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Unraveling Gridlock Disaster: Exploring the Interplay between Disaster Preparedness and Persistent Traffic Congestion in Magdiwang Noveleta, Cavite

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Abstract

This case study investigates the complex iterplay between disaster preparedness and persistent traffic congestion in Magdiwang Noveleta, Cavite, exploring community and authority responses to compounded risks. Through purposive sampling, insights from ten participants reveal the challenges and strategies in managing both traffic and disaster risks. The findings suggest that traffic congestion significantly impedes the effective disaster response, with rescue operations and emergency vehicle movements being blocked by persistent heavy traffic and problematic parking practices. The key themes indentified Traffic Challenges and Solutions, where road widening and enhanced traffic enforcement are proposed solutions, and Collaboration and Impact Assessment, emphasizing the critical need for coordinated efforts among local authorities, police assistance and the community. The study highlights the importance of integrating traffic management with disaster preparedness to mitigate risks, enhance safety, and improve overall community resilience, suggesting that addressing infrastructure limitations could significantly alleviate these challenges.

Introduction

Traffic congestion has become a severe issue. Traffic congestion is a real challenge to every growing city. Traffic congestion reduces speed and increases time and duration, which burdens every commuter. Though constructing new roads is one of the advantages of reducing congestion, building a new road is one of the roots of traffic congestion Ravish *et al.* (2021). Commuters have faced daily traffic congestion, particularly during peak hours, for over a decade. One of the reasons for this is that vehicle drivers need to follow traffic rules, which causes traffic jams and delays. Instead of lessening the traffic congestion, it's getting worse due to urbanization. Due to growing cities, a lot of establishments have been built, transportation has become the need of people, and vehicle demand has increased.

For a long time, traffic in Noveleta, Cavite, has become a problem for travelers, drivers, and especially commuters. Due to excessive traffic, some public transportation will not be able to reach its route. Instead of continuing, they turn back and let the passenger go down to find another ride, then change their route so they will not pass through Noveleta Cavite, especially during rush hours. Many urban areas around the world face this problem. Jakarta, one of the most populated cities, experiences this issue. That's why policies were implemented to lessen traffic congestion, such as renovating roads, improving transportation and vehicle restrictions on several roads, and creating an even-odd license plate policy mapping the Travel Behavior Genome (2020). However, in this study, the researchers will explore the Unraveling Gridlock Disaster, Exploring the interplay between disaster preparedness and persistent traffic congestion in Magdiwang Highway Noveleta, Cavite.

Traffic congestion has become a problem in cities, specifically on Magdiwang Highway in Noveleta, Cavite. Due to urbanization, the demand for vehicles is growing. Sadly, there are newly constructed establishments, but the road remains the same, which makes the traffic even worse. Many people pass through it daily because it is one of the roads to Manila. As time has passed, this problem still needs to be solved. People, especially commuters, constantly face it. Ineffective Disaster Preparedness will lead to incidents during traffic congestion. Ineffective Disaster Preparedness is caused by the stubbornness of the public people in enforcing strategies and an insufficient level of awareness Gallego *et al.*, (2023).

Gour Karmakar *et al*. (2020). Negative events on the roads, accidents, incidents, and continuous retrogradation of traffic jams can affect human lives and cause economic loss. That's why, to have efficient disaster management, it is essential to send emergency vehicles (EVs) to the incident location as quickly as possible. To lessen incidence clearance time, many approaches have been made to provide a clear pathway to EVs, mainly fitted with RFID sensors in urban areas. However, this is ineffective because it somehow assigns priority to the EVs based on the type and severity of an incident without considering the effect on other on-road traffic.

Aroba *et al*., (2023) there is considerable traffic congestion in cities worldwide. Using the power of today's computing, networking, and communications technologies, governments tried to create a system that can improve the efficiency of current road traffic and conditions. The researchers looked at the study and looked at the efficiency of intelligent systems when assessing their performance. Given the findings, it is clear that there are several possibilities for predicting traffic flows and involving various types of technology that can significantly reduce congestion problems in smart cities. These studies have subsequently evaluated traffic congestion's similarities, content, benefits, and drawbacks. Management tools, e.g., metrics and models, have been applied to assess and prioritize state-of-the-art methods in the project. To better get it and distinguish the activity dangers that influence street clients, as well as total data from vehicles, road lights, or sensors on streets, a classic show was proposed for investigation, such as the classification of cars and speed calculation. Vehicle checks these on-road sensors utilize execution.

Babaei *et al*., (2023). Transport activities, in particular on the road, have a significant impact on economic growth. On the other hand, sustainability is a major issue when planning transport. Researchers made a data-based network in this work to assess vehicle types' sustainability. The network integrated with a multiobjective optimization model to design three traffic congestion problem stages. Specific criteria, like overall profit, the efficiency of various vehicle types, the relationship between customers supplied by one retailer, and the risk that demand or sales prices may be underestimated, shall define objective functions. To solve the integrated model, chance-constrained programming and Chebyshev goal programming approaches will be used. Under simultaneous fuzzy and stochastic uncertainty conditions, traffic congestion has been incorporated into sustainable transport planning for the first time. Furthermore, researchers will evaluate a case study to assess the applicability and validity of the proposed model. The results shall be analyzed and evaluated using data envelope analysis and the method for order of preference similar to the Ideal Solutions method. The results indicate that the suggested model's components have a very positive effect on this problem and are far superior to competing approaches in terms of literature. The study results indicate that traffic congestion is more efficient at an initial level of the supply chain, and transport planning based on effective vehicles might reduce the attractiveness of objective function parameters.

Hadi Karimi *et al*., (2021) [41] one of the main problems affecting the quality of life for cities and driving up their costs is traffic congestion as part of a modern Sustainable City Structure. In some regions of large cities, traffic congestion is the result of an increased flow of traffic. Lately, urban approach creators and activity organizers depend on the one-way activity framework as a compelling activity administration methodology that includes an excellent effect on diminishing activity blockage and making strides in the activity stream, driving urban maintainability. In the present paper, the creators endeavored to create a novel methodological system based on optimization procedures to moderate activity clogs through one-way activity arrange reconfiguration. Researchers test the effectiveness of the proposed methodology framework; two cases were analyzed and evaluated, namely the Sioux Falls transport network, a medium-sized and a real-world extensive transport network in Isfahan, Iran. In the first instance, it is apparent that the proposed method can effectively reduce the total travel time in the interest area by around 9%. In the numerical results of Isfahan's transport network, researchers justified the practical value of the model and solution method by converting the proper links to one direction. As shown by the calculation results in two cases, this solution can effectively shorten passengers' overall journey times within a specific area of congestion.

The purpose of this study is to help people experiencing traffic congestion and to help people be aware of how traffic congestion can affect disaster preparedness. Traffic has become a prevalent problem in Noveleta. However, people do not somehow realize the problem of this issue, which can bring about many other inconveniences and problems in the future. And Cavite may be reduced with the aid of this study. The goal is to know how disaster preparedness is impacted by traffic congestion.

Objectives of the Study
This study aims to help the situation of traffic congestion in Noveleta, Cavite. (1) Determine the cause and effect of consistent heavy traffic in Magdiwang Highway Noveleta Cavite; (2) Identify the possible solution that should be done to lessen the traffic congestion; and (3) Reveal the connection of persistent traffic congestion in the disaster preparedness.

Methods and Materials
The research design of this study will use a qualitative case study method. The Case study is an in-depth research design primarily using a qualitative methodology. Explores and depicts a setting to advance understanding of the case study research, according to Cousin (2006). This note examines the dimensions of case study research in higher education, particularly geographical fieldwork. The case study explores the categories of Stake's three case study research, which are intrinsic, instrumental, and collective. Categories provide guidelines for limits and definitions of case study research. The findings of the case study are the provision of a thick description, formulation of research questions, data collection and analysis, and search for the meaning of a case study. A Case study research can 'sophisticate the beholding' of the settings and activities scrutinized, according to Priya (2020).

The researchers will use the qualitative interview methodology to explore the interplay between disaster preparedness and persistent traffic congestion. The interview will need an answer to the following questions: The respondents' data will be the core of this study, as will

collecting and collaborating with respondents and conducting in-person interviews with the participants.

According to Skinner *et al*., (2020), Qualitative Research clarifies social activities that require a substantial appreciation of every perspective, culture, and 'world views'. The case study is related to the topic because a case study is suitable if it is relevant to the phenomenon Schoch (2020) [58]. According to Chang *et al*., (2022) [28] traffic congestion is every commuter's daily experience. Locating the area where accidents happen due to congestion and capturing the perception of the public members is priceless for every policymaker.

The researchers of this study will gather data by conducting in-person interviews that are similar to the issue and respondents who have proper knowledge about this study. In-person interviews are a gold standard in qualitative research. Collecting and conducting qualitative research interviews in person is the researchers' standard Johnson *et al*. (2021). Interviews in qualitative research are utilized in data collection. However, personal interviews have disadvantages; they have more advantages regarding data Rahman (2023). In qualitative research interviews, in-person interviews require significant time and financial commitments to the researchers Robinson *et al*., (2021).

According to Allan and Skinner (2020b), qualitative interviews are less structured and related to the topic so that respondents can expand their responses to the questions. Traffic congestion has caused an increase in urban haze in many cities, according to Lu (2021). The researchers will explore the interplay between traffic congestion and disaster preparedness. This study is a Qualitative Research and Case study. This study will help researchers to conduct a solution for traffic congestion and disaster preparedness.

The target population of this study is 10 individuals who possess expertise in dealing with excessive traffic, such as traffic professionals and commuters who have experienced traffic. These individuals are expected to assist in the success of this study. The 10 participants will consist of 1 Local Disaster Risk Reduction Management Officer (LDRRMO), 1 Bureau of Fire Protection (BFP), 2 Philippine National Police (PNP), 2 traffic enforcers, 1 vehicle owner and 3 commuters who regularly pass by the Magdiwang Highway in Noveleta, Cavite. The participants are selected based on their credibility to aid this research. Their expertise and experiences will significantly impact finding the cause and possible solutions to traffic congestion.

The researchers will use purposive sampling to choose the participants for the study. The component is selected because it has the characteristics that you need in your sample, which is purposive sampling, according to Nikolopoulou (2022). Purposive sampling is not probability sampling, and the researchers choose participants who have characteristics and proper knowledge about their study.

Thematic analysis (TA) is one technique for finding and analyzing meaning patterns in a data set Braun & Clarke (2006). It highlights the aspects of explaining the phenomenon studied by Daly *et al*. (1997). The final output of TAs ought to draw attention to the data set's most prominent constellation meanings. The present elements in the constellation are affective, cognitive, and symbolic. Familiarization, coding, generating themes, reviewing themes, and writing up are the six-step processes that researchers follow. Virginia Braun and Victoria Clarke, psychology researchers, originally developed the method.

After conducting the interview, the researchers will analyze the data by transcribing the interviews and audio, reading through the text, taking initial notes, and looking through data to familiarize themselves. The researchers go through the transcript of the person we interview and highlight everything relevant, and they keep adding new codes as we go through the text. The researchers' decisions will vary according to what the researchers are trying to find out. The researchers will find the results, find the solutions to these situations, and discuss the role of misinformation in respondents' perceptions.

Results and Discussion
Theme 1: Traffic Challenges and Solutions
The purpose of this theme is to identify the challenges and possible solutions to traffic congestion. This theme provide information to challenges and solutions in traffic congestion.

Traffic Woes: Major cities around the world and growing populations have traffic problems, which puts a huge stress on countries (Tripathi *et al*. 2022). This study revealed the traffic woes faced by the people experienced in Magdiwang Noveleta, Cavite. Traffic congestion is a headache for them. Khali said that,

> **"***Regarding po naman sa traffic, 'yan din yung ano karamihan na… almost lahat ng bayan 'yan yung sakit sa ulo"*

According to Godwin *et al*., (2021) the traffic is an inevitable problem in growing cities worldwide. The growth of population is rising. Traffic congestion is a big problem to all growing cities, it is also a headache for some people who experience traffic congestion. Also Chad thinks that traffic rules are insufficient and lack of implementation as Chad stated,

> *"Maybe in some cases it's not fully implemented or may kulang pa"*

The development of urbanization and modernization, it is important to see what's happening in network worldwide traffic (Zhang *et al*., 2020). However, it is expensive to install detectors on every corner of the city. The statement states that traffic congestion occurs because of insufficient traffic rules and the implementation is lacking.

Parking woes: The number of motor vehicles, primarily cars and two wheelers, rise because the population grows and expands (Jha, 2024). This study revealed that it is hard to rescue on congested roads because of double parking. Khali stated that,

> *"Pag rumeresponde kami. Minsan hirap kaming makapasok ano… sa mga Lugar na makikipot, maraming naka double parking"*

According to Kim & Wang, (2022) Commercial vehicles are most likely park close to the destination of the people than the passenger vehicles. However, both vehicles are close to illegal parking or double parking behavior. The statement states that double parking can cause traffic congestion on the road.

Traffic hindrance: Randomly distributed (NCVs) Non Cooperative Vehicles are causing traffic hindrance, the efficiency of traffic would be limited in the mixed traffic (Zhu *et al*. 2022). This study shows that a lot of hindrance on the road is caused by traffic congestion. Khali stated that,

"Magka-ka buhol-buhol talaga 'yan kapag walang sinusunod na traffic light"

The intersection traffic signal control problem (ITSCP) has become crucial in traffic congestion. ITSCP help to maximize the traffic flow in real-time strategies (Eom & Kim, 2020). Without traffic lights, traffic congestion will occur because they don't have lights that need them to follow for smooth traffic flow. Aside from that, every event causes heavy congestion. Shawn state that,

"Nakakalungkot nga dahil pag fiesta, alam naman natin ang traffic, eh medyo galit sila pero nakiki daan lang naman sila"

According to Kochetova, (2022) Driver behavior in the road traffic environment increase studies because it is the typical problem of an individual behavior on the road. People are getting mad because of the traffic caused by particular events in the town because they do not live in Noveleta, they are getting mad because every event in Noveleta causes heavy traffic. Sin also said that,

"Yung mga… magkakaroon ng event, tulad ng mga karakol, fiesta, 'yan ang cause ng traffic, sobrang traffic po 'yan"

The important reasons for traffic congestion are organize into some categories (Ramchandra & Rajabhushanam, 2022) it is because of the work zones, weather, special occasion or event, and traffic incidents. Events in Noveleta are the number 1 problem faced by people who passed by on Noveleta. Every special event needs to be celebrated. That's why Noveleta is under heavy traffic during events because people love to celebrate on the road. Also Sin stated that,

"Kaya lang po kami nag kaka-traffic dito, tulad ng mga pumapasok na trailer, mga ten wheeler"

According to Han *et al*., (2021) the accident model shows that the semi trailer truck drivers are dangerous because they are mostly the cause of accidents. Because of the trailers and ten Wheeler vehicles, traffic congestion also occurs. Trailers are huge vehicles that can cope with the entire road that will cause a huge traffic. Khali stated that,

"Pag congested, 'yan na experience ko din last bagyo, hindi makadaan masyado yung mga ano natin, yung mga rescue vehicles"

The path road is congested because some emergency rescue on urban roads has a high probability of congestion caused by accidents (Yan *et al*., 2021). Rescue vehicles can't enter the congested area during an emergency because that area is heavily congested. Rescuers can't enter immediately to rescue people. Khali said that,

"Yung epekto ng traffic sa mga tao, katulad sa'min sa Bureau Fire Protection, malaking ano 'yan, malaking sagabal"

According to Olayode *et al*., (2020) the major problem in living in Johannesburg in South Africa is traffic congestion. Traffic congestion is the problem faced by any developing city. Traffic Congestion is a hindrance especially for those rescuers that need to rescue someone immediately. It is a big hindrance for them because their time can affect that. Khali also said that,

"Malaking sagabal sa pag responde namin sa sunog kapag malala po yung trapiko natin sa Noveleta"

When a fire emergency occurs, Bureau Fire Protection can't come immediately because traffic congestion occurs at the same time as an emergency. It's a big hindrance for them, especially since they are rescuers. Meanwhile Shine said that,

"Mga baby bus? Nakaka traffic den ang mga baby bus kaya nga sinasaway namin sila e"

Traffic enforcers maintain the traffic flow, safety and public order on the road Paje *et al*., (2022) Traffic management enforcement was to prevent road traffic violations. Traffic Enforcers said that babybuses can also cause traffic on the road that's why the bus drivers who violate the traffic get warned by them.

Persistent congestion: Persistent congestion is a significant problem that affects the development of urban traffic. Analyzing the congestion and forecasting future traffic models is important to prevent traffic congestion (Almatar, 2023). This study revealed that Noveleta experiences persistent congestion on the road. Shawn said that,

"Nagsimula siguro ang traffic dahil sa dami na ng volume ng sasakyan"

According to Albatayneh *et al*., (2020) big growth of the transportation sector results changes ways of transport and high levels of energy needs. Traffic congestion started because of the volume rise of vehicles in Noveleta. Because of the high volume of vehicles the road becomes congested. Shawn also state that,

"Matagal na rin namang nagkaka-traffic sa atin, siguro…ano na, nasa Fifteen years na"

The persistent of traffic congestion becomes the problem in every growing city (Loo & Huang, 2022). The traffic congestion has occurred in Noveleta in the past fifteen years and the present. As the study said, traffic congestion is also caused by the high volume of the vehicles.

Safety reminder: It is not easy to perform successful road safety benchmarking practice, it is challenging to make final policy decisions (Shen *et al*. 2020). Safety reminders can help us to prepare for every unexpected situation we may face. Sin state that,

"Sinasabihan rin namin yung mga ano. Yung mga residente na sa pagdating ng sakuna"

Every resident gets advisory by the authority in every disaster that might happen in town. They are giving advice to all of the people in town for the people's safety. Shawn stated that,

"Pag-iingat"

Improving safety is crucial in enhancing safety during travel (Li *et al*., 2023). Improving safety during travel is important. People must stay safe everytime to avoid accidents. If people are stubborn and accident prone, people must stay safe. Shawn also said that,

"Napaka halaga noon"

Informing people about disaster readiness and traffic congestion is important. People will know about being ready in case any type of disaster occurs, especially on the road. Khali said that,

"Mahalaga na ano, kumbaga, mapagsabihan natin yung mga residente dito sa Noveleta pagdating sa mga disaster kasi kumbaga buhay kasi nila yung naka salalay pagdating sa mga sakuna kaya dapat alert sila tapos dapat alam nila yung mga dapat gawin"

According to Bi *et al*., (2022) [25] Non-cooperative behavior on the road could result a severe performance in emergency preparedness and mandatory restrictions. It is important to inform people about disasters to make the people resilient to any kind of situation that might happen to them. They also must be alert always to know their next move Incase of emergency. Sin stated that,

"Binibigyan na namin sila ng mga babala ho para sa gan'yan, tulad ng mga kalamidad, nagbibigay na rin kami ng tinatawag na yung…advice"

Efficient routing protocol should avoid considering the high mobility and uneven distribution of vehicles with low density in vehicular networks Chen *et al*., (2020). Traffic Enforcers give advisory and warnings to the people about disasters. It is crucial for the people to know the disaster might happen anytime. Sin said that,

"Natutulong lang namin sa kanila is yung mapag-sabihan sila ng maaga"

According to Yao & Qian, (2021) the reason of traffic breakdown is during rush hours. Early Morning traffic forecasts are important to inform commuter traffic management. Early advisory is the only help of traffic enforcers to the people during heavy traffic in the town. It will help people to be aware that the particular day or time will be having a heavy traffic congestion.
Chase said that,

"Dun pumapasok yung BLOW BAGETS"

BLOW BAGETS help drivers to avoid any unwanted situation or accidents that might occur on the road. BLOW

BAGETS help people to assess them while they are driving a vehicle. Chase also said that,

"Mahalaga syempre, mahalaga, sobrang mahalaga n'yan syempre"

It is crucial to inform people about disaster preparedness and traffic congestion. It will help people to determine the preparation they will perform Incase of emergency. Haze stated that,

"Tapos yung safety, ingat"

According to Abood *et al*., (2021) Intelligent Transportation System developed to improve the safety and efficiency of road transport. It detects the condition of driving, emergency situation, and remote warnings to the vehicles. People must always stay safe on the road to keep out in accidents. Be safe so that you are staying away from unwanted situations that might happen. Shine stated that,

"Pare parehas mag ingat kasi di ka naman kelangan mag madali e, mag madali sa pag drive, kaya kailangan mag ingat"

Traffic incidents or traffic crashes are one of the main reasons of deaths in the world. Improving drivers mental health and mindfulness has benefits in driving performance (Valero-Mora *et al*., 2021). Always put yourself safe during traffic congestion. People don't need to rush to drive, that's why people must stay safe. Be safe always. Chad stated that,

"Alam ko na laging traffic sa epza, sa tejero so kailangan prepare ako kailangan ay ready ako sa mga road na dadaanan ko"

Traffic congestion also occurs on Epza and Tejero. That's why Chad needs to be ready on the road that he will pass by because traffic congestion happens everywhere. Chad also said that,

"Another thing, which I used para maging prepared ako in any cases of disaster events in traffic congestion kailangan nakikinig ng balita o kaya nanonood sa television na pwedeng halimbawa merong ginagawang Maynilad na magccause yon ng traffic o pwedeng halimbawa may magsasara na kalsada ganiyan, o kaya pwedeng sabihin natin merong event sa lugar na yon halimbawa fiesta ng Rosario, lalo ngayon sa Rosario talagang madadaanan ko so syempre nag koclose sila ng roads so kailangan updated ako sa mga news para masabi ko na prepared ako sa mga traffic congestion"

Preparing for any cases of disaster events in traffic congestion is a must. Chad watches TV for any news if ever there will be times that the particular road is closed or heavily congested because of particular events. Chad also stated that,

"kailangan makiramdam ako ano nga ba ang nangyayari sa ating paligid ito bang traffic na ito ay sa tingin ko ay mawawala rin agad o saglit lang yan or pwede kong antayin yan kasi maaga pa naman

dahil maaga ako umalis so kailangan i-ano ko sabihin nating makiramdam ako sa kapaligiran"

Awareness of surroundings is a must to know that traffic congestion will disappear easily. Awareness of surroundings will help people in the situation they are in. Chad also stated that,

"Kahit papaano dapat mayroon tayong first aid kit and medicines at least mayroon tayong gamit na makatulong sa iba especially sa sarili natin incase may unexpected na small injuries na mangyayari. Kapag halimbawa merong nahilo incase na may nahilo may ointment ka na ipapaamoy sa iba and band aid in case na may simple wounds malaking bagay nayon"

People must have a first aid kit everywhere in case of an emergency. It will help other people too by giving them first aid incase of something important comes up and needs first aid. Alfonso said that,

"Dapat ay maingat pareho ang nagmamaneho"

According to Kashevnik *et al.,* (2021) Drivers must be alert to not cause inattention and distraction on the road. To reduce road accidents, it is crucial and essential the development of information systems to detect the inattentiveness of drivers. Drivers must be careful and always stay safe on the road to not cause any accidents. People need to always stay safe. Lucas said that,

"Kailangan maging alerto ka sa mga paparating na traffic"

People must be alert to incoming traffic on the road. People need to know the incoming traffic might happen every time. Lucas said that,

"Lagi kang naka focus ang mata mo at isip mo sa daan para kung sakaling may paparating na mga sasakyan na mabibilis mag maneho maiwasan mo ang aksidente"

People need to focus their eyes on the road Incase of incoming vehicles and fast drivers to avoid accidents. Always stay safe on the road. Lucas also state that,

"Pagdating sa mga traffic kailangan dapat hindi mainit ulo mo kase kung laging mainit ang ulo mo lagi kang mapapaaway"

People need to calm down if traffic congestion occurs. The situation will stay safe and you will also avoid trouble. Steve stated that,

"Kung wala ka naman talagang alam sa pag da-drive wag ka na lang mag drive tyaka kung sa mga rules ng kalsada tyka kung careless ka wag ka na lang mag drive. Dapat lagi silang may dalang first aid kit sa sasakyan"

If people are not drivers, and people don't know the rules on the road, People should not drive. Also if people are careless drivers, don't drive to avoid any accidents. Always bring a first aid kit too to keep people and also yourself safe.

Accident Impact: In view of the increasing number of traffic accidents, road safety is an issue which has been particularly important in recent years. It is therefore important to analyze the severity of the accident and the factors that influence it. There are significant differences between the types of accidents, according to the results so far. Laura Eboli, *et al,* (2020) [47] Sin state that,

"Ang mga nakakapangit lang yung mga insidente, lalo na banggaan. Nagkakaroon tayo ng cause ng traffic"

According to Wang *et al.,* (2023) The number of cars on the road continues to increase, which has resulted in a rise in traffic accidents.The majority on analyzing the causes of road accidents. Rather than looking for underlying factors, in order to obtain reduced dimensionality features and accurately classify accidents severity based on analysis results. It show that traffic management factors have the most significant impact on road accidents.
Impact of Accident are the various factors relating to road, factors affecting the different type of accidents this is also the reason why there is heavy traffic. Having a good communication about the impact of the accident will help to know the impact of the various accident, he stated that accidents are the cause of traffic. He also added that they also assist to traffic to help in the accident so it can be done properly.

"Uma-assist po kami sa traffic para maisagawa nila ng maayos yung pagtulong sa na-aksidente"

According to Demir *et al.,* (2023) [34] In particular, the bystander effect is a common problem when it comes to car accidents. Theory that individuals are less likely to offer help if they're around other people. In this paper, we present a first-aid communication system (AutoMate) that shall increase empathy of nearby drivers and support them in helping a car accident victim. AUTOMATE-an empathic FIRST-aid communication system to reduce the bystander effect in car accidents.
Another thing is it stated that they choose to suggest new routes whenever there's an incident

"Ang karaniwan may nasisiraan, may aksidente, may mga patay, kaya ang ginagawa nalang ho namin d'yan, pinapaikot nalang po namin sila. Oo, nagbago ng way"

According to Chavhan *et al.,* (2021) it is not possible to classify navigation as the fastest route, toll free, or any other variant due to the continuous urbanization with extensive dynamic situations in developing cities, urban, and suburban areas. As a result of overcrowded and dynamic changes in the number of passengers arriving, urban areas are more susceptible to traffic jams, bottlenecks, accidents, The time needed for covering the distance and shortest route to reach a destination has been provided, Information related to accidents, vehicles, weather conditions, roadside units, roads and so on shall be taken into account in the proposal system. In this context, both mobile agents and dedicated short range communication protocols will be used to collect and share

information with nearby vehicles and roadside units. Shine also stated that they assure that they will respond immediately in case of there's an accident happened.

> "*Meron din naman, katulad nga ng sinabi ng chief namin rumeresponde kami katulad nalang kapag may banggan, aksidente, para kailangan natin ng back up para mapadali*"

Weather Impact: The attribution of extreme events is intended to clarify the relationship between global climate change, thus it is possible to separate from human caused climate change the various drivers of extreme weather and thus provide useful information on how to adapt or assess losses and damages, the influence of climate change on five different extreme weather hazards, namely extreme temperatures, heavy rainfall, drought, wildfire, tropical cyclones, and the impact of recent extreme weather events of each type, and thus the degree to which different impacts are due to climate change, Due to climate change, having a direct impact on this. Ben Clarke *et al* (2022) [24] Khali state that,

> "*Mahalaga na ano, kumbaga, mapagsabihan natin yung mga residente dito sa Noveleta pagdating sa mga disaster kasi kumbaga buhay kasi nila yung naka salalay pagdating sa mga sakuna kaya dapat alert sila tapos dapat alam nila yung mga dapat gawin*"

The Impact of Weather shall provide useful information, It is important to inform residents upon the arrival of disaster and on climate change is a big help and more can be learned about the impact on how losses and damages can be adapted or assessed, with a view to clarifying the relationship among disasters that are possible to separate from humans, different causes of severe weather events and it's impact. Steve stated that.

According to Cory L. Armstrong (2021) [6] this was to examine how people are learning about and preparing for potential disasters in their area, given the current major weather disturbances in the United States. The two main factors influencing disaster preparedness have been identified information seeking was significantly influenced by fear and the perception of the risk of severe weather, but also by mediated and non mediated sources. The findings showed that concern and the perception of the risk of severe weather had a significant influence on information seeking, but that mediated and nonmediated sources, together with information sufficiency, were key indicators of disaster preparedness.

> "*I'll carry a umbrella and raincoat para hindi narin mabasa ng ulan*"

Incase of falling rain, he will bring a raincoat and umbrella to not get wet.
Being ready for any kind of disaster is a must. It will make you safe and aware.
According to Ronik Ketankumar Patel *et al*. (2023) [56] There have long been students in universities and colleges who are at the forefront of emotional and physical damage caused by natural or man made disasters, yet there is still a lack of efficient disaster response and mitigation practices. It has impact on their awareness of the dangers of disasters

and their ability to survive and cope with the changes that disasters bring. The results show that the university curriculum has an impact on students' awareness of disasters and the establishment of emergency procedures has an impact on students' preparedness for disasters. It is a must to gain more awareness and being ready in any kind of disaster.

Rescue Challenges: Rescue challenges is the field of natural hazards and disaster risk science, a multidisciplinary and interdisciplinary approach is needed to explain spatial temporal patterns, processes and mechanisms, emergency response and mitigation of risks related to natural disasters. natural hazards, disaster risk assessment, forecast, monitoring and early warning, hazard mitigation, emergency response and rescue risks management and post disaster reconstruction in addition to the existing shortcomings and significant gaps that need to be addressed, trends in natural hazard and disaster risk as a discipline have been identified, comprehensive discipline for such risks. Peng Cui *et al*, (2021) [54] Khali state that how they struggle in responding in disaster.

> "*Pag rumeresponde kami. Minsan hirap kaming makapasok ano… sa mga Lugar na makikipot, maraming naka double parking*"

Rescue Challenges should have the pattern and on how they face on it in a disaster, it is important to discuss how to overcome the challenges in rescuing on a disaster risk. Chase also state that the rescue vehicles struggle to rescue beacause of road congested.

> "*Pag congested, 'yan na experience ko din last bagyo, hindi makadaan masyado yung mga ano natin, yung mga rescue vehicles*"

According to Sharaf ALKheder *et al*. (2024) a one minute delay caused by traffic congestion may lead to loss of life on some occasions. The increasing number of vehicle users, which leads to an increase in travel time for road users, is causing traffic congestion. Ambulance drives are supposed to transfer patients from their locations to the closest hospital with minimum time to save their lives. However, due to traffic congestion, they are facing delays that could endanger the lives of patients. It is the current state of ambulance services in Kuwait and their transport problems is at the heart of this report. There is a significant correlation between drivers' experience and their confidence in their ability of drivers have a strong correlation.

Regulatory Importance: In order to manage traffic and reduce vehicle emissions, a wide range of regulations have been adopted by different municipalities. The motor vehicle restriction policy is one of the most commonly and widely adopted regulations, as practiced, However, the effectiveness of a motor vehicle restriction policy to reduce traffic pollution is not known of various types of policies into continuous and occasional restrictions to verify the impact conduction mechanism, However, by swiftly reducing traffic congestion and avoiding unnecessary emissions from idle engines, intermittent policies are helping to reduce pollution. Michele Gazzea *et al* (2023) Chase state about the rules in maintaining the flow of traffic.

"*Kaya 'yan ginawa eh para i-maintain yung magandang flow ng traffic*"

According to Edward Zadobrischi *et al*., (2021) Congestion, which is one of the most important factors influencing traffic flows but also affects the global economy, has set a precedent in terms of increasing vehicle numbers. In view of the fact that society revolves around transport and its symmetry, Wireless communication technologies have the potential to significantly change road safety and improve efficiency of transport systems, as well as communications between vehicles through vehicle infrastructure or vehicle technology. Therefore, in order to streamline vehicle density and reduce traffic congestion, this paper focuses on several simulations based on symmetry models which have been carried out in practical applications. The scenarios aim to communicate the vehicles to each other and to prioritize them by infrastructure.

The importance of regulation is to maintain and handle the situation in certain events of a disaster or in a traffic. It is important to have better communication by giving regulations and rules to the people to maintain the flow of a traffic and not affect any emergency responses. This would help the traffic enforcer's, police, ldrrmo to manage the flow of the traffic and disasters. Khali states that they give advisory to the residents upon the disaster.

"*Sinasabihan rin namin yung mga ano. Yung mga residente na sa pagdating ng sakuna*"

Regulatory Importance would help residents to have idea in terms of disaster preparedness and traffic to work and to have an idea in terms of policies.

According to Ahmed M Al-Wathinani *et al*. (2023) [36] a comprehensive rapid review of the current disaster risk reduction (DRR) efforts in Saudi Arabia, a country exposed to a variety of hazards such as extreme heat, droughts, floods, dust, and sandstorms, along with threats from terrorism and violence. Developing early warning systems, increasing awareness of the dangers and strengthening emergency response capacity. This includes the need for more sophisticated early warning systems, greater public awareness campaigns and continuous improvements in emergency response capabilities. Practical considerations to improve disaster risk management, which can be communicated to policy makers, increase awareness and contribute to building a more secure and resilient future in Saudi Arabia have emerged from our study.

Enforcement Improvement: Impact of law enforcement and increased traffic fines policy on road traffic fatality, injuries and offenses Interrupted time series analysis (Milad *et al* 2020)
This study will tell us about traffic law enforcement on April 1, 2011 (the first intervention), and how traffic ticket fines were increased on March 1, 2016 (the second intervention).The aim of the current study was to evaluate the effects of the law enforcement on reduction in the incidence rate of road traffic fatality (IRRTF). It provides information and assessments to law enforcement about road deaths. Haze states that,
"*Para maiwasan ang traffic congestion.Ang pinaka maganda dyan pagandahin yung ano law inforcememt*

tyaka i limit yung sasakyan para makaiwas rin sa aksidente."

According to Manzano *et al* the impact of this law enforcement is to reduce traffic and accidents that occur in all traffic, such as in the Philippines. It improves our present traffic situation and prevents further fatalities that will happen in the future. As stated by Chad,

"*Mas maimprove natin yung traffic management and bawasan talaga yung mga private vehicles.Kase para sakin marami na tayong infrastructure na nagawa.Yung mga fly over merong mga nasa ilalim pa pero sa dami ng ginawa natin may traffic parin kase hindi nauubos yung pagbili ng mga sariling sasakyan.*"

Solution proposal: In recent years, traffic congestion has been regarded as one of the most important worldwide problems facing all countries. There has been increased traffic congestion and delays on the highways in Basrah City, especially those that encircle and lead to the University of Basrah, Bab Azzubair campus, and the college complex. This study's main goal is to make some recommendations for ways to reduce traffic jams and longer delays on these roads. Highway Capacity Software (HCS 2010) was used to evaluate the level of service (LOS) on the roadways, while field traffic data and questionnaires were employed for data analysis. Iman *et al* (2023) Khali states that.

"*Yung hindi kana dadaan sa lugar na hindi mona dapat daanan katulad sa bayan ng noveleta kung pupunta ka ng Rosario gagawa ng bagong kalsada papuntang Rosario,bali ang tawag don by-pass road sa bawat bayan na madadaanan mo hindi kana dadaan dahil may iiba ng daanan.*"

According to Zheng *et al* (2020) Traffic can causes unexpected delay for travelers.Traffic congestion is the worldwide problem facing all countries, there are different causes of traffic. Sin states that.

"*Yung mga events magkakaroon ng event, tulad ng mga karakol, fiesta yan ang cause ng traffic po yan.*"

People make a difference way to reduce traffic when heavy rain and flooding happen during traffic congestion Suwano *et al* (2021).Traffic is a hindrance to us and its difficult to solve it so people make a way to alleviate the traffic. Sin added that.

"*Pag baha talagang pag baha, ma ano ang tubig sa tulay hindi na ho kami nag papa abante sinasarado na ho namin.*"

Road widening Advocacy: Planning should be done at the design phase to avoid engineering, financial, and environmental problems that may arise from demolishing buildings for urban road expansion projects Feng *et al*., (2022) [38]. This research suggests a technique to calculate the amount of building demolition brought on by urban road widening utilizing online map data and statistics from official websites, based on as-is BIM. In order to support building demolition estimation using clash detection, as-is

BIM models of the existing old road and the surrounding buildings are created, this study tells a road widening planning and cause of it. Chad states that.

"Kung maayos yan mas magiging diretso ang mga sasakyan.Maging tuloy tuloy yung ang project ng gobyerno na rallways.Gaya nung sa batangas na ang karoon ng tunnel so nag karoon ng access from the other part ng location na ito papunta sa ibang lokasyon.Because of that tunnel nagkaroon ng another way at nagkaroon na ng shortcut."

There are changes when road widening project finished and also it had an effect on people Marisa *et al*., (2020). Chad added that the Road widening project can cause a lot before finishing it there will be a demolition when the road widening starts.

"Maraming masasagasaan na bahay tatanggalin ang mga bahay kaliwat kanan."

Road widening: The regeneration, plant diversity, and change of soil properties are the determining factors affecting the stability of natural forests Basiri, (2024). Road construction activities are considered among the most important contributing factors Sin stated that,

"Road widening pero malabo, kasi mula d'yan sa San Rafael III, nakatigil na ho ang road widening"

The road is being widened to reduce excessive traffic and road congestion. When the downstream of a road is smaller than the upstream, this is referred to as road narrowing. The study site experienced a respectable volume of traffic Baskara *et al*., (2021). The road should therefore be able to function as best it can. In actuality, the density brought about by road narrowing persists.

Uncertainty community: To manage traffic emergencies, cities require multiple types of traffic rescue vehicles, which need to be dispatched from various rescue stations dispersed throughout the city. A reasonable way of deploying the rescue vehicles must be determined given that the times and locations at which the traffic emergencies occur are uncertain Le Zhen *et al*., (2024). Sin said that,

"Mag c-cause po tayo ng mga traffic d'yan bago sirain ang mga bahay na 'yan"

We need a wide road for emergencies and to reduce our traffic. The design of smart transportation management systems, which includes enhancing the effectiveness with which traffic accidents are managed in cities, is a crucial smart-city issue Le Zhen *et al*., (2024). Smart transportation management is becoming more and more significant as focus is placed on creating "smart cities".

Theme 2: Collaboration and Impact Assessment
The purpose of this theme is to identify the impact of traffic congestion and the collaboration of authorities in terms of traffic congestion on the road.

Community coordination: In this survey, we focus on investigating the recent advances in using reinforcement

learning (RL) techniques to solve the traffic signal control problem Zhenhui *et al*., (2021). The researchers explore future directions in the area of RLbased traffic signal control methods. We hope this survey could provide insights to researchers dealing with real-world applications in intelligent transportation systems. Khali stated that,

"yung traffic light, hindi na gumagana, dapat ipa-ayos 'yon, tapos pangalawa, lagyan din dito sa ano kasi dalawang kanto 'yan eh, Isa lang yung meron tapos hindi pagumagana dapat mayroon din dito para yung mga motorista, yung mga ano, stop and go nalang sila, first stop, first go"

It is necessary to fix the traffic lights to reduce traffic jams and drivers' headaches and avoid accidents Wang *et al*., (2024). Without modifying the actual road infrastructure, traffic signal optimization is recognized as a financially viable strategy for lowering energy consumption and traffic in metropolitan areas. The majority of intersections, however, are managed by fixed-time traffic lights that are not routinely improved because vehicle detectors are expensive to install and maintain.

Enforcer assistance: The law enforcement officer's experience in the administration of justice is attributable to following protocols, encounter with the accused and trauma from these experiences Zech, (2023). Sin stated that,

"Kaya kami nand'yan, binibigyan namin sila ng daan para magka-bigayan sila. Kung wala kami d'yan, hindi nagakaka-bigayan"

Everyone must be equal and without discrimination so as not to have any accidents and in the case of an emergency it is necessary to be notified first. The occupational health and safety risks that traffic enforcers face include noise pollution, which can cause occupational hearing loss Reyes *et al*., (2024). The purpose of this cross-sectional study was to determine the prevalence of hearing loss and evaluate the connection between workplace noise and hearing loss.

Authority collaboration: Collaborative governance in the implementation of traffic safety and road transportin Semarang seen first conditions, institutional design, and collaborative process has been running well, but not an optimal implementation of facilitative leadership. From some of these studies, it is considered very important to conduct an in-depth study of collaborative governance in handling traffic problems in the city of Surabaya (Muhammadv Farid Ma'ruf *et al*., 2021). This study revealed the importance of authorities' collaboration to aid traffic congestion. Shine states that,

"Importante yon kasi isa pa kasi karagdagan sa kaalaman. Meron kaming di namin alam so more on knowledge, para may mga alam sila na di namin alam na dapat namin malaman"

Collaboration of authorities is important. Communication will help them understand the different causes and effects of traffic in different perspectives. Additionally by communicating they can share their knowledge and discuss a plan to have better traffic management.

Police Assistance: Safer roads and police enforcement are closely associated since the latter directly encourages road users to improve their behavior by complying with basic traffic rules and laws. (Mingjie Feng *et al*. 2020)

> *"Kapag may kasama kaming police, syempre mga takot yon sa pulis. Kahit na ayaw nila kaming sundin mapipilitan silang sumunod kase katabi namin mga pulis diba. So napakalaking bagay talaga sa amin kapag mayroon kaming mga pulis dito sa kanto. Lalo na kapag may aksidente dyan, may banggaan at away madaling respondehan kase kami, wala kaming mga armas eh, paano kung may nagbabarilan dyan, paano na, anong gagawin namin doon? Diba?"*

It is clearly stated above the importance of police assistance specially during unexpected events, so that it would be easier for them to respond. She also stated that they are not trained to rescue accidents so instead of giving rescue they still need to call other authorities for help, specially the police for the investigation.

> *"Hindi kami trained magbigay ng first aid, so kapag may insidente natawag kami agad ng police at rescue na mag-a-assist at kasama na rin kami doon kapag pumunta sa police station para magbigay ng statement kung ano ba ang nangyari"*

She also added that they need some backup to make the response quick.

> *"Katulad nga ng sinabi ng chief namin rumeresponde kami katulad na lang kapag may banggan, aksidente, pero kailangan natin ng backup para mapadali"*

Traffic Economic Loss: Traffic congestion is one of the major barriers to the economic development of developing economies, resulting in severe social and economic impacts. (Md. Abdul Fattah *et al*. (2022). A method of direct economic loss analysis for road traffic accidents based on entire evaluation capabilities is proposed to reduce the time required and increase the accuracy of the assessment. Initially, create the evaluation index system according to the evaluation index system's construction principles. Second, by employing the assessment index approach, the direct economic damages resulting from traffic accidents are assessed independently. In the end, the comprehensive evaluation function is employed to assess the direct economic loss of traffic accidents, and the evaluation findings of the direct economic loss of traffic accidents are obtained, based on the individual evaluation results of various indicators. This study revealed that traffic can be the cause of delay that may affect the incomes of the people that are causing economic loss. Chase said that,

> *"Yung traffic halimbawa, papasok ka, yung mga male-late diba imbis na makabukas ka agad ng store mo para meron kang kikitain doon nagsimula ang ekonomiya eh"*

Business world ownership is one of the parts of our economic cycle. That's why traffic that will be the cause of delay may become a hindrance to business owners because delays may impede their earnings and by that, it can also affect our economy. Haze said that,

> *"Hindi lang naman sa noveleta nakakaapekto ng ekonomiya ang traffic, pati ang ekonomiya ng iba naapektuhan. Tulad nung, kunyari yung nagdedeliver ng gulay galing Cavite city eh natraffic, edi na late na, nalanta na yung gulay pagdating sa tanza, kaya malaki talaga apekto non hindi lang sa noveleta"*

Food products produced by unsustainable and intensive production methods have caused some negative impacts on human well-being, society and the environment. (Shanshan Lin *et al*., 2020). The statement of Haze also revealed the influence of traffic affects the economic loss in terms of trading products to another place. The delays caused dropping of products. Chase said that,

> *"Halimbawa ang bumabyahe, ikaw driver ka, minsan imbis na naka dalawang balik ka na eh traffic, isang balik na lang.*

The statement above says that public transportation drivers are also affected due to traffic. Instead of continuing finding passengers they are just choosing to stop and boundary their vehicles. Some of them are also not continuing their route and rerouting to avoid heavy traffic.

Impact of Congestion: Traffic congestion is occurring in the Philippines, especially during peak hours, according to Montemor *et al*., (2023) [50], an increasing number of vehicles on the road, the tight capacity of the road, and large vehicles cause slow-moving traffic. People rush to work or school during peak hours, which causes many vehicles on the road to cause delays for some.
Lucas stated that

> *"Malaking epekto ang traffic sa mga tao dahil maraming taong nalalate pumasok sa mga trabaho nila at Hindi sumasakto sa oras"*

Edwin stated that the traffic is really bothering to people especially those who have work. Because in some cases there aren't able to attend their work on time. Chad also said that,

> *"Syempre ako bilang nagtatrabaho kapag na traffic ako then nalate ako may salary deduction."*

Traffic congestion is also affecting employees in attending their work early and on time. Chad also added,

> *"Kapag natraffic ako dumating sa akin na parang i'm not well prepared na parang pagod na pagod nako agad pero ang dahilan lang naman non ay traffic."*

The statement revealed that when the employees are not able to attend their work on time they will have a salary deduction that may really affect their productivity. In some cases there are also times where he will look like he's so tired and not well prepared to do his job. But the only reason for that is traffic. The statement states that traffic might also affect people's impressions. Lucas said,

"Nakakapagod sya tapos nakakabagal sya ng Oras, at Hindi ka agad makakapunta ng saktong Oras sa pupuntahan mo dahil sa sobrang traffic at Yung mga taong nag cocommute"

The statement revealed that the Traffic congestion is a hindrance to people. Traffic congestion becomes a cause of delay and time consuming. It also affects the physical health of a person. Steve also stated

"Yung risk na magkakasakit ka anong oras kana makakauwe."

The statement above support the statement of Lucas that traffic congestion is not only causing delays but also affecting our well being. That only shows that traffic congestion is stressful. Steve stated,

"Minsan sobrang init nakaka stress talaga puno lagi yung bus talagang pagod ka tapos inis yun ang mararamdaman mo."

It shows that the commuters not only feel delays but also stress due to traffic congestion. Especially if they are experiencing extreme heat. Chad stated,

"I feel irritated lahat naman siguro ay sasangaayon"

Irritation is a situation or action that annoys someone — emotionally or physically. The statement above says that traffic congestion has a lot of impact on a person's well-being. It is jot also affecting their physical health, but also their mental health. Due to heavy traffic people especially commuters experience not only delays but also stress and irritations. However, Alfonso stated,

"Nagtitiis nalang ako umabante, anong magagawa edi magtiis sa traffic hanggang sa umabante kahit ilang oras sa traffic. Magpaypay, magtiis, walang magagawa.Walang choice, hindi ka pwedeng umikot lalong matraffic."

The statement says that each person has different ways to cope up in every situation. Unlike the statement above, Alfonso is choosing to keep calm because he knows that he can't do *anything but to endure the traffic problem.* Steve stated,

"Titiisin ko nalang yung traffic tapos mag dadala nalang ako ng mga kailangan kong gamit kagaya ng tsinelas lalo na pag tag ulan babalott ko nalang yung sapatos."

"Mag aadopt ka na lang siguro mag ready ka na lang ganun na lang din mag ready kasi wala ka din namang magagawa."

Shelo's statement support the claim of George by saying to just be ready, because they can't do anything but to endure the problem. Instead of stressing himself he choose to get ready incase there are disasters that would happen in the middle of traffic. Alfonso stated,

"Tuwang tuwa ako kasi ang dami naming natatraffic, kapag naiinis ka naman mas lalo ka lang may highblood, edi tumawa ka lang at magtiis."

Many studies found that positive mood and positive thinking increase one's ability to manage stress in healthy ways, which leads to improved health outcomes such as increased immunity and longevity, as well as improved lifestyle factors such as greater job satisfaction (Elizabeth Scott 2020). The study supports the statement of Alfonso that it is important to keep calm and just entertain yourself instead of stressing yourself.

Conclusion
Analysis of the results simply means that In many urban places, traffic congestion is still a major problem that negatively affects people's quality of life and the economy. In order to relieve traffic and lessen its detrimental consequences, solutions frequently combine infrastructure upgrades, public transportation advancements, and the promotion of alternate forms of movement Addressing congestion requires a combination of infrastructure improvements by reducing traffic during emergencies disaster preparedness strategies can facilitate evacuation routes and speed up the response time of emergency services. On the other hand, traffic congestion can make it more difficult to respond to disasters, which emphasizes how important it is to plan ahead and make infrastructure upgrades in order to lessen these difficulties.
Thus, the results showed that the respondents improve their skills, from achieving those challenges in their ways on how they take and address the improvements in responding and giving services in Traffic management and disaster preparedness. To sum-up, the strategies, advancement has a significant impact on improving and enhancing to reduce the traffic and to lessen the difficulties in disaster. Furthermore, the evidence showed that In arrange to control activity and lower outflows from vehicles, controls are imperative. It emphasizes the importance of collaborative administration among specialists in tending to activity blockage, the inclusion of law requirement in keeping the streets secure, and the utilize of support learning for activity flag

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