Exploring the influence of social engagements on trip generation and destination choice

Thi Anh Hong NGUYEN[1], Makoto CHIKARAISHI[2], Akimasa FUJIWARA[3], Junyi ZHANG[4]

[1]PhD Student, Graduate School for International Development and Cooperation, Hiroshima University
(1-5-1 Kagamiyama, Higashi Hiroshima, 739-8529, Japan)
Email: d141236 @hiroshima-u.ac.jp
[2]Associate Professor, Graduate School for International Development and Cooperation, Hiroshima University
(1-5-1 Kagamiyama, Higashi Hiroshima, 739-8529, Japan)
Email: chikaraishim@hiroshima-u.ac.jp
[3]Professor, Graduate School for International Development and Cooperation, Hiroshima University
(1-5-1 Kagamiyama, Higashi Hiroshima, 739-8529, Japan)
Email: afujiw@hiroshima-u.ac.jp
[4]Professor, Graduate School for International Development and Cooperation, Hiroshima University
(1-5-1 Kagamiyama, Higashi Hiroshima, 739-8529, Japan)
Email: zjy@hiroshima-u.ac.jp

Travel engages in making new connections and extending one's network or sustaining one's existing networks, and such a social engagement would be essential to enhance one's social capital. As a result of growing private vehicles dependence, a strong local social capital could be more important, especially in Asian societies where social ties are believed stronger than Western ones. This paper explores impacts of social engagements measured in two dimensions (i.e. social network and participating in local community activities) on trip generation and destination choice of non-mandatory activities in three new urban areas in Hanoi Metropolitan Area (Vietnam). For this purpose, a logit model of destination choice and an ordered probit model of trip generation were developed to identify different impacts of the social engagements with controlling for socio-demographics, mobility and accessibility, and built environment factors. Results show that for both models the individual's social network variables are statistically significantly, while there is an insignificant for participating community activities. In other words, the individual's social network has a significantly higher impact on destination choice and trip generation for non-mandatory activities compared to participation in local community activities. We also examine whether or not increasing activities and social engagements in residents' location contribute to the improvement of their subjective well-being. The result reveals that social networks have a positive impact not only on self-containment of discretionary activities but also on residents' subjective well-being

Key Words : *Social engagement, destination choice, trip generation, subjective well-being*

1. INTRODUCTION

In order to understand the factors that influence travel choice decisions, transport planners focus particularly on analyzing transport demand, then proposing new transport policies and investments. For instance, changes in trip generation and destination choice could be attributed to factors related to the socio-demographics (e.g. age, gender, income and education), mobility and accessibility (e.g. vehicle ownership and distance to nearest transit stop), context (i.e. trip purpose), and built environment. In transport modelling literature there has been rising recognition that the aforementioned factors are not sufficient to capture travel behavior of a decision maker. As a result, there is increasing interest in examining new variables (e.g. attitudes, habit, awareness and social capital) that has incorporated in transport models (Anable, 2005; Ben-Akiva et al., 2002; Cantillo et al., 2007; Deutsch and Goulias, 2010; Di Ciommo et al., 2014; Domarchi et al., 2008; Hwang et al., 2006; Páez, 2013).

Recent studies have also recognized that social engagements influence travel behavior (Ben-Akiva et al., 2012; Carrasco and Miller, 2006) by extending choice models including some specific elements of social influences (e.g. family and friends) that impact on the process of making a choice. In addition, some

studies have stated that travel engages in making new connections and extending one's network or sustaining one's existing networks, and such a social engagement would be essential to enhance one's social capital (Di Ciommo et al., 2014; Gray et al., 2006; Kamruzzaman et al., 2014; Stanley et al., 2011; Urry, 2012). It is possibly because of the difficulty in measuring the social capital of people with respect to their social relationships, variables representing key components of social capital are quite different across these studies.

Social capital is an original term used in the discipline of sociology, and it is complicated because of set of ambiguous definitions. Social capital refers to the advantages an individual can gain from social participation/networks, reciprocity and mutual trust (Putnam, 1993). As financial capital, it is also like a capital captured though social relations "investment in social relations with expected returns in the marketplace" (Lin, 2002). The matter of social capital has become a prominent subject for many debates, one of these is from the theory of perspective that whether social capital refers only to an individual matter or whether it relates to a broader context – community level (Currie and Stanley, 2008). For social capital at individual level, one of the earliest writers, Bourdieu (1985), views narrowly social capital as a means to gain access through social bonds, to economic and cultural capital. In his view, the volume of the social capital depends on the size of the network of connections and on the volume of the other possessed capitals. Some followers have extended Bourdieu's definition by associated with other capitals such as financial, cultural and human capitals (Fine, 2001; Lin, 2002). This approach would be applicable because (1) according to Gray et al. (2006), a range of acquaintance groups (including families, schools, colleagues and virtual bonds via internet) spatially scatter across regions, and thus social capital would vary and (2) an advantages of this approach - focusing only on structure, such as groups and networks, which would reduce the complexity of handling social capital in empirical studies. On the other hand, such definition would not be able to encompass participation in community and to capture networks automatically gaining more benefits (Johnson et al., 2003). With regards to social capital at community level, Putnam tends to deal with the concept of social capital which is associated with civic engagements in communities/towns (Putnam, 1993; Putnam, 1995a; 1995b; 2000). Particularly, as a measurement through membership in community groups, parents associations and sport clubs, there has been a decline in America's level of civic and political engagements, resulting in negative economic and political consequence (Putnam, 1995b). Putnam believes that social capital refers to community context rather than individual.

In the context of social capital and transport, it has been argued that there are negative relation between car dependence and the development of social capital, resulting in an increase in commuting time and a decrease in community engagements (Adams, 1999). There is a recommendation in enhancing more casual socializing in the community (Putnam, 2000). Additionally, in case that people move in towns but maintain previous activities (e.g. working, shopping and social engagement patterns) without integrating them into the moved local towns, the social capital in the towns would be immediately weakened (Urry, 2002). By focusing on environmentally travel modes (e.g. public transport, walking and cycling), Vuchic (2000) argues the notion of transport planning to create "livable cities" with three major characteristics (environmentally efficient, economically viable, and socially sound). Despite no direct reference, to some extent the aspect of socially sound is implied to social capital. Finally, growing private vehicles dependence and increasing new urban areas nearby downtowns have been witnessed in many countries as a result of rapid economic development, leading to overload the urban transport system (e.g. traffic jam) and to undermine social capital in locality (Adams, 1999). Therefore, having a strong local social capital could be more important, especially in Asian societies where social ties are believed to be stronger than Western ones.

Those social capital are fostered through social engagements that are geographically stretching out, making travel often desirable and necessary (Páez et al., 2006; Urry, 2012). According to Dugundji and Walker (2005), decision makers are influenced by both social (e.g. interactions with other people) and spatial (e.g. locations where they live) networks. Social networks often create demand for traveling (Carrasco and Miller, 2009; Farber and Páez, 2009), and hence travel behavior and mobility are coupled with social bonds and locations (Ryley and Zanni, 2013). In particular, social networks may be an important factor for destination choice and trip generation of discretionary activities, since these activities are often done with family members, relatives and/or friends and thus he/she may not be able to decide solely based on his/her preferences.

Motivated by the above discussions in existing studies on the link between social engagement and travel choice behavior. As a recognition of causal relationship between social engagement and travel

choice is vague and is needed to examine in further agendas. Social engagement would be affected by travel behavior in a long term, while the opposite causal relation may exist in a short term. Following the latter, this study attempts to capture the impacts of social engagements measured in two dimensions (i.e. individual - social network, community - participating in local community activities) on trip generation and destination choice of non-mandatory activities. A logit model of destination choice and an ordered probit model of trip generation were developed to identify different impacts of social engagements with controlling for socio-demographics, mobility and accessibility, and built environment factors. The results show that for both models the individual's social network variables are statistically significantly, while insignificant effects are found for participating community activities. In other words, the individual's social network has significantly higher impact on destination choice and trip generation for non-mandatory activities compared to participation in local community activities. Then, relationship among destination choice and social engagement related to subjective well-being is discussed to examine whether having more activities and social engagements inside new urban areas contributes to having a better quality of life or not. Through answering these questions, it would be essential for urban planning policies as improving self-contained neighborhood. For example, due to housing shortage in urban areas, after moving to new urban areas, residents' social engagements and activities inside should be promoted, potentially leading to positive impacts on their quality of life. Data used in this study were collected in 2015 from a travel diary survey with respect to 469 respondents in three new urban areas in Hanoi Metropolitan Area of Vietnam.

This paper is organized as follows. Sections 2 summarizes the travel diary survey implemented in the three new urban areas in Hanoi Metropolitan Area and shows some aggregation results of travel mode choice and data used in this study. The models and estimation results are shown and discussed in Section 3. In the section 4, the relationships among destination choice, social network and well-being are discussed. Finally, some research findings and future research issues are summarized in Section 5

2. SURVEY AND DATA

(1) The survey

A travel diary survey was conducted at three new urban areas in Hanoi Metropolitan Area (HMA), Vietnam. These are Van Quan, Viet Hung and Ecopark which are located in the inner and outer city of Hanoi, respectively (see Fig. 1). These three areas were selected by considering the timing of the first group of residents moving into these locations and the distance from the Hanoi's Central Business District (CBD). Residents living in these different types of areas may have significantly different residential behaviors, being attributable to their travel mode choices. Among these new urban areas, only Ecopark is located outside of Hanoi City, about 11 kilometers away from the CBD. While Van Quan is a typical community of the first generation of urban development in Hanoi, Ecopark is one of the newly developed areas. Table 1 illustrates the more detailed information about the characteristics each three new urban areas.

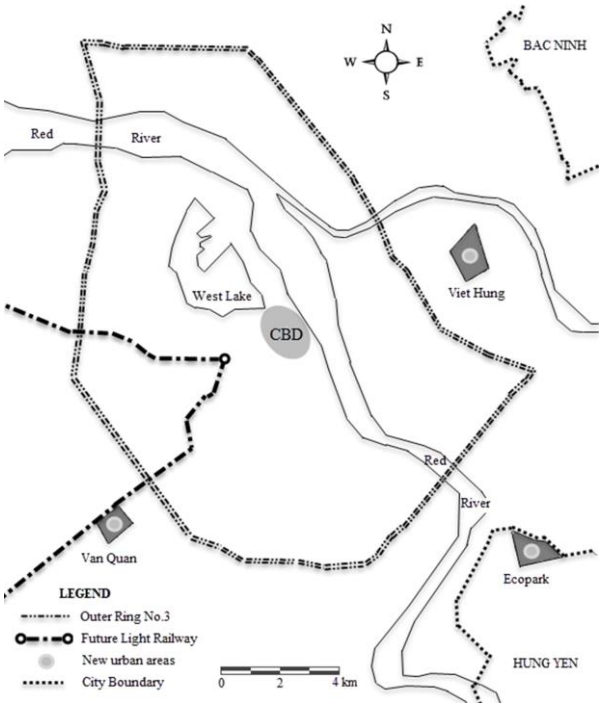

Fig.1 Locations of the three new urban areas

It is important to remember that urban sprawl to the eastern part of HMA is partially restricted by the Red River crosses HMA, and the older part of Hanoi city is located in the western part of HMA with a strong city centre. As many developing cities, road transport is still the dominant travel mode in HMA and traffic congestion is regularly observed. The current public transport supply could not catch up with the fast growth of travel demand, naturally leading to the dominance of motorcycle ownership and use in daily travel (Dharmowijoyo et al., 2015; Tuan, 2012). In 2015, The public transport system was only public bus. While high-income people tend

to own and use private cars due to its comfortability, safety and a sign of social status (Tuan, 2015), chronic congestion and the low performance of public transport services spur HMA's travelers to use motorcycles.

Table 1 Characteristics of the three new urban areas

Characteristics of the three new urban areas	Van Quan	Viet Hung	Ecopark (1st stage)
Area (ha)	61.5	119.4	53.9
Distance to CBD (km)	9	7	11
The first phase of residents moving in	2005	2007	2013
Land use (percentages within each area)			
Residential	39.2	49.7[a]	50.0
Administration and public	9.2	20.5[a]	10.0
Open space	21.0	8.3[a]	12.1
Transport	30.6	21.5[a]	27.9
Number of bus stop	0	8	6[b]

Note: The above information was collected based on the area planning, obtained by interviewing the area investors

[a] Constructed areas of Residential, Administration and public, Open Space & Transport account for about 70%, 55%, 90% of their planned areas in 2015, respectively.

[b] There are two types of bus systems in Ecopark: one is public bus and the other is the investor's bus

The survey contents include four categories of information: (1) household attributes and individual characteristics, (2) frequency to access facilities per month, people's satisfaction with current living area in terms of transport environment and traffic safety, and level of respondents' happiness measured by the Likert scale (0 to 10), (3) social network composition and participation in community activities, and (4) travel diary in two days (one weekday and one weekend day). For capturing intra-household interactions and understand travel activities within a new urban area, data were collected for two household members aged 15 years old and over, but a few of household is with one respondent. As a result, the survey involved 469 individuals from 243 households.

A face-to-face interview was adopted for this survey in October 2015 when there were no special events or local/national holidays that may divert respondents' daily patterns. With the support of the University of Transport and Communications and the local community, the recruitment began with direct communication between the surveyors and the potential respondents. Although it was a recognition of difficulties in getting the entire travel diaries' information without supporting of GPS devices, surveyor training and piloting of the survey were delicately performed to verify whether the design of the survey forms/questions would be understood by both the surveyors and the respondents in order to capture respondents' activities especially short-distance trips. Noted that unlike traditional residential areas, a majority of respondents living in new urban areas in HMA belong to working-age people, making it possible to meet respondents in early evening during weekdays.

(2) Aggregate analysis

A total of 469 respondents, from 243 households, participated in the survey. Some respondents had to be excluded due to missing data (incomplete daily travel diaries, unwillingness to provide some individual characteristics and household attributes), and then some trips with purposes of going home and others also were excluded. As a result, destinations of mandatory trips (working, school, medical treatment and pick-off/drop-off) and discretionary trips (shopping, personal business, meeting with friends/acquaintance, doing exercise, eating out, taking around, leisure activities, and so on) are shown in Table 2. A majority of mandatory activities haven been done outside the new urban area. It is because most respondents travel out the areas for commuting – typical characteristics of new urban areas located in HMA. In contrast, discretionary activities tend to be done inside the area. Since new urban areas were not planned for providing jobs or quality hospitals/universities at the beginning, it would not be easy to reduce traveling out for mandatory purposes. In this case, focusing on discretionary activities looks appropriate in an encouragement of reducing vehicle mile travel, and thus, there are 1718 discretionary trips selected for the binary destination choice model.

Table 2 Destinations of mandatory and discretionary activities

	Destination		
	Inside area	Outside area	Total
Mandatory activities	260	718	978
	26.6%	*73.4%*	*100%*
Discretionary activities	965	753	1718
	56.2%	*43.8%*	*100%*

Table 3 The share of trip generation for discretionary activities

Number of trip generation per day	Number	Share (%)
Zero trip	61	6.9%
One trip	273	30.7%
Two trips	319	35.9%
Three trips	171	19.2%
More than three trips	65	7.3%
Total	*889*	*100.0%*

Table 3 shows basic statistics on share of discretionary trip generation per day. Two and one trips per day are two biggest shares with 35.9% and 30.7%, respectively, followed by three trips per day with 19.2%. In contrast, having no trip and more than three trips per day just accounts for approximately 7%. Thus five categories are selected in the ordered probit model for trip generation with 889 individual-day

Built environment has examined as a key factor affecting trip generation and destination in many studies. Due to limitation in collecting built environment information in the three areas, perceived built-environment measures are used to handle the impact of neighborhood built environment (Michael et al., 2006; Sallis et al., 1997; Wood et al., 2010; Zhang, 2013), instead of objective built-environment measures. As one part of the survey, subjective residential environment measurement focuses on the household's perceptions of the quality of their residential environment. These variables were collected using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). In particular, there are total satisfactions of sixteen aspects related to residential environments (e.g. shops/markets for non-daily shopping and daily shopping, kinder garden, school, restaurants, open/green space, and so on). Then, three new synthetic variables created based on the result of factor analysis, which include leisure satisfaction, education satisfaction and shopping satisfaction, are incorporated into the models

For social engagement factors considered in this study for both models, social engagement at the individual level is represented by social network composition (i.e. number of acquaintance in and out the areas) and "close" social network composition (i.e. number of "close" social network in the areas), while social engagement at the community level is represented by participation in community activities. With regards to social network composition, the respondents reported a number of children/parents, relatives, and acquaintances who do not live together with, and still keep in touch with (i.e. face-to-face communicate at least once within six-month). As a typical feature of residents living in the areas moved in for several years, whose children/parents and relatives live outside their areas, they are commencing to establish new social engagements in the locality and to maintain old ones, and hence, the number of acquaintance in and out the areas are considered to add in the models. Regarding the "close" social network composition, which consists of meeting face-to-face often for non-working purposes, discussing important matters with, and needing help. From information of six people related to being so-called "small worlds" (Watts, 2003) (including basic individual's characteristics, relationship, location, and conversation frequency), to capture the local social engagement, herein the number of "close" social network in the areas was added in the models. As for participation in community activities (comprising about civic community, parents' associations and sports clubs, women associations and so forth), despite the existence of these community groups in the area, some residents do not engage in these community activities. For this reason, having a participation in the community was treated as a variable in the models.

3. MODEL ESTIMATION

(1) Modelling travel choice

A logit model for destination choice and an ordered probit model for trip generation were developed to identify different impacts of the social capital at different levels with controlling for socio-demographics, mobility and accessibility, and built environment factors (Washington et al., 2010). The utility function was assumed to be a linear function of explanatory variables. The model estimation is done by using Software R. It is hypothesized that a greater social engagement at individual level leads to increasing discretionary activities in the area, and vice versa. The based models are presented below.

(a) Destination choice model

The utility U_{njt} that an individual n ($n = 1, 2, \ldots, N$) who travel on a t-th trip ($t = 1, 2, \ldots, T$) chooses destination choice alternative j ($j = 1, 2$) may be written as

$$U_{njt} = \beta x_{njt} + \varepsilon_{njt} \tag{1a}$$

where β is a vector of parameters, x_{njt} is a vector of explanatory variables, and ε_{njt} is an error term which is Gumbel-distributed.

The probability that individual n chooses destination choice i can be written as the following standard logit formulation.

$$P_{njt}(\beta) = \prod_t \left[\frac{e^{\beta x_{nit}}}{\sum_j e^{\beta x_{njt}}} \right] \tag{1b}$$

(b) Trip generation model

The model platform is an underlying random

utility model or latent regression model y^* that an individual n (n = 1, 2,…, N) chosen trip generation alternative y (y = 1, 2,.., J) may be written as

$$y_n^* = \beta x_n + \varepsilon_n \tag{1c}$$

where β is a vector of parameters, x_n is a vector of explanatory variables, and ε_n is an error term.

The probabilities of making j trips can be written as

$$\begin{aligned} P_n(y=j) &= P(\mu_{j-1} < y_n^* < \mu_j) \\ &= P(\mu_{j-1} - \beta x_n < \varepsilon_n < \mu_j - \beta x_n) \end{aligned} \tag{1d}$$

where μ_j are the unknown threshold parameters, defined as $\mu_1 = -\infty$, $\mu_j = +\infty$, and $\mu_1 < \mu_j$ for all j. More concretely, the choice probabilities of the ordered probit model is written as

$$\begin{aligned} &P_n(y=0) = \Phi(-\beta x_n) \\ &P_n(y=1) = \Phi(\mu_1 - \beta x_n) - \Phi(-\beta x_n) \\ &\cdots \\ &P_n(y=j) = \Phi(\mu_j - \beta x_n) - \Phi(\mu_{j-1} - \beta x_n) \\ &\cdots \\ &P_n(y=J) = 1 - \Phi(\mu_{J-1} - \beta x_n) \end{aligned} \tag{1e}$$

where Φ represent the cumulative normal distribution function.

(2) Estimation Results

Table 4 and Table 5 show explanatory variables introduced in the destination choice model and the trip generation model. In general, there are four main groups of explanatory variables (1) socio-demographic and trip context, (2) mobility and accessibility, (3) built environment and (4) social capital. Besides, there are some specific intentions for age and social engagement at the individual level. Particularly, age variable in this study is divided into five age groups to understand differences among these groups on the choice models, while incorporating logarithm of some acquaintances inside/outside into the choice models increases the model fit significantly.

Estimation results for the destination choice and the trip generation are shown in Table 6 and Table 7, respectively. A set of four model results is presented in each table of estimation result where the first model as a base model, the second model regarding social engagement at individual level, the third model respecting to social engagement at the community level, and the final one considering social engagement at both levels.

First, as for the destination choice, as expected, three variables characterizing for social engagement at individual level are statistically significant across models. Especially, the number of acquaintance inside [outside] increases the number of activities inside [outside], being consistent with Nguyen et al. (2016) finding that a greater number of friends within the newtown leads to increasing discretionary activities in the newtown. In contrast, social engagement at the community level does not affect the destination choice for non-mandatory activities. Although only age variable from 51 to 60 years old is indeed significant at 5% level, other socio-demographic factors other show signs as predicted: (1) age-working residents tend to travel out the areas, and female or low/middle individual income or high education people favor in traveling inside the area maybe because of covering house works usually located nearby their houses, vehicle ownership constrains. Almost of trip context variables are significant at 0.1% level, pointing that discretionary related to doing exercise/daily shopping/recreation turn to be done inside the areas. There is a statistically significant for mobility and accessibility with a negative sign (excepted for car ownership), implying that close accessibility transit stops foster to travel out by public transport and those who have a vehicle tend to do activities in the residential areas. The built-environment variable associated with leisure has a significant effect on destination choice, indicating that residents tend to do activates inside by dint of satisfaction on recreation in the current residential areas. Based on the good-of-fitness among the four models, it is confirmed that social engagement at individual level has a significant impact on deciding travel in/out the residents.

For the estimation results for the trip generation, social engagement at individual level is statically significant (excepted for acquaintance outside), while it is interesting that those participating in community' activities leads to an increase in the trip generation. However, when adding both social engagement related variables into the model 4b, social engagement at the community becomes statically insignificant. It is also found that all age-group variables negatively influence on generating the discretionary trips and most of them are statistically significant (excluding the group 51-60 years), indicating that the young lessen in discretionary activities as a burden of commuting and schooling. While female/high education people tend to generate more

discretionary trips, low/middle individual income tend to reduce the number of these trips. The weekend variable is significant at 1 % level. This would be because of stress in working days; residents tend to cut off discretionary trip at weekend. Motorcycle ownership has a significant impact at 5% level in all four models, meaning that owing motorcycle spurs more short-distance non-mandatory activities. Besides, the results show that satisfaction on education/ leisure in residential built-environment result in rising non-mandatory activities.

In summary, based on the estimation results, it is obvious that social engagement at individual level significantly affect destination choice and trip generation for discretionary activities. Also, social engagement at the community level has insignificant impacts on destination, while it could have modest impacts on generating trips though it becomes insignificant when adding both social engagement related variables. Thus, social engagement at the individual level generally has more impact on travel choice (i.e. destination, trip generation) compared with one at the community level. From statistical aspect based on Akaike information criterion (AIC), the second models (model 2a, model 2b) including only social engagement at the individual level is the best model for the both destination choice and trip generation.

Table 4 Explanatory variables for the destination choice

Explanatory variables	Definition	Mean	SD
Socio-demographic and trip context			
Age22	1: < 22years old; 0: Otherwise	0.011	0.102
Age30	1: 23-30 years old; 0: Otherwise	0.147	0.354
Age40	1: 31-40 years old; 0: Otherwise	0.437	0.496
Age50	1: 41-50 years old; 0: Otherwise	0.121	0.326
Age60	1: 51- 60 years old; 0: Otherwise	0.121	0.327
Male	1:Male; 0: Otherwise	0.433	0.496
High education	1: From Bachelor; 0: Otherwise	0.809	0.393
Low individual income	1: Lower than 3 *mil. VND*; 0: Otherwise	0.121	0.327
Middle individual income	1: 3-9 *mil. VND*; 0: Otherwise	0.379	0.485
Weekend	1: Weekend day; 0: Otherwise	0.536	0.499
Doing exercise	1: Exercise purpose; 0: Otherwise	0.208	0.406
Doing daily shopping	1: Daily shopping purpose; 0: Otherwise	0.190	0.392
Doing recreation	1: Recreation purpose; 0: Otherwise	0.229	0.420
Mobility and accessibility			
Car own	1: Household having a car, 0: Otherwise	0.421	0.494
Motorcycle own	1: Household having a motorcycle, 0: Otherwise	0.920	0.272
Distance to nearest bus stop	Distance to nearest bus stop, *meter*	290.472	213.906
Built environment			
Leisure satisfaction	Satisfaction on leisure environment in the area	3.849	0.239
Education satisfaction	Satisfaction on education environment in the area	3.867	0.197
Shopping satisfaction	Satisfaction on shopping environment in the area	3.761	0.224
Social engagement			
Acquaintance inside	Log(Number of acquaintance in the area + 1)	1.809	1.255
Acquaintance outside	Log(Number of acquaintance out the area + 1)	2.833	0.979
Close social network inside	Number of close social network in the area	1.131	1.547
Participating	1: Participating community's activities; 0: Otherwise	0.496	0.500

Table 5 Explanatory variables for the trip generation model

Explanatory variables	Definition	Mean	SD
Socio-demographic and trip context			
Age22	1: < 22years old; 0: Otherwise	0.018	0.133
Age30	1: 23-30 years old; 0: Otherwise	0.142	0.349
Age40	1: 31-40 years old; 0: Otherwise	0.474	0.500
Age50	1: 41-50 years old; 0: Otherwise	0.124	0.329
Age60	1: 51- 60 years old; 0: Otherwise	0.108	0.311
Male	1:Male; 0: Otherwise	0.436	0.496
High education	1: From Bachelor; 0: Otherwise	0.819	0.385
Low individual income	1: Lower than 3 *mil. VND*; 0: Otherwise	0.117	0.322
Middle individual income	1: 3-9 *mil. VND*; 0: Otherwise	0.372	0.484
Weekend	1: Weekend day; 0: Otherwise	0.398	0.490
Mobility and accessibility			
Car own	1: Household having a car, 0: Otherwise	0.435	0.496
Motorcycle own	1: Household having a motorcycle, 0: Otherwise	0.937	0.243
Distance to nearest bus stop	Distance to nearest bus stop, *meter*	296.249	209.701
Built environment			
Leisure satisfaction	Satisfaction on leisure environment in the area	3.835	0.234
Education satisfaction	Satisfaction on education environment in the area	3.853	0.193
Shopping satisfaction	Satisfaction on shopping environment in the area	3.754	0.212
Social engagement			
Acquaintance inside	Log(Number of acquaintance in the area + 1)	1.702	1.254
Acquaintance outside	Log(Number of acquaintance out the area + 1)	2.836	0.970
Close social network inside	Number of close social network in the area	1.002	1.470
Participating	1: Participating community's activities ; 0: Otherwise	0.469	0.499

Table 6 Model estimation results for the destination choice

Independent Variables	Model 1a		Model 2a		Model 3a		Model 4a	
	Estimate	z value	Estimate	z value	Estimate	z value	Estimate	z value
(Intercept)	-1.169	-0.80	-0.304	-0.20	-1.160	-0.79	-0.312	-0.21
Socio-demographic and trip context								
Age22	-0.900	-1.68+	-0.671	-1.25	-0.879	-1.63	-0.690	-1.27
Age30	-0.237	-1.06	-0.061	-0.27	-0.221	-0.96	-0.076	-0.33
Age40	-0.278	-1.35	-0.200	-0.96	-0.273	-1.32	-0.206	-0.98
Age50	-0.424	-1.79+	-0.360	-1.50	-0.417	-1.76+	-0.369	-1.53
Age60	-0.459	-2.02*	-0.459	-2.01*	-0.454	-1.99*	-0.465	-2.03*
Male	-0.096	-0.81	-0.077	-0.65	-0.093	-0.78	-0.080	-0.67
High education	0.088	0.53	0.106	0.64	0.086	0.52	0.107	0.64
Low individual income	0.306	1.40	0.193	0.87	0.299	1.36	0.200	0.90
Middle individual income	0.088	0.65	0.021	0.15	0.088	0.65	0.020	0.15
Weekend	-0.011	-0.10	-0.022	-0.20	-0.011	-0.10	-0.022	-0.20
Doing exercise	2.722	13.75***	2.739	13.71***	2.720	13.73***	2.743	13.71***
Doing daily shopping	0.721	4.80***	0.745	4.92***	0.720	4.80***	0.747	4.93***
Doing recreation	1.060	7.64***	1.047	7.49***	1.060	7.64***	1.047	7.49***
Mobility and accessibility								
Car own	-0.026	-0.23	0.041	0.35	-0.026	-0.23	0.040	0.34
Motorcycle own	-0.874	-3.81***	-0.889	-3.82***	-0.872	-3.80***	-0.891	-3.83***
Distance to nearest bus stop	-0.001	-2.04*	-0.001	-1.88+	-0.001	-2.05*	-0.001	-1.85+
Built environment								
Leisure satisfaction	0.447	1.85+	0.436	1.79+	0.445	1.84+	0.438	1.80+
Education satisfaction	0.165	0.57	0.119	0.41	0.160	0.55	0.124	0.42
Shopping satisfaction	-0.163	-0.64	-0.320	-1.23	-0.166	-0.65	-0.319	-1.23
Social engagement								
Acquaintance inside	-	-	0.087	1.78+	-	-	0.090	1.82+
Acquaintance outside	-	-	-0.151	-2.43*	-	-	-0.151	-2.41*
Close social network inside	-	-	0.123	3.09**	-	-	0.125	3.11**
Participating	-	-	-	-	0.038	0.33	-0.042	-0.36
Observations n = 1706								
Initial log-likelihood	*-1182.51*		*-1182.51*		*-1182.51*		*-1182.51*	
Final log-likelihood	*-997.88*		*-987.28*		*-997.83*		*-987.21*	
McFadden's Rho-square $\bar{\rho}^2$	*0.139*		*0.146*		*0.138*		*0.145*	
Akaike information criterion (AIC)	*1.193*		***1.184***		*1.194*		*1.185*	

- Not relevant; *** Significant at 0.1% level; ** Significant at 1% level; * Significant at 5% level; + Significant at 10% level

Table 7 Model estimation results for the trip generation

Independent Variables	Model 1b		Model 2b		Model 3b		Model 4b	
	Estimate	z value	Estimate	z value	Estimate	z value	Estimate	z value
(Intercept)	-0.506	-0.50	-0.500	-0.49	-0.523	-0.54	-0.503	-0.46
Socio-demographic and trip context								
Age22	-1.169	-4.02***	-0.996	-3.32***	-1.072	-3.60***	-0.943	-3.15**
Age30	-0.417	-2.84**	-0.264	-1.72+	-0.350	-2.27*	-0.230	-1.49
Age40	-0.604	-4.52***	-0.536	-3.89***	-0.577	-4.18***	-0.521	-3.81***
Age50	-0.515	-3.34***	-0.462	-2.92**	-0.478	-3.00**	-0.440	-2.78**
Age60	-0.104	-0.71	-0.048	-0.32	-0.078	-0.52	-0.035	-0.23
Male	-0.052	-0.70	-0.047	-0.63	-0.045	-0.61	-0.043	-0.57
High education	0.091	0.86	0.095	0.89	0.088	0.83	0.093	0.87
Low individual income	-0.111	-0.78	-0.134	-0.93	-0.136	-0.94	-0.149	-1.03
Middle individual income	-0.122	-1.40	-0.162	-1.83+	-0.122	-1.39	-0.161	-1.82+
Weekend	-0.211	-2.88**	-0.244	-3.28**	-0.220	-2.99**	-0.248	-3.33***
Mobility and accessibility								
Car own	-0.098	-1.32	-0.108	-1.43	-0.098	-1.33	-0.106	-1.41
Motorcycle own	-0.316	-2.05*	-0.342	-2.20*	-0.316	-2.05*	-0.342	-2.19*
Distance to nearest bus stop	-0.000	-0.38	-0.000	0.17	-0.000	-0.45	0.000	0.09
Built environment								
Leisure satisfaction	0.317	1.93+	0.307	1.88+	0.315	1.95+	0.306	1.86+
Education satisfaction	0.404	2.16*	0.415	2.17*	0.390	2.08*	0.406	2.08*
Shopping satisfaction	0.050	0.29	-0.034	-0.20	0.046	0.27	-0.032	-0.18
Social engagement								
Acquaintance inside	-	-	0.070	2.19*	-	-	0.064	2.01*
Acquaintance outside	-	-	0.025	0.64	-	-	0.022	0.55
Close social network inside	-	-	0.090	3.34***	-	-	0.087	3.22**
Participating	-	-	-	-	0.161	2.18*	0.099	1.31
Threshold 2	1.111	36.94***	1.118	36.94***	1.112	36.96***	1.119	36.95***
Threshold 3	0.996	41.49***	1.001	41.48***	0.997	41.48***	1.002	41.48***
Threshold 4	0.925	28.64***	0.935	28.62***	0.927	28.63***	0.935	28.61***
Observations n= 889								
Initial log-likelihood	*-2308.06*		*-2308.06*		*-2308.06*		*-2308.06*	
Final log-likelihood	*-1226.15*		*-1214.56*		*-1223.78*		*-1213.70*	
McFadden's Rho-squared $\bar{\rho}^2$	*0.447*		*0.4566*		*0.448*		*0.4569*	
Akaike information criterion (AIC)	*2.803*		***2.7842***		*2.800*		*2.7845*	

- Not relevant; *** Significant at 0.1% level;** Significant at 1% level; * Significant at 5% level; + Significant at 10% level

4. THE RELATIONS AMONG DESTINATION CHOICE, SOCIAL ENGAGEMENTS, AND SUBJECTIVE WELL-BEING

In the previous sections, it has been confirmed that the social engagements at different levels have a significant impact on destination choice decisions. We found that, when residents have more social fabric (acquaintance, close social network, participating to community activities) inside, they tend to conduct activities inside, and vice versa. The social and psychological aspects associated with transport mobility have focused on subjective well-being aspects. For example, participating in a range of activities outside homes is important for well-being (Spinney et al., 2009). According to Stanley et al. (2011), boosting mobility and a sense of community have been shown to be associated with improve personal well-being. However, whether or not having more activities inside new urban areas contributes to having a better quality of life has little been addressed. Answering this question would be essential for urban planning policies as improving self-contained neighborhood. For example, due to housing shortage in urban areas, after moving to new urban areas, residents' social engagements and activities inside should be promoted, potentially leading to positive impacts on their quality of life. As mentioned in the subsection 2.1, this section attempts to provide some additional insights on the impacts of doing activities and social network inside the areas on quality of life by comparing the subjective well-being among different groups. Our particular interest is in the group relating to inside the areas: if their subjective well-being is significantly higher than the other groups, then maintaining the self-contained area would be an important aspect of neighborhood planner. Another important classification in this study is that, to represent respondents' social engagement status in a simple manner, respondents are divided into two groups: those who have more acquaintances inside the new town compared to the outside is grouped into "inside-network" group, and those who have more acquaintances outside is classed as "outside-network" group.

Table 8 Level of subjective well-being across groups

	Those who did more activities inside	Those who did more activities outside
Inside-network group	8.98	8.90
Outside-network group	8.87	8.55

Table 8 presents the level of subjective well-being across four groups. It is confirmed that the respondents belonging to the inside-network group get higher subjective well-being than those in the outside-network group. Although activity locations seem not to be really influential on subjective well-being.

Table 9. The results of t tests for two groups of social networks based on level of subjective well-being

Variable	n	Mean	*t*-value
Those who did more activities inside	956	8.90	
Those who did more activities outside	750	8.62	
			5.519
Inside-network group	442	8.95	
Outside-network group	1264	8.71	
			4.472

As can be seen from Table 9, there is statistically significant for friend networks, with the representatives of inside-network category ranking higher in happiness than the members of outside-network one. This result proves the level of well-being is significantly influenced by social network existed in residents' location. It is also pointed out statistically significant difference is found in the destination choices between the inside and the outside, indicating that there are significant impacts of activities doing inside the residential areas on subjective well-being.

The findings are consistent with the literature reviewed and the hypothesis earlier in this paper. Social engagements affect destination choice of discretionary trips (choosing destinations inside or outside the new town) as well as residents' happiness. In other words, it is thanks to social fabrics in the new town that the respondents who have a higher number of trips within the areas would obtain a higher level of happiness. Policy-makers in urban and transportation planning, therefore, should carefully consider policies promoting mobility and fostering social life inside neighborhood.

5. CONCLUSION

Effects of social engagement on travel behavior have been studied recently in literature. However, relevant studies in the context of developing countries are limited, and especially, the impacts of social engagement at different levels on travel choice have remained unknown. As a result of growing private vehicle dependence and increasing new urban areas

located in the urban fringe have been witnessed in many countries, leading to overload the urban transport system (e.g. traffic jam) and to undermine social engagement in the locality. Therefore, one having a strong local social engagement could be more important, especially in Asian societies where social ties are believed to be stronger than Western ones. Ignoring impact of social engagement at different levels on travel choice may misunderstand the factors affecting travel demand and even can lead to wrong transport policy implications, resulting in lessening the sustainable development of new urban areas.

Targeting a developing city, Hanoi Metropolitan Area (HMA), Vietnam, this study has examined the impacts of both individual, and community levels of social engagement on destination choice and trip generation in the context of discretionary activities. A logit model of destination choice and an ordered probit model of trip generation were developed to identify different impacts of the social engagements with controlling for socio-demographics, mobility and accessibility, and built environment factors based on data collected in three new urban areas in HMA in 2015. For social engagement factors considered in this study for both models, social engagement at the individual level is represented by social network composition (i.e. number of acquaintance in and out the areas) and “close” social network composition (i.e. number of “close” social network in the areas), while social engagement at the community level is characterized by participation in community activities. It is found that social engagement at the individual level significantly affects destination choice and trip generation for discretionary activities, and social engagement at the community level has no significant impact on destination choice. More concretely, social engagement at an individual level have more impact on travel choice (i.e. destination, trip generation) compared with one at the community level. We also examine whether or not increasing activities and social engagements in residents’ location contribute to the improvement of their subjective well-being. The result reveals that social networks have a positive impact not only on self-containment of discretionary activities but also on residents’ subjective well-being.

There are some remaining issues that need to be addressed in future studies. First, the residential environment has been proved to affect travel behavior, which is however measured by perceived information in this study. Also, social engagement at the community level is simplified through only one variable – participation, due to data limitation. Second, it would be worth examining how daily social engagements contribute to enhancing one’s social engagement, which requires longer time-period data such as biographical survey data (e.g. Zhang et al., 2014).

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