Information Diffusion on COVID19 and Its Impact on Consumer Behavior

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ABSTRACT

Due to the COVID-19, overall personal consumption in Japan has declined significantly since January 2020. In particular, consumption of services that are mainly provided face-to-face, including eating and drinking, retail, accommodation, etc., has fallen sharply. In this study, the author attempted to quantify the impact of COVID-19 on consumers by analyzing the purchasing behavior of consumers influenced by the media. The survey period was before the state of emergency was lifted, and the results suggest that people spent more time at home and were more interested in overseas and domestic travel. Relationship between watching TV commercials and the intention to purchase PC or tablets, which is necessary for online meetings, and working from home was positive and significant.

Keywords: Consumer behavior, COVID-19, Media, Structural equation modelling.

1. INTRODUCTION

Because of the request to refrain from going out due to the COVID19 crisis, overall personal consumption in Japan has declined sharply since January 2020. In May 2020, it fell to a level below those of the Lehman Shock and the Great East Japan Earthquake. In particular, consumption of services including eating and drinking, retail, accommodation, etc., that are mainly provided face-to-face, have fallen significantly as shown in Figure 1.

According to a survey conducted by NTTCOM Online Marketing Solutions between April 15 to 17, 2020 (n=3,125), decreased activities due to the declaration of a state of emergency were eating out, drinking parties, shopping other than food and daily necessities, using public transportation, traveling, watching movies, concerts, and watching live performances as shown in Figure 2 (Hashimoto, et al. 2020). A research study was conducted by the Ministry of Internal Affairs and Communications on the actual state of digital utilization and changes in user awareness during the COVID-19 pandemic (MIAC, 2021). The results are **as** follows. "Media that quickly learns about events and movements in the world" 1. TV (55.3%), 2. News distribution service (40.7%); Search engine (32.7%)

"Media that obtains reliable information on world trends" 1. TV (43.7%), 2. Newspapers (34.6%); 3. News distribution service (29.1%). "Media for obtaining information on hobbies and entertainment" 1. Video posting/sharing sites (38.1%), 2.

Search engine (37.5%), 3. TV (34.1%). The influence of mass media is enormous. In particular, the sense of crisis is amplified by tabloid TV show programs that continue to cover news related to COVID19 every day rather than news programs (Hashimoto, 2020). The anxiety that COVID19 gave us are "Anxiety about infectious disease itself," "Anxiety in life," "Medical related Anxiety," and stems from news and inaccurate information about famous people getting sick.   It is said that there is "anxiety in society" that it has greatly influenced our psychology. Therefore, this study aims to quantify the impact of COVID-19 on consumers (general citizens) by analyzing the purchasing behavior of consumers influenced by the media.

Figure 1. Changes in the real activity index during the COVID-19 pandemic (monthly/seasonally adjusted)
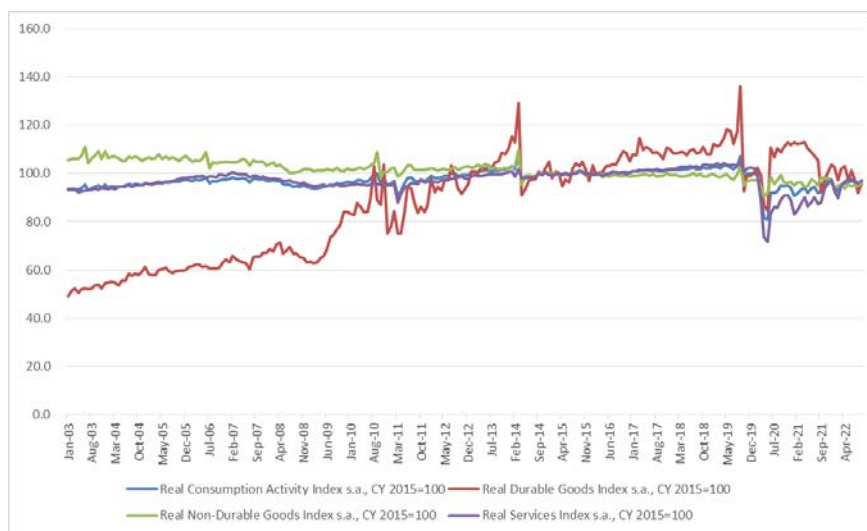
Source: Created by the author based on the Bank of Japan's Consumption Activity Index

Figure 2. Items decreased due to the declaration of a state of emergency.
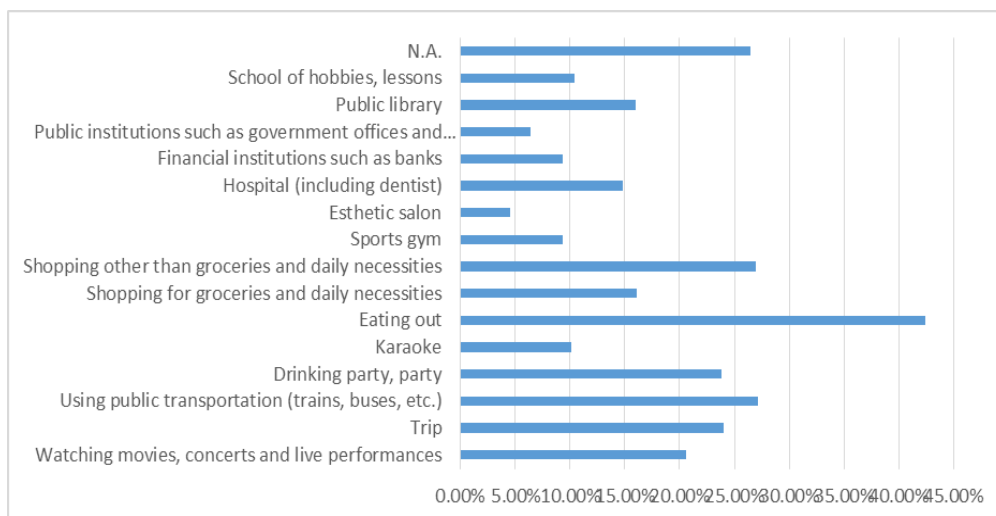
2. LITERATURE REVIEW

People usually change their behavior when affected by new events, and this is an essential aspect of the pandemic phenomenon. Moretti, et al. (2021) noted that, in general, studies on the impact of consumer behavior in epidemics are scarce, with the exception of works by Asian researchers, mainly on SARS (Wen, et al., 2005). As for the effect on COVID-19, Wen, et al. (2020) detected a reduction in travel, mainly tourism in China, recommending changes in distribution channels and travel destinations, with emphasis on health and wellness. It is also observed that the continuous dissemination of information about the pandemic, amplified by the use of social media, acts as a catalyst for stressful states in a mixture of novelty and fear, sometimes exaggerated (Aven & Bouder 2020).

According to research conducted by Social Miner-Opinion Box (2020), there are new buying and consumption habits emerging from COVID-19; it showed that among consumers, 7.5% bought online for the first time, 16.5% bought on e-commerce which they never heard of before and 53.6% considered these experiences positive. Other survey results indicate that consumers would continue shopping online even after the reopening of physical stores, if there were good prices (65.4%), fair shipping (59%), speedy delivery (51.8%) and guarantee against fraud and scams (34.2%).

Chukwu et al., (2019) indicates that emotional response, environmental response towards brands, brand awareness and sensory stimulated advertising have a positive relationship with consumer buying behavior. These factors may include availability of alternative products, the prices of alternative products and income of the consumer. According to Valaskova et al. (2015) buying behavior of customers is more likely influenced by the social norms and their personal economic condition. Laato et al's (2020) research shows that consumers were forced to shift to alternative brands due to unavailability of certain goods of certain brands during the pandemic, largely because of accumulation of commodities.

Romeo-Arroyo et al. (2020) conducted a national survey related to food consumption, home-food and cooking related habits in Spain. Most respondents were categorized as "External eaters" (67%) after analyzing the responses by the DEBQ (Dutch Eating Behavior Questionnaire). "Restraint" and "Emotional eaters" represented a 23% and 10% of the sample population, respectively.

Based on these literatures, the author had formed the following hypotheses:

H1: A series of news reports about COVID19 affects consumers' purchasing behavior.

H2: Online purchases would increase.

3.DATA

Data is provided by Nomura Research Institute, Ltd. It is a single-source data, collected from 2,500 consumers, during the period from January 22 to April 2, 2022. A sample of descriptive statistics for respondents are shown in table 3.

Table 3. Descriptive Statistics

Age	20s=503, 30s=641, 40s=766, 50s=590
Gender	Male=1,288, Female=1,212
Marital Status	Single=1,090, Married=1,274, Divocee/Bereavement=136
Having any children	Yes=935, No=1,565
Household status	Single household=586, Husband & wife=390, Husband & wife & unmarried children=1,135 A single parent & unmarried children=193, Husband & wife & married children=13, Three generetions =114, Others=69
Income status	No income=45; less than one million yen=77; 1~2 million yen=106; 2~3 million yen=214; 3~4 million yen=255; 4~5 million yen=327; 5~6 million yen=288; 6~7 million yen=231; 7~10 million yen=559; 10~15 million yen=307; 15~20 million yen=54; more than 20 million yen=32

Single-source data track the same individuals or households for both their purchases and opportunity to see advertising (Jones 1995; McDonald 2003).

COVID19 Related TV Programs

Within this data, there are eighty-three (83) TV programs with "COVID19" in the titles. Fewer than half of those surveyed said they had seen a program specializing in COVID19. Slightly more males than females watched that kind of program. There are older viewers who are watching COVID19 related TV programs, especially those in their 40s and over, than younger generations.

Table 4. Viewing ratio by gender and age (COVID19 Special)

		Never watched	Watched	Total
Male	Count	702	586	1,288
	%	49.90%	53.70%	51.50%
Female	Count	706	506	1,212
	%	50.10%	46.30%	48.50%
Total	Count	1,408	1,092	2,500
	%	100.00%	100.00%	100.00%

	Never Watched	Watched	Total
20s	381	122	503
30s	413	228	641
40s	393	373	766
50s	221	369	590
Total	1,408	1,092	2,500

COVID19 Related TV Programs and SNS

Many people who answered that they never watched TV programs on COVID19 said that they use Twitter and YouTube almost every day as shown in Table 5. It implies they are collecting information from SNS instead of TV.

Table 5. COVID19 x SNS

			Frequency of use (Twitter)							
			none	Less than once a month	Once a month	Once a week	A few times a week	Several times a week	Almost everyday	Total
COVID19 Related TV Programs	Never watched	Count	601	23	28	68	77	67	530	1394
		% within Twitter	54.2%	57.5%	51.9%	56.7%	55.8%	54.0%	59.2%	56.2%
	Watched	Count	508	17	26	52	61	57	365	1086
		% within Twitter	45.8%	42.5%	48.1%	43.3%	44.2%	46.0%	40.8%	43.8%
	Total	Count	1109	40	54	120	138	124	895	2480
		% within Twitter	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

			Frequency of use (YouTube)							
			none	Less than once a month	Once a month	Once a week	A few times a week	Several times a week	Almost everyday	Total
COVID19 Related TV Programs	Never watched	Count	279	45	41	123	162	116	624	1390
		% within YouTube	55.9%	46.9%	41.8%	48.2%	49.7%	55.0%	63.2%	56.2%
	Watched	Count	220	51	57	132	164	95	363	1082
		% within YouTube	44.1%	53.1%	58.2%	51.8%	50.3%	45.0%	36.8%	43.8%
	Total	Count	499	96	98	255	326	211	987	2472
		% within YouTube	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

4. RESULTS

Relationship between travel purchase intentions and advertising media

A-1. Overall (including non-COVID19 special program viewers)

Figure 3 and Table 6 show the results of the research model for entire consumers. The indices suggested an acceptable model fit of the structural model (CFI=0.920, IFI=0.921, RMSEA=0.042). (Bentler 1990; Browne & Cudeck 1993). Regarding travel (overseas travel, automobiles) and purchase of PCs necessary for online meetings, etc. during the COVID19 crisis, the author analyzed the relationship between CM (automobiles/ real estate) views, SNS, and online shopping.

  Since there were no overseas travel commercials within the data, the number of real estate commercials, which is a high-priced item, are used as a substitute.

   CM viewings and automobiles/overseas travel intentions were positive but not significant.   And a relationship between SNS and automobiles /overseas travel intentions were negative and not significant.   CM viewings and personal computer

purchase intentions were positive and significant at 1%.

   YouTube/Google and purchase intentions for personal computers were positive and significant. The relationship between SNS and online shopping were positive and significant. That of online shopping and durable goods intention to buy were also positive and significant. However, relationship between Intention to buy durable goods and SNS were negative and not significant. There might be other variables at play that are influencing both durable goods intentions to buy and SNS usage. For example, personal income, age might be confounding variables that affect both the desire to buy durable goods and the use of SNS. That would be one of the subjects of future research.

Figure 3. A Research Model for Overall Viewers
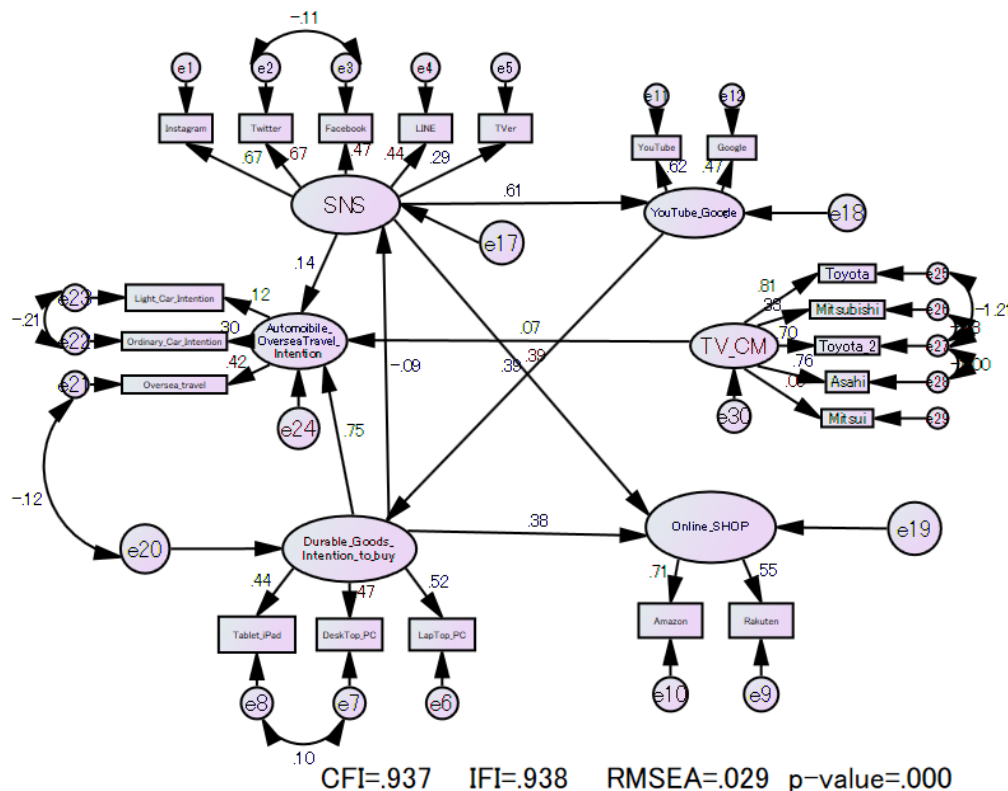
A-2. Results for COVID19 Special Program-Viewers

Figure 4 and Table 7 show the results of the research model for those who had watched COVID19 special programs. The indices suggested an acceptable model fit of the structural model (CFI=0.913, IFI=0.914, RMSEA=0.038). (Bentler 1990; Browne & Cudeck 1993). **T**hose who watched the COVID19 specialized program, PC purchase intention and online shops such as Rakuten and Amazon were positive and significant, but the coefficients were small. The intention to purchase for automobiles and overseas travel is positive and significant. Personal computers (both laptop and desktop) as well as tablets are positive, significant, with large coefficients. Relationships between SNS such as Instagram, Twitter, Facebook, and online shops, such as Rakuten, and Amazon,

were positive and significant. Those of online shops and Google and YouTube were also positive and significant.

Table 6. The Path Coefficients of Research Model

			Std. Weight	Unstd. Weight	S.E.	C.R.	p-value
Online SHOP	<---	SNS	0.381	0.209	0.021	9.871	***
Online SHOP	<---	Durable Goods Intention to buy	0.382	2.301	0.287	8.01	***
Automoibile OverseaTravel Intention	<---	Durable Goods Intention to buy	0.706	0.679	0.09	7.544	***
Automoibile OverseaTravel Intention	<---	SNS	0.158	0.014	0.005	2.839	0.005
Automoibile OverseaTravel Intention	<---	TV CM	0.114	0.087	0.035	2.454	0.014
Instagram	<---	SNS	0.673	1			
Twitter	<---	SNS	0.668	1.037	0.05	20.653	***
Facebook	<---	SNS	0.473	0.56	0.035	16.118	***
LINE	<---	SNS	0.445	0.642	0.037	17.329	***
Tver	<---	SNS	0.294	0.27	0.022	12.055	***
Laptop PC	<---	Durable Goods Intention to buy	0.518	1			
Desk top PC	<---	Durable Goods Intention to buy	0.464	0.588	0.059	9.91	***
Tablet	<---	Durable Goods Intention to buy	0.438	0.593	0.061	9.645	***
Rakuten shop	<---	Online SHOP	0.551	1			
Amazon	<---	Online SHOP	0.709	1.139	0.088	12.979	***
YouTube	<---	YouTube Google	0.628	1			
Google	<---	YouTube Google	0.472	0.802	0.067	11.971	***
Oversea travel	<---	Automoibile OverseaTravel Intention	0.328	1			
Ordinary Car Purchase Intention	<---	Automoibile OverseaTravel Intention	0.312	0.864	0.128	6.749	***
Light Car Purchase Intention	<---	Automoibile OverseaTravel Intention	0.116	0.202	0.061	3.31	***
Toyota Moters (Auto CM)	<---	TV CM	0.804	1			
Mitsubishi Moters (Auto CM)	<---	TV CM	0.329	0.413	0.032	13.036	***
Toyota Moters 2 (Auto CM)	<---	TV CM	0.365	0.426	0.073	5.816	***
Mitsui Fudosan (Housing CM)	<---	TV CM	0.762	0.965	0.063	15.206	***
Nomura Fudosan (Housing CM)	<---	TV CM	0.093	0.066	0.015	4.25	***
Durable Goods Intention to buy	<---	YouTube Google	0.402	0.044	0.008	5.36	***
YouTube and Google	<---	SNS	0.603	0.499	0.038	13.307	***
SNS	<---	Durable Goods Intention to buy	-0.081	-0.891	0.769	-1.158	0.247

B. Who is watching COVID19 special programs?

In order to identify what kind of people are watching COVID19 special programs, the author uses a logistic regression analysis. Logistic (or logit) regression is a statistical method for binary classes (e.g., watched COVID19 special programs or not). The Logistic regression model is a multivariate analysis method to measure the relationship between the dependent variable *y* and the independent variables (x_1, x_2, x_3,…, x_n). It is very efficient, accessible, and flexible.

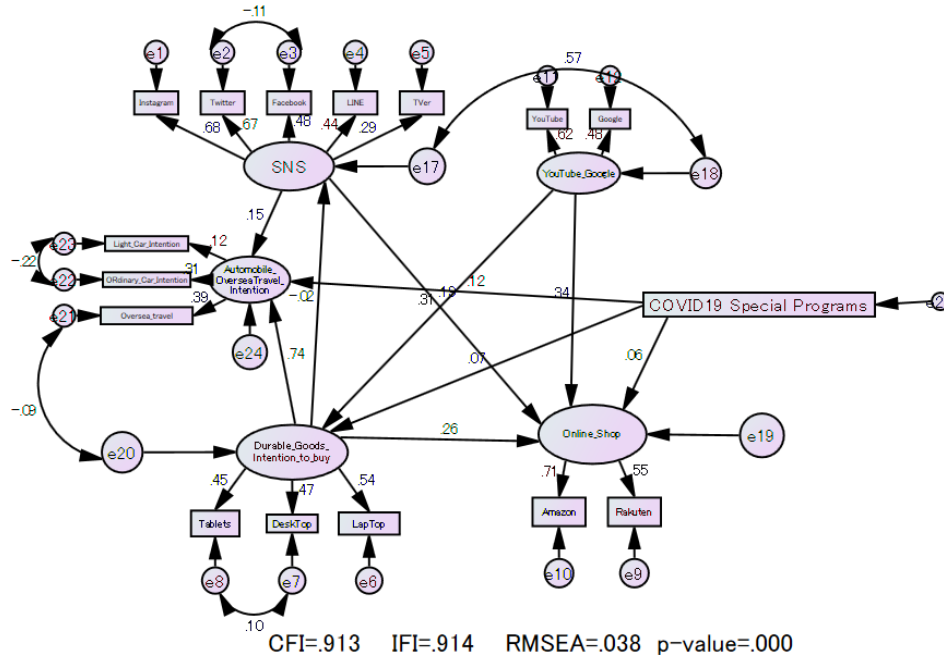Figure 4. A Research Model for COVID19 Special Program Viewers

Table 7. The Path Coefficients of Research Model for COVID19 Special Program Viewers

			Std. Weight	Unstd. Weight	S.E.	C.R.	p-value
Durable Goods Intention to buy	<---	YouTube Google	0.314	0.036	0.006	6.412	***
Durable Goods Intention to buy	<---	TV watch	0.072	0.024	0.01	2.466	0.014
SNS	<---	Durable Goods Intention to buy	-0.016	-0.175	0.427	-0.41	0.681
Online Shop	<---	SNS	0.188	0.102	0.026	3.982	***
Online Shop	<---	Durable Goods Intention to buy	0.264	1.528	0.261	5.855	***
Automobile OverseaTravel Intention	<---	Durable Goods Intention to buy	0.739	0.813	0.19	4.268	***
Automobile OverseaTravel Intention	<---	SNS	0.147	0.015	0.005	2.904	0.004
Automobile OverseaTravel Intention	<---	TV watch	0.115	0.043	0.016	2.753	0.006
Online Shop	<---	YouTube Google	0.337	0.226	0.043	5.249	***
Online Shop	<---	TV watch	0.056	0.11	0.048	2.261	0.024
Instagram	<---	SNS	0.68	1			
Tweitter	<---	SNS	0.669	1.027	0.05	20.4	***
Facebook	<---	SNS	0.477	0.558	0.035	16.07	***
Line	<---	SNS	0.444	0.634	0.037	17.31	***
Tver	<---	SNS	0.293	0.266	0.022	12.01	***
Laptop PC Purchase Intention	<---	Durable Goods Intention to buy	0.537	1			
Desktop PC Purchase Inteniton	<---	Durable Goods Intention to buy	0.465	0.569	0.06	9.519	***
Tablet Purchase Intention	<---	Durable Goods Intention to buy	0.446	0.582	0.062	9.343	***
Rakuten shop	<---	Online Shop	0.55	1			
Amazon	<---	Online Shop	0.712	1.147	0.084	13.63	***
YouTube	<---	YouTube Google	0.618	1			
Google	<---	YouTube Google	0.476	0.821	0.065	12.63	***
Oversea travel Intention	<---	Automobile OverseaTravel Intention	0.389	1			
Ordinary Car Purchase Intention	<---	Automobile OverseaTravel Intention	0.31	0.724	0.156	4.639	***
Light Car Purchase Intention	<---	Automobile OverseaTravel Intention	0.123	0.179	0.057	3.117	0.002

Table 8. A Result for Logistic Regression

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)
Age	0.545	0.043	159.186	1	0.000	1.724
Children	-0.169	0.099	2.905	1	0.088	0.844
Family Structure	0.049	0.032	2.310	1	0.129	1.050
Household Income	0.082	0.018	20.358	1	0.000	1.086
Job	-0.018	0.011	2.718	1	0.099	0.982
Constant	-2.738	0.239	131.209	1	0.000	0.065

a. Variable(s) entered on step 1: Age, Children, Family Structure, Household Income, Job

The result for logistic regression implies that those who watched COVID19 special programs have higher income (positive at 1% significant). Coefficient for children is negative and significant. Job is negative and 10% significant.

5. CONCLUSION AND FUTURE STUDY

In general, relationships between PC purchase intentions and online shops such as Rakuten and Amazon were positive and significant, but the coefficients were small.
The intention to purchase an automobile and travel abroad were positive and significant. The results suggested that consumers were collecting through various media such as SNS, TV commercials, YouTube, and Google.

The survey period was before the state of emergency was lifted, so that the results suggest that people spent more time at home and are more interested in overseas and domestic travels which were discouraged. Relationships between TV commercials and the intention to purchase computers (desktop, laptop, tablet, etc.) necessary for online meetings, and remote working were positive and significant at 1%. The relationships are positive and significant in their intention to purchase a PC, and their use in online shops such as Rakuten and Amazon. Purchase intentions for automobiles and overseas travel were positive and significant, but the coefficients were small. Personal computers (laptop, desktop) and tablet terminals were positive and significant with large coefficients. Lastly, typical profiles of the viewers who watched the programs featuring COVID19 had higher incomes.

This study can have several policy implications as follows.
1. Public health communication: The findings of the study suggest that media plays a significant role in shaping consumer behavior during a crisis like COVID-19. Policymakers can use this information to enhance public health communication strategies. They can work closely with media outlets to ensure accurate and timely information reaches the public, thereby influencing consumer behavior towards safer practices and responsible purchasing.

2. Consumer protection: Understanding how media influences consumer behavior during a crisis can help policymakers identify potential vulnerabilities and protect consumers from misinformation, scams, and exploitation. Policies can be developed to monitor and regulate misleading or false advertising related to COVID-19, ensuring consumer protection, and promoting responsible purchasing decisions.

3. Economic stimulus and recovery: The study's insights into consumer purchasing behavior can inform policymakers' decisions regarding economic stimulus and recovery measures. By understanding the factors that influence consumer spending patterns, policymakers can design targeted interventions to stimulate specific sectors or encourage certain types of spending. This can help revitalize industries affected by the pandemic and promote overall economic recovery.

4. Media literacy and education: The study's findings underline the importance of media literacy and critical thinking skills, especially during times of crisis. Policymakers can prioritize the development and implementation of educational programs that promote media literacy, enabling individuals to make informed decisions based on accurate information. By empowering consumers to critically evaluate media messages, policymakers can mitigate the negative impacts of misinformation and improve overall consumer decision-making.

These policy implications are not exhaustive, but they provide a starting point for policymakers to consider how the study's findings can inform strategies and interventions to address the impact of COVID-19 on consumers' purchasing behavior influenced by the media. It is crucial to adapt these implications to the specific context and needs of each country or region.

After this survey, the state of emergency was lifted in the Tokyo metropolitan area, three prefectures, and Hokkaido on May 25, 2022, a step towards the normalization of socio-economic activities started, and the nationwide travel support campaign was resumed. However, since the beginning of November 2022, it is said that the number of COVID19 infected people has increased nationwide, and the government is also reported to be requesting people to refrain from going out in preparation for the "eighth wave" of COVID19. In the future, the author would like to investigate consumer behavior after the normalization of socioeconomic activities. In addition, it will be necessary to keep an eye on how news about the COVID19 affects consumer behavior.

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