



UNIVERSITI
TEKNOLOGI
PETRONAS

Department of Civil and Environmental Engineering

FYP II – VIVA PRESENTATION

The Effects of Socio-demographic Characteristics and Activity-Travel Behaviour Change on Online Activity Patterns during the Pandemic

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01

Introduction

Background of Study



Travel

- People have different needs and commitment every day, and they will travel to various locations **to satisfy their needs and desires**.
- It is a **permanent constraint**, and it is necessary for people to travel to fulfil their needs and desires (Hägestrand, 1970).

The Changes of Activity-Travel Behaviour

- Before the pandemic, people **travelled for out-of-home activities to achieve their day-to-day needs**, such as shopping, school, work, etc.
- Since the announcement of COVID-19 as a global pandemic, studies have found that the **activity-travel behavior** of the people have undergoes **significant changes** due to the change in space-time constraints.



Background of Study



COVID-19 in the Context of Space-Time Prism

- The emergence of the pandemic has caused many countries to impose full or partial lockdowns that restricted the people's movement (**Authority constraint**).
- The imposed authority constraint (e.g., travel restriction, changes in business operating hour) leads to the **change in activity-travel behavior**.
- People will utilize the **resources** (e.g. money, internet access) around them that can provide the **opportunity** for the people to reduce the constraint imposed on them, allowing them to participate in certain activities.

Problem Statement



The **trip-based analysis** has been chastised for **failing to predict the individual's real travel demand**. It **assumes that individual engages in similar travel and activities every day**, such approach solely considers only inter-personal variation (Senbil & Kitamura, 2009).

Passenger forecasts are overestimated for nine out of ten rail projects; the average excess is 106% There is also a **significant discrepancy between actual and anticipated traffic**, which for half of all road developments is greater than $\pm 20\%$. (Flyvbjerg et al., 2005)

Considering the recentness of the COVID-19 pandemic, there is only **minimal amount of research study** which relates activity-travel changes due to the pandemic with online activity patterns using activity-based analysis.


Objectives



To **investigate** the effects of individual's activity-travel behaviour on the online-activity pattern using **bivariate analysis**.



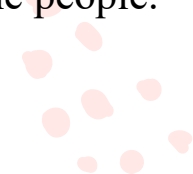
To **investigate** the effects of individual's activity-travel behaviour on the online-activity pattern using **simple multivariate analysis**.





Scope of Study



- This study focuses on **analyzing** the effects of the activity-travel behavior during the COVID-19 through the collected dataset that captured:
 - ❖ Travel behavior change
 - ❖ Activity behavior change
 - ❖ Built environment
 - ❖ Socio-demographic variables
 - ❖ Generation of online activity patterns.
 - The analysis will be made by using the **Space-Time Prism (STP) Theory**, introduced by Torsten Hägerstrand to study on how the changes of activity-travel behaviour can affect the online activity pattern of the people.
- 



02

Literature Review

Time Geography and Space-Time Prism

Resources



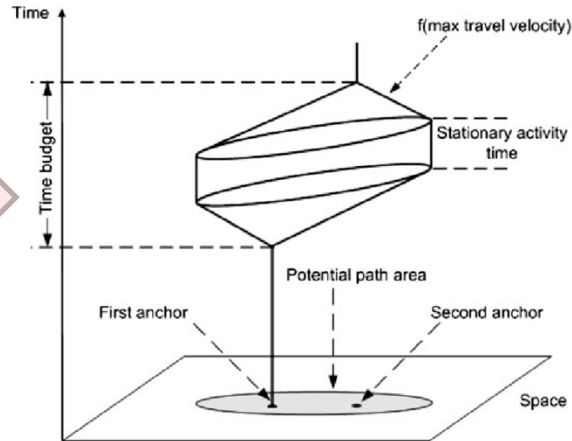
Needs

Constraints

Capability

Coupling

Authority



Time geography is a method of **studying the human activities in space and time** that is based on constraints. Humans have **spatial and temporal limitations**, in which people can only be in one location at a time (Miller, 2017).

Hägerstrand (1970) identified that there are constraints that limited an individual's ability to travel and occupy certain time and space freely, and these constraints are **'capability', 'coupling', and 'authority' constraints**. These constraints are **interrelated** rather than additive to each other (Neutens et al., 2011)

Personal and social identities depict how an individual interacts with other people and things. As a result, every individual will have **different needs and constraints** (Dharmowijoyo, 2016).

The Changes of Activity Behaviour Due to COVID-19 and Its Relationship with Online Activity Patterns

The **public health measures** put in place will cause the people to **change their physical activity behaviour and a reduction in physical activity**. (Iris and Nienhuis, 2020).

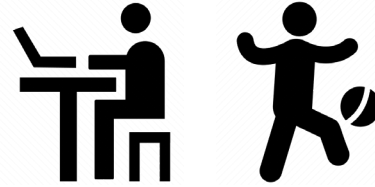
Activity Behaviour Changes during the Pandemic

During the epidemic, **significant shifts** have been made from in-store shopping, business meetings, and long commutes to internet shopping, telecommuting, and road trips (Shamshiripour et al., 2020).

Changes in the physical activity behaviour are mainly due to factors such as **self-determination and enjoyment, supports from others, and the availability of physical activity facilities and equipment** (Andriyani et al., 2021).

The Changes of Activity Behaviour Due to COVID-19 and Its Relationship with Online Activity Patterns

Relationship between Activity Behaviour Changes and Online Activities



➡ The internet use has replaced out-of-home activities during the COVID-19 in Japan. There is a **high correlation between less time spent outdoors and internet use** for socialising, exercising, and entertainment, specifically (Yabe et al., 2021).

➡ Telework and e-learning have replaced traditional office and schoolwork and study routines, drastically **reducing the need for outside-the-home activities** (Irawan et al., 2021).

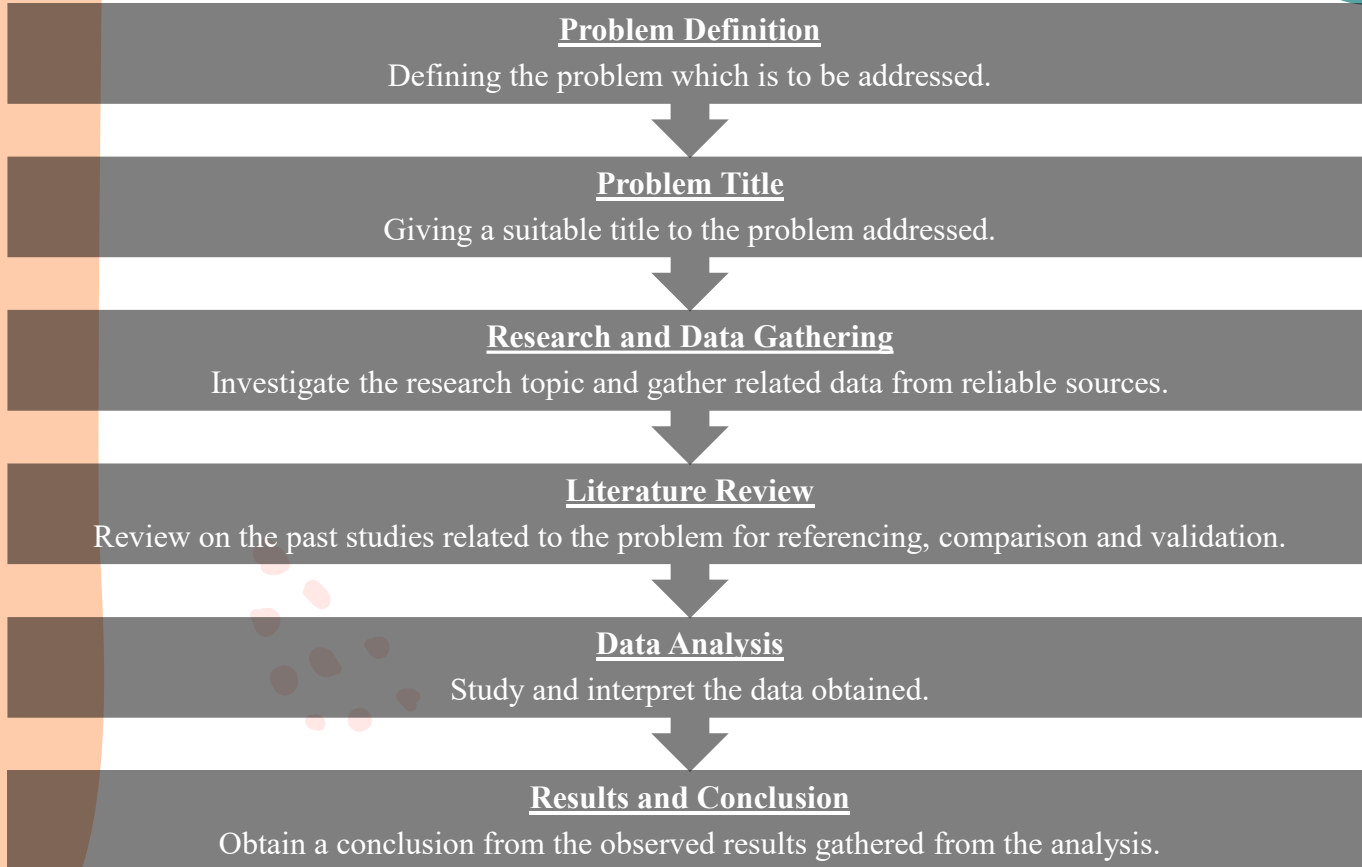
➡ There are important interactions between out-of-home and in-home activities. A **shorter period of in-home online shopping increases the likelihood that the consumer will engage in out-of-home buying**, and vice versa (Hossain et al., 2022).



03

Methodology

Project Flowchart



Research Methodology and Project Activities

Data Collection

✓ Thailand Dataset (N=247)

Out-of-Home Social
Activities

Out-of-Home
Leisure Activities

Socio-demographic
Characteristics

Activity Behaviour
Changes

Online Activities

Investigate the relationship between individual's socio-demographic characteristics, activity behaviour changes and online activity patterns

Data Type	Variables
Socio-demographic Characteristics	Gender Age Highest Education Occupation Marital Status Household Members Income (Thai Baht) Number of Cars Number of Motorcycles
Out-of-Home Social Activities	Trips with Household Member(s) Trips to Visit Relatives Trips to Visit/Meet Close Friends Trips to Visit/Meet Friends or Colleagues Trips to Visit/Meet New Friends
Out-of-Home Leisure Activities	Trips to Parks Trips to Amusement Parks or Playground Trips to Natural Recreations Trips to Cultural Places Trips to Resorts or Luxury Recreations
Online Activities	YouTube Activities Twittering Activities Instagram Activities Facebook Activities Tik Tok Activities Tinder Activities Stock and Foreign Currency Trading or Investment Activities Blogging Activities Online Gaming Online Working/Studying Online Meeting for Non-work/study Purposes Movie Streaming Activities Online Grocery Shopping Online Food and Beverages Delivery

Research Methodology and Project Activities

Microsoft Excel

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SPSS Software

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COVID-19 IMPACT IN THAILAND

Worksheet1

Workbooks

Share

A	B	C	D	E	F	G	H	I	J	K	L	M
ID number of the respondent	Gender of the respondent	Age of the respondent	Highest Education of the respondent	The respondent's Occupation	The main sector of the respondent's occupation	Marital status of the respondent	Number of members in the respondent's household	The respondent's total household income per month (Thai Baht)	Number of cars in the respondent's household	Number of motorcycles in the respondent's household	Number of trips of the respondent on the respondent's National Identity Card	More tips of the respondent on the respondent's National Identity Card
1	R1	Female	18-23	Secondary Education	Student	-	Single	5	10,001-15,000	1-2	0	more or less the use of
2	R2	Female	18-23	Bachelor	Private employee	Single	5	70,001-100,000	1-2	0	more or less the use of	
3	R3	Male	24-45	Student	Student	Single	5	15,001-20,000	0	0	somehow agree	
4	R4	Male	18-23	Bachelor	Private employee	Others	Single	5	50,001-70,000	1-2	0	somehow disagree
5	R5	Male	18-23	Diploma	Student	Others	Single	5	50,001-70,000	1-2	0	Agree
6	R6	Female	24-45	Master	Others	Single	5	30,001-50,000	1-2	0	Agree	
7	R7	Male	18-23	Bachelor	Self-employed	Others	Single	5	>100,000	>4	0	Strongly Agree
8	R8	Male	24-45	Private employee	Private employee	Single	5	20,001-30,000	1-2	0	Strongly Agree	
9	R9	Male	18-23	Secondary Education	Security and Defense	Single	5	>100,000	3-4	0	Strongly Agree	
10	R10	Male	18-23	Bachelor	Private employee	Others	Single	5	>100,000	>4	>2	somehow disagree
11	R11	Male	18-23	Bachelor	Student	Others	Single	4	50,001-70,000	1-2	>2	Strongly Agree
12	R12	Male	18-23	Master	Student	Single	5	>100,000	1-2	0	Strongly Agree	
13	R13	Female	18-23	Bachelor	Student	Single	5	70,001-100,000	1-2	0	Strongly Agree	
14	R14	Female	24-45	Bachelor	Private employee	Others	Single	5	15,001-20,000	1-2	0	Strongly Disagree
15	R15	Male	18-23	Bachelor	Student	Food	Single	5	50,001-70,000	1-2	0	Agree
16	R16	Male	18-23	Bachelor	Student	Others	Single	4	>100,000	3-4	0	Strongly Disagree
17	R17	Male	18-23	Bachelor	Private employee	Single	5	50,001-70,000	3-4	0	more or less the use of	
18	R18	Male	24-45	Bachelor	Private employee	Single	5	15,001-20,000	0	0	Agree	
19	R19	Male	18-23	Bachelor	Student	Hotel and Accommodation	Single	5	>100,000	1-2	0	Strongly Agree
20	R20	Female	18-23	Bachelor	Private employee	Water	Single	4	50,001-70,000	1-2	0	Strongly Disagree
21	R21	Female	18-23	Bachelor	Student	Others	Single	5	50,001-70,000	0	0	Strongly Agree
22	R22	Female	>60	Bachelor	Not employed	Others	Single	5	10,001-15,000	0	0	disagree
23	R23	Female	24-45	Private employee	Private employee	Single	5	30,001-50,000	0	0	Strongly Agree	
24	R24	Female	18-23	Master	Student	Others	Single	4	>100,000	3-4	0	Strongly Agree
25	R25	Female	24-45	Bachelor	Private employee	Single	4	>100,000	3-4	0	Strongly Agree	

COVID-19 IMPACT IN THAILAND

Worksheet1

Workbooks

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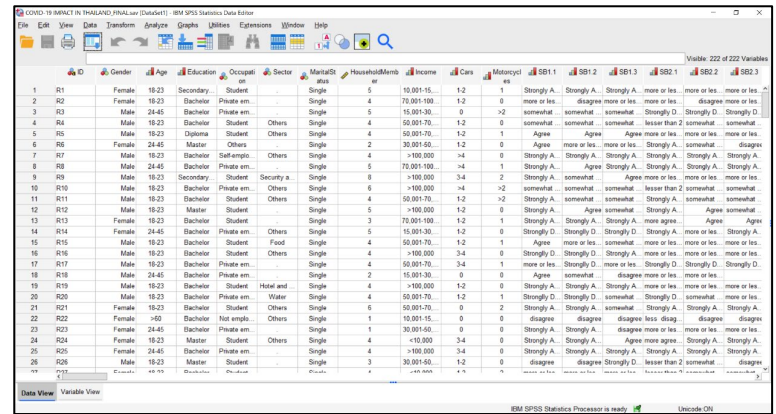
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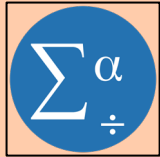


The screenshot shows the SPSS Statistics Data Editor window with the same data as the Excel spreadsheet. The variables are listed in the top row: Gender, Age, Education, Occupation, Sector, Marital status, Household members, Income, Cars, Motorcycle, SB1, SB2, SB3, SB4, SB5, SB6, SB7, SB8, SB9, SB10, SB11, SB12, SB13, SB14, SB15, SB16, SB17, SB18, SB19, SB20, SB21, SB22, SB23, SB24, SB25, SB26, SB27, SB28, SB29, SB30, SB31, SB32, SB33, SB34, SB35, SB36, SB37, SB38, SB39, SB40, SB41, SB42, SB43, SB44, SB45, SB46, SB47, SB48, SB49, SB50, SB51, SB52, SB53, SB54, SB55, SB56, SB57, SB58, SB59, SB60, SB61, SB62, SB63, SB64, SB65, SB66, SB67, SB68, SB69, SB70, SB71, SB72, SB73, SB74, SB75, SB76, SB77, SB78, SB79, SB80, SB81, SB82, SB83, SB84, SB85, SB86, SB87, SB88, SB89, SB90, SB91, SB92, SB93, SB94, SB95, SB96, SB97, SB98, SB99, SB100, SB101, SB102, SB103, SB104, SB105, SB106, SB107, SB108, SB109, SB110, SB111, SB112, SB113, SB114, SB115, SB116, SB117, SB118, SB119, SB120, SB121, SB122, SB123, SB124, SB125, SB126, SB127, SB128, SB129, SB130, SB131, SB132, SB133, SB134, SB135, SB136, SB137, 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Research Methodology and Project Activities

Data Interpretation and Analysis

Data were analysed using the SPSS software



Performed bivariate analysis

$$Y = a + bX$$

Performed multivariate analysis

$$Y_i = B_0 + B_1X_{1i} + \varepsilon_i$$

Data were interpreted to establish explanatory concepts that can be used as a guideline for future research studies



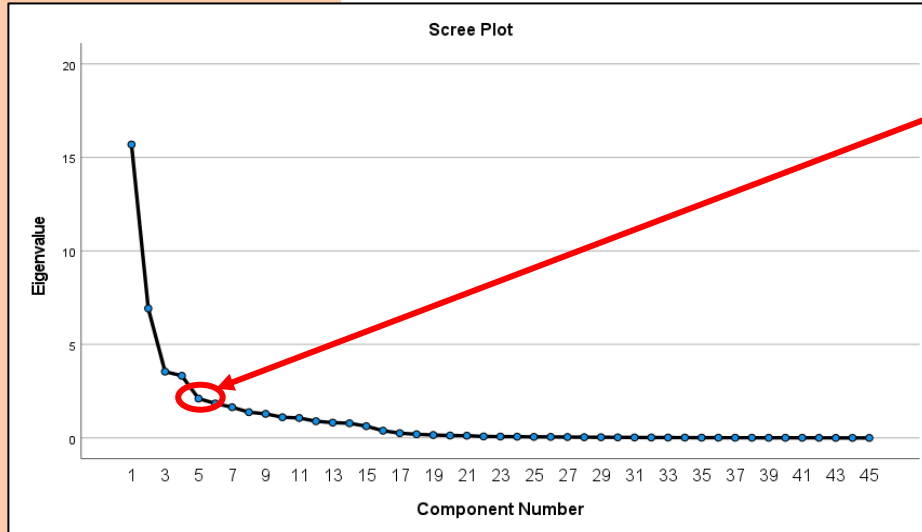


04

Results and Discussion

Results and Discussion

Types of Online Activities / Online Activity Patterns during the Pandemic



Factor analysis with varimax rotation is used to reduce all the online activities variables into fewer number of factors. Scree Plot is used to identify the number of components to be extracted.

The slope of the curve levelled off at the fifth components, hence the number of components to be extracted are five.

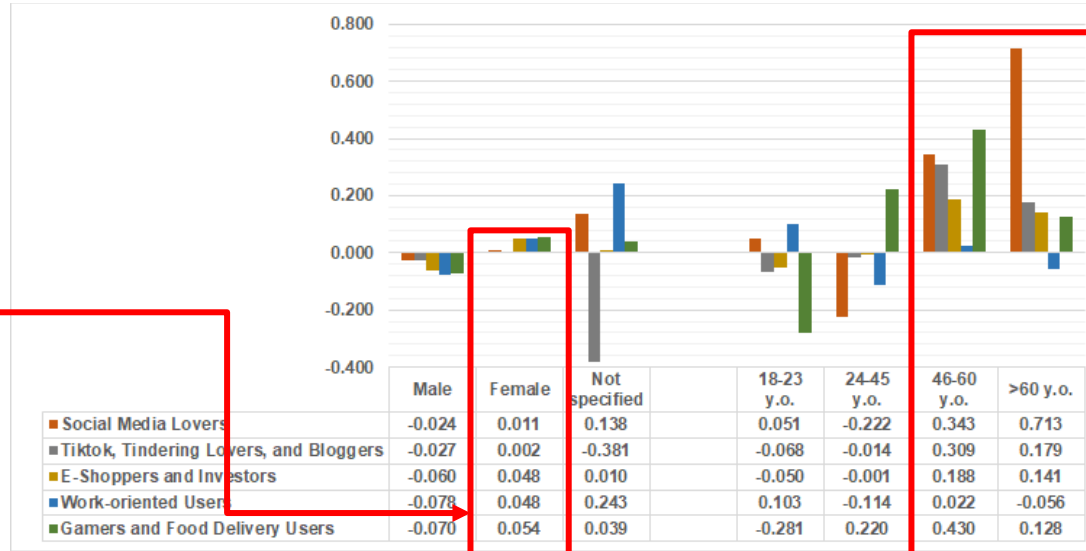
Extracted Component	Online Activity Variables
Social Media Lovers	<ol style="list-style-type: none">1. YouTube Activities2. Twitter Activities3. Instagram Activities4. Facebook Activities5. Movie Streaming Activities
Tiktok, Tinder Lovers, and Bloggers	<ol style="list-style-type: none">1. Tik Tok Activities2. Tinder Activities3. Blogging Activities
E-Shoppers and Investors	<ol style="list-style-type: none">1. Stock and Foreign Currency Trading or Investment Activities2. Online Shopping3. Online Grocery Shopping
Work-oriented Users	<ol style="list-style-type: none">1. Online Working/Meeting2. Online Meeting for Non-work/study Purposes
Gamers and Food Delivery Users	<ol style="list-style-type: none">1. Online Gaming2. Online Foods and Beverages Delivery

Results and Discussion

The Effects of Socio-demographic on the Changes of Online Activity Pattern (1)

Female have a higher intensity in all online activities compared to before pandemic.

This can be because of their roles centered around household and domestic.



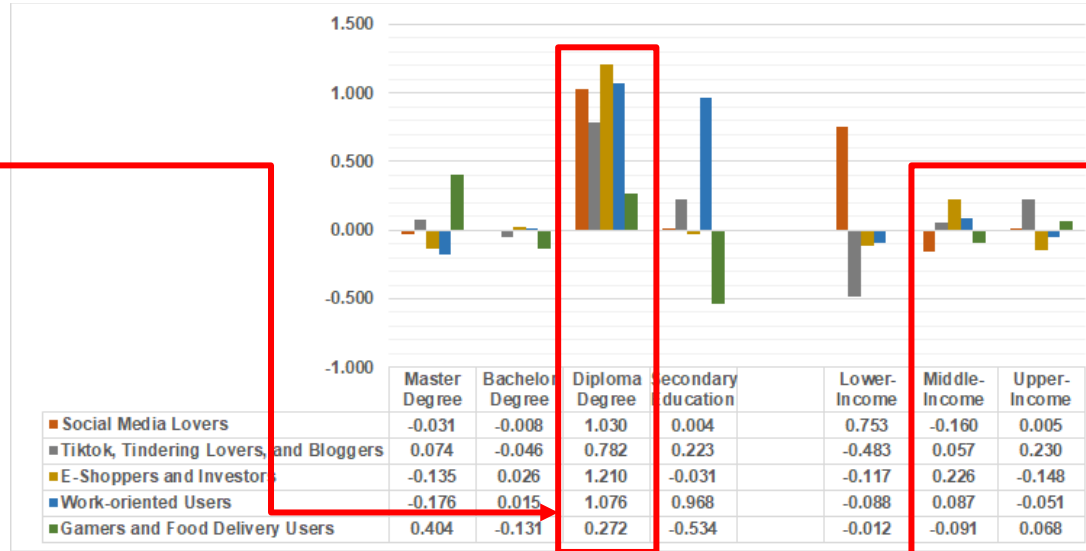
Older people have high changes in all online activities.

They decreased their out-of-home activities to reduce the risk of getting infected during the pandemic and starting to learn to use ICT to replace those activities.

Results and Discussion

Diploma degree have the **highest** changes in the online activity patterns.

The Effects of Socio-demographic on the Changes of Online Activity Pattern (2)



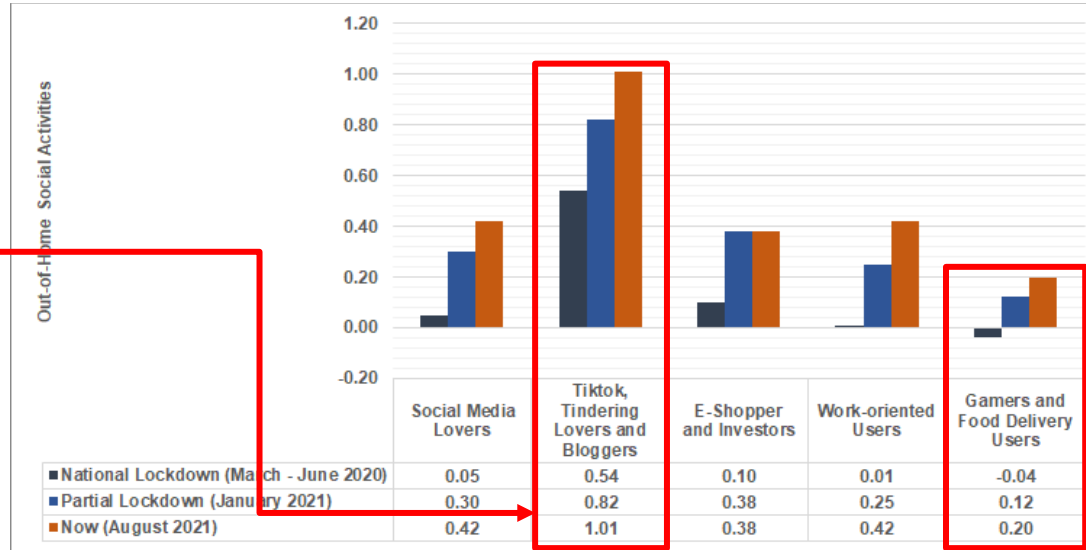
Households with **better incomes** are **more active** in online activities during the pandemic.

This can be explained by that **money (resources)** allow them to have better internet access.

Results and Discussion

The Changes on Out-of-Home Activities Based on the Online Activity Pattern (Social)

Surprisingly, people that participate **more often** in out-of-home social activities are **Tiktok, Tindering Lovers, and Bloggers**.

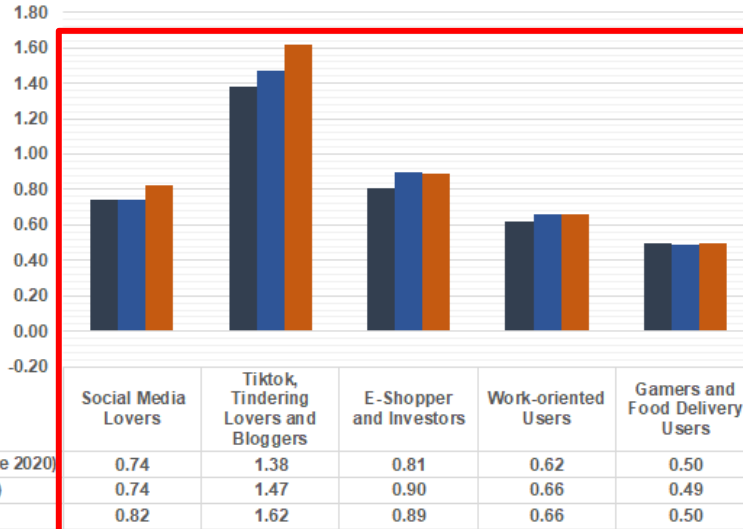


People that are **least active** in out-of-home social activities during the National Lockdown are **Gamers and Food Delivery Users**. They slowly become more active after the lockdown eased.

Results and Discussion

The Changes on Out-of-Home Activities Based on the Online Activity Pattern (Leisure)

Out-of-Home Leisure Activities



People in Thailand that spend **more** time on online activities were also spending more time on out-of-home leisure activities.

This can be because of the **reduction** in activity space - indicating that while people were still **travelling more**, they were doing so within their local neighbourhood (Joseph et al., 2021).

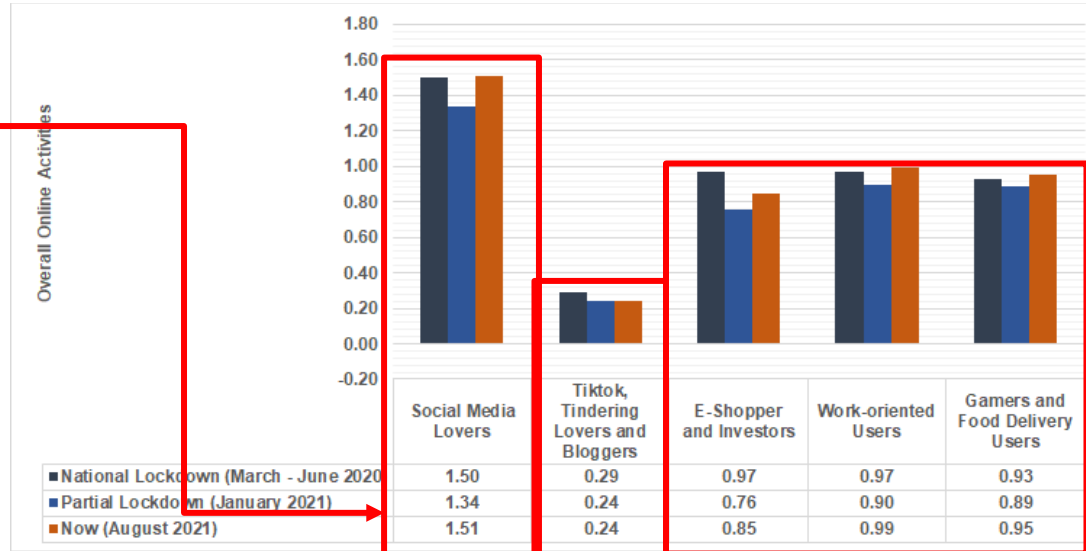
Online activities have also **reduced** the restriction in travelling, allowed them to allocate more times on out-of-home leisure activities (Kwan et al, 2007)

Results and Discussion

The Effects of Different Online Activity Pattern on the Overall Online Activity

Social Media Lovers have the **highest changes** in the overall online activity during the pandemic.

Tiktok, Tindering Lovers, and Bloggers have the **least changes** in the overall online activity.



These online users have **nearly the same** intensity of overall online activities during the pandemic.

Different online activity patterns may have different time budget, therefore their intensity on other types of online activities may be different.

Results and Discussion

Variables	Social Media Lovers		Tiktok, Tinder Lovers, and Bloggers		E-Shoppers and Investors		Work-oriented Users		Gamers and Food Delivery Users	
	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.
Socio-demographic Characteristics										
Male	0.315	0.782	0.420	0.746	0.088	0.940	-0.346	0.759	-0.693	0.534
Female	0.429	0.714	1.518	0.264	-0.144	0.903	-0.707	0.543	-0.824	0.465
Not Specified	Reference									
18 – 23 years old	-0.166	0.905	-2.451	0.145	-0.231	0.879	-5.386	0.023*	0.665	0.675
24 – 45 years old	-0.506	0.716	-2.011	0.213	0.361	0.811	-5.951	0.014*	0.487	0.755
46 – 60 years old	-1.559	0.308	-3.668	0.051	0.763	0.627	-4.930	0.039*	0.171	0.918
More than 60 years old	Reference									
Master	2.179	0.229	-1.142	0.545	-0.799	0.654	0.129	0.944	-2.577	0.303
Bachelor	1.773	0.298	1.270	0.480	-0.684	0.689	-1.112	0.527	-2.253	0.356
Diploma	-16.866	.	-15.439	.	-19.698	.	-19.611	.	-21.666	.
Secondary Education	Reference									
Private Employee	1.306	0.222	-0.491	0.707	1.508	0.152	2.083	0.093*	0.528	0.622
Government Employee	-0.828	0.533	0.106	0.946	0.634	0.632	2.437	0.106	-0.215	0.871
Student	0.265	0.814	-0.646	0.639	1.346	0.222	1.418	0.268	0.840	0.456
Self-employed	0.975	0.439	0.367	0.796	0.020	0.987	6.326	0.000*	1.437	0.255
Not employed	-0.399	0.760	0.219	0.886	0.403	0.746	3.229	0.038*	1.780	0.185
Others	Reference									

- ✓ People with the ages between 18 and 60 years old are correlated to Work-oriented Users.
- ✓ Private employee, self-employed, and not employed people have significant impact on Work-oriented Users.

Results and Discussion

Variables	Social Media Lovers		Tiktok, Tindering Lovers, and Bloggers		E-Shoppers and Investors		Work-oriented Users		Gamers and Food Delivery Users	
	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.
Socio-demographic Characteristics										
Married	-0.874	0.402	-1.152	0.342	-2.122	0.037*	-3.438	0.005*	-1.898	0.079*
Divorced	2.384	.	-1.057	.	2.889	.	-3.497	.	0.745	.
Widowed	-18.484	0.998	-22.486	0.998	1.654	0.466	-6.033	0.043*	19.060	.
Single	<i>Reference</i>									
Number of Household Members	-0.008	0.959	0.189	0.292	-0.239	0.137	-0.541	0.005*	0.090	0.579
Lower-Income	-0.107	0.910	-0.638	0.615	0.170	0.852	-0.066	0.952	0.200	0.846
Middle-Income	0.463	0.374	-0.875	0.152	-0.047	0.924	-0.271	0.617	0.541	0.280
Upper-Income	<i>Reference</i>									
Does not own any cars	-1.698	0.130	-0.362	0.768	-3.203	0.007*	-0.727	0.529	-1.146	0.279
1 – 2 cars	-0.554	0.475	-0.289	0.739	-1.446	0.065*	-0.338	0.676	0.259	0.725
3 – 4 cars	-0.882	0.261	-1.310	0.142	-0.735	0.346	0.486	0.560	0.348	0.641
More than 4 cars	<i>Reference</i>									
Does not own any motorcycles	-0.174	0.819	-1.185	0.240	-0.050	0.946	-1.295	0.079*	-0.424	0.567
1 motorcycle	-0.288	0.703	-1.609	0.105	-0.223	0.766	-1.661	0.031*	-0.494	0.507
2 motorcycles	-0.945	0.258	-2.081	0.041*	-0.534	0.502	-0.740	0.352	-0.551	0.484
More than 2 motorcycles	<i>Reference</i>									

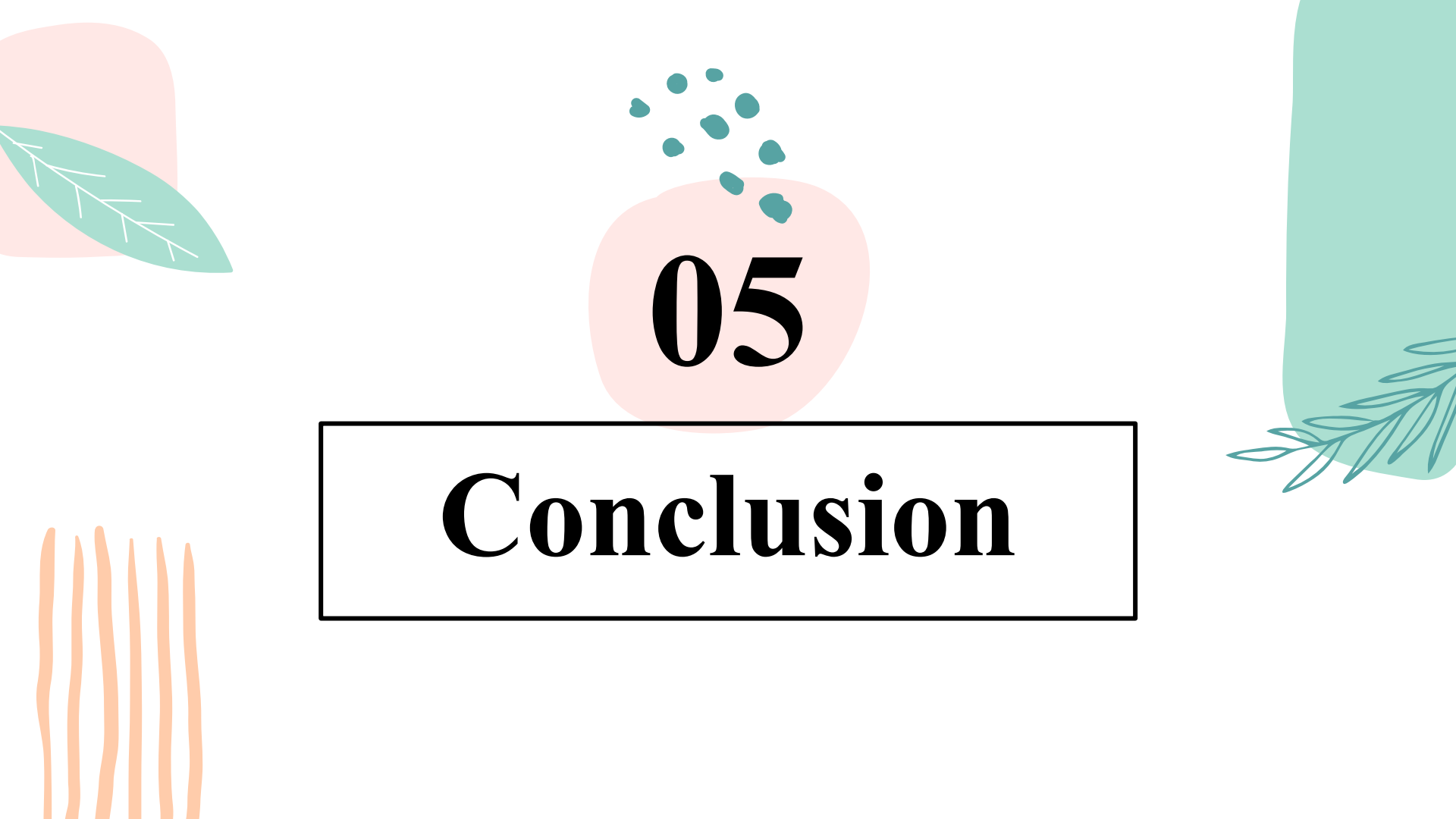
- ✓ Having **two motorcycles** are correlated to Tiktok, Tindering Lovers, and Bloggers.
- ✓ **Married people, people with up to two cars** are statistically significant towards E-Shoppers and Investors.
- ✓ **Married, widowed people, number of household members, and people with up to one motorcycles** are correlated to Work-Oriented Users.
- ✓ **Only married people** have significant impact on Gamers and Food Delivery Users.

Results and Discussion

Variables	Social Media Lovers		Tiktok, Tindering Lovers, and Bloggers		E-Shoppers and Investors		Work-oriented Users		Gamers and Food Delivery Users	
	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.
Behavioural Changes										
Trips with Household Member(s)	0.002	0.993	-0.105	0.658	-0.138	0.517	-0.195	0.369	-0.132	0.530
Trips to Visit Relatives	-0.152	0.540	-0.311	0.273	-0.055	0.806	0.704	0.005*	0.388	0.103
Trips to Visit/Meet Close Friends	-0.812	0.006*	0.006	0.981	-0.678	0.009*	-0.424	0.083*	-0.300	0.227
Trips to Visit/Meet Friends or Colleagues	0.456	0.099*	0.504	0.097*	0.875	0.002*	0.007	0.976	0.147	0.578
Trips to Visit/Meet New Friends	0.519	0.008*	-0.149	0.480	0.071	0.680	-0.254	0.176	-0.453	0.018*
Trips to Parks	-0.146	0.541	-0.235	0.382	-0.254	0.244	0.406	0.141	0.748	0.006*
Trips to Amusement Parks or Playground	0.051	0.846	-0.585	0.052*	0.024	0.918	-0.621	0.029*	-0.572	0.040*
Trips to Natural Recreations	0.182	0.415	0.202	0.378	-0.604	0.015*	0.249	0.206	0.389	0.057*
Trips to Cultural Places	-0.330	0.192	-0.381	0.173	0.291	0.225	-0.223	0.360	-0.252	0.286
Trips to Resorts or Luxury Recreations	0.058	0.759	0.011	0.964	0.180	0.340	0.002	0.991	0.029	0.878

**p-value < 0.1, meaning that the variable has a statistically significant impact on the dependent variables.*

- ✓ **Changes in the out-of-home social activities** can have significant impacts on the online activity patterns.
- ✓ Some **out-of-home leisure activities** (e.g. trips to parks, playground, natural recreations) have significant impacts on the online activity patterns.



05

Conclusion

Conclusion

- ✓ Changes in the activity-travel behaviour during the pandemic are unique to each individual.
- ✓ Online activities participation are found to have increased during the pandemic.
- ✓ Changes in the out-of-home activities (social and leisure) have a strong impact on the participation of online activities during the pandemic.



Recommendations

- Exploring the online activity patterns in different context, studying, and collecting information from more research articles
- Perform more study on this research topic to further clarify the variables.
- Include more variables for the research (e.g. Activity behaviour changes)

