

Innovations in Transport

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Abstract

Customers have in recent times been increasingly demanding better and sustainable service solutions in preference to regular or standardized services. This has led to a sporadic increase in the acceptance and improvement in service innovations in global transport services. The increasing consumer orientation on the internet, mobile telecommunications and sustainability of the environment has attracted consumers to services that provide convenience, improved safety and trip reliability. Through increasing capacity of the virtual platform, ground service firms should focus more on building core competences on the digital interaction of the ground service value chain. These firms will subsequently focus more of their resource budget and allocation to marketing activities and operational efficiency based on previous data analysis, and demand forecasts. This implies that most transport companies have to innovate if they want to protect or expand their market share.

Keywords: Transport; service innovation; demand; mobility; logistics, technology.

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I. INTRODUCTION

1.1 The Concept of Transport

From early history, there has been an increase in human sensitivity revealing an urge for mobility that has led to a measure of Society's progress. The history of mobility or transport can be regarded as the history of civilization. Modern and efficient Transport is a one of the basic requirements for any economy to develop in the right the momentum. It has been observed throughout the history of any country that an encompassing and efficient Road Transport has played a major role in economic growth and development. At every stage of advance civilization, transport providers perform one of the most important activities. Where roads are conceptualized as veins and arteries of an economy, passengers and goods transported are compared to blood in circulation system of the human body. Passenger Road Transport Service (PRTS) is an essential component of the economy connected to the economic development. Transport is an important convenience with which people not just connect but progress in different areas of life. All over history, people's progress has been preserved on the safety, speed and convenience of the different modes of transport. This is the major reason Road transport occupies a primary place in today's modern world as it provides an access or reach that cannot be compared to any other contemporary mode of transport. Transport (British English) or transportation (American English) is the movement of people and goods from one place to another. The term is derived from the Latin *trans* ("across") and *portare* ("to carry") (wikipedia.com, 2020).

1.2 History of Transport

Humans' first means of land transport was walking. The domestication of animals paved a new way to transfer the burden of transport on more powerful animals, encouraging heavier loads to be transported, or humans to ride the animals for higher speed.

The first forms of road transport were horses, oxen or even humans carrying goods over dirt tracks that often followed game trails. Paved roads were built by many early civilizations, including Mesopotamia and the Indus Valley Civilization. The Persian and Roman empires built stone-paved roads to allow armies to travel quickly. Deep roadbeds of crushed stone underneath ensured that the roads kept dry. The medieval Caliphate later built tar-paved roads. Until the Industrial Revolution, transport remained slow and costly, and production and consumption were located as close to each other as feasible.

The Industrial Revolution in the 19th century witnessed several inventions and innovations that fundamentally change the transport system. With telegraphy, communication could be done instantly and independent of transport. The invention of the steam engine, which was closely followed by its application in rail transport, led to the independency of land transport from human or animal muscles. Speed, safety and capacity increased greatly, facilitating further specialization in manufacturing.



Figure 1: Modes of road transport in Dublin, 1929, Wikipedia.com

Sequel to the invention of the combustion engine and the automobile at the tail of the 19th century, road transport became more sustainable and reliable, thereby accommodating the introduction of private mechanical transport. This led to the construction of the first highways in the 19th century with macadam. Subsequently, tarmac and concrete was been adopted as the dominant paving material.

After World War II, the airlines and automobile sector dominated transport, thereby reducing rail to freight and short-haul passenger transport. In the 1950s, the innovation of containerization provided high efficiency and effective benefits for international freight transport, facilitating the globalization concept. In the 1960s, accessibility to international air travel increased, with the invention and commercialization of the jet engine. The growth in automobiles and motorways, spurred further developments in the rail transport such as the Shinkansen in 1964, high-speed rail transport in Asia and Europe started engaging passengers on long-haul routes and destinations from airlines.

2.1 Modes of Transport

The modes of transport are characterized on the basis of “the way”, “the vehicle”, “the motive power” and “terminals”.

2.1.1 Land Transport

Land Transport may be classified as according to the following;

i. Pathways:

Pathways are common in remote villages, forest and hilly areas and are still an important part of Land transport. It can further be subdivided into Head loads (which is also known as human transport used in the hilly areas where animals cannot attain) and Pack animals (also referred to as animal transport like horse, pony, donkey, ass, buffaloes, camel, elephant, yak, and sheep)

ii. Roadways:

Road Transport is one of the largest and most important modes of transport. The history of Road Transport dates back from the ancient civilizations. Gradually it gained attention as a crucial means of transport.

Types of Road Transport include

- Vehicular Transport; Cars, Trucks, Buses, Lorries, Autoricksaws, Bullock Carts, Tongas, Tumtums, and Hand Carts , and
- Non-vehicular Transport; Hamals, Animals like Camel, Dogs, Elephant, Horse, Mules etc

iii. Tramways:

Tramway is mostly suitable in cities due to the fact that it is one of the cheaper, longer, quicker and safer modes of Land Transport. However, due to some limitations like slow pace, not being flexible and it requires huge investment, development in this mode of transport has not been fully harnessed.

iv. Railways:

Railways have been responsible for the greatest revolution in transport by being the pioneer of modern mechanical transport. In previous centuries, Railways accelerated the commercial and industrial development of many countries. Until Motor Transport was introduced, Railway had the monopoly of the Land Transport. Unfortunately, it is not the principal means of transport in Nigeria as the qualities and capacity are not being fully harnessed for economic development.

2.1.2 Water Transport

The cheapest and oldest form of transport is water transport. Water transport is highly suitable for heavy goods and bulk cargoes especially across international boundaries.. Water transport can be subdivide into:

i. Inland Waterways

Inland waterways may be subdivided into River Transport:

Rivers are the natural water highways. River Transport is mostly suitable for small boats and steamers.

-Canal Transport

Canals are the artificial waterways designed and constructed to aid navigation and irrigation.

ii. Ocean Transport

Ocean Transport otherwise known as shipping may be subdivided into

-Coastal Shipping

Coastal shipping is a flexible, speedy, cheaper and economical form of transport used to move bulky and heavy cargoes.

-Overseas Shipping:

Overseas shipping may be subcategorized into The Liner (ships which follow defined routes with fixed destinations and fixed schedules). The Tramps (are usually chartered ships that don't provide scheduled services) and The Oil Tanker (specialized ocean carriers of crude oil in large quantities across continents). The Liners may also be subcategorized into Passenger Liners and the Cargo Liners. Overseas shipping trade has not favored national or local shipping in Nigeria, even with the Cabotage Law (established in 2003 and became operational in 2004) was established to support the commercial transportation of vessels owned and crewed by Nigerian citizens has not been effective in recent times.

2.1.3 Air Transport

A special gift to the world in the twentieth century is air transport. 1903 marked the first flight in the air for only for twelve seconds. It was successfully adopted as an alternate means of transport after the First World War which occurred between 1914 and 1918. Since the first air service in 1919 between London and Paris, air transport has made notable progress and provided stiff competition to Railways. Air Transport can also be subdivided into passenger and cargo transport.

2.2 Functions of Transport

Movement of passengers and cargo are the most common functions of transport. However, other functions exist, such as for security; strategic and tactical relocation of armed forces during warfare.

2.2.1 Passenger



Figure 2: local transit buses regulated by LAMATA and currently operated by Primero Transport Services Limited in Lagos Nigeria, 2021.



Figure 3: A taxicab operated in New York City, United States. Wikipedia.com

Passenger transport is broadly divided into public and private transport. Public transport are scheduled services on fixed routes with graduated fares or prices, while private transport is the utilization of vehicles that provide personalized services at the passenger's desire. Private transport has lower capacity but offers better flexibility and a higher environmental impact. The purpose for travel may be part of daily commuting, for economic, political or social reasons. Taxis and buses can be largely utilized on both ends of the public transport. Buses are cheaper but are not so flexible, while taxis are more flexible but more costly.

2.2.2 Freight

Freight transport is a major aspect of the value chain in the manufacturing sector. Due to increased specialization and globalization, manufacturing plants are being located far away from consumers, thereby speedily increasing the demand for transport. Knowing that all modes of transport can be used for cargo transport, there is a significant difference in the mode of transport relating to the nature of the cargo that is being transported. Freight logistics involves the entire activity or process involved in the transfer of products from producer to consumer, which consist storage, transport, trans-shipment, warehousing, material-handling and packaging, with exchange of related information. Incoterm deals with the handling of payment and responsibility of risk during transport.



Figure 10: Freight train with shipping containers in the United Kingdom. Wikipedia.com

3.1 Impact of Transport

3.2 Economic

Transport is crucial to specialization which allows the production and consumption of products to take place at different geographical locations. Throughout history, transport has been a catalyst to expansion by allowing more trade and dispersion of people. Economic growth has greatly depends on increasing the capacity and sustainability of transport systems. Meanwhile, transport infrastructure and operations has greatly impacted on the land as a vital mode making it the largest drainer of energy. This brings the issue of transport sustainability a major concern.

The modern society has structured physical distinction between home and work, compelling people to transport themselves individually or as a group from their homes to places of work or study as well as to temporarily move for other daily activities. Passenger transport therefore has become a major part of transport economics. Similarly, commerce requires the movement of people and products to conduct business, either to allow physical communication for important deals or decisions or to move specialists/professionals from their regular place of work to locations where they are highly demanded for.

3.3 Planning

Transport planning enables proper design and high utilization of transport infrastructure. Using transport forecasting models, transport planners are able to envisage future transport patterns. On the operational level, logistics allows cargo owners to plan transport as part of the supply chain process. The management of transport resources is studied through transport economics, which is the backbone for the creation of regulation and policy by relevant authorities. Transport engineering, which is a sub-field of civil engineering, takes into account the activities relating to trip generation, trip distribution, mode choice and route assignment, while the operational level is managed through traffic engineering.



Figure 4: The engineering of roundabout in Bristol, United Kingdom, wikipedia.com

Due to the negative impacts, transport mostly becomes the subject of discussions related to modal choice, and infrastructural capacity. Automotive transport is mainly perceived as a tragedy of the commons, where the comfort and flexibility for the consumer deteriorates with the natural environment. Population and development highly depends on road transport, with public transport allowing for better spatial utilization. Beyond transportation some land uses are more efficient when clustered. An efficient transport system can reduce land waste by properly managing facilities that consume land.

In recent years, traditional transport practices have been questioned in many sectors, due to the new types of analysis which provides a more dynamic range of qualities than those traditionally relied having impact on areas such as environmental impact analysis, public health, sociologists as well as economists. European cities are leading the transition from the old mobility solutions to more viable and innovative alternatives.

3.4 Environment



Figure 5: Traffic congestion in São Paulo, Brazil. Wikipedia.com

Transport is a major consumer of energy and uses most of the world's petroleum. This consumption creates air pollution, including nitrous oxides and particulates, and is a major contributor to the effects of global warming through emission of carbon dioxide. A sub sector of transport is road transport which is the highest contributor to global warming. Environmental regulations in developed countries have significantly reduced the emissions from vehicles; but this has been countered by increase in the numbers of vehicle ownership as well as the private use of most vehicles.

4.0 Service Innovation in Transport

A lot of research have been done on product innovation management supported by empirical studies, but service innovation, specifically innovations connected to logistics and transport services, have not received sufficient attention. (Klink and Visser, 2004; Grawe et al., 2009). Wagner (2008) also corroborates that the service innovation concept has been largely ignored in research of logistics. Nagarajan and White, (2007) mentioned that innovation and innovation management are not only a profit multiplier function but also a matter of survival and success for most businesses, economies and individuals. However, they further noted that logistics service providing companies are not an exception to the rule. Logistics companies are actively seeking new solutions to contend in technologically advanced and international business environment. Armstrong (2015) in his article titled "From transport to 'mobility'- innovation in the transport sector" describes how intelligent mobility is the kind of innovation that the transport sector needs in recent times. A large part of history has shown that transport has remained largely unrevolutionized. It has been attributed to a slow pace of innovation and infrastructure with high cost. The transport system or industry has majorly forgotten the customers while trying to override the issues it is battling and cope with extended stress on it. The transport sector is undergoing a fundamental shift in the way it thinks which will reveal what will occur when the strong force of digital innovation collides with the force of transport innovation.

4.1 The Concept of Mobility as a Service (Intelligent Mobility).

Intelligent mobility perceives transport as a user orientated service fashioned to supply an integrated responsive multimodal transport service. New technology is making it possible to utilise real time information and provide a common transport system.

There are four key trends of the intelligent mobility system that have the capacity to provide disruptive innovations:

- **New stakeholders in the transport sector**

Thoughtfully, the most influential disruptive change will come from new players harnessing new opportunities in the transport sector. Data management companies, IT companies, and energy companies are gaining market entry, powered by new technologies and an international desire for personalised services. These new players bring with them new business models, new approaches and different challenges that the transport sector has not

previously experienced. They are able to leverage their size and influence in making deals with different operators to create opportunities for all operators.

- **End to end user focused service**

The current global trend towards customized services in different sectors from Education to healthcare and transport is synonymous. The drift from transport as an operationally driven system to a user driven system will potentially provide many benefits for the public but requires a drastic revolution in the orientation of many transport companies. Some of these transport companies will be able to offer ‘mobility’ as a service in other sectors.

- **Positioning of new forms of technology**

This kind of service will require a team approach to many aspects of transport such as reservations, routing, ticketing and pricing. This will deliver substantial advantages and enable service providers to understand customers better, manage demand process and make asset managers to more efficiently maintain transport infrastructure.

- **Change in business models**

The concentration on user centred services over classic transport business models will provide a clear distinction between asset ownership (e.g. cars, buses, trains) and service provision (e.g. IT service providers) and subsequently a shift in orientation and value from the assets to service delivery. Incumbents will be left behind if they don’t react to this change in time.

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- **The sharing economy**

The new sharing economy brands like Über, Avis, Hertz, Europcar, Taxify (now Bolt), Oga Taxi have entered into ignored developing economies through franchising, alongside the use of technology or direct entry to indigenous markets coverage in several developing economies and they keep expanding to remote areas. A resultant impact of these foreign brands has resulted in indigenous entrepreneurs adapting the same idea or strategies in most developing economies as the market entry of Jekalo, Kabukabu, GoMyWay, and Avis Nigeria among some others cannot go unnoticed in Nigeria.

5.0 Recommendations

5.1 Future Capacity

In an advanced world, the target of innovation will no longer be to improve the transport system by building more capacity, but by innovating ideas in a smarter way.

Government investments in existing road and rail systems by trying to increase capacity or infrastructure may be the wrong approach to renewing outdated infrastructure and assets. What is required in intelligent mobility is a ‘smarter way’ of using and managing these assets to create opportunities for future development. Highway England developed a long term strategy for using their assets and refining them. This kind of strategic thinking is required to propel the revolution of the transport sector.

Intelligent mobility will change the way transport is thought about and run but is unlikely to do much to tackle some of the biggest challenges and if it's not managed in the right way may cause more. It's unclear where transport is going in the long run but for the time being the integration of new technology and the concepts of 'mobility' will push innovation in the sector, even if it is still incremental change.

5.2 Why Transport Operators Must Invest In Innovation

In an article written by Lynch (2018), he explained why innovation is a crucial part of the evolution of customer demand and technology and how transport industry can buy-in and adapt to this approach.

Since the Wright Brothers’ first flight in 1903 to today’s actualization of business space travel, transport plays an important role in shaping the world. Actually, many of *Fortune’s* “organisations that revolutionized the world” were from the transport business– United Fruit, Suez Co., Pan-American Airlines, McLean Industries. Nevertheless, most of these companies started operations at the in the early 20th century. So where are the world-changing transport titans of today?

Potential companies to be this century’s game-changers are thriving. Uber is test running flying taxis in Dubai. Virgin Hyperloop One is working on the world’s first hyperloop from Mumbai to Pune, and Amazon is test running delivery drones to replace delivery trucks and riders. Yet many of today’s transport disruptors proudly identify themselves as technology companies, rather than transport companies.

A scan of traditional transport companies in the *Fortune 100*, or *Forbes’* “Most Innovative” lists, reveals that the well-known and trusted brands are few and far between. With this new competition, traditional

transport companies need to have a re-think about the near future and how they can secure the opportunities that are giving the new start-ups most of the recognition – and financial backing.

Age-old modes of transport are being challenged by these new disruptors that are trying revolutionise the way we think and demand for transportation using technology. Such emerging companies and transport systems are revolutionizing how commuters move themselves and their products from origin to destination. These types of companies now appear on the *Forbes* “Most Innovative” list, alongside Tesla and Expedia.

Unsurprisingly, a survey of 201 European transport leaders by PA Consulting Group discovered that 68 per cent are worried about what is coming in the near future. Hopefully, there is no need to be worried about the future if existing transport companies can utilize the three trends that are crucial to shape the transport sector:

- **Increase in connectivity:** Multifaceted, integrated and intelligent transport systems that adopt mobility as a service are already in the pipeline. For example, in Germany, a new on-demand electric shuttle service was launched along with the existing innovations of bike rentals, car-sharing and traditional public transport systems. The majority of transport frontiers believe seamless integrated, fingertip transport across different modes of transport will be possible by 2030.
- **Advent of new modes of transport and increase in competition:** Test running of autonomous vehicles and drones are already in the pipeline for transport and logistics in some sectors. These new system of transport projects what we can achieve, and current transport players will have to invest smartly and innovate in order to continuously deliver value and prompt services to customers with increasing demand.
- **Improvement in capacity:** Effective innovative transport operators are able to satisfy customers’ expectations through customized services to individual consumers on an economic scale. Operators that are unable to meet this standard will lose customers who are increasingly demanding flexible transport services.
- **Technology:** Transport operators that are able to deliver on these ideas of the future will be forced into extinction. The responsibility rests on today’s transport leaders to become innovative enough to compete with upcoming transport high tech companies. We often compare innovation with technology but technology is vital to maintain competitiveness. Today’s technology has more capability and reliability to meet the demands of the future, and that is why it is being utilized by new innovative companies.
- **Capital and innovative models:** Transforming a company that revolutionizes the world is more dependent on the capital secured to propel and deliver innovative strategies. PA’s research reveals that over 40 per cent of transport front-runners believe that investment or capital is the most important constraint to delivering the future of transport within their establishment and the industry. Hopefully, over two thirds of transport leaders are of the opinion that innovating transport operating models is vital to delivering the future of transport both with internal models (breaking silos, agile working and sharing resources) and external models (revenue sharing, mergers and acquisitions, and open data).
- **Revolution:** Transport companies need to penetrate the yokes of the 20th century innovations by not following the same path as world-changers from previous years ago. More importantly, they need resourcefulness, originality, and innovative investment strategies so that they can lock their place in *Fortune*’s 2021 list of companies that revolutionized the world.

5.3 Some Recent Innovations in the Global Transport Sector



Figure 6: INNOVATION & TECHNOLOGY: Study probes post-pandemic world
by PASSENGER TRANSPORT on Jul 20, 2020

Consultancy releases the fourth edition of its Future of Mobility study in collaboration with UITP Global management consultancy Arthur D. Little has released the fourth edition of its Future of Mobility study in collaboration with UITP. The study, which engaged with over 70 executives from more than 30 organisations worldwide.



Figure 7: INNOVATION & TECHNOLOGY: ITS (UK) backs flexible bus technology
by PASSENGER TRANSPORT on Jul 10, 2020

Lobby group says flexible bus service would offer more efficient mobility ITS (UK) says DRT technology could offer a bright future for bus services. Pictured is a screenshot of the recently launched Stagecoach Connect app.



Figure 8: INNOVATION & TECHNOLOGY: c2c completes rollout of new ticketing system
by PASSENGER TRANSPORT on Jul 7, 2020

New system combines all ticketing operations into single platform. Trenitalia UK has launched a new mobile app for consumer to consumer passengers, completing the roll-out of the Pico4UK ticketing system at the Essex train operator.



Figure 9: INNOVATION & TECHNOLOGY: Omnibus enhances stop information package
by PASSENGER TRANSPORT on Jul 3, 2020

More than 20 individual changes to the software to enable operators to rapidly update their publicity. Technology specialist, Omnibus has updated its bus stop and station information display software package to make it easier to use as a result of feedback from customers.



Figure 10: INNOVATION & TECHNOLOGY: £350m for first mainline digital railway
by PASSENGER TRANSPORT on Jun 25, 2020

Scheme will see conventional line-side signals replaced. The East Coast Main Line is set to become Britain's first mainline digital rail link with £350m of new investment to install state-of-the art electronic signalling. The upgrade, between London King's Cross and Stoke Tunnel in Lincolnshire, will see ETCS Level 2 in-cab signalling installed.



Figure 11: INNOVATION & TECHNOLOGY: Zenobe secures £20m for electric bus rollout
by PASSENGER TRANSPORT on Jun 24, 2020

Funding will assist with electric bus expansion Zenobe Energy, one of the UK’s largest independent owners and operators of battery storage, has secured up to £20m of contracted receivables funding from NatWest Specialist Structured Finance, to support the continued growth of the company. The funding is the first financing arrangement to support electric bus.



Figure 12: INNOVATION & TECHNOLOGY: Cityswift secures €2m funding for growth
by PASSENGER TRANSPORT on Jun 24, 2020

Additional funding to accelerate growth in UK & European markets with creation of 25 jobs Go-Ahead has rolled out Cityswift’s AI-based bus capacity checker technology across its bus operations in the UK Transport data and tech firm Cityswift has closed a funding round that has raised €2m for the Galway-based firm.



Figure 13: INNOVATION & TECHNOLOGY: Advancing mobility with geospatial technologies
by PASSENGER TRANSPORT on Jun 17, 2020

Martí Jofre of Pildo Labs explains how the GALILEO 4 Mobility and ARIADNA projects have sought to demonstrate how GALILEO satellite technology can be used for MaaS schemes. With innovations such as Mobility as a Service (MaaS) and shared mobility like bike- sharing and e-scooters, the urban mobility landscape is evolving faster.



Figure 14: INNOVATION & TECHNOLOGY: Arrival reveals plans for electric bus
by PASSENGER TRANSPORT on Jun 17, 2020

Electric vehicle start-up reveals plans for electric bus London-based tech firm and electric commercial vehicle manufacturer Arrival has revealed it is working on an electric bus. It claims the zero-emission vehicle will “transform the public transport industry at a time when it is facing its biggest challenges”.

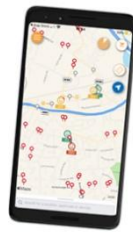


Figure 15: INNOVATION & TECHNOLOGY: **Stagecoach launches ‘busy bus’ tracker**
by PASSENGER TRANSPORT on Jun 12, 2020

App will use artificial intelligence to help customers socially distance Stagecoach is launching a new smartphone “busy bus” indicator to help passengers plan their journeys as services increase across the country. The new feature on the group’s bus app will use extensive data and artificial intelligence to provide a traffic light indicator.

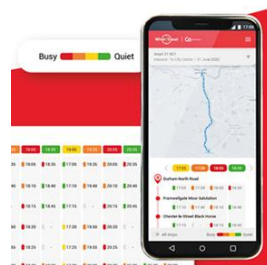


Figure 16: INNOVATION & TECHNOLOGY: **Go-Ahead Group rolls out ‘When to Travel’ tool**
by PASSENGER TRANSPORT on Jun 9, 2020 •

New unique AI based technology will help bus customers plan their travel The Go-Ahead Group is rolling out its innovative ‘When to Travel’ tool for customers nationwide. Along with social distancing, wearing face coverings, enhanced cleaning and hygiene, it aims to give confidence to use buses as customers return to work and school.



Figure 19: INNOVATION & TECHNOLOGY: **First Aberdeen launches Apply Pay Express Mode**
by PASSENGER TRANSPORT on Jun 9, 2020 •

Pilot scheme has been accelerated to make bus travel easier than ever for essential journeys around the city First Aberdeen has become the first bus operator outside London to offer Express Mode for Apple Pay as a payment method for customers. The plan is to extend this function across all First Bus networks.

REFERENCES

- [1]. Armstrong H. 2015. From transport to 'mobility'- innovation in the transport sector. Nesta. <https://www.nesta.org.uk/blog/from-transport-to-mobility-innovation-in-the-transport-sector/>
- [2]. Chris Lynch, 2018. Why transport operators must invest in innovation. *New Statesman*. <https://www.newstatesman.com/spotlight/transport/2018/05/why-transport-operators-must-invest-innovation>

- [3]. Grawe, S.J., Chen, H. and Daugherty, P.J., 2009. The relationship between strategic orientation, service innovation, and performance. *International Journal of Physical Distribution and Logistics Management*, 39(4), pp. 282-300.
- [4]. Klink, A.V. and Visser, E.J., 2004. Innovation in Dutch horticulture: fresh ideas in fresh logistics. *Tijdschrift voor economische en sociale geografie (Journal of Economics and Social Geography)*, 95(3), pp. 340-346.
- [5]. Nagarajan, A. and White, C.C., 2007. Logistics. In: Macher, J.T., Mowery, D.C., 2008. *Innovation In global industries: U.S. Firms competing in a new world*. Washington, D.C.: The National Academies Press. Ch. 8.
- [6]. Passenger Transport, 2020. <http://www.passengertransport.co.uk/2020/06/arrival-reveals-plans-for-electric-bus/>
- [7]. Passenger Transport, 2020. <http://www.passengertransport.co.uk/2020/07/study-probes-post-pandemic-world/>
- [8]. Passenger Transport, 2020. <http://www.passengertransport.co.uk/2020/07/its-uk-backs-flexible-bus-technology/>
- [9]. Passenger Transport, 2020. <http://www.passengertransport.co.uk/2020/07/c2c-completes-rollout-of-new-ticketing-system/>
- [10]. Passenger Transport, 2020. <http://www.passengertransport.co.uk/2020/07/omnibus-enhances-stop-information-package/>
- [11]. Passenger Transport, 2020. <http://www.passengertransport.co.uk/2020/06/350m-for-first-mainline-digital-railway/>
- [12]. Passenger Transport, 2020. <http://www.passengertransport.co.uk/2020/06/zenobe-secures-20m-for-electric-bus-rollout/>
- [13]. Passenger Transport, 2020. <http://www.passengertransport.co.uk/2020/06/cityswift-secures-funding-for-growth/>
- [14]. Passenger Transport, 2020. <http://www.passengertransport.co.uk/2020/06/advancing-urban-mobility-with-geospatial-technologies/>
- [15]. Passenger Transport, 2020. <http://www.passengertransport.co.uk/2020/06/stagecoach-launches-busy-bus-tracker/>
- [16]. Passenger Transport, 2020. <http://www.passengertransport.co.uk/2020/06/go-ahead-rolls-out-when-to-travel-tool/>
- [17]. Passenger Transport, 2020. <http://www.passengertransport.co.uk/2020/06/first-aberdeen-launches-express-mode-for-apply-pay/>
- [18]. Wagner, S.M., 2008. Innovation management in the German transportation industry.

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