INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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SHORT ABSTRACT

In recent years, there has been a manifold rise in the frequency of extreme climatic events. These unprecedented changes in weather patterns are hugely driven by anthropogenic causes led by increasing economic activities and exploitation of the natural quality of the environment. Of all the environmentally detrimental anthropogenic activities, the transportation sector is one of the huge contributors to the rising greenhouse gas (GHG) in the atmosphere, thereby accentuating climate change issues. This necessitates adopting low- carbon consumption in different carbon-intensive sectors. Some of the low-carbon transport options in India include public transport or the latest technological advancement in the form of electric vehicles (EVs). However, very few cities in India have an extensive network of public transport. In the case of Assam, several emerging towns and cities are not yet connected with a timely and efficient network of public transport systems. This leaves people with only one option, i.e., to use personal vehicles. With the rising incomes and aspirations of the middle-income group, the demand for carbon-intensive goods like internal combustion engine (ICE) personal vehicles is only increasing. Replacing the demand for ICE vehicles with demand for electric vehicles (EVs) can significantly decarbonize the transport sector, one of the highest carbon-emitting sectors. Such a transition towards low carbon mobility can be a step towards climate change mitigation on the part of individuals.

This thesis aims to address the existing research gap on climate change mitigation through behavioral adaptation, by critically examining different ways to incentivize people's adoption of EVs in Assam. Using structural equation modeling (SEM) and mediation analysis, we identify the direct and indirect pathways through which people might develop an intention to adopt EVs. Variations in the intention pathways for different demographic groups (gender, age and location) have also been analyzed and explained in terms of gain, norm, and fear & protection motivation, underlying the theory of planned behavior (TPB), norm activation model (NAM) and protection motivation theory (PMT) respectively. This thesis further develops a mental accounting-based vignette-stated choice survey to examine the impact of different

nudges on people's stated choice for sustainable mobility and the results are analyzed by conducting a multinomial regression analysis. This thesis finally analyzes how the EV adoption intention pathways, and the impact of nudges differ according to the stage of behavior that a person is in.

Intention formation being a cognitive process, it is an individual level process. Therefore, the socio-psychological indicators that influence the intention to adopt EVs in the developed nations are very different from the social, cultural, and economic contexts in a developing nation. This study fills a gap by critically examining various aspects of behavioral route to incentivizing EV adoption in the context of emerging towns and cities of Assam in India. The major findings of the thesis diverge significantly from the leading previous studies on drivers of EV adoption in nations like USA, UK, Germany, Australia, etc. Previous studies found attitude as one of the primary drivers of intention. In the context of Assam, subjective norms are found to significantly influence EV adoption particularly among middle-income people in small towns, where societal validation shapes decisions. Perceived behavioral control and ascription of responsibility also shapes intention to adopt EVs. Social media is found to amplify attitude, while social competition and status enhancement further drive intention. Encouraging people to view themselves as agents of change can boost their willingness to adopt EVs. However, environmental concerns about the use of coal-based electricity generation deter some environmentally conscious individuals. EV adoption depends on government initiatives like an increase in the use of renewables-based power generation, and an expansion of the EV infrastructure.

Women are found to be influenced by confidence of EV use, comfort, and moral obligations, while men respond more to social impressions due to frequent social engagements. Awareness campaigns combined with addressing the environmental concern are found to influence women towards EV adoption, while coping appraisal factors has an impact on both men and women. Demographic and regional factors also shape EV adoption preferences. Younger individuals are more influenced by personal confidence with EV use and digital communication, while middle aged individuals are more influenced by societal approval and efficacy of EVs.

Metropolitan residents expressed a stated choice for EV hatchbacks and SUVs, leveraging the presence of better infrastructure and a sense of control, whereas non-metropolitan residents are primarily motivated by societal approval. Financial behaviors and an individual's preferences of personal income allocation are also found to influence EV adoption intention. Individuals who are found to allocate income from green source to consumption of necessities or those who prefer to save income earned from green sources are more inclined to choose EVs. People who tend to save income towards luxury commodities and indulgence are found to be more likely to choose EV SUVs. General information about climate change is found to be an effective nudge in influencing one's choice favorably towards EVs over ICE vehicles. Behavioral transitions towards EV adoption decision is not found to necessarily follow a linear pathway as explained in the Stage Regulated Behavior Change (SRBC) model. In the early stages of pro-environmental behavior formation, subjective norms are found to dominate, but as an individual's behavior progresses, perceived behavioral control gains better control on one's decisions. The findings of this study underscore the need for targeted policies addressing gender, age, regional factors, and behavioral tendencies to effectively promote EV adoption.