THE IMPACT OF COVID-19 ON SUSTAINABILITY BEHAVIOURS IN HONG KONG:

A Report on Key Findings and Policy Recommendations

NARRATIVE REPORT

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About HKUST Institute for the Environment

The Institute for the Environment (IENV) at HKUST is an interdisciplinary research institute dedicated to addressing the pressing environmental challenges our world faces, such as climate change, pollution, biodiversity loss, and resource scarcity. Effectively managing and minimizing these challenges requires an integrated, multidisciplinary approach involving scientists, technologists, thinkers, and policymakers from academia, industries, and the government.

IENV collaborates with numerous academic, industrial, and environmental nongovernmental partners to conduct research aimed at improving the environment of Hong Kong, the Pearl River Delta, and beyond. With a strong track record in conducting air quality studies in Hong Kong and the region, IENV's research findings have been influential in the local and regional policy-making process. The Institute has received significant support from the University for their research work and facilities, including the establishment of the Atmospheric Research Center in Guangdong in 2006.

In addition to collaborating with various stakeholders, including academic, industrial, and environmental non-governmental partners, IENV aims to expand its collaborative efforts to foster cross-border synergies with mainland institutions for a greener and healthier Greater Bay Area.

About HKUST Division of Environment and Sustainability

The Division of Environment and Sustainability is dedicated to creating significant international and local impact through interdisciplinary environmental education and research. Its mission is to foster collaboration among students and faculty members, enabling them to address relevant science, technology, and policy issues in environmental education. The division provides rigorous and inquiry-based education for students to solve complex environmental problems that involve scientific, technological, societal, regulatory, and business issues.

Additionally, the division enhances university students' awareness about the environment by offering general environmental courses. It engages in interdisciplinary environmental research that is academically challenging and has high potential impact in Hong Kong and the region, with a particular focus on atmospheric and oceanographic research with policy implications. Key research interests focus on air and health, climate adaptation and resilience, and sustainable finance and net-zero solutions. The division strives to study the relationship between air quality and human health, develop adaptation strategies and build resilience to climate change, and investigate the intersection of finance and sustainability to promote investments in environmentally friendly practices. Through its dedication to education and research, the division aims to make an impactful difference in creating a sustainable and resilient future for all.

Acknowledgment

The work described in this paper was supported by a grant from The Robert H.N. Ho Family Foundation for the project titled "What matters most? How COVID-19 may help re-align Hongkongers values and motivations towards sustainability." his report provides an overview of the key findings from a mixed-method study conducted in Hong Kong, examining the impact of the COVID-19 pandemic on sustainability behaviours across five domains of the Sustainable Development Goals (SDGs): health, consumption, social environment, quality of life, and institutions, and the implications behind from personal values to societal policy-makings.

The study employed surveys and focus group discussions to comprehensively explore behavioural shifts. The findings illustrated both positive and negative impacts on sustainability behaviors due to the pandemic.

Within the domain of health, individuals have displayed an increased inclination towards prioritizing their well-being and hygiene, as evidenced by their frequent engagement in handwashing and consistent usage of face masks. However, this heightened focus on personal hygiene has inadvertently contributed to the upsurge in the production of single-use plastic waste, primarily driven by widespread utilization of disposable masks and gloves.

The pandemic has brought about notable alterations in consumption behaviors, as evidenced by the increasing preference of individuals to minimize travel and resort to online shopping. Consequently, consumption patterns have undergone significant modifications, with indications of declining non-essential expenditures such as dining out and leisure travel.

With the social sphere, the decline in face-to-face interactions and the rise in virtual interactions contributed to a reduction in carbon emissions stemming from transportation. However, this behavior shifts concurrently resulted in elevated energy consumption attributable to the heightened usage of digital devices. The noticeable rise in individuals' environmental consciousness during the pandemic indicates an enhanced awareness of sustainability. But, this heightened sustainability awareness has not necessarily translated into tangible actions, primarily due to the limited or complete absence of opportunities for actively engaging in public activities that promote sustainability.

The pandemic has also exerted a significant influence on the overall quality of life for individuals in Hong Kong, as evidenced by reports of increased levels of stress, anxiety, and decline in outdoor activities.

The pandemic has led to increased attention to personal hygiene and health practices, reduced consumption of non-essential goods, and a greater appreciation for local nature. External factors such as age and income were found to shape these behavioural changes.

Based on the study's findings, the report presents eighteen SDG-aligned policy recommendations to enhance sustainability behaviours in the post-pandemic era in Hong Kong. These recommendations include promoting sustainable alternatives to single-use plastic waste, implementing policies for sustainable packaging and consumer awareness, promoting energy-efficient practices in virtual interactions, enhancing mental health support and outdoor activity opportunities, enhancing digital infrastructure for sustainable engagement, improving communication between authorities and the community, implementing anti-discrimination policies, and integrating sustainability education into school curricula. These policy recommendations aim to address the challenges and leverage the opportunities arising from the pandemic's impact on sustainability behaviours in Hong Kong, fostering a more sustainable and resilient future aligned with the SDGs.

Table of Contents

Introduction	5
Methodology	6
Key Results	8
Summary and Policy Recommendations	12



Introduction

he COVID-19 pandemic has brought unprecedented challenges to societies worldwide, including Hong Kong. As a densely populated region, Hong Kong faced significant health and economic threats, necessitating strict containment measures to mitigate the spread of the virus. These measures disrupted daily lives and prompted behavioural changes in various domains, raising concerns about their implications for sustainability. This paper aims to shed light on the impact of the pandemic on sustainability behaviours in Hong Kong and its alignment with the Sustainable Development Goals (SDGs).

While previous research has examined the societal shifts caused by the pandemic, limited attention has been given to understanding specific behavioural changes during the crisis compared to the pre-pandemic period. Moreover, the implications of these behavioural changes for sustainability remain poorly understood. For instance, although the initial months of the pandemic saw a temporary decrease in global greenhouse gas emissions due to lockdown measures, there was a concerning surge in single-use plastic waste associated with hygiene practices. These changes pose significant threats to economic and human well-being and have implications for achieving the SDGs.

Hong Kong has embraced the SDGs as a guiding framework for sustainable development across various domains. However, the emergence of pandemic-induced lifestyle changes and resulting behavioural shifts raises important concerns regarding the achievement of sustainability goals. Understanding these intersections is crucial for better comprehending human behaviour during periods of distress and informing targeted policymaking. It is essential to incorporate sustainability and insights from behavioural studies into recovery agendas to ensure the achievement of the SDGs.

This paper fills a research gap by exploring individuals' perceptions of changing behaviours during the global crisis and their implications for sustainability. A mixed-method approach was employed to answer research questions related to behavioural changes across five domains and the relationships between these domains. Additionally, external factors such as demographics were examined to understand their role in explaining behavioural changes. By studying these changes in behaviour during the pandemic, this research contributes to the literature on sustainability science and urban studies, especially in densely populated areas like Hong Kong.

The findings of this study are relevant as Hong Kong pursues new sustainability policies aligned with its net-zero ambitions. The outcomes provide insights for government agencies and the private sector to design and implement innovative policies and interventions that ensure the achievement of the SDGs.

Methodology

A mixed-methods research design was adopted to address the research questions, combining two data collection techniques: a survey and focus group discussions. The survey, approved by the human research ethics panel at the Hong Kong University of Science and Technology, involved 4586 respondents. The survey instrument consisted of a set of structured questions designed to gather data on behavioural changes during the pandemic and their implications for sustainability. The target population for the survey was Hong Kong residents aged 18 and above.

Mixed-methods approach in the current study:



The survey instrument included questions covering various domains related to sustainability behaviours and demographic information. The number of questions in the survey and their specific content are discussed in detail. The sampling technique employed was explained, and the sample size was determined based on statistical considerations and the need to achieve adequate representation of the population. Weighting techniques were applied to ensure the sample was representative based on census data. Data collected through the survey was analysed using statistical methods, including Structural Equation Modelling (SEM) and linear regressions. Detailed methodology and results were illustrated in the Full Report.

In addition to the survey, eight focus group discussions were conducted to gather gualitative insights into participants' perceptions and experiences related to sustainability behaviours during the pandemic. The recruitment process for the focus group discussions is outlined, including the criteria for selecting participants and the recruitment methods utilized. The conduct of the focus group discussions, including the number of sessions, duration, and facilitation techniques, is explained. Data from the focus group discussions were analysed using qualitative data analysis software, which aided in organizing, coding, and identifying key themes and patterns in the participants' responses. The specific software used for data analysis is mentioned.

FIGURE 1

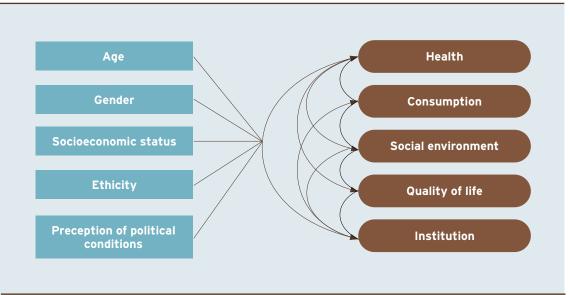


Figure 1 visually depicts the relationships between observed and latent variables. The latent domains, i.e., health, consumption, social environment, quality of life, and institutions, are represented by ellipses, while rectangles represent the observed variables (i.e., age, gender, and socioeconomic status) and the external factors (i.e., sociodemographic status, ethnicity, and the perception of Hong Kong political conditions. The arrows between the latent domains represent their intercorrelations. Overall, the mixed-methods approach employed in this study allowed for a comprehensive understanding of sustainability behaviours during the pandemic, combining quantitative data from the survey and qualitative insights from the focus group discussions. The combination of these two data collection techniques provided a richer and more nuanced understanding of the research questions and facilitated triangulation of findings.

Key Results

This section presents the key findings from the study, highlighting the behavioural shifts observed in various domains during the COVID-19 pandemic in Hong Kong. The results are organized according to the five research domains.

Behavioural shifts in health, consumption, social environment, quality of life, and Hong Kong institutions

Healthrelated Behaviours



The COVID-19 pandemic has brought about significant changes in public outings, handwashing, and maskwearing behaviours. Among the frequently mentioned codes in the health domain are "decreased going out in public" (13%), "frequent handwashing" (13%), and "always masked" (11%). The fear of crowds and the higher risk of contracting the virus in densely populated spaces have strongly influenced the reduction in public outings. Globally, social distancing measures have been implemented to curb the spread of the virus, and in Hong Kong, the severity of the pandemic situation has driven residents to adjust their behaviours

accordingly. Government mandates, including restrictions on gatherings and dining services, have played a significant role in shaping participants' behaviours and experiences. As a result, handwashing and disinfection practices have become ingrained habits, with participants adopting frequent handwashing and taking precautions to sanitize personal items. Regular mask-wearing has been reported by all participants, as Hong Kong has implemented a public mask mandate. Overall, the health-related behaviours adopted during the pandemic have centred around promoting health and hygiene.

Consumption Patterns



The COVID-19 pandemic had notable effects on travel, shopping, and waste generation. Participants frequently mentioned the codes "traveling less" (12%), "shopping online" (12%), and "increased packaging/shopping waste" (9%). It was observed that most participants experienced a significant decrease in international travel, aligning with survey findings that indicated a decline in air travel. The mandatory hotel quarantine for inbound travellers emerged as a major deterrent, with participants describing it as a "traumatic" experience. Consequently, there was a shift towards online shopping as individuals preferred to stay home and reduce public outings. Online platforms were perceived as safer and more convenient, with discounts serving as a motivating factor. However, this increased reliance on online shopping also contributed to a surge in packaging and shopping waste, leading to higher levels of waste accumulation in participants' homes. Additionally, online banking gained popularity as a secure and convenient alternative during the pandemic.

Social Environment

During the COVID-19 pandemic, participants expressed dissatisfaction with the support from authorities and concerns about the selective enforcement of pandemic policies, which significantly influenced their behaviours and experiences. Government mandates played a crucial role in shaping participants' actions. Among the various aspects of social and environmental engagement discussed by interviewees, the most frequently mentioned topics were "increased environmental consciousness" (22%), "enhanced knowledge of sustainability" (18%), and "reduced social and environmental engagement" (13%). Participants reported a heightened environmental consciousness, citing factors such as

Quality of

The COVID-19 pandemic had a significant impact on social and environmental engagement in Hong Kong. Two main factors contributed to the decline in engagement: the implementation of social distancing policies, which limited collective events and volunteer activities, and the lack of opportunities for volunteering due to the postponement of public health drives. However, there was an increase in outdoor activities, particularly to visit the nature (11%) such as hiking and increased awareness of plastic and mask waste in the environment and spending more time at home, which made them more conscious of their daily waste generation. They acquired knowledge through various sources like podcasts and articles. However, despite this increased awareness, participants did not actively engage in collective actions or campaigns, such as donating to charities or participating in beach clean-ups, during the pandemic. The reason behind this lack of engagement remained unclear. From the dialogue, the research team gained an overall impression that the long-standing habit of inactive participation in charity activities exhibited significant inertia, resisting any impact from the pandemic to change people's behaviour.

visiting green spaces, as participants sought leisure and fresh air amidst restrictions. The pandemic also affected the quality of life, with experiences of racial discrimination reported, healthcare workers exhibiting high hygiene practices, and older individuals modifying their mobility patterns. Overall, the pandemic reshaped social and environmental behaviours and had both positive and negative effects on people's lives in Hong Kong.

Views on Hong Kong Institutions



In the domain of opinions on institutions and organizations, participants expressed various sentiments. Online banking (15%) received positive feedback for its convenience during the pandemic, allowing transactions without in-person visits. However, dissatisfaction was prevalent among different professional groups, small business owners, and healthcare workers regarding the lack of increased support from authorities (12%) compared to pre-pandemic times. Concerns were raised about the allocation of funds and the perception of selective enforcement of pandemic policies. Questions were raised about the fairness of quarantine protocols, highlighting perceived double standards (11%).

Behavioural shifts across inter-related domains

Health & Consumption



We found that there is a significant relationship between health and consumption behaviours. People who reduced their public outings during the pandemic tended to engage more in online shopping and ordering takeout.

Within the consumption domain, we also observed an interaction between environmental consciousness and various behaviours. Participants who were environmentally conscious were more likely to use reusable products,

be interested in sustainable products, reuse plastic bags and containers, and be mindful of packaging waste. Some participants mentioned adopting small measures to minimize their negative impact, such as conserving water, selecting products with minimal plastic packaging, and adjusting their masks for a better fit to prevent harm to marine life. These findings highlight the connection between healthrelated behaviours and sustainable consumption practices.

Quality of Life



Consumption & Behavioural shifts related to the interaction between consumption and quality of life during the pandemic have had various impacts:

- 1. More time in nature: Participants reported that reducing travel activities led to spending more time in nature, which had a positive impact on their overall quality of life. Exploring local hiking trails, camping, and visiting beaches became popular alternatives to international vacations.
- 2. Fatigue from mandatory quarantine measures: The inability to travel abroad and the sustained workload during the pandemic contributed to feelings of fatigue and exhaustion among working individuals. The absence of vacation time and limited travel options added to the strain.
- 3. Difficulty detaching from work even during holidays: Remote work and the accessibility of online tools made it challenging for individuals to disconnect from work, even during designated leave days. Being physically present in Hong Kong hindered their ability to fully relax, as they felt compelled to continue working to meet expectations.

- 4. Disparate feelings of unseen hope and future: Young professionals expressed frustration over the lack of something to look forward to due to limited travel options. The absence of upcoming holidays and uncertainty about when travel would be possible again impacted their well-being and motivation.
- 5. Positive impact on exploring the local community: With international travel being unfeasible, individuals were compelled to explore leisure activities within their local community. Many discovered the abundance of hiking trails and scenic spots in Hong Kong, leading to a newfound appreciation for their own city.

Overall, the pandemic has reshaped the relationship between consumption, travel, and quality of life, prompting individuals to find alternative ways to enjoy leisure time, adapt to remote work, and cope with the absence of international travel opportunities.

External factors and behaviour shifts

In terms of sustainability behaviours, age, gender, education, household size, and income were found to correlate with engagement. Age is consistently associated with increased engagement in sustainable behaviours. Gender effects vary across domains, while education and ethnicity also influence behaviour. Household characteristics like size and income have mixed effects. Evaluation of institutions' performance and perception of political conditions impact behaviours. Racial discrimination experiences highlight the need for awareness. Healthcare workers prioritize hygiene and limit outings, while younger individuals have fewer health concerns and continue using public transportation. Older participants modify mobility patterns. These findings demonstrate the complex interplay of factors shaping sustainable behaviours during the COVID-19 pandemic.

Summary and Policy Recommendations

The COVID-19 pandemic has had a significant impact on sustainability behaviours in Hong Kong across various domains. The study explored the effects on health habits, consumption patterns, social environment, quality of life, and Hong Kong institutions, revealing both positive and negative impacts. Individuals have shown increased emphasis on well-being and hygiene, but there has been a surge in single-use plastic waste due to the widespread use of disposable masks and gloves. Consumption behaviours have shifted towards reduced travel and increased online shopping, resulting in a decrease in carbon emissions but an increase in packaging and shopping-related waste. The decline in face-to-face interactions has reduced transportation emissions but increased

energy consumption from digital devices. There is an enhanced awareness of sustainability, but limited opportunities for active engagement. The pandemic has also affected the quality of life, with increased stress, anxiety, and reduced outdoor activities. Institutions have provided convenience through online transactions, but public support has been disappointing, with vulnerabilities in the healthcare system and gig economy. Age, education, and ethnicity influence sustainability behaviours, highlighting the need for targeted interventions. The findings emphasize the necessity of proactive policies to address challenges and leverage opportunities arising from the pandemic's impact on sustainability behaviours in Hong Kong.

Based on the findings, the report presents the following policy recommendations:

1.	Sustainable Alternatives to Single-Use Plastics	Implement educational campaigns and awareness programs that emphasize the importance of sustainable alternatives to single-use plastic products to address the negative environmental impacts and promote the principles of SDG12 (Responsible Consumption and Production).
2.	Promoting Reusable and Eco-Friendly Materials	Encourage the development and utilization of innovative, reusable, and eco-friendly materials, hence aligning with the objectives of SDG14 (Life Below Water) and SDG15 (Life on Land).
3.	Encouraging Sustainable Packaging Practices	Implement policies that encourage businesses to adopt sustainable packaging practices, promoting the use of recyclable and biodegradable materials, thereby aligning with the principles of SDG12 (Responsible Consumption and Production).
4.	Mindful Consumption in Online Shopping	Foster consumer awareness and education campaigns that emphasize the importance of mindful consumption, urging individuals to make sustainable choices in their online shopping habits, such as opting for products with minimal packaging or choosing brands with robust sustainability practices in line with SDG12 (Responsible Consumption and Production) and SDG13 (Climate Action).
5.	Adoption of Energy-Efficient Technologies	Develop initiatives that promote the adoption of energy-efficient technologies and practices in the digital realm in alignment with the objectives of SDG7 (Affordable and Clean Energy).

6.	Balancing Virtual and Face-to-Face Interactions	Encourage individuals and organizations to strike a balance between virtual and face-to-face interactions, highlighting the importance of maintaining meaningful human connections while also considering the environmental implications of excessive digital engagement. This approach supports the principles of SDG11 (Sustainable Cities and Communities) and SDG13 (Climate Action).
7.	Engaging in Sustainable Practices Online	Foster virtual platforms and online initiatives that facilitate public engagement in sustainable practices, allowing individuals to participate in sustainability-related activities from the comfort of their homes. These digital platforms can provide educational resources, virtual workshops, and interactive campaigns, aligning with the principles of SDG4 (Quality Education) and SDG12 (Responsible Consumption and Production).
8.	Public-Private Partnerships for Sustainability	Establish partnerships between public and private sectors to create innovative solutions that bridge the gap between individuals' sustainability consciousness and their ability to engage in practical actions. This collaboration can promote initiatives such as sustainable product offerings, community-based projects, and sustainable infrastructure development, supporting SDG17 (Partnerships for the Goals) and SDG13 (Climate Action).
9.	Accessible Mental Health Support	Strengthen mental health support systems by allocating resources to provide accessible and comprehensive mental health services to individuals affected by the pandemic. This includes promoting mental well-being through counselling services, support hotlines, and online mental health platforms, aligning with the objectives of SDG3 (Good Health and Well-being).
10.	Enhancing Outdoor Activities and Green Spaces	Enhance opportunities for outdoor activities while adhering to public health guidelines to strike a balance between physical well-being and the need for leisure and recreational pursuits. Encouraging the development and maintenance of green spaces, parks, and nature reserves can contribute to improved mental health, physical fitness, and overall well-being, in line with SDG11 (Sustainable Cities and Communities) and SDG15 (Life on Land).
11. EEE	Improving Digital Infrastructure and Accessibility	Enhance the digital infrastructure and accessibility of online services to ensure a seamless and efficient experience for individuals engaging in online transactions. This includes enhancing digital literacy programs, and investing in secure and user-friendly online platforms, in line with SDG9 (Industry, Innovation, and Infrastructure).
12.	Enhancing Communication and Community Engagement	Strengthen communication and coordination between public authorities and the community, ensuring transparency, responsiveness, and timely provision of support during crisis situations. Establishing mechanisms for gathering public feedback and incorporating citizen perspectives in decision-making processes can enhance trust and accountability, aligning with the principles of SDG16 (Peace, Justice, and Strong Institutions).
13.	Anti-Discrimination in Healthcare	Implement comprehensive anti-discrimination policies and initiatives within the healthcare system to address and eliminate discrimination based on ethnicity or any other factors. This can involve awareness campaigns, training programs, and strict enforcement of existing regulations, aligned with the principles of SDG3 (Good Health and Well-being) and SDG10 (Reduced Inequalities).

14.	Protection for Gig Economy Workers	Strengthen labour market regulations to ensure adequate protection and rights for gig economy workers. This includes establishing mechanisms for fair remuneration, access to social benefits, and safeguards against exploitation, in accordance with the principles of SDG8 (Decent Work and Economic Growth) and SDG10 (Reduced Inequalities).
15.	Sustainability Education in Schools	Incorporate comprehensive sustainability education into the curriculum of schools and educational institutions at all levels, promoting awareness, knowledge, and practical skills related to sustainable behaviours. This can encompass topics such as environmental conservation, responsible consumption, and social responsibility, aligned with the objectives of SDG4 (Quality Education) and SDG12 (Responsible Consumption and Production).
16.	Sustainability Programs for Children and Youth	Encourage partnerships between educational institutions, civil society organizations, and relevant stakeholders to develop and implement sustainability-focused programs and initiatives that target children and young individuals. These initiatives can include interactive workshops, community engagement projects, and extracurricular activities that foster a sense of environmental stewardship and social consciousness, supporting SDG4 (Quality Education) and SDG17 (Partnerships for the Goals).
17.	Culturally Sensitive Sustainability Education	Develop tailored sustainability education programs that address the specific needs and perspectives of different educational levels and backgrounds. These programs should incorporate culturally sensitive approaches and utilize various mediums to effectively engage individuals from diverse ethnicities and educational backgrounds, aligned with the objectives of SDG4 (Quality Education) and SDG10 (Reduced Inequalities).
18. Q O	Engaging Ethnic Communities in Sustainability	Implement targeted awareness campaigns and initiatives that promote sustainable behaviours within specific ethnic communities, considering cultural norms, values, and beliefs. Collaborate with community leaders, organizations, and grassroots networks to ensure effective outreach and dissemination of sustainability messages, supporting SDG12 (Responsible Consumption and Production) and SDG17 (Partnerships for the Goals).

In conclusion, the COVID-19 pandemic has yielded both positive and negative consequences on sustainability behaviours in Hong Kong. The lessons learned from this experience are essential for promoting sustainable practices and rethinking our lifestyles and institutional/public policies, particularly in densely populated urban areas like Hong Kong. Regardless of whether or not COVID-19 or other pandemics recur in the future, it is imperative for policymakers to leverage these lessons in order to develop policies and programs that address the identified challenges and opportunities.





