

A study on the impact of rail and road transportation during pandemic situation

Submitted in partial fulfillment of the requirements for the
award of
Master of Business Administration

By

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SCHOOL OF BUSINESS ADMINISTRATION

SATHYABAMA

**INSTITUTE OF SCIENCE AND
TECHNOLOGY (DEEMED TO BE
UNIVERSITY)**

**Accredited with Grade "A" by NAAC | 12B Status by UGC | Approved by
AICTE Jeppiaar Nagar, RAJIV GANDHI SALAI, CHENNAI - 600 119**

APRIL - 2021



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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of Mr. Periya Nayaham A (39410250) who has done the Project work entitled," **A Study On the impact of rail and road transportation**" under my supervision from December 2020 to February 2021.

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DECLARATION

I, **PERIYA NAYAHAM A. (39410250)** hereby declare that the Project Report entitled **STUDY ON THE IMPACT OF RAIL AND ROAD TRANSPORTATION DURING PANDEMIC SITUATION** done by me under the guidance of **DR. UMAMAHESWARI** is submitted in partial fulfillment of the requirements for the award of Master of Business Administration degree.

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ABSTRACT

The COVID-19 pandemic crisis has greatly impacted public transport ridership and service provision across the world. As many countries start to navigate their return to normality, new public transport planning requirements are devised. These measures imply a major reduction in service capacity compared to the pre-COVID-19 era. At the time of writing, there is a severe lack of knowledge regarding the potential impact of the pandemic on public transport operations and models that can support the service planning given these new challenges. In this literature review, we systematically review and synthesise the literature on the impacts of COVID on public transport to identify the need to adjust planning measures, and, on the other hand, the existing methods for public transport planning at the strategic, tactical and operational level. We identify intervention measures that can support public transport service providers in planning their services in the post-shutdown phase and their respective modelling development requirements. This can support the transition from the initial ad-hoc planning practices to a more evidence-based decision making.

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CHAPTER-1

INTRODUCTION

1.1 GENERAL

The rapid spread of the COVID-19 virus, which became a worldwide pandemic in a matter of weeks, has been attributed to the hypermobility of our current lifestyle, globalization, and the connectivity and accessibility of Wuhan, the first epicenter. Since then, the COVID-19 pandemic rapidly evolved into a situation with profound effects on lifestyle and travel worldwide, ranging from a dramatic decrease in air travel to an unprecedented increase in teleworking. These impacts resulted from governmental measures (e.g., travel restrictions and shutdowns of whole sectors in the economy) as well as individual choices to refrain from traveling in order to reduce exposure to other people and the risk of contamination.

Urban travel has declined all over the world, but not uniformly for all modes; public transportation has taken the hardest blow, as shown by survey-based data. This was in some cases accompanied by a reduced service supply and exacerbated by the perception of public transportation as riskier than private or personal means of transport because of the closer contact to other people that is possible, sometimes unavoidable, in public transportation vehicles and stations. The variation on the use of public transportation hubs based on Google Mobility Reports data. The baseline for the data is the median value for the corresponding day of the week, during the five-week period between January 3 and February 6, 2020. The coronavirus disease (COVID-19) pandemic, which originated in the city of Wuhan, China, has quickly spread to various countries, with many cases having been reported worldwide. As of May 8th, 2020, in India, 56,342 positive cases have been reported.

India, with a population of more than 1.34 billion the second largest population in the world will have difficulty in controlling the transmission of severe acute respiratory syndrome coronavirus 2 among its population. Epidemic and pandemic outbreaks, such as the dengue fever, the swine influenza, the avian flu, and recently the COVID-19 virus, have a severe and versatile impact on the society, as well as the economy. Aspiring to slow down the spread of the highly contagious COVID-19

virus, governments around the world decided to impose several Temporary restrictions. The restrictions include e.g., (1) contact restrictions and the distance rules, (2) temporary closure of trade and service companies, as well as (3) gastronomy, hotel business, and leisure facilities, (4) travel restrictions within a country and especially for non-essential travel, or (5) the obligation to wear a mouth-and-nose cover when using public transport. These measures have a significant impact on the global economy and, consequently, on the transportation of goods, passengers, as well as information. In today's increasingly globalized world, functioning supply chains are a major success factor for economic prosperity enabled by freight transportation. Pandemic outbreaks such as the COVID-19 virus are disruption risk factors for supply chain network design structure. Therefore, understanding the impact of COVID-19 on transport volume and freight capacity dynamics is of central importance.

1.2 STATEMENT OF THE PROBLEM

Governmental restrictions aspiring to slow down the spread of epidemic and pandemic outbreaks lead to impairments for economic operations, which impact transportation networks comprising the maritime, rail, air, and trucking industries. Witnessing a substantial increase in the number of infections in India, the authorities have imposed drastic restrictions on everyday life. Resulting panic buying and increasing home consumption had versatile impacts on transport volume and freight capacity dynamics in German food retail logistics. Due to the lack of prior research on the effects of COVID-19 on transport volume in retail logistics, as well as resulting implications, this article aspires to shed light on the phenomenon of changing volume and capacity dynamics in road haulage.

The study specially focuses on the impact of the railway and road transportation during pandemic situation. More than half of the world's population now lives in cities and just about every country on the planet is urbanized. Cities in spite of the huge population can be perfect breeding grounds for disease to spread as seen when Ebola spread in Africa. There are many ways by which disease spreads through virus infection such as Ebola and Corona. Most populated areas are the

victims of the virus spread. Growing population attributes to faster spread of infections especially during when migration happens through different means of transport such as railways and roadways. India is one of the countries where many people living below poverty line prefers the cheapest means of transportation such as railways and roadways for many purposes that includes many more businesses as well. During when migration happens, people along with their carrying goods happen to spread disease from one place to another. It happens due to the lack of awareness. On seeing the impact of the migration especially through railway and roadway transportation found to be biggest threat, the World Health Organization (WHO) had declared COVID 19 a global pandemic. During the pandemic people were very much affected physically, emotionally and psychologically. This study discusses about the factors how people and their livelihoods were affected. People and their lives were very much affected in various ways. Among the four means of transport (airways, water ways, railways and roadways) the roadways and railways are accessible for all people from poor to rich. During pandemic situation people were very much affected because they could not move from one place to another even to fulfill their basic needs such as food and medicine.

1.3 INDUSTRY PROFILE

Road transport and rail transport industries play a huge role in contributions to the economy. As the requirements for transportation of goods and passengers keeps increasing, the demand for supply of vehicles also increases simultaneously. The dependence on road transportation's easy accessibility, flexibility of operations and service that is delivered to the door step is increasing its demand majorly, For example- in India, road transport's segment is dominated as compared to rail transport, in which road transport's share of 4.5% in GDP has surpassed rail transport's which is at 1%.



The demand for road transport and rail transport is increasing rapidly due to the growth in commodity- producing sectors such as agriculture and manufacturing. In the time of technological improvements taking place every day, transportation segment is investing a lot in high-technology vehicles and devices that offer more efficient performances. Road transport and rail transport industries are accelerating towards the technological advancements in vehicles that utilize and install features to be more energy efficient, reliable and durable. Environment concerns being one of the factors that lead to efficient operations, rising prices of fuels, labour costs, inflation are all factors that affect the road transport industry. With passenger transport achieving incredible growth, public transport sector is one of the areas where road transport industry and rail transport industry are majorly and rapidly increasing their investments. Globalization is allowing the manufacturers of public transport vehicles to increase the supply and innovate more with changing times. Technology is helping road transport industry to scale on top of each year's revenue ladder. Traffic congestions, taxes, maintenance and service costs increasing, road transport industry and rail transport industry are concentrating on finding solutions to all transportation problems and issues related to it. Nature friendly, high-tech, safer and stronger vehicles manufacture is the main focus of companies in road transport industry.

Railroads transformed the world in the nineteenth century and supported the industrial expansion of the early twentieth century, then declined in the face of airline and highway competition. To survive, railroads were forced to rationalize their systems, develop more efficient operations, and introduce new services. At the turn of the twenty-first century, railroads remain dominant for bulk transportation, provide the backbone of rapidly growing intermodal freight services, and compete successfully with airlines in medium distance markets. Highway congestion, limited

airport capacity, and environmental concerns guarantee a continued role for rail systems in the twenty-first century.

The introduction of railways reduced transportation costs and travel times by an order of magnitude, changing the economic geography of the world forever. Railways integrated continents, escaping geographic constraints dictated so long by the location of ports and inland waterways. Cheaper transportation meant remote sources for raw materials and broader markets for products, enabling economies of scale by consolidating production. Railways favoured the development of cities that were larger or better located in relation to railroad development and diminished the fortunes of those that were bypassed. In North America, railways enabled rapid development of the Midwest and West. Chicago became the “Metropolis of the American West” and the largest rail hub in North America, quickly surpassing St. Louis and the other cities along the Mississippi River. In South America and Africa, railways opened up the interiors of the countries, often enabling the export of coal, ore, or agricultural products. In China and India, railroads provided the transportation links necessary to connect large national economies.

Railroads required vast amounts of capital. The possibilities and opportunities were evident to investors, despite a suspicion that profits were in construction rather than in operation of lines. While many companies failed in the recessions and panics of the nineteenth century, the best of the survivors were highly profitable. Railroads became the first industrial superpowers, inventing management structures as they expanded, establishing vast communication networks, and using military discipline to control operations over thousands of route-miles.

Railway expansion continued worldwide into the twentieth century. The expansion of the railways was finally slowed or stopped by international turbulence and violence. The railways, like the countries they served, suffered from the devastations of two world wars, the resulting shrinkage of world trade, and the financial and social disruptions of the Great Depression. By the end of World War II, railways were at best worn out and at worst destroyed. Massive investment was needed to revitalize the systems; where such investment was unavailable, the systems were destined to a slow, but certain decline.

The turmoil of war and depression masked the emergence of new modes of transportation. Military logistics dominated freight transport, and military needs suppressed the growth of highway transportation. With peace came the realization that railways were too slow and unreliable to withstand the appeal of automobiles, the speed of airplanes, and the flexibility of trucks. The strategic question was how best to respond: whether to hang on to the old systems, try new approaches, or simply abandon the field. The struggle was difficult for railroads, their customers, and towns that were dependent upon rail. The loss of markets, price competition, and decaying infrastructure frequently led to bankruptcy.

By the end of the twentieth century, railway networks were no longer ubiquitous. Where road networks developed, automobiles and trucks carried most of the regional passengers and tonnage. For longer trips, trucks captured some of the high value freight and airlines most of the passengers. In most countries, the loss of traffic resulted in railroad bankruptcies, line abandonment, and government ownership. In North America and Australia, where distance favours rail, the railroads survived, but primarily for freight; more tonnage was handled, but route-miles and market share declined. In India and China, which still lacked modern highway networks and where air transportation was expensive, railroads remained dominant and rail capacity was a major concern. In Europe, the major concern was for passenger service, although there were hopes for freight. In Europe and in Japan, high-speed passenger services connected major cities, offering medium distance service superior to airlines.

Despite competition from other modes and the financial collapse of so many railroad companies over the second half of the twentieth century, rail remains the mode of choice for several important markets: bulk commodities like coal, ores, sand and gravel, and grain; long-distance movements of containerized freight; and medium distance, high-density passenger services. Since railroads are generally more energy efficient than highway or air transportation, expanded use of rail will reduce both energy consumption and emissions of greenhouse gases. As railroads are flexible in their energy choice, especially for electrified lines, they are not as oil-

dependent as other transport modes. Railroads also require less land than highways for rights-of-way, which is important in urban and also in environmentally sensitive regions. In undeveloped areas, for instance interior regions of South America or Africa, railroads are less intrusive than roads because access can be controlled, whereas new roads generally entice new settlement. Thus, railways are generally viewed as a key element for sustainable freight and passenger mobility in the twenty-first century.

1.4 RAILROAD TECHNOLOGY

The basic elements of the railway system are the track structure, locomotives, rolling stock, terminals, and the control system. The essence of the railway system is the “steel wheel on the steel rail,” implying both low rolling resistance and guided transport. With a durable, level surface, it is possible to pull a car or, better, a “train of cars” (which is how the concept of a train was originally phrased) with a minimum expenditure of energy, thereby maximizing the load pulled for a given source of power.



Route and Track Structure: Route choice is important for engineering and marketing reasons. Engineers balance the costs related to distance, curvature, grades, tunnels, and bridges. Marketing concerns include the ability to serve current and potential markets, as well as location relative to competing lines and modes.

Route selection is dominated by the need for a nearly level route. If grades are too steep, tremendous energy will be expended, and the benefits of low rolling resistance will be lost. Railroads can operate with grades of 4% (a rise of 4 feet in a distance of 100 feet, or 40 m over 1 km), but only with difficulty; normally, the maximum grade is 1–2%. Railroad routes therefore tend to follow the natural features of the landscape, using cut and fill, tunnels, and bridges as necessary to maintain a nearly level route. Operating savings over the life of these circuitous routes justifies the added construction expense.

Train size and speed are limited by engineering factors related to safety and cost. The main consideration is that the train stays on the track, despite dynamic interaction between the train and the track. Rail and wheels are designed to minimize energy dissipation at the wheel/rail interface and to provide strength to resist the forces of the operating environment. For any curve, lateral forces are a function of wheel and rail profiles, car weight, center of gravity, and train speed. Since the running surface of a wheel is conical, the rolling radius increases as lateral forces shift cars toward the outside of the curve. This difference in rolling radius allows cars to navigate modest curves without initiating flange contact. For sharper curves, the flange comes into contact with the rail; at a sufficiently high speed, the lateral forces will cause the wheel to climb up and over the top of the rail, causing a derailment. This destructive possibility limits train speeds and curvature.

To allow higher speeds, the outside rail can be superelevated, which allows gravity to offset some of the lateral forces. The maximum superelevation is determined by the requirement that equipment with the highest center of gravity must be able to stop safely on the curve, meaning that the gravitational force acting on the center of gravity of the car must fall between the rails. Superelevation is problematic in locations where several kinds of trains operate at different speeds, such as curves located close to passing sidings. Passenger trains may run along such curves at

high speeds, whereas low priority freight trains will frequently be stopping at the siding. If superelevation is maximized for passenger trains, then freight trains will tend to crush the low rail. If superelevation is designed to accommodate the low-

speed freight trains, then the passenger trains may have to slow down to negotiate the curves.

Variations in track geometry and stiffness will stimulate dynamic activity and increase the probability of a derailment unless speed is reduced. Issues of track/train dynamics therefore underlie railway or regulatory standards for track geometry and track strength. Track geometry standards define limits for such measures as variation in track gauge (distance between the rails), cross Level (relative height of rails), and vertical or horizontal alignment (variation between the centre of the track and the design location). Track stiffness is a measure of the deflection of the track structure under load. As a train moves along the track, there will be a slight deflection of the rail under each wheel; the greater the deflection, the greater the interaction between the equipment and the track structure and the more rapid the deterioration of the track geometry and the track components. To minimize the risk of derailment, train speeds must be reduced where there are significant variations in track geometry or where the track structure is weak. Or, from a track standards perspective, the track geometry needs to be better and the track structure stronger to support higher speed operation.

Economic considerations may further limit train speeds and track quality. For low-density lines, minimizing maintenance cost is much more critical than train speed. For major freight lines, speeds of 40–70 miles hr⁻¹ (64–112 km hr⁻¹) are almost always deemed sufficient, and lower speeds are often acceptable. Higher speeds are desirable for intercity passenger operations, requiring better track geometry for passenger than for freight operations.

Engineering departments ensure that track geometry and strength are adequate by selecting, installing, inspecting, maintaining, and eventually replacing track components. A basic challenge is that the “steel wheel on the steel rail” concentrates load in a contact patch that is smaller than 1.5 cm², creating pressures greater than 50 000 Mg/m². The track structure must spread these loads over a wide enough area that they will not deform the natural subgrade, which commonly supports only 10–20 lb/sq.in. While many different approaches have been tried, the typical track structure has rail installed on steel tie plates that are attached to wooden or concrete ties (sleepers) that are embedded in ballast that may be sitting on a layer of sub-

ballast that is sitting on the natural sub-grade. The larger the cross-section of the rail head, the better it is able to withstand the extreme stress; the larger the tie plates and the better the fastening system, the lower the pressure on the ties; the larger and more closely spaced the ties, the lower the pressure transmitted to the ballast; and the deeper the ballast and sub-ballast, the lower the pressure transmitted to the subgrade. The choice of components determines how the pressure is distributed and the maximum loads that can be safely transported over the route.

Economic limits will be tighter than safety limits for axle loads in mainline operations, because heavier loads increase deterioration rates of some track components. Although operating expenses generally decline for heavier loads, these savings may be offset by higher expenditures for inspection, maintenance, and replacement of track components. Higher quality materials can be used to reduce deterioration, and research has helped the industry introduce more durable steel, premium fastenings, concrete ties, premium turnouts, and other improvements in track components. For example, concrete ties are more costly than wood ties, but they are frequently used in passenger routes and on curves in high tonnage freight routes because they are more durable, hold gauge better, and provide stiffer support.

Route and track characteristics also determine the size of equipment that can be carried. Clearances limit the width, height, and shape of equipment. Sharp curves limit the length of vehicles, as very long vehicles may derail. Bridge characteristics limit the maximum loading density, in other words the gross weight of a car divided by the length of a car. Clearances, maximum axle loads, and maximum loading density are therefore key design parameters for rail equipment.

1.5 EFFECTS AND NEW RULES FOR THE USE OF PUBLIC TRANSPORT

The Emergence of Physical Distancing: Respiratory infections such as COVID-19 are transmitted through droplets (5 to 10 μm) and aerosols (smaller than 5 μm) exhaled from infected individuals when breathing, speaking, coughing, and sneezing. Although there is still plenty of uncertainty about the various ways in which COVID-19 contagion occurs airborne transmission in closed environments has been established by several authors. Consequently, closed environments are generally riskier than open environments. Aerosols can accumulate and remain infectious in indoor air for hours which is the greatest challenge for public transportation and the

resuming of day-to-day human activities in other closed environments during the COVID-19 pandemic. For example, guidance on the resuming of activities in workplaces highlights the relevance of natural ventilation, air filtration, and employees following strict hygiene protocols, in addition to the cleaning and disinfection especially of high-touch surfaces among several other actions.

The concept of physical distancing (also called social distancing) has emerged as one of the most widely non-pharmaceutical measures applied to prevent COVID-19 transmission. The World Health Organization (WHO) recommends keeping a distance of at least one meter from other persons, while other health organizations suggest a physical distance of two meters to reduce the risk of COVID-19 transmission. A distance of at least one meter has been found to significantly reduce the probability of COVID-19 contagion.

The Use of Face Masks: The use of face masks by asymptomatic persons as a virus containment measure has been a contentious issue particularly during the first months of the COVID-19 pandemic. Arguments against suggesting the widespread use of face masks include the initial limited evidence of their efficiency, misuse due to lack of information about how to properly wear them, and the possibility of adopting risk behaviours when wearing masks. For several months, the World Health Organization (WHO) recommended face mask use only for people with respiratory symptoms and for healthcare workers. On June 5, 2020, WHO revised its guidelines to suggest the use of non-medical (fabric) masks in public places including public transportation, and the use of medical masks for vulnerable populations.

Even though doubts over the universal use of face masks were prevalent in many countries particularly during the first months of the COVID-19 crisis, the latest research suggests that universal mask wearing is critical for the containment of COVID-19. Face masks can significantly reduce the number of infectious COVID-19 viruses in exhaled breath, particularly of asymptomatic people and those with mild symptoms. The filtration capacity of fabric masks was found to be larger than 80% for particles <300 nm and larger than 90% for particles >300 nm, with particular combinations of common fabrics including cotton, silk, chiffon, and flannel.

Social Equity: Working from home during the COVID-19 crisis has been shown to be mostly a privilege of higher income jobs, as reported in data from different countries including the United States, Canada, and Chile. Based on survey data collected from 20,000 respondents in Germany, the United Kingdom, and the United States, concluded that less educated workers and women are more negatively impacted by the ramifications of the pandemic on the labor market. The long-term impacts of the pandemic crisis are expected to exacerbate disparities not only within countries, but also between countries due to their different levels of resourcefulness in recovering from the crisis. In this context, the vision of public transportation as a motor of social integration rather than of social segregation seems more distant today than ever. With the COVID-19 pandemic, people have abandoned public transportation, but not uniformly: high-income groups have left public transportation in larger numbers.

Sustainable Mobility: The sharp reduction in public transportation demand due to the new physical distance behaviours and the fear of COVID-19 contagion poses several questions for the future sustainability of mobility in cities. Designing a plan to make public transportation safe for a period of time (post-crisis) that is likely to be prolonged (as long as there is no widespread immunity to the new virus) requires several coordinated actions from policy makers, public transportation agencies, workers, and users. The objective should be to ensure that public transportation is as safe as possible and that it can accommodate and attract more people than those who have no viable alternative. If buses and trains are running almost empty in the COVID-19 era, then the economic and environmental efficiency argument for promoting public transportation is severely challenged, and the only argument remaining would be providing mobility to those who have to travel because public transportation is their only option.

1.6 IMPACT ON THE USAGE OF PUBLIC TRANSPORT

During the Covid-19 outbreak, the entire world is dealing with a myriad of new challenges. Businesses and all other activities across the globe have been adversely affected which in return is affecting the economy. The demand-supply

gaps are clearly visible in every sector. The effect of Covid-19 can be seen in the usage of public transport also. Trade all across the globe is plunged as Covid-19 upends the global economy.

According to the latest consumer research by Auto Trader, the UK's largest marketplace for new and used cars, nearly half (48%) of UK public transport users said that they would be less likely to use public transport once the lockdown restrictions have been lifted. This trend is also being seen in US cities, such as San Francisco's Bay Area Rapid Transit (BART), which has reported an 85% decline in ridership and a 50% reduction of economic activity.

Most of the public transport, rental services companies suspended their services during the lockdown tenure. Automobile executives also found that people would prefer to buy their own vehicles in the future because the perception of the people towards hygiene will change.

Public transport provides an alternative to private cars and has become an important part of sustainable transport policies. Public transport benefits the whole community financially, for each coin invested during this sort of transport tons of cash in economic returns are generated. Public transport ferries incorporate more people into a little space compared to an individual vehicle and hence reducing the traffic jam, vehicular pollution as well as reducing the carbon footprints.

Indian Railways has suffered a loss of Rs 6,500 crore on revenue earned from ticket sales (during the first two phases of lockdown itself).

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In Ola and Uber rides, it is suggested that both rider and driver must wear a mask. Every time we ride, we should confirm that we have taken specific safety steps and even drivers are required to complete a similar checklist. Guidelines released by the WHO should be followed. All high contact surface area should be cleaned with

sanitizer before and after each trip. As they are widely used for traveling all across the globe, these companies have come up with a unique feature called face cover technology. Most of the buses are incorporating very few people to maintain physical distancing. The central government is preparing measures for metro rails by maintaining spaces between 2 passengers, zone-wise queuing, screening and controlling crowds at the station.

Cities are the centre of our economic life: Our way of life is based on physical interactions, we're social creatures—it's how we're built, function and thrive. With more than half the world's population living in cities, this is where we find the most opportunities to create ideas, exchange knowledge and celebrate unique cultures. With the concentration of people, ideas and the like, they are the powerhouses of our global economies. The pandemic's origins and its hopeful eradication are likely an urban one. Historically, ancient cities and their markets have been the epicenter for social interaction and cultural and economic activity. They're also where some of the public health issues have started from and society has generally taken those lessons to enact great social and public health advancements. It is believed the COVID-19 virus started at a city "wet" market (i.e., a market selling animal products and fresh produce versus a "dry" market which sells clothes, art equipment, etc.) in Wuhan, a thriving metropolis in China's rapidly urbanizing and industrial centre.

Transportation the great enabler: Transportation has enabled the great movements of people and things to create a global transport network that is making the world smaller each day. The pandemic spread in a local global-local transportation pattern. First with physical interactions in cities and towns via local transport networks then globally via international air travel and then again with locally on the pandemic offers us a unique once-in-a-lifetime opportunity to re-imagine the transportation system and move it towards a more resilient, equitable and seamless experience. 20th end. Governments responded with travel restrictions and bans to minimize that spread from country to country. They've also enacted domestic measures such as social distancing minimums (six feet or about two meters) from each other, shelter in place (stay at home and only go out if essential) or mandatory curfews and lockdowns (cannot go out without special permission). These restrictions are an effort to "flatten the curve" meaning reduce and slow down the escalating infection and mortality rate in the community while giving the medical teams the time and capacity to prepare and adequately care for those most vulnerable. Density, a precursor of successful cities, is being argued by some as the reason for the spread. The issue isn't density, it's the agility of the public response to the crisis that will determine containment and hopefully eradication in a city,

suburb or rural area. In transportation, we live with some very tragic numbers each year: 1.2 million people being killed on our streets by people driving and many more from vehicle air pollution. Recent comments about accepting these virus mortality numbers as a cost of doing business and comparing them to road fatalities are terrible analogies and no death should ever part of any business model. Every death is a system failure and the goal should always be zero.

Our way of life has been put on pause: Everything we do in our day today way of life from going to work, education, shopping, restaurants, appointments, arts and culture, entertainment, celebrations, errands, that are accessed with various transportation networks are now being restricted or banned due to the virus. All major conferences, concerts, street fairs, parties and sports events and have been cancelled or postponed. Places like markets are either limited access or are being strictly monitored. We are all glued to the media nervously watching the global infection numbers rise and hearing how each region is being asked to stay home unless we are part of the essential workforce first responders (medical, utilities, public services, enforcement, supermarket and other critical supply chain providers, etc). All of a sudden super busy business travellers, bi-coastal travellers, hyper-scheduled parents and kids, and all out partygoers are grounded. If we can and do need to go outside, we are asked to keep our distance from each other and that's going to be our new normal for the time being. It's time for a pause.

Commute disrupted: Disruptions are impacting commuters differently depending on their job type. One of the biggest obsessions in the transportation industry is trying to solve congestion. It's the result of a finite amount of space or supply with too much demand causing delays for everyone. I've long argued that transportation congestion is not an infrastructure capacity problem, it's a work culture issue. People whose work requires a computer and internet connection don't need to go to the office every day. They do so because of outdated work culture and managers who organize their teams based on headcount, seats and desks. When these workers are required to drive to the office, they are the root cause of most of the congestion in cities. They're also the cause of public transit peak overcrowding and people in most regions spend at least 10 days of their lives commuting. For those that can

(which is a lot of us), working from home frees up those commute hours to do other things and generally, people think that's a good thing. Commute transportation managers have long argued that working from home is ideal option for this group as they are a large part of the urban economy and a slight shift can minimize congestion and overcrowding on the transportation networks. Our road infrastructure is designed around the two peaks-one in the morning and one in the evening albeit at a great cost. Parking also takes up most of land of most suburban office developments. By not having to travel reduces peak demand and supply of expensive new roadway and transit capacity freeing up space for everyone else that needs steady all-hours access. It also reduces the need for so much land-hungry parking. This is like flattening the curve for transportation supply and demand capacity. For these workers, this crisis has moved this from principle into practice. Managers who initially resisted these measures are now faced with the pressure to implement it companywide as work from home is becoming mandatory. Technologies like Wi-Fi and mobile-enabled video conferencing; cloud-based file sharing; collaboration and document management tools; have responded to the call. These platforms are seeing huge uptick in downloads and resulting swinging stock prices.

Working from home-some love it others don't: Now a few weeks in, it seems that the office is not as critical as we thought for managing staff and existing client work. Managers and teams are starting to see how these measures can actually be better for everyone including the company. For families with kids at home this poses another set of challenges and I'm hearing all sorts of perspectives including hilarious kid and pet cameos mid-video chat. Some companies I'm working with are seeing that moving their operations to fully remote homework hasn't been done before and was a reason for the resistance. Work phones as well as email have been intermittent until they could get their VPN (Virtual Private Networks) operational and stabilized. Also, new business development is generally more difficult to develop without that initial face-to-face meeting or previous relationship. With business-to-business travel restrictions that could be a key challenge for companies exploring new opportunities during this time. For the designated essential workforce commuter, they still have to go to the worksite every day and many of them rely on

each other's services to get in and out. For example, transportation and utilities staff provide the critical backbone service for many other essential workers to get to their jobs, care for those that are sick and deliver supplies. These commuters Our road infrastructure is designed around the two peaks-one in the morning and one in the evening albeit at a great cost. Parking also takes up most of land of most suburban office developments. 4keep our systems and supply chains running, many are at risk of exposure and we owe a great debt of gratitude to them for their services as we can comfortably shelter in place. All the other customer-facing services including but not limited to food and beverage services, retail, arts, culture and entertainment, etc. are being asked to close or strictly limit access to the public. Some of these businesses are allowed to provide delivery, which is mostly performed by gig workers keeping things moving. Most of these workers have essentially been locked out of work and many have vulnerable employment and housing agreements.

Transportation industry impacts: The COVID-19 impact to our economy and the transportation system that enables it sounds like and is a nightmare scenario. The transportation manufacturing industry from autos, airlines and other vehicles were already experiencing flat or lower unit sales prior to this crisis. According to the commercial airlines' announcements they're preparing for a huge drop in passenger revenues and it turn cutting or eliminating domestic and global capacity. As oil prices free-fall, demand for fuel and electric vehicles may follow suit necessitating another bailout to the auto industry. And while the logistics industry is working to move goods, overall economic demand will see a drop in the coming months.

Urban transportation impacts are mixed: For cities the issue is more acute. Restricting local economic activity mean less taxes, fees and fines to pay for the operations, maintenance and expansion of our already expensive road transport systems. This pandemic will require us to address some truths about how we currently subsidize and operate a fractured and fragmented urban transportation system that is inequitable, not coordinated or integrated and is unsustainable to operate and maintain, let alone expand. This makes it quite vulnerable to these kinds of shocks. We need to get real and rethink our broken transportation business models and be better at understanding what it truly costs (all of them) to move a

person or a thing around our cities and what we are willing to pay for that so everyone can benefit. As we dig a little deeper there is and will be a mixed set of impacts that will vary by region. Maintain, let alone expand. 5mine seeing up to 50% reduction even with people shifting out of public transit. Travel times have been reduced for deliveries and goods

Driving: The work from home and shelter in place restrictions dramatically reduce the number of cars on the road resulting in a lot less fuel, paid parking, tolls and fewer fines. Most of these funds go to pay for expansion, maintenance and road repair, and some regions use a portion of these revenues to support the operations of their public transit systems. For those workers that need to drive and provide essential services, congestion is all but gone with some regions like This pandemic will require us to address some truths about how we currently subsidize and operate a fractured and fragmented urban transportation system that is inequitable, not coordinated or integrated and is unsustainable to operate and movement. Post crisis- very few may want to go back to the highway commute grind if they don't have to. That may mean less highway congestion at pre-crisis levels and less demand for expensive capacity expansion. As demand and traffic congestion are all but gone, the key focus now should be on maintenance and critical public transit service.

Public Transit: The dramatic and global drop in public transit patronage will further impact the ability of transit agencies to fund their services. Many have put in extra measures from disinfecting their rolling stock more often, protecting their drivers with the appropriate equipment, indicating where people should sit or not sit to keep the social distancing minimums while seated, and some have removed fare payment and front door boarding altogether to protect the driver. These measures aren't free and will have deep impacts on their already strained budgets. They will be faced with even harder choices over the next few months between providing essential coverage and reducing service frequency and service overall. Day and night coverage is most important as the essential workforce needs to get to work all hours of the day and night and that should be the priority of the service plan. The pandemic

raises old questions and some honest, needed reflection about the purpose and role of public transit as an essential public service—not a money-making enterprise. It also raises the question of what does public transit look like in a future that may not have the same peaks as before? In the US, Congress has included \$25 Billion for transit as part of the historic \$2 Trillion stimulus package which will ease some of the pain temporarily, but not solve the chronic issues with the industry.

Shared Mobility: For the plethora of services like ride-hailing (Uber, Ola, Didi etc.), micro mobility (bike share, kick scooter and moped companies), car share, on-demand shuttles and other services, the impacts have been extreme. Some systems in some regions are seeing a temporary spike in demand as people shift

out of public transit, others are suspending or eliminating offerings as demand has evaporated overnight. As movement becomes restricted, ride-hailing is being asked to pause pooling for social distancing reasons. Several start-up and legacy companies in the space had existing operational and financial business model issues raising the question of how long can they sustain these tough times. The next 90 days will be critical to the survival of these companies, and for those that make it through this period, a post crisis economic recovery could be a historic growth opportunity.

Walking and Bicycling: Residents are going back to basics. They're also pointing out to their city leaders that they have too narrow sidewalks and can't maintain the minimum social distance when out. As cities are limiting access to the public transit system, some like Bogota, Colombia, New York City and others are using this opportunity to create emergency lanes by reappropriating what are now empty roads and making space so that walking and cycling are the preferred way to get around. We're seeing sales for personal micro mobility grow as people buy their own devices to get around.

Deliveries: E-commerce deliveries were growing at a rapid clip prior to the pandemic and now even higher demand as shelter in place restrictions are put in place. Amazon and Instacart alone need almost 400,000 people to meet the growing

delivery demands. Ride hailing companies have pivoted as drivers shift from moving people to delivering food and products. As people stay home and can't go out, they will be demanding more of their e-commerce and local food venues to deliver. Some cities are responding by allocating more space at the curb for these delivery services to keep access while maintaining social distancing. It's not yet clear how these services will manage over time but these allocations will help set the groundwork for more curb space management in the near future.

1.7 NEED FOR STUDY

This study was based on the acknowledgement of transportation, the important role that challenges faced by people during the pandemic period. the purpose of this study is to evaluate how the life of people was affected during the pandemic situation and before that.

1.8 SCOP OF THE STUDY

- The goal of this study is to investigate the impact of road and rail transportation during the pandemic situation.
- This research analyses the impact of rail and road transportation during pandemic situation.
- This research provides clear information about the risk given to the public people.
- The challenges faced by the people in pandemic period

1.9 OBJECTIVES OF THE STUDY

1.9.1 PRIMARY OBJECTIVE

To make people know about the importance of public transportation such as railways and road ways during pandemic period.

1.9.2 SECONDARY OBJECTIVE

- To compare the use of transportation in pandemic period and before that.
- To make people be aware of the ways by which the dangerous viruses like corona spreads.
- To enable people be aware of the transportation as the major cause to spread decease like COVID 19.

1.10 LIMITATION OF THE STUDY

- There where restriction in the impact on rail and road transportation.
- The present research was conducted using a sample size of 115 respondent.
- The location of the research was covered in the inside states.
- This paper had restriction on the study at rail and road transport.

CHAPTER-2

REVIEW OF LITERATURE

2.1 LITERATURE SURVEY

Konstantinos Gkiotsalitis,09 Dec 2020

The COVID-19 pandemic crisis has greatly impacted public transport ridership and service provision across the world. As many countries start to navigate their return to normality, new public transport planning requirements are devised. These measures imply a major reduction in service capacity compared to the pre-COVID-19 era.

Varun Sukumar ,23 Jun 2020

According to a 2018 Ease of Mobility Index report from the Ola Institute, Chennai emerged on top when it came to public transport usage, with 75% of the population opting for public transport; buses being the most widely used. The MTC bus system in Chennai has proven to be most popular due to high daily frequency, capacity, affordability and accessibility. The main patrons have been those who are in lower income groups such as daily wage labourers who often have to travel long distances to their place of work.

Ozay Ozaydin,9 Sep 2020

The pandemic due to the coronavirus disease 2019 (COVID-19) by its nature has affected all aspects of life. The impact on transportation sector has been investigated immediately as it played an important role in sustaining crucial functions. There are yet many unknowns regarding the future. This report summarized the effects of COVID-19 on transportation sector.

Eeshan Bhaduri, November 2020

The COVID-19 pandemic has resulted in unprecedented changes in the activity patterns and travel behaviour around the world. Some of these behavioural changes are in response to restrictive measures imposed by the Government.

Shilpi Bishoni, Director, 21 April 2020

Indian Railways plays a vital role in the economy and the lives of people in India. While the overall intermodal share of rail in freight traffic is around 35 per cent, it continues to account for a major share in transportation of bulk commodities – such as coal, iron ore, cement and food grains – which are drivers of the economy.

Godstime Nwaeze ,8 Jun 2020

The transportation industry is an integral component of the economy and a common tool used for development. This is even more so in a global economy where economic opportunities have been increasingly related to the mobility of people and freight, including information and communications technologies.

Nishant Sawant, 2020

Covid-19 is the biggest disruption of the century. It has had an unprecedented impact on the mobility sector across the world. This research presents the perceptions of people living in Indian cities with regards to the impact of Covid-19 on the urban transport sector following India's nationwide lockdown. The paper investigates the impact of lockdown on various parameters like mode choice, vehicular ownership, public transport patronage, frequency of travel and expectations from public transport operators.

Alexander Blackburn ,16 Nov 2020

This page collates data sources for all inland transport modes (including public transport, road and rail network traffic, inland freight transport, vehicle registrations, road safety) as well as maritime and/or port traffic, produced on a short-term basis that give insights into the Coronavirus impact on transport systems. Most sources come from UNECE member State official sources.

Paul Lewis ,28 Feb 2020

The Centers for Disease Control said this week it is expecting that the COVID-19 virus will spread to the United States. With cases and fatalities rising, stock markets took a significant plunge and the world is watching closely. The virus is already having an effect on the global transportation system.

Hesham Rakha,24 Jul 2020

A dramatic reduction in traffic demand was observed during the pandemic of COVID-19 producing noticeable reductions in traffic delay, energy consumption, and emissions. This unprecedented event provides us with a perfect chance to investigate how limiting the number of vehicles on the transportation network can contribute to a better environment. This paper quantifies the effects of reduced traffic demand on air pollution and greenhouse gas emissions.

Cecilia Demartini ,22 May 2020

Mobility and climate change go hand in hand as lockdowns have made it even more visible. In these areas, the unfortunate pandemic produced an unexpected, positive impact on the environment, as a result of travel bans and millions of people staying at home due to COVID-19 related restrictions.

Patrick Troy ,29 Jun 2020

As EU countries begin to reopen and emerge from the virus crisis, greenhouse gas emissions have been rising. Many countries were expecting this as one of the major reasons for the fall in emissions was the drop in vehicle traffic.

Shri Iyer .2 Oct 2020

The novel Coronavirus COVID-19 spreading rapidly throughout the world was recognized by the World Health Organization (WHO) as a pandemic on March 11, 2020. One month into the COVID-19 pandemic, this white paper looks at the initial

impacts COVID-19 has had on transportation systems in the metropolitan area of New York, which has become the U.S. epicenter of the coronavirus.

Nancy Vandycke ,30 Apr 2020

The novel coronavirus has had a profound, dramatic impact on our world. Many of us are feeling overwhelmed right now—with the news, with data, and with the immediate impact of COVID-19 on lives and livelihoods of people around the globe. But while it's still very much an ongoing situation, there is already a lot of talk about the scenarios that could unfold after the pandemic.

Nilola Medimorec ,23 Mar 2020

The COVID-19 pandemic has sent a shock wave through our society, and is permanently changing the world as we know it. Our global economy has been severely disrupted, from supply chains and markets, to workers and trade, laying bare the weaknesses in our overall preparedness for disasters and global crises.

Alexander Love ,11 Aug 2020

With the Covid-19 pandemic grounding planes and pushing airlines in financial peril, alternative means of international travel such as rail could benefit. Investment banking firm UBS believes that a combination of improving rail market conditions and changing attitudes to train travel could enable this.

Prachee Mishra ,14 Apr 2020

Since the travel ban extends from March 23 till April 14, 2020 (and may extend further), it will impact Railways' finances for both 2019-20 and 2020-21. In this post, we discuss the situation of Railways' finances, and what could be the potential impact of the travel ban on Railways' revenues.

Santanu Bandyopadhyay ,09 Oct 2020

The current pandemic due to the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) or commonly known as the novel Coronavirus Disease 2019 (COVID-19) has affected human lives in a significant way. Various authorities and

law-enforcing agencies imposed several interventions, including stopping of public transport to restrict travel and out-of-home activities to arrest the spread of viral infections. In many places, the restrictive environment persisted for weeks and months.

Gössling et al. (2020) and de Vos (2020)

Epidemic outbreaks and the impact on transportation, epidemic outbreaks and governmental restrictions aspiring to slow down the spread of these outbreaks lead to impairments for economical operation, which impacts transportation networks comprising the maritime, rail, air, and road industries. This is examined regarding travel behaviour and the impact on the aviation industry. Furthermore, Aloï et al. (2020) investigate the impact of COVID-19 on urban mobility, stating that overall mobility fall of 76%, especially driven by the public transport users that dropped by up to 93%. Finally, trade restrictions, demand restraint, and lack of skilled labor significantly impact supply chains and consequently freight volume (Jones et al., 2008; Luke and Rodrigue, 2008). A simulation of the impacts of epidemic outbreaks on global supply chains and in the context of COVID-19 is presented by Ivanov (2020).

Aaron Gutierrez, Aug 2020

This article explores the implications of the COVID-19 pandemic for public transport. Three elements are explored, Firstly the short- term effects including perceptions of public transport as a vector of virus transmission and shifts towards less-sustainable modes of transport. Secondly, we discuss key challenges such as the new difficulties of providing safe and reliable public transport services the consequent barriers for the promotion of sustainable and healthy urban mobilities and the potential exacerbation of inequalities. Finally we assess future research directions focussing on how pandemics should be monitored and the need to construct sustainable and human-scale cities.

Alessio Tardivo, April 2020

The possible impact that COVID-19 will have on the transport sector. It also gives the prospect on how the sector should approach the “new normal” which will follow the current health emergency and be resilient in case of future outbreaks. The paper

identifies several impacts that are already taking place in different instances such as the global consumers' behaviour. Due to the current lockdown situation interaction between producers and consumers has changed radically, and the supply chain had to adapt to cover necessities of citizens. The effects of the outbreak have been profound in consumption, however a growth in eCommerce and digital services have gained in importance and it is supposed to continue growing. The pandemic also had effects on the transport sector, to the point that a new paradigm of mobility will be necessary to meet environmental demands. The crisis halted passengers' mobility and limited air and sea freight capacity significantly.

Alejandro Tirachini, July 2020

The COVID-19 pandemic poses a great challenge for contemporary public transportation worldwide, resulting from an unprecedented decline in demand and revenue. In this paper, we synthesize the state-of-the-art, up to early June 2020, on key developments regarding public transportation and the COVID-19 pandemic, including the different responses adopted by governments and public transportation agencies around the world, and the research needs pertaining to critical issues that minimize contagion risk in public transportation in the so-called post-lockdown phase. While attempts at adherence to physical distancing (which challenges the very concept of mass public transportation) are looming in several countries, the latest research shows that for closed environments such as public transportation vehicles, the proper use of face masks has significantly reduced the probability of contagion. The economic and social effects of the COVID-19 outbreak in public transportation extend beyond service performance and health risks to financial viability, social equity, and sustainable mobility.

Mr. Aravind Harikumar, April 2020

Transportation sector has been one of the primary victims of COVID-19. From rickshaw pullers to airlines, all have been affected economically by the pandemic. India's overall energy demand fell by 11% in March 2020 Due to lockdown in many countries, the demand for passenger transport has been adversely hit. The freight segment has had a mixed short-term effect in terms of transportation demand. There is a surge in demand for truck drivers in transportation of essential goods. For instance, there is 40% to 60% increase of product being moved into grocery stores

and warehouses in US since COVID spread started. However, the supply chain disruption and slowdown caused by COVID is expected to pull down freight demand in the medium-term. Urban freight segments in India have also had a mixed short-term effect in terms of transportation demand. Since February, the online food orders have dropped by 20% whereas online grocery orders are overflowing. It is yet to be seen whether these acquired habits of online grocery shopping will sustain after the pandemic passes.

Shahin Shakibaei, Nov 2020

The COVID-19 pandemic, which was reported in early January 2020 in China and spread rapidly around the globe, will certainly remain as one of the most impactful disruptive events of the 21st century. To contain the spread of the virus while awaiting a vaccine, countries applied different approaches from simply giving advice on personal hygiene and applying progressive measures to total lockdown. This paper aims to investigate the impacts of the pandemic on travel behaviour in Istanbul, Turkey, through a longitudinal panel study conducted in three phases during the early stages of the epidemic and pandemic. The paper reflects the travel behaviour evolution during the development of the outbreak resulting from residents' self-regulation and governmental measures, distinguishing travel for commute, Social/Recreational/Leisure (SRL), and shopping activities, as well as use of different travel modes based on various socio-economic characteristics. Due to the application of the social distancing of at least 1.5 m, closure of numerous non-essential venues, encouraging teleworking and distance education, job losses and cancellation of all social gatherings in Istanbul between the second and third phase of our data collection, the transition in travel activity pattern and transport mobility appears to be quite extreme, particularly for commuting and SRL trips.

S. Velmurugan, Sep 2020

This report discusses the implications of various phases of lockdown as well as unlocking phases aimed at the gradual ramp up of the economy during the ongoing COVID-19 pandemic in India. In this regard, the consequences and changes in the travel behaviour of commuters by air, rail and various forms of road based transport are discussed. The report also presents an overview of the impact of the pandemic on freight traffic as well as its impact on road safety. To derive the related findings,

the relevant studies carried out across India by different organizations during the ongoing pandemic have been briefly discussed and compared with pre-COVID-19 scenario. This is primarily aimed at improving the transport scenario to a sustainable level post COVID which is expected to be reached earliest by the middle of 2021.

J. Krishna Naik, June 2020

During the Covid-19 outbreak, the entire world is dealing with a myriad of new challenges. Businesses and all other activities across the globe have been adversely affected which in return is affecting the economy. The demand-supply gaps are clearly visible in every sector. The effect of Covid-19 can be seen in the usage of public transport also. Trade all across the globe is plunged as Covid-19 upends the global economy. Most of the public transport, rental services companies suspended their services during the lockdown tenure. Automobile executives also found that people would prefer to buy their own vehicles in the future because the perception of the people towards hygiene will change.

Mehaffy Weber, Dec 2020

The outbreak of the novel coronavirus Sars-Cov-2, also known as COVID-19, has brought profound changes and disruptions to nearly every aspect of transportation in the United States. The airline, automobile, and rail industries, as well as the energy companies that support them all, have been hit hard by the virus itself, stay-at-home orders, and even social distancing. With the demand for travel plummeting to a modern all-time low, the transportation industry is having to shift its focus of moving citizens and goods around the country to keeping a core transportation system operational with a smaller workforce. Keeping the country's transportation infrastructure operating ensures freight and key essential workers can continue to travel. As many transportation companies are making these appropriate shifts in operations, they are also experiencing a sudden change in their source's revenue leading to financial shortfalls. While these changes may not be permanent once COVID-19 restrictions are loosened, the transportation industry

needs to plan ahead to keep its network ready to return to normal, pre-COVID-19, operations.

Katarzyna Glodowska & Paulina Owczarek, 2020

The aim of the article is to present the scale of the problem caused by the outbreak of the COVID-19 pandemic regarding road freight transport and ensuring continuity and security of the supply chain. It presents statistics on the dynamics of changes in demand for transport services in Poland and the break-up of international supply chains. The results of research concerning the activity of a transport company operating in the food industry and changes in its structure that occurred during the pandemic are presented. Design/Methodology/Approach: The following research methods were used to achieve the aim of the article. The direct interview method was used to collect data on the current situation of the investigated transport company. The analysis of transport orders before the outbreak of the pandemic and since its announcement, comparison and conclusions were drawn. The deduction method was used to assess the impact of the decrease in demand for national and international transport services in specific industries. Statistical methods and methods of mathematical modelling were applied to analyse the research results. The induction method was used to formulate conclusions from the information collected in this area.

Ankita Sharma, May 2020

The COVID-19 pandemic has had a significant impact on nearly all spheres of the Indian economy. Due to restricted connectivity during the lockdown, supply-chains, exchange and transfer of essential goods and services and distribution of various commodities have all been affected. However, a critical public utility has emerged as a beacon of hope and public service in this crisis: the Indian Railways.

India's multi-layered and mammoth network of railways - the world's fourth largest – has not only weathered this ongoing storm with remarkable resilience but is also proving to be an essential lifeline for those in need. Between 25 March to 17 April, under the aegis of the Ministry of Railways, special parcel trains have been instrumental in transporting 5.2 million tonnes of food grains across the country. In addition, the supply of fuel stocks, medical equipment and supplies, Personal Protective Equipment and general goods are being made available in cities and

villages through the Indian Railways. Due to this proactive stance, shortages of goods and food stocks have been largely minimized.

Ashish Verma, Jun 2020

Central to India's lockdown to control the spread of COVID-19 was a complete shutdown of the transport system. Now, as the country emerges from the lockdown, a proper ramping up of the transport system is needed. This should not be done in haste, however. Can COVID-19 spread through public transport systems? It is difficult to answer this question with numbers. A recent paper from the Massachusetts Institute of Technology argued that New York's subways seeded the epidemic in the city. While the research fails to establish causation from the observed correlation, as the author had admitted, it cannot be discarded as implausible. It is commendable that India shut down public transport before it could contribute to the spread, with an early lockdown. We now need to consider what can ensue on a restart, especially of metro rail.

Paul Baker, May 2020

The COVID-19 pandemic is leaving its footprint on most industries in the world. Obviously, the impact on the transport and logistics sector is big. This article analyses the potential impact on this sector around the globe – ranging from supply chain disruptions to major effect on GDP. The response at national and regional level to keep goods moving has been positive. Nearly 90% of the World's population is subject to some form of international travel restrictions as a result of the COVID-19 global pandemic. This has halted travel demand, with significant implications for airlines, and carriers such as Air Mauritius and Virgin Australia have been put into voluntary administration. In 2020, Africa is expected to lose over half

the air traffic it had in 2019, losing USD 6 billion in passenger revenue, and nearly half of the sector's employees.

Arnaud koehl, July 2020

The COVID-19 pandemic has recently forced half of humanity to experience an unprecedentedly expansive lockdown. Naturally, this has brought urban transport systems under a near standstill, which in turn resulted in a sharp drop in carbon emissions and levels of air pollution in affected areas. While the induced health and economic crisis is already lasting longer and affecting many more than originally expected, questions arise on what that means for the future of urban living, urban design and connectivity.

A post-COVID-19 city could notably see a sustained drop in demand for commuting transport due to a combination of enduring economic crisis and changing work habits. It could experience a behavioural shift with regard to crowded spaces, and public transport in particular. In such context, this snapshot piece aims first at examining the possible consequences on public health of this scenario. Secondly, it uses system thinking to evaluate how stimulus plans could maximise social, health and climate co-benefits. It takes the example of populous middle-income countries to suggest a shift to investing in infrastructure focused on active travel modes, as the most prone to cheaply sustain hygiene, social-equity, reduced exposure to air pollution, reduced numbers of fatal accidents, and enhanced levels of physical activity.

CHAPTER-3

RESEARCH METHODOLOGY

3.1 RESEARCH DESIGN

AN descriptive research design is used in this research topic. a research is the framework of research methods and techniques chosen by a researcher.

3.2 SAMPLING TECHNIQUE

Sample Plan: To develop this study, the data will be collected from public, people working in railway transport, road transport, people who survive depending road and railway transport and business sectors that supply goods and materials to the two means of transport functioning.

Population: In this study the population used are public, workers, suppliers.

Sampling Frame: Sampling frame are those each set of employees within the working frame such as workers and the public who rely on the means of transport in thinking on what way they could adjust and make profit during Covid-19 and innovations made by them after Covid-19.

Sampling Unit: People working in the means of transport and the public running businesses depending on the means of transport.

Sampling Design: During pandemic situation, the positives and negatives are to profoundly researched in order to find the practicable solution to the problem.

Keeping mind, the government holds the greater responsibility to avail the alternatives for the public to overcome the challenges faced during pandemic situation as seen in developed countries.

3.3 SOURCE OF DATA

- Primary data is a type of data that is collected by researcher from questionnaire consist of multiple-choice questions
- The secondary data is collected by referring by websites, journals, articles and research paper.

3.4 STRUCTURE OF QUESTIONNAIRE

Multiple choice questions used as a structure in the questionnaire.

3.5 SAMPLE SIZE: The two main towns in which many people are very much affected during pandemic situation.

3.6 PERIOD OF STUDY

the period of study is from January 2021 to march 2021 which is three months of study

3.7 ANALYTICAL TOOLS

- percentage analysis
- chi square test in spss tool
- anova in spss tool

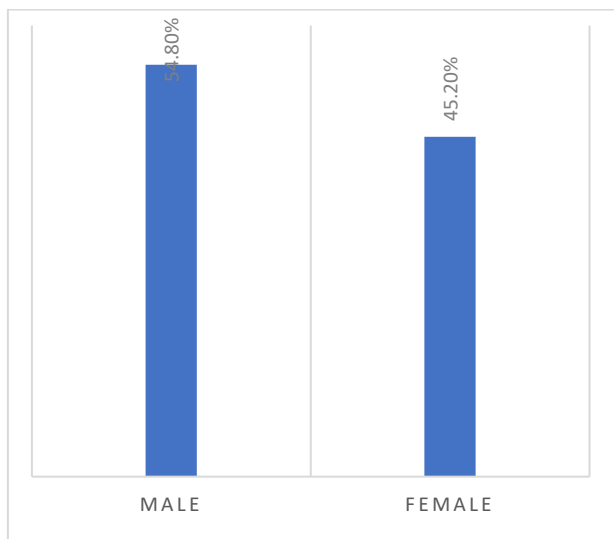
CHAPTER – 4

DATA ANALYSIS AND INTERPRETATION

4.1 PERCENTAGE ANALYSIS

Table 4.1.1 Showing gender wise classification of respondents

Particulars	No. of Respondents	Percentage
Male	63	54.8%
Female	52	45.2%
Total	115	100.00%



Source: Primary data

Chart 4.1.1: Showing gender wise classification of respondents

INTERPRETATION:

From the above table it is interpreted that 54.80% are male respondents and 45.20% are Female respondents.

Table 4.1.2: Showing age wise classification of respondents

Particulars	No. of Respondents	Percentage
18 – 30	77	67%
31 – 50	24	20.9%
Above 50	14	12.2%
Total	115	100.00%

Source: Primary data

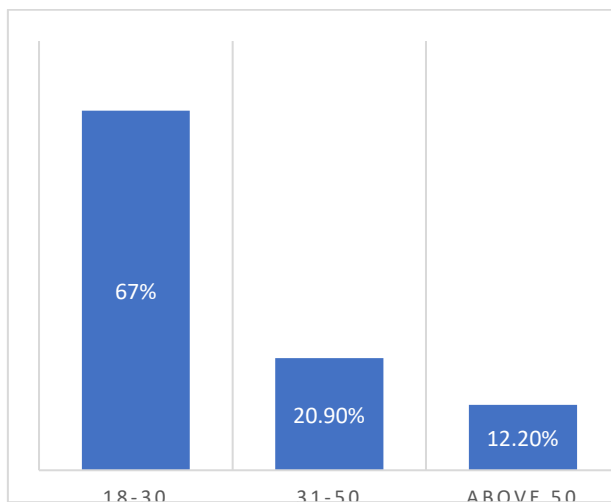


Chart 4.1.2: Showing age wise classification of respondents

INTERPRETATION:

From the above table it is interpreted that 67% are between 18-30 years respondents, 20.2% are between 31-50 years respondents, 12.2% are above 50 years respondents.

Table 4.1.3: Showing educational wise classification of respondents

Particulars	No. of Respondents	Percentage
Bachelor and below	31	27%
Masters	54	47%
Phd	15	13%
Others	15	13%
Total	115	100.00%

Source: Primary Data

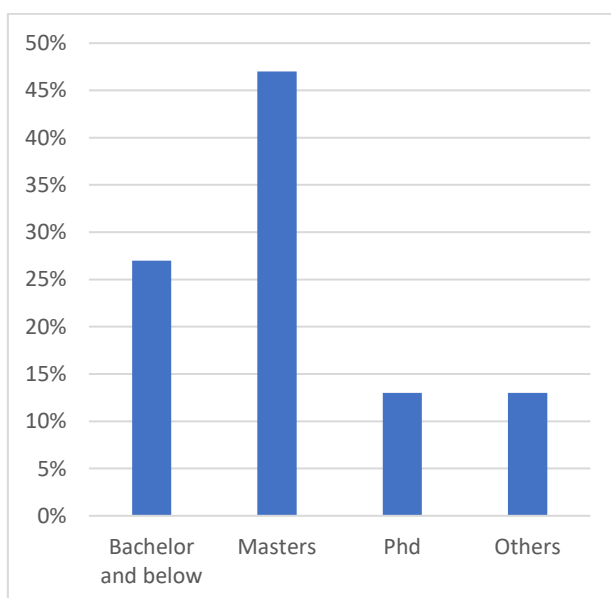


Chart 4.1.3: Showing educational wise classification of respondents

INTERPRETATION:

From the above table it is interpreted that 27% are bachelor and below respondents, 47% are masters respondents, 13% are Phd respondents, 13% are other educational respondents.

Table 4.1.4: showing marital status wise classification of respondent

Particulars	No. of. respondent	Percentage
Married	55	47.8%
Unmarried	60	52.2%
Total	115	100.0%

Source: primary data

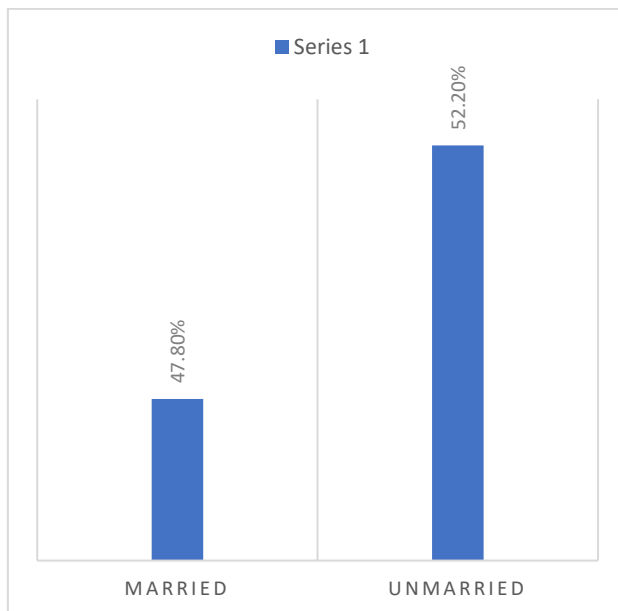


Chart 4.1.4: showing marital status wise classification of respondents

INTERPRETATION:

From above table it is interpreted that 52.2% are married respondents and 47.8% are unmarried respondents.

Table 4.1.5: showing the usage on transportation during pandemic situation of respondents

Particulars	No. of respondent	Percentage
Extremely satisfied	12	10.4%
Satisfied	34	29.6%
Neither satisfied	27	23.5%
Dissatisfied	34	29.6%
Extremely dissatisfied	8	7%
Total	115	100.00%

Source: Primary data

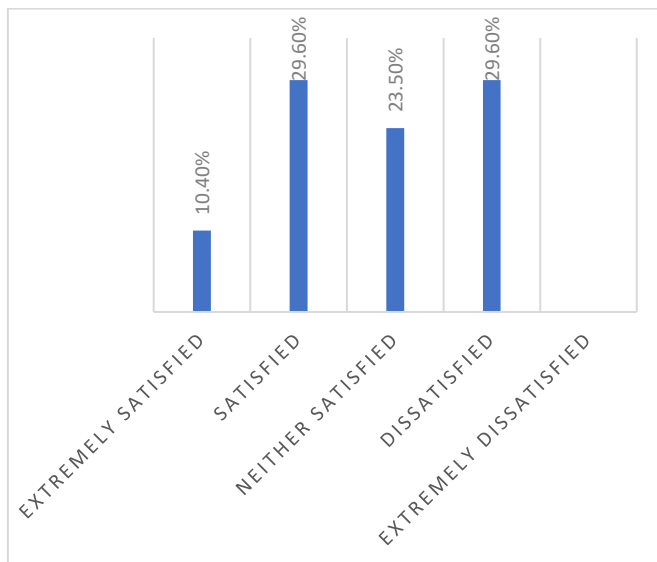


Chart 4.1.5: showing the usage on transportation during pandemic situation of respondents

INTERPRETATION:

From above table it is interpreted that 10.4% are Extremely satisfied respondents, 29.6% are Satisfied respondents, 23.5% are Neither satisfied respondents, 29.6% are Dissatisfied respondents, 7% are Extremely dissatisfied respondents.

Table 4.1.6: Showing the regular travel during pandemic period of respondents

Particulars	No. Of. Respondent	Percentage
Yes	21	18.3%
No	94	81.7%
Total	115	100.00%

Source: Primary data

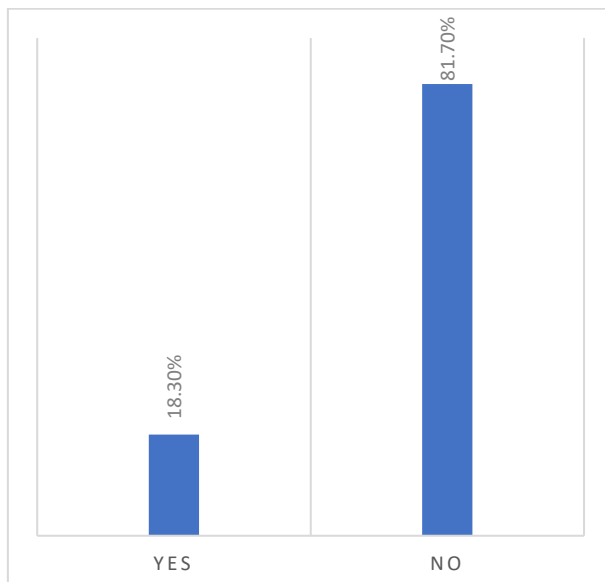


Chart 4.1.6: Showing the regular travel during pandemic period of respondents

INTERPRETATION:

From above table it is interpreted that 18.3% are saying Yes, 81.7% are saying No.

Table: 4.1.7: Showing major purpose of the travel during pandemic situation of respondents

Particulars	No. of. Respondent	Percentage
Treatment	60	52.2%
Meeting relatives/friends	33	28.7%
Shopping	22	19.1%
Total	115	100.00%

Source: Primary data

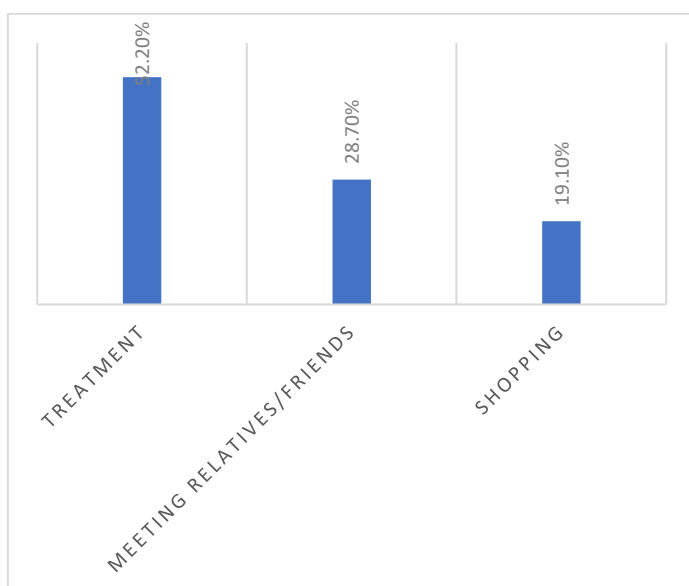


Chart 4.1.7: Showing major purpose of the travel during pandemic situation of respondents

INTERPRETATION:

From above table it is interpreted that 52.2% for treatment, 28.7% for meeting relatives/friends, 19.1% for shopping.

Table 4.1.8: showing Distance traveled during pandemic period of respondents

Particulars	No. of respondent	Percentage
10 to 30 kilometers	65	56.5%
30 to 100 kilometers	33	28.7%
Above 100 kilometers	17	14.8%
Total	115	100.00%

Source: Primary data

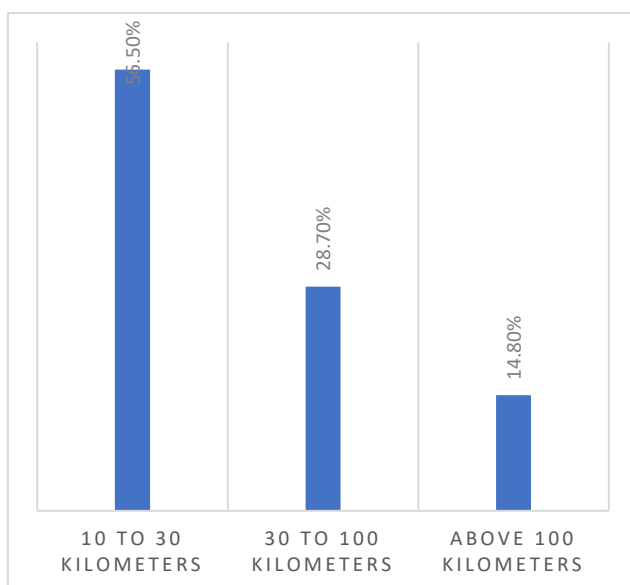


Chart 4.1.8: showing Distance traveled during pandemic period of respondents

INTERPRETATION:

From above table it is interpreted that 56.5% are select 10 to 30 kilometers, 28.7% are select 30 to 100 kilometers, 14.8% are select above 100 kilometers.

Table 4.1.9: Showing public transport needs precaution measurement at any cost met by government

Particulars	No. of. Respondent	Percentage
Strongly agree	30	26.1%
Agree	58	50.4%
Neither agree or disagree	22	19.1%
Disagree	4	3.4%
Strongly disagree	1	1%
Total	115	100.00%

Source: Primary data

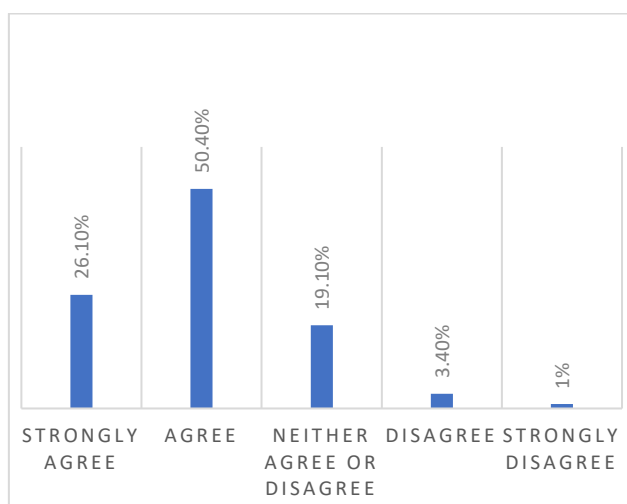


Chart 4.1.9: Showing public transport needs precaution measurement at any cost met by government

INTERPRETATION:

From above table it is interpreted that 26.1% are Strongly agree, 50.4% are Agree, 19.1% are Neither agree or disagree, 3.4% are Disagree, 1% is Strongly disagree.

Table 4.1.10: Showing highly most affected because of transportation during pandemic situation

Particulars	No. of respondent	Percentage
Patients	40	34.8%
Employees	42	36.5%
Transport workers	33	28.7%
Total	115	100.00%

Source: Primary data

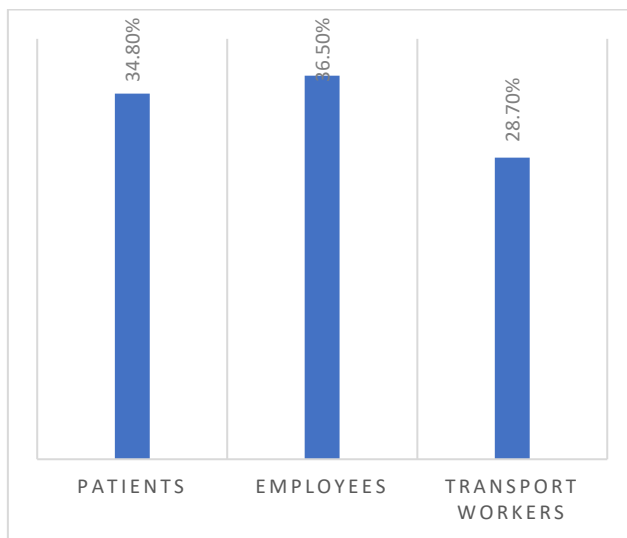


Chart 4.1.10: Showing highly most affected because of transportation during pandemic situation

INTERPRETATION:

From above table it is interpreted that 34.8% are select patients, 36.5% are select employees, 28.7% are select transport workers.

Table 4.1.11: Showing work affected during pandemic period

Particulars	No. of. respondent	Percentage
Strongly agree	51	44.3%
Agree	40	34.8%
Neither agree or disagree	17	14.8%
Disagree	4	3.6%
Strongly disagree	3	2.5%
Total	115	100.00%

Source: Primary data

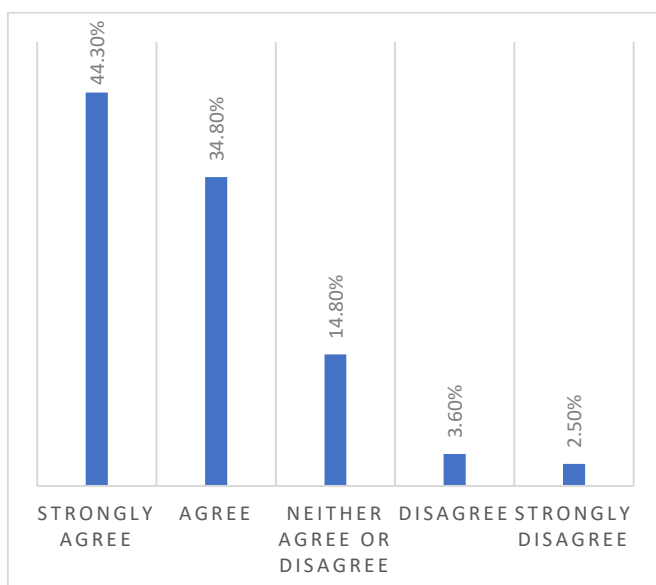


Chart 4.1.11: Showing work affected during pandemic period

INTERPRETATION:

From above table it is interpreted that 44.3% are Strongly agree, 34.8% are Agree, 14.8% are Neither agree or disagree, 3.6% are Disagree, 2.5% are Strongly disagree.

Table 4.1.12: Showing applicability of social distancing in rail and road transport

Particulars	No. of respondent	Percentage
Strongly agree	27	23.5%
Agree	61	53%
Neither agree or disagree	18	15.7%
Disagree	6	3.9%
Strongly disagree	3	3.9%
Total	115	100.00%

Source: Primary data

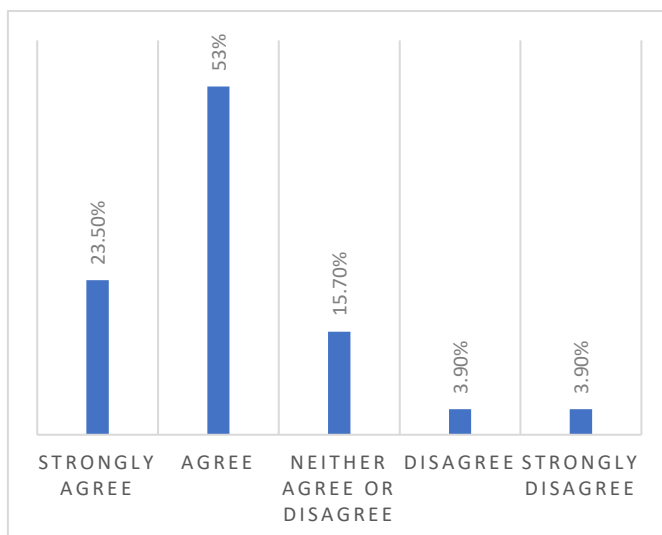


Chart 4.1.12: Showing applicability of social distancing in rail and road transport

INTERPRETATION:

From above table it is interpreted that 23.5% are Strongly agree, 53% are Agree, 15.7% are Neither agree or disagree, 3.9% are Disagree, 23.9% are Strongly disagree.

Table 4.1.13: Showing reason to prefer rail transport

Particulars	No. of. respondent	Percentage
Comfort/safety	60	52.2%
Cheap	34	29.5%
Others	21	18.3%
Total	115	100.00%

Source: Primary data

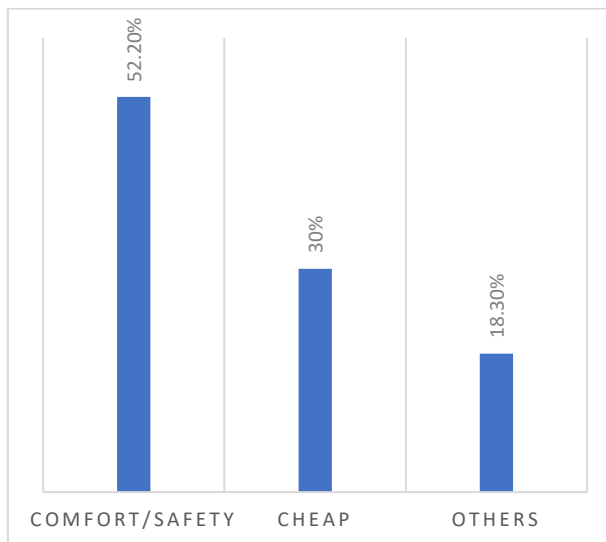


Chart 4.1.13: Showing reason to prefer rail transport

INTERPRETATION:

From, above table it is interpreted that 52.2% are select Comfort/safety, 29.5% are select Cheap, 18.3% are select others.

Table 4.1.14: Showing reason to prefer road transport

Particulars	No. Of. Respondent	Percentage
Time saving	41	35.7%
Reachable to interior areas	56	48.7%
Others	18	15.7%
Total	115	100.00%

Source: Primary data

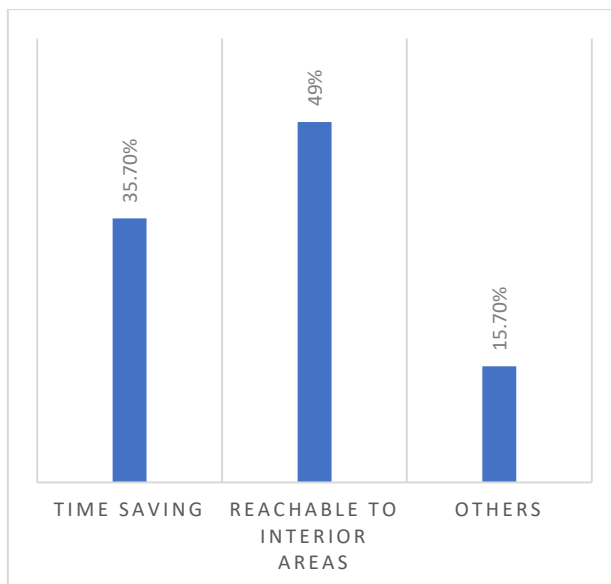


Chart 4.1.14: Showing reason to prefer road transport

INTERPRETATION:

From above table it is interpreted that 35.7% are select Time saving, 48.7% are select Reachable to interior areas, 15.7% are select others.

Table 4.1.15: Showing the acceptance of E-pass system in pandemic situation

Particulars	No. Of. Respondent	Percentage
Strongly agree	28	24.3%
Agree	42	36.5%
Neither agree	25	21.7%
Disagree	16	13.9%
Strongly disagree	4	3.6%
Total	115	100.00%

Source: Primary data

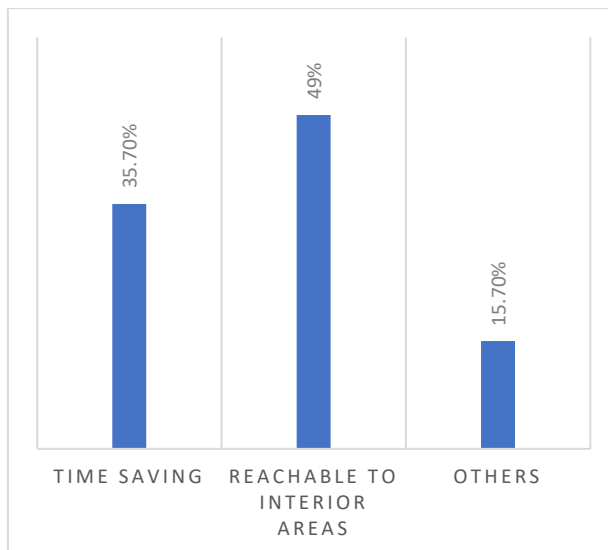


Chart 4.1.15: Showing the acceptance of E-pass system in pandemic situation

INTERPRETATION:

From above table it is interpreted that 24.3% are Strongly agree, 36.5% are Agree, 21.7% are Neither agree, 13.9% are Disagree, 3.6% are Strongly disagree.

Table 4.1.16: Showing health related safety perception with respect to public mode of transport during pandemic period

Particulars	No. Of. Respondent	Percentage
Not safe	29	25.2%
Slightly safe	42	36.5%
Moderately safe	24	20.9%
Safe	17	14.8%
Very safe	3	2.6%
Total	115	100.00%

Source: Primary data

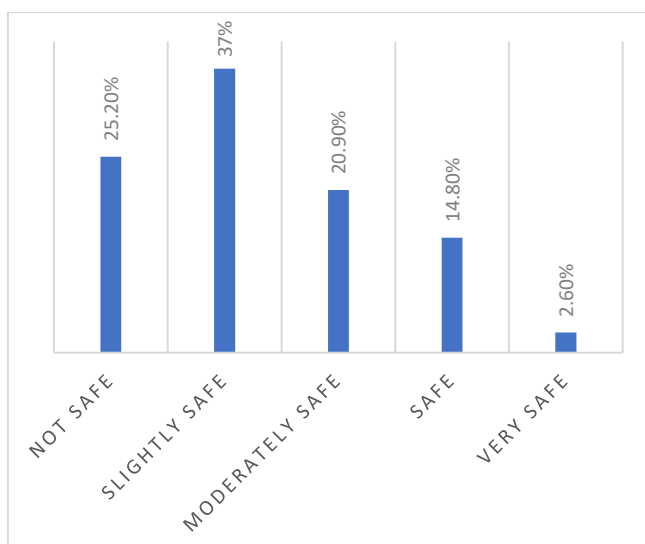


Chart 4.1.16: Showing health related safety perception with respect to public mode of transport during pandemic period

INTERPRETATION:

From above table it is interpreted that 25.2% are select Not safe, 36.5% are select Slightly safe, 20.9% are select Moderately safe, 14.8% are select Safe, 2.6% are select Very safe.

Table 4.1.17: Showing health related safety perception with respect to private mode of transport during pandemic period

Particulars	No. of respondent	Percentage
Not safe	22	19.1%
Slightly safe	38	33%
Moderately safe	27	23.5%
Safe	218	8.7%
Very safe	10	15.7%
Total	115	100.00%

Source: Primary data

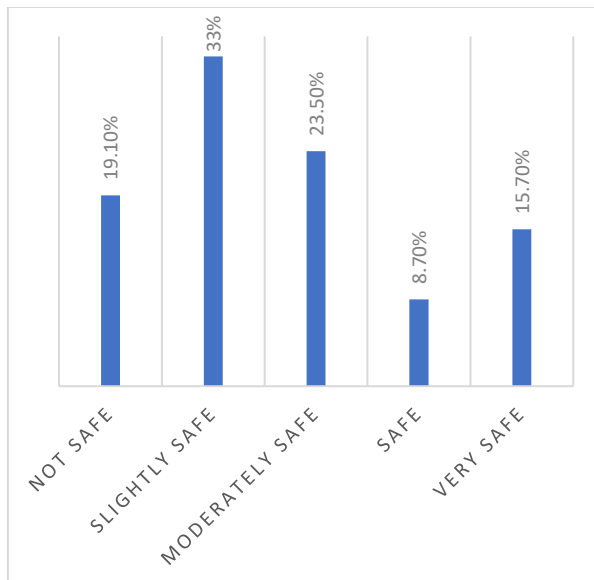


Chart 4.1.17: Showing health related safety perception with respect to private mode of transport during pandemic period

INTERPRETATION:

From above table it is interpreted that 19.1% are select Not safe, 33% are select Slightly safe, 23.5% are select Moderately safe, 8.7% are select Safe, 15.7% are select Very safe.

Table 4.1.18: Showing which transport normally preferred safe during pandemic period

Particulars	No. of respondent	Percentage
Rail transport	53	46.1%
Road transport	62	53.9%
Total	115	100.00%

Source: Primary data



Chart 4.1.18: Showing which transport normally preferred safe during pandemic period

INTERPRETATION:

From above table it is interpreted that 46.1% are select Rail transport, 53.9% are select Road transport.

Table 4.1.19: Showing Vaccine is an utmost necessity

Particulars	No. of respondent	Percentage
Strongly agree	40	34.8%
Agree	42	36.5%
Neither agree or disagree	20	17.4%
Disagree	9	7.8%
Strongly disagree	4	3.5%
Total	115	100.00%

Source: Primary data

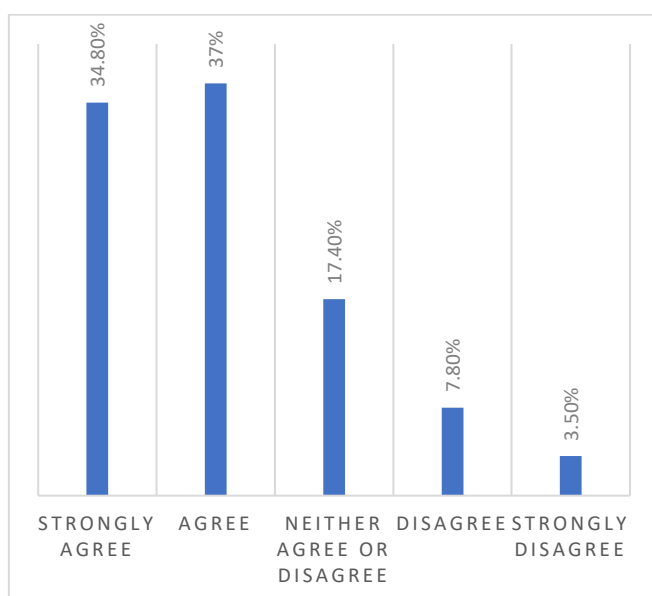


Chart 4.1.19: Showing Vaccine is an utmost necessity

INTERPRETATION:

From above table it is interpreted that 34.8% are Strongly agree, 36.5% are Agree, 17.4% are Neither agree or disagree, 7.8% are Disagree, 3.5% are Strongly disagree.

4.2 CHI SQUARE TEST:

AGE OF THE RESPONDENTS

VS

RATE AND USAGE OF TRANSPORTATION DURING PANDEMIC SITUATION

H₀ (Null hypothesis) = There is no significant relationship between age of the respondents and rate and usage of transportation during pandemic situation

H₁ (Alternate hypothesis) = There is a significant relationship between age of the respondents and rate and usage of transportation during pandemic situation

TABLE 4.2.1: Age * how do you rate the usage transportation during pandemic period

age	dissatisfied	Extremely dissatisfied	Extremely satisfied	neither satisfied	satisfied	total
18 to 30 years	22.8	5.4	8.0	18.1	22.8	77.0
31 to 50 years	7.1	1.7	2.5	5.6	7.1	24.0
above 50 years	4.1	1.0	1.5	3.3	4.1	14.0
total	34.0	8.0	12.0	27.0	34.0	115.0

TABLE 4.2.2: Age * how do you rate the usage transportation during pandemic period

	Value	Df	Asymptotic . Sig. (2-sided)
Pearson Chi-Square	20.283 ^a	8	.009
Likelihood Ratio	23.098	8	.003
N of Valid Cases	115		
a. 7 cells (46.7%) have expected count less than 5. The minimum expected count is .97.			

At 5% level of significance and df (8) the table value is 20.283

Calculated value = 0.97

Significance value ($p=0.005$) < calculated value

H_0 is accepted.

Inference:

The results of the "Pearson Chi-Square" say that $\chi^2(8) = 20.283$, $p = 0.97$. This tells us that there is no statistically significant association between age of the respondents and how do you rate the usage of transportation during pandemic situation

4.3 ONE WAY ANOVA TEST

Hypothesis set between Public transport needs precaution measurement at any cost met by government And Work affected during pandemic period

Null Hypothesis:

Ho = There is no statistically significant relationship between Public transport needs precaution measurement at any cost met by government And Work affected during pandemic period

Alternate Hypothesis:

H₁ = There is a statistically significant relationship between Public transport needs precaution measurement at any cost met by government And Work affected during pandemic period

TABLE 4.3.1: DESCRIPTIVES

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum
					Lower Bound	Upper Bound	
Agree	40	1.78	1.187	.188	1.40	2.15	1
Disagree	4	1.75	.957	.479	.23	3.27	1
Neither agree or disagree	17	2.12	1.111	.270	1.55	2.69	1
Strongly agree	51	2.59	1.431	.200	2.19	2.99	1
Strongly Disagree	3	3.67	.577	.333	2.23	5.10	3
Total	115	2.23	1.333	.124	1.99	2.48	1

TABLE 4.3.2: ANNOVA

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	22.152	4	5.538	3.375	.012
Within Groups	180.509	110	1.641		
Total	202.661	114			

Interpretation:

This is the table that shows the output of the ANOVA analysis and we have a statistically significant difference between our group means. We can see that the significance level is 0.012, which is more than 0.005, therefore, there is no statistically significant relationship between Public transport needs precaution measurement at any cost met by government And Work affected during pandemic period

Hypothesis set between applicability social distancing in rail and road transport and support e-pass system in pandemic situation

Null Hypothesis:

Ho = There is no statistically significant relationship between applicability social distancing in rail and road transport and support e-pass system in pandemic situation

Alternate Hypothesis:

H₁ = There is a statistically significant relationship between applicability social distancing in rail and road transport and support e-pass system in pandemic situation

TABLE 4.3.3: DESCRIPTIVES

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum
					Lower Bound	Upper Bound	
Agree	42	1.93	1.237	.191	1.54	2.31	1
Disagree	16	1.69	1.352	.338	.97	2.41	1
Neither agree or disagree	25	2.60	1.354	.271	2.04	3.16	1
Strongly agree	28	2.39	1.474	.279	1.82	2.96	1
Strongly Disagree	4	2.50	1.291	.645	.45	4.55	1
Total	115	2.17	1.359	.127	1.92	2.42	1

TABLE 4.3.4: ANNOVA

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	12.620	4	3.155	1.754	.143
Within Groups	197.902	110	1.799		
Total	210.522	114			

Interpretation:

This is the table that shows the output of the ANOVA analysis and we have a statistically significant difference between our group means. We can see that the significance level is 0.143, which is more than 0.005, therefore, there is no statistically significant relationship between applicability social distancing in rail and road transport and support e-pass system in pandemic situation.

CHAPTER-5

5.1 FINDINGS

- 58.4% of the people are male candidates showing the gender wise calculation.
- 67% of the respondents are between 18-30 age wise classification.
- 47% of the respondents are showing highest educational qualification in masters.
- 52.2% Of the respondents are showing unmarried people.
- 29.6% of the respondents satisfied with usage of transportation and 29.6% of the respondents dissatisfied with usage of transportation during pandemic period.
- 81.7% of the respondents are not able to take regular travel during pandemic situations.
- 52.2% Respondents travelled for treatment purpose in the pandemic period.
- 56.5% respondents are able to travel 10 to 30 kilometers in the pandemic situation.
- 50.4% of the respondents are agree with public transport needs precaution measurement at cost met by government
- 36.5% respondents showing that employees are mostly affected people. Because of transportation in the pandemic situation.
- 44.3% Respondents are strongly Agree with, work affected during COVID-19.
- 53% Respondents are Agree with, applicability of social distancing in rail and road transport.
- 52.2% Respondents are preferred rail transport for comfort/safety.
- 48.7% Respondents are preferred road transport for easy to reach interior areas.
- 36.5% Respondents are Agree with E-pass system in the pandemic situation.
- 36.5% Respondent are shows slightly safe with public mode of transport.
- 33% Respondent are shows slightly safe with private mode of transport.
- 53.9% Respondents normally prefers road transport safe during pandemic situation.
- 36.5% of Respondents are Agree with Vaccine is an utmost necessity.

5.2 SUGGESTIONS

- ✓ To provide information about transportation in the pandemic situation.
- ✓ Let government motivate people to adopt with new rules of transportation (social distancing, use of mask, to sanitized)
- ✓ transportation needs precaution measurement for safe travel.
- ✓ To give correct information for taking regular travel.
- ✓ Public transport needs on safe while traveling to long distance.
- ✓ To give more value on the transportation like rail and road ways.
- ✓ Transport management have to focus on safe of the common people during the travelling period

5.3 CONCLUSION

The objective of this study was to provide an overview of the impact of rail and road transportation during pandemic situation. Mainly research about the challenges and the risk of Transportation. A survey was conducted to 115 respondents and data was collected on march 2021.conclusively what I am coming to say is that the pandemic situation of covid 19 has instilled the minds of people starting from aged to children that transport is more than the basic needs.

Without food and water, there is no life. without transport, nothing of those sots are possibly impossible.

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APPENDIX -1(QUESTIONNAIRE)

A STUDY ON THE IMPACT OF RAIL AND ROAD TRANSPORTATION DURING PANDEMIC SITUATION

1. Gender

- a) Male
- b) Female

2. Age

- a) 18-30
- b) 31-50
- c) >50

3. Education level

- a) Bachelor and below
- b) Masters
- c) PhD
- d) Others

4. Marital status

- a) Married
- b) unmarried

5. How do you rate the usage of transportation during pandemic period

- a) Extremely satisfied
- b) Satisfied
- c) Neither Satisfied
- d) Dissatisfied
- e) Extremely dissatisfied

6. Are you able to take regular travel during pandemic period

a) yes

b) no

7. Major purpose of the travel during pandemic period

a) Treatment

b) Shopping

c) Meeting relatives/friends

8. Distance traveled during pandemic period

a) 10-30 kilometers

b) 30-100 kilometers

c) Above 100 kilometers

9. Public transport needs precaution measurement at any cost met by government

a) Strongly agree

b) Agree

c) Neither agree nor disagree

d) Disagree

e) Strongly disagree

10. Highly most affected people because of transportation during pandemic situation

a) Patients

b) Employees

c) Transport workers

11. Work affected during pandemic period

- a) strongly agree
- b) agree
- c) neither agree nor disagree
- d) disagree
- e) strongly disagree

12. Applicability of social distancing in rail and road transport

- a) strongly agree
- b) agree
- c) neither agree nor disagree
- d) disagree
- e) strongly disagree

13. Reason to prefer rail transport

- a) Comfort/safety
- b) Cheap
- c) others

14. Reason to prefer road transport

- a) Time saving
- b) Reachable to interior areas
- c) Others

15. Do you support e-pass system in pandemic situation

- a) Strongly agree
- b) Agree
- c) Neither agree nor disagree

d) Disagree

e) Strongly Disagree

16. Health related safety perception with respect to public mode of transport during pandemic period

a) Not safe

b) Slightly unsafe

c) Moderately safe

d) Safe

e) Very safe

17. Health related safety perception with respect to private mode of transport during pandemic period

a) Not safe

b) Slightly unsafe

c) Moderately safe

d) Safe

e) Very safe

18. Which transport normally preferred safe during pandemic period

a) Rail transport

b) Road transport

19. Vaccine is an utmost necessity

a) Strongly agree

b) Agree

c) Neither agree nor disagree

d) Disagree

e) Strongly Disagree

APPENDIX -2 (Article)

A STUDY ON THE IMPACT OF RAIL AND ROAD TRANSPORTATION DURING PANDEMIC SITUATION

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ABSTRACT

The COVID-19 pandemic crisis has greatly impacted public transport ridership and service provision across the world. As many countries start to navigate their return to normality, new public transport planning requirements are devised. These measures imply a major reduction in service capacity compared to the pre-COVID-19 era. At the time of writing, there is a severe lack of knowledge regarding the potential impact of the pandemic on public transport operations and models that can support the service planning given these new challenges. In this literature review, we systematically review and synthesise the literature on the impacts of COVID on public transport to identify the need to adjust planning measures, and, on the other hand, the existing methods for public transport planning at the strategic, tactical and operational level. We identify intervention measures that can support public transport service providers in planning their services in the post-shutdown phase and their respective modelling development requirements.

INTRODUCTION

The rapid spread of the COVID-19 virus, which became a worldwide pandemic in a matter of weeks, has been attributed to the hypermobility of our current lifestyle, globalization, and the connectivity and accessibility of Wuhan, the first epicenter. Since then, the COVID-19 pandemic rapidly evolved into a situation with profound effects on lifestyle and travel worldwide, ranging from a dramatic decrease in air travel to an unprecedented increase in teleworking. These impacts resulted from governmental measures (e.g., travel restrictions and shutdowns of whole sectors in the economy) as well as individual choices to refrain from traveling in order to reduce exposure to other people and the risk of contamination.

NEED FOR STUDY

This study was based on the acknowledgement of transportation. the important role that challenges faced by people during the pandemic period. the purpose of this

study is to evaluate how the life of people was affected during the pandemic situation and before that.

OBJECTIVES OF THE STUDY

- To make people know about the importance of public transportation such as railways and road ways during pandemic period.
- To compare the use of transportation in pandemic period and before that.
- To make people be aware of the ways by which the dangerous viruses like corona spreads.
- To enable people be aware of the transportation as the major cause to spread decease like COVID 19.

REVIEW OF LITERATURE

Paul Lewis ,28 feb 2020, United states are close to the covid -19. With increase in cases and death counts, the stock market and global transport system was already affected in covid-19.

Hesham Rakha ,24 jul 2020, A transport sector observed during the covid-19, this paper talks about the reduced traffic and air pollution.

Shri Iyer ,2 oct 2020, White paper looks at the impact on transport system during covid-19, in the area of new york. Which was the epicenter of corona virus

Prachee Mishra ,14 apr 2020, Travel ban extends from march 23 till April 14 ,2020. In this paper we discus about the railways finance system and railways revenues.

S. Velmurugan , sep 2020, This report discuss about the level of lockdowns as well as restriction are had major impact on economy during the ongoing covid-19, in india.

RESEARCH METHODOLOGY

Sampling technique: To develop this study, the data will be collected from public, people working in railway transport, road transport, people who survive depending road and railway transport and business sectors that supply goods and materials to the two means of transport functioning.

Sample Size: The two main towns in which many people are very much affected during pandemic situation.

Sampling Design: During pandemic situation, the positives and negatives are to profoundly researched in order to find the practicable solution to the problem.

Keeping mind, the government holds the greater responsibility to avail the alternatives for the public to overcome the challenges faced during pandemic situation as seen in developed countries.

Period of study: the period of study is from January 2021 to march 2021 which is three months of study

Analytical tools: percentage analysis, chi square test in spss tool and anova in spss tool.

RESULT ANALYSIS AND INTERPRETATION

CHI SQARE TEST:

H₀ (Null hypothesis) = There is no significant relationship between age of the respondents and rate and usage of transportation during pandemic situation

H₁ (Alternate hypothesis) = There is a significant relationship between age of the respondents and rate and usage of transportation during pandemic situation

TABLE showing the Age * how do you rate the usage transportation during pandemic period

age	dissatisfied	Extremely dissatisfied	Extremely satisfied	neither satisfied	satisfied	total
18 to 30 years	22.8	5.4	8.0	18.1	22.8	77.0
31 to 50 years	7.1	1.7	2.5	5.6	7.1	24.0
above 50 years	4.1	1.0	1.5	3.3	4.1	14.0
total	34.0	8.0	12.0	27.0	34.0	115.0

TABLE showing the Age * how do you rate the usage transportation during pandemic period

	Value	Df	Asymptotic. Sig. (2-sided)
Pearson Chi-Square	20.283 ^a	8	.009
Likelihood Ratio	23.098	8	.003
N of Valid Cases	115		
a. 7 cells (46.7%) have expected count less than 5. The minimum expected count is .97.			

At 5% level of significance and df (8) the table value is 20.283

Calculated value = 0.97

Significance value ($p=0.005$) < calculated value

H₀ is accepted.

Inference:

The results of the "Pearson Chi-Square" say that $\chi^2(8) = 20.283$, $p = 0.97$. This tells us that there is no statistically significant association between age of the respondents and how do you rate the usage of transportation during pandemic situation

ONE WAY ANOVA TEST

Hypothesis set between Public transport needs precaution measurement at any cost met by government And Work affected during pandemic period

Null Hypothesis: H₀ = There is no statistically significant relationship between Public transport needs precaution measurement at any cost met by government And Work affected during pandemic period

Alternate Hypothesis: H_1 = There is a statistically significant relationship between Public transport needs precaution measurement at any cost met by government And Work affected during pandemic period

Table showing work affected during pandemic period

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	22.152	4	5.538	3.375	.012
Within Groups	180.509	110	1.641		
Total	202.661	114			

Interpretation:

This is the table that shows the output of the ANOVA analysis and we have a statistically significant difference between our group means. We can see that the significance level is 0.012, which is more than 0.005, therefore, there is no statistically significant relationship between Public transport needs precaution measurement at any cost met by government And Work affected during pandemic period.

SUGGESTIONS

- ✓ To provide information about transportation in the pandemic situation.
- ✓ Let government motivate people to adopt with new rules of transportation (social distancing, use of mask, to sanitized)
- ✓ transportation needs precaution measurement for safe travel.
- ✓ To give correct information for taking regular travel.
- ✓ Public transport needs on safe while traveling to long distance.

CONCLUSION

The objective of this study was to provide an overview of the impact of rail and road transportation during pandemic situation. Mainly research about the challenges and the risk of Transportation. A survey was conducted to 115 respondents and data was collected on march 2021.

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