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The impact of COVID-19 to the amount of single use plastic: a case study in faculty of International Management and Business Budapest Business School

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Abstract

It is an indisputable fact that plastic plays a crucial role in modern society. It has transformed our daily lives as well as various industries sectors. Nevertheless, the overuse of single-use plastic has caused numerous problems to the global environment and human health due to the toxic substances contained. Given the major concern about this problem, it is critical to set out Sustainable Development Goal 12 (SDG12), ensuring Responsible Consumption and Production in the 2030 Agenda for Sustainable Development. Recently, COVID -19 has provided ideal conditions for the rising use of plastic, exacerbating the situation. In this research, we conducted an in-depth case study in the Faculty of International Management and Business, Budapest Business School to investigate the amount of single-use plastic by students before and during the pandemic. We collected the student's routine data on the usage and recycling of single-use plastic by asking them to fill in the survey with ten Likert- scale and multiple-choice questions. The result of this survey is quantitative evidence of the impact of COVID-19 on the amount of single-use plastic consumed. We found that COVID-19 has substantially increased the procurement and consumption of single-use plastic during the pandemic. Most of the excessive use comes from personal protective equipment such as masks, gloves, and the adjusting habit of home delivery of consumers. The impact of plastic pollution on the environment and human health under short and long-term circumstances is provided thoroughly, revealing major impediments and considering possible solutions to deal with it. Although the convenience of using plastics has dramatically contributed to enhancing our quality of life, it is essential to modify our behavior towards sustainable lifestyles, such as selecting bio-based packaging products. Budapest Business School should maintain sustainability as its priority mission, not only to reduce plastic pollution but to encourage sustainable growth and promote a green environment in the university. Raising students' awareness should also be exaggerated by promoting them to participate in conferences or workshops related to sustainability.
Keywords: Covid pandemic, Single-use plastics, Sustainability, FIMB and BBS, SDG12

Introduction

Humanity has a lot of environmental problems to deal with. One of them is garbage production which affects the whole world, countries, oceans, cities, and individual's daily life. Every minute, one garbage truck of plastic ends up in the ocean. Many calculations infer the fact that by 2050 there will be more plastic in the sea than fish. Countries aim to reduce garbage production to slow down the process, but a lot depends on single plastic production. How can an average person help this problem?

Toxic substances such as styrene and benzene are carcinogenic, which can cause other health problems included in Styrofoam products. Plastics in the environment endanger wildlife both on land and in the ocean. Despite the great harm, young people with busy lives often use disposable plastic a lot in their daily lives to save money and time due to the convenience and popularity of this material. In addition, Covid -19 has recently provided ideal conditions for the rising use of SUP, exacerbating the situation. The solution to this problem has long been a top concern in environmental efforts. For many years, numerous researches have been conducted to investigate how the excessive use of single plastics has impacted our human lives and the natural environment. Covid 19 pandemic, an extraordinary circumstance, stimulated substantial amounts of plastic waste generated. A relationship between the pandemic and SUP waste is provided comprehensively in this context.

We aim (1) to measure the amount of SUP in our case study which is used by students in the FIMB, BBS daily during the pandemic; (2) to determine the purpose of usage, therefore come to conclusion about the uptrend of disposable plastics amount used among people and (3) adopt solutions to tackle

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each factor and evaluate the chance of success. These goals shall be specified based on four primary approaches identify, avoid, substitute, and recycle.

Research methodology

Type of research

A quantitative method is utilized to comprehend the consequences of the COVID-19 dilemma in connection to single-use plastic garbage. By definition, quantitative research is a type of research that explains phenomena by collecting numerical data that are analyzed using mathematically based methods (Sukamolson, 2007). This study is to measure the frequency of SUP consumption before and during COVID 19 by students studying at FIMB, BBS to give the explanation of the uptrend of consumption; therefore, quantitative research is applied. Responses were collected taking place in one week between April 01, 2022, and April 08, 2022. Questionnaires are online written in the Google Form and disseminated through authors' friends. At the end of the survey, there were 93 responses recorded. In order to evaluate how the pandemic impacted on consumption of SUPs, authors raised questions following with multiple choices answered at different times before and during COVID 19:

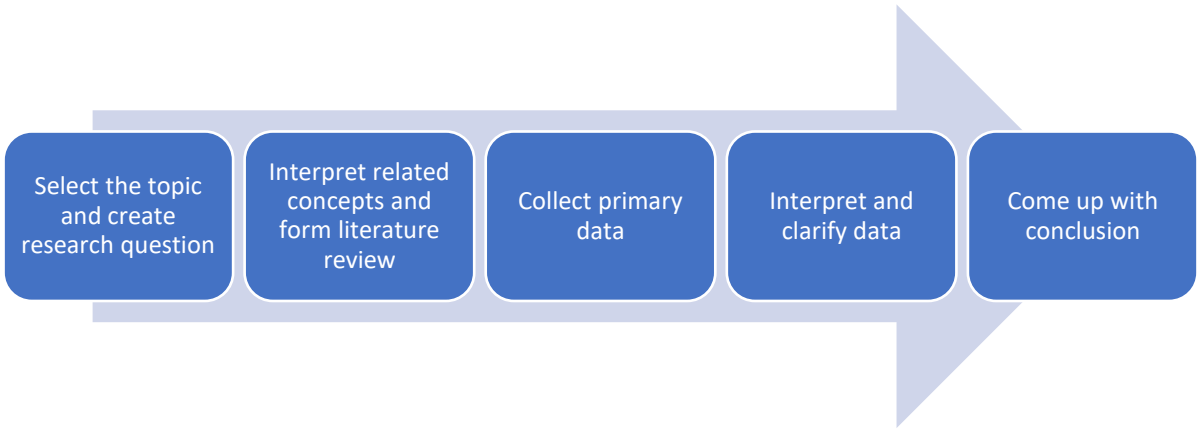
"How often did you use single-plastic per week?"
"On average, how many times did you order food/ shopping online weekly?"
"How often did you use masks, gloves, face shields weekly?"
"What do you mainly use plastics for?"
"Did you recycle?"
"How has Covid-19 impacted the amount of single-use plastic you use?"

The survey was conducted in early 2022 when the Covid-19 epidemic had not completely ended but gradually stabilized and people lived in the "new normal" with vaccines. At the end of 2019, this infectious disease was discovered in China as Corona, but until March 2020, Hungary recorded its first infection (MTI-Hungary Today, 2020). The difference we want to compare is in the first three months of 2020 and beyond. When a series of policies, continuous changes took place, perhaps creating shocks because they greatly changed people's daily living habits, so that obvious change might leave an impression in mind even though two years have passed. For these reasons, the article chooses an earliest pre-Covid period in 2020 to compare with 2021, when the pandemic is happening. This will make the collected data more precise and reliable, contributing to an accurate assessment.

Research process

Following the early phases of selecting a topic and forming research questions, the research process moves on to the definition of related concepts. The concepts should be explicated in this study including what is SUP and how excessive consumption impacts the environment and human health. This paper emphasizes the negative effects of the overuse of SUP to indicate the urgency and necessity of the topic. The Covid 19 outbreak is also indicated as one of the reasons contributing to the enlargement of single-use plastic garbage. Subsequently, the data were collected from both secondary sources and the survey. Those data were interpreted and visualized with a bunch of pie charts in order to compare the increasing consumption of SUP because of the pandemic.

Figure 1: Steps in the process to conduct the research



Source: Own creation

Thereafter, numerous reasons were investigated as justifications to respond to the expansion of demand for utilizing SUP. Finally, numerous solutions are proposed in terms of individuals and organizations with an aim to raise awareness of protecting the environment towards a sustainable lifestyle and to reduce SUP consumption effectively.

Data collection

Secondary data

Secondary data for this study were gathered from a variety of sources, including prior studies, newspapers, journals, publications, and the World Wide Web. Initially, such data served as the foundation for providing a wide overview of the field of single-use plastic garbage. They help elucidate significantly what kind of plastic is more accessible for study and more relevant in bringing forth the subject's key difficulties.

Primary data

Through a number of answers, primary data were gathered in order to present accurate information about the issues at hand. Questionnaires were implemented because it is an inexpensive method. Respondents are the students having the capability to access the online survey or mobile survey intending to reduce cost. In addition, the population of FIMB students is huge, survey could gather a lot of accurate samples to collect specific results from which to form conclusions.

The selection of students at FIMB, BBS

FIMB is located in district 16, a large rural area surrounding a myriad of trees. Therefore, if the use of SUP is not rigorously limited, the environment nearby the region will be severely harmed. The location of the faculty facilitates organizing activities for sustainability education. Moreover, with more than 350 international students and they are the subjects that the faculty pays close attention to since they will be the messengers who promote the spirit of environmental conservation across the world. For these reasons, choosing such a faculty to give a comprehensive overview concerning the state of plastic garbage caused by Covid 19 and the level of student understanding of sustainability manner.

Literature review

Background information about single-use plastic (SUP)

Humanity is facing many significant challenges in the 21st century, from climate change (Caterina Agrimonti, 2020) to water pollution (René P. Schwarzenbach, 2010), air pollution (Gordon, 1995),

deforestation, and forest degradation. Recently, the SUP has been the major topic of concern with its rapid increase and serious threat to the environment and ocean. In 2015, approximately 6300 Mt of plastic garbage was produced, with roughly 9% being recycled, 12% is incinerated, and 79% being deposited in landfills or the natural environment (Roland Geyer, 2017).

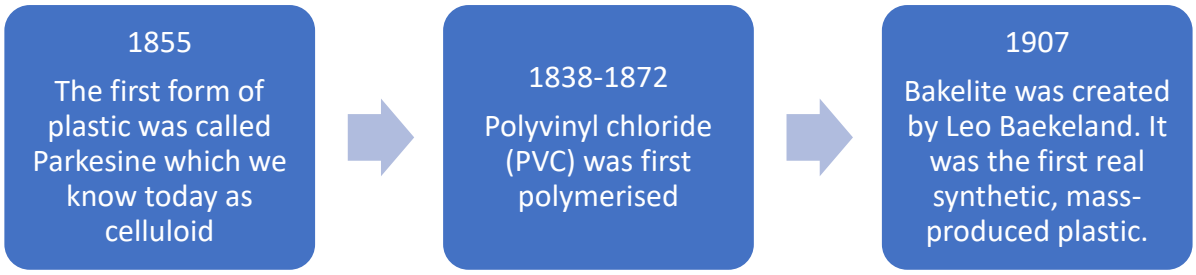
Plastic waste is everywhere and reported from the North Pole to the South Pole, from surface to sediment (David K. A. Barnes, 2009). Plastic packaging for food, drinking, and tobacco items are often used only once, contributing to 61% of global beach waste (Amy L. Brooks, 2018). Plastic packaging and single-use items enter the waste stream after use, contributing to the cumulative accumulation of more than 6.3 billion tons of plastic waste generated worldwide. Only 9% of waste plastic is already being recycled globally. The vast majority of global plastic waste is either landfilled or eventually polluting the environment (80%), resulting in an estimated 4 million to 12 million tons of plastic ending in the oceans annually (LAW, 2015).

Definition and history of SUP

"Simply put, single-use plastic products are products made of plastics, that are meant to be used once, or for a short period of time, before being thrown away." (Kathrin Graulich, 2021). University is one of the places with a large amount of SUP waste, popularizing thin-film plastic bags, plastic bottles, straws, cups/glasses, etc. Nowadays, students consume a lot of food and drinks products related to single-use plastics, such as plastic bottles, milk teacups, and takeaway coffee. This amount of plastic contributes significantly to society's overall emissions, environmental impact, and ocean impact.

It has been 160 years since the first plastic was invented in the world. In 1862 Alexander Parkes introduced the world's first man-made plastic called" Parkesine" at the London International Exhibition. Since then it went through a lot of changes until it reached its form known today.

Figure 2: The History and Proliferation of SUP



Source: Own creation

However, general manufacturing of plastics did not begin in effect until the end of World War II, with yearly output reaching over 5 million tonnes in the 1950s. Plastics rapidly became popular because of their lightweight, robust, affordable, durable, and corrosion-resistant qualities. Plastics are highly elastic materials that may be used to make various goods, including flexible and stiff objects, adhesives, foams, and fibers. As a result, yearly plastic manufacturing surged dramatically from 30 million tonnes in 1988 to 359 million tonnes in 2018 (Trettnak, 2020).

The effects of SUP

Single-use plastic wastes produce numerous adverse effects on both individuals and the environment. On an individual level, plastic discharged into the environment or buried will be decomposed into millions of tiny plastic pieces of different sizes, such as micro, nano, and pico, which can easily mix with water, soil, and air. Drinking water, breathing the air, and eating food grown from the ground with these harmful plastics can threaten human and sea creatures' health. The waste treatment produces toxic gases: dioxins, furans, etc., which will remarkably affect the endocrine glands, reduce immunity, and even cause cancer. In plastic bags, pure kerosene can be mixed with sulfur and burned with steam to form sulfuric acid, which causes acid rain. Many low-quality plastic products are produced in large quantities, which during use, they will make BPA - a toxic substance and causes many dangerous diseases in humans such as infertility, diabetes, cancer... (Tập, 2020) On the environmental level, the plastic bags

that mix with the soil will change the physical properties of the soil, cause erosion, make the soil unable to hold water and nutrients, and prevent oxygen from passing through the soil, affecting plant growth. For living species: Plastic waste dumped into the sea can, unfortunately, be eaten by sea creatures. It will destroy or degrade biodiversity, kill marine organisms and reduce the absorption capacity of animal food. When marine creatures ingest additives in plastic, it negatively affects their bodies' endocrine systems and hormone regulation. These aquatic organisms can either die of plastic or become deprived of food because the plastic kills the creatures in their food chain. When caught in discarded fishing nets or other plastic waste, marine animals will not be able to escape so they will weaken and die. In human tourism activities: when the environment is polluted, it can cause a bad impression of tourist destinations, affecting the tourism income of the locality (Tập, 2020). Impact on human fishing activities: The more organisms die of plastic waste, the less production of seafood catches. Moreover, plastic waste blocking the water intake or getting caught in fishing nets, propellers, etc., can cause equipment damage.

The impact of Covid 19 on the amount of SUP in the world

From 2020 until now, all of humanity has been a struggle with a global pandemic – COVID-19. The World Health Organization has requested a 40% increase in the production of disposable PPE Suppose the global population adheres to the standard of one disposable mask per day after the blockade is over (WHO, 2020). In that case, the pandemic's global population could lead to monthly global consumption and waste of 129 billion masks and 65 billion gloves. At the peak of the COVID-19 outbreak, hospitals in Wuhan, the core of the disease, generated more than 240 tons of single-use medical waste (such as disposable masks, gloves, and gowns) each day, six times the daily average before the outbreak (Zuo, 2020). If the increase observed in Wuhan holds true elsewhere, the United States could generate an entire year’s worth of medical waste in only 2 months (Cutler, 2020). In addition, COVID-19 makes online shopping more popular than ever. The study also reports an increase in online shopping from 12 to 57% in countries like Vietnam, India, China, Italy, and Germany during the same period. A market research firm, Rakuten Intelligence has reported a growth rate higher than 50% compared to 20% year-on-year growth in online shopping in the US from March to mid-April (Rattner, 2020).

The factors lead to the increasing amount of SUP even before the pandemic

The affordable price and short-term convenience of plastic

“$ 0.50 – 1.50 per kilogram for virgin PET (PET=polytethylene terephthalate), $ 0.20 – 0.30 per kilogram for recycled PET, and $ 0.06 – 0.08 per kilogram for mixed plastics” (Poolen, 2016)

Plastic is well-known for its low production costs. It is formed of natural oil and gas, containing cellulose, coal, and salt. As the prices demonstrate, a plastic bottle is far less expensive to manufacture than a glass bottle since it does not weigh as much and does not require a specific thickness. The main reason people and the factories do not recycle more is that manufacturing is so cheap that even recycling is more expensive due to water, electricity, and scrubbing. A plastic bag takes 20 years to decompose, while a plastic bottle takes 450 years. Unfortunately, this problem has existed for centuries, regardless of whether new recycling technologies or sophisticated machinery developed.

One of the primary reasons people prefer plastics is that it is long-lasting and protects against contaminants and the environment. It minimizes food waste by preventing food from spoiling or drying out in a short period. For instance, putting a slice of cheese in the refrigerator might dry up in a day, but if storing it in a plastic box, it will endure at least a week. (Beeson, 2017)

Humans’ limited awareness of solid waste management

Humans' limited environmental culture is the most fundamental cause of plastic waste. Human consciousness is still not competent (Vuong, 2021), as evidenced by the preceding relatively common activities nowadays: Overuse of nylon bags and disposable plastic items, specifically in business, due to its low cost and convenience without caring about the non-biodegradable characteristics of plastic. The garbage disposal is arbitrary, not in the appropriate places, and does not involve garbage sorting. Littering in the sewers clogs the pipes that cause flooding as in the streets. People do not consider waste categorization seriously, which poses plenty of problems. Additionally, the agricultural waste

contains numerous hazardous chemicals, damaging water sources; many farmers also find it "convenient" to throw garbage in ponds, waterways, canals, etc.

Indirect factors originate from the education industry: school plays a specific role in shaping the knowledge and attitudes of younger generations regarding the environment and biodiversity. (Rieckmann, 2018). Nevertheless, education seems to neglect to provide individuals with the necessary knowledge, skills, and environmental conservation. Trash sorting and disposal have not been strictly enforced; sometimes, it is merely a few uninteresting lectures that have not been invested in an attempt to attract students and enable them to recognize the necessity of waste management.

Weak national and local government enforcement of the environmental protection

On the national level, the sewage treatment process still includes numerous disparities. Many developing countries, like the Philippines, Vietnam, and Indonesia, have outdated sewage treatment technologies that work poorly, therefore, are not purified, sorted, or recycled effectively. Tourism activities are also to bear responsibility: the more tourists there are, the more rubbish there can be, having a detrimental effect on waste collection and treatment. Many countries, particularly Thailand, the Philippines, and many others, have been pushed to suspend several tourist attractions that have been severely impacted by tourist trash. On the local level, consequences of local authorities' indifference: Many localities have not appropriately fully cooperated with waste treatment legislation, decrees, and laws, have not strictly conformed with punishments for the act of polluting the environment carelessly in the wrong place, and have not attentively managed the waste treatment system.

During Covid 19: factors related to Covid-19 that have impact on the amount of SUP

At first glance, the COVID-19 pandemic appears to be indirectly contributing to the UN 2030 Sustainable Development Goals (SDGs), which are specifically 11, 12, 13, and 15. In order to improve overall city health and safety (Silva A. L.-S., 2021). The ideal action is to lower the level of greenhouse gas emissions (GHG), outdoor air pollution, and environmental noise level including underwater noise due to reduced marine transportation activities, land and wildlife pressure (Silva A. L.-S., 2021). However, the rise in the number of consuming SUP including PPE, and the shift in waste management priorities are counter-productive to environmental sustainability considered as factors of the green and circular economies (Silva A. L.-S., 2021). Covid 19 led not only to the biggest loss of lives, it also caused a global recession and a considerable quantity of medical waste. The most significant shift is due to personal protective equipment consisting of disposable plastic, single-use degrees, and online purchase for essential needs.

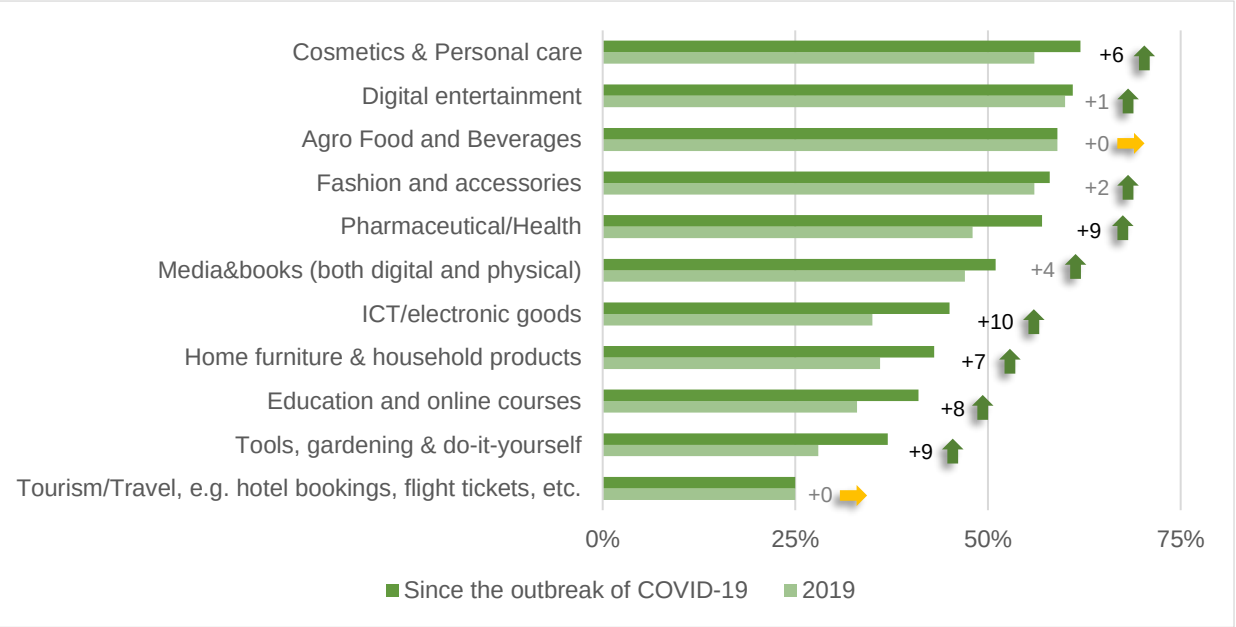
Increased medical waste during the pandemic

Face masks were shown to be 79 percent efficient in avoiding transmission if used by all household members prior to the onset of symptoms (Jeremy Howard, 2021). To avoid virus transmission, it becomes necessary to use PPE, such as surgical masks and gloves, by healthcare professionals and subsequently by the general population. Each month, it is estimated that 129 billion masks and 65 billion gloves are consumed globally (Prata, 2020). The rise in public demand for the use of PPE rapidly became contentious due to incorrect handling and destruction, as well as shortages of the material in hospital settings, where it is essential and most important. At the height of the epidemic level, the Chinese city of Wuhan generated almost 247 tons of medical waste each day, nearly six times more than before the outbreak (Singh, 2020).

Increased use and demand of SUP for packaging

The Covid-19 pandemic has prompted an unprecedented shift in consuming habits, especially as lockdowns contribute to an increase in online shopping and delivery services. According to the UNCTAD and Netcomm Suisse eCommerce Association survey, which was performed in partnership with the Brazilian Network Information Center (NIC.br) and Inveon as in figure 3, online purchases have surged by 6 to 10 percentage points across most product categories.

Figure 3: The shares of online shoppers making at least one online purchase every two months in some countries in 2020 (%)



Source: (UNCTAD and NetComm Suisse eCommerce Association, 2020)

The total or partial shutdown of food facilities for indoor services boosted demand for delivery services by around 15%, adding to the increase usage of SUPs (EAE Business School, 2020).

Safety concerns related to supermarket shopping during COVID-19 have resulted in consumers and suppliers favoring fresh food packaged in plastic containers (to avoid food contamination and extend product shelf life), and using disposable food packaging and plastic bags for groceries. One of the most obvious examples of the increase in the amount of plastic packaging is that most airlines have changed the ways they serve food and drinks. Instead of pouring drinks into a plastic cup, flight attendants handed passengers bottles of water, soda, and wine, and all dishes were prepackaged inside the plastics bag (Martín, 2021).

Increased SUP of sanitary products during the pandemic

In addition to the habit of wearing a mask to avoid the virus, people also pay more attention to the disinfection of hands or items, leading to the need of using cleaning and disinfecting products. These products are used a lot today such as wet wipes, hand sanitizers, alcohol solutions to sterilize implements, cotton buds, etc. Wet wipes are wet cleaning tissues or towels that are intended to be used just once. 90% of wet wipes marketed are manufactured from synthetic materials such as polyester or other harm to the environment (ITV News, 2021). Hand sanitizer bottles are very popular, just like plastic bottles, they are released in large quantities contributing to the pollution. Furthermore, cotton buds are often generally made with both cotton and plastic. Some cotton buds are plastic-stemmed while others are paper-stemmed. This implies that these cleaning products come in a variety of designs. This is to say that they will complicate the process of recycling (Rinkesh, 2021). This type of item is used many times for the purpose of taking samples for testing and it comes in many popular COVID-19 test kits on the market. Thus, this could also be considered medical waste. In most cases, PPE will likely be discarded without precautions along with empty hand sanitizer bottles and organic solids in regular municipal solid waste. These wastes were thrown away indiscriminately in the environment.

Solutions have already been used to tackle the increasing amount of single-use plastic

Plastic production has numerous detrimental repercussions on our environment, such as the emission of greenhouse gasses and toxic waste. The chemicals emitted by the manufacturing process accumulate on land and in seas, rivers, air, and ice, causing terrible harm to human and ecological health. Unfortunately, these issues are still little recognized.

Confronted with an increasingly severe situation of plastic waste pollution, Vietnam's Prime Minister has directed offices and agencies to discontinue the use of single-use plastic products by 2020. The Prime Minister has aimed that, commencing in October, Ministers, Heads of Ministerial-Level Agencies, Governmental Agencies, People's Committees of Provinces, and Cities to issue guidelines or proposals for the intervention of plastic waste. According to the proposal, the entire country has set a goal of eliminating the use of single-use plastic products by 2025. The Canadian government has taken the following collaborative steps to reduce plastic pollution: Under the Canadian Environmental Protection Act, harmful single-use plastics will be prohibited as early as 2021; companies producing plastic products or selling items with plastic packaging will be made accountable for controlling their collection and recycling of plastic waste; collaborating with industry to reduce and recover ghost fishing gear; investing in new Canadian advanced technologies; mobilizing international support to tackle plastic pollution, and reducing plastic waste from federal operations (Mont-Saint-Hilaire, 2019). Japan launched a plastic-reduction plan in June 2019. By installing dedicated recycling bins adjacent to vending machines, the Japanese government aimed to achieve 100 percent efficient use of plastic bottles (WAKAI, 2021). In addition, Japanese authorities have intensified patrols to prevent illegal disposal. As a result, the government will install particular bins for collecting plastic waste nationwide, promote activities to collect trash in rivers and oceans, and develop biodegradable packaging materials (y Mizuki Kato, 2021).

Most EU Member States have undertaken voluntary measures or entered into agreements with merchants to phase out the usage of plastic carrying bags progressively. On the other hand, Cyprus, Italy, Poland, Portugal, Bulgaria, the Czech Republic, Denmark, Ireland, Malta, the Netherlands, Romania, and Slovenia do not have voluntary efforts. Some have incorporated a statute prohibiting it in their national laws (e.g., Ireland), while others do not have an adequate regulatory system. In several EU Member States, voluntary efforts appear to be successfully dealing with the problem of plastic bags. In particular, Austria, Germany, Finland, Belgium, and France have lower single capita consumption rates of single-use plastic carrier bags. Nevertheless, despite implementing voluntary activities, plastic carrier bag use and littering rates stay high in Hungary, Lithuania, Slovakia, and Latvia (Mezei, 2018).

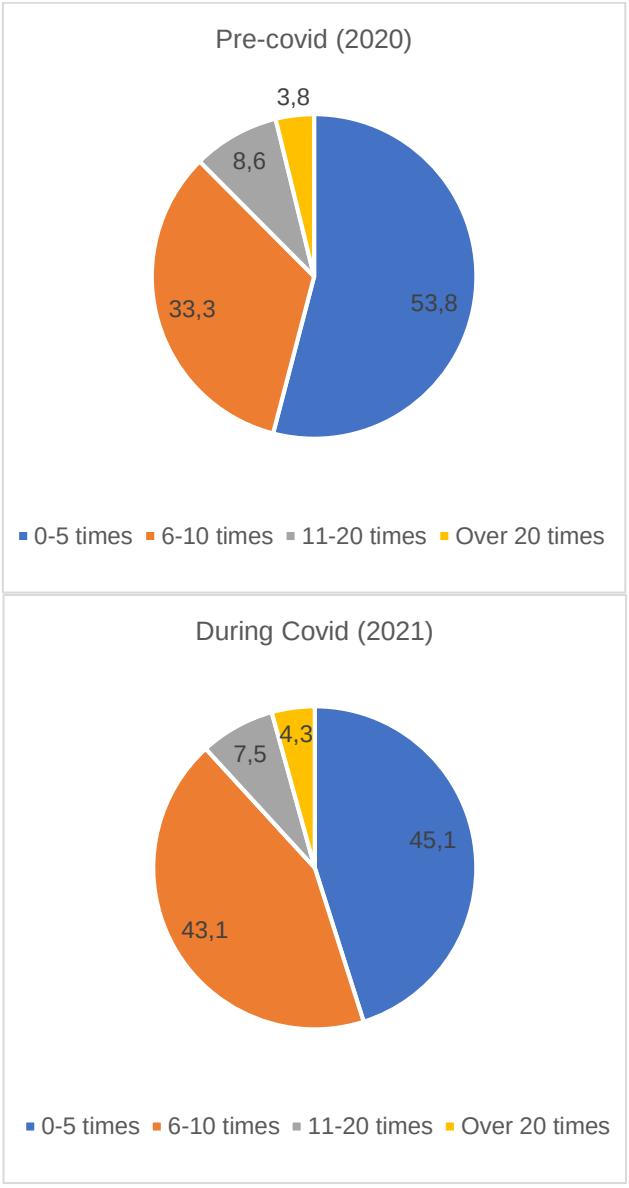
In healthcare, one of the most critical aspects is hygiene, which plastic can help to ensure due to its ability to protect from containments and environments. Plastics have been used in hospitals in a myriad of areas, ranging from disposable plastic syringes and prostheses to surgical instruments. When single-use plastics were first introduced into hospitals, they were an excellent replacement since they allowed for the preservation of a sterile environment and allowed infected plastic material to be conveniently thrown away. The Royal College of Physicians stated 12 principles to reduce waste. The three most important are responsible procurement, mindful use of plastic, and recycling. According to the Royal College of Nursing (RCN), surgical gloves have been overused by the Royal College of Nursing (RCN) over the years. Gloves are critical for controlling infections and reducing the risk of cross-infection between patients and workers. However, excessive use may result in poor hand hygiene (users do not wash their hands properly because they assume the gloves will do the work), increasing the risk of infection. Recycling in a hospital is not easy because it demands proper hygiene. Domestic and infectious waste clearly can not be recycled. However, wards should find ways to divert or prevent waste from going to landfill sites or incineration plants (Davis, 2022).

Therefore, to overcome the issue of environmental pollution in general and waste in particular, we conclude that it is vital to focus on the solution ecosystem, which incorporates multiple cultures, scientific investment, information communication, technology infrastructure, and administrative compliance.

Results and discussion

The frequency of using SUP per week (times/week)

Figure 4: Percentages comparison of the frequency of using SUP weekly by students at the FIMB, BBS between 2020 and 2021 (%)



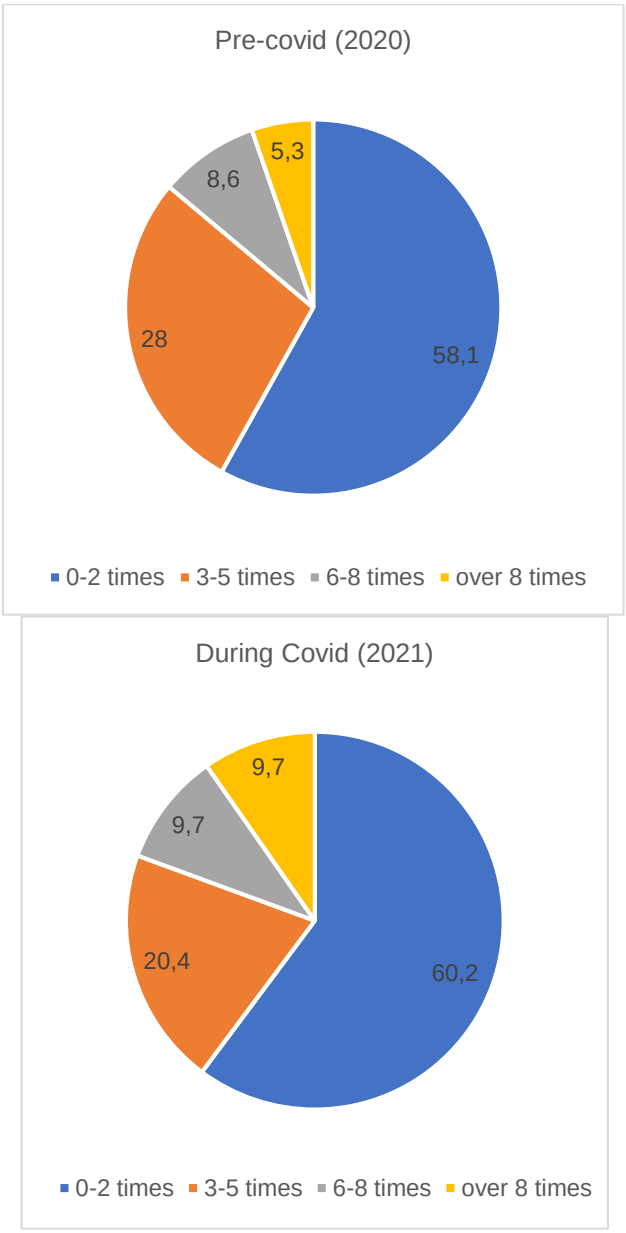
Source: Own creation

Figure 4 with two pie charts illustrates the number of times that students in the FIMB, BBS, use SUPs and how this has changed over one year period from 2020 (before the Covid pandemic, the first three months of 2020) to 2021 (during the Covid pandemic). At the first glance, in both years, the most significant number of times students use plastic is 0 to 5 times a week, accounting for half of the respondents. In comparison, students who use plastic over 20 times a week account for the least percent, only 4.3%, even during Covid 19. It can be clearly seen that the proportion of students using plastic 6 to 10 times a week has increased by approximately 10%, from one-third of the students to nearly half (43.1%). This increase is mainly because of the increase in the use of packets and wrappers (food containers, beverage containers,..); mainly medical (marks, gloves, face shields) and sanitary items (wet wipes, cotton bud sticks). However, there is no substantial growth recorded in this number because the pandemic also helps decrease the amount of SUP among students by minimizing the use of plastic bottles or plastic cups used in universities. Because of the pandemic, students were allowed

to study online classes instead of going to school in the traditional ways. Accordingly, the consumption of single plastic were not increasing significantly in the university. Moreover, at the peak of the Covid pandemic, people tended to cook at home rather than ordering food since they were afraid of the risk when exposed to the shippers. Meanwhiles, global plastics use in 2021 was estimated to have declined 2021 by around 10 million tonnes (Mt) or 2.2%, which is 4.5% below the pre-COVID projection for 2021 (OECD, 2022).

The frequency of ordering food/shopping online weekly (times/week)

Figure 5: Percentages comparison of the frequency of ordering food/ online shopping by students at the FIMB, BBS between 2020 and 2021 (%)



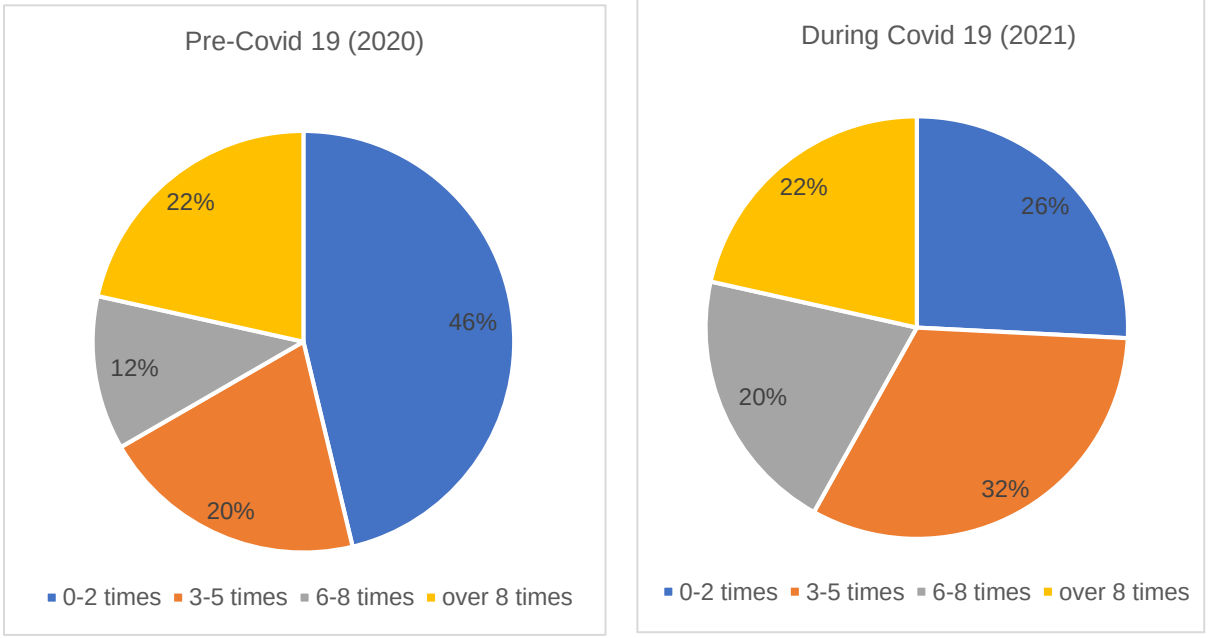
Source: Own creation

As can be observed from Figure 5 showing the frequency of ordering food/ online shopping weekly before and during Covid 19, there is no noticeable difference in the students' ordering habits and online shopping habits, only a mild fall in the percent of respondents doing this 3-5 times a week by 7.6% (from 28% to 20.4%). Despite the increasing demand for food delivery and online shopping due to social

distancing, the effects of the coronavirus pandemic hit household spending harder than following the Global Financial Crisis. During the first two quarters of the pandemic, household spending fell 22.2% because of the introduction of lockdowns and other public health restrictions. These particularly affected social expenditures, such as dining out, recreation, and culture (Taiyan Lee, 2022). This decrease in household spending can be explained by the evidence reported in various studies indicating that pandemic disease impacts a country's economy through several channels, including the health, transportation, agricultural, and tourism sectors (Feyisa, 2020). On the one hand, about the global habits of ordering food and online shopping, an overall increase may be attributed to the closing of restaurants and hotels, resulting in a shift to take away and home deliveries. On the other hand, reduced shopping, commuting, travel, and the cancellation of events and festivals may have resulted in fewer take-away meals from these activities (Kathrin Graulich, 2021).

The frequency of using masks, gloves, face shields weekly (times/week)

Figure 6**:** Percentage's comparison of the frequency of using masks, gloves, face shields by students at the FIMB, BBS between 2020 and 2021 (%)

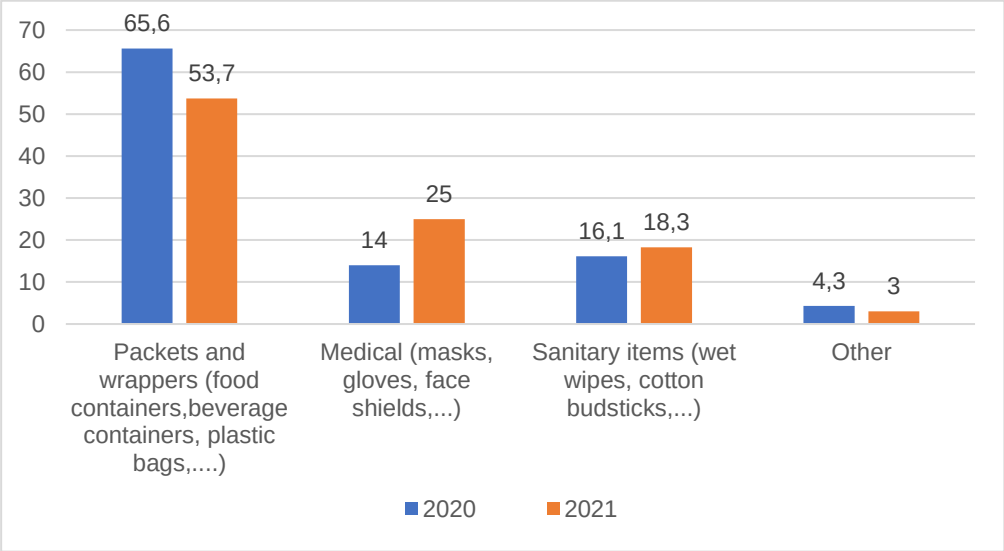


Source: Own creation

Figure 6 shows a big change, if in 2020 the number of times using masks, gloves, face shields,... less than 2 times/week accounts for the majority with 46 percent, one years later, the consumption of these items increased greatly, from 20 percent to 32 percent of people using it 3-5 times a week, occupying the largest position of the chart. Moreover, the number of people using 6-8 times a week has also increased by 8% since 2020 which is 12%, and the number of users more than 8 times has remained at 22 percent. Thus, it can be seen that a large number of masks, gloves, and face shields have been discharged since the outbreak of the disease. Understandably, many people used masks to protect themselves, causing this type of garbage to increase. This number has increased many times because the maximum duration of a mask is 4 hours to avoid infection, its uses seem to come from the World Health Organization (WHO) recommendation given in March 2020 (World Health Organization, 2020), therefore, the number of medical masks and gloves discharged every day is extremely large. Improper disposal of disposable gloves and masks, along with other plastic items, has been found littering some public places. For instance, a considerable amount (compared with only one or two items observed per month) of disposable masks was observed in a 100 m stretch in Soko's islands beach, Hong Kong, during an environmental survey carried out by the NGO Oceans Asia (Oceans Asia, 2020).

The main reasons for using SUP

Figure 7: Percentage's comparison of the main reasons for using SUP by students at the FIMB, BBS between 2020 and 2021 (%)

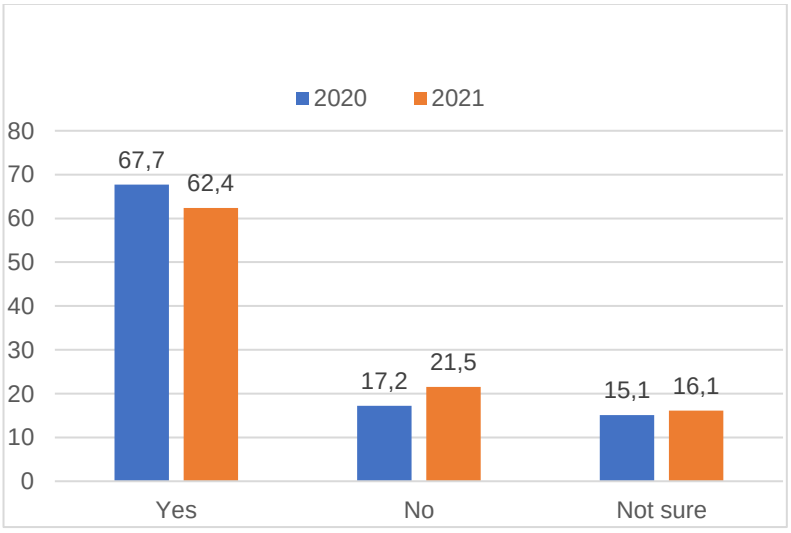


Source: Own creation

It can be seen obviously the figure 7 that the Package and Wrappers column was the highest of both times and the number for 2021 was 11.8 percent lower. In contrast, because of the pandemic, the number of masks, gloves, and face shields,…was two times as big as these one years ago. Similarly, the number of sanitary items was 2.2 percent smaller than that in 2021, with 25 percent. In the United Kingdom, 11 billion wet wipes are discarded each year, and their use has soared since the beginning of the Covid-19 outbreak (ITV News, 2021). As in the study of BusinessWaste.co.uk, up to 10 million empty bottles wind up in already overcrowded disposal sites (Hall, 2020). It can be seen that the impact of the epidemic has created a significant change in the use of plastic products.

Plastic recycling habits of students at FIMB and BBS

Figure 8: Percentage comparison of plastic recycling habits of students at FIMB, BBS between 2020 and 2021 (%)

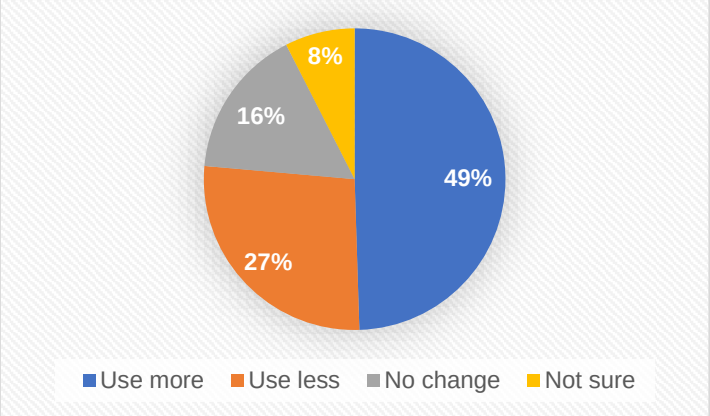


Source: Own creation

Based on the comparison results of students' plastic recycling habits as shown in Figure 8, knowledge about recycling and how to separate garbage is still ambiguous leading to 15-16 percent of interviewees still saying that they were not sure if they recycle plastic waste or not. Besides that, perhaps good sustainability education has helped a large number of students to become recycling conscious, over 67 percent, this number has decreased significantly now compared to the past. This result is much higher than the specific goal for plastic packaging recycling of a preliminary political agreement between the European Council, European Parliament, and European Commission that 50 percent by 2025 and 55 percent by 2030 (Silva A. L.-S., 2020). The percentages of people who did not recycle before and during Covid differed slightly, at 17.2 percent and 21.5 percent, respectively, according to Figure 8.

The impact of Covid-19 on the amount of SUP

Figure 9: Percentage of personal feelings about the impact of Covid-19 on the amount of SUP by students at FIMB, BBS in 2021 (%)



Source: Own creation

Figure 9 demonstrates that half of the respondents said they used more SUP due to the impact of the pandemic, this was 3 times higher than the number of people who thought this did not affect their plastic consumption, which is 16 percent. The negative impact of the epidemic on the amount of plastic discharged every day can be seen. Governments have accepted the trade-off of rising waste in general and SUP in particular to reduce the risk of virus transmission. In addition to masks, gloves or other types of plastic directly related to health, the closure of restaurants and shopping stores made people choose to shop online and as a result, plastic bags and plastic boxes are used to protect food storage, styrofoam boxes, plastic straws, plastic cutleries, ... increased many times compared to before. However, with 27% people use less plastic because they spend less time outside during the epidemic, the majority of the time they use staying at home. As a consequence, the use of face masks and face shields has not risen considerably. In addition, they have more spare time to cook and improve their health; therefore, the amount of packaging is decreasing slightly.

Conclusion

This study was implemented to measure the amount of SUP impacted in the pandemic consumed by FIMB students at BBS. The findings demonstrate that, as predicted, the COVID-19 pandemic and its subsequent lockdowns changed consumer behavior, not just in terms of purchasing patterns but also in terms of trash production. Here the SUP as disposable gloves and masks were intended to analyze. According to the data we investigated, 49% of students inquired assumed that their consumption increasing than before COVID 19, emphasizing the expansion in food packaging and single-use plastic bags. Nonetheless, a sizable number of people are making attempts to segregate plastic garbage and minimize their usage of SUP.

Some solutions should be carried out as ways of reducing this plastic utilization in terms of individuals and organizations. Students could choose biodegradable package food or even purchase the less packed food. It makes the food industry, and the retailers motivated to get business opportunities because of adjusting consumer behavior by introducing alternative packaging. In addition, students can

participate in communication professionals, and non-governmental environmental organizations, to promote the message of minimizing the usage of unneeded SUP during the epidemic and encouraging alternative methods of consuming certain items (ex. reusable masks, bio-plastic bags). The young generation who are students is ideal ambassadors representing future owners of the earth to join hands so as to reduce plastic waste. Moreover, Budapest Business School can maintain plastics as its priority mission by organizing many conferences, and workshops with an aim to raise awareness of students in protecting the environment and to give them sustainability education.

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