

# A Comparative Study on Pandemic Response and Their Impact on Economic Growth: Evidence From COVID-19 Outbreak In Scandanavia

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## Abstract

Coronavirus strikes again with the delta variant and puts the world in a phase 3 pandemic state. Countries all over the world have adopted different response mechanisms to contain the virus's spread. Health officials call for lockdown strategies as Covid-19 cases rise in most countries. In a faster and more effective worldwide vaccination scenario, leading economies are racing towards "herd immunity" under an optimistic hypothesis, speeding the world's economic recovery. The justification behind countries making a move towards the open community approach is to keep the economy in good shape. Validating both "lockdown" and "herd immunity" approaches, Scandanavian countries were studied in this paper. Sweden, a Nordic member state that follows an open economy approach, and; Denmark, Finland, and Norway that follows strict social-distancing and lockdown strategies as a measure to flatten the curve were considered in this study. This can help assess each government policy's success or failure against containing the virus. IBM Cognos Business Intelligence platform is used to visualize the different factors affecting the economy namely, the number of infected people and the number of deaths per country. The analysis revealed that Sweden chose an open economy strategy, failed to sustain a stable economy, and continued its upward trajectory with a rising number of virus-related deaths. The comparison of Gross Domestic Product (GDP), inflation, and unemployment rates showed Sweden as one of the least, if not the worst, among other Nordics in flattening the curve. This research thus contradicts the notion of herd immunity as a measure to sustain a healthy economy to be no longer valid.

**Keywords:** Coronavirus, pandemic, lockdown, herd immunity, social-distancing

## 1. Introduction

Coronavirus at its new form, strikes again (Islam et al., 2020). The outbreak has set the world in an unprecedented health challenge, causing neuro-respiratory failures leading to death along with disruptive effects on the global economy (Ibarra-Vega, 2020). When writing this manuscript, the total number of infected people worldwide reached 203.25 million with 4.3 million deaths as per World Health Organization (WHO, 2021). The Alpha B.1.1.7 Corona Virus first started in late 2019 in China's Hubei province and started spreading worldwide through human-to-human contact. International air travel and the high infection rate helped the virus spread rapidly, with almost 10 times more reach than the seasonal flu variants (Mukherjee, 2020). By March 2020, the virus spread alarmingly in European countries, especially in Italy, France, and Germany (Anttiroiko, 2021). As the virus began to mutate in late 2020, governments worldwide enforced strict restrictions to contain the spread of the virus as most available vaccines were proven less effective to the mutant variants (Islam et al., 2020). These measures include; increased safety while traveling, banning events, closure of shops and institutions, and forced quarantines for suspicious and infected patients (Ibarra-Vega, 2020). These measures were enforced to reduce the risk of transmission of the disease between the infected and non-infected people and, to slow down the virus spread to avoid flooding the health care facilities with patients more than the hospital capacity (Anttiroiko, 2021). On the other hand, some countries adopted softer measures such as the "herd immunity." The concept behind this lies in protecting the high-risk population by infecting all healthy, low-risk populations surrounding them, which will prevent the virus from reaching high-risk vulnerable people. Even though this approach feels right and can be a solution, the main issue with this idea is that there will be

a possibility of a high flow of infected people to the health care system, causing the healthcare system to collapse. This will prevent many people needing access to proper health care facilities or intensive care units (Anttiroiko, 2021).

In all cases, many socio-economic complications occurred in different sectors due to the style of governmental responses; some of the sectors include education, manufacturing, finance, and tourism (Maria et al., 2020). This paper will focus on the economic factors, as one of the negatively affected sectors, due to the forced closure of enterprises and business units. This forced closure has caused many of them to close for good and laying off their workers, moreover declining Gross Domestic Product (GDP) and reducing the Harmonized Index of Consumer Prices (HICP) - a measure of inflation in European countries (European Central Bank, 2020). All the adverse effects led to a drop in the global economy in 2020 (Mofijur et al., 2020).

## 2. Research Motivation

Nordic countries consist of seven sovereign states: Denmark, Norway, Sweden, Finland, Iceland, Faroe Islands, and Greenland (Nordic co-operation, 2020). This paper will focus on 4 Norden regions, namely: Denmark, Norway, Sweden, and Finland, due to their relatively high population compared to their peers. Three out of 4 Nordic states, namely; Denmark, Norway, and Finland, used a lockdown community approach to slow down the virus spread (Olagnier and Mogensen, 2020; Ursin et al., 2020; Tiirinki et al., 2020). However, Sweden took a different approach relying on personal responsibility towards the community to slow down the spread. They guided the community on the importance of hand hygiene, social distancing, staying home when sick, avoiding contact with senior citizens (70 and above), and by avoiding unnecessary travel. In parallel, they kept institutions, transport, clubs, and others open (Kavaliunas et al., 2020). The summary of different COVID-19 responses for the selected Nordic countries is shown in Table 1.

From Table 1, it is to note that the percentage of COVID-19 cases in Denmark and Finland were higher than others, while both of them embraced different response strategies to deal with the pandemic situation. This paper will discuss the effect of different COVID-19 responses for Nordic countries and understand how these response mechanisms influence the economic variables of GDP, HICP, and the unemployment rate for each Scandinavian state under study. GDP is used to measure the economic growth (Saymeh and Orabi, 2013; Mofijur et al., 2020; Kutty et al., 2020), while HICP measures the price stability (European Central Bank, 2020); and, the unemployment rate indicates the impact of business closures due to the pandemic on the labor market.

## 3. Research Method

The impact of different COVID-19 strategies followed by Nordic countries was explored using descriptive-analytic methods such as data discovery and data visualization. In descriptive analytics, each step described, summarized, and analyzed the historical data to understand how different response strategies affected the Nordic countries. The collected data include:

- (1) Number of confirmed COVID-19 cases for each country extracted from the WHO webpage (WHO, 2021).
- (2) Number of COVID-19 deaths for each country extracted from WHO webpage (WHO, 2021).
- (3) Total population of each country extracted from Worldometer webpage (Worldometer, 2021).
- (4) Economic factors of each country such as; GDP, HICP, and unemployment (Eurostat, 2021).

The percentage of infected cases for each country was calculated by dividing the total number of confirmed COVID-19 cases by the total population, as indicated in Table 1. The data collected for the economic factors helped understand how successful the government responses affected the economy positively or negatively for the selected countries. Predictive outcomes will predict future outcomes based on the collected past data to understand the benefits and drawbacks of the selected COVID-19 strategies. To get the best value from the data and the analytics, the PwC framework was used, which includes; Discovery, Insights, Actions, Outcomes (DIAO) (PwC, 2020), as shown in Figure 1.

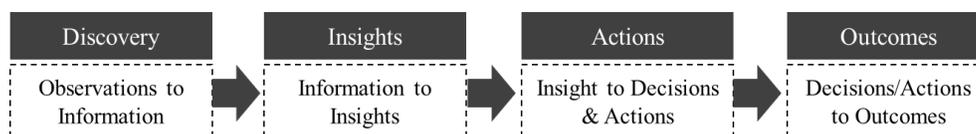


Figure 1. DIAO Framework (PwC, 2020)

IBM Cognos Business Intelligence (BI) platform is used to visualize the extracted data. IBM Cognos is an AI-fueled business intelligence platform that will support the entire analytics cycle from Discovery to Outcomes. However, the data must be cleaned and rearranged to suit the application, as shown in Figure 2.

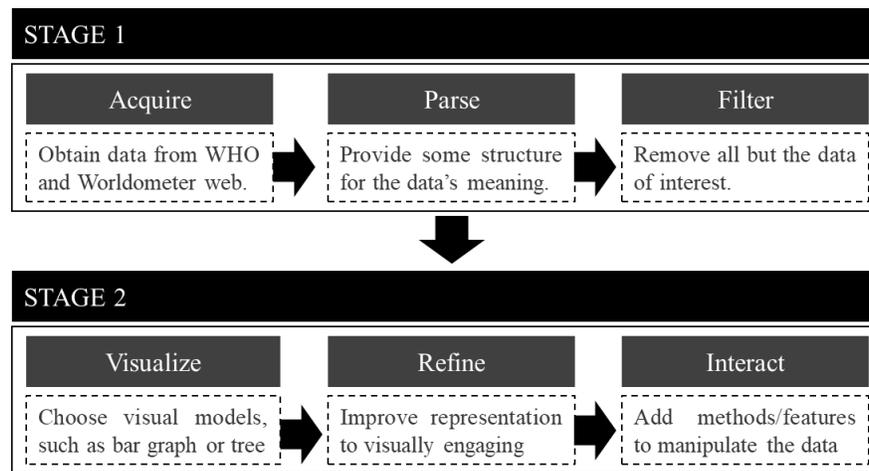


Figure 2. Research method

Table 1. Covid-19 statistics and response measures per selected Scandinavian countries.

Country	Population (X)	Total cases reported (Y)	Total death	% of cases (Y/X *100)	Response measures per Nordic states
Denmark	5,792,202	57,952	753	1.0%	Strong restrictions (by law)
Norway	5,421,241	26,195	285	0.5%	Strong restrictions (by law)
Sweden	10,099,265	166,707	6,082	1.7%	Loose restriction (relying on personal responsibility to the community)
Finland	5,540,720	18,345	365	0.3%	Strong restrictions (by law)
Iceland	341,243	-	-	-	-
Faroe Islands	48,863	-	-	-	-
Greenland	56,770	-	-	-	-

## 4. Results and Discussion

### 4.1 Cumulative New Cases

The results show variations in each Nordic country depending on the response mechanism it chose. When the virus started notable spike (S) amino acid changes under monitoring in September 2020, the total Cumulative New Cases (CNC) registered in the selected Nordic countries were on par with each other; however, by June 2021, 129,045 residents of Sweden were tested positive for the virus while in Denmark, Norway and Finland, the reported cases were just 45,225, 19,563 and 15,910 respectively. During the said period, Sweden had administered at least 7,435,943 doses of COVID vaccines so far. From the CNC curves for each country (see Figure 3), it is noted that Norway, Denmark, and Finland hold lower CNC values while Sweden shows an exponentially higher value.

These CNC numbers were then compared with the total number of population for each country as a percentage share. The reason being Sweden having almost double the population of Denmark, Norway, and Finland with values of 10.1 million, 5.79 million, 5.42 million and 5.54 million respectively; the increased number of deaths in Sweden is well justified. It is seen from the total confirmed number of cases reported, Finland has the lowest rate with 0.3%, followed

by Norway with 0.5%, then Denmark with 1%, and finally Sweden with 1.7%, the highest among all, as shown in Table 1 and Figure 3.

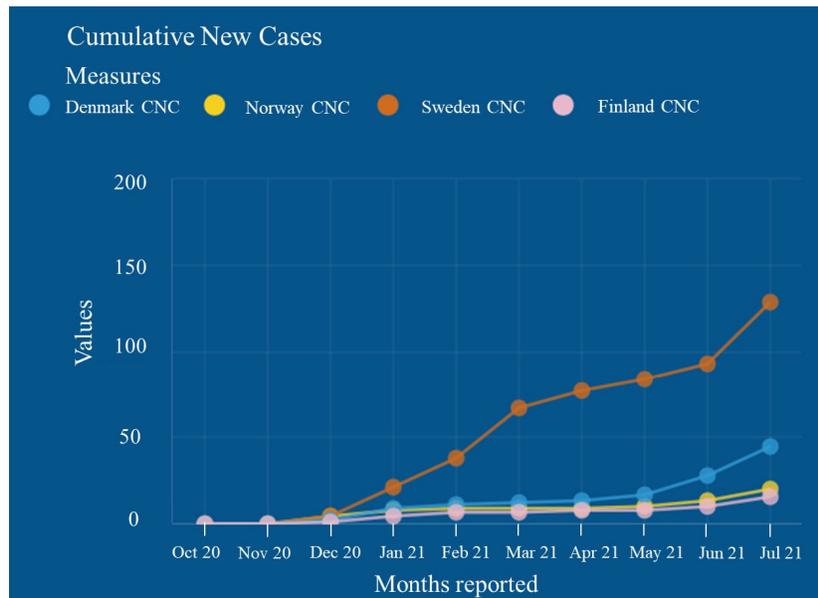


Figure 3. Cumulative New Cases (CNC) by country

#### 4.2 Death Rate

Mortality rates are highly dependent on the efficiency of the healthcare system and the number of infected people categorized as a vulnerable populations in each country. Between October 2020 till July 2021, the rate of death caused by COVID-19 for Sweden, Norway, Finland, and Denmark was 0.059%, 0.005%, 0.006%, and 0.012%, respectively, wherein Sweden, the number of deaths was 5,991, which is 21 times more than those reported in Norway, which has the least number of deaths, as shown in Figure 4.

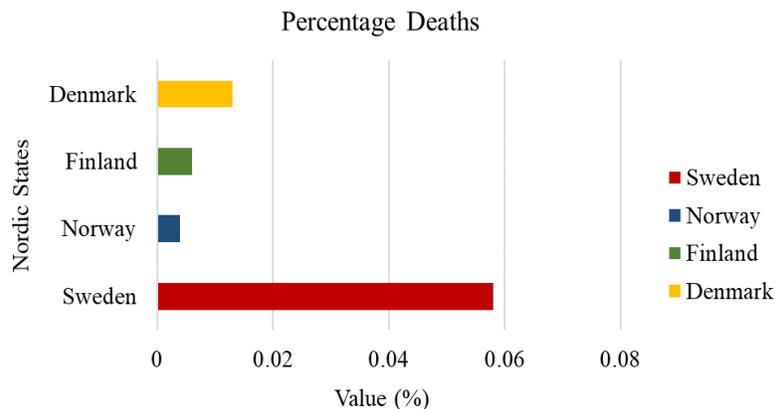


Figure 4. Visualization of mortality rate by country

#### 4.3 HICP or Inflation Rate

For the data analysis, monthly inflation indicators were considered for a period from September 2020 till June 2021. The results found Denmark with an inflation rate between -0.4% and 0.9%, Finland between -0.4% and 0.5%, Sweden between -1.3% and 0.6%, and Norway between -0.5% and 0.8%. Norway has jumped from -0.5% to 0.4% in the last two months, while Denmark scored the best rate in September 2020 with -0.2%, as shown in Figure 5. The low value of inflation implies the excess availability of consumer products with low demand for purchasing, which reduced consumer product prices.

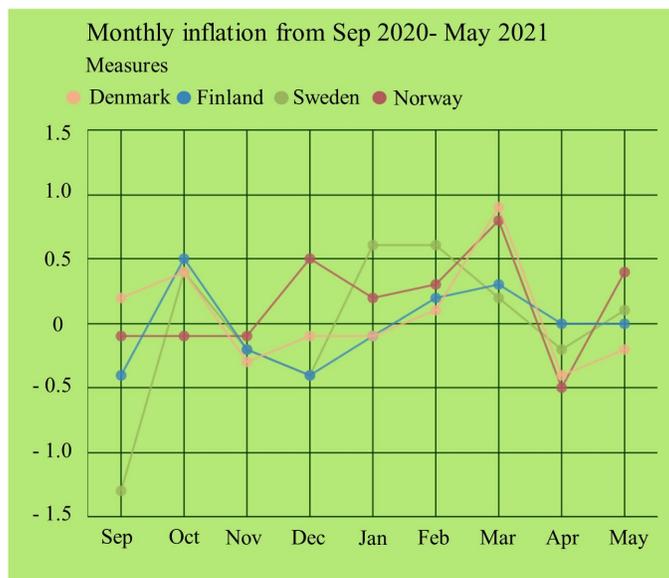


Figure 5. Visualization of inflation rate by country

#### 4.4 Gross Domestic Product (GDP)

The gross domestic product (GDP) is the overall market value of all finished goods and services manufactured in a given country and manufactured within that country's borders over a given period [18]. GDP is used to measure the economic productivity of a country. Two-time frames were compared to investigate the economic performance before and during the pandemic phase. The selected periods were Quarter 1 (Q1) and Quarter 2 (Q2) of the year 2019, against Quarter 1 (Q1) and Quarter 2 (Q2) of the year 2020. In 2019 periods Q1 and Q2, all four countries had close-range GDPs. Denmark, Finland, and Norway had a similar downward trend in 2020, while Sweden managed to retain a GDP of 0.2 in Q1 2020 and unexpectedly plunged to -8.3 in Q2 for the year 2020, as shown in Figure 6.

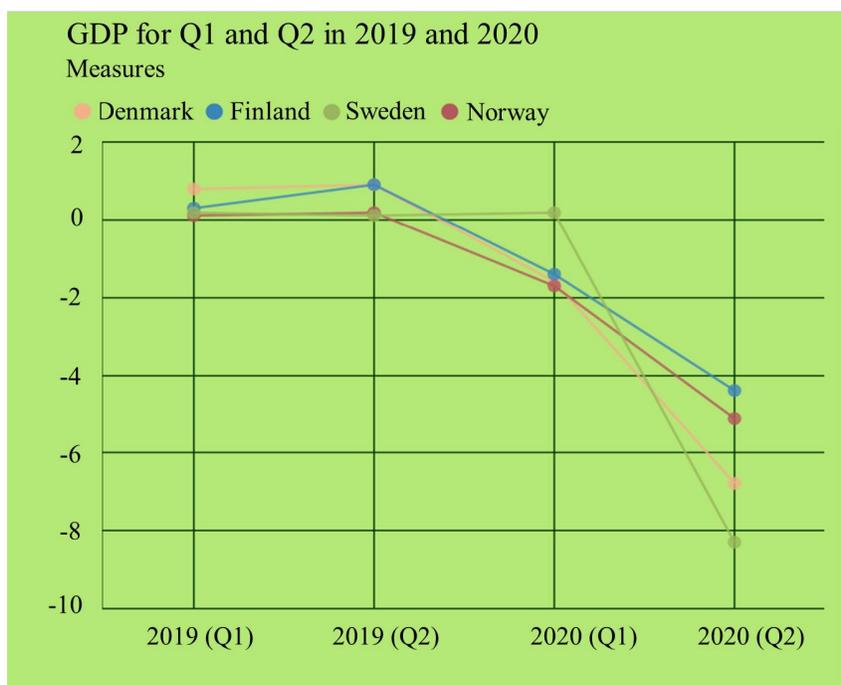


Figure 6. Visualization of GDP by country for the selected periods

#### 4.5 Unemployment Percentage (GDP)

The percentage of unemployed workers is another essential indicator in any economy. The higher the number of unemployed workers, the less they spend or buy commercial products, affecting the HICP rate and the economy. The extracted data showed an increase in the percentage of unemployed workers from the fourth quarter of 2020 until the second quarter of 2021, the virus spread period. Where the values of unemployment percent for each country for 2020 Q4, 2021 Q1, 2021 Q2 are as follows: Norway the percentages were 2.1, 2.2, and 2.4, Finland the percentages were 2.5, 2.5, and 2.8, Sweden the percentages were 2.5, 2.5, and 3.0, and Denmark, the percentages were 2.1, 2.2, and 2.1 respectively. Share of the population unemployed for 2020 Q3 was available only for Norway and Sweden, as shown in Figure 7.

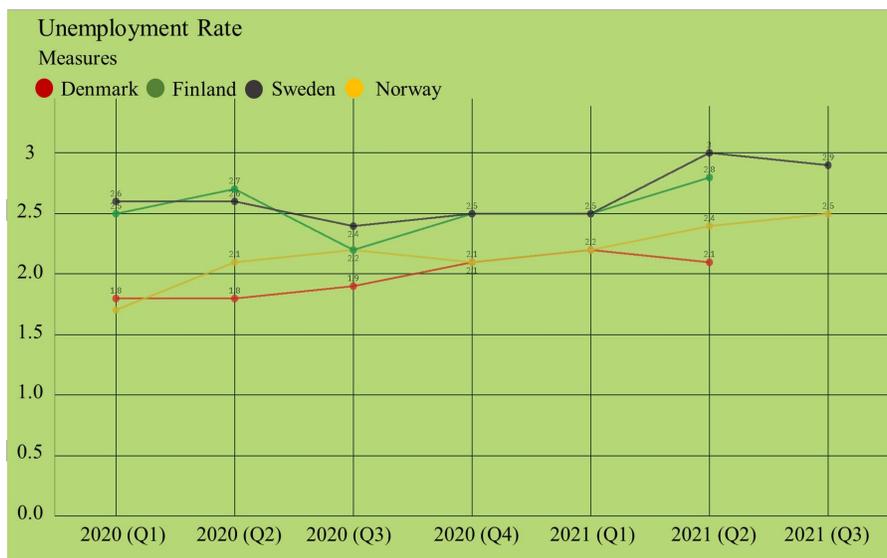


Figure 7. Unadjusted unemployment percentage data by country

## 5. Discussion of Results

The analysis revealed the following:

Firstly, Sweden followed an approach in handling the Coronavirus as a normal flu variant, relying on the responsible responsiveness of the Swedish community. The government set priorities considering the Swedish economy, recognizing the implications of lockdowns on the economy. This study showed that Sweden has the highest number of positive covid cases among all the Nordic countries that were under study, which would undoubtedly place a significant strain on the healthcare system and lead to high deaths. On the other hand, other Nordic countries have a lower ratio of infected positive cases and lower death numbers than Sweden. These countries embraced lockdown policies to control the virus spread along with vaccinating their population, which helped in flattening the curve. This strategy helped to prevent hospitals from reaching their maximum capacity and eventually had a positive impact on reducing the number of deaths.

Secondly, even though Sweden followed the "No-lockdown" strategy, this did not help their GDP stay positive. It dropped steeply to be less than -8%, where other Nordic countries who embraced the economic lockdown had a less severe impact on their GDP and performed better than Sweden. Moreover, from an inflation point of view, all nordic countries deflated to be less than 0 at the beginning of the virus spread in March 2020. However, Norway has been able to balance supply and demand to get their inflation rate positive at 0.4% in September 2020, noting that Norway was one of the countries that embraced lockdown policies to contain the virus outbreak. This clearly shows the failure of an open economy strategy during pandemic emergencies.

Thirdly, the labor market in the Nordics collapsed during the pandemic; however, to understand the effect of each response strategy; the difference between the unemployment rate of the fourth quarter of the year 2019 (beginning of the pandemic) and the second quarter of the year 2020 (middle of the pandemic) was calculated. The results highlighted that Sweden and Finland were the highest in the unemployment rate, with values of 0.5 and 0.6, respectively, where Norway and Denmark have lower value differences; this emphasizes again that the open economy strategy did not give any advantage to Sweden to have better economy than it is neighbouring countries.

## 6. Conclusion

It is seen from the study that Sweden is one of the countries that adopted the herd immunity approach for fighting the virus, while others opted for partial and full lockdown strategies. This research investigated and compared different data for the selected Nordic countries to understand the effectiveness in their response mechanism to flatten the curve. These selected countries have a lot in common, such as common geographic boundaries, culture, and monetary values, and many more, which will help assess each government policy's success or failure against containing the pandemic. In conclusion, Sweden's choice of choosing an open economy on public safety was inappropriate since it failed to sustain a stable economy and exacerbated the overall number of new deaths. It has drained the health care system, and when considering the spread of the virus due to travel, it will affect other nations. The comparison of GDP, Inflation, and unemployment rates showed that Sweden was one of the least if not the worst among the other Norden regions. So, any argument that the option of herd immunity was made to sustain a healthy economy can no longer stay valid. A dashboard was created to study all the factors together, as shown in Figure 8.

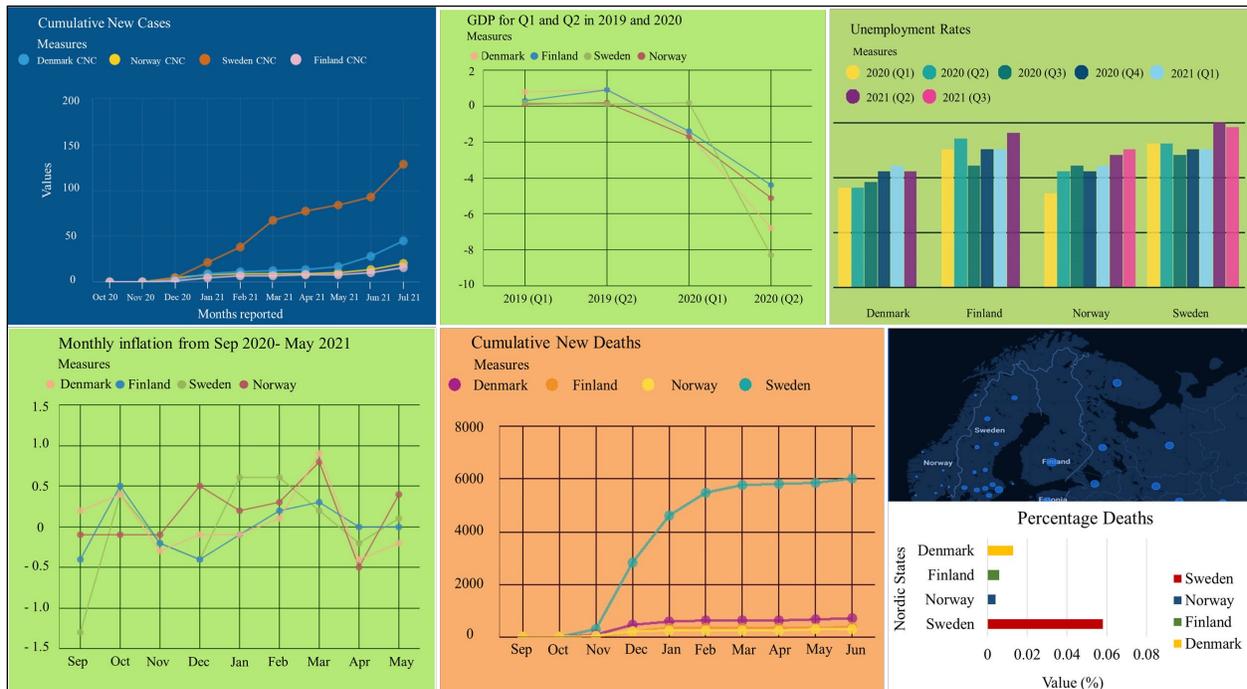


Figure 8. Covid-19 visualization dashboard for Nordic countries

The novel Coronavirus has been declared a pandemic. Therefore, even though it is detrimental to their economies, countries should take the right steps to monitor the spread of this disease. Future research can be conducted to study the correlation between these different factors. The authors could not do this due to various time intervals for each element and pandemic dynamics being a wicked problem. For future research, the authors suggest in understanding the Global Health Security (GHS) dynamics post the pandemic recovery through the lens of sustainability and global sustainable development goals.

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## Biography

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