Manila, with many jeepney operators owning only one unit. In addition to jeepneys, air-conditioned Asian utility vehicles provide express services in several areas of Metro Manila, together with taxis and localized modes of transport such as tricycles and pedicabs. Tricycles and pedicabs are restricted to serving local areas and provide a feeder service to the larger-scale public transport services. Improving the social and economic wellbeing of the citizenry is the aim of every nation. The long-term goal of government is to raise the standard of living of all Ghanaians to a level consistent with that of middle-income economy. One basic economic and social necessity that comes into focus when discussing economic and social development is transportation. Transportation is an activity of life processes and seeks to provide access to various activities that satisfy mobility needs of humankind (Arasan 2012). According to Eddington (2006), an effective transportation system is significantly important in sustaining economic growth in contemporary economies since it provides linkages between different parts of the country and the global world. It links to work, deliver products to market, underpins social and economic development, and enhances the quality of life of all citizens. The government of the Philippines is taking steps to improve its transportation infrastructure and services, with a focus on developing a comprehensive network of roads, railways, and airports. The development of toll expressways and the expansion of the road network are key initiatives in this regard. The government is also working to improve traffic congestion by implementing measures such as axle-load regulations and enforcing traffic laws. In the urban areas, efforts are being made to enhance public transport services, including the expansion of bus networks and the development of multimodal transport systems. Additionally, efforts to improve the social and economic wellbeing of the citizenry are being made through transportation initiatives, with a focus on providing accessible and efficient transportation options to all citizens.
logistics and supply chain, and support local and international trade. A well-established transportation system is not only key to national growth but also serves as catalyst for economic development of a country. Thus, there is a relationship between transportation and productivity (Lu et al. 2009). Economic and social activities of human kind revolve around transportation. It is a link to almost all sectors of an economy. Virtually everything we do relies on transportation. Trade within and between different regions is vital to economic development and directly depends on transportation (Kulash 1999, World Bank 2002). Thus, the importance of transportation to societal growth cannot be underestimated. Broadstock (2011) and Pacione (2005) state that increasing wealth and high population, and availability of vehicle loan facility result in more car ownership than current transportation network can handle. It could be inferred from the above statement that there is a relationship between income level and car ownership and that the dominance of private car usage, particularly within cities, is likely to increase even further as a result of rise in household income with its attendant traffic congestion and high consumption of fuel. Eddington (2006) cites adequate transport network, traffic management and control system and effective, efficient and reliable mass transit as key factors that affect urban transportation system. Nadiri (1998) postulates that investment in adequate transport infrastructure improves transport efficiency in terms of increased productivity and continue that transportation infrastructure involves good road network, adequate bus stops, parking areas with traffic signals. Shapiro et al. (2002) assert that mass transit is prerequisite for ensuring efficient and effective transportation system in urban areas in terms of energy conservation reduced traffic congestion and environmental preservation. They argue that effective mass transit system is underpinned by availability, accessibility, and reliability of buses. Effective traffic management and control system is key to ensuring effective transportation system in the urban areas. This involves management and control of road signals, road space, parking space and road users (Arasan 2012; Jones 1999). The impact of productivity has to deal with the ratio of volume measure of output to the volume measure of input. It measures the extent to which production input is utilized to produce output in the production process. Economic growth and business competitiveness is underpinned by productivity growth (Organization for Economic Co-operation and Development (OECD) 2006; Nadiri 1996). Nadiri (1996) argues that the input of productivity is a state or national investment in transportation whilst the output is gross domestic product (GDP) growth. An effective transportation system is therefore key in sustaining economic growth in the contemporary economies by its capacity to link people to job, deliver products to markets where there is demand, drives supply chain and logistics and enabling domestic and international trade. Again, improvement in transportation efficiency can influence cost of doing business, travel time, forecast reliability, comfort, safety and security of commuters. The direct benefit of an efficient and effective transportation system reflects in the reduced travel time, which translates into cost saving, increase in output and ultimately GDP (Kulash 1999, World Bank 2002). Eddington added that travel reliability is critical to some business sectors, especially those that deal with perishable goods as well as those that rely on just-in-time (JIT) deliveries. That is, to some businesses, productivity growth is underpinned by what they termed as predictable and time-critical deliveries. This view is further shared by Weisbrod and Reno (2009), when they state that effective transportation system increases productivity in terms of job creation, reduction in business operation cost, improved output, expanded market and increase in economic competitiveness. They continue to suggest that effective transportation system contributes to productivity by improving business ability to provide goods and services, improving people’s ability to access education and health services, create employment and reduce vehicle operation cost as well as emission and safety benefits. Thus, effective transportation system improves productivity which is a key determinant of economic growth and living standards. Rodrigue et al. (2009) states that congestion can be perceived as unavoidable consequences of scarce transport facilities such as road space, parking area, road signals and effective traffic management. They argue that urban congestion mainly concerns two domains of circulation, passengers and freight which share the same infrastructure. Thus, traffic congestion condition on road networks occurs as a result of excessive use of road infrastructure beyond capacity, and it is characterized by slower speeds, longer trip hours and increased vehicular queuing. Downie (2008) also opines that traffic congestion occurs when the volume of vehicular traffic is greater than the available road capacity, a point commonly referred to as saturation. He describes a number of specific circumstances which cause or aggravate congestion. Most of such circumstances are concerned with reduction in the capacity of road at a given point or over a certain length, or increase in the number of vehicles required for the movement of people and goods. Downie (2008) further argues that economic surge in various economies has resulted in a massive increase in the number of vehicles that overwhelms transport infrastructure, thus causing congestion on roads in cities. Rodrique et al. (2009), note that congestion in urban areas is dominantly caused by commuting patterns and little by truck movement. They further attributed the causes of congestion to rise in population densities, road incidents and broken vehicles on the roads which restrict capacity of roads and impair smooth traffic flows. Another contributing factor to congestion as suggested by Herman (2001), cited Downie (2008) is parking. He is of the view that road parking, which consumes large amount of space has become a land issue that greatly inflates the demand for urban land, causing congestion in cities. He adds that high urban mobility rate also contributes to the congestion menace. The massive use of cars does not only have an impact on traffic congestion but also leads to decline in public transit efficiency, thereby creating commuting difficulties in cities. Indeed, the overdependence on cars has tremendously increased the demand for transport infrastructure. Unfortunately, the supply of transport infrastructure has never been commensurate with the growth of mobility needs. Consequently, several vehicles spend most of the time in traffic as a result of traffic space limitation (Yan and Crooks 2010). Furthermore, Urban Roads (2004) Report that traffic congestion in Kumasi is attributable to limited road capacity, parking space, dysfunctional road signals, drivers’ behavior, vehicle breakdown on roads and too many cars within the city. Rodrique et al. (2009) outline some measures that could help deal with the congestion menace. They mention traffic signal synchronization, incident management, congestion pricing and the use of public transit as possible effective strategies available in dealing with
congestion situation, although not without their associated challenges. Any city that is economically dynamic and vibrant will rarely be free from traffic congestion. Congestion has become an inevitable part of everyday life and that it is the city authorities that have to devise policies to help manage congestion on affordable basis to relief commuters of the difficulties imposed upon them by traffic congestion (May and Marsden 2007, Yildirim 2001). According to them, there is little consensus on the type of policies that can be used to trade congestion in cities, and that it is unsure that congestion has any clear-cut solution. Indeed, people living in cities have come to accept traffic congestion as part of city dynamics and therefore have become used to getting along with it. They continue to argue that traffic congestion in cities is a symbol of a successful socio-economic development – improved business activities, increase in employment and improved culture. These are factors that motivate firms to operate in cities to benefit from economic gains. May and Marsden (2007), however argue that congestion impairs us from moving freely and that it disrupts business activities in cities and reduces productivity. Congestion affects speed and smooth traffic flow. This affects a wide range of activities, services, goods, markets opportunities in the cities which can best be delivered through transport mobility. The report continues that congestion also reduces productivity through increased inventory holding by manufacturers and retailers as a result of unreliable travel conditions within cities. Business activities depend on timely delivery of logistics. However, freight movement in cities is impaired by traffic congestion, thus making productivity suffer. Weisbrod et al. (2003) reinforce this assertion by saying that increased traffic congestion imposes cost upon commuters and affect business operations. They further affirm that businesses that have high needs for incoming deliveries are mostly affected by traffic congestion and thus reduce productivity. Thus, traffic congestion increases the cost of businesses operations. For instance, delay in delivering time-sensitive logistics can impose additional inventory and logistics cost. Indeed, congestion affects lean management system like just-in-time, making businesses less responsive. Weisbod et al. (2003) conclude that congestion leads to reduced productivity through reduced worker access to job and shopper access to stores as a result of excessive delay in traffic. According to Crowther et al (1963), cutting traffic congestion by half will bring huge economic benefit to economies. This statement lends credence to the fact that traffic congestion has negative impact on productivity. Indeed in August 2010, Habee, one of the provinces of China experienced what is considered the world worst traffic jam ever, as traffic congestion stretched more than 100km from August 14 to 26 (Hickman 2010) . Such situation has obvious implication on productivity and the socio-economic development at large. Lewis (2008) and Donnie, (2008) further delineate that although the digital revolution enables twenty 21st Century industries to adopt just-in-time production, distribution and inventory management system, the challenges in the transportation system such as congestion, makes it difficult for them to be up to the task of ensuring reliable just-in-time deliveries for enhanced productivity and competitiveness. Poole (1998), and Eddington, (2006) argue that economic cost of congestion takes the form of time wasted through travel delays and unreliable transportation conditions, extra fuel, the environmental damage and related cost to human health.

III. SUMMARY

Traffic congestion is a normal phenomenon associated with transportation, especially in urban areas. Congestion is one of the problems involving road. Normally, network congestion occurs on land transport on roads. As demand approaches the capacity of a road or of the intersections along the road, extreme traffic congestion will set in. When vehicles are fully stopped for periods of time, this is colloquially known as a traffic jam or traffic snarl-up. Traffic congestion can lead to drivers becoming frustrated and engaging in road rage. Managing Urban Traffic Congestion Report (2007) stated that traffic congestion refers to the physical phenomena related to behavior or situations that prevent the movement of vehicles to each other in order to get the limited space on the road to achieving maximum capacity. Congestion also refers to the phenomenon in relation to the expected performance of the service road system vis-a-sis (networked). Congestion also is the inability to move (immobility). Congestion is a phenomenon in which long lines of vehicles moving slowly or stopped at the highway city, suburban highways or city streets. Congestion can occur every day at the same time at a specific location that is referred to as recurrent congestion or accidents during road maintenance or availability of any non-recurring congestion. Normally, congestion occurs when the road system cannot accommodate the volume of traffic at a reasonable speed, there is a conflict between the various types of traffic such as cars, trucks, buses or pedestrians and traffic control are not used efficiently. Convergence path, decreasing the capacity of a sudden, that movement is stuck or increased friction also led to increased traffic congestion (Rahim F. (Ray), 1997). In addition, according to Daniel Mohamed (1993), congestion occurs due to the long queue of vehicles along the way and the vehicle cannot move smoothly due to certain obstacles. Among the forms of barriers that exist are a crossroads and traffic lights that affect delay, accidents, floods as well as road maintenance. Apart from that, Bruton (1982) stated that, traffic congestion can cause discomfort and emotional problems (anger, worry and stress of mind) that can interfere with a driver's concentration on the road and causing accidents. The density of vehicle movements can also cause the gathering of pollutants from the exhaust of vehicles in the city area. The density of vehicular movement occurs when people have the same destination. In addition, the lack of a systematic traffic route that lead to conflict between pedestrians and motor vehicles, and between vehicles and the vehicle itself could also cause congestion to happen. Annual report (2013) by Tom Tom specified 10 most congested cities facing a congestion in peak hours. Peak hour congestion is generally of most public policy concern than all day congestion. This happens because of the concentration of work trips in relatively short periods of time. Work trips are by no means the majority of trips, but it can be argued that they cause the most congestion. Many cities have relatively less off-peak traffic congestion.

IV. REFERENCES


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