

10th INTERNATIONAL CONGRESS
ON TRANSPORTATION
RESEARCH



ICTR 2021

**September 1-3
Rhodes, Greece**

A four-country comparative overview of the impact of COVID-19 on traffic safety behavior

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Introduction

- **COVID-19** disease initially diagnosed in patients in Wuhan, China in December 2019
- Declared as **a pandemic** in the beginning of March 2020
- The majority of countries in a **“lockdown”** restricting everyday life activities to only the most essential movements
- 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%)

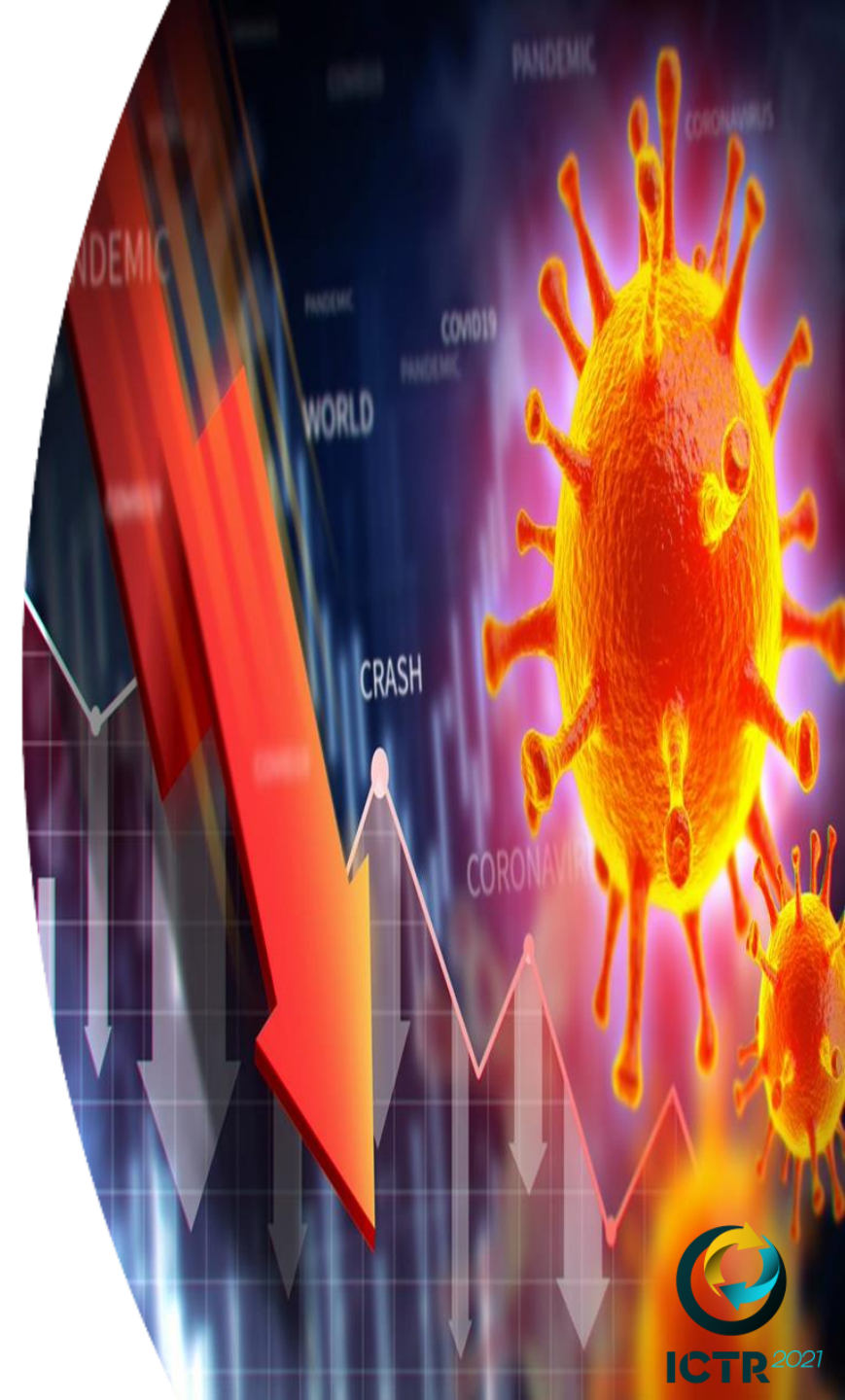
Road Traffic Crashes

- 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 (1/3)

- Data from the **Mobility Trend Report of Apple**
- Data from the smartphone sensors (e.g. GPS, accelerometer data and gyroscope data) were collected using the smartphone applications technology that has been developed by **OSeven**
- Monthly road traffic crashes, fatalities, serious and slight injuries data were derived from the **Hellenic Statistical Authority**



Data Collection (2/3)

- Traffic volume, driving behavior and road traffic crashes data for **four countries** (i.e. Greece, Saudi Arabia, Cyprus and Brazil) from 29/12/2019 to 31/12/2020 were collected and analyzed
- Descriptive statistics both **before and after** the appearance of COVID-19 were estimated
- **Geographical differences** among the four countries examined were not taken into consideration



Data Collection (3/3)

➤ Driving indicators of the analyzed data

Indicator	Unit	Description
Total distance	km	Total trip distance
Driving duration	sec	Total duration of driving (i.e. duration of stops has been excluded)
Harsh accelerations/100km	count/100km	Number of harsh accelerations per distance (i.e. 100 km)
Harsh brakings/100km	count/100km	Number of harsh brakings per distance (i.e. 100 km)
Average driving speed	km/h	Average speed during driving with stops been excluded from the duration of the trip
Speeding percentage	%	Ratio of duration of speeding in a trip per total duration of driving (i.e. duration of stops has been excluded)

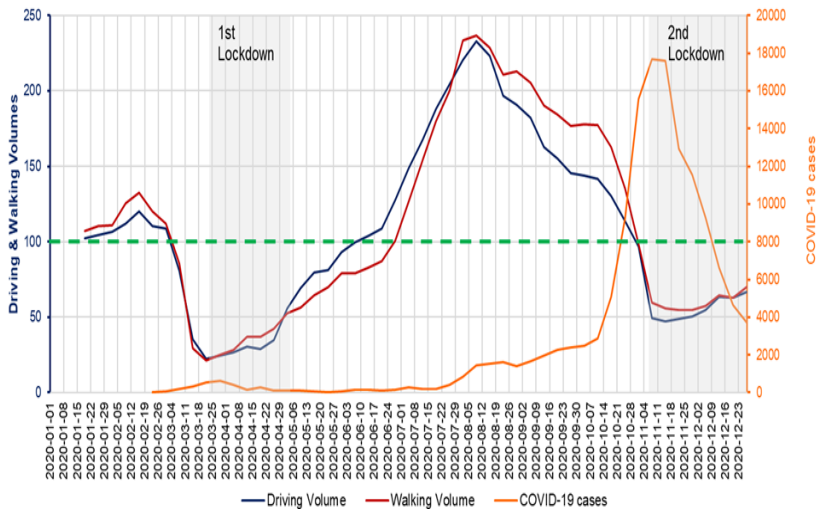
Source: [OSeven](#)



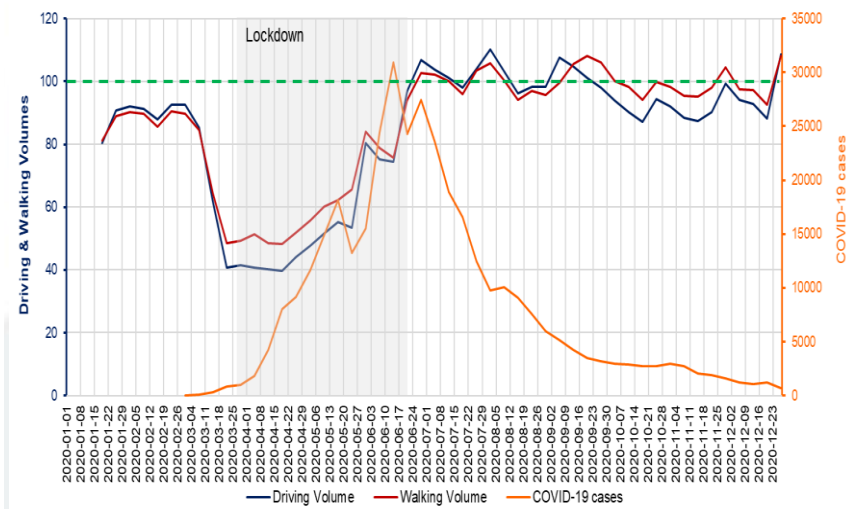
Traffic Volumes

- In **Greece**, total number of trips and distance travelled reduced by 70% (1st lockdown) and 37% (2nd lockdown) for people driving and walking compared to the period before
- In **Saudi Arabia**, a 56% and 47% reduction of people driving and walking was observed during the lockdown period compared to the period before
- In **Brazil**, a 63% and 56% decrease of driving and walking patterns was identified during the lockdown period compared to the period before
- After the end of the lockdown periods, people walking and driving **reverted immediately** to baseline frequencies

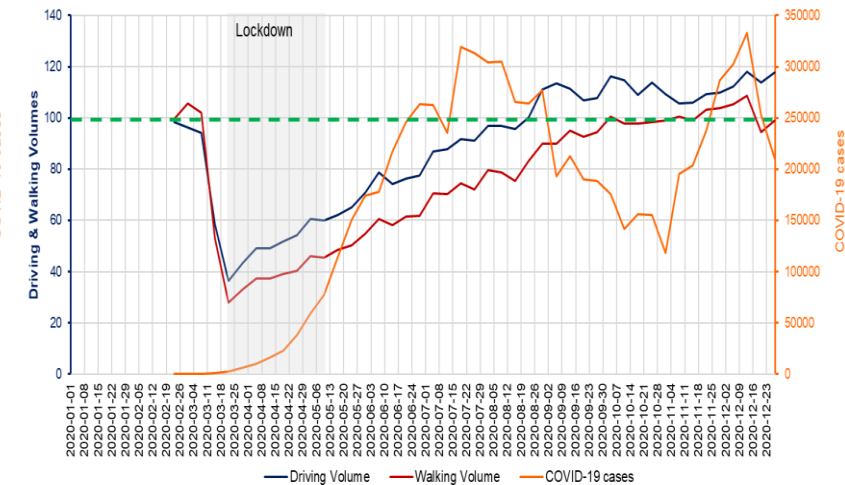
Driving & Walking Volumes in Greece



Driving & Walking Volumes in Saudi Arabia



Driving & Walking Volumes in Brazil

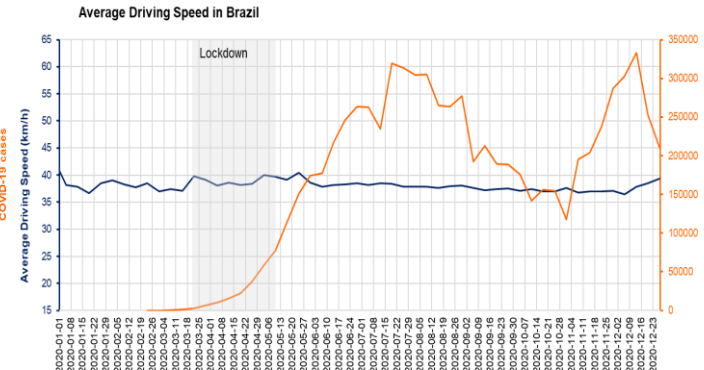
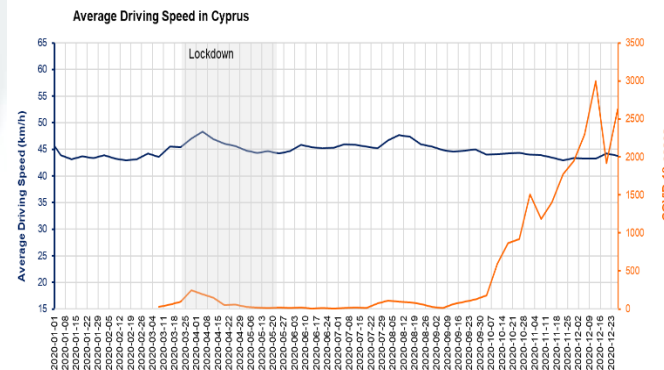
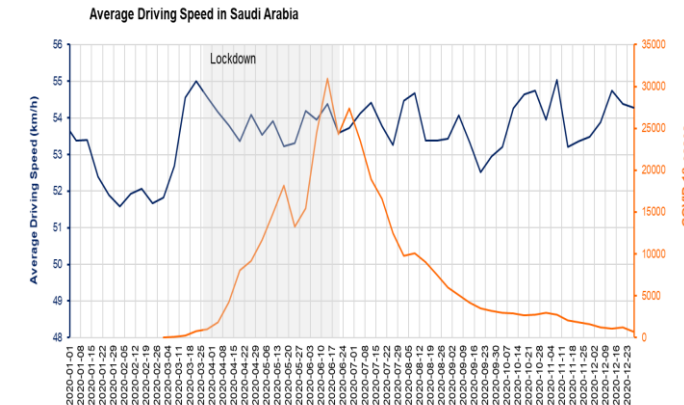
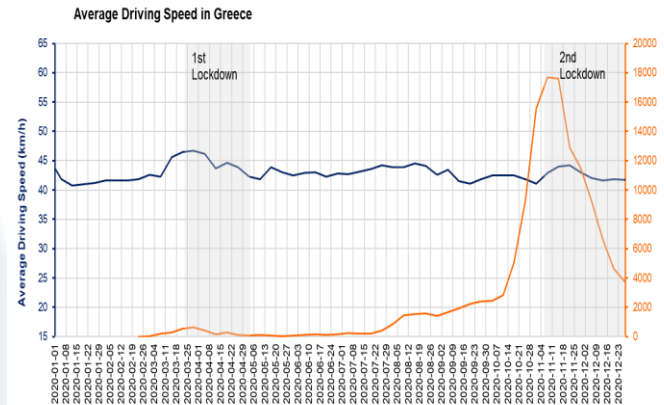


Source: [Apple](#)



Driving Behavior – Average Driving Speed

- In **Greece**, average driving speed increased by 7% (1st lockdown) and 1% (2nd lockdown) compared to the period before
- In **Saudi Arabia and Cyprus**, a 2% and 4% spike in average driving speed was identified during the lockdown period compared to the period before
- Interestingly, no significant change was detected on average driving speed in **Brazil**
- The highest values of average driving speed were identified during August 2020 for all countries → Reduced traffic volumes in summer holidays led to **higher average driving speeds**

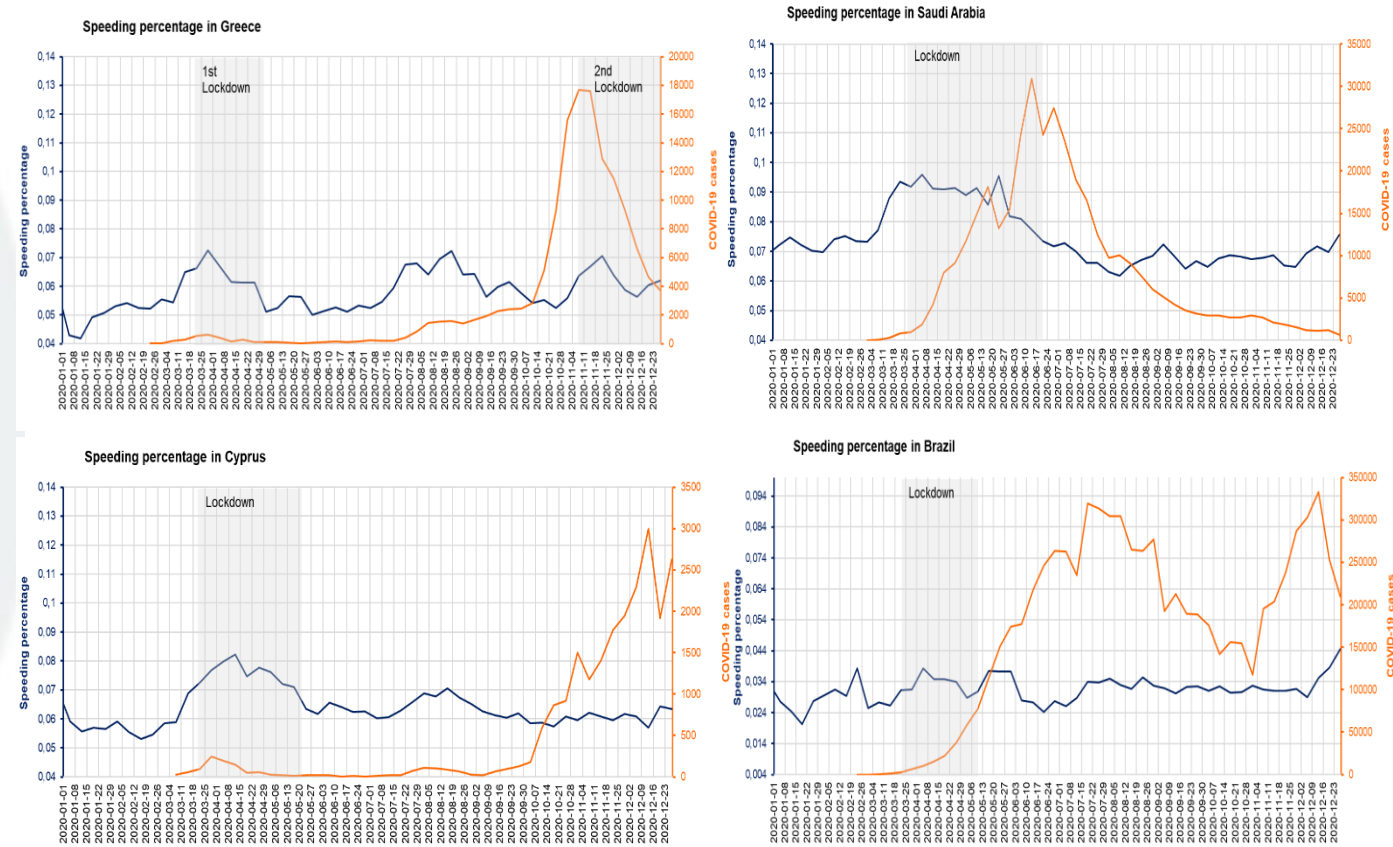


Source: [OSeven](#)



Driving Behavior – Speeding Percentage

- In **Greece**, a remarkable 22% (1st lockdown) and 20% (2nd lockdown) spike on speeding percentage was observed compared to the pre-pandemic period
- The speeding percentage was increased by 17% during the lockdown in **Saudi Arabia**, by 22% in **Cyprus** and by 15% in **Brazil**
- After the end of the lockdown periods, a **significant drop** in speeding percentage was identified

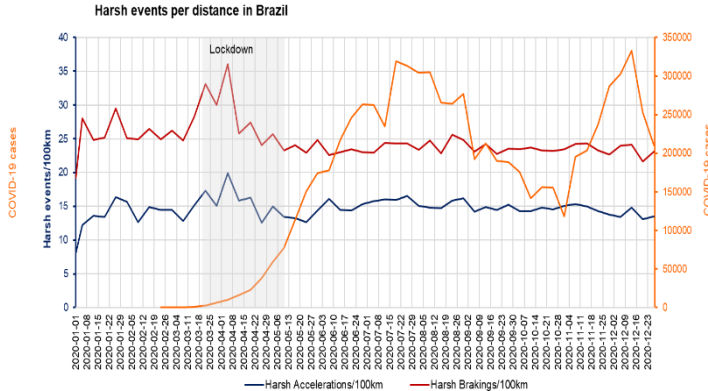
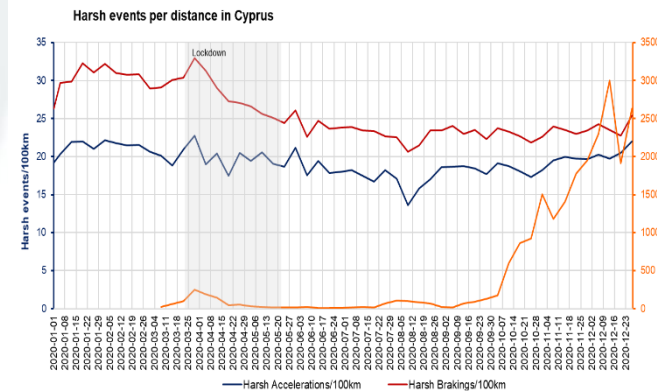
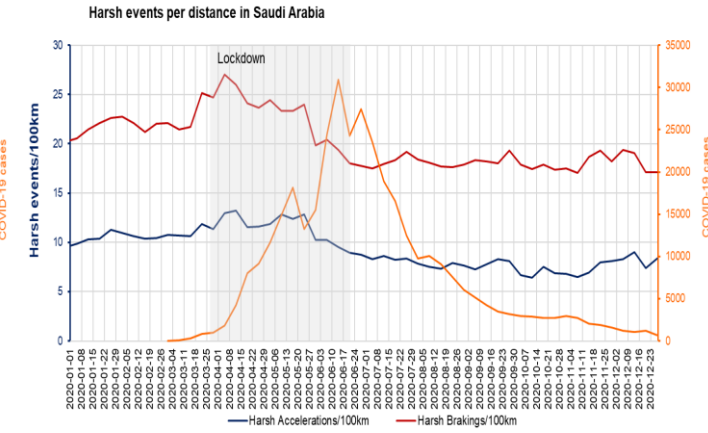
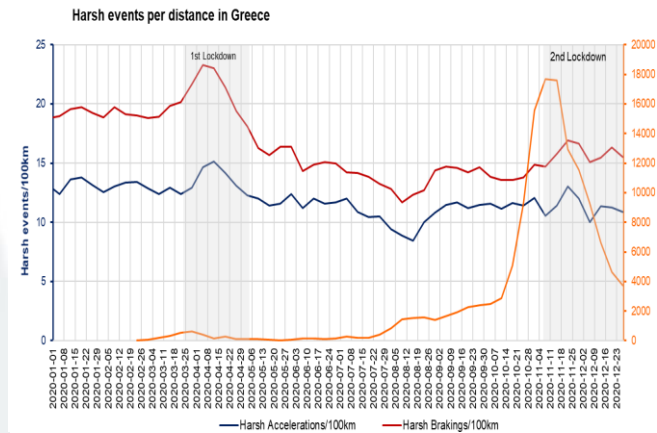


Source: [OSeven](#)



Driving Behavior – Harsh Events

- In **Greece**, harsh accelerations/100km and harsh brakings/100km increased by 5% and 11% during the 1st lockdown compared to the period before. Interestingly, during the 2nd lockdown, harsh events reduced by 13% and 17%
- Similar trends were observed during the lockdown periods in **Saudi Arabia** and **Brazil**, where the number of harsh events per 100km was increased by 11% and 15%, respectively
- However, in **Cyprus**, a 6% reduction in harsh events per distance was observed compared to the period before
- After the restrictions, **fewer harsh accelerations and brakings** per distance were identified

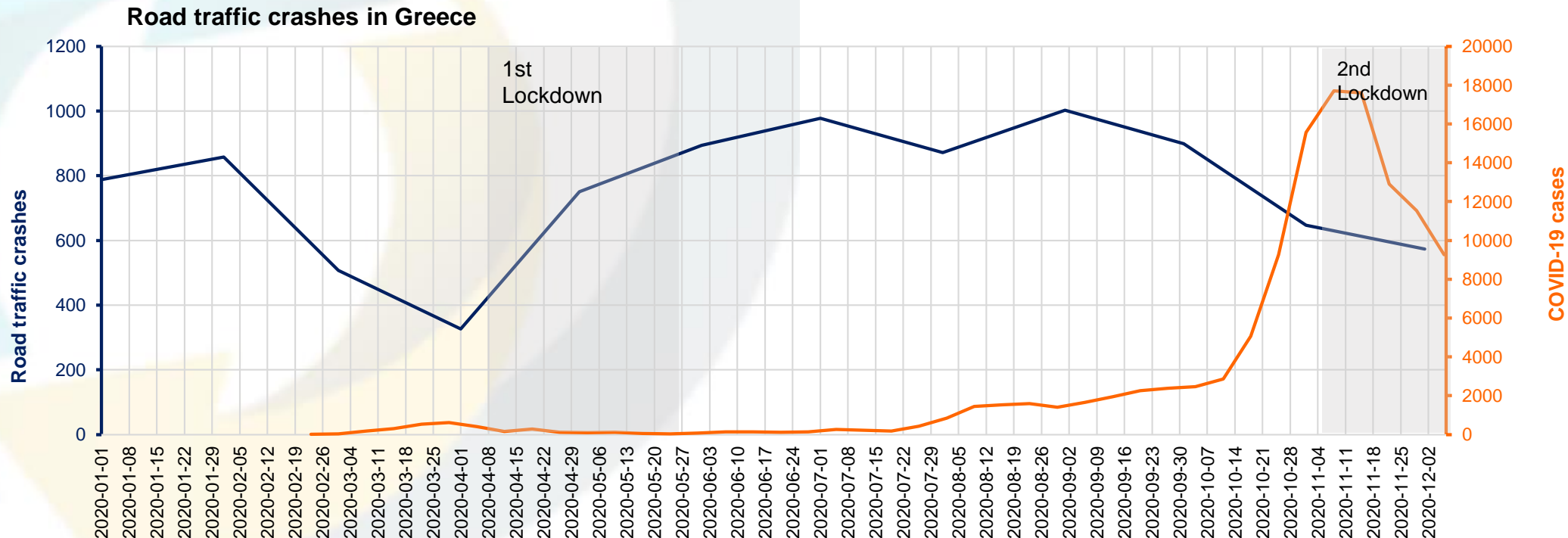


Source: [OSeven](#)



Road Traffic Crashes

- A **significant annual reduction** (16%) was recorded in traffic fatalities in 2020 compared to 2019, mostly due to the pandemic
- In **Greece**, a 49% (1st lockdown) and 26% (2nd lockdown) reduction in road traffic crashes was observed compared to the period before
- Monthly data for road traffic crashes were **not available** for Saudi Arabia, Cyprus and Brazil



Source: [ELSTAT](#)



Conclusions

- A dramatic change in traffic was observed and traffic volumes **were substantially increased** when comparing the lockdown periods with the period before
- As traffic levels reduced and police time was spent on other duties, **speeding went up** and in some cases **more casualties per traffic** 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



Key Lessons

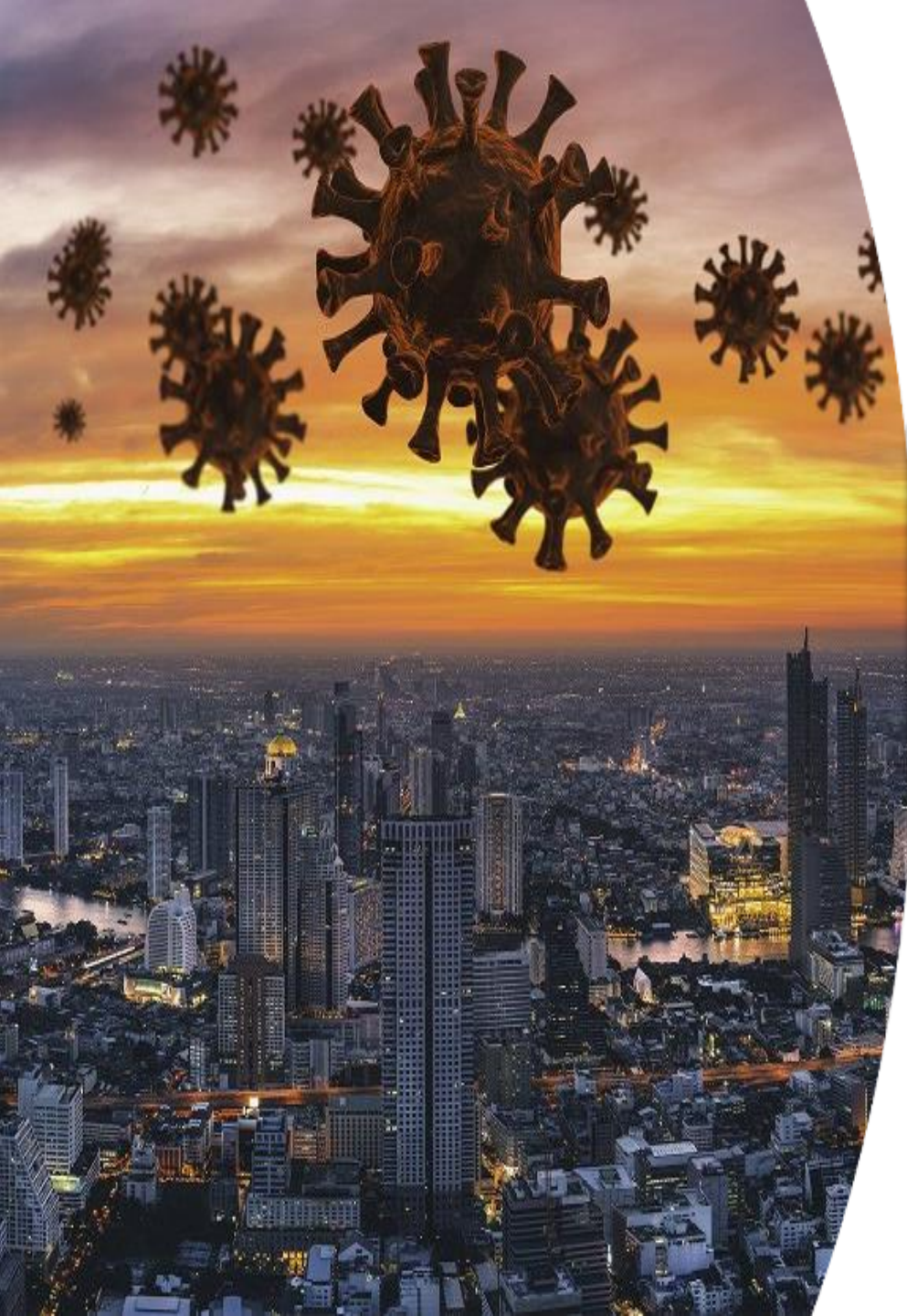
- The COVID-19 pandemic has shown how quickly **global mobility and safety conditions** can change
- **Road safety is also a pandemic**, and should also be treated as such
- On a positive note, as cities put in place new cycling infrastructure, **cycling use numbers increased**
- After the pandemic, 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 in several cities (e.g., the Athens Great Walk major urban regeneration project), is a positive result of this crisis and should be further explored
- 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





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