MIX: Jurnal Ilmiah Manajemen

Management Scientific Journal
ISSN (Online): 2460-5328, ISSN (Print): 2088-1231
https://publikasi.mercubuana.ac.id/index.php/jurnal_Mix

The Concept of Quadruple Helix Collaboration and Quintuple Helix Innovation as Solutions for Post Covid 19 Economic Recovery

Rahma Wahdiniwaty [1]; Deri Firmansyah [2*]; Dede [3]; Asep Suryana [4]; Asep Achmad Rifa'i [5]

[1] rahma@email.unikom.ac.id, Universitas Komputer Indonesia, Jawa Barat
[2]deri@stiepasim.ac.id, STIE Pasim Sukabumi, Jawa Barat
[3]dedecspasim@gmail.com, STMIK Pasim Sukabumi, Jawa Barat
[4]asepsuryana@stiepasim.ac.id, STIE Pasim Sukabumi, Jawa Barat
[5]aseprifai1975@gmail.com, STIE Pasim Sukabumi, Jawa Barat

*) Corresponding Author

ABSTRACT

The COVID-19 pandemic has had a serious impact on the health, economy, transportation, and other industrial crises. The implementation of the lockdown or PSBB has disrupted the operations of various economic sectors.
Objectives: The purpose of this research is to describe the concept of the Quadruple Helix collaboration and the Quintuple Helix Innovation model as part of the collaboration, innovation, and synergy initiatives between multi actors to help find solutions in an effort to recover the national economy after COVID-19 in implementing government policies.
Methodology: The research method used is the descriptive qualitative method using secondary data from various works of literature, such as books, articles, and home pages to access information data relevant to the Quadruple Helix collaboration concept, namely government, academia, company, and society. The analysis technique was carried out by descriptive analysis.
Finding: Based on the research results, it can be seen that the Quadruple Helix collaboration concept is a solution for national economic recovery which can refer to the structure, process, input, and output.
Conclusion: The Quintuple Helix Innovation model views more comprehensively the importance of adaptability and the suitability of interactions with social environmental conditions in every process from the structure, the process itself, input and output along with its evaluation.

Keywords: *economic recovery; innovation; policy implementation*.

Submitted:	Revised:	Accepted:
2022-02-21	2022-06-05	2022-10-20

Article Doi:
http://dx.doi.org/10.22441/jurnal_mix.2022.v12i3.005

p-ISSN: 2088-1231
e-ISSN: 2460-5328

INTRODUCTION

In 2020 the COVID-19 pandemic spread globally from China which ravaged the world economy sectors, including Indonesia (Olivia et al., 2020). The COVID-19 outbreak has had a serious impact on health, economy, transportation, and other industrial crises (Baniamin et al., 2020; Hite & McDonald, 2020; Shen et al., 2020). Official data on COVID-19 patients shows that Indonesia ranks 23rd in the world for the total cases of patients with COVID-19 health effects. At the time of writing, 25,231,335 cases of COVID-19, and over 847,712 deaths have been confirmed worldwide. Table 1 presents data on the largest COVID-19 infected patients in the world and Asia, including Indonesia.

No	Country Affected	Confirmation Total cases	Die	Total Cases Recovery
1	Amerika Serikat	6.141.742	186.883	3.409.063
2	Brazil	3.846.965	120.498	3.006.812
3	India	3.570.733	63.893	2.734.783
4	Rusia	990.326	17.093	806.982
5	Peru	639.435	28.607	446.675
6	Afrika Selatan	622.551	13.981	536.694
7	Kolombia	599.914	19.064	440.574
8	Mexico	591.712	63.819	409.127
9	Spanyol	455.621	29.011	-
10	Chili	408.009	11.181	381.183
23	Indonesia	172.053	7.343	124.185
	World	25.231.335	847.712	17.578.140

Table 1 : Cases and Deaths of Patients Affected by COVID-19 (as of August 28, 2020)
Source : (Worldometers, 2020)

The United States (USA) has the highest number of cases and victims, with more than 6.1 million cases and close to nearly 200,000 deaths, followed by other countries that are included in the list of 10 countries most affected by COVID-19 such as Brazil, India, Russia, Peru, South Africa, Colombia, Mexico, Spain, and Chile. Meanwhile, Indonesia, which is located in Southeast Asia, was affected based on the number of confirmed cases, deaths, and recovery cases, in 23rd position with 172,053 cases, 7,343 deaths, and 124,185.

The COVID-19 pandemic has triggered serious disruptions in various countries, including Indonesia. All aspects of life, such as education, politics, public security, and economic activities, are greatly affected due to this global health threat (Baniamin et al., 2020). Large-Scale Social Restrictions (PSBB), which limit social activities due to the COVID-19 pandemic, have caused many economic losses nationally (Hadiwardoyo, 2020). The sectors affected during the COVID-19 pandemic are transportation, tourism, trade, health, and many others, but the economic sector most affected by COVID-19 is the household sector (Susilawati et al., 2020). Meanwhile, according to other sources, the weakening economy is due to the sharp decline in real sector activities, especially the service, tourism, and aviation sectors (Mulyiddin, 2020).

p-ISSN: 2088-1231
e-ISSN: 2460-5328

After COVID-19 at the beginning of the third quarter, although people's activities are gradually starting to return to normal, there are still concerns about the COVID-19 outbreak that occurred, as can be seen from the community's habits at the time the PSBB was enforced because patent drugs and vaccines have not yet been found to stop the COVID-19 outbreak which has implications for continued uncertainty for economic growth (Mulyiddin, 2020; Novianti et al., 2021). The absence of a vaccine that can weaken COVID-19 until mid-June 2020 has implications for economic growth, employment, and welfare that remain uncertain (Olivia et al., 2020; Wahdiniwaty & Firmansyah, 2022). Recent developments have begun to be considered to deal with slow economic growth and sluggish business in all sectors.

Governments and stakeholders can initiate changes from the scope and depth of the crisis to economic recovery strategies, and opportunities for change emerge. Currently, many experts don't agree on what to do to get the economy back strong again after the COVID-19 attack, many of us can hope to change the way so that the wheels of the economy return to normal. In the new normal phase, people can return to their activities by following health protocols (Sasongko, 2020; Olivia et al., 2020). The COVID-19 pandemic has spawned a shift in which population mobility has decreased which has led to weakening purchasing power and a stagnant economy (Shen et al., 2020). The World Trade Organization (WTO) estimates that the volume of world trade globally is likely to decline by around 32% in 2020 during the COVID-19 period (Islam, 2020).

The COVID-19 pandemic has the impact of decreasing economic growth, and the health crisis that has occurred can push the Indonesian people to the edge of poverty. Indonesia's economic impact from COVID-19 is expected to be very severe, reducing the projected economic growth of 5% in 2020 to between 4.2% and -4.7%, and the poverty rate is expected to increase from 9.2% in September 2019 to 9. .7% by the end of 2020 (Suryahadi et al., 2020). Worst case scenarios have been proposed projecting a -3.5% probability of an economic contraction (World Bank, 2020a), concurring that a -4.7% contraction is a possibility (McKibbin & Fernando, 2020). To mitigate the economic impact of COVID-19, the Government of Indonesia has announced a fiscal stimulus of IDR 695.2 trillion, with an overall impact on the budget estimated at 4.3% of GDP (World Bank, 2020b).). Therefore, the focus of advancing the Indonesian economy is to overcome the problems that arise due to COVID-19 and reduce the impact of economic shocks as well as prepare steps for a fast, sustainable, and innovative economic recovery. This is the reality of the changes needed to find a real economic recovery solution that cannot be ignored by any party (Firmansyah et al., 2022).

Efforts to recover the post-COVID-19 economy can be started through continuous cooperation in several sectors controlled by government authorities. The pandemic will indeed end with certainty, when the world chooses to end it, where the solution is in the hands of mankind together willing to end it (Ghebreyesus dalam Permatasari et al., 2021). Therefore, cooperation, awareness, and joint participation are indispensable and are the responsibility of all parties involving all elements of society, even though the core policy and authority are in the hands of the government. Indonesia needs to expand its social protection program through collaborative environmental innovation. Economic programs that give birth to current and future analysis policies must refer to the impact of COVID-19 on the economy and the potential for various responses and risks. The best approach that the government can adopt, is to find the right way to deal with the risks in the post-COVID-19 economy.

p-ISSN: 2088-1231
e-ISSN: 2460-5328

Quadruple Helix collaboration between stakeholders, public controllers, academia, industry, and users/society is expected to produce the best solution in the post-COVID-19 economic recovery effort. In today's highly uncertain environment, broad collaboration and innovation collaboration between stakeholders is essential for the economy and future prosperity, for example, Kimatu (2016) mentions that in an innovative and sustainable economic development a country depends not only on the existence of strong governments, universities, industry, and society but rather on how they interact with each other for strategic purposes, jointly together to achieve strategic goals. do what is necessary for competitive economic growth. The Quadruple Helix innovation model is an innovation model that emphasizes cooperation between four elements, namely public authorities, industry, universities/education systems; and communities/users who work together dynamically and form an overlapping helix towards development and progress (Widjajani et al., 2016).

The Quadruple Helix concept is an extension of the Triple Helix. The Triple Helix model is a dynamic collaboration between universities, industry, and government so that it develops and progresses through optimizing the potential of the three elements (Henry Etzkowitz & Rangga, 2010). In the Quadruple Helix concept, a fourth helix is added, namely the user or society (social society), the fourth helix is the party involved by connecting the parties in the Triple Helix. According to the QH theory, the economic structure of a country lies in four helices, namely the government, academia, companies, and civil society through synergistic collaboration schemes, adaptability, and continuous innovation that can encourage economic growth (Afonso et al., 2012a). With these conditions, QH framed the equally important role of all helix, especially in the post-COVID-19 new normal era which requires synergistic interaction, collaboration, innovation, and adaptation from all helix actors, especially when various policies and stimuli are set by the government. the government as the control holder of the other three helixes with the aim of breaking the chain and stopping the spread of COVID-19 and maintaining the survival of all helix actors back to normal so that efforts to accelerate recovery and economic growth during long-term goals can be achieved immediately. The Quadruple Helix innovation collaboration model after COVID-19 can be applied through innovation collaboration and an integrated and sustainable innovation environment in the current economic recovery effort in Indonesia, to be able to carry out economic recovery efforts that lead to strengthening competitiveness, innovation is needed where collaboration and partnership running together on an ongoing basis. Where the government acts as a public controller through its setting standards and various policies (H Etzkowitz & Leydesdorff, 2000; Peris-Ortiz et al., 2016; Sumarto et al., 2020).

The quadruple helix model views the importance of creating innovative collaboration, synergy, and cooperation between all parties in the midst of a changing environment that requires innovation to solve complex problems in order to accelerate the achievement of goals. Quadruple helix collaboration is essentially a real step that can be taken, requires a complex process, and a critical evaluation of the behavior and interactions of the helix in applying policy measures that may be more than just prevention and mitigation in the context of the post-COVID-19 health and economic crisis. Currently, the situation has not shown any signs of returning to normal, even though it has begun to enter a new chapter in the new normal, even though economic conditions continue to show changes and uncertainty. Therefore, efforts to recover the national economy through quadruple helix collaboration so that it can be achieved immediately view the need for development and innovation from an environmental perspective that requires understanding and awareness of all helices while

p-ISSN: 2088-1231
e-ISSN: 2460-5328

emphasizing the importance of adaptive behavior and social interaction with the current environment. It is so important to do because over time, the environment continues to change, and to harmonize it requires social interaction that is in line with environmental conditions so a fifth helix needs to be added to better understand innovation in current conditions, namely by including the environment (Carayannis et al., 2012; Park, 2014). This paper is a social environment that emphasizes adaptive behavior and social interaction, which is then used as a Quintuple Helix Innovation (QHI) model. The natural environment must be seen as a strong supporter of the capacity for sustainable economic recovery and progress (Sumarto et al., 2020).

The purpose of this research is to describe the concept of the Quadruple Helix and Quintuple Helix Innovation collaboration as part of the initiative to help post-COVID-19 economic recovery with policies established through continuous collaboration with the elements in the Quadruple Helix, to then see and describe more comprehensively with the inclusion of an environment that is sensitive to each cycle of change as the fifth helix conceptualized in the Quintuple Helix which emphasizes the existence of the sustainability of cooperation, innovation and the interaction process between each element of the helix that is in line with the environment.

This study observes and studies literature on the government as a public controller through its policies, academics who act as teaching institutions, the industry as a company connected to the market, and society as users of these three elements, and the environment as a supporter of innovation, development, recovery and economic growth. in a sustainable manner through circulation, collaborative innovation, adaptive interaction processes, and policy practices and strategies established by public authorities. The community/citizen is an important element that must be immediately saved from a health and economic perspective through policies issued by the government that are mutually beneficial to all elements so that people's purchasing power and consumption can increase again so that it will support the rise of the post-COVID-19 economy. It is hoped that this research will have an element of novelty associated with post-COVID-19 conditions because this research captures the current conditions and government policies so that it can be proposed as a framework that can be used as a reference for further research.

To get results that are in accordance with the application of the right QH and QHI collaboration models, they are easy to implement with the readiness and participation of various parties involved as a solution for sustainable national economic recovery through the creation of circulation and innovation. Collaboration between actors in the helix is supported by an adaptive interaction process with the social environment, as well as the overall importance of conducting this research. So first we will present some important issues relevant to the topic raised. In the first part, we describe the issue of the impact on the national economy from the first quarter to the beginning of the third quarter of 2020 caused by the viciousness of the COVID-19 outbreak which caused crises in various sectors. In the second part, several policies and assistance or stimulus set by the government proactively and reactively by regulators in dealing with and overcoming the spread of COVID-19. The third part presents the conceptual approach of QH and QHI cooperation as a national economic recovery solution, which is complemented by an explanation of the analytical approach in accordance with the data collection and analysis methods used in this study. The fourth section develops the conceptual framework and implementation of the QH and QHI

p-ISSN: 2088-1231
e-ISSN: 2460-5328

collaboration concepts which emphasizes the importance of collaboration and cooperation of the actors involved in the helix supported by an adaptive social interaction process. The fifth section describes important findings to support the successful implementation of the QH and QHI concepts as an appropriate and relevant national economic recovery solution to current needs, complemented by several conclusions offered and at the same time fulfilling the objectives of this research.

LITERATURE REVIEW

Economic Impact

The Covid-19 pandemic has disrupted the Indonesian economy from the end of the first quarter to the beginning of the third quarter of 2020 and shows a slowdown or decline, even though the Indonesian government has taken a series of policies and stimulus packages in an effort to reduce the impact on health, economy, people's living standards, business, and work activities. The Central Statistics Agency BPS) has released Indonesia's economic growth in the first quarter of 2020 which was recorded at 2.97%, this achievement is lower than the previous prediction of 5 percent. Then economic growth in the second quarter of 2020 experienced a contraction of -5.32% (year on year) (BPS, 2020c). The contraction was also deeper than the previous prediction by the Minister of Finance (Menkeu) Sri Mulyani. Where the prediction of economic growth in the second quarter will experience a contraction in the range of minus 3.5-5.1 percent. COVID-19 has indeed caused many losses to the Indonesian economy in various sectors (Yamali & Putri, 2020). The significant weakness shown in the first quarter and second quarter of 2020 data has shown the rate of economic growth is falling. Such conditions raise concerns that the Indonesian economy will suffer for the rest of the year, especially of the large part of the growth in Covid-19 cases occurring in early June, meaning that the impact is likely to occur (Olivia et al., 2020).

The Minister of Finance, Sri Mulyani, has revealed the projected growth of Indonesia's Gross Domestic Product (GDP) in the current quarter and the next few quarters, and the projections are bleak. GDP growth in the third quarter, which began in July, is predicted to grow in the range of 1.4%, or weaken to minus 1.6%. For the fourth quarter, the Indonesian government expects the economy to start recording a growth of 3.4%, or at least 1%. If economic growth is minus in two consecutive quarters, it can be said that Indonesia is in a recession (bbc.com, 2020).

The weakening economy in Indonesia due to COVID-19 has raised concerns about the increasing poverty rate. Estimates based on growth projections from the June 2020 Global Economic Prospects report indicate that, compared to pre-crisis forecasts, COVID-19 could push at least 71 million people into extreme poverty by 2020 under the baseline scenario and 100 million under the down-scenario (World Bank, 2020c). In addition, the pandemic has also caused millions of people to lose their jobs. The International Labor Organization (ILO) estimates that 6.7% or the equivalent of 195 million full-time workers were affected by the global pandemic in the second quarter. COVID-19 will have a broad impact on labor market outcomes. Beyond concerns about the health of workers and their families, the virus and subsequent economic shocks will impact the world of work in three main dimensions: 1) Number of jobs (both unemployed and underemployed); 2) Quality of work (eg salary and

p-ISSN: 2088-1231
e-ISSN: 2460-5328

access to social protection); and 3) Effects on certain groups that are more vulnerable to adverse labor market outcomes (ILO, 2020).). This impact implies that employment will experience a large loss of income for workers, which can be translated into the loss of income in terms of consumption of goods and services will be low which is detrimental to business continuity and economic resilience, because it is a vital aspect of the economy; supply, demand, and supply-chain have been disrupted and will worsen the economy evenly across various layers of Indonesian society.

The lockdown policy or large-scale social restriction (PSBB) that has been adopted by the Indonesian people which requires all normal activities to be carried out to be temporarily suspended, where all activities, both in the office and industrial sectors, are temporarily forced to stop operating. Likewise, for the education sector, public services, all places of worship, shopping centers, restaurants, and tourism places also experience the same thing (Yamali & Putri, 2020). This shows how important it is to stop the COVID-19 outbreak and that it must be "expensively" through restrictions on social activities, which allow work and activities to be carried out at home (WFH) or in a hygienic and healthy workplace with social distancing provisions. Casual daily workers who work in public spaces, especially in places where there is a risk of COVID-19 infection, are forced to stop which results in loss of income.

Education, learning is done using a learning system in the network (online) which sometimes creates new problems for the learning process. In this online learning system, there are various problems faced by students and students and teachers or lecturers, such as subject matter that has not been completed by the teacher and then the teacher replaces it with other tasks. This has become a complaint for students because the tasks given by the teacher are more than usual (Siahaan, 2020). Other problems in online learning are access to information which is constrained by signals that cause slow access to information and the emergence of new fees for students' families for the availability of pulses (internet quota) in the midst of economic difficulties. Another impact affected by the closure of schools and shopping centers, places of recreation, and entertainment, namely the culinary sector of fast food products and the transportation service sector which lost income due to the lack of users of these services. This limitation of social activity has an effect on the decline in overall economic activities (Iskandar et al., 2020). Apart from the various policies that have been issued by the Government of Indonesia, the impact of COVID-19 has caused serious disruptions to various economic sectors on a massive scale. old normal period.

After COVID-19, the economic threat still continues to follow because at the same time the massive spread of the coronavirus is still ongoing which triggers fears that the second wave will be worse than the previous one that has made the economy so slumped. Indonesia must improve with all resources through the cooperation of stakeholders, integrated actors, or parties in advancing the Indonesian government, it needs to be mobilized in synergy, and full of innovation and collaboration so that Indonesia can rise from this COVID-19 pandemic. Collaboration between stakeholders needs to be carried out, both the government as a policy maker or public authority, academia, the industry as a producer of products, absorbers of labor, and as a mediator that brings together the market with buyers, as well as the community as users. Likewise, this paper will study the steps and collaborations between the four aspects that need to work together in a synergistic and sustainable manner in the economic emergency environment as a good solution for the post-COVID-19 National Economic Recovery (PEN).

p-ISSN: 2088-1231
e-ISSN: 2460-5328

Indonesian Government Policy

In response to the COVID-19 Pandemic, the Indonesian government has taken various policies and introduced a number of unprecedented stimulus packages. Wisdom in implementing policies should be able to meet expectations and be able to achieve goals through several interrelated aspects. In a policy, there are 4 interrelated aspects in its implementation, namely aspects of communication, resources, disposition, and bureaucratic structure (Wahyudi, 2016). The policy was issued by the Indonesian government in an effort to deal with COVID-19. The policies referred to include 4 Presidential Decrees, 2 Presidential Regulations, 1 Government Regulation, 1 Presidential Instruction, and 1 Government Regulation in Lieu of Law. The policies that have been made are responses and alternative solutions to problems that can be seen from the side of public health, administrative consequences, authority and politics in government, and the finances of the Indonesian state as a result of the COVID-19 pandemic (Mas'udi & Winanti, 2020).

Quadruple Helix Collaboration Concept

In the Triple Helix (TH) system, government, academia, and industry (UIG; University,-Industry-Government) miss an important fourth helix, namely society. In this case, the community is a very vital part because they are the users of the triple helix system. Thus, in its development, the Quadruple Helix (QH) innovation model emerged. It can be seen that the QH concept is a development of TH with various fourth parties, such as education and entrepreneurship development managers (Rebernik, 2009). Emphasis on investment in innovation transmission mechanisms in economic growth and productivity achievement, in the one-high-technology sector, by emphasizing the active role of the helix in the Quadruple Helix Innovation, namely academia and technology infrastructure, enterprises and innovation, government and civil society (ABGC; Academic, Business, Government and Citizens). In the literature, the relationship between the helix and the impact on economic growth is not clear. However, the rate of economic growth is obtained from the increase in synergy and complementarity between different productive units, or an increase in productive government spending (Afonso et al., 2012a). Sustainable economic development and growth will be seen clearly if every stage in the helix can be carried out properly (Kimatu, 2016).

The development of TH by including the user, namely the community as the fourth helix, so that it becomes QH. Synergy in QH can help increase user demand for innovation to serve needs by working together intelligently, effectively, and efficiently, especially in meeting social and environmental needs globally. People can be said to be citizens of various communities that are sensitive to change. The QH collaboration model focuses on safe and relevant innovation policies that meet the needs of citizens, in this case, the innovation policy is adjusted to the conditions and goals to be achieved. The QH model is an integral part of an innovation policy that aims to create sustainable and inclusive growth (Roman et al., 2020). The relevant policies needed today are coordinated, responsive, and comprehensive policies. The policy in question is a policy issued by the government in an effort to prevent a more

p-ISSN: 2088-1231
e-ISSN: 2460-5328

severe economic impact that threatens the welfare of the community due to the COVID-19 outbreak which needs to be carried out as a whole.

Quintuple Helix Innovation (QHI) Collaboration Concept

The Triple Helix (TH) innovation model focuses on the university-industry-government relationship (H Etzkowitz & Leydesdorff, 2000). While the Quadruple Helix (QH) innovation model develops the TH model by placing the community (society) as the user of the collaboration and synergy output of the three actors in TH, even in some literature the fourth helix places what he says is a media and culture-based civil society (Carayannis et al., 2012). To comprehensively support the policies issued by the government in an effort to prevent a more severe economic impact that threatens the welfare of the community due to the COVID-19 outbreak which needs to be carried out as a whole, it is necessary to further develop existing innovations by including more actors than before (Grundel & Dahlström, 2016). QH was developed into Quintuple Helix Innovation (QHI) which adds a fifth helix by including a social environment that emphasizes social ecology that is adaptive to current conditions in order to support national economic recovery efforts that can immediately be achieved towards a better future.

The Quintuple Helix emphasizes the necessary socio-ecological transitions in 21st century societies and economies (Carayannis et al., 2012). For this reason, Quintuple Helix demands an ecological sensitivity to the social environment. Quintuple Helix here supports the formation of a situation and success between the adaptability of social ecology and the environment, innovation creates a synergy of government, academia, industry, society, and the social environment. The national economic recovery pays attention to aspects of the social environment that must be understood and realized about the importance of the suitability of interacting in the process of behavior and social ecological activities with each other that is in line with the social environment so that the Quintuple Helix innovation model can be applied.

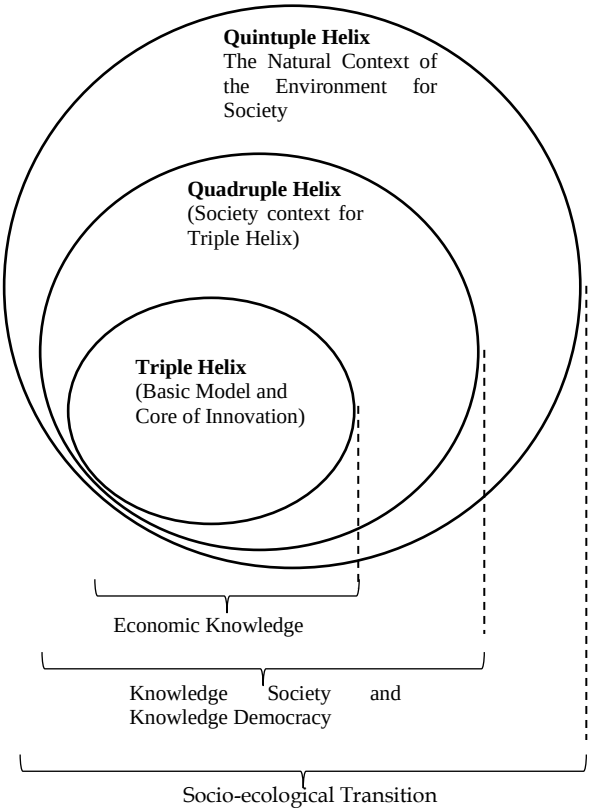
Quadruple Helix and Quintuple Helix Innovation Collaboration Concepts for Implementation of National Economic Recovery

The recovery from the post-COVID-19 economic crisis, of course, cannot be done quickly, it will take longer for the economy to return to normal. To successfully deal with the crisis, the Indonesian government needs to issue and develop effective and safe policies, as well as effective stimulus and assistance packages for the affected communities and businesses including academia. A crisis management policy will be meaningful and effective if it is fully transmitted from the top to the bottom line of government, including the community. The policy that is urgently needed is an integrated policy channel, which connects all lines of stakeholders. Thus, there will be an equal interpretation of policies among the multi-actor in the political system and government in the country. This policy channel will also be able to build public trust in the COVID-19 pandemic handling system (Purwanto et al., 2020). Efforts to deal with COVID-19 require the cooperation of multi-government actors that cross bureaucratic boundaries at all levels of government and place this crisis as a common problem that must be resolved together as well.

p-ISSN: 2088-1231
e-ISSN: 2460-5328

Given how important cooperation is in overcoming the post-COVID-19 economic crisis during the new normal, the government with the policies it has issued can see far into the needs needed by elements of society, industry, and academia at this time. For this reason, the policies issued must be able to touch and meet the needs of these three elements in order to carry out their normal survival so that they are able to make a real contribution to national economic recovery efforts. Optimizing various government policies will not be a mere discourse if the policy is implemented by increasing the collaboration of all related sectors. Collaboration between the government, universities, industry, and the community is needed both for the transfer of information and for implementing policies (Tjenreng, 2020). Furthermore, in this paper, the collaboration of four elements is called the quadruple helix (QH) collaboration which has an important role in restoring the post-COVID-19 economy with various policies issued by the government as references and guidelines in acting, doing activities, carrying out life towards a better future. in terms of health, economy, living standards, environmental innovation, and the ability to use information technology digitally which can also prepare a more advanced economy in welcoming the era of 21st century disruption.

The Quadruple Helix aims to define more democratic policy-making towards the innovation process (Henry Etzkowitz & Rangga, 2010; Hasche et al., 2020). The Quadruple Helix (QH) has pushed the Triple Helix (TH) perspective from media and culture-based knowledge society, and knowledge democracy to knowledge production and innovation (Carayannis & Campbell, 2009; Widjajani et al., 2016).



p-ISSN: 2088-1231
e-ISSN: 2460-5328

Figure 1. Knowledge production and innovation in the context of knowledge economy, knowledge society, and natural environment of society (Etzkowitz & Leydesdorff, 2000; Afonso et al., 2012b; Carayannis et al., 2012)

On the understanding of QH, the basis for sustainable development of the knowledge economy requires coevolution with the understanding and knowledge of society that is adaptive to changes in the social environment. Therefore, to balance the policies of public authorities with the current post-COVID-19 conditions, a wider sustainable innovation is needed, namely by adding a fifth helix which is a perspective from the social environment as a comprehensive and contextualization innovation from Quadruple Helix to Quintuple Helix Innovation (QHI). The QHI model is ecologically sensitive, for that QHI emphasizes the socio-ecological transition and adaptation that the community needs to carry out as an actor using the output of other helices in order to accelerate the achievement of post-COVID-19 national economic recovery as well as efforts to establish and rebuild towards a strong and more advanced economy. in the twenty-first century.

Figure 1, shows that the Quintuple is a helical innovation model that offers the answer that is problem solving and sustainable development oriented, furthermore, shows how socioecological transitions (the actors in QHI) can be mastered in combination with knowledge and innovation (Carayannis et al., 2012). The socio-ecological transition in synergy and adaptive behavior in line with the demands of the social environment is a driving force for innovation, supporting the creation of more knowledge, understanding, and awareness through the flow of information for better innovation so that strategies and best practices can be implemented for a sustainable national economic recovery policy.

Understanding the Quintuple Helix model is the most important force and support for progress. Quintuple Helix is a model that understands and specializes in the number of social interactions (social) to promote and visualize systems of cooperation, knowledge, and innovation for more sustainable development (Carayannis et al., 2012). In accordance with the analytical context, the Quintuple Helix model is used to describe the process of solving problems in a sustainable manner which implies eco-innovation as an approach to the decline of the national economy through steps that are in line and in harmony with the current environmental situation and conditions towards a future life and economy better.

The Quintuple Helix model offers coherence between all helices, from public institutions (top) to companies (bottom) seeking a balance between the economy and the environment and by including civil society which emphasizes knowledge and the ability to adapt to various policies and changes in the environment in interacting, behaving, and acting. and activities (adaptive processes) in line with various policies and changes globally in all sectors of the economy and life. Quoted from the National Economic Seminar on National Press Day 2022, Tuesday (08/02), the Coordinating Ministry for Economic Affairs, Airlangga Hartarto said, efforts to restore the national economy are supported by the issuance of various policies, and the key to success lies in their implementation, which sees the importance of increasing collaboration between stakeholders (Keminfo, 2022), and or actors in QHI so that it is necessary to establish interactions between different subsystems (political, educational, industrial, social, and social environment) in order to protect and strengthen health, maintain productivity, minimize social and economic impacts and even national economic recovery and development efforts can be achieved immediately (Carayannis et al., 2012; Grundel & Dahlström, 2016).

p-ISSN: 2088-1231
e-ISSN: 2460-5328

The pattern of national economic recovery through QHI views a country as an ecosystem inhabited by the government as a public authority, regulation, and policy; industry as a user of various resources, producer of goods or services, and market intermediary; academics as implementers of education, research and development of technology and information; community as users; and the social environment which implies the importance of the suitability of the interaction of all actors, the existence of a dynamic perspective in behavior patterns and acting on current social and economic conditions that require special attention and treatment of evolutionary and unimaginable social activities.

METHOD

The research method used in this research is the descriptive qualitative method and documentation study, using and utilizing secondary data from various literatures, such as books, articles, and home pages to access information data relevant to the Quadruple Helix and Quintuple Helix Innovation concepts. which is expected to be used as a solution to the post-COVID-19 economic recovery. The use of descriptive qualitative methods aims to provide a clear description and picture to answer the problem, namely how the concepts of quadruple helix and quintuple helix innovation are concepts that can be used as solutions to find a national economic recovery strategy after COVID-19 (figure 2).

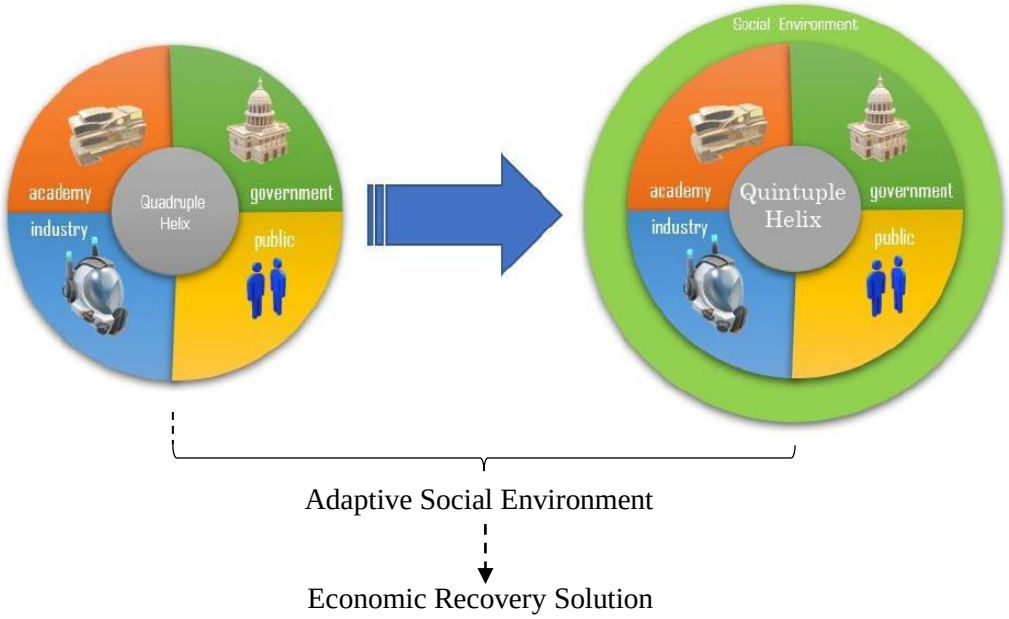


Figure 2. Conceptual Framework
QH and QHI Collaboration Model as a Post COVID-19 Economic Recovery Solution
(Source: Developed from various sources and relevant theories, 2022)

RESULTS AND DISCUSSION

The Impact of COVID-19 on the Indonesian Economy

p-ISSN: 2088-1231
e-ISSN: 2460-5328

COVID-19 not only threatens health but also threatens the economy. The COVID-19 pandemic has caused serious disruptions to the Indonesian economy until the end of the second quarter of 2020 experiencing a contraction of -5.32% (year on year) as seen in Figure 3, cumulatively Indonesia's growth in Semester I-2020 compared to Semester I-2020. 2019 contracted 1.26 percent (BPS, 2020c). This condition is likely to continue in the third quarter of 2020 considering that the COVID-19 pandemic still does not show any signs of leaving this archipelago even though it is currently entering the new normal phase. To cope with the worsening economic conditions after COVID-19, the Indonesian government has issued various policies and several stimulus packages (Burhanuddin & Abdi, 2020). However, the lack of coordination and synergy in implementing policies resulted in the handling of the pandemic being fragmented and ineffective in preventing the spread of the virus (Mas'udi & Winanti, 2020). As a result, it is feared that the economic crisis will deepen and the consequences of economic recovery will take longer with greater financing.

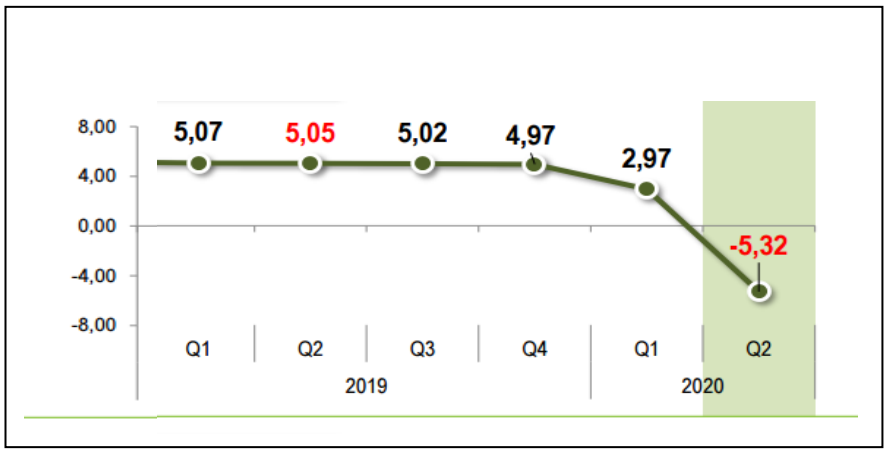


Figure 3. Indonesian Economy from Quarter I-2019 to Quarter II-2020
Source: Central Bureau of Statistics (BPS, 2020b; BPS, 2020c)

The Covid-19 pandemic has caused economic shocks that have led to a global recession. Various policies implemented to suppress the spread of Covid-19, such as closing schools and some business activities, large-scale social restrictions, and even lockdowns have resulted in a decrease in consumption and investment levels. The Indonesian government's policies are set by taking a quick and prudent approach to reduce its impact on the economy. The economic impact caused by Covid-19 could be greater than the health impact, and economic growth will slow down. If there is an economic slowdown, the absorption of labor will decrease, unemployment and poverty will increase (Nainggolan, 2020).

The sectors most severely affected by the outbreak of COVID-19 are the tourism and manufacturing sectors. Not only that, the imposition of a lockdown or PSBB, a travel ban, a travel ban, and the consequences of social distancing clearly have an impact on the disruption of hotel, restaurant, retail, and transportation service operations. Likewise, the manufacturing sector is affected by the obstruction of the supply chain for raw materials imported from outside, causing a shortage of raw materials. The implication is that manufacturing companies operate only by utilizing raw materials that are still available. On the other hand, demand

p-ISSN: 2088-1231
e-ISSN: 2460-5328

continues to decline which has a serious impact on the company's overall financial performance.

Economic conditions are getting worse when the management of many companies are forced to change the style of the game in managing the company by downsizing through the gradual reduction of employees as part of the company's assets with the option of termination of employment (PHK) as a last resort that can be taken to reduce operational costs in maintaining survival. and long-term corporate goals. This condition is really worrying so many employees lose their income due to layoffs, they return to their family homes and stay at home. In the absence of income, the consumption of family consumers is reduced due to decreased purchasing power, while the government's economic growth, apart from large income from taxes (taxes), is supported by the high and low consumption of citizens.

Table 2. Increase in Poor Population in Indonesia Effects of COVID-19 (as of March 2020)

No	Impact	Total (million people)	Total (%)	Increase (million people)	Increase (%) since Sept 2019
	Increasing number of poor population in Indonesia	26,42	9,78	1,63	0,56
1	The urban poor	11,16	7,38	1,3	0,82
2	Poor population in the countryside	15,26	12,82	0,33	0,22

Source: Central Bureau of Statistics (BPS, 2020a)

The occurrence of layoffs in many companies has pushed up unemployment and led to an increase in poverty rates even though the government has issued policies and stimulus packages for Pre-Employment Cards. The Central Statistics Agency (BPS, 2020a), has noted that in March 2020 there was an increase in the number of poor people by 1.63 million people compared to the September 2019 period. Thus, the number of poor people in Indonesia currently stands at 26.42 million people.

Table 2. Shows the increase in the number of poor people in Indonesia, which is a combination of the poor in urban areas and the poor in rural areas. The increasing number of poor people clearly cannot be separated from the large-scale social restriction (PSBB) policy to prevent the spread of the coronavirus (Covid-19) which causes economic activity to be disrupted and affects the income of the population and has implications for household consumption expenditures to decline, resulting in a slowdown in growth. The poor population increased by 1.63 million against September 2019, for the percentage of poor people in March 2020 was recorded at 9.78 percent, an increase of 0.56 percentage points against September 2019 and an increase of 0.37 percentage points against March 2019.

Policies that have been issued by the government by prioritizing improving health services, then providing assistance to small communities affected by COVID-19, and increasing business resilience in the face of COVID-19 through stimulus assistance policies require the cooperation of various synergized parties to truly implement these policies. run effectively and efficiently. The involvement of various parties in tackling COVID-19 during the new

p-ISSN: 2088-1231
e-ISSN: 2460-5328

normal is expected to support various business sectors to be able to continue operating so that the demands and needs of the community are met again. If the resilience of the business world is strong in the face of the epidemic, then the post-epidemic economic recovery can also be faster. The policies issued by the government are of course policies that have clear targets and directions that support the creation of certainty and confidence that all parties can rise from the economic crisis. Policies must accommodate the interests of various parties to ensure the fulfillment of needs (MS & Rizaldi, 2020).

Quadruple Helix and Quintuple Helix Innovation Collaboration as a Solution for National Economic Recovery

Until now (Nov, 2020), new policies are still needed to find compatibility with post-COVID-19 conditions, the new normal period, in which COVID-19 victims have continued to rise since August 2020 and will further aggravate Indonesia's economic conditions. With more and more accumulated knowledge on COVID-19 available, as well as various ongoing developments, the government needs to increasingly base its policy choices for handling COVID-19 on science and relevant contemporary data. This kind of policy learning process will make policies to handle COVID-19 more focused (Purwanto et al., 2020). There is a need for a routine coordination system and synergy between actors so that the implementation of policies dealing with COVID-19 will be within shared goals and responsibilities.

The economic crisis due to COVID-19 is more severe than the crisis that occurred in 1988. The COVID-19 pandemic not only threatens the general health of a person but also their life, while it is so strong and vicious that the effects of COVID-19 are able to destroy various sectors of the economy and paralyze social activities in all circles. So that the government as a regulator and facilitator needs to work together with various parties to deal with this crisis. The parties that are important to collaborate with are Academics, Companies, and the Community. Collaboration between the government, academia, companies, and the community to implement policies that can bring about change and restore the national economy. As previously mentioned, the collaboration between the four actors is known as the Quadruple Helix (QH) collaboration.

According to the QH theory, the economic structure of a country lies on a four helix, Government, Academics & Technological Infrastructure, Enterprises, and Civil Society, with economic growth generated through continuous innovation (Afonso et al., 2012a). The continuous innovation referred to here begins with government policies that are relevant to the conditions that befell Indonesian society as a whole after COVID-19. QH emphasizes broad collaboration on innovation and represents a change toward a systemic, open, and user-driven innovation policy (Widjajani et al., 2016). This is a challenge for the government as a public authority that has control over the wheels of the economy through the relevance of its policies.

Theoretically, it should be realized that in the helix, the actors both have an important role in economic growth. These actors are like the pillars of a building that interactively support and support and together provide a strong impact on the building, as well as the economy can grow with the collaboration of the four pillars. Assuming that government policy is a strategic policy, right on target, easy to interpret, and able to connect to the four pillars. The government as a regulator in QH must be able to encourage the creation of relations between academics and companies as well as the community as users who are part of economic growth through production, consumption contributions, and demand for the quality of products and

p-ISSN: 2088-1231
e-ISSN: 2460-5328

services needed. In today's challenging economy, people's creativity from everyone is an important resource. QH highlights that all social classes within it must work together to achieve common goals, with social inclusion being a prerequisite for growth and development. Thus, the government, academia, companies, and the community collaborate together to restore the national economy and at the same time strengthen competitiveness.

The role of the government in issuing regulations or policies, improving health services, infrastructure, and providing public needs, for education, companies, and the community. People associate with creative industry media; culture, lifestyle, and art which allows also ideas about creativity. This shows that the government's strategic policies can be constructed and communicated by the other three pillars.

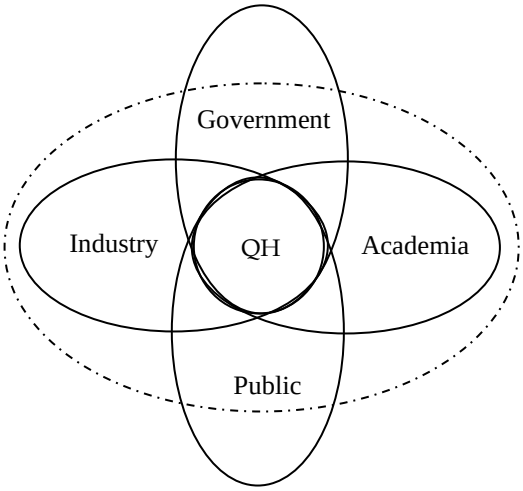


Figure 4. Institutional Model of Quadruple Helix (QH)

Figure 4 visually shows the integration and the relationship between the four interrelated elements showing overlapping roles. To restore the current economy is innovation, which means that whatever government policies are relevant to current conditions and can be implemented and used by the four helixes in synergy with each other.

In this Quadruple Helix collaboration, concept solutions for national economic recovery can refer to structures and processes as well as inputs and outputs.

1. The structure emphasizes that many parties involved in implementing policies have knowledge of the dangers of the COVID-19 pandemic and economic recovery is a shared responsibility even though the government is a public authority for the parties in it. Policies issued by the government will pass through the government itself through government administration, then academics who have the task of teaching, transferring knowledge and technology, and conducting basic research through community service (PKM) to solve problems, find solutions, and produce concrete innovations. , improving soft skills, as well as creating capital of superior quality human resources, because academics are intermediaries between government, industry, and society. While the company is the user of human resources (HR), the workforce produced by academics, produces products, acts as a market intermediary with buyers, and conducts research and development of products and technology. The last is the community as a user

p-ISSN: 2088-1231
e-ISSN: 2460-5328

(user). Society consists of various social classes, cultures, and demographics that use and utilize government policies, academic outputs, and companies. In the end, on a helix basis, the overall achievements of these four helixes will again rest on the government.

2. The process is the steps in implementing the policy. Policies for academia/education during COVID-19 the learning process is carried out online (on a network), but it is necessary to realize that there are positives and negatives to this learning process. The government's readiness for this learning process is seen by geographical area/location, network, technology, knowledge, time, constraints experienced by students (students/students) including additional costs incurred for parents of students. Innovations in learning methods that are more effective are needed in online learning systems that can be used as media in creating superior quality human resources to meet the 21st century. Policy certainty to return to normal learning also needs to be issued expressly so that later it can revive activities related to the educational environment such as culinary places, fast food sellers, transportation services, and others, so that the economic economy will recover soonThe policies for companies were issued, but many companies could not fully implement them, resulting in massive layoffs unilaterally, although no one could be blamed because the company was getting heavier with operating costs while sales were disrupted. The community as users of the other three elements is affected. Even though the government has made efforts to provide and assist the lower classes of society in order to maintain their purchasing power and consumption, assistance is needed so that the assistance is fully targeted so that it does not become a polemic and conflict in the community.
3. Input is a package of policies issued by the government in the form of fiscal aid stimulus for academics, companies/businesses, and the public. Of course, this stimulus must be jointly given to the three elements and given an understanding that the stimulus assistance from the government aims to increase all resources, especially to meet basic needs, and as an intermediary to rise from an economic downturn.
4. Output is the output of structures and processes that are supported by input as a supplement in carrying out regulators or government policies in collaboration and synergy while still prioritizing health protocols in every activity, participating in the COVID-19 mass vaccination program in 2021 (passing clinical trials/ feasibility The central role of the government as a public authority or controller of the other three helixes is to always evaluate and continue to make continuous improvements by identifying structures, processes, inputs, and outputs so that problems can become other obstacles in national economic recovery, apart from the threat of a pandemic. COVID-19 so that with regular evaluations it is hoped that innovations related to policies that are appropriate, safe, and more strategic can be used, thus the quadruple helix collaboration can be used as a solution for post-COVID-19 economic recovery.

Quintuple Helix Innovation (QHI) model, as an innovation model that is expected to bridge the actors involved in the Quadruple Helix (QH) Model, by embedding social environmental factors in QHI not only as an aspect that becomes the ecological area of QH actors to work together and interact with each other but more than that the environment can influence the formation of innovation on an ongoing basis. The social environment was identified as an opportunity that could further push for the benefits of sustainable economic recovery and growth efforts. However, the prerequisites for creating a stronger and more reliable

p-ISSN: 2088-1231
e-ISSN: 2460-5328

innovation advantage, environmental factors suggest and emphasize innovation in knowledge, understanding, and awareness of the importance of adaptive behavior and interactions from QHI actors in carrying out strategies as a form of best practice for policies issued government as a public controller in an effort to accelerate national economic recovery.

In the QHI model, it can be seen that the social environment represents, frames, and simultaneously influences the cooperation and interaction of the five helices (figure 5). Environmental factors are disruptive as innate and global external influences so they require adaptive behavior and social interaction from the helices in order to create balance and harmony. Likewise, the post-COVID-19 economic downturn was a result of changes in the global economic environment and non-natural disasters, so the recovery effort is through the QHI framework that the structure, processes, inputs to outputs are the basis for reference to the QH concept (the results of the QH discussion) as a solution for economic recovery. national. Thus, QHI emphasizes the adaptability and suitability of interactions with environmental conditions in each process from the structure, the process itself, inputs, and outputs complete with their evaluation of the actors involved in QHI.

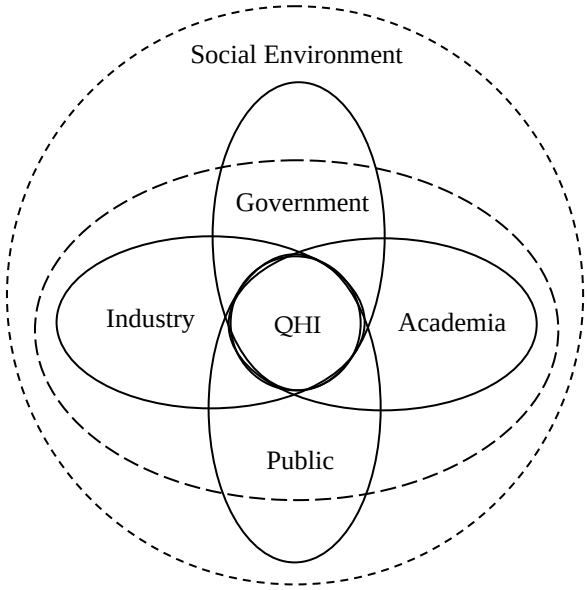


Figure 5. Five Institutional Model of *Quintuple Helix Innovation (QHI)*
(Sumber : Adapted & modified from (H Etzkowitz & Leydesdorff, 2000)*; Carayannis et al., 2012)*

The collaboration of actors in QHI will provide positive learning in an effort to restore the national economy in a sustainable manner because by understanding the social environment that emphasizes the suitability of every process of behavior, cooperation and social interaction, new habits, new knowledge, ideas, and social interactions will emerge. sustainable new innovations that are able to answer every challenge and environmental change that occurs. Thus, QHI looks more comprehensively at every process of national economic recovery after COVID-19 by including a social environment that emphasizes the adaptive behavior, cooperation, and interaction of the helices in QHI in each process in implementing various strategies and policies issued by public authorities, so as to create a balance and strength that can push to accelerate the achievement of post-COVID-19 national economic recovery and even strong and sustainable national economic growth. Therefore, we

p-ISSN: 2088-1231
e-ISSN: 2460-5328

realized that the integration of the quadruple helix model places four important actors involved in system change, innovation, and development. For example, Arnkil et al., (2010), Quadruple Helix (QH), with its emphasis on broad collaboration among stakeholders in innovation, represents a shift towards systemic, open, and user-centred innovation policies. Similarly, Schütz et al., (2019) state that the Quadruple Helix innovation model recognizes four main actors in the innovation system: science, policy, industry, and society. In keeping with this model, more and more governments are prioritizing greater public involvement in sustainable innovation processes. Similarly, the Quadruple Helix (Carayannis et al., 2012; Grundel & Dahlström, 2016) locate government, academia, industry and combines media and culture-based public perspectives. The triple helix evolved by including civil society as the fourth component of the quadruple helix. This inclusion helps in increasing the voice of users of innovation to meet primarily social and environmental needs on a global scale (Kimatu, 2016). Quintuple Helix frames knowledge and innovation in the context of the social environment (Grundel & Dahlström, 2016). Finally, Quintuple Helix can be interpreted as an approach that is in line with sustainable development and social ecology. "Eco-innovation" and "eco-entrepreneurship" must be processed in such a way that the understanding of knowledge and innovation becomes wider according to the scope of the problem and the context that is learned and developed through the involvement of the main helix. that incorporates innovation as a problem-solving focus for society and the economy.

CONCLUSION

Based on the results of the research above, it can be concluded that the COVID-19 pandemic has spread globally and has threatened and destroyed the world economy, including Indonesia. The COVID-19 outbreak has had a serious impact on health, economy, transportation, and other industrial crises. The implementation of the lockdown or PSBB, the travel ban, the travel ban, and the consequences of social distancing clearly have an impact on the disruption of the operations of various economic sectors. Indonesia's economic growth until the second quarter of 2020 contracted by -5.32% (year on year), indicating a deeper contraction than previously predicted. In addition, there has been an increase in the number of Indonesian poor people by 1.63 million people compared to the September 2019 period. It rose to 26.42 million people. Indonesia needs to issue clear, precise, safe, and strategic policies for economic recovery that can be implemented by multiple actors who collaborate and synergize in it.

The collaboration of the government, academia, companies, and public to implement policies is expected to bring about change and restore the national economy. National economic recovery efforts cannot be carried out alone by government elements with various policies, of course, there needs to be awareness and participation from other actors to be involved hand in hand in tackling economic problems after COVID-19. Government, academia, companies, and the community collaborate together to restore the national economy and at the same time strengthen competitiveness. In this Quadruple Helix collaboration, concept solutions for national economic recovery can refer to structures and processes as well as inputs and outputs. The government's central role as a public authority or controller of the other three helixes is to always evaluate and continue to make continuous improvements by identifying structures, processes, inputs, and outputs so that problems can become other obstacles in the national economic recovery, apart from the threat of the COVID-19 pandemic. 19 so that with

p-ISSN: 2088-1231
e-ISSN: 2460-5328

regular evaluations, it is hoped that innovations related to policies that are appropriate, safe, and more strategic are expected.

The Quintuple Helix Innovation model looks more broadly and comprehensively on the importance of adaptability and the suitability of interactions with environmental conditions in each process from the structure, the process itself, its inputs and outputs, and their evaluation of the actors involved, so as to create a balance and strength that can encourage to accelerate the achievement of post-COVID-19 national economic recovery and even strong and sustainable national economic growth.

Increasing or tightening the use of protocols and their nature becomes mandatory for all citizens to comply with them until COVID-19 is completely gone and a powerful vaccine is found to tame COVID-19 so that the new normal activities continue to run like the old normal. So that there is no longer a case for imposing a lockdown or PSBB policy because the social activity restriction policies that have been carried out previously have paralyzed various economic sectors and caused a slowdown in Indonesia's economy. Even if you have to quarantine, you should do self-quarantine, not mass quarantine.

The policy and stimulus package from the government that is needed is a policy that is able to adjust to the post-COVID-19 conditions, the new normal period, in which the number of victims of COVID-19 is still increasing. These policies and stimuli need to be realized with cooperation between important actors; government, academia, companies, and the community through collaboration and synergy to deal with COVID-19 and restore a contracting economy.

In this Quadruple Helix collaboration, concept solutions for national economic recovery can refer to structures and processes as well as inputs and outputs. Meanwhile, Quintuple Helix emphasizes adaptive behavior, cooperation, and interaction with the social environment in order to create a balance that can encourage and accelerate efforts to recover the national economy after COVID-19 that is stronger, superior, and sustainable. The central role of the government as a public authority or controller of the other three helixes is to always evaluate and continue to make continuous improvements. It is hoped that with regular evaluations, it is hoped that innovations related to policies that are appropriate, safe, and more strategic are expected.

Our findings are limited to gathering relevant empirical material, selecting data based on current and past events, habit changes, and interactions. Without being a complete study of the interactions involved among the described helical actors, we hope to describe the implementation of the QH and QHI frameworks in every process of interaction, knowledge, collaboration, innovation, and adaptation of interactions with the social environment, changes in flexibility occur to create a winning balance in the environment stronger and more sustainable economic recovery. Future research is expected to explore the depth of interaction and the role of QH and QHI actors, or even modify the role of the helix. For example, industries ranging from micro, small and medium enterprises (MSMEs) and large enterprises (UB) as producers of products and services, especially MSMEs are the most basic pillars of national income as seen from the gross domestic product (GDP) of a country, through a market with various marketing media as intermediaries for the product to reach the user (public). An expanded and in-depth study of this dimension can discuss the era of the digital economy or a new economy that demands innovation models and the transformation of business processes from conventional to digital f or MSMEs actors as part of the helix dimension, where there is digital innovation, where there is economic literacy, digital.

p-ISSN: 2088-1231
e-ISSN: 2460-5328

literacy, and understanding of various accesses to work. and the ability to adapt and interact in the digital market space are some of the prerequisites for the success of the new economic era. This research can provide various information that can be used as a basis for choosing alternative solutions for economic recovery and even as an indicator of a country's development, especially in terms of the economy.

REFERENCES

Afonso, O., Monteiro, S., & Thompson, M. (2012a). A Growth Model for the Quadruple Helix Innovation Theory. *Journal of Business Economics and Management. SSN 1611-1699 Print / ISSN 2029-4433 Online.*, *13*(5), 849–865. https://doi.org/doi:10.3846/16111699.2011.626438

Afonso, O., Monteiro, S., & Thompson, M. (2012b). A growth model for the quadruple helix. *Journal of Business Economics and Management*, *13*(5), 849–865. https://doi.org/10.3846/16111699.2011.626438

Arnkil, R., Järvensivu, A., Koski, P., & Piirainen, T. (2010). *Exploring quadruple helix outlining user-oriented innovation models*. https://trepo.tuni.fi/bitstream/handle/10024/65758/978-951-44-8209-0.pdf

Baniamin, H. M., Rahman, M., & Hasan, M. T. (2020). The COVID-19 pandemic: why are some countries coping more successfully than others? *Asia Pacific Journal of Public Administration, 42:3.*, 153–169. https://doi.org/DOI: 10.1080/23276665.2020.1784769

bbc.com. (2020). *Menteri Keuangan Sri Mulyani Indrawati memproyeksikan Pertumbuhan Ekonomi pada Triwulan Ketiga Berada di kisaran 0 persen hingga minus 2 persen. Adapun untuk Keseluruhan tahun 2020, Pertumbuhan Ekonomi Diperkirakan akan Berada di Kisaran -1,1 persen Hingg*. https://www.bbc.com/indonesia/indonesia-53152994

BPS. (2020a). *Persentase Penduduk Miskin Maret 2020 naik menjadi 9,78 persen*. Badan Pusat Statistik. Berita Resmi STatistik. Ekspor Dan Impor, Neraca Pembayaran Dagang, Upah Buruh, Profil Kemiskinan Indonesia, Gini Rasto1. 5 Juli. https://www.bps.go.id/website/materi_ind/materiBrsInd-20200715120937.pdf

BPS. (2020b). *Pertumbuhan Ekonomi Indonesia (Produk Domestik Bruto), Perkembangan Tenaga Kerja Indonesia Februari 2020; Catatan Peristiwa Triwulan I-2020*. Berita Resmi Statistik, 5 Mei. https://www.bps.go.id/pressrelease/2020/05/05/1736/ekonomi-indonesia-triwulan-i-2020-tumbuh-2-97-persen.html

BPS. (2020c). *Pertumbuhan Ekonomi Indonesia Triwulan II-2020*. Berita Resmi Statistik 5 Agustus. https://www.bps.go.id/pressrelease/2020/08/05/1737/-ekonomi-indonesia-triwulan-ii-2020-turun-5-32-persen.html

Burhanuddin, C. I., & Abdi, M. N. (2020). Ancaman Krisis Ekonomi Global Dari Dampak Penyebaran Virus Corona (Covid-19). *AkMen. Volume 17 Nomor 1 Maret. e-ISSN : 2621-4377 & p-ISSN : 1829-8524* ., 90–98.

Carayannis, E. G., Barth, T. D., & Campbell, D. F. J. (2012). The Quintuple Helix innovation model: global warming as a challenge and driver for innovation. *Journal of Innovation and Entrepreneurship*, *1*(1), 2. https://doi.org/10.1186/2192-5372-1-2

Carayannis, E. G., & Campbell, D. F. J. (2009). "Mode 3'and'Quadruple Helix": toward a 21st century fractal innovation ecosystem. *International Journal of Technology*

p-ISSN: 2088-1231
e-ISSN: 2460-5328

Management, *46*(3–4), 201–234.

Etzkowitz, H, & Leydesdorff, L. (2000). The Dynamics of Innovation: from National Systems and "Mode 2" to a Triple Helix of University-Industry-Government Relations. *Research Policy*, *29*, 109–123. https://doi.org/doi:10.1016/S0048-7333(99)00055-4

Etzkowitz, Henry, & Rangga, M. (2010). *A Triple Helix System for Knowledge-Based Regional Development : From "Spheres" to "Spaces".* Routledge. http://www.triplehelixconference.org/th/8/downloads/%0ATheme-Paper.pdf

Firmansyah, D., Suryana, A., & Rifa'i, A. A. (2022). PMD (Pelatihan Media Digital) Sektor Usaha Mikro dan Kecil Handycraft Bambu Di KAA Sukabumi Guna Meningkatkan Pemasaran Online Berbasis Marketplace Di Era Ekonomi Digital. *J-ABDI: Jurnal Pengabdian Kepada Masyarakat*, *1*(10), 2805–2816. https://www.bajangjournal.com/index.php/J-ABDI/article/view/1633

Grundel, I., & Dahlström, M. (2016). A Quadruple and Quintuple Helix Approach to Regional Innovation Systems in the Transformation to a Forestry-Based Bioeconomy. *Journal of the Knowledge Economy*, *7*(4), 963–983. https://doi.org/10.1007/s13132-016-0411-7

Hadiwardoyo, H. (2020). Kerugian Ekonomi Nasional Akibat Pandemi COVID-19. *Baskara: Journal of Business and Entrepreneurship. Volume 2, No. 2. e-ISSN: 2623-0089.*, 83–93. https://doi.org/DOI: 10.24853/baskara.2.2.83-92

Hasche, N., Höglund, L., & Linton, G. (2020). Quadruple helix as a network of relationships: creating value within a Swedish regional innovation system. *Journal of Small Business & Entrepreneurship*, *32*(6), 523–544. https://doi.org/10.1080/08276331.2019.1643134

Hite, L. M., & McDonald, K. S. (2020). Careers after COVID-19: Challenges and changes. *Human Resource Development International*, *23*(4), 427–437. https://www.tandfonline.com/doi/full/10.1080/13678868.2020.1779576

ILO. (2020). *COVID-19 and the World of Work: Impact and Policy Responses*. ILO Monitor 1st Edition. 18 Maret 2020. https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/briefingnote/wcms_738753.pdf

Iskandar, A., Possumah, B. T., & Akbar, K. (2020). Peran Ekonomi dan Keuangan Sosial Islam Saat Pandemi Covid-19. *Jurnal Sosial & Budaya Syar'i, 7*, *7*, 625–638.

Islam, A. (2020). Configuring a Quadruple Helix Innovation Model (QHIM) based blueprint for Malaysian SMEs to survive the crises happening by Covid-19. *Emerald Open Res*, *2*.

Keminfo. (2022). *Kerja Sama Pulihkan Ekonomi Nasional, Pemerintah Ajak Insan Pers Bangun Optimisme*. Kementerian Komunikasi Dan Informatika (Keminfo) Republik Indonesia. https://www.kominfo.go.id/content/detail/39870/kerja-sama-pulihkan-ekonomi-nasional-pemerintah-ajak-insan-pers-bangun-optimisme/0/berita

Kimatu, J. N. (2016). Evolution of strategic interactions from the triple to quad helix innovation models for sustainable development in the era of globalization. *Journal of Innovation and Entrepreneurship. Springer Open Access.*, *5*(16), 1–7. https://doi.org/DOI 10.1186/s13731-016-0044-x

Mas'udi, W., & Winanti, P. S. (2020). *Tata Kelola Penanganan Covid-19 di Indonesia: Kajian Awal*. Yogyakarta: Gajah Mada University Press. https://digitalpress.ugm.ac.id/book/257

McKibbin, W., & Fernando, R. (2020). The Global Macroeconomic Impacts of COVID-19: Seven Scenarios. *CAMA. Centre for Applied Macroeconomic Analysis. Australian National University. Crawford School of Public Policy. ISSN 2206-0332.*, 1–43. https://cama.crawford.anu.edu.au/sites/default/files/publication/cama_crawford_anu_edu

p-ISSN: 2088-1231
e-ISSN: 2460-5328

_au/2020-03/19_2020_mckibbin_fernando_0.pdf

MS, Z. H., & Rizaldi, A. (2020). Merespon Nalar Kebijakan Negara Dalam Menangani Pandemi Covid 19 Di Indonesia. *Jurnal. Ekonomi Dan Kebijakan Publik Indonesia. Volume 7, No. 1, Mei . ISSN: 2442-7411. FEB Unsyiah, KOPELMA Darussalam, Banda Aceh.*, 36–53.

Mulyiddin. (2020). Covid-19, New Normal dan Perencanaan Pembangunan di Indonesia. *The Indonesian Journal of Development Planning. Volume IV No. 2 – Juni 2020. Kementerian Perencanaan Pembangunan Nasional/Bappenas Republik Indonesia.*, *IV*, 240–152.

Nainggolan, E. U. (2020). *Kebijakan Fiskal dan Moneter Mengadapi Dampak Covid-19*. Direktorat Jenderal Kekayaan Negara Kementerian Keuangan. Artikel DJKN, 01 April. https://www.djkn.kemenkeu.go.id/artikel/baca/13017/Kebijakan-Fiskal-dan-Moneter-Mengadapi-Dampak-Covid-19.html

Novianti, D. A., Sari, I. K., Saputri, R., Parasian, W., Subekan, A., Hariyanto, E., & Darono, A. (2021). *Merekam Pandemi Covid-19 Dan Memahami Kerja Keras Pengawal APBN*. Kemennterian Keuangan Republik Indonesia. https://www.kemenkeu.go.id/media/18295/buku-merekam-pandemi-covid-19-dan-memahami-kerja-keras-pengawal-apbn.pdf

Olivia, S., Gibson, J., & Nasrudin, R. (2020). Indonesia in the Time of Covid-19. *Bulletin of Indonesian Economic Studies, 56:2, ISSN 0007-4918 Print/ISSN 1472-7234 Online/18/000143-174print/ISSN 1472-7234 Online/18/000143-174*, *56*, 142–174. https://doi.org/https://doi.org/10.1080/00074918.2020.1798581

Park, H. W. (2014). Transition from the Triple Helix to N-Tuple Helices? An interview with Elias G. Carayannis and David F. J. Campbell. *Scientometrics*, *99*(1), 203–207. https://doi.org/10.1007/s11192-013-1124-3

Peris-Ortiz, M., Ferreira, J. J., Farinha, L., & Fernandes, N. O. (2016). Introduction to multiple helix ecosystems for sustainable competitiveness. In *Multiple helix ecosystems for sustainable competitiveness* (pp. 1–13). Springer. https://idp.springer.com/authorize?response_type=cookie&client_id=springerlink&redirect_uri=https%3A%2F%2Flink.springer.com%2Fchapter%2F10.1007%2F978-3-319-29677-7_1

Permatasari, C. H., Putri, W. Y., & Asutina, N. (2021, September). Pandemi COVID-19 Belum Berakhir, Transisi Ke Endemi Menjadi Pilihan. *Swantara*, 1–56. http://www.lemhannas.go.id/images/Publikasi_Humas/Swantara/Swantara_Edisi_38_September_2021.pdf

Purwanto, E. A., Kumorotomo, W., & Widaningrum, A. (2020). Problematika Kebijakan Krisis COVID-19 di Indonesia. In *Policy Brief*.

Rebernik, M. (2009). Quadruple Helix of Entrepreneurship and Management Education. *University of Maribor, Slovenia. Eview of International Comparative Management.*, *10*(5), 1–12. https://www.researchgate.net/publication/46567657_Quadruple_Helix_of_Entrepreneurship_and_Management_Education

Roman, M., Varga, H., Cvijanovic, V., & Reis, A. (2020). Settings Open AccessArticle Quadruple Helix Models for Sustainable Regional Innovation: Engaging and Facilitating Civil Society Participation. *Economics, MDPI*, *8*(2). https://doi.org/https://doi.org/10.3390/economies8020048

Sasongko, D. (2020). *Strategi Kebijakan Pemulihan Ekonomi Nasional (PEN)*. Kementerian

p-ISSN: 2088-1231
e-ISSN: 2460-5328

Keuangan Republik Indonesia. https://www.djkn.kemenkeu.go.id/artikel/baca/13287/Strategi-Kebijakan-Pemulihan-Ekonomi-Nasional.html

Schütz, F., Heidingsfelder, M. L., & Schraudner, M. (2019). Co-shaping the Future in Quadruple Helix Innovation Systems: Uncovering Public Preferences toward Participatory Research and Innovation. *She Ji: The Journal of Design, Economics, and Innovation*, *5*(2), 128–146. https://doi.org/https://doi.org/10.1016/j.sheji.2019.04.002

Shen, H., Fu, M., Pan, H., Yu, Z., & Chen, Y. (2020). The Impact of the COVID-19 Pandemic on Firm Performance. *Emerging Markets Finance and Trade. 56:10.*, 2213–2230. https://doi.org/https://doi.org/10.1080/1540496X.2020.1785863

Siahaan, M. (2020). Dampak Pandemi Covid-19 Terhadap Dunia Pendidikan. *Jurnal Kajian Ilmiah (JKI). e-ISSN: 2597-792X, ISSN: 1410-9794. Edisi Khusus No. 1, Juli. Fakultas Ekonomi Dan Bisnis; Universitas Bhayangkara Jakarta Raya.*, 73–80. http://ejurnal.ubharajaya.ac.id/index.php/JKI%0D

Sumarto, R. H., Sumartono, S., Muluk, M. R. K., & Nuh, M. (2020). Penta-Helix and Quintuple-Helix in the Management of Tourism Villages in Yogyakarta City. *Australasian Accounting Business and Finance Journal*, *14*(1), 46–57. https://doi.org/doi:10.14453/aabfj.v14i1.5

Suryahadi, A., Izzati, R. Al, & Suryadharma, D. (2020). Estimating the Impact of COVID-19 Outbreak on Poverty In Indonesia. *Bulletin of Indonesian Economic Studies. ISSN: (Print) (Online) Journal. Accepted Manuscript.*, 1–34. https://doi.org/DOI: 10.1080/00074918.2020.1779390

Susilawati, S., Falefi, R., & Purwoko, A. (2020). Impact of COVID-19's Pandemic on the Economy of Indonesia. *Budapest International Research and Critics Institute-Journal (BIRCI-Journal). Volume 3, No 2. e-ISSN: 2615-3076 (Online), p-ISSN: 2615-1715 (Print).*, 1147–1156. https://doi.org/https://doi.org/10.33258/birci.v3i2.954

Tjenreng, Z. B. (2020). *Kebijakan Pemerintah Dan Pemda Dalam Penanganan Covid-19 Serta Pengaruhnya Bagi Ekonomi Nasional".* Webinar. ARS University. Yogyakarta. 7 - 10 Mei. https://www.ars.ac.id/event/content/kebijakan-dan-strategi-pemerintah-dan-pemda-dalam-penanganan-covid-19-serta-pengaruhnya-bagi-ekonomi-nasional

Wahdiniwaty, R., Firmansyah, D., Suryana, A., Dede, D., & Rifa'i, A. A. (2022). Mystery in Marketing Management Products Post COVID-19 as a Model of Survival Strategy Towards the Awakening of Micro Small and Medium Enterprises (MSMEs) in the Digital Economy Era. *Khazanah Sosial*, *4*(1), 187–210. https://journal.uinsgd.ac.id/index.php/ks/article/view/17397

Wahyudi, A. (2016). Implementasi rencana strategis badan pemberdayaan masyarakat dan desa dalam upaya pengembangan Badan Usaha Milik Desa di Kabupaten Kotawaringin Barat. *Jurnal Ilmiah Administrasi Publik (JIAP). Vol. 2, No. 2. ISSN 2302-2698. e-ISSN 2503-2887. FIA UB*, 101–105. https://media.neliti.com/media/publications/81884-ID-implementasi-rencana-strategis-badan-pem.pdf

Widjajani, Fajarwati, A., & Hidayat, As. (2016). Model Quadruple Helix Sebagai Model Inovasi Daerah (Kajian Literatur). *Sosiohumanitas Journal. Jurnal-Jurnal Humaniora, Vol 18, No.1. Universitas Langlangbuana, Bandung.*, 85–95. http://journal.unla.ac.id/index.php/sosiohumanitas/article/view/60

World Bank. (2020a). *East Asia and Pacific in the Time of COVID-19*. Regional Economic Update, April 2020. https://www.worldbank.org/en/region/eap/publication/east-asia-pacific-economic-update

p-ISSN: 2088-1231
e-ISSN: 2460-5328

World Bank. (2020b). Pospek Perekonomian Indonesia, Jalan Panjang Pemulihan Ekonomi. In *Indonesia-Economic-Prospects-The-Long-Road-to-Recovery.txt*. http://documents1.worldbank.org/curated/en/667791596695692335/text/Indonesia-Economic-Prospects-The-Long-Road-to-Recovery.txt

World Bank. (2020c). *Projected Poverty Impacts of COVID-19 (coronavirus)*. Overview of Results. June 8, 2020. https://www.worldbank.org/en/topic/poverty/brief/projected-poverty-impacts-of-COVID-19

Worldometers. (2020). *COVID-19 Coronavirus Pandemic Update*. Worldometers. Info. https://www.worldometers.info/coronavirus/

Yamali, F. R., & Putri, R. N. (2020). Dampak Covid-19 Terhadap Ekonomi Indonesia. *Journal of Economics and Business, 4(2). ISSN 2597-8829. Publisher by Lembaga Penelitian Dan Pengabdian Kepada Masyarakat Universitas Batanghari Jambi.*, *4*(2), 384–388. https://doi.org/DOI 10.33087/ekonomis.v4i2.179