EVALUATING INTERNATIONAL RETIREMENT MIGRATION OPTIONS WITHIN ASIA PACIFIC: THE TOPSIS METHOD

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ABSTRACT. *Longer life expectancy has presented older adults the option of international retirement migration (IRM). Using the TOPSIS method, this study aimed to provide a systematic way of evaluating possible migration destination within Asia Pacific for older Asian adults. Four countries, namely Australia, Japan, New Zealand, and Singapore were chosen as many of their cities have consistently appeared in various lists of "best cities to live in". Criteria for consideration include cost of living, quality of life, Hofstede's masculinity, and health care quality. On behalf of an elderly couple from Taiwan, this study evaluated multiple attributes using the TOPSIS method to provide a ranking of countries that best suited their IRM requirements. Final evaluation showed that Australia is the most desirable retirement migration destination while Singapore is the least desired destination. This study demonstrated that the TOPSIS method can be utilized to assist in unstructured decision-making such as evaluation of real life choices.*
Keywords: International retirement migration, Older adults, Quality of life, TOPSIS, Migration destination

1. Introduction.

Recently the World Health Organization (WHO) has forecasted that the proportion of the world's population over 60 years old will double from 11% of world population to 22% between 2000 and 2050, with the absolute number of people aged 60 years and over to increase from 605 million to 2 billion over the same period. As medicine advances and technology progresses, the number of octogenarians and centenarians in countries around the world will only increase in the years to come.

With these extended years and better health, people would either delay their retirement age or enjoy longer retirement life. These options bring new challenges to the human and societal dynamics. Previously conspicuous in the U.S. and Europe, the phenomenon of IRM is becoming more salient in Asia. Globalization and ease of mobility has made the option of IRM or simply having a second home in a foreign country a possible and feasible alternative for the aging but increasingly affluent society of Asia. For example in Japan, long-stay tourism, known as *"rongusutei"* in Japanese, is a blooming tourism segment in which people stay in foreign destinations for long periods of time in order to experience living abroad. As the standard of living in Asian cities improves, the trend of IRM within Asia Pacific will only become more widespread.

In this study, a preference measurement model was developed to rank four Asia Pacific countries, namely Australia, Japan, New Zealand, and Singapore. Cities in these countries were ranked in Mercer's 2011 Quality of Living Survey [1] and Monocle's 2012 Quality of Life Survey [2]. Hong Kong was not included due to the lack of reliable data for several evaluation criteria.

2. Theoretical Background.

More than two decades ago, Wilson [3] has shown that IRM, from northern to southern Europe has grown in scale and geographical span at the

same time as there has been a marked increase in life expectancies and in the ability of individuals to lead longer active lives in retirement. In order to enjoy their retirement in a different country, older adults would need to take the following criteria into consideration.

Cost of Living. Stretching their retirement funds to ensure lifestyle continuity is one of the important concerns of older adults. Clark and White [4] provide the most detailed study of income and mobility, discovering that older adults with low or high incomes are more likely to move than their middle-income counterparts. Older adults who intend to move will definitely take the cost of living of their prospective migration destinations into consideration as the lower cost of living makes going out to restaurants, cafes, and bars more affordable than in their home countries [5,6].

Quality of Life. Whatever the reason(s) older adults have for embarking on international migration, seeking a better quality of life is never far from the list of considerations [7]. Among the measurements of quality of life are political stability, security, public services and transportations, recreation, consumer goods, housing, and natural environment. In a survey conducted by King et al. [8], the top 2 reasons given by older adults for moving to their chosen destination were climate and health.

Masculinity. In later life, a stable relationship to a place enhances continuity, a strong self-image, independence, and feelings of competence [9]. Thus it is only natural to choose a country that has similar cultural values if older adults are to consider international migration. According to Hofstede [10], a society that is culturally feministic prefers cooperation, modesty, and cares for the weak, and it is more consensus-oriented. Thus migrating to a culturally feministic society would minimize adaptation and acculturation issues that may arise.

Health Care Quality. The need for formal health care services for individual aged 65 years and older will increase at a rapid rate [11]. Thus the quality of health care in the migration destination must be adequate to cater for the needs of older adult migrants. Number of physicians in migration destination countries is one of the many obtainable indicators for the availability and accessibility of health care services.

Many studies on IRM are focused on the socio-economic background [12], characteristics [12] and motivation [7,8] of these retiree migrants. Data is gathered and analyzed before and/or after the decision to migrate has been made. Researchers have limited insights into the evaluation criteria and decision making process of these retiree migrants. This study aimed to propose a novel yet scientific method to assist in their decision making.

3. TOPSIS Method. Hwang and Yoon [13] initially presented TOPSIS as a concept of distance measurement. The ideal solution is a solution that maximizes the benefit attributes and minimizes the cost attributes, whereas a negative ideal solution does the opposite [14]. According to Shih et al. [15], the TOPSIS method denotes a sound logic that represents the rationale of human choice; it is also a simple computation process that can be easily programmed into a spreadsheet; and finally, it provides a scalar value that accounts for both the best and worst alternatives at the same time.

Suppose a MADM/MCDM problem has m alternatives $(A_1, A_2, \ldots, A_m)$, and n decision criteria/attributes $(C_1, C_2, \ldots, C_n)$. Each alternative is evaluated with respect to the n criteria/attributes. All the values/ratings assigned to the alternatives with respect to each criterion form a decision matrix denoted by $X = (x_{ij})_{m \times n}$. Let $W = (w_1, w_2, \ldots, w_n)$ be the relative weight vector about the criteria, satisfying $\sum_{j=1}^{n} w_j = 1$. Then the TOPSIS method can be expressed in a series of steps as follows:

(1) Normalize the decision matrix $X = (x_{ij})_{m \times n}$ by calculating r_{ij} which represents the normalized criteria/attribute value/rating. For the minimization objective

$$r_{ij} = (1/x_{ij}) \Big/ \sqrt{\sum_{i=1}^{m} 1/x_{ij}^2}, \text{ where } i = 1, 2, \ldots, m \text{ and } j = 1, 2, \ldots, n. \quad (1)$$

For the maximization objective

$$r_{ij} = x_{ij} \Big/ \sqrt{\sum_{i-1}^{m} x_{ij}^2}, \text{ where } i = 1, 2, \ldots, m \text{ and } j = 1, 2, \ldots, n. \tag{2}$$

(2) Calculate the weighted normalized decision matrix $V = (v_{ij})_{m \times n}$

$$v_{ij} = r_{ij} \cdot w_j, \text{ where } i = 1, 2, \ldots, m \text{ and } j = 1, 2, \ldots, n, \tag{3}$$

where w_j is the relative weight of the jth criterion or attribute, and $\sum_{j=1}^{n} w_j = 1$.

(3) Determine the ideal (A^*) and negative ideal (A^-) solutions:

$$A^* = \{v_1^*, v_2^*, \ldots, v_n^*\} \text{ where } v_j^* = \max_i(v_{ij}), \tag{4}$$

$$A^- = \{v_1^-, v_2^-, \ldots, v_n^-\} \text{ where } v_j^- = \min_i(v_{ij}). \tag{5}$$

(4) Calculate the Euclidean distances of each alternative from the positive ideal solution and the negative ideal solution:

$$d_i^* = \sqrt{\sum_{i=1}^{n} (v_{ij} - v_j^*)^2} \quad i = 1, 2, \ldots, m, \tag{6}$$

$$d_i^- = \sqrt{\sum_{i=1}^{n} (v_{ij} - v_j^-)^2} \quad i = 1, 2, \ldots, m. \tag{7}$$

(5) Calculate the relative closeness of each alternative to the ideal solution. The relative closeness of the alternative A_i with respect to A^* is defined as CC_i

$$CC_i = d_i^- / (d_i^* + d_i^-) \quad i = 1, 2, \ldots, m. \tag{8}$$

(6) Rank the alternatives according to the relative closeness to the ideal solution. The bigger the value of CC_i, the better the alternative A_i. The best alternative is the one with the greatest relative closeness to the ideal solution.

4. **Case Study.** Based on the criteria specified in the literature review, a decision matrix was constructed as in Table 1. Main reason for most retirement migration is to maximize one's dollar in search of a better quality of life. For this study, an elderly couple from Taiwan was interviewed to seek their opinion on the weight of these criteria. Being fairly healthy and wealthy (both are recently retired teachers receiving monthly pension), they ranked the criteria as follows: quality of life was given the highest weight of 4, followed by healthcare quality (a weight of 3), cost of living (a weight of 2) and masculinity (a weight of 1). The flexibility of the TOPSIS method is such that the weight can be decided and/or changed accordingly to meet varied requirements and importance.

After filling in the values taken from the sources specified in Table 1, an initial decision matrix is obtained (Table 2).

A normalized matrix can be derived from either Equation (1) or Equation (2) by deciding whether to minimize or maximize the objective of the selection criteria. See Table 3. In this study, QoL and HcQ are to be maximized while CoL and MAS are to be minimized. Table 4 showed the weighted normalized decision matrix for each criterion.

TABLE 1. Criteria, source and weight

Criteria	Objective Measurement and Source	Weight
Cost of Living (CoL)	Consumer Price Index (World Bank, 2011)	2
Quality of Life (QoL)	International Living's QoL Index 2011 [16]	4
Culture Compatibility – Masculinity (MAS)	Hofstede's Masculinity/Femininity scores	1
Healthcare Quality (HcQ)	Physicians per 1000 population (World Bank, 2010)	3

TABLE 2. Evaluation criteria of candidate countries

Country	CoL	QoL	MAS	HcQ
Australia	119.7	73	61	3.9
Japan	99.3	74	95	2.1
New Zealand	120.0	76	58	2.7
Singapore	119.6	57	48	1.9

TABLE 3. Normalized decision matrix

Country	CoL	QoL	MAS	HcQ
Australia	0.2610	0.2607	0.2328	0.3679
Japan	0.2165	0.2643	0.3626	0.1981
New Zealand	0.2617	0.2714	0.2214	0.2547
Singapore	0.2608	0.2036	0.1832	0.1792

TABLE 4. Weighted normalized decision matrix

Country	CoL	QoL	MAS	HcQ
Australia	0.5220	1.0429	0.2328	1.1038
Japan	0.4331	1.0571	0.3626	0.5943
New Zealand	0.5233	1.0857	0.2214	0.7642
Singapore	0.5216	0.8143	0.1832	0.5377

TABLE 5. Positive and negative ideal solution

Country	CoL	QoL	MAS	HcQ
(A^*)	0.4331	1.0857	0.1832	1.1038
(A^-)	0.5233	0.8143	0.3626	0.5377

The positive (A^*) and negative (A^-) ideal solutions are determined using Equation (4) and Equation (5). The values are displayed in Table 5. Finally, the distance of each alternative is calculated using Equation (6) and Equation (7). The values and their corresponding ranks are shown in Table 6.

Using Equation (8), the relative closeness to the ideal solution for each product can then be calculated and ranked. The country with the smallest CC_i value will be ranked as the first and so on. Based on the relative weight given by the elderly couple interviewed, Table 7 clearly showed that Australia is their most ideal migration destination while Singapore is the worst.

This study has demonstrated that other than the usual structured performance assessment, such as transportation performance evaluation [17], the TOPSIS method is sufficiently versatile to evaluate life choices. More evaluation criteria can be added and their relative weight can be manipulated to assist older Asians to find their ideal IRM destination. For instance, for older adults who are no longer able to drive, the availability and affordability of public transport will be a major concern and this can be easily incorporated into the decision making matrix.

5. **Conclusion.** With longer life expectancy, international retirement migration is expected to be a trend in the future. The above case study has shown that Australia emerges as the ideal retirement migration destination for this elderly couple from Taiwan, with New Zealand being second and Japan third. Singapore was found to be the least attractive migration destination for the interviewed couple.

TABLE 6. Distances from ideal solutions and ranks

Country	d^*	d^-
Australia	0.1105	0.6241
Japan	0.5409	0.2653
New Zealand	0.3535	0.3806
Singapore	0.6340	0.1794

TABLE 7. Relative closeness to ideal solutions

Country	CC_i	Rank
Australia	0.0304	1
Japan	0.8062	3
New Zealand	0.4631	2
Singapore	0.9259	4

Nonetheless, this study does not claim that the set of evaluation criteria used above is the most comprehensive for older Asian adults as choosing IRM destination involves addressing personal needs and concerns. With the TOPSIS method, additional criteria such as availability of public transportation, proximity to basic amenities, preferred weather conditions and many more can be easily incorporated into the decision matrix. In future, researchers can strive to obtain more evaluation criteria by conducting more face-to-face interviews and/or surveys with older Asian adults before using an objective MCDM method, such as the TOPSIS method, to help with the decision making process. Follow-ups can also be made to seek the participants' views on the relevancy and satisfaction of the rankings of IRM destinations. All these will enhance the versatility and applicability of the TOPSIS method in evaluating life choices.

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