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Advancing relative utility maximization models: Application to leisure choice behavior

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Abstract: To better understand individual choice behavior, so-called reference-based models are receiving increasing attention. This paper follows the basic assumption underlying relative utility theory that judgments about choice alternatives are made relative to one or more reference points and proposes a general framework in which these references points are defined related to choice alternatives, social network members and time. To do so, first the concept of reference is elaborated such that it acts as an information source and individuals decide to what extent they should believe it. Then, different model specifications in terms of social network-referenced and time-referenced relative utilities are put forward. Finally, the design of a questionnaire about tourists’ destination and itinerary is presented and descriptive statistics of the collected data are provided.

Keywords: relative utility, reference, leisure choice, questionnaire design, personality traits

1. Introduction

Traditional utility-based choice models have dominated discrete choice modeling and have been applied in different domains for decades (e.g. McFadden, 2001). More recently, more advanced choice models have been developed in an attempt to better predict individual choice behavior. For example, hybrid choice models introduce unobserved constructs, such as attitudes, personality and social influence into conventional utility-based models (e.g. Ben-Akiva et al., 2002; Abou-Zeid & Ben-Akiva, 2014; Kim et al., 2014, 2016). Likewise, reference-based choice models assume that individuals make choices relative to some reference point (e.g. Avineri, 2006; Xu et al., 2014). This reference may be the division point between gains and losses as in prospect theory or one or more other choice alternatives as in regret theory. Rasouli & Timmermans (2015) provide a review of such models for decision making under uncertainty.

In the recent attention given to reference-based choice models, relative utility models suggested by Zhang et al. (2004) largely went unnoticed. This may be because the original model concerned group decision-making. In that context, relative utility models indeed have been acknowledged as useful models (e.g. Ho & Mulley, 2015; Ermagun & Levison, 2016). However, the conceptual foundation of relative utility models is richer and more encompassing, while the mathematical specification is quite versatile. Zhang et al. (2010) showed that prospect theoretic models can be captured in terms of relative utility models. Pan et al. (2016) proved that the random regret minimization model suggested by Chorus (2010) can be viewed as a special case of relative utility models. So it seems timely and worthwhile to further assess the potential value of relative utility models as reference-based choice models.

Relative utility models assert that utility is meaningful only relative to one or more reference points. Similar to the most commonly used random regret model, relative utility models take the non-chosen alternatives as reference points. However, Zhang et al. (2004) argued that individuals’ own choices experienced in the past and choices from their social network

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members may also act as reference points. That is, three different kinds of relative utilities were defined:

1. Alternative-specific relative utility, which is defined by referring to the existence of other alternatives in a choice set;
2. Social network-specific relative utility, in which the alternatives chosen by other persons (i.e., social reference group or social network) serve as reference points;
3. Time-specific relative utility, in which reference points are the alternatives that were chosen by individuals themselves in the past.

Because this terminology may cause confusion, in this paper we suggest using the terms alternatives-referenced, social network-referenced and time-referenced relative utility. To the best of our knowledge, current applications of relative utility models have been confined to alternatives-referenced relative utility. Application domains vary and include mode choice (Zhang & Fujiwara, 2004), choice of destination and shop pattern (Zhang et al., 2004), parking choice and activity participation (Zhang et al., 2005), and joint departure time and route choice (Zhang et al., 2010; Zhang et al., 2013).

This paper aims to further elaborate the originally intended framework for relative utility models by proposing model specifications that also include the social network and temporal decision context. This elaboration is important as the current specification of relative utility models has not been critically assessed for these decision contexts. Meanwhile, we extend the concept of reference by claiming that it may act in varied ways. Conventionally, it is the difference between the performance of an alternative and one or more reference alternatives that truly affect the utility that is derived from choosing the considered alternative. However, the reference could also act as an information source that individuals consult before making decisions. Leisure choice behavior is taken as the example to examine the predictive validity of the proposed models.

The remainder of the paper is organized as follows. In section 2, we first introduce the current relative utility models and then provide potential model specifications (work in progress) that capture the effects of social network and time. In section 3, we discuss the challenges of applying relative utility maximization model to analyze leisure choice behavior, which is followed by an introduction of the questionnaire design used to collect the necessary data. It addresses some specific problems and issues in collecting data for complex decision problems. Descriptive statistics of the collected data are provided at the end of this section. Finally, the paper is completed with a conclusion and discussion of planned future work.

2. Relative Utility Models

2.1 Relative utility in alternative-referenced decision contexts

As mentioned, relative utility models take the non-chosen alternatives in a choice set as reference points. In that sense, these models can be viewed as context-dependent models in which the utility of a choice alternative does not only depend on its attribute values but also on choice set composition. Current relative utility models allow individuals to asymmetrically evaluate alternatives in response to unobserved exogenous and/or endogenous factors. Thus, the basic alternative-referenced relative utility maximization model can be expressed as follows (Zhang et al., 2004):

\[ RU_i = r_i \sum_{j \neq i} (U_i - U_j) = RV_i + \varepsilon_i = r_i \sum_{j \neq i} \sum_k [\beta_k(X_{ik} - X_{jk})] + \varepsilon_i \]

where \( RU_i \) indicates the random relative utility of alternative \( i \); \( RV_i = r_i \sum_{j \neq i} \sum_k [\beta_k(X_{ik} - X_{jk})] \) indicates the deterministic part of \( RU_i \), \( \beta_k \) is the taste parameter with respect to \( k \)th
attribute, $\varepsilon_i$ indicates the random part of $RU_i$; $U_i$ and $U_j$ indicate the utilities of alternatives $i$ and $j$, respectively; $r_i$ is a relative interest parameter for alternative $i$, indicating individuals’ asymmetrical evaluation of alternatives; $X_{ik}$ and $X_{jk}$ indicate the level of the $k$th attribute of alternatives $i$ and $j$, respectively. Assuming distributions for $\varepsilon_i$, a new family of choice models based on relative utility can be developed. Beyond the original, basic formulation, the flexibility of the model has been illustrated. Zhang et al. (2010) showed that the model specification may reflect prospect theory by treating gains and losses unequally. This specification can be described as follows:

$$RV_i = r_i \left\{ \sum_{j \neq i} \left[ \sum_k \left( y^+_k \left( d^+_i \Delta X_{ijk} \right)^{\alpha} - y^-_k \left( -d^-_i \Delta X_{ijk} \right)^{\beta} \right) \right] \right\}$$

where $y^+_k$ and $y^-_k$ are taste parameters for attribute $k$; $\alpha$ and $\beta$ are parameters derived from prospect theory; $\lambda$ is a loss aversion parameter, which is assumed to be larger than 1, indicating that individuals are more sensitive to losses than to corresponding gains; $d^+_i$ and $d^-_i$ are dummy variables, $d^+_i$ is set to 1 if $\Delta X_{ijk}$ is non-negative, otherwise 0, $d^-_i$ is set to 1 if $\Delta X_{ijk}$ is negative, otherwise 0; $\Delta X_{ijk} = X_{ik} - X_{jk}$, which defines difference of attribute $m$ between two alternatives.

Thus, as indicated in Zhang et al. (2013), a more general framework for alternatives-referenced relative utility can be expressed as:

$$RV_i = f(g(X_{ik} - X_{jk}), r_i, \omega_{ij} | j \neq i)$$

where $\omega_{ij}$ is a weight parameter reflecting the influence of alternative $j$ on alternative $i$. Using different functional forms for $f$ and $g$, this equation can flexibly represent different reference-based mechanisms, including random regret minimization. More specifically, the additive RUM model can be represented by assuming a linear form with all relative interest parameters being the same; the regret-based model suggested in Chorus et al. (2010) takes a smooth exponential form, and considers all foregone alternatives. Thus, relative utility models represent a powerful framework to model choice behavior that includes the additive RUM model, and some regret minimization and prospect theoretic models as special cases. Mathematically, the random regret model specification suggested in Chorus et al. (2008) is another special case in that it takes a non-smooth polyline form, and only considers the best foregone alternative. However, in this case, it is questionable whether the term utility is adequate considering the process that is represented.

2.2 Relative utility in social network referenced decision contexts

There are many studies in which social influence, usually presented as the market share of the alternatives chosen by social network members, enters the choice model as part of the utility function (e.g. Brock & Durlauf, 2001; Dugundji & Walker, 2005). The focus of these studies is on measuring the relationship or “distance” between egos and social networks members. By contrast, social influence in this paper focuses on specific social network members, whose choice and/or provided information is taken as a reference. Individuals may passively or actively become aware of the choices of members of their social network or opinions and preferences of their social network members. If the attributes of alternatives are subjective, individuals have to decide to what extent they should trust the information from social network members and take it into consideration. If the attributes of alternatives are objective, such as travel time or ticket price, the choices of social network members’ choices may affect individuals’ preferences. In that sense, in the first situation, the provided information about alternatives acts as an information (re)source; while in the second situation, choices of social network members act as reference points that individual prefer to
come close to or keep away from. Accordingly, two different relative utility function forms are proposed. In the first situation, a possible general specification for social network-referenced decision contexts may be:

\[ RV_{in} = f(\beta_k, g(\Delta X_{ikn'}, \omega_{knn'}) ) \]

where \( RV_{in} \) is the deterministic part of the relative utility of alternative \( i \) for individual \( n \); \( g \) is a monotonic function reflecting the shift of individual \( n' \) perception of alternatives; \( \Delta X_{ikn'} \) could be either the ratio or difference between \( X_{ikn} \) and \( X_{ikn'} \); \( X_{ikn} \) and \( X_{ikn'} \) are the performance of alternative \( i \) with respect to the \( k \)th attribute for individuals \( n \) and \( n' \), respectively; \( \omega_{knn'} \) is a weight parameter, which could be a function of relationship between individual \( n \) and \( n' \), indicating to what extent individual \( n \) adapts his/her opinion about attribute \( k' \) based on the opinions of individual \( n' \). \( \omega_{knn'} \) should follow a principle that when it is 0, the model would reduce to the additive RUM model. One example may be:

\[
RV_{in} = \sum_{n'} \sum_k \beta_k \left[ \left( \frac{X_{ikn'}}{X_{ikn}} \right)^{\omega_{knn'}} X_{ikn} \right] = \sum_{n'} \sum_k \beta_k \left[ X_{ikn} (1-\omega_{knn'}) \cdot X_{ikn'}^{\omega_{knn'}} \right]
\]

For the above specification, \( \omega_{knn'} \) falls between 0 and 1. If \( \omega_{knn'} = 0 \), individual \( n \) prefers to stick to his/her own opinions; if \( \omega_{knn'} = 1 \), individual \( n \) copies individual \( n' \) information. In the second situation, a possible general specification for social network-referenced decision contexts may be:

\[
RV_{in} = f( h(\Delta X_{ikn'}, \theta_{knn'}), X_{ikn} )
\]

where \( h \) is a function reflecting the shift of preference of individual \( n \); \( \theta_{knn'} \) is a weight parameter, which could be a function of relationship between individual \( n \) and \( n' \), indicating the influence of choice of individual \( n' \). \( \theta_{knn'} \) could be any real number, and should follow a principle that when it is 0, the model would reduce to additive RUM model.

Notice that the above specifications do not contain the relative interest parameter as alternative-referenced relative utility models do. The reason is that we believe that the constant (interception) in the utility function has a similar meaning as relative interest parameter. In order to avoid the confounding effect of these two parameters, the relative interest parameter is not considered here.

### 2.3 Relative utility in time-referenced decision context

We assume that individuals’ experiences may act as reference points in relative utility models in time-referenced decision contexts. That is, the utility that individuals derive from the planned choice depends on the choices they made in the past in similar choice situations. The influence of past choice behavior varies across individuals. Some prefer to choose the same/similar alternatives (loyalty) while others prefer to choose other alternatives (variety-seeking behavior). This may depend on individuals’ personality, attitudes or the specific choice context. Particularly in leisure and vacation behavior, both strong habitual behavior (e.g. Bargeman et al., 2002) and variety-seeking behavior has been reported (e.g. Kemperman et al., 2002). The corresponding relative utility model may be specified as follows:

\[
RV_{it} = f(\beta_k, p(\Delta X_{iktt'}, \omega_{ktt'}) )
\]

where \( RV_{it} \) is the deterministic part of relative utility at time \( t \) (current time); \( \Delta X_{iktt'} \) could be either the ratio or difference between \( X_{ikt} \) and \( X_{jkt'} \); \( X_{ikt} \) is the current performance of
alternative \( i \) with respect to the \( k \)th attribute; \( X_{jkt'} \) is the performance of chosen alternative \( j \) with respect to the \( k \)th attribute at time \( t' \); \( \omega_{kt} \) is a weight parameter, which could be a function of satisfaction, elapsed time (or other factors) of previous trips, indicating the influence of chosen alternative \( j \) at time \( t' \) on current alternative \( i \) with respect to the \( k \)th attribute. Here \( t' < t \), indicating the influence of past choices on current behavior.

3. Application to Leisure Choice Behavior

To empirically test the proposed models, a questionnaire about tourists’ destination and itinerary choice was designed. Tourism destination and itinerary choice behavior was taken as the application domain for the following reasons: 1) to our best knowledge, previous studies in leisure choice behavior domain may take experienced choice, or social interactions into consideration (e.g. Wu et al., 2012; Wu et al., 2013), but no one has applied relative utility models; 2) it is a class of choice behavior for which all three kinds of reference may be relevant, allowing us to estimate models of different complexity. At the same time, leisure choice behavior offers various challenges in the data collection because it is more complex than many other types of choice behavior. Here we use destination and itinerary choice behavior as examples to offer a brief statement.

The first challenge comes from the design of the destination choice set. Motivations for vacations differ widely. Consequently, tourists may have succinct preferences for particular destinations. Moreover, vacation choice is fundamentally multi-faceted choice behavior (van Middelkoop et al., 2004) in which households trade off destinations, activities, accommodation, transport mode, and price, etc. As a consequence, a wide set of attributes influences the decision process, while the choice set is potentially very large, presenting challenges to the data collection process. Meanwhile, households will also face budget and other constraints. A second challenge therefore is the identification of attributes of destinations and the consideration set. A destination could provide leisure activities, natural landscape, and cultural heritage, etc. Potentially not only many attributes influence the decision making process, but because the decision may involve non-repetitive behavior, individuals have incomplete and imperfect knowledge about the attributes of the destinations. Therefore, attributes of destinations are subjective rather than objective. Under these circumstances, they likely collect information from different sources, including from members of their social network who visited the destination before. Therefore, a third operational challenge is how to measure data on social influence and previous trips. On the one hand, leisure trips do not occur frequently, so respondents may not remember the details of the trips exactly. On the other hand, information from social network members may vary and be incomplete. How to offer this information to the egos is an issue. A fourth challenge lies in variety of travel mode. Tourists go for vacation by different modes, such as aircraft, automobile, train, and intercity bus, etc. Even in some situations, tourists use several modes sequentially. How to identify the key travel mode as well as its attributes is another issue. In the remainder of this section, the questionnaire that we used to collect data is briefly introduced, and descriptive statistics of collected data is also presented.

3.1 Leisure choice questionnaire design

As for destination choice, the questionnaire prompts respondents to first generate a choice set and then asks them to choose a certain city from the choice set. Specifically, first a set including 32 tourism destinations (cities) in Europe was generated after an extensive review on the Internet. Then, these cities were divided into 4 groups according to their main characteristics (Nature, Culture, Leisure and Atmosphere). Respondents were asked to choose one city from each group to construct a choice set of their interest. Then city images, consisting of 4 factors (Nature, Culture, Leisure and Atmosphere) were considered as determinants of tourists’ choices. Nature and Culture are easy to understand, Leisure denotes the opportunities in a city
to carry out recreational activities such as shopping, nightlife and sports, and *Atmosphere* denotes public security, friendliness of residents and language barriers in a city. Finally, 4 statements about these images were presented, and respondents were asked to report how much they agree or disagree with these statements using a scale from 0 to 10. The higher the score, the more they agree with the statement.

As for itinerary choice, attributes such as ticket price and flight departure time were taken into consideration. We consider the aircraft as the main travel mode. Since the destinations we provide are somewhat far away from the Netherlands, it is reasonable to assume tourists go to their destination by air. Note that our purpose is not to develop a general model of vacation choice behavior; otherwise we should allow for alternative transport modes. A D-efficient stated choice experiment was designed using Ngene. The complete list of attributes and their levels are shown in Table 1. Some attributes need further explanation: length of stay in a city is not an attribute of the itinerary; instead, it acts as a context variable. On-time performance means the percentage of times an aircraft arrived within 15 minutes of the scheduled arrival during the past 30 days. Finally, 128 profiles with 32 blocks (i.e. each respondent should answer 4 stated choice questions) were generated in total. For the context variable, length of stay, its 4 levels were randomly ordered and then presented in blocks to each respondent.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of Stay</td>
<td>1 ~ 3 nights, 4 ~ 7 nights, 8 ~ 10 nights, 11 nights or more</td>
</tr>
<tr>
<td>Flight Departure Time</td>
<td>6:00 ~ 9:00, 9:00 ~ 17:00, 17:00 ~ 21:00, 21:00 ~ 24:00</td>
</tr>
<tr>
<td>Ticket Price</td>
<td>€69, €139, €209, €279</td>
</tr>
<tr>
<td>On-time Performance</td>
<td>60%, 70%, 80%, 90%</td>
</tr>
<tr>
<td>Aircraft Type</td>
<td>propeller, jet</td>
</tr>
<tr>
<td>Leg Room</td>
<td>wide, small</td>
</tr>
<tr>
<td>Charge for Food</td>
<td>yes, no</td>
</tr>
<tr>
<td>Charge for Checked Baggage</td>
<td>yes, not for the first one</td>
</tr>
<tr>
<td>Frequent Flyer Member</td>
<td>yes, no</td>
</tr>
</tbody>
</table>

As for past experience, respondents were asked to recall 5 leisure trips. Travel information that was collected included travel mode, departure time from home, travel cost and length of stay. Meanwhile, overall satisfaction with these trips and images of main visited cities were also collected.

As for social network, respondents were first asked to recall 3 members from different social network (friends, neighbors, and relatives) in order to measure the influence of different types of social network. For the sake of questionnaire simplicity, one of the 3 members was (randomly) chosen. Then, socio-demographic information and the relationship between respondents and this social network member were gathered. Ideally, we would contact this person and collect data on images, past experience and past choice. However, as this is difficult and costly to implement in practice, we designed this kind of information. In the destination choice part, we used an orthogonal design to generate social network members’ images. A potential problem of this approach is that the generated images may be incongruent with the social network member’s personality. Consequently, the respondent may doubt the reliability of specific opinions of the social network member or even the credibility of the full data collection. On the other hand, we know from the literature on family decision making that even spouses often do not know each other’s preferences, and hence in reality this potential problem may be less for social networks. In order to avoid extreme situations, only the scale from 3 to 8 was used. Finally, 72 profiles of destination images were generated in total. For each respondent, the opinions of a social network member were randomly sampled from the.
orthogonal set of 72 profiles. The results were presented in graphic form. Figure 1 shows an example.

![Figure 1: Example of city image presenting in questionnaire](image)

In addition, we believe that tourists’ destination and itinerary choice behavior is rooted in their inherent personalities. Therefore, several questions about personality were asked. Specifically, 6 personality traits were defined in our questionnaire. Notice that we did not aim to model a full spectrum of personalities of tourists. Rather, we focused on only those we think are related to leisure choice behavior. These six selected personality traits are: **Adventure, Artistic Interests, Social Ability, Variety Seeking, Adaptability and Rational Consumption**.

The **Adventure** trait reflects individuals’ attitudes towards extreme things. High adventure could be found in individuals who like challenges, risks, or extreme activities. With respect to leisure destination choice, an individual with high adventure might like destinations that can offer extreme sports, unique experience, etc. This trait also reflects individuals’ attitude towards safety. Individuals with a high score on adventure may sacrifice safety for other things, such as saving money or unique experience.

The **Artistic Interests** trait reflects the tendency to appreciate arts. High artistic interests can be found in individuals who like painting, music, dance, photography, literature, etc. As to leisure destination choice, an individual with high artistic interests may prefer destinations with well-designed architecture, big museums, beautiful views, great history, or artists’ former residences, etc.

The **Social Ability** trait reflects the tendency of individuals to express themselves in public, or hang out with friends, etc. High social ability can be found in individuals who spend most of their time with friends, and cannot stand being alone even for a short time. In the context of leisure destination choice, an individual with high social ability may like destinations that have wonderful nightlife, crazy carnival, crowded tourists, etc.

The **Variety Seeking** trait reflects individuals’ attitudes towards different things. High variety seeking can be found in individuals who like to try new things, dislike routine or conventional things. With respect to leisure destination choice, individuals with high variety seeking may like travel to different destinations with different customs and culture.

The **Adaptability** trait reflects individuals’ attitudes towards others’ behavior, opinions, critics, proposals, etc. It indicates to what extent an individual is willing to take others’ advice. High adaptability can be found in individuals who are indecisive, dependent, unaccustomed to making decisions, or used to following others. In another words, an individual with high adaptability tend to consult his/her friends and makes decisions according to the advice of friends.
The *Rational Consumption* trait reflects individuals’ consumption attitudes. High rational consumption can be found in individuals who are careful spending money, mainly focus on products’ price/performance ratio, or buy only the things they need. This trait is mainly related with tourist itinerary choice in our case. An individual with a high score on rational consumption may prefer cheap itineraries, which usually sacrifice level of service, such as safety, comfort, free food/checked baggage.

In these 6 personality traits, *Adventure, Artistic Interest, Social Ability* and *Variety Seeking* are related to destination choice. *Rational Consumption* is related to itinerary choice, *Variety Seeking* is also related to experience, and *Adaptability* is related to social-network influence. Each trait contains 6 items, which were derived from an online database called International Personality Item Pool ([http://ipip.ori.org/](http://ipip.ori.org/)).

### 3.2 Descriptive statistics of the collected data

The online-based survey was administered in April 2017. Finally, 808 completed questionnaires were collected. Table 2 shows some descriptive statistics of the collected data.

| Table 2 : Summary of respondents’ socio-demographic characteristics |
|-------------------------------------------------|-----------------|-----------------|-----------------|-----------------|
| Gender                                         | Frequency       | Percentage      | Age             | Frequency       | Percentage      |
| Male                                           | 407             | 50.37%          | 25 ~ 35         | 175             | 21.66%          |
| Female                                         | 401             | 49.63%          | 36 ~ 45         | 176             | 21.78%          |
| Education                                      |                 |                 |                 |                 |                 |
| Primary Education                              | 11              | 1.36%           | 56 ~ 65         | 167             | 20.67%          |
| Secondary Education                            | 253             | 31.31%          | 66 ~ 75         | 99              | 12.25%          |
| Vocational Education                           | 228             | 28.22%          | Paid Job        | 530             | 65.59%          |
| University Degree                              | 316             | 39.11%          | Others          | 278             | 34.41%          |
| Income (monthly)                               |                 |                 | Marital Status  |                 |                 |
| ≤ €625                                        | 75              | 9.28%           | Single          | 167             | 20.67%          |
| €626 ~ €1250                                   | 140             | 17.33%          | Live with Partner| 159             | 19.68%          |
| €1251 ~ €1875                                  | 183             | 22.65%          | Married         | 435             | 53.84%          |
| €1876 ~ €2500                                  | 214             | 26.49%          | Divorced        | 30              | 3.71%           |
| €2501 ~ €3125                                  | 119             | 14.73%          | Widowed         | 17              | 2.10%           |
| ≥ €3126                                        | 77              | 9.53%           |                 |                 |                 |

Table 2 shows the socio-demographic characteristics of respondents. The collected sample is not representative of the Dutch population. However, that is not needed for the analysis. The sample is nearly uniformly distributed with respect to gender – 50.37% are male and 49.63% are female. The age of the sample ranges from 25 to 75, who we believe can conduct independent leisure trips. The sample is nearly equally distributed in each interval, except those aged from 66 to 75, which includes less respondents. In terms of education, most respondents have a university degree (39.11%), followed by those who received secondary education (31.31%) and vocational education (28.22%). Only very few respondents (1.36%) just received primary education. In terms of occupation, most respondents (65.59%) have a paid job, almost twice as many as others (34.41%). In terms of monthly income, the sample is nearly normal distributed, most of which are located in the interval [€1876, €2500] (26.49%). In terms of marital status, most respondents are not alone – “married” accounts for 53.84% and “live with partner” accounts for 19.68%. Others include “single” (20.67%), “divorced” (3.71%) and “widowed” (2.10%).

As to destination choice, 278 respondents (34.41%) show shifting behavior after considering information of social network members. As to itinerary choice, there are 1716 observations in
which respondents’ independent choices differed from the designed choice of social network members. Among these 1716 observations, 433 observations reveal shifting behavior, accounting for 25.23%. The results show that social influence does affect individuals’ choice behavior to some extent.

![Figure 2: Distribution of previous trips in terms of visited year](image)

As to previous trips, Figure 2 presents the distribution of the year mentioned. It shows most recalled trips were carried out during the last few years, especially during the last year. It is realistic in that individuals tend to retrieve information from their memory based on some guiding principle. Elapsed time is one of these. However, we should notice that some respondents recalled the trips before the year 1997, suggesting that the uniqueness of the trip may also matter. These trips might be so memorable that the probability of respondents retrieving these trips from their memory increases: the activation level of these trips is relatively high.

4. **Conclusions**

We like to emphasize that the paper reports work in progress. The paper followed the basic ideas of relative utility models and presented a general framework for relative utility maximization models in terms of alternative-, social network- and time-referenced decision contexts. In addition to expand the interpretation from direct comparison to other influence, the meaning of the concept of reference was elaborated. First of all, it refers to assessments of performance differences between alternatives, people and episodes. Second, it could act as information source that influences the decision process. Third, its existence may cause the shift of individuals’ preference.

Different tentative model specifications for social network- and time-referenced decision contexts were suggested. To test the validity of the proposed models, leisure choice behavior was considered and a questionnaire about tourists’ destination and itinerary choice with social network and experience influence was designed. In addition, tourists’ personalities were also taken into account and a 6-trait structure was designed. The paper focused on some challenging issues in the data collection that reflect the complexity of the decision making process. Unfortunately, there was not enough time to rigorously estimate and assess the models. However, results of descriptive analysis indicate that leisure choices are partly influenced by social influence and previous experiences. Thus, in coming months we will investigate the regularity in the collected data and assess the potential of relative utility models in that context.
References


