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Introduction

- **COVID-19** disease initially diagnosed in patients in Wuhan, China in December 2019
- Declared as a pandemic on the beginning of March 2020
- The majority of countries in a “lockdown” restricting everyday life activities to only the most essential
- As a result, road traffic volumes and mobility activities in general have immensely dropped
Background

Traffic Volumes
- Travel demand was decreased and many countries have witnessed sizeable drops in car traffic and public transport ridership
- A 37% and 35% decrease in driving days per week and vehicle miles driven, respectively among adolescents was identified

Driving Behavior
- Fixed safety cameras detected that speed violations have been increased by 39% and average driving speed by 6–11%
- Reduced traffic volumes due to lockdown, led to more frequent harsh accelerations and harsh brakings per 100km (up to 12%)

Road Traffic Crashes
- The total number of road traffic crashes, serious and slight injuries was decreased by half, mainly due to the dramatic traffic reduction
- Fewer fatalities were observed but, unfortunately, the rate of reduction has slowed
Data Collection and Analyses

- Data from the **Mobility Trend Report of Apple**
- Data from the smartphone sensors were collected using the smartphone applications technology that has been developed by **OSeven**
- Monthly road traffic crashes, fatalities, and slight injuries data were derived from the **Hellenic Statistical Authority**
- Advanced **Statistical Analyses**
  - Machine Learning (XG Boost, Clustering, Neural Networks)
  - Time-series (ARIMA, SARIMA, SARIMAX)
Traffic Volumes

- The total number of trips as well as the distance travelled was reduced considerably.
- Increased driving and walking volumes, roughly by 100%, during the 2nd COVID-19 lockdown compared to the 1st one.
- A 57% and 58% reduction on people driving and walking was identified in the 2nd lockdown compared to the period between the 1st and the 2nd lockdown.

*Source: Apple*
Driving Behavior

- During the 1\textsuperscript{st} lockdown period, an **overall 10\% increase** in average speed was identified compared to the period before the appearance of COVID-19 pandemic. Interestingly, during the 2\textsuperscript{nd} lockdown period, a 6\% decrease in average speed was identified in Greece compared to the 1\textsuperscript{st} one

- **Comparison** between normal evolution and COVID-19 period data
  - Higher **speed** values up to 7.5 km/h more than the “normal” time-series evolution
  - Values for harsh brakings/100km were **much higher** than the forecasted values

Source: OSeven
Road Traffic Crashes

- After the appearance of COVID-19 pandemic in 2020, a **significant 15% reduction** in road traffic crashes was found compared to 2019.
- A **32% reduction in road traffic crashes** was observed in November-December 2020 compared to the period between the 1\textsuperscript{st} and the 2\textsuperscript{nd} lockdown.
- During the 2\textsuperscript{nd} lockdown period, a **46% increase in the total number of road traffic crashes** was identified compared to the 1\textsuperscript{st} one.

**Road accidents in Greece**

![Graph showing road accidents in Greece with 1\textsuperscript{st} and 2\textsuperscript{nd} lockdown periods highlighted.](source: ELSTAT)
Significant Findings

- A dramatic change in traffic was observed and traffic volumes were substantially increased when comparing the 1st and the 2nd lockdown.
- As traffic levels reduced and police time was spent on other things, speeding went up and in some cases more casualties per traffic were occurred.
- Increased average speed and more frequent harsh events per distance were demonstrated. This indicates that with fewer vehicles on city streets, slightly more drivers were blowing the speed limit.
- The fatality and slight injuries rates per crash were increased compared to assumed conditions without COVID-19.
Scientific and Social Impact

- The COVID-19 pandemic has shown how quickly global mobility and safety conditions can change.

- Road safety is also a pandemic, and should also be treated as such.

- On a positive note, as cities put in place new cycling infrastructure, cycling use numbers increased.

- After the pandemic, we need to build a safer and more equal system for all road users – giving back separated space for healthier and sustainable active travelling.
Future Challenges

- A more **in-depth understanding** of how the pandemic has affected road safety, and how a gradual re-opening and possible subsequent restrictions may affect driver behaviors is still to be determined.

- The impetus that COVID-19 is placing on installations of **temporary or permanent infrastructure** to facilitate more pedestrians and cyclists, is a positive result of this crisis and should be further explored, whereas the regain of Public Transport passengers is a challenge.

- COVID-19 crisis can be the trigger also for a new and **serious behavior of the Authorities** and the citizens for safer roads for all, everywhere in the world.
COVID-19 impact on mobility and safety

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