The Development in the Technology of Transportation

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Abstract

There has been rapid and widespread development of technology in transportation over recent years. A definitive assessment of the effectiveness of intelligent transportation systems is undoubtedly premature (ITS). Although it is not too early to reflect on what has been achieved and to look ahead to what might be achieved in the near future. ITS innovations, in our perspective, have been mostly hardware-driven to date, resulting in the introduction of several advanced technologies in the transportation arena. To unlock the full potential of ITS, one must solve the difficulty of interpreting the enormous amount of data it produces. We think that the fields of operations research and transportation planning and management are particularly important in addressing this dilemma. Efforts are being made around the world to make development patterns more sustainable. In countries with more advanced economies, special attention is paid to the vital role of transportation, land use, and activity systems. The notion that information technology is regarded as particularly important in the current period is thus not surprising because of its novelty, but rather as a consequence of the accumulation of a steady long-term progress rate advantage against slower-moving technologies such as energy technology. This research paper talks about the development as well as the advancement of technology in transportation with the help of operations research.

Keywords Operations Research, Intelligent Transportation System, Sustainable Development city logistics

Introduction

This research paper is a long study of papers from the Stone Age era to this year, also known as one of the fastest developing periods in terms of technology, IoT also known as the internet of things and AI. It begins with a long journey from a stone age era of transportation to specialized hybrid fuel cum electric vehicles (artificial intelligence) is taking the development of transportation in terms of tech to a whole new level because (Almeida Neves et al., 2019) this the cost of transporting goods has reduced to a great extent, which helps the economy as the cost of delivery reduces which leads the cheaper price of the product and so it is affordable of customers.

All things considered, e-communication is meant to guide, accomplish, and monitor transportation frameworks. This combination of cutting-edge data and communication technology is intended to finance the significant advancement of the transport framework in a number of ways. In general, ITS improves the efficiency and usefulness of the transportation system, especially in the areas of productivity, sufficiency, and usability. It also significantly reduces hardships by handling multiple transportation-related issues at once (Kadubek, 2021).

In contrast to private autos, advancements in public transportation, such as bus or train services, may allow for physical exercise. Cross-sectional studies done in Australia, the United States, Columbia, and Europe show that those who use or have access to public transportation walk and exercise more than people who do not have a highly efficient public transportation system. However, initiatives like Bogotá's rapid transit (BRT) could support an increase in the use of active transportation while providing high-quality public transportation at a lower price than conventional rail services if the needs of pedestrians and cyclists are properly taken into account in the design of the vehicles, stations, and their surroundings. Although evidence from rigorous intervention studies is limited at the moment, many cities that have implemented integrated urban transportation policies have reported favorable trends in travel patterns. It is imperative that these programmes continue to be used and evaluated because controlled studies of interventions to promote cycling show that they have only modest impacts. Although the effectiveness of interventions that encourage walking in boosting physical activity may vary depending on the populations or environments targeted, these interventions have a stronger empirical foundation. The evidence indicates an evaluative bias in which interventions applied to entire populations have tended to be evaluated using less rigorous methods than those applied to small groups of motivated volunteers (Pratt et al., 2012).

Today, digitalization and automation enable a plethora of additional degrees of freedom for the provision of on-demand mobility (Savelberg et al., 2017). Thus, we are witnessing the rapid spread of new modes of transportation and associated services, such as e-scooters or ride-hailing, driven by users' demands for flexible

and on-demand mobility. The article focuses on one of these new transportation services: mobility on-demand services, which use dynamic ride pooling algorithms to either replace or supplement public transportation systems in low-demand areas and times by adapting their routes to the actual demand (Mulley and Nelson, 2009). MODS services differ significantly from fixed-scheduled public transportation because they are defined as "an intermediate form of public transportation, somewhere between a regular service route that uses small low floor buses and variably routed, highly personalized transport services offered by taxis" (Brake et al., 2004; p. 324). If potential consumers have never used the service before, their understanding of the MODS operation idea and service model is likely to be restricted. Thus, before launching new MODS, it is prudent to investigate the factors that may facilitate their adoption as well as the usage barriers that prevent people from using MODS systems (König and Grippenkoven, 2019a, 2019b).

According to a study that looked into why the MODS Kutsuplus was discontinued in Hel- sinki it was brought to notice that residents were not aware about how to use the service and had incomplete information about the service itself. These were the primary reasons for not using the service.

Transit networks are represented by their layout using nodes and lines. The lines are known as links or route segments, while the nodes are known as stops. Links in a multimodal transit network differ from those in a road network in terms of their features. A section of a transit line that serves a number of transit stops is known as a link in a multi-modal transport network., as opposed to a link in a road network which is a physical segment connecting one node to another (nodes). Multiple transit linkages may exist between nodes in a multi-modal transit network since a stop may be served by many transit lines. However, there is only one link between each node in a highway network. Critical terms that characterize the characteristics of a route for a transit link are headway, frequency, speed, and capacity. Similar to how highway nodes differ from transit nodes in their composition, so do their features. The transit system's nodes and links and graph theory's examination of connectedness are equivalent (Harary, 1971).

Two invariants, such as node and line connectivity, are used to establish if a graph is more or less linked.

The two methods most frequently used to model transportation data are statistics and/or computational intelligence (CI). The first, known as statistics, is the mathematics involved in gathering, organizing, and deciphering numerical data, especially when those data are used to analyze population characteristics using sampling-based inference (Glymour et al., 1997). Statistics may shed light on the processes generating the data because of its sound and widely accepted mathematical basis. But when dealing with complicated and extremely nonlinear data, they frequently fall short (curse of dimensionality). The second method, called cognitive intelligence (CI), combines components of learning, adaptation, evolution, and fuzzy logic to produce models

that are "intelligent" in the sense that structure develops from an unstructured starting point (the data) (Engelbrecht, 2007; Sadek et al., 2003). Because they are relatively general, precise, and practical mathematical models that can easily replicate numerical model components, neural networks (NN), a particularly popular class of CI models, have been widely used for a variety of transportation problems. They can be applied in one of three fundamental ways and have an innate predisposition to store empirical knowledge (Haykin, 1999): i. As representations of natural neurological systems. ii. As controllers or real-time adaptive signal processors.

iii. As techniques for data analysis. Due to its versatility in modelling, ability to cope with large volumes of multidimensional data, ability to learn and generalize, adaptability, and usually strong prediction ability, NN has been utilised mostly as data analytical tools in transportation research.

Sustainable development aims to meet the needs of the present without disrupting the future needs of the generations to come (van Vuuren et al., 2022). The environment, society, and economy are three pillars of sustainable development, and transportation is a significant contributor to each of them (Mohamad Taghvaee et al., 2019). Additionally, the outdated technology used in various means of transportation contributes to increased inefficiency and road fatalities. From a purely environmental standpoint, transportation is the largest consumer of oil goods and is virtually entirely powered by dirty fossil fuels that emit a lot of CO2s (Mohamad Taghvaee et al., 2019). It is essential to develop a sustainable and effective transportation system all over the world.

Literature Review

The field of development in the technology of transportation is a widely researched topic with noteworthy contributions by prolific researchers. A plethora of materials were available on the field of transportation which focused on several industries. We have restricted our review to the research work which focuses on the technology developed.

Originating from the attempts of military strategists during the second world war, "Operation Research" formerly helped war criminals destroy the earth and all of its residents. Now it is time to be prepared to give its contributions to the utmost extent possible in order to atone for its sins by this time rescuing the globe and its inhabitants.

Public transportation, cycling, and pedestrian infrastructure have been fully developed by policymakers. People are now inspired to choose more active and environmentally friendly means of transportation as a result of effective cultural efforts. Regulations that aim to cut down on driving have been used most effectively.

Alternative cleaner-burning fuels have been created, and automakers have used cutting-edge technologies to build first-rate automobiles compliant with the best global pollution standards.(Salimifard et al., n.d.)

Operation Research (OR) is able to play such an accommodating role and contribute to the reduction of CO2 emissions from road transportation through its optimization tools, despite the fact that it has lagged behind other scientific disciplines in this area and is largely ignored and neglected in serving the green transportation agenda(Salimifard et al., n.d.).

There are various sustainable measures adopted for the development of technology. Some of them are discussed ahead.

Eco-driving is a method of transportation that helps the environment by not only CO2 emissions but also fuel consumption from automobiles. When driving in an eco-friendly manner, the driver must simultaneously adjust the vehicle's speed and acceleration to the driving environment and choose a route that uses the least amount of fuel (Young et al., 2011).

In addition to offering in-car information like streaming video, eco-driving route navigation, driving behaviour pattern analysis, etc., the cloud-based platform can also develop visualisation software as an additional eco-driving option. It also makes it easier to collect, exchange, and integrate information related to transportation-related energy conservation (Hsu et al., 2015).

To balance energy requirement and environmental cleanliness, hydrogen energy is sustainable option. Carbon capture and sequestration (CCS) technology can provide environmentally beneficial energy, or "Clean Energy," by converting fossil fuels into hydrogen (Salvi & Subramanian, 2015).

The Sustainable Transportation Decision Support System's implementation aids in maximising the use of a company's resources, including capacity loading, lowering labour costs, and cutting fuel expenditures. The efficient flow of containers boosts customer satisfaction and operational effectiveness and cuts necessary expenses (Shi et al., 2019).

There are techniques to generate hydrocarbons without using fossil fuels, thus the engine doesn't care where the necessary combination of hydrocarbons comes from. These methods make it possible to produce fuels that are carbon-free or contain less carbon than fuels made from fossil sources (Senecal & Leach, 2019).

Lignocellulosic biomass that has been pyrolyzed to make biofuels have the potential to replace fossil fuels in future energy systems since bio-oil is a renewable fuel, has a plentiful supply of raw materials, produces few pollutants when used, and can immediately replace liquid transportation fuels (Yang et al., 2015).

Resilient transportation systems, a sort of essential infrastructure that promotes growth and allows for mobility. Economic considerations are crucial when talking about creating sustainable and intelligent cities. A pathway for incorporating resilience into transportation systems has been found using inference studies, which contributes to a better understanding of resilience and sustainable development in urban transportation (Tang et al., 2020).

The COVID-19 pandemic, which has persisted for more than a year and still affects supply chains and logistics systems worldwide, highlights the need to improve managerial choices (Kim, 2021; Pour-soltan et al., 2021).

Researchers created inventory models that take into account supply, demand, and transportation interruptions before the COVID-19 pandemic (Wilson, 2007; Hishamuddin et al., 2013; Azad et al., 2014; Snyder, 2014; Paul et al., 2016; Taleizadeh, 2017). Wilson (2007), for instance, used a system dynamic method to examine the effects of a transportation disruption on the various supply chain echelons. The transportation capacity, inventory volatility, and unmet consumer demand were the main topics of this study.

Azad et al. (2014) and Hishamuddin et al. (2013) took a single disruption into account and calculated how long it would take for production and distribution to recover. The analyses don't match the disruption brought on by COVID-19 since none of them take into account the rising transportation costs brought on by lockdowns and health regulations during a pandemic. The diversity of transportation costs in various places with various epidemic intensities was not taken into account in that research.

A recent analysis from Ricardo (Powell et al., 2018) explored three scenarios to meet an EU target of 85% CO_2 reduction by 2050. According to this analysis, low-carbon fuels and a diversified electrified fleet (including BEVs, MHEVs, FHEVs, and PHEVs) were crucial for the quickest and most affordable CO2 reduction. Pure BEV scenarios were hampered by the availability of limited resources, greater costs, and a slower rate of adoption.

The primary goals of the research on new intelligent goods are to recognise the challenges that transportation businesses encounter when deploying monitoring technology to enhance operational management and to create a strategy for addressing those challenges. Regarding this type of research objective, Simon (2002) argues that the design science research paradigm cannot only be used to explain and predict the phenomenon of interest, but more importantly, it also allows for shaping the phenomenon by the design of novel solutions (Meyer et al., 2013).

Intelligent Transportation Systems, or ITS, is a word that is frequently used to describe future technology, infrastructure, and services as well as techniques for organising, running, and managing the movement of people and products. But with ITS, today is already tomorrow. The primary impetus for the creation of ITS was the recognition that more infrastructure development could not continue to be the only solution to deal with the rise in transportation demand and the associated issues that it often brings about.

The logical response to the requirement to greatly enhance transportation system capacity was to try to make them more efficient by integrating the most recent innovations in diverse fields, such as electronics, telecommunications, computing hardware, positioning systems, and infrastructure and vehicle technologies. Thus, during the past 15 years or more, there have been significant efforts made to develop and implement a new generation of transportation systems with the goal of reducing traffic, enhancing safety and mobility, and improving the efficiency and productivity of both private and public fleets. (Crainic et al., 2009).

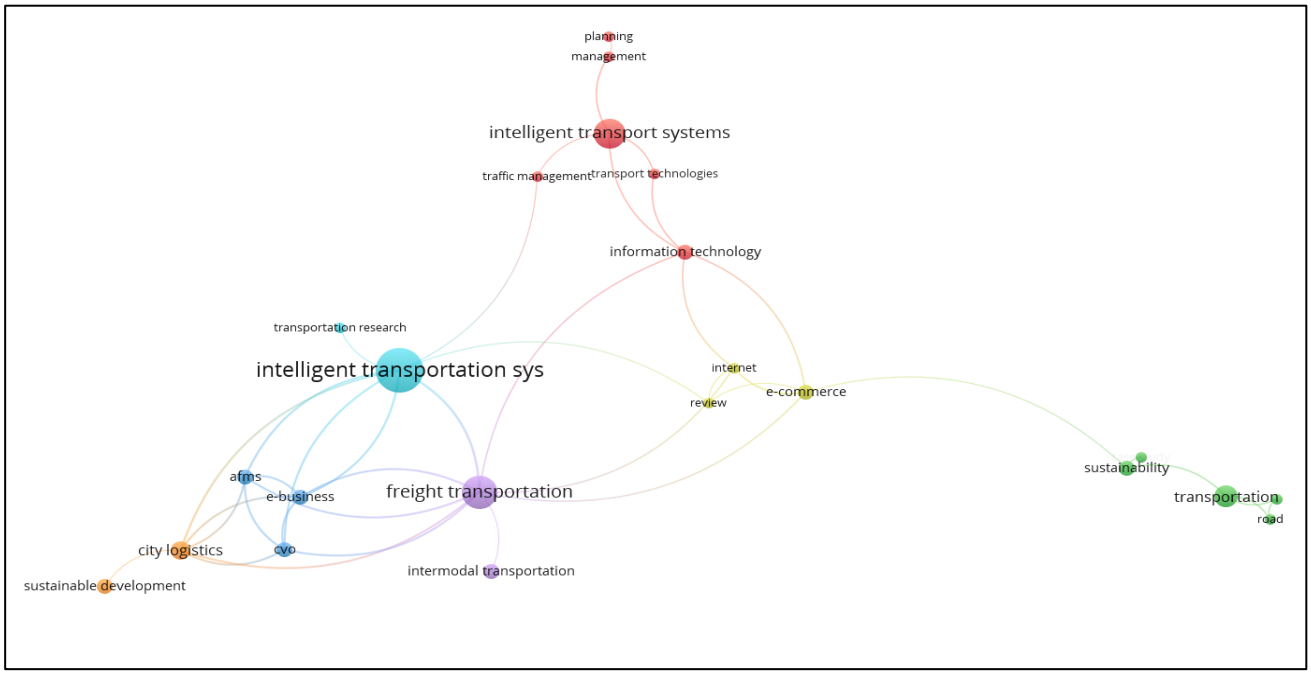
The developed electric drive train provides a 'green' and affordable means of human transportation in a world geared towards the elimination of pollution (Chinguwa et al., 2019). Over the past 200 years, bicycles have undergone constant advancement. The bicycle, which had a standard frame and two wheels but was propelled by walking, was created in 1817 by German scientist Barn Karl von Drais (Malizia & Blocken, 2020). There are still many aspects of the contemporary bicycles that can be improved, despite the fact that many excellent bicycles have been created and produced. Since most of the energy must come from the chemical energy stored in human muscles, the majority of bicycles currently in use require a lot of human effort to cycle, which is a disadvantage for practical use. People prefer using motor vehicles, which utilize fuel and pollute the environment since they demand so much effort to operate (Batterbury, 2003). The use of hybrid energy can be a very pivotal turnaround in the use of bicycles as it can improve the efficiency and power required in order to drive a bicycle (Chinguwa et al., 2019). Economists have long been advocating the use of economic incentive policies to promote the use of bicycle (Johnstone & Karousakis, 1999).

The development of self-driving cars has been significantly hastened by recent developments in the fields of machine learning and computer vision (Kaszas & Roberts, 2022). Only now are all the necessary components for a car capable of completely autonomous driving in cities being assembled (Papers, 2005). When thinking about on-demand mobility with self-driving cars, it might be challenging to forecast how it will affect the environment because there are so many unknowable variables. To start, because of vehicle repositioning and sharing between customers, vehicle distance travelled will inevitably grow (Sieber et al., 2020). On the other hand, self-driving cars may demonstrate their ability to improve road dynamics, such as by lowering the distance

between vehicles, increasing intersection throughput, or by using other measures (Lioris et al., 2016). This has an impact on emissions and traffic flow generally. Additionally, the use of self-driving vehicles for on-demand transportation may encourage and speed up advances in vehicle technology that would significantly lower overall emissions. According to a research, light-duty vehicle greenhouse gas emissions might be reduced by up to 94% in the US by 2030 (Greenblatt & Saxena, 2015).

Methodology and Analysis

We have carried out extensive research on the development of technology in the field of transportation. We have used 'EBSCO host', 'Science Direct', 'Google Scholar', 'ResearchGate' and other websites to collect over 250 Research Papers for our analysis. To find these papers, we used some key words such as 'Technology', 'Transportation', 'Operations' and 'Research'.

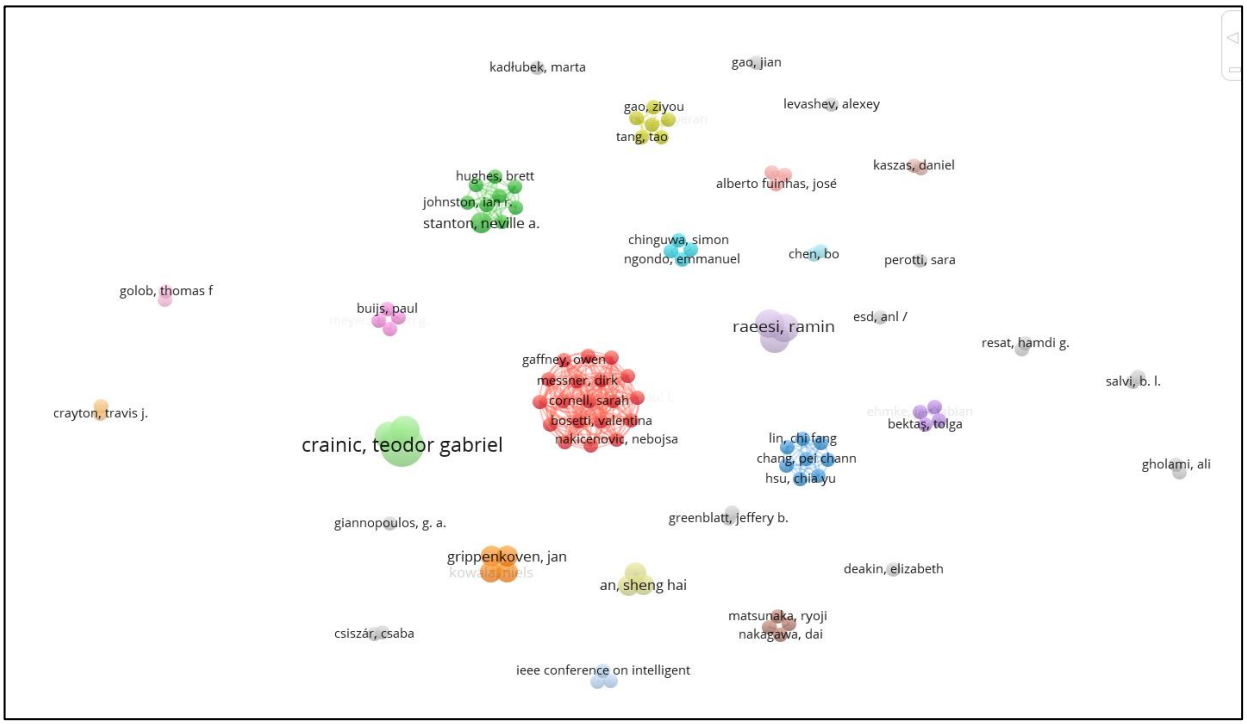


(Source: VosViewer)

Figure 1: Co-occurrence of keywords used in the selected contributing published papers

In **Figure 1** we can observe the co-occurrence of major keywords. It can clearly be seen that keywords like intelligent transport systems, freight transportation, and information technology are some of the most occurring

keywords. Keywords like city logistics, sustainability, and e-commerce are some of the lesser occurred words. Planning, review, and roads are some of the fewest keywords which have occurred.



(Source: VosViewer)

Figure 2: Co-authorship of citation network from authors of the selected published article

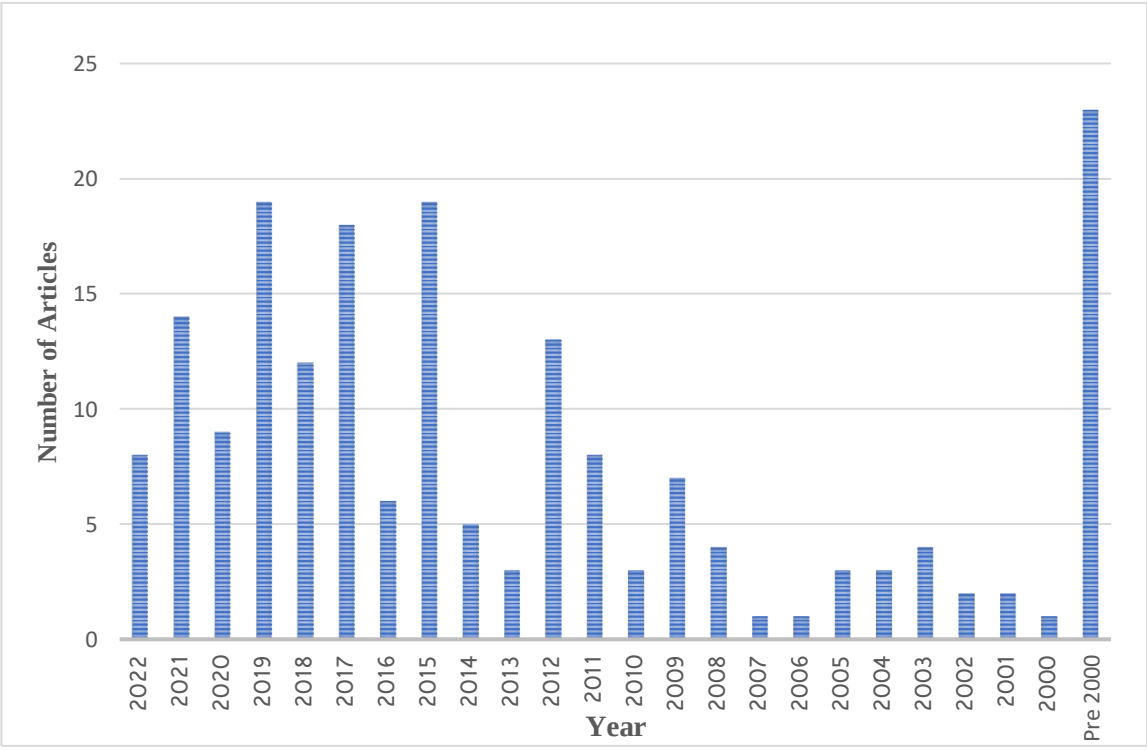


Figure 3: Number of articles Published Per year on the Development of technology in transportation.

In figure 2: A cluster denotes co-authorship of the authors working on similar topics and keywords related to the topic development of technology in transportation. The pinkish cluster of Gaffney, Owen, Cornell, Bosetti, Valentina and others shows they have published the most articles as well as co-authored on a large number of articles. Gao and Jian are the authors which have the least number of articles on the topic concerned.

The number of articles published from 2000-2022 and pre-2000 is shown in **Figure 3**. It is observed that there is a constant increase and decrease in alternate years since 2008. It shows that as new technologies in transportation development and researched by people, it is a rapidly developing field with new research on technology progressing every year.

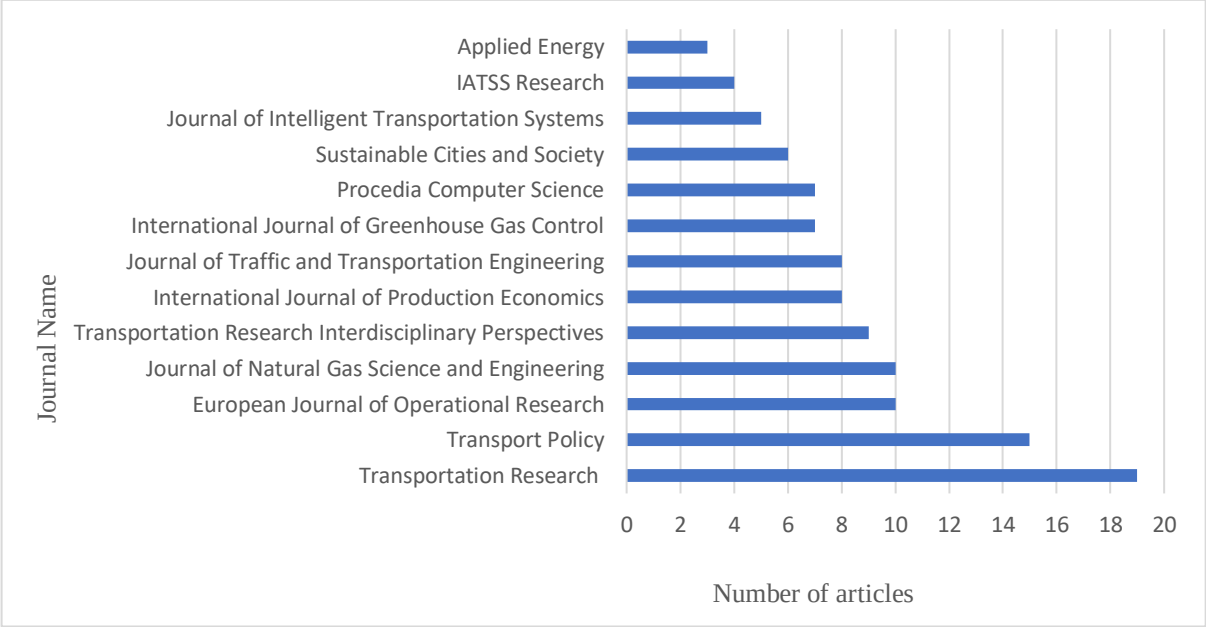
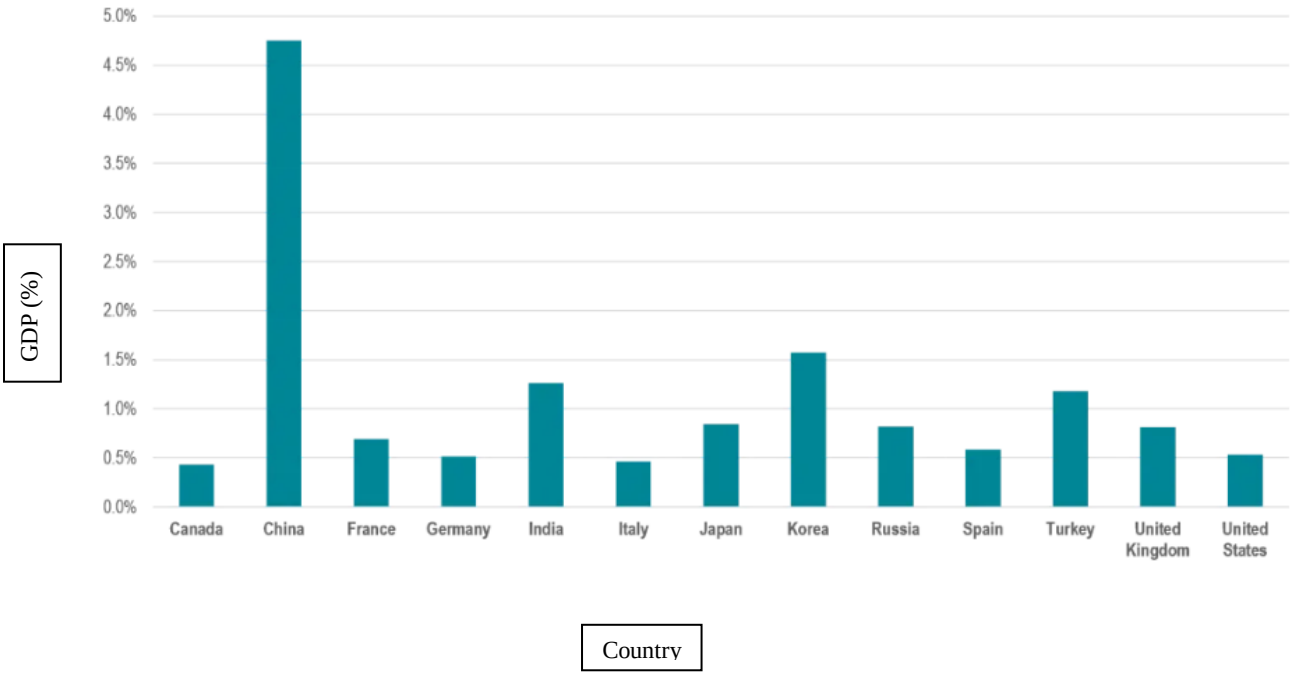


Figure 4: Number of articles published in different journals

The number of articles published by different journals is presented in **Figure 4**. The Transportation Research journal has published the highest number of articles (19 articles) followed by Transport Policy and the European Journal of Operational Research.

Journal of Natural Gas and Engineering throws light on the impact of the transportation system on the environment and renewable sources. Sustainable Cities and Society Journal and International Journal of Greenhouse Gas Control Journal focus on developing sustainable technological changes in the transportation system. Journal of Intelligent Transportation Systems, IATSS Research Journal, Procedia Computer Science Journal, and Applied Energy Journal has helped to bring new technological advancements in the field of transportation.



(Source: Organisation for Economic Co-operation and Development)

Figure 5: Transport Infrastructure Investment and Maintenance Spending as Share of GDP, 2015

The share of Gross Domestic Product (GDP) in Transport Infrastructure Investment and Maintenance of different countries is shown in **Figure 5**. A sampling of countries' GDPs shows that spending on infrastructure for transportation represents about constant 0.5% to 1% of GDP. Aside from experiencing a rapid economic expansion, outliers like China and India are also enhancing the efficiency of their transportation systems. Although the degree of infrastructure currently in place looks to be sufficient to meet needs, a smaller proportion

of investment compared to GDP is not necessarily indicative of capacity or performance difficulties. Each transport system must therefore be viewed through the prisms of the current level of accumulation, relation to the current and anticipated demand, as well as the lifespan of its current infrastructure base. In the following years, countries are trying to develop sustainable yet technologically advanced transportation infrastructure to mitigate the greenhouse emissions by the transportation sector as well as to improve the connectivity and convenience of the transportation system.

Results and Discussions

Due to fast growing technology and internet mobiles, transportation of freight has become very cheap fast and easy because of which production houses have reached rural area which indirectly has increased the Gross Domestic Product (GDP) of India. And so, India is one of the fastest growing economies. Goods transportation has become more efficient from air, water and road due to growing sustainable resources like electric transport.

Here, we compare and discuss the experimental findings from the suggested methodology TARS. Results obtained with the DBSR and POVRP protocols using highway scenarios based on the performance parameters. The BSM plays a very important role for security message delivery in the VANET environment. The safety message should be continuously broadcast to all nearby vehicles.

A transport network must reach its destination without causing congestion of the channel. Additionally, it produces transmission storm issues by sending security signals without using congestion control or avoidance measures. In the TARS logbook, the number of basic safety instructions rises with the increasing quantity of automobiles. RSU also makes smart decisions and sends safety messages to other vehicles, taking topological dynamics into account. Adjust storm issue transmissions to account for current traffic information. In order to determine the traffic conditions (whether it is congested) and traffic conditions on the network, the RSU measures the distance between the two vehicles. If the distance is less than the predetermined threshold, the RSU sends an alarm. Warns the vehicle of the distance. Ensuring channel stability networks, RSUs and vehicles only transmit warning and safety messages when absolutely necessary. TARS means TARS with fewer basic security messages than DBSR and POVRP. Meaning it reduces the chance of channel blockage and improves stability. Increased network performance with network protocol capacity.

With a focus on the European Union, this paper examines the key problems in creating sustainable transportation systems. It highlights current trends to pinpoint the most important research topics whose development will lessen the sector's environmental impact. It focuses on the new advancements in the field of technology.

The combination of physical and digital space into a single virtual universe is known as the metaverse, which takes its name from the meta-universe. The way we travel will alter as a result of metaverse technologies. The transition of the transportation networks into the metaverse is currently being prepared for.

Conclusion

The paper aims to show the development in technology of transportation, it's safety and freight in regard to operations research. We investigated the region of ITS freight from several supplementary perspectives, including those of enabling technologies involving commercial vehicles, electronic data transmission, etc. which included issues with border crossing, cutting-edge technologies for managing fleets, the logistical ideas for for comprehensive citywide freight management, and how ITS and e-business for freight are connected and converged. Transportation operations are changed by freight ITS. This is what is anticipated to happen. However, there is interaction between private, public, and freight vehicles that transport passengers. Logistics processes and industrial value chains are significantly impacted by freight ITS, such as CVO systems. It is unknown how these effects relate to ITS systems, supply networks, and regulations governing sustainability and the environment. One lacks the information and tools required to evaluate and compare various systems, practises, and investments. It should be possible to evaluate these linkages and the impact of freight ITS on the overall mobility within a particular region or on the logistical operations of particular commercial sectors. Such urban/regional planning systems require a multidisciplinary approach that incorporates cutting-edge optimization and simulation techniques, parallel or distributed computing environments, and a thorough representation of the economic, operations, and information and decision technologies used by the various actors. The established methods would be utilised for experimentation and instruction at the university and industrial levels in addition to policy assessment.(Crainic et al., 2009)

We looked into the ergonomics and associated performance literature on driving to create these standards and the usefulness of the Foot-LITE system. It was evident that how one drives may have a quantitative influence on safety and environmental friendliness, and that most driving behaviours that affect these two goals (such speed and animosity) are connected. Although driver education can improve driving behaviour, there is evidence to suggest that the advantages are outweighed by continuing feedback, such as that provided by an IVIS adviser. A variety of existing IVIS devices that can offer further advantages for both safe and environmentally friendly driving were researched, despite the fact that there is a developing market for specific green driver assistance solutions. Despite these positive results, we also learned that sometimes driving safely and ecologically friendly

might be incompatible. We truly think that safety should always come first in these circumstances and that a system like Foot-LITE will be required to address these conflicts.(Young et al., 2011)

• Transportation systems based on hydrogen would lower localised emission levels of CO, CO2, HC, PM, smoke, and soot. The fuel would have zero net CO2 emissions if it were produced using sources of renewable energy, such as biomass, wind, and solar.

• One way to start lowering these emissions, including CO2, is to convert liquid fuels like gasoline and diesel into gaseous fuel like compressed natural gas (CNG).

• The introduction of hydrogen (18% hydrogen-CNG blend) in the fleet of vehicles would benefit from the existing CNG infrastructure, which doesn't require major modification.

• Governments need to develop an auto fuel strategy that might be useful in promoting hydrogen as a fuel for automobiles.

The pyrolysis of lignocellulosic biomass yields bio-oils, which have the potential to replace fossil fuels in future energy systems since they are sustainable, made from abundantly available raw materials, emit no pollution when used, and may immediately replace liquid transportation fuels. High-value compounds can also be produced using bio-oil as a base. However, a significant obstacle to its direct use is the low fuel quality of bio-oil, which is brought on by its unfavourable features, such as its high levels of water and oxygen, acidity, and instability both in storage and during transportation.

Further study on solvent and surfactant recovery is essential for the application of physical procedures like solvent addition and emulsification. Although its impact on ageing is currently unknown, moderate HDO looks to be a practical way for lowering bio-oxygen oil's content. A possible technique for creating liquid fuels that should be more stable than conventional bio-oil is catalytic rapid pyrolysis. The employment of catalysts during pyrolysis is complicated by the catalysts' resistance to deactivation. Additionally, it is imperative to have integrated catalysis and multifunctional catalysts that work well with a variety of substrates. Multiple strategies together might work well. Each strategy's thorough economic analysis is also essential for its successful commercialization. The standardisation of bio-oil stability test procedures and the development of high-quality bio-oil production systems would both benefit from an understanding of the reaction mechanisms involved in both thermal and oxidative ageing processes. (Yang et al., 2015)

The need to reduce carbon and greenhouse emissions, which are typically produced by fuel-powered engines, is becoming more widely recognised. To protect the environment and the risks of climate change, it became

necessary to create pollution-free, sustainable transportation networks. The usage of solar and electric vehicles has progressively gained popularity, but the largest obstacle for the majority of people worldwide is price. This study analysed the choices for a bicycle that would be better than the standard model in terms of efficiency, ease of manufacture, and maintenance costs, among other factors. The continuously variable transmission, the chosen design, was examined and further developed, and it is suggested as a sustainable mode of transportation. A tricycle version of the concept is advised for stability and safety. The designed electric drive train provides a "green" and reasonably priced means of transportation for people, as well as safeguarding the environment from the dangers of climate change and growing emissions from industries and fuel-powered cars but still it will cost more than a conventional bicycle. The addition of controllers and sensors allows for further investigation and advancements that will improve the design.

Future Research

We advise future study in the subject to take social factors into account when designing and assessing motivating technology. This will encompass a wider range of transportation modes, go beyond the person-centered approach to error management, and investigate how motivating technologies might contribute to system design that increases transportation safety. Future studies should validate the knowledge transfer of serious games into safety behaviour, investigate the emergent effects using qualitative approaches, and address the long-term effects of motivational interventions on safety indicators. They should also compare the learning impact of motivational interventions to the conventional approach.

We have employed safety-related search phrases, records that did not specifically mention them to define their focus were excluded, even though it can be difficult to distinguish between terms like "eco-driving," "collaborative driving," and "driving safety."

Methods and models for risk assessment are questionable as a result of this complicated transportation system. As a result, uncertainty analysis may become a popular area of study in the future.

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