

Malaysian and Libyan Perspectives on Single-Use Plastic's Environmental Impact During the Pandemic COVID-19: A Pilot Study

Kamal Yousef Ali Zreba¹, Tengku Nuraiti Tengku Izhar^{1,2*}, Farah Naemah Mohd Saad¹, Irmis Azura Zakarya^{1,2}, Rajeb Salem A. Hwidi³

¹Faculty of Civil Engineering and Technology,
Universiti Malaysia Perlis, 01000 Arau, Perlis, MALAYSIA

²Environment Research Group, Centre of Excellence Geopolymer and Green Technology,
Universiti Malaysia Perlis, 01000 Arau, Perlis, MALAYSIA

³Higher Institute of Technical Water Affairs, El Ajelat, LIBYA

*Corresponding Author

DOI: <https://doi.org/10.30880/ijie.2023.15.02.028>

Received 11 January 2023; Accepted 01 May 2023; Available online 13 September 2023

Abstract: Plastics have become a significant threat to natural ecosystems as well as human health. The use and consumption of plastics improves our quality of life significantly, but it is critical to transition to more sustainable alternatives. Thus, the current study proposes an investigation into the impact of single use plastic products during pandemic on the impact to the environment from the Malaysian and Libyan perspective. A pilot study was conducted to examine the strength of the questionnaire in collecting on the environmental impacts of single use plastic during COVID-19 pandemic distributed across two countries (Libya and Malaysia). SPSS was used to test the questionnaires' strength with 40 participants, 20 in each nation. The reliability test results with Cronbach's Alpha predicted values of 0.7-0.86 and actual data Alpha values 0.87-0.93, normal test of variance inflation factor ranging between 1 and 5, skewness and kurtosis values of -1.343 to -0.076 and 5.312 to -0.024 respectively confirmed the strength of the questionnaires as benchmarked in the literature. Further, the participants' responses to the quality of the questionnaire in determining the single use plastic impact to environmental have clearly revealed the strength and applicability of this questionnaire for wider data collections.

Keywords: Waste management, single use plastic, environmental impact, Cronbach's alpha, COVID-19

1. Introduction

The importance of single-use plastics has been highlighted by Coronavirus disease (COVID-19). Single-use plastic food packets used in food delivery due to people staying at home during a pandemic, along with packaging solutions, have emerged as a lifesaver for protecting frontline health workers and ordinary residents during a pandemic [1]-[5]. Polyethylene terephthalate has been a major pandemic polluter due to its widespread use, indiscriminate littering, and mismanagement in the face of rising plastic usage and trash generation [6]. This study investigates the impact of single-use plastic on users, industry, and the environment during the pandemic [7]. Based on the advantages and disadvantages of single-use plastic, as well as how it is managed (or not managed), as well as the fate of producers' and customers' behaviour, attitude, and awareness as important drivers leading to mismanagement and transforming plastic into a dangerous environmental polluter [8]. Plastic can protect against the pandemic if it is handled properly and combined with circular economy ideas to reduce leaks. This project will use a questionnaire and Gabi education to investigate the impact of single-use plastic on users, industry, and the environment throughout the epidemic era. This

*Corresponding author: nuraiti@unimap.edu.my

pandemic is caused by the Coronavirus disease (COVID-19) [9]- [11]. The world has come to a halt as a result of the SARS-CoV-2 pandemic, and a new way of life has emerged. SARS-CoV-2 is highly contagious (median incubation period: 5.1 days), infecting 2.4-3.3 people per confirmed case [12]. The COVID-19 disaster has brought to light the significance of plastic [14]. Throughout the pandemic, plastics made significant contributions to healthcare and public health safety [15].

The use of hand sanitizer often, social seclusion, and a nationwide lockdown are also recommended. Frontline healthcare workers put on protective medical suits, aprons, gowns, face shields, surgical masks, and other PPEs to prevent virus contamination and fight COVID-19 [16]- [20]. Plastics are durable, portable, and flexible. Plastics play a crucial role in the healthcare industry, as they are widely used in packaging as well as single-use medical items and equipment [21]. Plastic intended for one use is a packing material that is lightweight, flexible, and durable [22]. The most typical material used in packaging is plastic. The demand for plastic-based packaging, especially single-use plastics (SUPs), has surged despite bans or limitations in many countries because to changes in consumer behaviour and reliance on online shopping and takeaway services for home delivery of vital commodities during the pandemic [23]. The use of PPEs and packaging materials grew. The accumulation of single-use plastic items in the environment of the Earth has a negative influence on people, animals, aquatic life, and their habitat. As more people disregard the correct disposal practises for old single-use plastic goods, there is an increase in the amount of mask waste produced globally. Single-use plastic items (SUPs) are items that are used only once or for a brief time before being discarded, according to several research that have sought to define them and provide methods for measuring them [24]. Global and severe effects of this plastic trash are on the ecosystem and our health [25]. Reusable alternatives are less likely to enter our oceans than single-use plastic products. The top 10 single-use plastic products are discovered on beaches. The manufacture of single-use plastic is one of the study's most significant independent variables [26]. Due to the rising use of face masks and the shift in consumer preference to single-use masks as a result of the sanitary issue, there is a considerable increase in the creation of plastic waste during the COVID-19 [27]. The environment for each individual, business, educational institution, place of employment, and economy in every nation affected has been significantly changed by the ongoing COVID-19 outbreak [28]. As of right now, there is no reliable medication that can stop the coronavirus disease from spreading. Some of the tactics now being utilised to reduce coronavirus transmission include personal protective equipment (PPE), social distance, travel restrictions, and lockdown [29].

2. Methodology

The research philosophies, approaches, strategies, and methods used in the study are covered in this section. The population, sample size, and sampling methodologies are all explained in this section, along with the research strategy chosen for this study. In addition to describing the questionnaire created for data collection, techniques of data collection, and the processes followed in data collection for this study, it examines operationalization of the variables evaluated in this study. The research hypotheses are:

- H1: Industry has a positive influence on the single use plastic impact during pandemic.
- H2: Users have a positive influence on the single use plastic impact during pandemic.
- H3: Use of single use plastic has a positive influence on the single use plastic impact during pandemic.
- H4: Pandemic has negative influence on the user, industry, and environment on the impact of single use plastic.
- H5: Users have a positive influence on the pandemic.
- H6: Use of single use plastic has a negative influence on the pandemic.
- H7: Use has positive influence on the pandemic.
- H8: Pandemic mediates the relationship between users and impact of single use plastic on the environment.
- H9: Pandemic mediates the relationship between industry and impact of single use plastic on the environment.
- H10: Pandemic mediates the relationship between use of single use plastic and impact of single use plastic to environment.
- H11: Waste disposal moderates the relationship between pandemic and impact of single use plastic to environment.

This section discusses how the data was collected and analyzed. It started with a graphical view of the relationships among the main variables [30]. The discussions on these variables that lead to the development of hypotheses were equally presented in this section. A proposed research framework in this study gives a picture of the whole idea of the study and illustrates the schematic diagram in Fig 1. Hypotheses are based on problems and research questions that lead to the research objectives. The hypotheses of this study are developed to test the relationship amongst the variables in this study model. A hypothesis was established according to a deep discussion of the literature review. The participants were selected based on the sampling procedure provided from literature where sampling can be defined as a process of selecting units (e.g. people, organizations, or things of interest to the researcher). The population is regarded as one of the vital research elements that encompass a common characteristic of all the individuals in the group. For the purposes of this study, the target participants are both single-use plastic industries and end users. The sampling represents the collection of the groups that participate in a particular group. The population can either be a target or an accessible population. There are arguments, that the larger the sample size, the greater the likelihood of lower error in generalizing results [25], [26]. The target population of this research consists of industries and users in Libya and Malaysia. The

population size of this study is 20 industry participants and 20 user participants. This study adopted the commonly used method for adjusting sample size introduced by Salkind and Bartlett to increase or reduce sample size error.

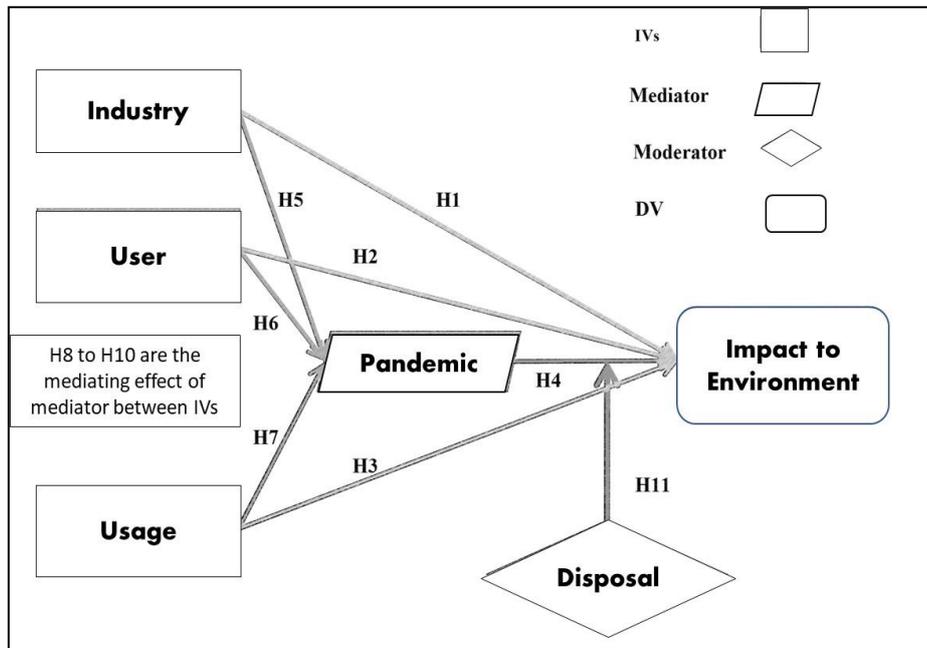


Fig. 1 - Conceptual framework

This study distributed 40 questionnaires to ensure the reliability and validity of the results was achieved. Regular follow-up was conducted. This questionnaire is adapted from the previous study that has been tested, and whose reliability and validity are good enough to support this study as well. In this study, the researcher applied three major procedures to ensure the validity of the questionnaire used in this study. According to Yusof et al. [33], a scale is said to be valid when it exactly measures what it is intended to measure without any bias. The study questionnaire designed was conducted with full supervision and has been tested several times on a staged basis according to the procedures as suggested by Yeboah-Boateng & Essandoh [34]. Several guidelines were consulted on how to design a questionnaire and equally. Questions were translated and reviewed by experts. Instructions also translated to Arabic according to the guideline [35]. The accuracy of the question was determined by how accurately it was translated according to Klemeš et al. [36]. A pilot study is an attempt to avoid the mistakes made in the main study and to save money and time for the research. The validity and reliability of the research instrument are critical [37]- [42]. The pilot study should be carried out among participants from the population of the study.

2.1 Research Philosophy

Research philosophy, also known as the research paradigm, is a "fundamental belief system or world view that directs the investigation," according to various researchers. The positivist paradigm and the interpretive paradigm are two subcategories of research philosophy. The interpretive paradigm, also known as constructivist or phenomenologist, holds that social life can be studied qualitatively using a variety of methods such as direct observation, interviews, and case studies, in contrast to the positivist paradigm, also known as the scientific paradigm, which holds that social reality can be studied independently and objectively. The choice of the research paradigm is largely influenced by the nature of the topic and the questions being asked, rather than just the researcher's philosophical outlook. Therefore, based on the study objectives and questions, the positivist paradigm is adopted [43].

2.2 Research Design

A research design is a framework or strategy that outlines the steps to take in order to gather and examine the necessary data and information. There are three distinct categories of study designs: exploratory, descriptive, and explanatory. Exploratory research is used when a topic is not well defined and frequently uses the literature and data already accessible to study the issue before developing any kind of research framework. When there is some knowledge and awareness of the nature of the problem and a more thorough description of the problem is provided, descriptive research is conducted. Explanatory or hypothesis testing further explains the nature of the correlations among the study's variables. This study will use an explanatory approach [44].

2.3 Population and Sample Size

When one wants to generalise survey results to all units, the population is the set of things from which the sample is drawn. The sample of units in which information is to be obtained is known as a sampling frame. A solid sample frame can take care of a number of requirements, including being complete and current. Probability and non-probability sampling are the two categories under which sampling is categorised. When the sample's representativeness and generalizability are crucial, probability sampling is frequently used. Some academics claim that data collecting and the impossibility of gathering information from the complete population are two reasons why sampling is necessary. To enable the researcher to generalise to the population, a systematic random sample technique will be used [45].

2.4 Instruments and Measurements

The factors in the questionnaire were modified from earlier studies on the production, use, disposal, and environmental impact of SUPs in order to better fit the study's goals and the viewpoint of the local community. The survey includes a number of questions. To record the level of their judgement and impression on each item, respondents will be asked to answer to the question's statement using a five-point Likert scale ranging from 1 for "strongly disagree" to 5 for "strongly agree." Respondents find it simple to read, comprehend, and report their perceptions of variables using a Likert scale. One of the most used scales is the Likert scale, which has received support from earlier research on the impact of plastic [46].

2.5 Validity and Reliability

The degree to which an instrument (questionnaire) measures what it is intended to measure is known as validity. The two criteria for evaluating validity are construct validity and content validity. The subjective evaluation of content validity is predicated on individual opinion. Survey results are validated and determined using the experts' opinions. SPSS was used in this study to validate the data and assess construct validity. To assess the level of internal consistency in the equipment used for measurement (questionnaires). It will establish the instrument's consistency in producing consistent results over time. Cronbach Coefficient Alpha can be used to evaluate reliability. An Alpha of 0.8 or higher is regarded as excellent, and 0.7 is regarded as acceptable [47].

2.6 Pilot Study

A pilot test was carried out, and a team of specialists was asked to contribute to the questionnaire development. If the survey's questionnaire is clear and pertinent to the measurement's variables, the goal was achieved. The questions were aimed at academics and industry professionals. They were requested to comment and offer input on the suitability of the questionnaire that was used to gather the data. A sample of 20 to 40 people representative of the study's population was chosen. The purpose of the pilot study is to assess whether the respondents comprehend the questionnaire, to look for suggestions for improving the questionnaires, and to estimate the time needed by respondents to complete the survey. This might improve the validity and reliability of the study's surveys.

2.7 Data Collection

Self-reported questionnaires will be used to gather data for this study, which will be sent by mail. Numerous researches have shown that self-reported surveys are more successful and have an impact on respondents' satisfaction levels. Additionally, completed questionnaires can be gathered quickly.

3. Results and Discussions

The reliability is one of the most important aspects of any examination, the evaluation of the test's questions' level of quality is absolutely essential to its success. The evaluation of the quality of the questionnaires was the focus of the research that was carried out. It has something to do with concerns about uniformity. On the other hand, if the dependability of the test is low, the examinee may receive dramatically different scores when it is given twice in a row. If a test produces contradictory results, using those results as the foundation for significant life decisions can be considered immoral. There are a number of different approaches that can be taken to evaluate the accuracy of a test's reliability. Some examples of these approaches include test-retest reliability, parallel-form dependability, decision consistency, internal consistency, and interrater reliability. Findings from Reliability Studies Conducted as Part of Pilot Project Table 1: The findings of a reliability assessment were out over the course of the pilot research. The table shows the results of the pilot test conducted, where it shows four columns, where the first columns show the variables and the second column shows the items. It means the number of the questions. The third column, on the other hand, displays the Cronbach Alpha obtained using software, whereas the third column displays the actual Cronbach obtained from the field study, which indicates participant on the questionnaire. By observing this result, the predicted results show an Alpha value between 0.7 and 0.86 and the result of the actual Alpha shows a value between 0.87 and 0.93. The Cronbach's alpha is a way or approach that measures the integrity of a questionnaire by observing the internal

consistencies of the questions being set. In other words, it is the coefficient of reliability that indicates the method of measuring the internal consistency of tests being conducted. Its reliability scale ranges between 0 and 1. Where the acceptable range is from 0.7 to 1. It is interesting to note that in this table, both actual and predicted Cronbach values are within the acceptable range, and in fact, the actual data shows an excellent acceptability than predicted Cronbach values, with a minimum value of 0.87, which shows the consistency of the questions being set. Several researchers with similar methods of data collection have tested their questionnaires through pilot studies, but unfortunately, most could not fully determine the consistencies of the questions because they could not achieve the desired Cronbach value [48].

Table 1 - Reliability studies

Variables	Items Count	Cronbach's Alpha (Pilot Test)	Cronbach's Alpha (Actual Data)
		N=40	N=40
Industry	5 items	0.71	0.90
User	5 items	0.70	0.89
Plastic usage	5 Items	0.72	0.93
Pandemic	5 items	0.76	0.87
Disposal	5 items	0.70	0.88
Environmental Impact	5 items	0.86	0.89

A phenomenon known as multicollinearity may be present when the independent variables are significantly related with one another and with one another with one another. In addition, the standard error of the regression coefficient will expand when there is a substantial amount of multicollinearity across variables; as a result, the statistical reliability of these coefficients will be reduced. However, according to various studies for reflective measurement model multicollinearity is not an issue. In statistic the term variance inflation factor (VIF) is introduced to test the degree of relationship or correlation among independent variables and said to be a measure of the amount of multicollinearity in a set of multiple regression variables include dependent and independent variables. In other word, it is the ratio calculated for each independent variable, which determine the linkage between variables and associated in the model variables. Meanwhile, a high multicollinearity still refers to a problem. Therefore, in current study variance inflation factor (VIF) is used to test multicollinearity following the previous studies. Value of VIF should be greater than 1 and less than 5 is acceptable. Values of VIF are extracted from SPSS algorithm and statistical result of multicollinearity indicated that the there is no multicollinearity problem in current study. The output of this study indicates high correlations among the model variable, similar results have been presented in the study of Hellewell in 2022 [38].

Table 2 - Hypothesis and variance inflation factor

Hypothesis Relationships	VIF
H1	1.047
H2	1.075
H3	1.096
H4	1.006
H5	1.044
H6	1.031
H7	1.002
H8	1.009
H9	1.002
H10	1.013
H 11	1.009

We investigated the degree to which the variables are correlated with one another by referring to the normal distribution of the data. The assumption that the data follows a normal distribution is one of the most essential assumptions in statistical analysis and structural equation modelling. The SPSS lenient model doesn't make any assumptions about whether or not the data distributions are normally distributed. Even though SPSS is a non-parametric statistical method that does not require the data to be normalised and distributed, it is of the utmost importance to guarantee that the data does not deviate from the normal distribution more than is considered acceptable. When dealing with extremely odd data, the bootstrapping technique may give inflated standard errors since it is difficult to evaluate the parameters of the model. The statistical methods of skewness and kurtosis were utilised in this investigation to test for normalcy. This involves examining any potential departures from normality as well as the form of the distributions. Skewness and kurtosis should both have values that are lower than 2, and kurtosis should have a value that is lower than 7. The statistical information shown in Table 3 shows that the levels of skewness and kurtosis are within the acceptable bounds. As a result, there is no cause for concern regarding the normalcy of the data [33].

Table 3 shows the result of the of the normality test on the variables measurements. These tests were determined by the result of the skewness and kurtosis study conducted. The first column shows the 6 variables: Industry, user, single usage, pandemic, disposal and the environmental impact. The second and third columns show the skewness statistic and standard deviation error. The fourth and fifth columns show the kurtosis statistic and standard deviation error. The skewness statistic ranging between -1.343 to -0.076, and with all similar standard deviation errors. Kurtosis statistic shows the value ranging between 5.312 to -0.024, and with similar standard deviation errors [48]. In these results, the skewness statistics are all negatives indicating the finding are consistent with skewed distribution. The result is confirmed by the similarity of the standard deviation in all the measurements. In other hand, the kurtosis results indicate the all the three independents' variables are highly independent especially the industry with highest statistic value of 5.312. Moreover, the 4 variables; industry, user, single usage and pandemic have positive kurtosis statistic values. Borongan 7 NaRanong [49] have made study on the validation of their questionnaire, where they introduced skewness and kurtosis results They found out that the skewness and kurtosis do not exceed between +2 and -2. The correlation coefficient value that was greater than 0.8 was identified in their study for any of the observable indicators in the correlation matrix. Based on the claimed, multicollinearity is not a problem with the data. Thus, for the current study similar clamed can be made since my results show a similar pattern to what obtained the literature.

Table 3 - Normality test on the variables measurements

	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
Industry	-1.343	0.121	5.312	0.242
User	-0.444	0.121	0.621	0.242
Single usage	-1.067	0.121	0.762	0.242
Pandemic	-0.420	0.121	0.231	0.242
Disposal	-0.800	0.121	-0.024	0.242
Environmental Impact	-0.076	0.121	-0.400	0.242

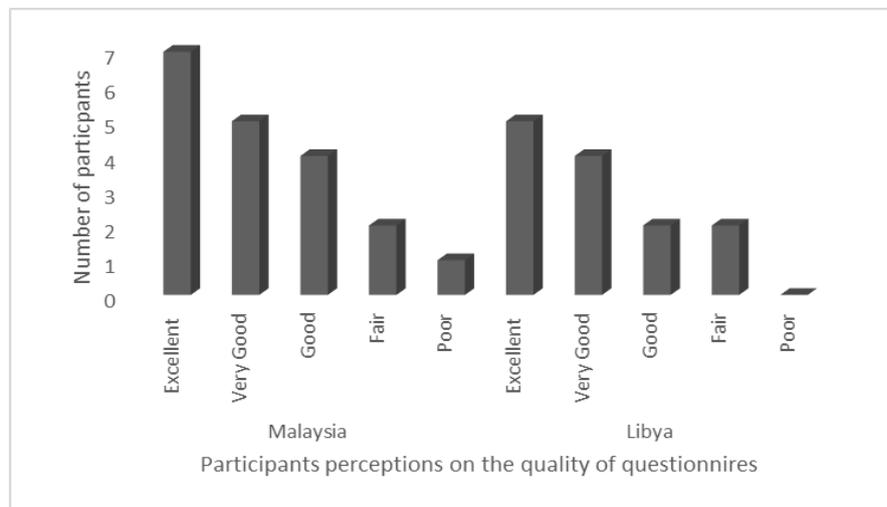


Fig. 2 - Participant's perception on the quality of the questionnaires

An effective questionnaire is the heart and soul of a survey, and its quality and significance are directly influenced by its design. Without a well-designed questionnaire, a survey will never have the desired impact, much less produce the findings that were anticipated. The survey's overall quality and usefulness will suffer if the sample survey asks the wrong questions in the wrong way to the wrong people at the wrong time. Fig. 2 shows the results obtained from the response of the participants namely Libyan and Malaysian that measuring the quality of the questionnaire. The breakdown of the participant responses on the quality of the questionnaire are as follow, 7 participants have responded excellent in Malaysia, 5 participants responded excellent in Libya, 5 participants responded very good in Malaysia and 4 participant responded very good in Libya. Similarly, the 4 participants responded good in Malaysia and 2 responded good in Libya and 1 participant responded fair in Malaysia and 1 participant responded fair in Libya. Only 1 participant responded in Malaysia. In conclusion, the questionnaire is verified by the support indicated by the participant's opinions with 96.6% agreed on the quality to conduct the survey.

Every year, people all over the world use more than 500 billion different types of plastic bags. The vast majority of plastic bags find their way into bodies of water, including extremely rare instances of freshwater. In the coming decades, if current tendencies remain the same, the plastics industry might be responsible for twenty percent of the total

oil consumption that occurs around the world [35]. The negative effects that plastic bags have on the environment are becoming increasingly severe in developing countries. According to some estimates, the amount of plastic produced worldwide increased from 1.5 million tonnes in 1950 to 381 million tonnes in 2015. Of this amount, somewhere between 5 and 13 million tonnes were dumped into the oceans each year by nations that have ocean coastlines. The plastics industry could be responsible for 20 percent of the world's total oil consumption by 2050. This would place a significant burden on the earth's diminishing supply of fossil fuels. The majority of people are aware of the negative effects that plastic shopping bags have on the environment. Perceptions about single use plastic impacts are investigated its impacts as well as sociodemographic and psychological factors predicting individuals' pro-environmental behaviors during COVID 19 were analyzed. Fig. 3 shows the participant opinion on the impact of the single use plastic to the environment between two countries namely, Libya and Malaysia. In the single use impact to the environment, 18 agreed extremely impact, 4 agreed high impact and 8 agreed moderate impact with no one responded "no impact". The break down of the response on the impact of the single use plastic recorded between the two countries. 12 responded extreme impact in Malaysia and 6 responded extreme impact in Libya. One responded high impact in Malaysia and 3 responded high impact in Libya. 5 responded moderate impact in Malaysia and 3 responded moderate impact in Libya. Here, as can be seen 100% participant in both countries agreed that there impact to the environment by the single use plastic. It can be concluded that research model has captured the problem and objective of the study and the questionnaire have indicated reliability in collecting the full data collection [50]. Finally, the questionnaire is the potential instrument in gauging the impact of the single use plastic on the environment.

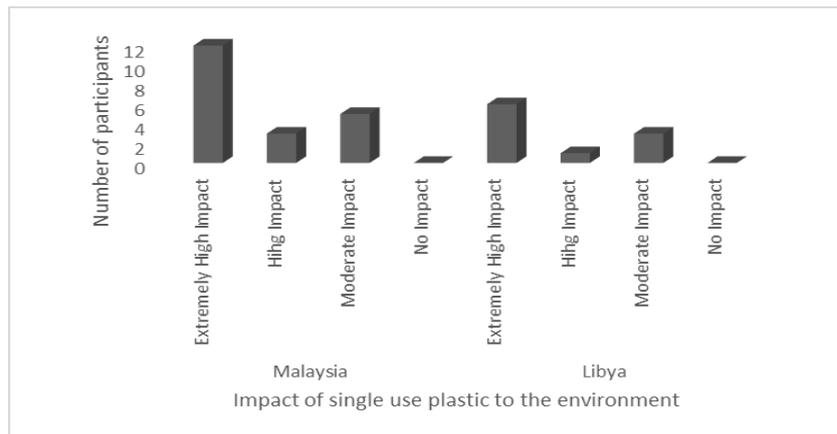


Fig. 3 - Participant's perception on environmental impacts of single use plastic during COVID-19 pandemic

Face masks worn over the nose and mouth are the first line of defence in the fight against the spread of the severe acute respiratory syndrome SARS-CoV-2. The World Health Organization (WHO) has already revised the recommendations and strongly suggested that people wear face masks whenever they are in public places. Because of this, the production of face masks as well as their use in many different regions of the world has dramatically increased. Malaysia and Libya have a good reputation among their citizens for adhering to WHO guidelines. Therefore, results from Fig. 4 confirm that the scenarios of Malaysia and Libya adhere to the recommendations made by WHO. Malaysia and Libya have exercised extreme caution throughout the COVID-19 pandemic. Where it appears to be the major potential contributors of pollution in both countries. The high usage of face masks is expected to increase since both countries recorded successful control of the virus [51].

Fig. 4 shows the participant response on the single use plastic product used during the covid-19 pandemic. 13 Malaysian participants agreed that disposal face mask are mostly used during the pandemic, 7 Libyan participants agreed that disposable face masks are mostly used during the pandemic. One Malaysia participant agreed that hand gloves are mostly used during pandemic and one Libyan participant agreed those hand gloves are mostly used during the pandemic. In the other hand, 4 Malaysia agreed that hand sanitizers are mostly used during the pandemic and 4 Libyan participants agreed that hand sanitizers are mostly used during the pandemic. This result has fully agreed with most studies in the literatures, for example Martinelli et al, 2021 [40] have indicated that the face masks have gradually been adopted where they "face mask use has been recognized as a suitable measure within the scientific community" they further said, the face mask have capability to serve as a precautionary measure in face of some acute breakout of pandemic such as covid 19. Furthermore, in the same study they claimed that their observation has supported by some literature through empirical observations. Similarly, Mamata et al. [52] claimed in their study, the facemasks among the single use plastic used during the pandemic and they found out that the face masks are most reliable product for infection preventive measures. However, they have indicated the masks along will not be 100% preventer to infection or against the viral infections but these materials have proven to wealthy of the putting barriers to the virus through filtration. That what attracted the huge usage in face mask, this study has concurred with literature as earlier mentioned.

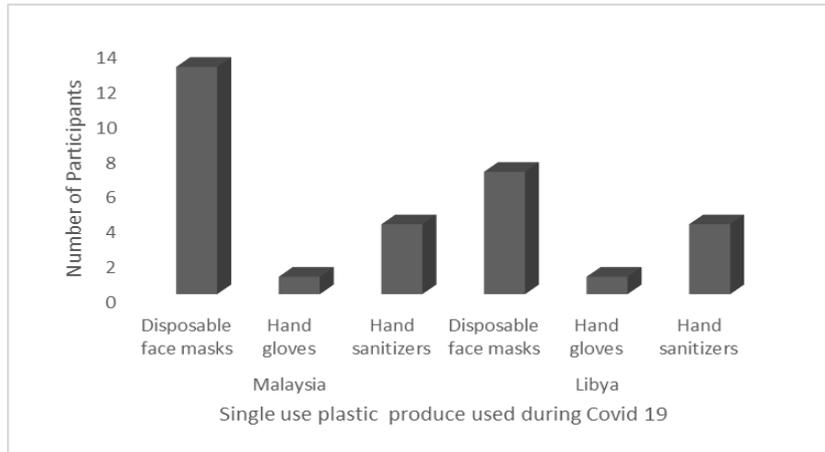


Fig. 4 - Participant's perception on usage of single use plastic during COVID-19 pandemic

Every minute, one million plastic bottles are purchased. It is estimated that, nearly five trillion plastic bags are used annually across the globe. The majority of the plastic that is manufactured is intended for single-use applications, meaning it is utilised just once before being discarded. Fig. 5 shows the participant's awareness on banning of usage.

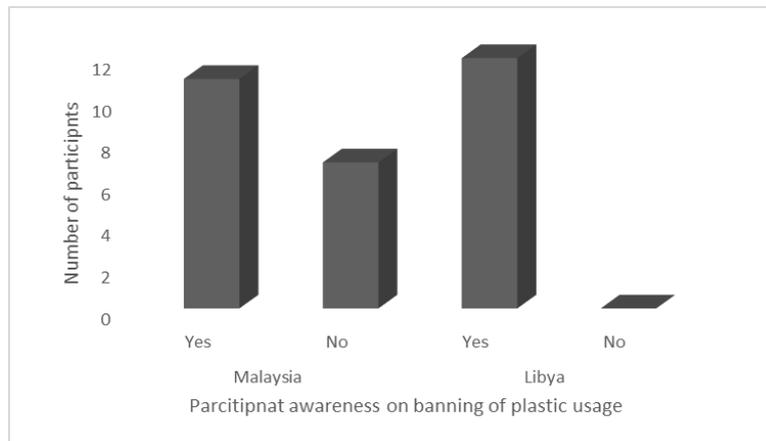


Fig. 5 - Participant's perception on banning of single use plastic

Based on the Fig. 5, 11 Malaysian participants agreed that they have knowledge on the banning of the single used plastic and 16 Libyan participants have agreed that they have knowledge on banning of single use plastic. 7 Malaysian participants agreed that they don't have knowledge on the banning of the single use plastic. The result shows that Malaysian and Libyan has awareness on banning of the single use plastic. Chen et al. [52] have claimed that in 2011, Malaysia has introduced law to reduce the usage of the plastic. This program was supported by regular awareness activities among the Malaysian. Many single-use plastic goods are difficult and expensive to recycle. They frequently wind up polluting the recycling programme. They are frequently avoidable or replaceable with reusable items. It will also minimise plastic pollution by prohibiting harmful single-use plastics. It is interesting to note, the result show that Malaysia are more aware than Libyans on banning of the single use plastic. This trend of the result might be because Malaysian is getting more access to information compared Libya. Based on the result above and the finding in the literature have fully confirmed to the outcome of this results. Chen et al. [42] have claimed that in 2011, Malaysia have introduced law to reduce the usage of the plastic. This program was supported by regular awareness activities among the Malaysian, with this, my pilot worked haven confirmed the strength of the questions and the entire questionnaire. Moreover, the questionnaire able to capture all the variables in the model. Both empirical studies in the literature concurred with the finding of this study.

4. Conclusion

This study presents a pilot study, which tested the questionnaire, where the questionnaire is part of a study on the user, industry, and waste management perspectives on single-use plastic's environmental impact during the pandemic. A pilot study that examined the impacts of the coronavirus pandemic in relation to single-use plastic waste on the environment by means of an international survey with two groups of participants (industry and users) distributed in two countries (Libya and Malaysia). The strength of the questionnaires was tested using SPSS with 40 participants, 20 in

each. The results reliability test with approximately Cronbach's Alpha for all variables, a normal test of variance inflation factor and skewness values to confirm the strength of the questionnaires as bench marked in the literature. The response of the participants to the single-use plastic impact on the environment, the nature of plastic products used, and awareness of plastic usage have confirmed the problem and objective of this study. Thus, in conclusion, the pilot study on the user, industry, and waste management of single-use plastic on environmental impact by pandemic has shown correlations among the variables. The was conformed through reliability test results with Cronbach's Alpha predicted values of 0.7 -0.86 and actual data Alpha values 0.87- 0.93, normal test of variance inflation factor ranging between 1 and 5, skewness and kurtosis values of -1.343 to -0.076 and 5.312 to -0.024 respectively confirmed the strength of the questionnaires as benchmarked in the literature. Further, the participants' responses to the quality of the questionnaire in determining the single use plastic impact to environmental have clearly revealed the strength and applicability of this questionnaire for wider data collections.

Acknowledgment

The authors fully acknowledged Universiti Malaysia Perlis and Higher Institute of Technical Water Affairs for supporting this work.

References

- [1] Caraka R. E., Lee Y., Kurniawan R., Herliansyah R., Kaban P. A., Nasution B. I., Gio P. U., Chen R. C., Toharudin T. & Pardamean B. (2020). Impact of COVID-19 large scale restriction on environment and economy in Indonesia. *Global Journal of Environmental Science and Management*, 6, 65-84. <https://doi.org/10.22034/GJESM.2019.06.SI.07>
- [2] Brohan M. A., Dom N. C. & Ishak A. R. (2021). An analysis on the effect of coronavirus (COVID-19) pandemic movement control order (MCOS) on the solid waste generation in Peninsular Malaysia. *Environmental Science and Pollution Research*, 28, 66501-66509. <https://doi.org/10.1007/s11356-021-17049-6>
- [3] Lauer S. A., Grantz K. H., Bi Q., Jones F. K., Zheng Q., Meredith H. R., Azman A. S., Reich N. G. & Lessler J. (2020). The incubation period of coronavirus disease CoVID-19 from publicly reported confirmed cases: Estimation and application. *Annals of Internal Medicine*, 172, 577-582. <https://doi.org/10.7326/M20-0504>
- [4] Liao L., Xiao W., Zhao M., Yu X., Wang H., Wang Q., Chu S. & Cui Y. (2020). Can N95 respirators be reused after disinfection? How many times? *ACS Nano*, 14, 6348-6356. <https://doi.org/10.1021/acsnano.0c03597>
- [5] Hasan N. A., Heal R. D., Bashar A. & Haque M. M. (2021). Face masks: Protecting the wearer but neglecting the aquatic environment? - A perspective from Bangladesh. *Environmental Challenges*, 4, 100126. <https://doi.org/10.1016/j.envc.2021.100126>
- [6] Nunally J. C. & Bernstein I. H. (1978). *Psychometric Theory*. McGraw-Hill.
- [7] Othman A. A. (2017). *Design, Development and Implementation of a Blended Learning Strategy for a Computer Science Course at the Faculty of Sciences, Omer Al-Mukhtar University, Libya*. PhD Thesis, University of Huddersfield.
- [8] Olson J., Codde J., deMaagd K., Tarkelson E., Sinclair J., Yook S. & Egidio R. (2011). *An Analysis of e-Learning Impacts & Best Practices in Developing Countries with Reference to Secondary School Education in Tanzania*. Technical Report. Michigan State University, pp. 1-54.
- [9] Silva A. L. P., Prata J. C., Walker T. R., Duarte A. C., Ouyang W., Barcelò D., & Rocha-Santos T. (2021). Increased plastic pollution due to COVID-19 pandemic: Challenges and recommendations. *Chemical Engineering Journal*. <https://doi.org/10.1016/j.cej.2020.126683>
- [10] Sekaran U. & Bougie R. (2016). *Research methods for business: A skill building approach*. John Wiley & Sons.
- [11] Sharma S. K., Joshi A. & Sharma H. (2016). A multi-analytical approach to predict the Facebook usage in higher education. *Computers in Human Behavior*, 55, 340-353. <https://doi.org/10.1016/j.chb.2015.09.020>
- [12] Walliman, N. (2020). *Research Methods: The basics*. Routledge, pp. 8-18.
- [13] Mackenzie N. & Knipe S. (2006). *Research dilemmas: Paradigms, methods and methodology*. *Issues in Educational Research*, 16(2), 193-205. <http://www.iier.org.au/iier16/mackenzie.html>
- [14] Bagozzi R. P. (1994). *Measurement in marketing research: Basic principles of questionnaire design*. In Bagozzi R. P (Ed.), *Principles of Marketing Research*. Blackwell Publishers, pp. 1-49.
- [15] Oppenheim A. N. (2000). *Questionnaire design, interviewing and attitude measurement*. Bloomsbury Publishing, pp. 33-43.
- [16] Chowdhury H., Chowdhury T. & Sait S. M. (2021). Estimating marine plastic pollution from COVID-19 face masks in coastal regions. *Marine Pollution Bulletin*, 168. <https://doi.org/10.1016/j.marpolbul.2021.112419>
- [17] Botetzagias I. & Malesios C. (2021) Do single-use facemask users' care for the effects on the (marine) environment during the COVID-19 pandemic? Preliminary results from Greece. *Marine Pollution Bulletin*, 167. <https://doi.org/10.1016/j.marpolbul.2021.112320>
- [18] Pasek J. K. & Krosnik J. A. (2015). Optimizing survey questionnaire design in political science: Insights from psychology. In Leighley J.E. (Ed.), *Oxford Handbook of American Elections and Political Behavior*. pp. 27-50.

- [19] Arnab S., Lim, T., Carvalho M. B., Bellotti F., De Freitas S. & Louchart S. De Gloria, A. (2015). Mapping learning and game mechanics for serious games analysis. *British Journal of Educational Technology*, 46(2), 391-411. <https://doi.org/10.1111/bjet.12113>
- [20] Lietz P. (2010). Research into questionnaire design: A summary of the literature. *International Journal of Market Research*, 52(2), 249-272. <https://doi.org/10.2501/S147078530920120X>
- [21] Weber Macena M, Carvalho R, Cruz-Lopes L. P. & Guiné R. P. F. (2021). Plastic food packaging: Perceptions and attitudes of Portuguese consumers about environmental impact and recycling. *Sustainability*, 13(17). <https://doi.org/10.3390/su13179953>
- [22] Ebner N. & Iacovidou E. (2021). The challenges of Covid-19 pandemic on improving plastic waste recycling rates. *Sustainable Production and Consumption*, 28, 726-735. <https://doi.org/10.1016/j.spc.2021.07.001>
- [23] Embrandiri A., Kassaw G. M., Geto A. K., & Wogayehu B. T. & Embrandiri M. (2021). The menace of single use plastics: Management and challenges in the African context. *Waste Management, Processing and Valorisation*, 1-21. https://doi.org/10.1007/978-981-16-7653-6_1
- [24] Cowan E., Booth A. M., Misund A., Klun K., Rotter A. & Tiller R. (2021). Single-use plastic bans: Exploring stakeholder perspectives on best practices for reducing plastic pollution. *Environments*, 8, 81. <https://doi.org/10.3390/environments8080081>
- [25] Kamaruddin H. M., Patittingi F., Assidiq H., Bachril S. N. & Al Mukarramah N. H. (2022). Legal aspect of plastic waste management in Indonesia and Malaysia: Addressing marine plastic debris. *Sustainability*, 14. <https://doi.org/10.3390/su14126985>
- [26] Winton D., Marazzi L. & Loiselle S. (2022). Drivers of public plastic (mis)use — New insights from changes in single-use plastic usage during the Covid-19 pandemic. *Science of The Total Environment*, 849. <https://doi.org/10.1016/j.scitotenv.2022.157672>
- [27] Kumar R., Verma A., Shome A., Sinha R., Sinha S., Jha P. K., Kumar R., Kumar P., Shubham, Das S., Sharma P. & Vara Prasad P. V. (2021). Impacts of plastic pollution on ecosystem services, sustainable development goals, and need to focus on circular economy and policy interventions. *Sustainability*, 13(17). <https://doi.org/10.3390/su13179963>
- [28] Massetti G. M., Jackson B. R., Brooks J. T., Perrine C. G., Reott E., Hall A. J., Lubar D., Williams I. T., Ritchey M. D., Patel P., Liburd L. C. & Mahon B. E. (2022). Summary of guidance for minimizing the impact of COVID-19 on individual persons, communities, and health care systems - United States. *MMWR Morbidity and Mortal Weekly Report*, 71, 1057-1064. DOI: doi.org/10.15585/
- [29] Trochim W. M. & Donnelly J. P. (2001). *Research methods knowledge base*. Atomic Dog Publishing Cincinnati, pp. 10-15.
- [30] Stafford T. J., Zhang, X., Jackson W. W. & Al-Khasawneh A. (2012). Global diffusion of information technology education: A comparison with developing economies. *Journal of Information Technology Management*, 22(1), 46-61.
- [31] Ntshakala T. & Eyono-Obono S. (2013). A framework of the factors affecting the adoption of ICT for physical education. *International Journal of Information and Communication Engineering*, 7(7), 2175-2180. <https://doi.org/10.5281/zenodo.1087506>
- [32] Benson N. U., David E. B. & Palanisami T. (2021). COVID pollution: Impact of COVID-19 pandemic on global plastic waste footprint. *Heliyon*, 7, 2. <https://doi.org/10.1016/j.heliyon.2021.e06343>
- [33] Yusof A. F., Miskon S., Ahmad N., Alias R. A., Hashim H., Syed Abdullah N., Mat Ali A. & Maarof, M. (2013). Implementation issues affecting the business intelligence adoption in public university. *ARPN Journal of Engineering and Applied Science*, 10, 18061-18069.
- [34] Yeboah-Boateng E. O. & Essandoh K. A. (2014). Factors influencing the adoption of cloud computing by small and medium enterprises in developing economies. *International Journal of Emerging Science and Engineering*, 2(4), 13-20.
- [35] Corburn J., Vlahov D., Mberu B., Riley L., Caiaffa W. T., Rashid S. F., Ko A., Patel S., Jukur S., Martínez-Herrera E., Jayasinghe S., Agarwal S., Nguendo-Yongsi B., Weru J., Ouma S., Edmundo K., Oni T. & Ayad H. (2020). Slum health: arresting COVID-19 and improving well-being in urban informal settlements. *Journal of Urban Health*, 97, 348-357. <https://doi.org/10.1007/s11524-020-00438-6>
- [36] Klemeš J. J., Fan Y. V., Tan R. R. & Jiang P. (2020). Minimising the present and future plastic waste, energy and environmental footprints related to COVID-19. *Renewable and Sustainable Energy Reviews*, 127. <https://doi.org/10.1016/j.rser.2020.109883>
- [37] Fadare O. O. & Okoffo E. D. (2020). Covid-19 facemasks: a potential source of microplastic fibers in the environment. *Science of the Total Environment*, 737. <https://doi.org/10.1016/j.scitotenv.2020.140279>
- [38] Hellewell J., Abbott S., Gimma A., Bosse N. I., Jarvis C. I., Russell T. W., Munday J. D., Kucharski A. J. & Edmunds W. J. (2020). Feasibility of controlling COVID-19 outbreaks by isolation of cases and contacts. *Lancet Global Health*, 8, 488-496. [https://doi.org/10.1016/S2214-109X\(20\)30074-7](https://doi.org/10.1016/S2214-109X(20)30074-7)

- [39] Vanapalli K. R., Sharma H. B., Ranjan V. P., Samal B., Bhattacharya J., Dubey B. K. & Goel S. (2020). Challenges and strategies for effective plastic waste management during and post COVID-19 pandemic. *Science of Total Environment*, 750. <https://doi.org/10.1016/j.scitotenv.2020.141514>
- [40] Fisher E. M., Williams J. L. & Shaffer R. E. (2011). Evaluation of microwave steam bags for the decontamination of filtering facepiece respirators. *PLoS One*, 6(11), 1-7. <https://doi.org/10.1371/journal.pone.0018585>
- [41] Ilyas S., Srivastava R. R. & Kim, H. (2020). Disinfection technology and strategies for COVID-19 hospital and bio-medical waste management. *Science of Total Environment*, 749. <https://doi.org/10.1016/j.scitotenv.2020.141652>
- [42] Sangkham S. (2019). Face mask and medical waste disposal during the novel COVID-19 pandemic in Asia. *Case Studies in Chemical Environmental Engineering*, 2. <https://doi.org/10.1016/j.cscee.2020.100052>
- [43] Junjie M. & Yingxin M. (2022). The discussions of positivism and interpretivism. *Global Academic Journal of Humanities and Social Sciences*, 4, 1, 10-14. <https://doi.org/10.36348/gajhss.2022.v04i01.002>
- [44] Makri C. & Neely A. (2021). Grounded theory: A guide for exploratory studies in management research. *International Journal of Qualitative Methods*, 20, 1-14. <https://doi.org/10.1177/16094069211013654>
- [45] Borg K., Lennox A., Kaufman S., Tull F., Prime R., Rogers L. & Dunstan E. (2022). Curbing plastic consumption: A review of single-use plastic behaviour change interventions. *Journal of Cleaner Production*, 344. <https://doi.org/10.1016/j.jclepro.2022.131077>
- [46] Lee V., Abdul Hamid N., Ahmad M., Ahmad A. N. A., Ruslan R. & Fadzline P. (2021). Factors of single use plastic reduction behavioral intention. *Emerging Science Journal*, 5, 269-278. <https://doi.org/10.28991/esj-2021-01275>
- [47] Mohebbi B., Sadeghipour P., Noohi F., Maleki M., Peighambari M. M., Hosseini S., Zahedmehr A., Moosavi J., Shafe O., Alemzadeh-Ansari M. J., Farrashi M., Pouraliakbar H. & Ghadrdoost B. (2022). Reliability and validity of a satisfaction questionnaire on virtual education in the coronavirus disease 2019 pandemic era aimed at cardiology faculty members. *Journal of Education and Health Promotion*, 26, 11-45. https://doi.org/10.4103/jehp.jehp_485_21
- [48] Choi E. H. Lee H., Kang, M. J., Nam I., Moon H. K., Sung J. W., Eu J. Y. & Lee H. B. (2022). Factors affecting zero-waste behaviours of college students. *International Journal of Environmental Research and Public Health*, 19. <https://doi.org/10.3390/ijerph19159697>
- [49] Borongan G. & NaRanong A. (2022). Practical challenges and opportunities for marine plastic litter reduction in Manila: A structural equation modeling. *Sustainability*, 14. <https://doi.org/10.3390/su14106128>
- [50] Martinelli L., Kopilaš V., Vidmar M., Heavin C., Machado H., Todorović Z., Buzas N., Pot M., Prainsack B. & Gajović S. (2021). Face masks during the COVID-19 pandemic: A simple protection tool with many meanings. *Frontiers in Public Health*, 8. <https://doi.org/10.3389/fpubh.2020.606635>
- [51] Karmacharya M., Kumar S., Gulenko O. & Cho Y. K. (2021). Advances in facemasks during the COVID-19 pandemic era. *ACS Applied Bio Materials*, 4 (5), 3891-3908. <https://doi.org/10.1021/acsabm.0c01329>
- [52] Chen H. L., Nath T. K. & Chong S. (2021). The plastic waste problem in Malaysia: Management, recycling and disposal of local and global plastic waste. *SN Applied Science*, 3, 437. <https://doi.org/10.1007/s42452-021-04234-y>