(UUT07) Transportation resilience during and post-crisis : the role of intelligent and energy-efficient transportation systems

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Infrastructure and transportation resilience

Infrastructure and transportation resilience

1. The purpose of the project and subjects of the investigation

1. The purpose of the project

This project aims to the determine the factors influencing attitudes and intentions towards **ridesharing** during a crisis such as war to improve transport resilience.

2. Tasks of the project

Tasks of the project are

- Development of a questionnaire for an online survey.
- Collect data from users using an online survey platform.
- Analysis of online survey results to identify important factors in providing resilient and sustainable transportation for the time of crisis and post-crisis.
- Building a model based on the identified factors to study people's attitudes and intentions towards ridesharing during war.

The main questionnaire's aspects

The following aspects were considered in the questionnaire:

-Typical travel behavior and mode choice transport of people without any crisis.

-Travel behavior of people while there is a disruption in public transport during the crisis.

-Travel attitude of people towards intelligent and energy-efficient transportation systems.

Analysis and modeling methods

For travel behavior data collection:

- Revealed Preference (RP).
- Psychometric questions (Likert scale based).

For revealing the important factors in providing resilient and sustainable transportation for the time of crisis and post-crisis the following method used for data analysis:

- Principal Component Analysis (PCA).
- Confirmatory Factor Analysis (CFA).
- Structural Equation Modeling (SEM).

3. Waiting for project results

Waiting for project results are

1. One conference paper; The target conference will be one of the following conferences: EWGT 2023 (Spain) or UTSG 2023 (Cardiff University)

2. One journal paper (Transportation Research Part E, IF:10.047 or Cities journal, IF: 6.07)

4. Road map of the project

Road map of the project

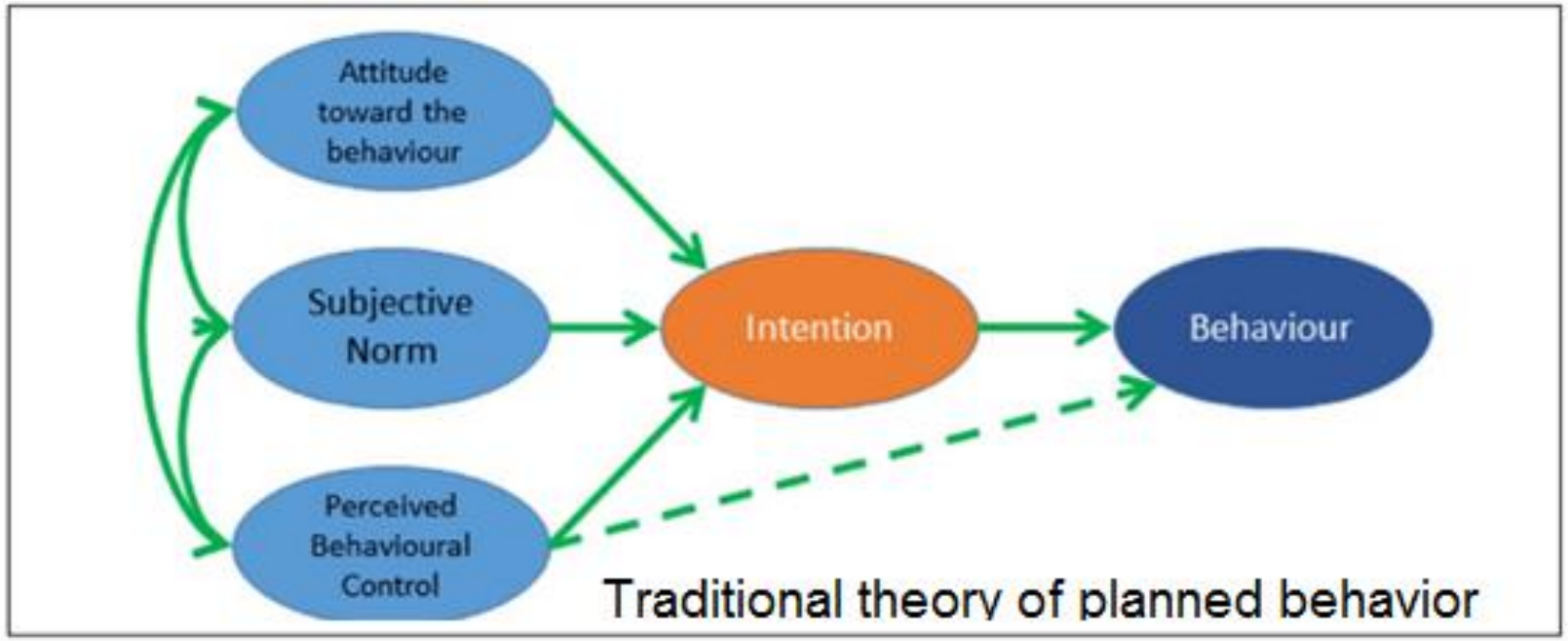
№	Research Phase	Time Slot
1	Review of thematic literature: Transport Sustainability in Times of Crisis. Assistance in developing a questionnaire. Translation of the questionnaire for the survey into Ukrainian	03.04.2023/ 01.05.2023
2	Conducting a survey. Data cleaning and data analysis	02.05.2023/ 02.06.2023
3	Preparation of abstracts for the UTSG2023 conference	04.07.2023/ 01.08.2023
4	Writing sections for journal (Transportation Research Part E, IF:10.047 or Cities journal, IF: 6.07)	02.08.2023/ 31.08.2023

5. Obtained project results

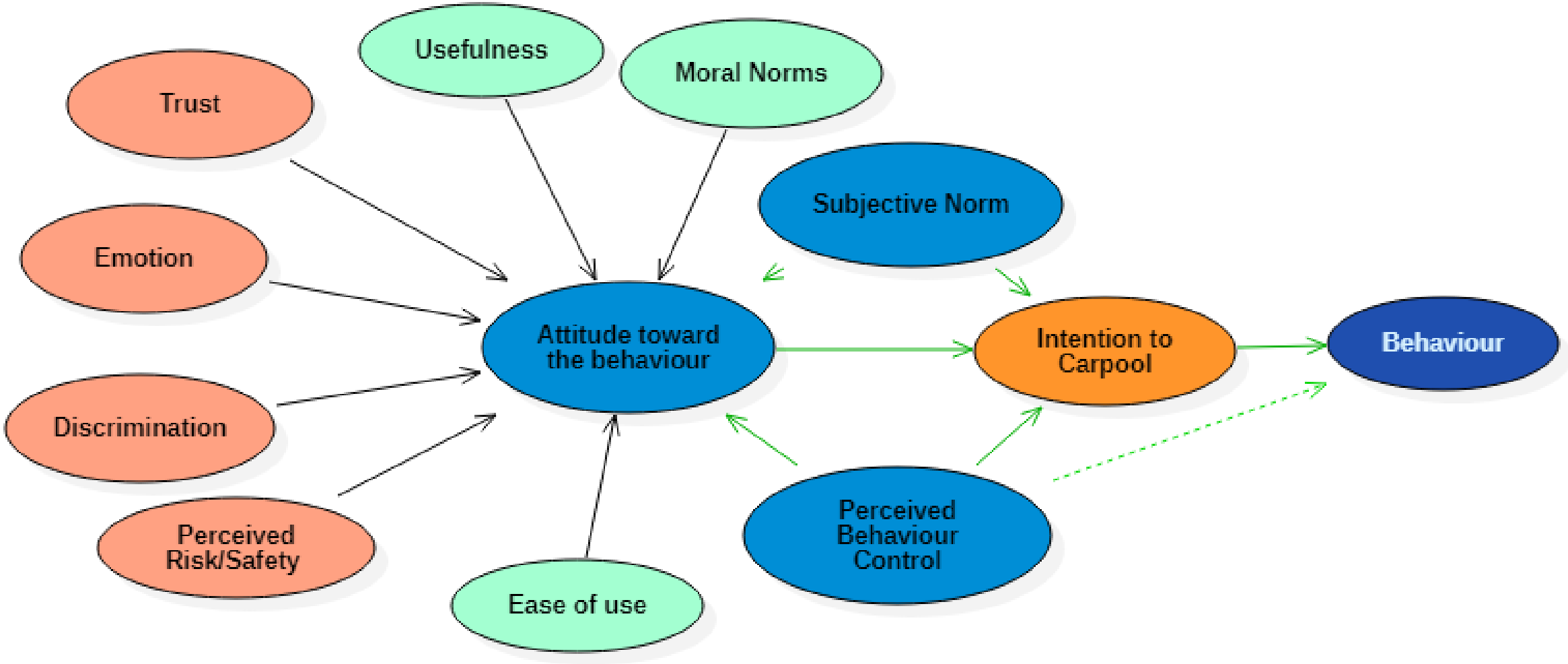
The important factors received from the literature review

Factors // Authors	
Cost savings, Travel time	// Malodia and Singla (2016)
Trust (Social proof, Social approval, Self-disclosure)	// Zhou et al. (2017)
Normative aspects (Descriptive norms), Perceived behavioral control	// Bachmann et al. (2018)
Willingness to share a ride, Time-cost, Trade-off	// González et al. (2020)
Discount, Travel time, Detour factor	// König and Grippenkoven (2020)

Theory of planned behavior



Modified theory of planned behavior



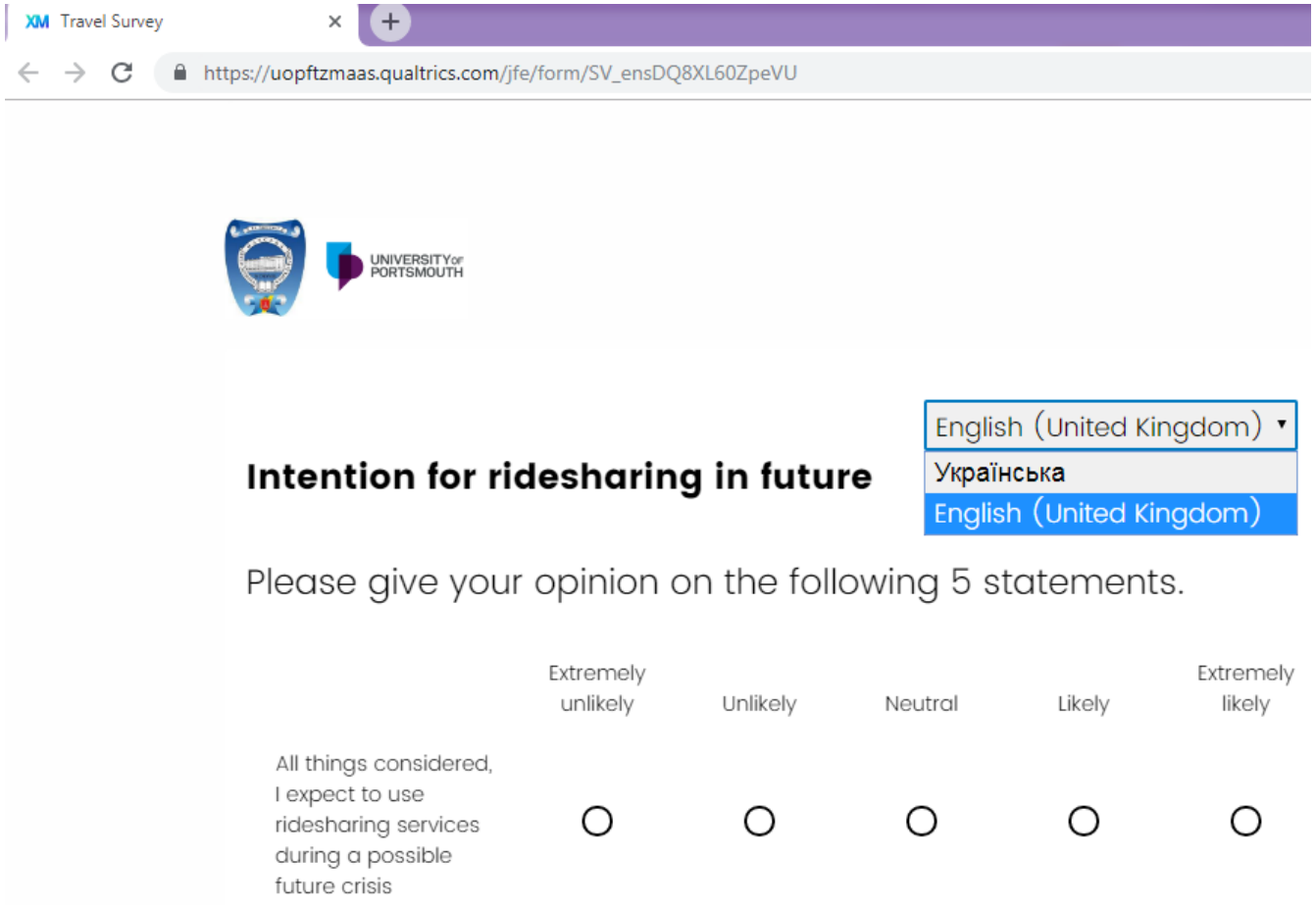
Survey structure

Survey			
Section 1	Section 2	Section 3	Section 4
Demographics	Travel Resources and Habits	Introduction to Carpooling or Ridesharing	Attitudes and Perceptions toward Carpooling
(age, gender, income, car ownership, etc.)	(travel mode, trip purpose, trip frequency)		(attitudes, current use, intention to ridesharing, etc.)

Survey structure

Attitudes and Perceptions toward Carpooling									
1	2	3	4	5	6	7	8	9	10
Attitude Towards Carpooling During A Crisis	Subjective Norms	Perceived Behavioral Control	Moral Norm	Perceived usefulness	Risk / Safety Perceptions	Trust	Moral Norm	Emotions	Rider-to-rider discrimination

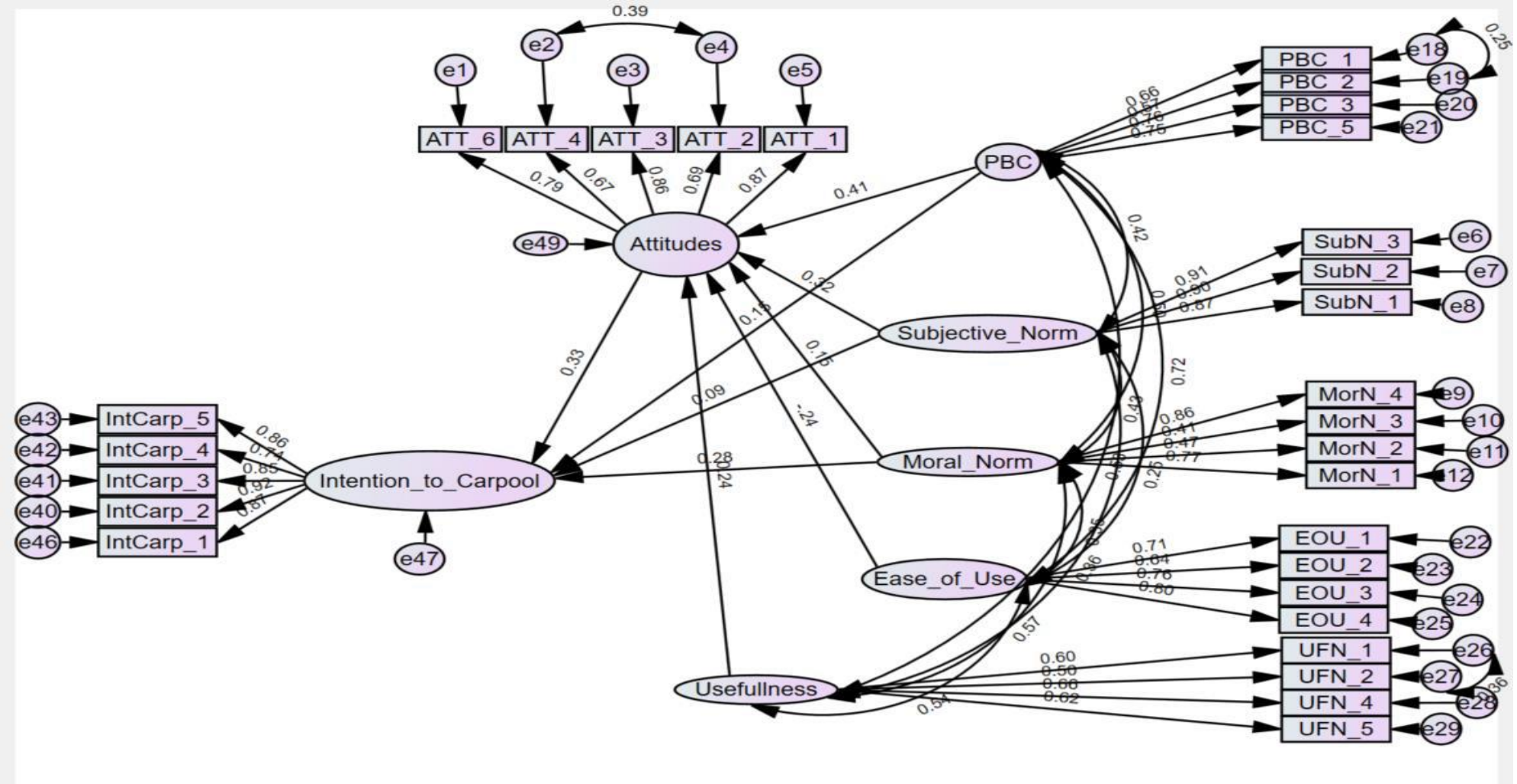
Example of the survey page



Information on gender and car ownership among survey participants

Gender			Car Ownership		
	Frequency	Percent		Frequency	Percent
Female	99	48.3	**Without Car**	116	56.6
Male	100	48.7	**At least one car**	89	43.4
Other	6	3.0			
Total	205	100	**Total**	205	100

The structural equation modeling method



Obtained results

- People with more positive **Attitudes** are more likely to have the **Intention to Carpool** during a possible future crisis.
- **Perceived behaviour control (PBC)** also has a positive effect on **Intention to Carpool**, although it is not statistically significant, suggesting that PBC may play a role but may not be as influential as other factors.
- **Moral Norm** shows a positive and significant relationship with Intention to Ridesharing, indicating that individuals' moral norms positively affect their **Intention to Carpool**.
- **Subjective Norm** has a nonsignificant positive effect on **Intention to Carpool**, suggesting that the influence of subjective norms on ridesharing intentions may not be statistically significant in this model.

6. Summary of the results

Summary of the results

- The findings suggest that interventions should primarily target perceived behavioural control, subjective norms, perceived usefulness, and moral norms; these could positively affect attitudes and increase ridesharing behaviours.
- This can perhaps shed light on the role that ridesharing can hold in efforts to improve transportation resilience during a crisis.

Summary of the results

1. One conference paper accepted and presented at the UTSG 2023 conference, UK's
   Dadashzadeh, N., Horpenko, D., Volkova, N., Ekmekci, M., Woods, L., & Nikitas, A. (2023). The role of ridesharing in improving transportation resilience during a crisis. In 55th UTSG Annual Conference, 10-12 July 2023, Cardiff, United Kingdom: UTSG2023. https://researchportal.port.ac.uk/en/publications/the-role-of-ridesharing-in-improving-transportation-resilience-du

2. Submission expected in mid-October 2023 to the Journal of Sustainable Cities and Society (IF: 11.7, Elsevier)

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