UREAP APPLICATION FORM

THOMPSON RIVERS UNIVERSITY
Office of Research and Graduate Studies

First Name: Rufaro

Last Name: Mundangepfupfu

Student ID: T00668639 Start Date of Project: 15/APR/2024 (DD/MMM/YYYY)

Please complete all sections of this application form.

1. FACULTY MENTORS INFORMATION

1.1 Who is your Primary Faculty Mentor? Dr. Zubair Raja

1.2 Who is your Secondary Faculty Mentor? Dr. Salman Kimiagari

NOTE: Your Primary and Secondary Faculty Mentors must each complete a Faculty Mentor Support Form. Forms can be found under the attachments tab within your TRU Romeo UREAP application and on the TRU UREAP webpage under information and Forms for Faculty Mentors..

2. PROJECT DESCRIPTION

2.1 Provide an abstract of your proposed research: (maximum 1500 characters)

Micromobility has been on the rise globally in recent years driven by the advancements of e-bikes and e-scooters. Shared mobility systems have successfully been implemented in countries across Europe and Asia, as well as select locations in North America. Most recently the province of British Columbia (BC) in Canada has been testing the feasibility of e-scooter systems with a pilot project in about 10 cities. While the industry can largely be viewed as positive given the many potential benefits it presents such as reduced congestion, lower emissions, etc., it has also seen its share of failures from unsuccessful integrations with the infrastructure and the people in some cities. This research study seeks to analyze the factors influencing the adoption of micromobility. By exploring the impact of micromobility on existing transportation systems and urban development, as well as examining the role of public policy, infrastructure, and rider behaviour in the adoption of micromobility solutions; the research aims to provide key insights for policymakers, urban planners and public transport systems looking to create a framework for the integration of micromobility in Canada. The data will be gathered from an in-depth review of recent existing literature, interviews with major industry players, surveys among current users, and questionnaires to potential users, and the findings will be adapted to a BC context.

2.2 Provide a brief literature review for your proposed research: (maximum 3500 characters)

With their potential to serve as a solution to the challenges posed by traditional transport systems, micromobility options such as the e-bike and e-scooter have gained significant attention in recent years. The first introduction of a shared micromobility in 2017, in Washington D.C, sparked rapid growth within the industry seeing shared systems available in over 100 cities in the following year (Buning, Pham, & Chen, 2023). Their portability and ability to run on different facilities make them a viable option for solving several travel problems(Ma et al., 2021). It has been suggested that e-mobility options have the potential to replace anywhere from 45-75% of short distance vehicle trips, supported by a 2023 study

looking at e-scooters as the vehicles to replace these short trips(Abouelela et al., 2023). The environmental benefits of micromobility have been found to include decreased dependence on fossil-fuel powered vehicles, reduced greenhouse gases, and improved air quality(Manirathinam et al., 2024) however, these benefits are also dependent on the nature of trips being replaced by micromobility. For example, the replacement of short car trips holds greater potential environmental benefits than replacing walking or cycling trips(Reck et al., 2022).

E-mobility vehicles are accepted for use in most Canadian provinces under varying restrictions, limiting their use on specific roads, paths, and lanes, use restrictions by age, license possession, and helmet requirements, depending on the province. The general classification of micromobility vehicles in Canada is based on their maximum assisted speed and power output, with a maximum speed ranging from 24 km/h for electric scooters to 32 km/h for e-bikes, and a maximum power output that does not exceed 500W(Electric Bike & Electric Scooter Laws & Regulations in Canada, 2024). Some of the factors influencing e-mobility adoption include the availability and accessibility of infrastructure, the perception of safety and convenience, the integration with existing transportation systems, and the presence of regulations and policies that support and encourage the use of e-mobility options(Abdelkareem et al., 2023). Thus in Canada, and particularly in BC where the adoption and integration of the options is relatively slow in comparison to other global markets(Oeschger et al., 2020), policy frameworks that support the safe operation of micromobility vehicles, including regulations related to rider behavior, speed limits, parking and charging infrastructure, and vehicle insurance safety requirements standards, are to essential be for developed the successful integration of e-mobility into urban centers(Avetisyan et al., 2022). By pooling local and global data on micromobility systems, this research project seeks to fill in the gaps in knowledge of the Canadian context of e-mobility, especially in the creation of policy frameworks to foster the adoption of micromobility and maximise its benefits on urban cities.

2.3 What is the hypothesis or research question for your proposed research? Include any specific objectives: (maximum 500 characters)

My proposed project examines the following two questions:

RQ1: What are the regulatory challenges and successes experienced by different Canadian municipalities in managing micromobility?

RQ2: How can the adoption of micromobility impact sustainable development goals in Canadian urban centres? These questions explore the extent to which micromobility can be used as a tool in implementing sustainable development plans in line with the UN SDGs, identifying adoption barriers and overcoming them.

2.4 Provide a description of the research methodology/methodologies and analysis that you intend to employ in completing this research: (maximum 1500 characters)

Using qualitative methods, the data for this study will be gathered from both seondary and primary sources. Information will be gathered from industry players locally and internationally, local governing bodies(City of Kamloops) and governments organizations(Ministry of transportation), university students and staff(TRU), high school students and parents(BC School District 73), cycling and active transportation interest groups, and community engagement groups. In addition to this, recent studies on the topic of micromobility will be studied. A thematic analysis will be conducted using data collected from interviews with industry players and government organizations, surveys and questionnaires for all

identified parties above, observation of e-mobility systems operating in BC, and an in-depth analysis of recent literature and government development plans. The interviews, observation and literature review will serve the purpose of consolidating data on the current state of e-mobility in BC, Canada. The surveys will collect data on the public's perception of e-mobilty and the challenges faced by current users of private e-mobiility vehicles. Data in interantional systems will be collected through a combination of interviews and literature analysis.

2.5 Provide a description of how your research will significantly impact your field of study:

(maximum 1500 characters)

This research stands to provide an understanding of the development and advancement of an emerging market propelling innovative technologies. Additionally, as electric vehicles are increasingly seen as sustainable transport options and cities look to develop and incorporate sustainable development initiatives, this study will assess environmental impacts and promote the benefits of green transportation. This research is especially important here in British Columbia as public micromobility options are still in a pilot phase operating in about 10 cities currently, one of the most well known locations being nearby in Kelowna. The analysis of environmental impacts of micromobility alongside the United Nations Sustainable Development Goals(SDGs) and British Columbia Strategic Development plans, will allow for the creation of a framework that can be used for most urban cities in Canada to support green urban planning.

The study also opens the door for students to learn from a dynamic growing system, fostering inter-diciplinary collaboration through the analysis of an innovative growth market still in an infancy stage globally. Collaboration with international organazations , e.g. Dutch Cycling Embassy, and other universities researching the field, e.g. the Future Transport Zone at Southampton University, as well as the local community, can establish the university as an innovation hub working towards internationally transferrable best practices for the industry as a whole.

2.6 Describe your plans to disseminate your research findings: (maximum 500 characters)

To disseminate this research, poster presentations will be made at the WDCAG Conference held at Okanagan College, as well as at the Undergraduate Research & Innovation Conference held at Thompson Rivers University. A framework document for micromobility adoption will be shared with transportation authorities and city planners, beginning with the Ministry of Transportation and Infrastructure, and the City of Kamloops. In addition to this, a submission will be made to a peer-reviewed journal.

2.7 List the references that you have citied throughout your research proposal observing the appropriate citation style for your discipline: (maximum 3500 characters)

Abdelkareem, M A., Wilberforce, T., Obaideen, K., Sayed, E T., Shehata, N., Alami, A H., & Abdelkareem, M A. (2023, February 1). Micromobility: Progress, benefits, challenges, policy and regulations, energy sources and storage, and its role in achieving sustainable development goals. Elsevier BV, 17, 100292-100292. https://doi.org/https://doi.org/10.1016/j.ijft.2023.100292

Abouelela, M., Chaniotakis, E., & Antoniou, C. (2023, March 1). Understanding the landscape of shared-e-scooters in North America; Spatiotemporal analysis and policy insights. Elsevier BV, 169, 103602-103602. https://doi.org/https://doi.org/10.1016/j.tra.2023.103602

Avetisyan, L., Zhang, C., Bai, S., Pari, E M., Feng, F., Bao, S., & Zhou, F. (2022, September 2). Design a sustainable micro-mobility future: trends and challenges in the US and EU. Taylor & Francis, 33(8-9), 587-606. https://doi.org/https://doi.org/10.1080/09544828.2022.2142904

Buning, R., Pham, W., & Chen, M. (2023). So, what do you think about eScooters and eBikes? Understanding visitor and resident experiences and perceptions with micromobility in Brisbane. Brisbane: The University of Queensland Australia.

Electric Bike & Electric Scooter Laws & Regulations in Canada. (2024, January 1). Retrieved January 30, 2024 from https://epiccycles.ca/electric-bike-electric-scooter-laws-regulations-canada/

Ma, Q., Yang, H., Ma, Y., Yang, D., Hu, X., & Xie, K. (2021, March 1). Examining municipal guidelines for users of shared E-Scooters in the United States. https://doi.org/10.1016/j.trd.2021.102710

Manirathinam, T., Narayanamoorthy, S., Geetha, S., Ahmadian, A., Φeppapa, M., & Kang, D. (2024, January 1). Assessing performance and satisfaction of micro-mobility in smart cities for sustainable clean energy transportation using novel APPRESAL method. Elsevier BV, 436, 140372-140372. https://doi.org/https://doi.org/10.1016/j.jclepro.2023.140372

Oeschger, G., Carroll, P., & Caulfield, B. (2020, December 1). Micromobility and public transport integration: The current state of knowledge. https://doi.org/10.1016/j.trd.2020.102628

Reck, D J., Henry, M., & Axhausen, K W. (2022, January 1). Mode choice, substitution patterns and environmental impacts of shared and personal micro-mobility. Elsevier BV, 102, 103134-103134. https://doi.org/https://doi.org/10.1016/j.trd.2021.103134

3. PROJECT TIMELINE WITH BENCHMARKS

3.1 Provide a timeline for your project that includes key benchmarks: (maximum 1000 characters)

*February

-Begin literature analysis

-Schedule local interviews

*March

-Hold local interviews

-Schedule and hold international interviews

-Shcedule and hold out of town interviews

-Poster presentation at The 65th Symposium of the Western Division of the Canadian Association of Geographers (WDCAG) at Okanagan College in Kelowna

-Poster presentation at TRU Undergraduate Research & Innovation Conference

-Creation of Surveys & questionnairs

*April

-Release of surveys & questionnaires

-Conduct observational studies in BC Electric Kick Scooter pilot communities

-Identification of peer-reviewed journal to submit report

*May

-Analysis of data and consolidation of findings

-Final UREAP report

-Preparation of report for peer-reviewed journal

*June

-Sharing of findings with mobility stakeholders within the city & province where applicable.

-Submission of report to peer-reviewed journal.

NOTE: Please refer to the UREAP Help Guide for a project timeline example. Students must demonstrate a willingness to engage in 12 weeks or equivalent of sustained research per the Terms of Reference.

4. OPERATING GRANT BUDGET PROPOSAL

4.1 The UREAP award offers up to $1000 toward direct research expenses. These expenses must be preapproved by the UREAP committee in the adjudication phase. Use the provided template under the Attachments tab in the TRU Romeo UREAP application to complete your budget proposal. Copy amount from the TOTAL AMOUNT line of the budget here. Total Amount: $ 1,000.00

4.2 Additional budget information: (maximum 500 characters)

The total cost required for the research assistance software($500) and, interviews and surveys($2000), exceed what can be provided by this grant. Myself and my supervising professors will work to gather these funds from alternative sources, we have requested $120 and $500 respectively, from this award for these budget items.

5. CONTRIBUTION TO ACADEMIC/PROFESSIONAL GOALS

5.1 Describe how this project will contribute to your academic and/or professional goals:

(maximum 1000 characters)

I am currently studying marketing, with a deep interest in entrepreneurship. This project stands to provide valuable experience in both fields by gaining an understanding novel ideas, technologies and systems, and how to properly communicate them to achieve the desired reception. The conception of this project came about from personal interest in the new technology and discussions with city officials when inquiring about the necessary permit requirements for the establishment of a shared mobility system in Kamloops. The BC market currently being in a phase of pilot projects necessitated the gathering of more data and acceptance into the pilot project for any city looking to adopt e-mobility options. The completion of this study and creation of an adoption framework for urban city adoption will open the market in BC and advance the urban market globally. Following my graduation, I will then be fully equipped to implement shared mobility ventures in new markets.

NOTE: Include your role in conceiving of the project, your role in the implementation of the project, and your overall academic objectives – explaining how this project will help to advance those objectives.