

## Editorial

## Captain Seat: Smart Solution for Physical Distancing on Buses During the Covid-19 Pandemic

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### Abstract

It has been a year after the announcement of Covid-19 outbreak in Wuhan. Activity restriction, implementation of health protocol, and lock-down are enforced to cut-off the spread of this virus. However, in the uncertainty towards a new normal, the mobility of people continues for various purposes. A rapid medical check-up at the airport or at railway stations is possible by the local authorities but it is impossible for public bus passengers due to the limitations of medical staff and a large number of bus stations. Most passengers also failed to comply with the government's recommendation to conduct a rapid test before using public buses. As anticipation, the Transportation Agency issued a regulation that all buses can only be filled with 50% (max) of their normal capacity by emptying 2 of the 4 seats in a row. As a consequence, a 32-seat bus can only be filled with 16 passengers (max) and the ticket price has doubled to cover operational costs. However, passenger interest in bus services has decreased due to high ticket prices. Therefore, this short article reports the smart actions of several bus companies in Indonesia to create a "Captain Seat", a 1-1-1 bus seat configuration to ensure physical distancing between passengers. With the captain seat model, buses with 32 seats are modified to 24 seats, the ideal distance between passengers during a pandemic can be maintained, the risk of loss to bus companies can be reduced, and passenger costs can be lowered.

**Keywords:** Covid-19, Rapid test for bus passengers, Captain seat

### Abstrak

Sudah setahun setelah pengumuman wabah Covid-19 di Wuhan. Pembatasan aktivitas, implementasi protokol kesehatan, dan lock-down diberlakukan untuk menghentikan penyebaran virus ini. Namun, dalam ketidakpastian menuju normal baru, mobilitas orang terus berlanjut untuk berbagai keperluan. Pemeriksaan kesehatan cepat di bandara atau di stasiun kereta api dimungkinkan oleh otoritas setempat tetapi tidak mungkin bagi penumpang bus umum karena keterbatasan staf medis dan banyaknya stasiun bus. Sebagian besar penumpang juga tidak memenuhi anjuran pemerintah untuk melakukan rapid test sebelum menggunakan bus umum. Sebagai antisipasi, Dinas perhubungan mengeluarkan peraturan bahwa seluruh bus hanya dapat diisi maksimum 50% dari kapasitas normalnya dengan cara mengosongkan 2 dari 4 kursi per baris. Akibatnya, bus 32 kursi hanya bisa diisi maksimum 16 penumpang dan harga tiket naik dua kali lipat untuk menutupi biaya operasional. Namun, minat penumpang terhadap layanan bus mengalami penurunan karena harga tiket yang tinggi. Karenanya, artikel singkat ini melaporkan tindakan cerdas dari beberapa perusahaan bus di Indonesia untuk membuat "Captain Seat", konfigurasi kursi 1-1-1 untuk memastikan jarak fisik antar penumpang di dalam bus. Dengan model captain seat, bus dengan 32 kursi diubah menjadi 24 kursi, jarak ideal antar penumpang saat pandemi bisa dipertahankan, risiko kerugian perusahaan bus bisa ditekan, dan biaya penumpang bisa diturunkan.

**Kata-kata kunci:** Covid-19, Rapid test untuk penumpang bus, Captain seat

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## 1. Introduction

Since it was announced in Wuhan-China at the end of 2019, the Covid-19 pandemic has become a world problem. Until the end of 2020, a year from being announced, the Covid-confirmed curve is increasing and spreading across all continents (Figure 1). Everyone was confused because they didn't have the same experience before. Medically, Covid-19 is transmitted from one person to another through droplets or physical contact.

Transportation activities by plane, train, ship and public bus are suspected to be one of the media for virus spreading. The results of Lau's study [1] showed a strong correlation between the spread of Covid-19 and flight traffic, both domestic flights in China and international flights from China to North America, Asia and Europe. Onsite symptom detection and temporary quarantine of passengers may be possible for passengers on planes, trains and ships, because the government has full authority and the number is identified. However, the practice of symptom detection for bus passengers is difficult because of the larger number of bus stops. Even if bus

passengers are willing to do a rapid test, the infrastructure and medical staff are not sufficient to serve them during the pandemic.

Meanwhile, the mobility of people using public buses continues for various purposes. Therefore, comprehensive cross-sectoral actions are needed for the continuity of public bus operations, including strengthening management, personal protection, disinfection, and education to public bus users. Virus prevention and control during the use of public buses is very important so that all countries can continue their social and economic activities [3].

Initially, the policy to lock-down and stop social activities for a certain time was expected to cut the virus spreading. However, it seems that not all citizens are subject to government policies. In India, it is reported that 51.31% of people continue to use public transportation and only 5.3% of people switch from public to private transportation [4]. In Jakarta, Indonesia, the local government took a policy to reduce the operating schedule for city buses. However, due to high demand, it resulted in crowds of passengers at the bus stop [5].

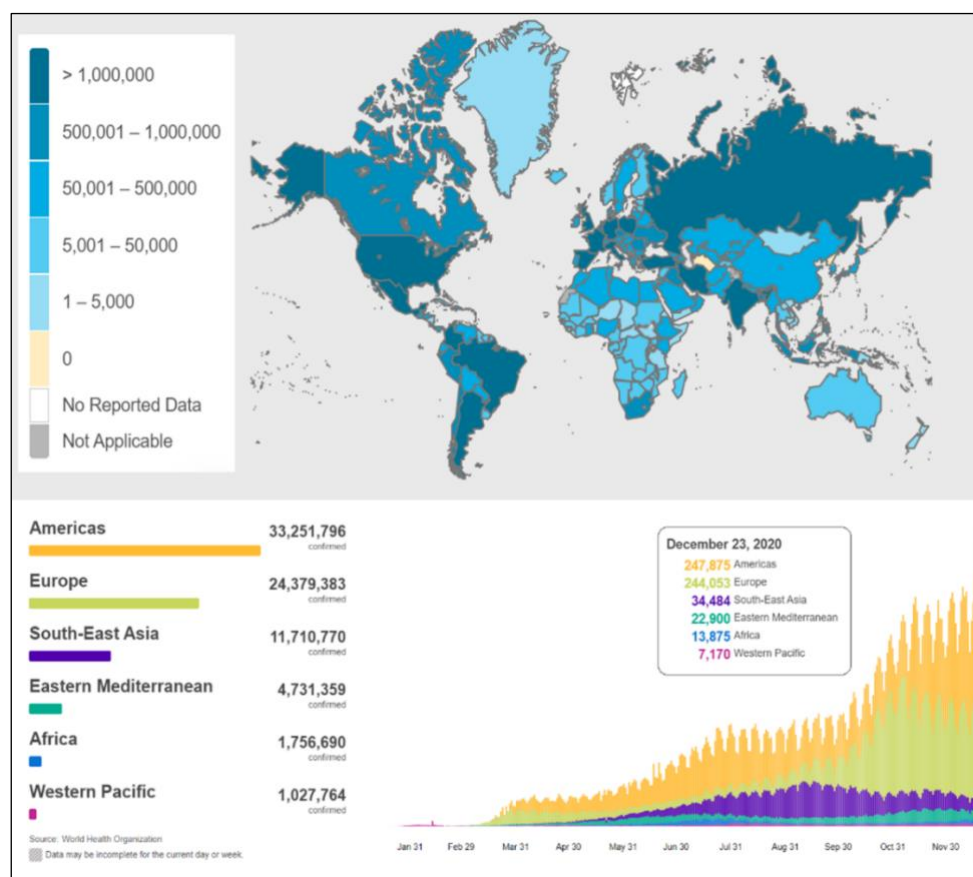


Figure 1. Map of the distribution of Covid-19 and trend of confirmed cases globally [2]

## 2. Captain Seat: An Innovation

In Indonesia, there was sharp declining in people mobility using intercity buses in the early spread of covid-19. However, the demand slightly rose again nowadays. Ground transportation authorities enforce rules to fill a maximum of half of bus seat capacity, which is the configuration of 2-2 bus seats can only be seated by 1 passenger for 2 seats. As a result, bus operators face huge dilemma between raising bus fares but causing low people interest or operating at the initial fare but the bus company will lose out. Meanwhile, there is no subsidy policy from the government.

For that reason, several intercity bus companies collaborate with car body companies modified the bus seat configuration, from 2-2 to 1-1 or known as "Captain Seat". This shows a new economic balance while still subject to physical distancing rules. For example, as shown in Figure 2, for a bus with a capacity of 32 seats, with physical distancing rules only 16 passengers are allowed (Figure 2b), but with a captain seat, the bus is allowed to be filled with 24 seats, where each row of seats is separated by space along the bus. Photographic view of captain seat configuration is shown in Figure 3.

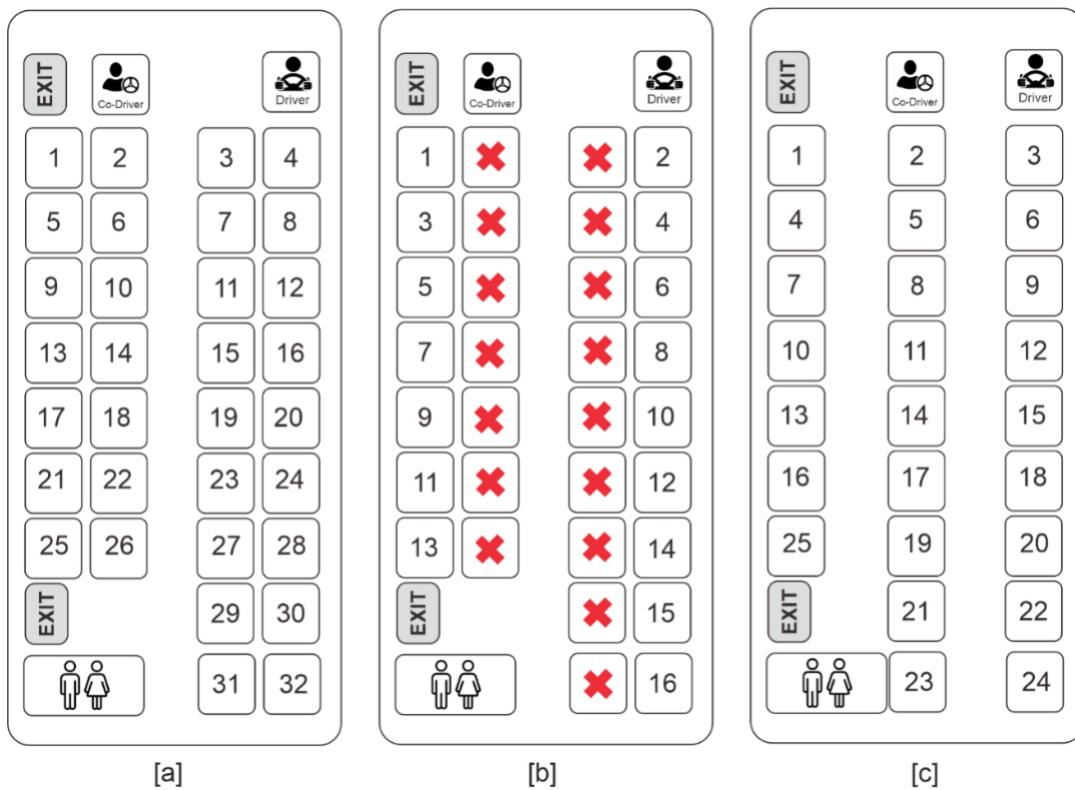


Figure 2. Redesigning normal seat to captain seat: (a) normal seat; (b) Seating arrangements during a pandemic, and (c) captain seat



Figure 3. Photographic view of captain seat implementation: (a) Bus with a captain seat, and (b) Captain seat configuration in the bus cabin

### 3. New Research Opportunities

Several bus companies have modified the bus seat configuration to Captain seats to increase occupancy from 50% to 75% of normal capacity as well as to comply with physical distancing rules in buses. However, there is an upfront modification cost for buses that were not designed that way from the start. Therefore, this opens up new research opportunities in engineering, economics and health, at least in the following aspects:

- Ergonomic, how should the captain seat design meets ergonomic aspects?
- Economically, how much the bus fare conversion is appropriate to be competitive during a pandemic and is the modification cost covered?
- Covid data analysis, can captain seat reduce or stop the spread of the virus?

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#### Author's Declaration

##### Authors' contributions and responsibilities

The authors made substantial contributions to the conception and design of the study. The authors took responsibility for data analysis, interpretation and discussion of results. The authors read and approved the final manuscript.

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##### Availability of data and materials

All data are available from the authors.

##### Competing interests

The authors declare no competing interest.

#### Additional information

No additional information from the authors.

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