http://ejournal.seaninstitute.or.id/index.php/Ekonomi
Jurnal Ekonomi, Volume 12, No 03 2023
ISSN: 2301-6280 (print) ISSN: 2721-9879 (online)

THE IMPACT OF COVID-19 ON SUSTAINABLE FOOD SUPPLY CHAINS IN THE VEGETABLE AND FRUIT E-COMMERCE INDUSTRY IN INDONESIA

Dytha Lastra Silalahi
Universitas Trisakti

ARTICLE INFO

Keywords:
Covid-19, Digital Technology, Government Support, Organization Management, Circular Economy.

ABSTRACT

The Covid-19 pandemic has had a major impact on economic, social and environmental aspects throughout the world, including in Indonesia. During the pandemic, many traditional markets were forced to close due to the implementation of restrictions on movement implemented by the government to reduce and prevent the spread of the Covid-19 virus in Indonesia. This research builds on previous research focused on learning about the resilience and sustainability of food supply chains in different contexts. The purpose of this research is to increase understanding of the Triple Bottom Line principle from economic, social and environmental aspects that affect sustainable food supply chains in Indonesia. The survey method was conducted on 48 vegetable and fruit companies that utilize digital technology in running their business by examining the role of technology, government support, organizational management and circular economy as questionnaire instruments. This study used the Likert scale (1= Strongly Disagree; 5 = Strongly Agree). The findings of this study are based on 136 valid respondents from vegetable and fruit market place companies from novice workers to directors in Indonesia to gain insight into the impact of the Covid-19 Pandemic. the survey from this study resulted in a significant impact of the Covid-19 pandemic on sustainable economic, social and environmental dimensions The analysis shows that digitalization, government support, organizational management and circular economy have proven to be very helpful in creating a sustainable Triple Bottom Line in the context of food supply chains. the findings of this study have implications for vegetable and fruit stakeholders, both company management and government as policy makers in understanding and learning the importance of digitalization in running a business to overcome future challenges. Company management can also learn the importance of effective organizational management, circular economy in making sustainable policies and adopting sustainable practices in supply chains in their companies. This research is a development of previous research by adding scientific and practical knowledge about understanding the exploration of the impact of Covid-19 on sustainable food supply chains through the Triple Bottom Line perspective and this research contributes to broadening horizons and understanding for vegetable and fruit stakeholders in Indonesia in implementing sustainable food supply chains.

E-mail:
122012101093@std.trisakti.ac.id

1. INTRODUCTION

The Covid-19 pandemic has had a major impact on human life in almost all corners of the world, both large and small, from toddlers to the elderly. Strict regulations, restrictions and physical distancing are implemented to reduce the risk of spreading the Covid-19 virus which has a major effect on human life. The Republic of Indonesia is no exception affected by Covid-19. The sectors hardest hit by the Covid-19 pandemic are the economic, social and environmental sectors. Some experts worry that the economic impact caused by Covid-19 could outweigh the health impact, and economic growth will slow. If there is an economic slowdown, then the absorption of labor will decrease, increasing unemployment and poverty (Edward UP Nainggolan)

The ongoing Covid-19 pandemic has placed unprecedented pressure on food supply chains and shocks affecting all segments, including agricultural production, food processing, transportation and logistics, and demand (Erokhin &; Gao, 2020)The food sector is one of the sectors affected by the Covid-19 pandemic.

One of the natural products affected is vegetables and fruits in terms of distribution and marketing, market closures that had a major impact on agricultural business actors, farmers experienced difficulties in marketing their produce. Indonesia is a country that has a tropical climate and is famous as one of the countries producing horticulture (vegetables and fruits), fertile soil, temperatures that support for horticultural crops to grow and produce quality vegetables and fruits.

The COVID-19 pandemic has actually had a positive impact on the high demand for vegetables and fruits, this is due to the community's need for food complements to maintain body immunity to avoid the virus. In the midst of the current pandemic, demand in the horticulture sector, especially for fruit and vegetable products, has actually increased. Thus, the domestic market continues to run despite changes in the global economy. Managing the food supply chain today is very complicated according to (Sustainable Food Lab; Sustainable Agriculture Initiative (SAI), 2019); Consumers become more aware about food products consumed and find out information about the production process, whether the manufacturer has run the production process responsibly? And has it gone through food safety standard tests? (Wang et al., 2022)

TBL (Triple Bottom line) in sustainability theory consists of economic aspects, social aspects and environmental aspects, according to (Gold et al., 2013) The concept of TBL advocates a shift of traditional organizations from economic values to social and environmental values that a company or organization provides. In the context of the Covid-19 pandemic, it is clear that horticultural stakeholders are affected by the pandemic, restrictions on movement, market closures resulting in reduced income from the vegetable and fruit business from an economic perspective, things like this can be anticipated by implementing protection for farmers during the pandemic, from providing agricultural capital assistance, knowledge or extension to marketing that aims to help farmers increase income from products Agricultural. Another example from the social aspect, farmers as the backbone of national food thus according to the principles of TBL supply chains need to help farmers in accessing education, health services and training in order to create new jobs in remote areas (Figueroa-Rodríguez et al., 2019)

The last principle of TBL is the environment, the beginning of Covid-19 occurred almost all over the world experiencing the same thing, namely the amount of waste from food, this happened due to various factors, one of which was due to the imposition of a lockdown system that made the supply chain hampered (Belhadi et al., 2020) However, there is something interesting about the results of research by (Burlea-Schiopoiu et al., 2021) Finding that the pandemic has changed the behavior of many people in reducing food waste and increasing awareness of food waste ethics and many people are more careful in protecting the environment.

Start-Up companies are aware that the horticultural agriculture industry in Indonesia has great business potential by utilizing technological advances in the process of production, distribution to marketing. This activity is to provide an understanding of the importance of farmers, business actors and horticultural stakeholders using digital technology. Especially during the Covid 19 pandemic, business activities are far more utilizing digital technology.ology (Indonesian Ministry of Agriculture, 2022) No less interesting in the vegetable and fruit industry in Indonesia is the growth of new Start-Ups that sell vegetables and fruits directly to customers, these Start-Up companies are usually directly related to farmers who sell their agricultural products by utilizing digital technology (mobile applications) in Marketing vegetables and fruits to consumers without having to interact directly between sellers and buyers.

Digital business platforms are growing rapidly during the COVID-19 pandemic with "Contactless Delivery" services (Chang & Meyerhoefer, 2020) claims that the platform's digital business may provide customers with a sense of comfort and security in preventing the spread of the Covid-19 virus and the Marketplace is designed to create market efficiencies and improve business processes as a business model. The Start-Up business studied in this study focuses on E-Commerce of vegetables and fruits that become commodities and focuses on Start-Up companies that have direct relationships with farmers in the sale of crops and funding to help finance farmers' operations, as well as other programs offered by each company.

Agricultural sector according to (Carmela Annosi et al., 2020) is a collaborative and economically sustainable business, socially and environmentally, for example, by utilizing digital technology, farmers

can access information to Start-Up companies to ensure the amount of demand and supply to reduce the level of risk and uncertainty and help farmers have more efficient distribution. Farmers and private companies cannot necessarily run without the help of the government as regulators, this is in line with Law Number 18 of 2012 concerning Food, where the Central and Regional Governments are tasked with controlling and responsible for the availability of staple and strategic foods throughout the territory of the Unitary State of the Republic of Indonesia (Indonesian Ministry of Agriculture, 2022)

In other words, the Indonesian government also has a role in creating sustainable supply chains through work programs under the Ministry of Agriculture. "Basic and strategic foods must be available in adequate quantities, meet quality standards and at reasonable prices to maintain food affordability for the community," explained Agung Hendriadi, Head of the Food Security Agency of the Ministry of Agriculture (Indonesian Ministry of Agriculture, 2022) In Indonesia, the National Food Agency is a government agency responsible for food affairs in maintaining food price stability and food availability in Indonesia, including the results of horticultural agriculture. Start-Ups vary in their business development.

Organizational management is very important in dealing with various kinds of problems faced in the company, the Covid-19 pandemic is a threat to the sustainability of a company and how companies can anticipate the possibilities that will occur and quickly adapt in fierce competition. According to (Michael, 2023) revealed that there are 10 basic principles of effective organization from encouraging cooperation among workers, quickly adapting, rewarding outstanding workers to creating a healthy work environment for workers. With the Covid-19 pandemic, many companies have to close permanently, one of the reasons is that the company cannot anticipate the impact of the Covid-19 pandemic, the management cannot quickly adapt in dealing with the impact of the pandemic.

What is an update of the previous research is to include elements of circular economy in this study, Circular economy is proposed as a practical approach to the sustainable use of limited natural resources through increasing the efficiency of resource use to contribute to the balance between Economy, Environment, and Society (Aranda-Usón et al., 2020) The government through its work programs through the ministry of agriculture, the ministry of trade, the ministry of environment and related parties and the private sector need to collaborate in realizing a sustainable supply chain from the economic, government and private sides to assist farmers in funding or by providing soft loans with low interest to assist farmers in buying more modern agricultural equipment needs so that farmers can take advantage of agricultural technology which is modern and able to produce vegetables and fruits to the maximum

2. METHOD

This research is based on research conducted by Vikas Kumar and colleagues entitled "Investigating the impact of COVID-19 on sustainable food supply chains" and published in 2022. Vikas Kumar researched the impact of the Covid-19 pandemic on various aspects, almost all sectors were disrupted, including the manufacturing and service industries, not the basic necessities and medicines sectors. The research conducted by Vikas Kumar focuses on food security and food sustainability and discusses the influence of Covid-19 with a different perspective and further examines the economic, social and environmental aspects that affect the food supply chain and discusses the effect of Covid-19 on food security.

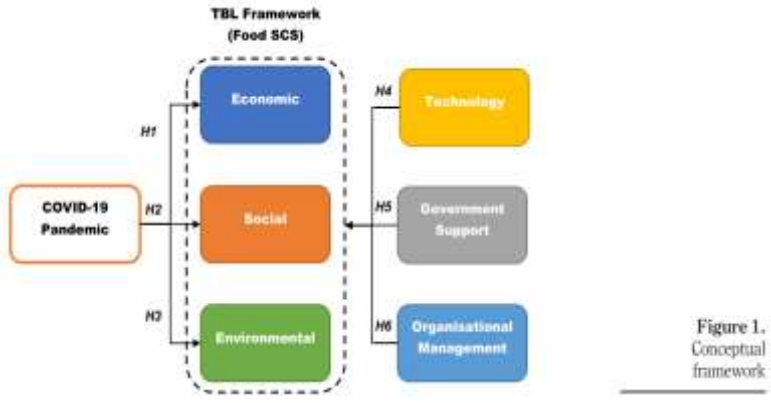

Figure 1 Conceptual Framework of major journals
Source (Kazancoglu et al., 2022)

To support the renewal in research using a supporting journal entitled "Establishing linkages between circular economy practices and sustainable performance: the moderating role of circular economy entrepreneurship" was published in 2022 and the research was conducted by Thanh Tiep Le and colleagues. This study was conducted to examine the mechanisms of circular economy (CEP) practices and economic entrepreneurship to promote sustainable supply chains (SP) and examine how MSMEs can develop economically, socially and environmentally in the food value chain. This study also examines how economic entrepreneurship (CEE) as moderation has a relationship between circular economy practices and sustainable supply chains (SCM).

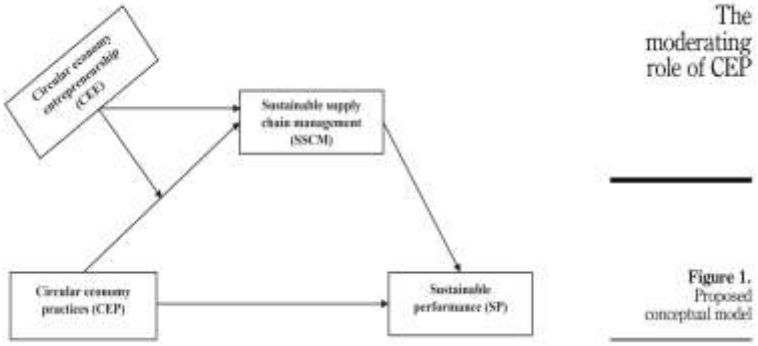

Figure 2 Conceptual Framework of supporting journals
Source: (Le et al., 2022)

Conceptual Framework

Related to the theories used by previous journals and supporting journals as research references with the aim of researching sustainable food supply chains with Vegetable and fruit E-Commerce as the object of research. By reviewing several variables, the impact of the Covid-19 pandemic phenomenon clearly affects economic, social and environmental aspects. The ongoing Covid-19 pandemic has placed unprecedented pressure on food supply chains and shocks affecting all segments, including agricultural production, food processing, transportation and logistics, and demand (Erokhin &; Gao, 2020), The concept of TBL in sustainable food supply chains during the Covid-19 pandemic is more challenging and complex than previously according to (Aday &; Aday, 2020).

The practice of TBL cannot stand alone without strong support from several variables in accordance with previous research as an example of the use of technology has a role in achieving the goals of the company or organization in monitoring, measuring, and analyzing information related to sustainable supply chains (O'Rourke, 2014)

The government in this case as a policy maker has a role as one of the determinants of the success of achieving TBL, an ineffective government can hinder the achievement of a sustainable supply chain (Narayanan et al., 2019) This is also in line with (BARNETT, 2016) The government can help sustainable supply chains, with government intervention can reduce the risk of monopolies carried out by stakeholders who are far from the concept of sustainable supply chains. Thus with effective organizational management and circular economy as evidenced through research (Adesanya et al., 2020) Social connections can help organizations to work together efficiently and lead to sustainable food supply chains, while the economy is circular (Kuzma &; Sehnem, 2022) The circular economy is a model of production and consumption that has principles and practices focused on extending the life cycle of goods and reducing waste to a minimum.

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Jurnal Ekonomi, Volume 12, No 03 2023
ISSN: 2301-6280 (print) ISSN: 2721-9879 (online)

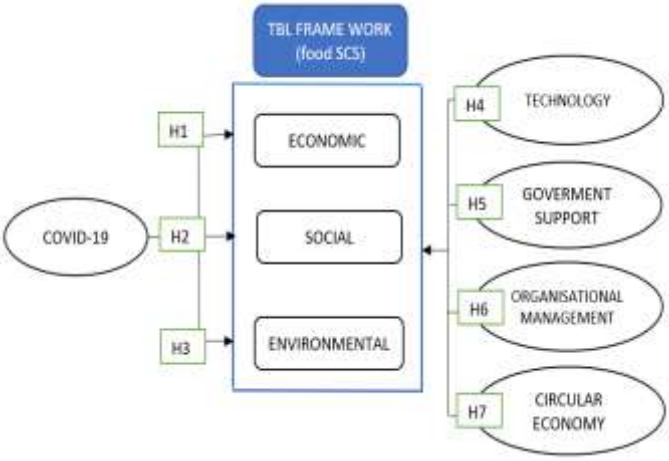

Figure 3 Conceptual Framework of research in Conceptual Framework of this research

Data Collection Methods

In this study, samples were collected from food supply chain professionals who work in vegetable and fruit E-Commerce in Indonesia based on TBL, with C2B business types or consumers to businesses by utilizing digital platforms in the form of marketplaces and other social media. The object of research is companies that utilize digital technology, be it social media or marketplaces in running their business and have direct relationships with farmers in the food supply chain and sell fruits and vegetables directly without intermediaries in accordance with the criteria set by researchers. Questionnaires are distributed online and use Google Forms to help fill out questionnaires.

In accordance with the statement (Saunders et al., 2019) which suggests that valid questionnaires allow accurate data collection and can quantify the concepts that are the object of research and ensure consistency. This study used questionnaires in collecting data, survey questionnaires were distributed to professional workers in the food supply chain, especially the vegetable and fruit supply chain and sent via google form (Kazancoglu et al., 2022). Quatric-based surveys are considered easy to access via mobile devices or computers connected to the internet. Of the 300 questionnaires distributed to more than 150 vegetable and fruit companies in the marketplace, 136 produced valid answers from 48 companies participating in the study.

During the Covid-19 pandemic, online vegetable and fruit companies in Indonesia mushroomed and grew rapidly along with the large demand for vegetables and fruits, the restrictions on movement from the government to prevent the spread of the Covid-19 virus encouraged the vegetable and fruit business to be in demand and felt the benefits by consumers without having to go out of the vegetable and fruit house delivered directly by courier to consumers' homes.

Population and Sample

This research is explanatory, a survey questionnaire-based approach to data collection is considered the most appropriate because it allows consistency and accurate data collection to measure the concepts that are the object of research (Saunders et al., 2019) and Definition of population according to (Sugiyono, 2015) is public domain which consists of objects or subjects that exhibit certain qualities and characteristics. Professional workers in the supply chain are the subjects of this study who work in vegetable and fruit companies based on TBL principles.

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3. RESULT AND DISCUSSION

This study used primary data using questionnaires in collecting answers from respondents in accordance with indicators that had been determined previously by researchers. This study involved workers or professional employees of the supply chain in the field of selling vegetables and fruits as respondents by distributing questionnaires with the google form application to online vegetable and fruit companies in Indonesia that utilize technology in selling and distributing vegetables and fruits.

Respondents involved in this study were based on age, area, level of workers, work experience, company where they worked. The data collected was obtained from the results of identification based on google forms that had been filled out as many as 136 respondents. Respondents consisted of employees who work in StartUp companies and operate in Indonesia based on TBL and the digital platform used has a direct relationship between farmers and consumers that allows farmers to sell directly to end users without having to go through intermediaries or middlemen. Descriptive analysis is necessary as a result of the study, and identifying important phenomena that have not yet been recognized and understanding the relationship between the factors found in the study (Loeb et al., 2017)

Description of respondents by location

Of the total 48 large and small companies that participated in this study, as many as 59% operate in the DKI Jakarta area which has a large market in the vegetable and fruit business and the rest operate outside the Jakarta city area.

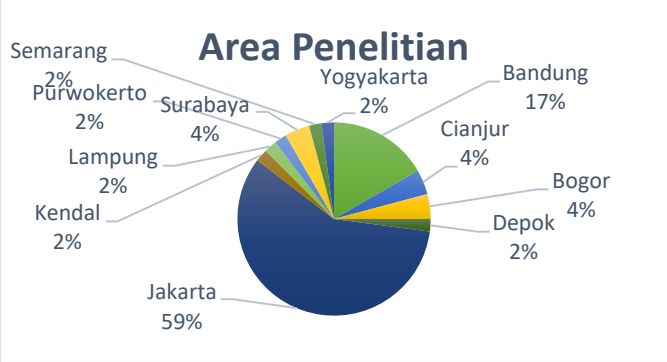

Figure 4 Research areas

Description of Respondents: Based on employment level.

The results of the data collected Level or level of workers in the vegetable and fruit business based on grouping as much as 75% senior level, 21% entry level and 4% director level.

Table 1 Respondents By employment level

Position	Sum	Percentage
Beginner	29	21%
Senior	102	75%
Director	5	4%
	136	100%

Description of Respondents Based on Period of Work Experience

The results based on 136 respondents showed that 9 respondents or 7% worked less than 1 year, 72 respondents or 53% worked 1-3 years, as many as 46 respondents or 34% worked more than 3 years and 5 respondents or 7% worked more than 5 years.

Table 2 Respondents Based on Period of Work Experience

Working Period	Sum	Percentage
Less than 1 Year	9	7%
1 – 3 Years	72	53%
More than 3 Years	46	34%
More than 5 Years	9	7%
	136	100%

Description of Respondents by Number of Workers

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Jurnal Ekonomi, Volume 12, No 03 2023
ISSN: 2301-6280 (print) ISSN: 2721-9879 (online)

The results of the questionnaire showed that as many as 60 respondents or 44% answered 1-10 workers in the company where they worked, 30 respondents or 28% answered 10-50 workers in the company where they worked, 35 respondents or 26% answered 50-100 workers workers in the company where they worked, 3 respondents or 2% answered 100-300 workers in the company where they worked.

Table 3 Number of Workers in the company.

Worker	Sum	Percentage
1 – 10 Workers	60	44%
10 – 50 Workers	38	28%
50 – 100 Workers	35	26%
100 – 300 Workers	3	2%
	136	100%

Chi-Square and Wilcoxon signed-rank analysis

The Chi-Square analysis in this study was conducted using the help of IBM SPSS Software version 2022. Analysis using Chi-square aims to find out if there is a difference between proportions and variables in categories (Montgomery &; Runger, 2018) Chi-square and Wilcoxon are used to assess validity and reality.

H1: The Covid-19 pandemic has had a significant effect on the sustainable economy of the food supply chain.

Based on the results of statistical testing using the Chi-Square analysis tool, the p-value of each indicator that measures the economy < 0.05 (alpha 5%), so that H1 is accepted. Statistically concluded, at a 95% confidence level, the results of this study resulted in the COVID-19 pandemic having a significant impact on the economy, sustainability of the food supply chain.

In other words, the Covid-19 pandemic has a positive and significant effect on the sustainable economy in the food supply chain or The first hypothesis (H1) is accepted. Based on data collected from sustainable economic indicators in the food supply chain, Q1: shows that 54 respondents answered disagree (TS) if their companies experienced a decline in sales and market share during the Covid-19 pandemic, Q2: showed that 80 respondents answered in agreement (S) if their companies experienced an increase in the number and increase in waste disposal costs due to Covid-19, Q3: showed that as many as 95 respondents answered in agreement (S) if their companies increase packaging costs so that vegetable and fruit products can last longer and hygienically from the spread of the Covid-19 virus.

Table 4 Likert scale frequencies for economic sustaibility questions

Likert Scale	Question		
	Q1	Q2	Q3
1	24	4	0
2	54	11	6
3	21	35	21
4	37	80	95
5	0	6	0
Sample	**136**	**136**	**136**

Table 5 Chi-Square test results for questions economic sustaibility

Sample	N	Df	Chi-Sq	P-value
Q1	136	3	19.941	0.000
Q2	136	4	150.691	0.000
Q3	136	3	149.235	0.000

Table 6 Wilcoxon signed test results for question economic sutainbilit

Sample	N	Wilcoxon Statistic	P-value
Q1	136	1,702	0.000
Q2	136	4,259	0.000
Q3	136	6,364	0.000

Source: Processed Data (SPSS 22)

The results of this study are in line with previous research conducted by (Kazancoglu et al., 2022) and (Le et al., 2022) The Covid-19 pandemic has brought many changes to the food supply chain, especially companies engaged in the vegetable and fruit business in Indonesia through the use of online digital technology, many of these companies integrate farmers in other words, these companies make transactions directly to farmers as vegetable and fruit producers by supplying their agricultural products to vegetable and fruit selling companies online. This contributes greatly to economic growth for farmers and can prosper farmers. This business concept aims to create transparency for vegetable and fruit stakeholders for sustainable economic growth in the food supply chain.

H2: The Covid-19 pandemic has had a significant impact on Social Sustainability in the Food Supply Chain.

Based on the results of statistical testing using the Chi-Square analysis tool, the p-value of each indicator that measures social < 0.05 (alpha 5%), so that H2 is accepted. It is concluded statistically that at a 95% confidence level, the results of this study resulted in the COVID-19 pandemic having a significant impact on the social sustainability of the food supply chain.

Based on questions from sustainable social indicators in the food supply chain that have been set by researchers Q1: showed that as many as 54 respondents answered agreeing disagree (TS) if their companies experience termination of employment due to the impact of the Covid-19 pandemic, Q2: showing as many as 54 respondents answered strongly disagree (STS) if their companies experience discrimination in terms of gender equality due to Covid-19, Q3: showing data as many as 97 respondents answered that their company experienced increased attention to organizational sustainability performance from its consumers due to Covid-19, Q4: showed as many as 89 respondents answered that their company experienced improved relations with social institutions during the Covid-19 pandemic, Q5: his company improved relations with the government during the Covid-19 pandemic by following appeals or regulations to reduce the effects of the spread of the Covid-19 virus.

Table 7 Likert scale frequencies for social sustainbility question

Likert Scale	Question				
	Q1	Q2	Q3	Q4	Q5
1	49	54	2	2	5
2	54	2	4	5	6
3	20	17	22	30	28
4	11	12	97	89	84
5	2	0	11	10	13
Sample	**136**	**136**	**136**	**136**	**136**

Table 8 Chi-Square test results for questions social sustainbilitiy

Sample	N	Df	Chi-Sq	P-value
Q1	136	4	78.779	0.000
Q2	136	3	45.118	0.000
Q3	136	4	232.897	0.000
Q4	136	4	193.044	0.000
Q5	136	4	160.691	0.000

Table 9 Wilcoxon Signedtest results for question social sustainability

Sample	N	Wilcoxon Statistic	P-value
Q1	136	545	0.000
Q2	136	396	0.000
Q3	136	6,135	0.000
Q4	136	5,232	0.000
Q5	136	5,115	0.000

Source: Processed Data (SPSS 22)

During the Covid-19 Pandemic, many companies were forced to close, this resulted in new problems for employment. The demand for vegetables and fruits in Indonesia is quite high so that the

farmer profession is a profession that can absorb many jobs and this can also be a solution for workers affected by factory closures in the regions.

In accordance with the statement of (Figueroa-Rodríguez et al., 2019) that the supply chain should be able to provide a conducive environment for every stakeholder to receive training, education services and health services both themselves and their families and train farmers to earn better incomes and can open up new job opportunities for rural communities. Thus, the Covid-19 pandemic has a positive effect on social sustainability in the food supply chain. H2 accepted. H.3 The Covid-19 pandemic has a significant effect on the Sustainable Environment in the Food Supply Chain.

Based on the results of statistical testing using the Chi-Square analysis tool, the p-value of each indicator that measures the environment < 0.05 (alpha 5%), so that H3 is accepted. Statistically concluded, at a 95% confidence level, the results of this study resulted in the COVID-19 pandemic having a significant impact on the environment, sustainability of the food supply chain. Based on questions from sustainable environmental indicators in the food supply chain Q1: showed that as many as 86 respondents answered in the affirmative (S) if their companies experienced an increase in the use of electrical and water energy during the Covid-19 pandemic, this was based on awareness from workers and the appeal to always wash hands with water to reduce and prevent the spread of the Covid-19 virus. Q2: as many as 89 respondents answered in agreement (S) if their companies experienced an increase in producing food waste during the Covid-19 pandemic.

Table 10 Likert scale frequencies for environmental sustainability questions

Likert Scale	Question	
	Q1	Q2
1	3	3
2	6	7
3	21	18
4	86	89
5	20	19
Sample	**136**	**136**

Table 11 Chi-square test results for questions environmental sustainability

Sample	N	Df	Chi-Sq	P-value
Q1	136	4	168.485	0.000
Q2	136	4	182.529	0.000

Table 12 Wilcoxon Signed test results for questions environmental sustainability

Sample	N	Wilcoxon Statistic	P-value
Q1	136	6,079	0.000
Q2	136	6,359	0.000

Source: Processed Data (SPSS 22)

At the beginning of the pandemic in 2020, many companies suffered losses due to the implementation of lockdowns, so many vegetable and fruit companies were forced to dispose of vegetables and fruits due to hampered distribution due to lockdowns. According to (V. Kumar, 2020b) Food waste accounts for more than a quarter of exhaust emissions and it worsened the environment at the start of the Covid-19 pandemic. However, according to (Burlea-Schiopoiu et al., 2021) Through his latest research, vegetable and fruit consumers experience behavioral changes in reducing food waste and explained in his research that consumers are more aware that disposing of food waste can be bad for the environment. Thus, the Covid-19 pandemic has a positive effect on the sustainable environment in the food supply chain. (H3) accepted.

H.4 Digital Technology has a significant impact on Sustainable Food Supply Chains.

Based on the results of testing with Chi-Square analysis tools and Wilcoxon signed-rank test, H4 is accepted, thus that "Technology has a significant impact in reducing the negative effects of the COVID-19 Pandemic on sustainable food supply chains in economic, social and environmental aspects.

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Based on indicators of the role of technology in the food supply chain Q1: 78 respondents strongly agreed (SS) that their companies use and utilize digital technology to improve the sustainable economy. Q2: A total of 71 respondents strongly agreed (SS) that their companies use and utilize digital technology to improve social sustainability in the food supply chain. Q3: A total of 78 respondents answered strongly agree (SS) that their companies use and utilize technology in improving the sustainable environment.

Table 13 Likert scale frequencies for economic sustainability questions

Likert Scale	Question		
	Q1	Q2	Q3
1	0	0	0
2	0	0	0
3	2	4	8
4	56	61	50
5	78	71	78
Sample	**136**	**136**	**136**

Table 14 Chi-square test results for questions economic sustainability

Sample	N	Df	Chi-Sq	P-value
Q1	136	2	67.471	0.000
Q2	136	2	57.632	0.000
Q3	136	2	54.765	0.000

Table 15 Wilcoxon Signed test results for questions economic sustainability

Sample	N	Wilcoxon Statistic	P-value
Q1	136	9,045	0.000
Q2	136	8,778	0.000
Q3	136	8,256	0.000

Source: Processed Data (SPSS 22)

In previous research by (Pathak et al., 2020) That the role of digital technology can improve performance in the sustainability of the organization, in other studies also revealed that the role of digital technology is very important in monitoring, measuring and analyzing information related to sustainable supply chains (O'Rourke, 2014). In line with the main research that is the reference of this study is (V. Kumar, 2020b) Explaining that digital technology can help with the upcoming challenges of collecting data in "real time" to improve communication between suppliers and buyers, simplify food distribution to reduce food waste to create a sustainable food supply chain.

H.5 Government Support has a significant impact on Sustainable Food Supply Chains.

Based on the results of testing with Chi-Square analysis tools and Wilcoxon signed-rank test, H5 accepted, that "Government support has a significant impact on mitigating the negative impact of the COVID-19 pandemic on sustainable food supply chains".

Based on the indicator of government support for sustainable food supply chains Q1: showed that 94 respondents answered in the affirmative (S) that their companies considered that government policies on Covid-19 and positive government support for vegetable and fruit businesses in Indonesia could improve sustainability in economic aspects. Q2: showed that 94 respondents answered in agreement (S) that government policies on Covid-19 and positive government support for vegetable and fruit businesses in Indonesia can improve sustainability on social aspects. Q3: showed that 91 respondents answered in agreement (S) that government policies on Covid-19 and positive government support for vegetable and fruit businesses in Indonesia can improve sustainability in environmental aspects.

Table 16 Likert scale frequencies for governmental policies and interventions questions

Likert Scale	Question		
	Q1	Q2	Q3
1	2	1	2
2	2	2	1
3	10	8	9
4	94	94	91

Likert Scale	Question		
5	28	31	33
Sample	**136**	**136**	**136**

Table 17 Chi-square test results for questions, governmental policies, and interventions

Sample	N	Df	Chi-Sq	P-value
Q1	136	4	221.647	0.000
Q2	136	4	226.721	0.000
Q3	136	4	211.647	0.000

Table 18 Wilcoxon Signed test results for questions, governmental policies and interventions

Sample	N	Wilcoxon Statistic	P-value
Q1	136	6,646	0.000
Q2	136	6,920	0.000
Q3	136	7,490	0.000

Source: Processed Data (SPSS 22)

The positive role and support from the government is needed in creating a sustainable business for all vegetable and fruit stakeholders, this is in accordance with research (Sodhi & Tang, 2021) which explains that government support can create sustainability for vegetable and fruit businesses. In this case, the government plays an active role in price control, fertilizer to providing training and counseling in agriculture so that there are no more middlemen who monopolize the price of vegetables and fruits in the market by practicing the principle of "Triple Bottom Line"

H.6 Effective Organizational Management has a significant effect on Sustainable Food Supply Chains.

Based on the results of testing with Chi-Square analysis tools and Wilcoxon signed-rank test shows that H6 is accepted. Namely, "Effective organizational management has a significant impact on mitigating the negative impact of the COVID-19 pandemic on sustainable food supply chains".

Based on the effective organizational management indicator Q1: as many as 62 respondents answered in the affirmative (S) if effective organizational management can improve economic sustainability. Q2: A total of 78 respondents answered affirmative(S) that effective organizational management can improve social sustainability. Q3: A total of 87 respondents answered in agreement (S) that effective organizations can improve environmental sustainability.

Table 19 Likert scale frequencies for organisational management questions

Likert Scale	Question		
	Q1	Q2	Q3
1	3	2	3
2	3	6	4
3	18	15	10
4	62	78	87
5	50	35	32
Sample	**136**	**136**	**136**

Table 20 Chi-square test results for questions organisational management

Sample	N	Df	Chi-Sq	P-value
Q1	136	4	109.809	0.000
Q2	136	4	142.456	0.000
Q3	136	4	184.515	0.000

Table 20 Wilcoxon Signed test results for questions organisational management

Sample	N	Wilcoxon Statistic	P-value
Q1	136	7,681	0.000
Q2	136	8,046	0.000
Q3	136	7,861	0.000

Source: Processed Data (SPSS 22)

http://ejournal.seaninstitute.or.id/index.php/Ekonomi
Jurnal Ekonomi, Volume 12, No 03 2023
ISSN: 2301-6280 (print) ISSN: 2721-9879 (online)

Effective organizational management has an important role in changing socially, economically, and environmentally for the better with good organizational management expected to anticipate future events (Florescu et al., 2019). Effective organizational management can help in creating good relationships with partners, be it suppliers, in this case farmers, to companies that sell vegetables and fruits towards sustainable food supply chains (Adesanya et al., 2020)

H.7 The Circular Economy has a significant impact on Sustainable Food Supply Chains.

Based on the test results with Chi-Square analysis tools and Wilcoxon signed-rank test, H7 was accepted where the test results showed "Circular Economy has a significant impact on mitigating the negative impact of the COVID-19 pandemic on sustainable food supply chains".

Based on indicators of a circular economy in sustainable food supply chains Q1: 89 respondents agreed(S) their companies increase recycling to reduce waste and utilize production waste to reduce waste. Q2: A total of 82 respondents responded that their companies actively share in obtaining certain resources to other companies in order to increase efficiency. Q3: A total of 88 respondents answered in agreement (S) that the company promotes saving the use of electrical energy and water in the company environment. Q4: A total of 84 respondents responded that their company promotes waste recycling in the company's environment. Q5: A total of 86 respondents responded that their company promotes the use of renewable natural resources in their corporate environment. Q6: As many as 92 respondents answered that their company adds value to products / services to get added value from its consumers. Q7: A total of 89 respondents responded that their company is proactive in providing input to its business partners in the supply chain. Q8: A total of 92 respondents answered quite agree (CS) that their companies are ready to face challenges by practicing energy saving and recycling production waste.

Table 21 Likert scale frequencies for governmental policies and interventions questions

Likert Scale	Question		
	Q1	Q2	Q3
1	2	1	2
2	2	2	1
3	10	8	9
4	94	94	91
5	28	31	33
Sample	**136**	**136**	**136**

Table 22 Chi-square test results for questions, governmental policies, and interventions

Sample	N	Df	Chi-Sq	P-value
Q1	136	4	221.647	0.000
Q2	136	4	226.721	0.000
Q3	136	4	211.647	0.000

Table 23 Wilcoxon Signed test results for questions, governmental policies and interventions

Sample	N	Wilcoxon Statistic	P-value
Q1	136	6,646	0.000
Q2	136	6,920	0.000
Q3	136	7,490	0.000

Source: Processed Data (SPSS 22)

Circular Economy is defined as a model of production and consumption that aims to extend the life span of a product to the maximum and reduce the amount of waste to the lowest level. According to (E. L. Kuzma et al., 2022) The circular economy stimulates cleaner, more efficient production and is able to turn waste into something useful for the production chain.

This is in line with the principle of TBL by utilizing waste, reducing the use of water and electricity energy, to social problems. With companies practicing a circular economy where a company no longer pursues economic profits but is expanded to include environmental and social indicators in running its business

4. CONCLUSION

Based on the results of research on workers of E-commerce vegetable and fruit companies in Indonesia, it can be concluded that Covid-19 has a significant effect on the economy, social and

environment, in other words, Covid-19 has affected economic, social and environmental aspects in the vegetable and fruit E-commerce industry in Indonesia. Digital technology has a significant influence on the food supply chain, with companies utilizing digital technology, online vegetable and fruit companies get large profits during the pandemic, this is due to consumers who prefer to shop online which consumers feel is safer from the dangers of the spread of the Covid-19 virus and more practical. Government support has a significant role in the sustainable food supply chain through policies made for farmers in order to support the agricultural industry in Indonesia, one of which is in terms of capital and training to maximize Indonesian agricultural output. Management organizations have a significant role in the company or management in determining policies or decisions related to threats that will occur in the future. The circular economy in the sustainable food supply chain has a significant influence on Covid-19, during the pandemic companies are required to be able to implement savings in the use of water and electricity energy, increase the conversion of waste into inputs useful for production which means that there are efficiencies applied in production lines to create sustainable supply chains.

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