INVESTIGATING SOCIAL, CULTURAL AND DEMOGRAPHIC FACTORS OF COMMUTERS’ MODE CHOICES IN KUWAIT CITY & SURROUNDING URBAN AREAS: Towards Developing a More Sustainable Transportation System

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ABSTRACT

This paper reports on the social, cultural, and demographic factors of Kuwaiti commuters. The objectives were to 1) investigate Kuwaiti’s awareness of transportation problems, 2) examine Kuwaiti’s perceptions of daily traffic congestion and how it affects them emotionally and physically, and 3) study Kuwaiti’s attitude towards using public transit (currently buses). An online survey was used to examine these factors, and a sample of five hundred transportation system users was obtained. The primary findings showed significant associations between the use of the public bus and users’ nationality, gender, age, education and income level. Men are 2.6 times more likely to use buses, and non-Kuwaiti residents are 6.4 times more likely to use it. In relation to the perceptions of the daily traffic congestion, findings indicate: firstly, that with the increase in travel time, commuters in general developed more negative feelings, such as exhaustion and stress. The sample, by a great deal, is aware of the current local transportation problems and the future transportation projects. The results of this study fill a gap in the knowledge of socioeconomic and cultural factors that may influence the success of potential sustainable solutions to the transportation challenges in Kuwait. It is recommended that officials use this new knowledge on cultural factors to develop integrated land use and transportation plans of the urban areas in Kuwait and to develop more effective and sustainable transportation demand management.

Keywords: transportation planning; environmental planning; sustainable transport; safety; public transportation; public bus; public transit; socio-cultural factors; public survey, passenger rail.
INTRODUCTION

Kuwait is one of the fastest growing developing countries in the Arabian Peninsula region and is undergoing challenging transportation issues. This rapid growth is expected to continue as a result of government initiatives, aimed at transforming Kuwait into a financial and commercial global investment hub (1). Kuwait's rapid growth has already increased the pressure on the existing transportation system. Traffic congestion has risen to unacceptable levels, leading to degradation in both the quality of life and the environment. Therefore, there is a need for appropriate policies, plans, and projects to provide a safe, affordable, and efficient transportation system to attain sustainable environmental development objectives.

Kuwait has used and continues to use foreign consulting companies to prepare its master plans without any means of public participation exercise. Often, those external consultants have recommended solutions and plans from their home countries that might be successful for a population with completely different characteristics than Kuwait (Hutchinson, 1990). Also, current studies focus on maximizing road capacity (UNDP, 2009), whereas sustainable solutions must consider many interrelated factors including environmental, social, cultural, and economic. The research providing the basis for this paper was intended to fill the knowledge gap surrounding the socioeconomic aspects for a comprehensive and sustainable solution, including a better understanding of the present public transportation system status in Kuwait and the motivating factors behind users’ choices. By collecting the necessary data, this study would provide a primary database that can be used to implement more efficient public transportation planning solutions that focus on the system user (including citizens and residents) across the State of Kuwait. The main objectives were to investigate 1) users’ awareness of transportation problems, 2) users’ perceptions of daily traffic congestion and how it affects them emotionally and physically: and, 3) users’ attitudes towards using public transit.

STUDY AREA

Kuwait, located in the northwestern corner of the Arabian Gulf (Persian Gulf), is bordered to the north/northwest by Iraq, and Saudi Arabia to the south/southwest (Figure 1). Kuwait is known for its generally flat terrain and slightly uneven desert. The country’s population reached 4 million in 2016 (2) spread over six districts across the country (Al Jahra, Al Asmimah, Al Farwaniya, Hawalli, Mubarak Al Kabeer, and Al Ahmadi). The economic activities of Kuwait are mainly located in the eastern urban areas surrounding Kuwait City along the coast of the Arabian Gulf, where 99% of the population lives between Al Jahrah in the north, and Umm-Alhaiman on the south, an area of 754.30 km² (291.23 mi²) that comprises less than 5% of the country. This concentration of economic activity (i.e. employment and residents in the same general area) suggest the potential for efficient land use and transportation planning and development strategies.
Like many developing Middle Eastern countries, Kuwait has a rapidly increasing and relatively unmanaged number of vehicles and levels of traffic congestion. Moreover, bad weather conditions (i.e. high temperatures, sandstorms and dust), the use of foreign companies to plan the urban area, rapid unplanned population increases, and high per capita income (3) have resulted in the predominance of private vehicles. Other factors that encourage the use of private vehicles include the affordability of vehicles, low petroleum prices (1), door-to-door convenience, and social status of owning a vehicle (4).

Kuwait has experienced significant road safety problems. In 2012, the total number of crashes was 86,542, with 459 persons killed (18.7 per 100,000 residents), and 9,959 persons injured; moreover, these statistics suggest a 31.4 % increase over two years (5). Al-Rukaibi et al. (6) found strong shortcomings in driver education in Kuwait, and concluded that most crashes occur because of intentional driver violations, especially speeding and running red lights.

The massive road congestion in Kuwait affects many facets of Kuwaiti lives. A recent study measured the average travel time from Shuwaikh city to some popular destinations in Kuwait with and without congestion (7). Not surprisingly, the results showed longer travel times during congestion ranging from 267% to 600% above normal. Given this situation, walking or
cycling might be more efficient than cars, but when considering the climate of Kuwait public transportation arises as the superior option. No study was found that could provide an understanding of how the congestion in Kuwait affects the people emotionally and physically, nor why most people don’t walk/bike.

In Kuwait, the largest growth in CO² emissions has come from power generation and road transport, with transportation producing one-third of its 27.3 metric tons (MT) per capita (2, 8, 9). Therefore, a key opportunity for mitigating these emissions is to reduce the amount of driving (vehicle-km traveled, VKT). Reduced VKT can be accomplished by a systematic shift from private vehicles to high quality, convenient public transport (10). This is most often completed by retrofitting existing and/or building new communities to provide compact, coordinated, and connected land use patterns, often termed SMARTer Growth (Fused Grid) Neighborhoods (11). This paper reports on research to investigate public attitudes towards transport; research on Kuwaiti land use patterns has only just been initiated. Meanwhile, improved public transport has the potential to not only reduce congestion in Kuwait, but also air pollution, health risks, and economic burdens (12). The existing urban area public transport service quality is poor, and as such, is used by mainly the transit-captive, lower socio-economic level of Kuwait residents. It is also unreliable, which paralyzes the lives of large numbers of service workers, further aggravating social inequity and congestion problems.

Mode Choice Factors That Affect Kuwaiti Travelers’ Decisions

Understanding traveler motivations related to mode choice is a complex topic, but a key element for improving transportation system sustainability, requiring decision-makers to develop convenient and practical solutions (13). Moreover, mode choice is not only a function of socioeconomic factors and land use characteristics, but it is also affected by the users’ attitudes and perceptions (14), including the following factors:

- Demographic factors (15, 16): household size, age, gender, education level, race, income level, worker status, vehicle ownership, and availability of driving license.
- Socio-physiological factors: trip purpose (17), individual’s habit to use a certain mode (18, 19), past experiences, attitudes and personality traits, social acceptance, individual’s emotional feelings, and benefits to the system user (19).
- Characteristics of the environment and land use: transit-oriented development, vehicle oriented development, neo-traditional development, mixed used compact city, rural area, urban area, suburban sprawl, and the size of the area (20).
- Level-of-service transit attributes: mode of transport, distance to destination, travel cost, travel time (20), the number of stops (15), travel speed, comfort, safety (17), crowding level, reliability, and transit technology (21).
Demographic and Socio-Economic Factors

In Kuwait, after the oil boom period, with the rapid economic development and the approval of the first Master Plan, an urgent need appeared for more specialists and professionals in all areas to support Kuwait’s growth. Lacking a domestic capacity to train and provide specialists in the service and technical sectors, more foreign workers have been attracted to job opportunities in Kuwait, leading to a rapidly growing transient, migrant, and non-Kuwaiti population (22). Moreover, Kuwait citizens are increasingly becoming a minority in their own country with 67% of the total population comprised of non-Kuwaitis, who are considered to be temporary and transient residents (2). This population growth and economic development have been accompanied by growth in private vehicle ownership (1). The number of vehicles is increasing on roads built in the 1950s for a much smaller population. Users’ attitudes and personality traits, as well as their behavioral and travel patterns are also changing (e.g. the habit of using a certain mode, trip purpose(s), past experiences, and compliance with traffic laws), with important differences, socially and economically, between the two populations (Kuwaiti and non-Kuwaiti).

Public Transit Level of Service Attributes, Land Use Characteristics Factors, and the Kuwait Metro Project

Although Kuwait has had a public bus system since 1962, people continue to rely heavily on their privately owned vehicles for various reasons, leaving the bus fleet with limited users (3). Until now, no previous estimates related to Kuwaiti bus use has been researched. According to Basel Al-Loughani (2015), the author of “Car history in Kuwait”, high private vehicle ownership in Kuwaiti culture is historical, pre-dating public bus service by many decades (Personal communication, May 12, 2015). Another factor appears to be Kuwait community development patterns and built form, which encourage car use due to 1) longer travel distances that cannot be conveniently reached by walking, cycling or public transit; 2) lack of dedicated high occupancy vehicle (HOV) lanes to reduce transit travel time; and 3) poor accessibility to bus stops. To explain this situation Dr. Farah Al Nakib (2013), director of the Gulf Studies Centre at the American University in Kuwait, presented a lecture titled “Back to the City”. In her lecture, she described the urban life in Kuwait as very different and divided into zones “People go to work in the city center, spend their leisure time along the coast, shop in the new commercial district, and then they go to rest in their homes in the suburbs. And they travel between these spaces in private cars.”

While Kuwait’s public transit system consists entirely of buses, the idea of passenger rail (Metro) as a means of public transport is not new to Kuwait. A study by the Ministry of Public Works (1978) indicated the need for a better public transit system than solely buses. The Ministry proposed the Kuwait Metro Rapid Transit (KMRT) project to ease daily commutes, reduce energy consumption, increase road safety, enhance air quality, and reduce travel time; however, it has not yet been implemented.
1 METHODOLOGY

To undertake this research, several surveys were designed to better understand residents’ underlying cultural and socio-economic factors related to transportation habits, attitudes, and preferences (experienced and hypothetical travel decisions)(23). As a research team based in North America with limited in-person travel to Kuwait, the most appropriate research method found in the literature to conduct this study was a web-based questionnaire to draw together perceptions on public transport from various segments of the resident population (24, 25). The main advantages of using a web-based questionnaire include: ability to cover a large sample size, absence of effects of the interviewer on the interviewee, fewer missing data, protection of privacy, time efficient, and relatively low cost. A common disadvantage in conducting any questionnaire is “the question-order-effect” (24). This effect develops when the respondents have the opportunity to read the questions before answering them, which may influence their responses. In this study, the order-effect issue is resolved by featuring transitions between questions. The transition to the next question is conditional upon completion of the current one.

The main disadvantages of using a web-based questionnaire include: 1) that the population of Internet users is not identified or registered, so it is not an easy process to select a fully representative sample; and, 2) the population of non-Internet users is excluded and missed in the sampling (26). In Kuwait, the fact that the Internet and smartphones are widely used (79.2% of the population in Kuwait use the Internet (27)), minimize the risk of under-representing non-Internet users’ population. Moreover, there are possibilities for the unintentional exclusion of individuals with low income and the elderly, who might not be familiar with the technology. To overcome the low-income population exclusion problem, “Amazon Mechanical Turk (MTurk)” was used to distribute the survey, a workplace via Amazon in which “workers” complete online jobs posted by “requesters” for monetary rewards (28). MTurk was originally developed for commercial use, but a growing number of academic researchers now use it. While few studies using MTurk have been published, those that have suggested the results look promising (29, 30, 28), with either slightly higher data quality in the MTurk samples when compared with other distribution methods. Moreover, these studies suggested that MTurk appears to be able to encourage low-income residents to participate in research and minimize unintentional exclusion. According to the Kuwait Central Statistical Bureau (5), the percentage of individuals age 65+ with access to a personal computer and Internet network is 89%, significantly assuaging concerns about exclusion of the elderly.

The final distribution method used was a combination of the MTurk tool (described above) and snowballing (distribution through select social media networks, family members, and friends) techniques. Confidentiality is an issue when sending questionnaires through regular mail, phone, or emails due to its association with individual identification. In this research, participant privacy was protected by giving each questionnaire a unique ID number, and by separating respondent answers from their personal information.

The survey started with a consent letter followed by questions to qualify participants (age and location). The first section explored and ranked the awareness of transportation problems. The second section gathered travel data and commuting trips. The third section investigated participants' feelings about daily congestion during commuting and non-commuting trips.
Questions in the fourth section were in a hypothetical form to indicate the stated preference mode and situation for travelers. As mentioned earlier, each participant is identified by a unique ID. Also, an Internet Protocol address (IP address) was accompanied with the ID to restrict dual participation.

**Statistical Analysis**

The preliminary analysis was mainly descriptive, followed by advanced statistical analyses to test the research hypotheses using the Statistical Package for the Social Sciences (SPSS). The standard statistical methodology of weight adjustment recommended by Bethlehem and Biffignandi (26) was also applied. The collected data consists of categorical discontinuous variables that fell into one of two categories: binary or nominal. To evaluate the association between categorical data, the appropriate analysis carried out either the Chi-Squared Test for independence or the Fisher's Exact Test, dependent on the ratio of the tables. The hypothesis tests were followed by Phi and Cramer’s V tests to determine the strength of association between the tested variables (24) with a 95% level of confidence. P-values of less than 0.05 were considered statistically significant.

**SURVEY IMPLEMENTATION, RESULTS, AND DISCUSSION**

Applying this methodology, an online survey was posted for the Kuwait community between July 17, 2014 and September 17, 2014, resulting in 500 responses with 331 (66.2%) fully completed questionnaires. The majority of the 169 partial respondents completed all portions until the final component, regarding demographic inquiry; out of the 45 questions, 95% were completed by all 500 respondents. To avoid low completion rates in the future, the questionnaire design should be shorter and of greater simplicity.

Most respondents, 78%, were Kuwaiti, another 22% percent non-Kuwaiti (stateless participants are combined with non-Kuwaitis data due to socio-economic similarities between both population). Sixty three percent of respondents were female, with 62% holding undergraduate degrees (Bachelor) and 31% holding graduate degrees (Master’s or higher). The typical respondent age range was 30 to 40 years old. High school respondents made up 4%, Middle school 2% and Elementary 1% only. More than half of the respondents are working in the government sector followed by 25% in the private sector, 10% self-employed, 6% students and 5% unemployed. The most common family income level category was 5,700 - 11,500 CAD $ per month (approximately 750 - 1,500 KD). The geographic distribution of home address within the six governorates ranged from 8% in Al Jahrah to a peak of 26% in Hawali. Also, the percentages of non-Kuwaiti respondents related to the number of years they have been residents are 34% for one to five years, 21% for less than a year and also more than 15 years, 16% for 6-10 years and 8% for 11 - 15 years (Figure 3).

The dominant work trip mode used in Kuwait is driving private cars at 63.1%. Combined with an additional 22.3% of trips made by cars as passengers, a total of 85.5% of all commuting
trips are made by car. On the other hand, the combined percentage of commuters choosing public bus or active modes (walk and bike) is around 10.5%. Females are less likely to use public transit (the opposite case of North America), walk or bike options, and show some interests in telecommuting. Table 1 shows the differences revealed between the study population and the sample. While most socio-economic segments were within an acceptable margin (i.e. < 5% difference), it was observed that a more significant different between sample and population occurred in the proportions of respondents based on gender and nationality. As such, a simple weighting method was used to adjust the sample to better match population socio-demographics (i.e. weight = proportion of population that the segment comprises / proportion of sample that the segment comprises). In any case, our sample is generally representative of the Kuwait population present during the survey time period in summer 2014. Conducting the survey during the summer time was our greatest limitation since 60.6% of the population are expatriates who usually travel home during that time. Table 2 provides a comprehensive breakdown of commuting choice in Kuwait in relation to nationality and gender. Analysis of the research hypothesis are summarized in Table 3 following.

<table>
<thead>
<tr>
<th>NATIONALITY</th>
<th>POPULATION</th>
<th>SAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>KUWAITI</td>
<td>39.1%</td>
<td>77.94%</td>
</tr>
<tr>
<td>NON-KUWAITI</td>
<td>60.6%</td>
<td>21.15%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GENDER</th>
<th>POPULATION</th>
<th>SAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEMALE</td>
<td>53.37%</td>
<td>62.83%</td>
</tr>
<tr>
<td>MALE</td>
<td>46.62%</td>
<td>37.15%</td>
</tr>
</tbody>
</table>
### TABLE 2  Commuting trip mode split by nationality and gender

<table>
<thead>
<tr>
<th></th>
<th>CAR, DRIVE</th>
<th>CAR, PASSENGER</th>
<th>BUS</th>
<th>WALK</th>
<th>BIKE</th>
<th>MOTORCYCLE</th>
<th>TELECOMMUTING</th>
<th>GRAND TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>KUWAITI</strong></td>
<td>54.3%</td>
<td>17.5%</td>
<td>2.1%</td>
<td>0</td>
<td>1.5%</td>
<td>0.3%</td>
<td>2.1%</td>
<td>77.95%</td>
</tr>
<tr>
<td><strong>MALE</strong></td>
<td>18.7%</td>
<td>5.7%</td>
<td>1.8%</td>
<td>0</td>
<td>0.9%</td>
<td>0.3%</td>
<td>0</td>
<td>27.4%</td>
</tr>
<tr>
<td><strong>FEMALE</strong></td>
<td>35.6%</td>
<td>11.7%</td>
<td>0.3%</td>
<td>0</td>
<td>0.6%</td>
<td>0</td>
<td>2.1%</td>
<td>50.4%</td>
</tr>
<tr>
<td><strong>NON-KUWAITI</strong></td>
<td>8.7%</td>
<td>4.8%</td>
<td>3.3%</td>
<td>0.3%</td>
<td>3.3%</td>
<td>1.2%</td>
<td>0.3%</td>
<td>22%</td>
</tr>
<tr>
<td><strong>MALE</strong></td>
<td>3.6%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>0.3%</td>
<td>1.8%</td>
<td>0.6%</td>
<td>0.3%</td>
<td>9.6%</td>
</tr>
<tr>
<td><strong>FEMALE</strong></td>
<td>5.1%</td>
<td>3.3%</td>
<td>1.8%</td>
<td>0</td>
<td>1.5%</td>
<td>0.6%</td>
<td>0</td>
<td>12.3%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>63.1%</td>
<td>22.3%</td>
<td>5.4%</td>
<td>0.3%</td>
<td>4.8%</td>
<td>1.5%</td>
<td>2.4%</td>
<td>100%</td>
</tr>
</tbody>
</table>
1 | **TABLE 3 The test statistics of results**  
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hypothesis</strong></td>
<td><strong>Results</strong></td>
<td><strong>Significance</strong></td>
</tr>
<tr>
<td>1</td>
<td><strong>Awareness of future transportation projects (i.e., KMRT) difference between Kuwaitis &amp; non-Kuwaitis?</strong></td>
<td>Not significant</td>
</tr>
<tr>
<td>2</td>
<td><strong>Does the use of public transportation abroad, affect peoples’ use of Public Transit in Kuwait?</strong></td>
<td>Significant</td>
</tr>
<tr>
<td>3</td>
<td><strong>Are perceptions of their daily commute travel time in Kuwait different between Kuwaitis &amp; non-Kuwaitis?</strong></td>
<td>Significant</td>
</tr>
<tr>
<td>4</td>
<td><strong>Are people’s perceptions of their daily commute in Kuwait different between male &amp; female?</strong></td>
<td>Significant</td>
</tr>
<tr>
<td>5</td>
<td><strong>Does the use of public transit differ between Kuwaitis &amp; non-Kuwaitis?</strong></td>
<td>Significant</td>
</tr>
<tr>
<td>6</td>
<td><strong>Does the use of public transit differ between males and females?</strong></td>
<td>Significant</td>
</tr>
</tbody>
</table>
| 7 | **Does the use of public transit differ between different income levels?** | Significant | Income level: 1,501 - 3,000 KD are not using buses.  
Income level: 251 - 750 KD are using buses. |
| 8 | **Does the use of public transit differ between different education levels?** | Significant | Bus users’ education level are mostly Master’s degree & higher.  
Non-bus users mostly have only a Bachelor’s degree. |
| 9 | **Does the use of public transit differ between different age categories?** | Significant | Most individuals in the age category from 24 -29 are using the bus system. |
| 10 | **Is the use of public transit affected by the number of years that non-Kuwaiti participants have been living in Kuwait?** | Significant | Non-Kuwaitis that have been living in Kuwait for 1 to 5 years are using buses. After this period, there is a trend toward driving private cars. |
The analysis suggests significant results in support of the research hypotheses. Only the first hypothesis was not supported (Difference in the awareness level of future transportation projects such as KMRT between Kuwaitis and non-Kuwaitis). Moreover, perceptions of the daily commute vary by nationality and gender. Non-Kuwaitis have more neutral perceptions of commuting; Kuwaitis perceive commute travel time as either wasted or valuable time, with, male commuters more stressed than female commuters. The significant demographic factors are nationality, gender, income level, education level, and age. Although non-Kuwaitis use the bus more than Kuwaitis, their usage significantly decreases over time. Additionally, there is a positive influence of having used public transportation abroad on Kuwaiti residents’ use of Kuwaiti buses; those that have used it elsewhere are more open to using them in Kuwait. The only non-significant finding in this study suggests that nationality does not influence the level of public awareness regarding transportation problems.

Significant Factors

Many factors revealed a significant association with public bus use. The characteristics of the typical Kuwaiti bus traveler were found to be: Non-Kuwaiti resident, male, age between 24-29 years, monthly income between 1,000 and 3,200 $ CAD (251 - 750 KD), and graduate degree (Master degree or higher). Except for the group with higher degrees, all other characteristics are predictable in a country like Kuwait, where the existing public bus system is very inefficient and unreliable. On the other hand, and if we can link the high educational degree with wealthiness, then the highly educated individuals’ use of public transit trends in Kuwait are similar to those observed in New York City and Manhattan, where affluent residents frequently use public transit (31). This pattern may relate to their valued travel time (i.e. minimizing wasted time, maximizing productivity while on transit), their desire to ‘do the right thing’ (i.e. minimize pollution and GHG emissions). It should be explored in future research as a possible public transit marketing and communication strategy to promote use of improved transit and/or metro. The rate of non-Kuwaiti public bus usage is 6.7 times higher than that of Kuwaitis; males use public buses 2.4 times as much as females. Both users and non-users of public buses agreed that all system elements need improvement, which is likely a contributing factor explaining the trend for Kuwaitis to commute via private cars and for non-Kuwaitis to shift to also drive cars.

These private car use trends and characteristics of bus users in Kuwait are consistent with those found by researchers in other developing countries such as India (in gender, age, income and education) and China (in income and education) (32, 16). However, Kuwait survey results also suggest that a large segment of the population (especially young workers, low-income residents, and higher educated classes) could be influenced to use bus service with minor changes to the Kuwait transit system, along with those who are related to these potential new users (i.e. partners, children, students). Although the characteristics of the Kuwaiti bus user may suggest that the current users of the system are individuals with no other alternatives, the tendency for the most highly educated group to use the bus does offer optimism that users remain rational about their transportation decisions, and therefore can be influenced by system improvements.
In relation to the perceptions of the daily traffic congestion, commuters develop more negative feelings, such as exhaustion and stress, especially in males. Green et al. (33) identified a negative effect of long travel times on family finances, quality of life, health, and well-being. Other researchers have concluded that the increase in travel time would also increase the use of private cars (32). Although private cars users are negative, they don’t see public buses as reducing travel time. Some considered commuting as a waste of time, but for others, the trips are used for audio based education, suggesting that people can adapt to longer than expected commuting times. Similarly, a study in New York City, found that car commuters have higher levels of stress and more negative moods than train commuters (34).

Other not previously explored factors that showed significant association with the likelihood of using public buses locally are: 1) the effect of using public transportation abroad and 2) the effect from the number of years that non-Kuwaiti residents have been living in Kuwait. First, the exposure to a positive experience of using public transportation abroad increased the acceptance of using the local public bus system; residents that had been living in Kuwait for one to five years were willing to use the system. Second, however, the longer a non-Kuwaiti stays in Kuwait the less willing they become to use public buses; over time non-Kuwaiti residents shift to commuting via private cars. These observations suggest hope for future transit use if system improvements can be made.

Kuwaitis are known for their love of travel, especially during the hot summer months of vacation season, to developed countries with high quality public transit systems. For example, in 2014, the number of passengers from Kuwait International Airport exceeded five million passengers traveling to different destinations around the world (5), with non-Kuwaiti residents accounting for 67% of that total. This international travel holds potential to foster a significant latent demand for any future Kuwait metro project, given Kuwaitis’ exposure to public transit abroad. Moreover, to attract Kuwaiti travelers, the goal for future public transportation projects should also consider providing a higher-quality bus service and passenger rail. This would lend positive thoughts and experiences about public transportation, and promote resident loyalty towards public transit.

**Non-Significant Factors**

The non-significant factors found in this study are related to nationality and awareness of transportation problems. These non-significant results could be related to their equal importance for both populations. The respondents (Kuwaiti citizens and non-Kuwaiti residents) both ranked “transportation and congestion” fourth in importance among local issues that need government attention, with 67% believing that “congestion” is the top transportation problem, followed by “an inadequate public transit system.” This high ranking suggests that they would support the government making transportation system improvements a higher priority.
Cultural Factors

When asked about the cultural aspects behind their transportation decisions, 22% of respondents indicated that the first barrier to using the bus system, even after improvements, is social acceptance (Figure 4 shows all other barriers). In Kuwait, a poor social image has been attached to bus system users for some time, which leads locals to favor the use of private cars (35). The results from this study support Van et al.’s (19) study as measured through public opinion surveys in six different Asian countries on the impact of social image on bus versus car use. Their results confirm that younger generation commuters (especially university students) are more likely to use a mode of transportation that has a positive image attached to it. It appears that a positive image is attached to the proposed Kuwait Metro Rail Transit (KMRT) metro project based on the 56% of survey respondents that would consider using it in the future. This could however be possibly due to its relative novelty. Moreover, Ben-Akiva and Morikawa (36) concluded that there is preference for rail travel over bus travel, especially when rail delivers better quality service. For those not considering use of the metro system, social image was not their main concern, as only 7% consider it a barrier. Respondents ranked the top three reasons for not using the metro as: improper route, available car, and car preference. Last, it appears that awareness of the negative impacts associated with private cars is enough to convince higher educated travelers to overlook any social perceptions and use public transit. Consequently, the success of public transit improvements in Kuwait will depend significantly on service quality, route convenience, and positive image.

FIGURE 2 Participants’ cited barriers to using buses in Kuwait, even after improvement.
Another barrier to current system usage, ranking 3rd (8% of respondents) is personal security while on board. One local example of how to overcome this barrier is the Dubai Transport Authority, which has reduced personal security issues by implementing a bylaw that allows bus drivers and metro operators to issue penalty tickets ranging from $35 to $715 CAD. The bylaw has not only successfully improved personal security, but it has also helped to reduce riots, vandalism and tampering on transit property (37). Dubai’s public transport network, including metro, trams, buses, and ferries has had a zero-crime rate recorded during the past eight years (38).

Finally, while much can be made of the results, they do have certain limitations. First, there was a lack of background data and literature related to the transportation situation in Kuwait, and in some cases, conflicting information between sources. Second, in the online survey, there were more than five hundred and eighty responses and three hundred and thirty-one questionnaires were completed (target sample size was above 300 and completion rate was 66.2%). Although the sample size is still large, and the completion rate is relatively high (compared to other transportation studies, where the completion rate is typically below 20%), this had an effect on the analysis process on questions with long options lists. The length of the survey, especially the length of listed answer options, had frequent comments from all respondents. Consequently, completing a long survey might affect the accuracy of responses, and aborting the survey affects the sample size. In this case, the risk of a Type II error is increased, and in turn the power of the analysis is decreased. Moreover, the survey was conducted during the summer period; the summer holiday stretched over three months in Kuwait (extended further for more than four months to include Ramadan month starting from 2016 summer). Launching the survey during the summer holiday time may explain the under-represented male and non-Kuwaiti residents, who typically leave for the summer. We acknowledge that our data is considered preliminary and reflects the importance of having a future national transportation survey in Kuwait.

**POLICY IMPLICATIONS**

A more sustainable and efficient transportation system in Kuwait will require improved transit and land use planning that carefully addresses cultural factors. Hajeeh (39) analyzed traffic problems in Kuwait using an Analytic Hierarchy Process, and found that more efficient traffic monitoring systems, encouraging greater public transportation use, and stricter enforcement of traffic rules and regulations will contribute to minimizing traffic problems, especially in reducing fatalities and injuries. To this end, we recommend the following:

First, the history of outcomes observed following the adoption of each Kuwait Master Plan provides lessons for transportation planners and officials to set clear, precise, adaptive and ongoing long-term goals. These goals must incorporate sustainable environment theory, population growth, and improved public transit. For example, improved public transit must be reliable; its routes must serve more areas; communities must be denser, mixed, and connected; and, metro rail must be the backbone to attract both citizens and expatriates.
Second, understanding the psychological, social, economic and cultural determinants of the behavior toward transportation are a key factor to successful planning for public transportation in Kuwait. The results of this research show a tendency for non-Kuwaiti residents and males to use the public buses more than other categories. Any reforms to the transportation system should be based on a proper assessment of the target group (nationality, gender, age, education and income level), including barriers to changing behavior. Barriers might include family size, weather conditions, quality of buses, drivers’ professionalism, religion, and social aspects. A good starting point to consider to change the negative image that people associate with buses and encourage their use might be a media campaign.

Third, participants of the online survey highlighted the deteriorating condition of current public buses in Kuwait. The low number and poor condition of public buses (and properly trained drivers) needs to be addressed. Results also indicate that improving the quality of buses will encourage their use. Bus improvements might include: air-conditioning units, upgraded seating, and Wi-Fi access. Moreover, more buses would allow for more convenient routes, shorter travel times, shorter walks to/from transit stations, and higher frequency of service.

Fourth, participants also underlined the issue of personal security on buses such as violence and abuse. More female users will be urged to use the system if personal security matters are addressed. For example, like Dubai, Kuwait should authorize bus drivers and/or onboard security officers to issue tickets for violations, and encourage Kuwaitis to try travel by bus.

Finally, to reduce the frequency and severity of traffic collisions, injuries, and congestion, metro passenger rail is needed as soon as possible. The vast majority (86%) of respondents support the metro project, as the solution to transportation problems in Kuwait City and its surrounding urban area. Furthermore, 40% of respondents have stated that they would use metro on a regular basis for both commuting and non-commuting purposes.

CONCLUSIONS

This study contributes critical initial research into understanding significant factors that influence travel mode choices in the Kuwait urban area. It has begun to fill knowledge gaps on public attitudes and travel habits, towards improved public transit systems, and how to implement more sustainable land use and transportation planning projects and policies in Kuwait. Factors such as nationality, gender, age, and education contribute significantly to the prediction of public bus use in Kuwait. The characteristics of the typical Kuwaiti bus user were found to be: non-Kuwaiti resident, male, age between 24-29 years, monthly income level between 1,000 and 3,200 $ CAD (251 - 750 KD), and a graduate degree (Master or higher). Non-Kuwaiti residents use the public bus system 6.4 times more than Kuwaitis, and men are 2.6 times more likely to use buses than women.

Although Kuwaitis appear unwilling to use the bus system (even following improvements) due to its generally negative social image, a large segment of society (especially young workers, low-income residents, and higher educated Kuwaitis) could be influenced to use it with relatively
minor changes (e.g. improved enforcement and bylaws, bus priority measures, and improved driver training). Furthermore, unlike buses, the planned KMRT metro passenger rail has a more positive social image, with 56% of non-users willing to use it. This high level of public support suggests that there would be no social barriers precluding success of a metro project in Kuwait.

These results are preliminary, and have significant limitations including a less than ideal completion rate (many incomplete surveys due to its length) and demographic differences between the sample respondents and Kuwaiti population (likely due to summer vacation leave). Given these limitations, the results and inferences may include some bias; however, the sample provides a significant initial dataset and demonstrates that surveys can be an effective aid in decision-making. This preliminary dataset provides the Kuwaiti government with an important foundation for future work toward sustainability-oriented solutions (e.g. metro planning). It also provides valuable insights to international planners and engineers wishing to understand the Kuwait culture and provide value-added services in Middle Eastern contexts. We recommend that prior to finalizing transportation and development plans in Kuwait, further research will require more comprehensive survey efforts, likely an in-country effort, to confirm results and build on this initial research.

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