

## INTISARI

Pada awal tahun 2020 ditemukan *Coronavirus* jenis baru (*SARS-CoV-2*) dan penyakitnya yang disebut *Coronavirus Disease 2019 (COVID-19)*. Diketahui, asal mula virus ini berasal dari Wuhan, Tiongkok. Hingga 12 Juni 2021 penyebaran *COVID-19* secara global mencapai 174.918.667 kasus terkonfirmasi dengan kematian sebanyak 3.782.490 kasus. Indonesia tercatat jumlah kasus terkonfirmasi sebanyak 1.894.025 kasus dengan kematian sebanyak 52,566 kasus. Di luar negeri telah dilakukan penelitian penyebaran virus *COVID-19* menggunakan *Agent-based Model (ABM)*. Dalam kasus virus *COVID-19*, perbedaan karakteristik model dapat berubah sesuai dengan kasus atau lokasi penelitian. Hal ini disebabkan perbedaan budaya (*culture*), tingkat literasi (*level of literacy*), kesadaran masyarakat (*awareness of people*), cara interaksi antar orang, ketersediaan transportasi, dll, sangat berpengaruh dalam pengembangan model simulasi ABM. Tujuan dari penelitian ini adalah melakukan analisis terhadap perilaku pergerakan agen saat pandemi *COVID-19* dan mengembangkan model simulasi penyebaran *COVID-19*.

Penelitian dilakukan pada kecamatan Tembilahan, indragiri Hilir, Riau. Khususnya pada kelurahan Tembilahan Hilir, Tembilahan Kota dan Pekan Arba. Model simulasi yang dikembangkan dibangun berdasarkan 6 komponen utama yakni jadwal pergerakan agen, mekanisme penularan virus *COVID-19*, mekanisme perubahan status agen berdasarkan *SEIRD (Susceptible-Exposed-Infectious-Recovery-Death) model*, probabilitas tingkat gejala infeksi *COVID-19*, mekanisme pelaporan kasus infeksi *COVID-19*, mekanisme karantina, dan *Geographic Information System (GIS)* kota Tembilahan. Komponen ini akan didefinisikan pada *ODD (Overview, Design Concept, Detail) Protocol*, selanjutnya model simulasi dibangun menggunakan *software Netlogo*. Simulasi dirancang dengan mempertimbangkan efek penggunaan masker, karantina, waktu dimulainya karantina, dan vaksinasi.

Hasil simulasi memperlihatkan bahwa ketaatan masyarakat menggunakan masker dan melakukan karantina lebih awal bagi orang yang terinfeksi *COVID-19* sangat efektif dalam menahan laju penularan *COVID-19*. Pada kondisi pembukaan sekolah, pemberlakuan penggunaan masker secara ketat dan vaksinasi tenaga pengajar sangat penting untuk dilakukan agar potensi penularan *COVID-19* di sekolah dapat dikurangi dan Pembelajaran tatap muka dapat dijalankan.

Kata Kunci : *COVID-19, ABM, ODD Protocol, GIS*

## ABSTRACT

*At the beginning of 2020, a new type of Coronavirus (SARS-CoV-2) was discovered and the disease was called Coronavirus Disease 2019 (COVID-19). It is known, the origin of this virus came from Wuhan, China. Until June 12, 2021, the global spread of COVID-19 reached 174,918,667 confirmed cases with 3,782,490 deaths. Indonesia has recorded a number of confirmed cases of 1,894,025 cases with 52,566 deaths. Abroad research has been carried out on the spread of the COVID-19 virus using the Agent-based Model (ABM). In the case of the COVID-19 virus, the different characteristics of the model may change according to the case or research location. This is because differences in culture, level of literacy, awareness of people, ways of interacting between people, availability of transportation, etc., are very influential in the development of the ABM simulation model. The purpose of this study is to analyze the behavior of agent movements during the COVID-19 pandemic and to develop a simulation model for the spread of COVID-19.*

*The research was conducted in the Tembilahan, Indragiri Hilir, Riau. Especially in the villages of Tembilahan Hilir, Tembilahan Kota and Pekan Arba. The simulation model developed is based on 6 main components including the agent movement schedule, the mechanism of transmission of the COVID-19, SEIRD (Susceptible-Exposed-Infectious-Recovery-Death) model, covid-19 symptoms distribution model, the mechanism for reporting cases of COVID-19 infection, the quarantine mechanism, and the Geographic Information System (GIS) of Tembilahan. This component will be defined in the ODD (Overview, Design Concept, Detail) Protocol, then the simulation model is built using Netlogo software. The simulation considers the effects of wearing a mask, quarantine, start time of quarantine, and vaccination.*

*The simulation results show that people's observance of wearing masks and conducting early quarantine for people infected with COVID-19 are very effective in restraining the rate of transmission of COVID-19. In conditions of school opening, strict enforcement of the use of masks and vaccination of teaching staff are very important so that the potential for COVID-19 transmission in schools can be reduced and face-to-face learning can be carried out.*

**Keywords:** COVID-19, ABM, ODD Protocol, GIS