ISCTE IUL REPOSITÓRIO
INSTITUTO UNIVERSITÁRIO DE LISBOA

Repositório ISCTE-IUL

Deposited in *Repositório ISCTE-IUL*:
2019-05-14

Deposited version:
Post-print

Peer-review status of attached file:
Peer-reviewed

Citation for published item:
Martin, J. C., Casanova, J. L. & Viñán, C.S. (2017). Quality of life, subjective well-being and democratic consolidation in Ecuador. ISQOLS 2017Conference International Society for Quality-of-Life Studies: Quality of life. Towards a better society.

Further information on publisher's website:
http://www.isqols2017.org/

Publisher's copyright statement:

Use policy

ISQOLS 2017 Conference
QUALITY-OF-LIFE: TOWARDS A BETTER SOCIETY
Innsbruck, Austria. September 28th-30th, 2017

Quality of life, subjective wellbeing and democratic consolidation in Ecuador.

Juan Carlos Martín
Universidad de Las Palmas de Gran Canaria
Instituto de Turismo y Desarrollo Económico Sostenible
35.017 Las Palmas de Gran Canaria
Teléfono: +34 928 45 8189   Fax: +34 928 45 8183
jcmartin@daea.ulpgc.es

Jose Luis Casanova
Instituto Universitário de Lisboa (ISCTE-IUL)
Av. das Forças Armadas, 1649-026, Lisboa, Portugal
jose.casanova@iscte.pt

Christian Stalin Viñán
Universidad Técnica Particular de Loja
11-01-608 Loja
Teléfono: + (593) 7 370 1444 Fax: + (593) 7 258 7810
csvinan@utpl.edu.ec

Abstract. The analysis of individual satisfaction and citizens' quality of life is paramount by the interdependence with democracy consolidation that exists nowadays in Ecuador. A proposal to calculate a synthetic indicator of satisfaction of citizens on the subjective wellbeing (SWB) in Ecuador based on fuzzy logic method and the degree of similarity to ideal solutions is developed in the study. The information is obtained through the application of a structured survey based on the European Social Survey to the Ecuadorian society to a sample of 416 Ecuadorians. The analysis is based on eight different dimensions of individual satisfaction, namely: (1) Life; (2) Economy; (3) City Government; (4) Transparency; (5) Education; (6) Health System; (7) Roads; and (8) National Government. The results are discussed according to three segmentation variables: gender, age and marital status. The results show that men experience more individual satisfaction than women; generation Y is more satisfied than other age groups; and those who live with couples without being married are more satisfied than single and married citizens.

Keywords: Satisfaction, Quality of Life, Social Welfare; Fuzzy Logic; TOPSIS.

Track 4: Methodological Issues in the Study of Quality of Life, Happiness and Well-Being

1   Introduction

Subjective well-being is nowadays a relevant topic for scientists, activists or policymakers around the world, and the analysis is considered a fundamental tool for the accomplishment of economic development and the consolidation of democracy. Kraeger, Cloutier & Talmage (2017) contend that the analysis of quality of life and well-being can be done focusing on the individual or a broader perspective, and that there are different theoretical and empirical approaches using quantitative, qualitative or mixed methods.

The theoretical, conceptual and methodological approaches to subjective well-being have long term philosophical roots and have been developed more intensely in social sciences after the 80's in the XX century. Currently, these approaches involve diverse models of conceptualization and measurement of subjective well-being, and an important contribute is one elaborated by the European Social Survey team that draws on the work of Abdallah, Mahony, Marks, Michaelson, Seaford, Stoll & Thompson, (2011), Diener & Seligman (2004) and Thompson & Marks (2008).

Maggino (2015) contends that quality-of-life studies are theoretically underpinned on the "social indicators" studies which are partly based on the analysis of the non-economic components of societal wellbeing, and that this discipline has gone through diverse stages of ups and downs. In this sense, the concern with subjective well-being has been particularly evident in the European Union, Canada and the USA, but it's growing in other countries and parts of the world, like South-America and in particular in Ecuador (Martín & Viñán, 2017).

The purpose of this paper is to analyse the subjective well-being (SWB) of a sample of Ecuadorians, segmenting the population according to the three different sociodemographic variables, namely gender, age and marital status. This analysis is appropriate and timing due to the process of the democratic consolidation that Ecuador is living these last years. The synthetic indicator proposed in the research is based on an hybrid-fuzzy multi-criteria-decision-making (HF-MCDM) model developed using triangular fuzzy numbers (TFNs) and the technique for order preference based on the similarity to ideal solutions (TOPSIS). The SWB is measured according to the individual satisfaction experienced on these eight dimensions of the personal life: (1) Life; (2) Economy; (3) City Government; (4) Transparency; (5) Education; (6) Health System; (7) Roads; and (8) National Government.

The aim of this research in not only to shed some light on this lively and debatable issue like the SWB of the Ecuador population in a period of the consolidation of democracy in the country, but also to provide some guidance to the policy makers in order to promote adequate policies that enhance the QOL and SWB of the Ecuadorian society taking into account special peculiarities presented in some societal groups determined by the age, gender and marital status taking into account that the new

Ecuadorian Constitution prioritizes "the sumak kawsay", the ancestral aim of improving QOL and SWB of the society developing the capacity of all the Ecuadorians (Ramírez, 2010). The added value of our research resides on the identification of the main drivers that affect the SWB of each of the segments analysed in our study.

2   Literature review

Reflexion on the limits of economic growth and income *per capita* to evaluate development and progress in contemporary societies has been growing for the last decades, and alternative and complementary dimensions have been developed with relevant success. Maggino (2015) suggests that there is a need for a new orientation that "includes identifying and studying subpopulations and subgroups, disentangling the difficult task of identifying determinants of quality of life, refining the capacity of measuring conceptual dimensions, defining new indicators able to measure and monitor particular social conditions and show that these are not separated fields of studies but intersect each other and produce different outcomes which can be with difficulty classifiable, consistent with the idea of the complexity of our reality (p. vi)".

Following the inherited tradition of the social indicators, the case of the Human Development Index can be first cited. This index is created in 1990 by a United Nations team coordinated by Mahbub ul Haq, and includes, in addition to those economic concerns, indicators of life expectancy and education (UNDP, Human Development Report, 1990). This index has been decisively enriched since 2010 with inequality evaluation on those three dimensions, resulting on a new Inequality-Adjusted Human Development Index (UNDP, 2010).

Several theories that emphasize subjective approaches to development and progress have also been advanced, focusing on happiness (Veenhoven, 1984), life satisfaction (Diener, Emmons, Larsen & Griffin, 1985), quality of life (Guillemin, Bombardier & Beaton, 1993), or well-being (Guttman & Levy, 1982), among others. These approaches are usually intertwined and some have direct expression as indicators while others constitute wider concepts.

There is a theoretical discussion over the primacy of objective *versus* subjective concepts, but the current major trend is to consider that we need to have both objective and subjective approaches to development and progress (Costanza et al., 2007). Nevertheless, this global picture comprises diverse strategies. Concepts of "happiness" or "life satisfaction" are taken mostly as subjective issues. Others, like "quality of life", for instances, have been defined either within a strict subjective perspective (Boswell et al., 1998) or integrating objective and subjective dimensions (Costanza et al., 2007; Sousa et al., 2007). The concept of "well-being" has recently been defined as a dynamic model, entailing relations between subjective (good feelings day-to-day and overall, good functioning and satisfaction of needs) and

objective (external conditions elements and personal resource elements) (Thompson & Marks, 2008).

Most of these concepts – and "well-being" in particular – represent nowadays a consolidated instrument for social scientists to rethink development and societal progress, but also for policymakers, mainly those who consider that one of the vital goals of a democratic government should be the promotion of well-being amongst the population. Besides, giving the knowledge of people's experiences, needs and concerns, a role in policymaking may contribute to increase the involvement of people on the political process in order to foster democracy.

The European Parliament and the OECD have a relevant role in the spread of this process, mainly after 2007, respectively with the creation of the Commission on the Measurement of Economic Performance and Social Progress in 2009, coordinated by Joseph E. Stiglitz, Amartya Sen and Jean-Paul Fitoussi, and the Better Life Initiative in 2011. The importance of well-being for the European Union is clearly institutionalized in the Treaty of Lisbon in 2007: "The Union's aim is to promote peace, its values and the well-being of its peoples."[1]

The European Social Survey (ESS), a prominent biennial cross-national and cross-sectional survey starting in 2001, assumes since its foundation several indicators of well-being and recently stresses the theoretical basis for the concept of well-being elaborated by Abdallah et al. (2011) after Thompson & Marks (2008).

Following this theoretical proposal, subjective well-being can be understood as the good feelings day-to-day and overall (e. g. happiness, joy contentment, satisfaction) and good functioning and satisfaction of needs (e. g. to be autonomous, competent, safe and secure, connected to others) (Abdallah et al., 2011, p. 13).

Subjective well-being has been considered for long a relevant issue. Within philosophy, since Aristotle, SWB was seen by the notion of eudemonic well-being or flourishing as living in accordance to you true-self. Epicurus also emphasized hedonic well-being (highlighting happiness and absence of pain). Recently, the concept of subjective well-being was developed within economics (Clark and Oswald, 1994) and sociology (Veenhoven, 2008), among other scientific fields, and its first appearance as an indicator in a national survey was introduced by the American Institute for Public Opinion in 1946.

The model to measure subjective well-being proposed by Abdallah et al. (2011), adopted by ESS, draws on this tradition, distinguishing two major components: the eudemonic ("good functioning and satisfaction") and the hedonic ("good feelings day-to-day and overall"). These two dimensions are contemplated on the core

---

[1] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:12007L/TXT&from=EN

questionnaire of ESS (that contains the same questions on every survey after 2002), and they are expressed in two basic and typical indicators of subjective well-being: "life satisfaction" (eudemonic dimension) and "happiness" (hedonic dimension), both using a 0-10 point answering scale (ESS, 2017).

The respective questions on the ESS questionnaire are as follows: (1) "All things considered, how satisfied are you with your life as a whole nowadays?"; and (2) "Taking all things together, how happy would you say you are?"

Happiness is conceptualised as an emotional response that assesses current feelings, and satisfaction as a cognitive or evaluative response measuring how individuals evaluate life as a whole (Clark and Senik, 2011). The first one appears under the theme "Subjective well-being, social exclusion, religion, national and ethic identity" in the questionnaire, and the second one under the theme "Politics".

The ESS also has a rotating module on "Personal and social well-being" in the questionnaire deployed in 2006 and 2012. With this specific module the ESS team wants to seize the concept of "subjective well-being" in its complexity, going beyond the basic dimensions of happiness and life satisfaction, and single indicators, to test a multidimensional approach with an extended number of indicators that may reveal important details on subjective well-being (ESS, 2017).

The model proposed with this aim focuses on six dimensions: (1) Evaluative well-being; (2) Emotional well-being; (3) Functioning; (4) Vitality; (5) Community well-being; and (6) Supportive relationships. These dimensions are expressed in 39 indicators and an index was created for each dimension on the basis of its respective indicators. The two basic indicators of the eudemonic and hedonic approaches, "happiness" and "life satisfaction", are included and defined here as the "evaluative well-being" dimension (ESS, 2017).

If we want to understand what influences and explains well-being of people for scientific and policymaking purposes, we must look for the factors underlying subjective well-being, that include objective external conditions and personal resources, that is the remaining elements of the dynamic model advanced by Thompson & Marks (2008). The ESS team already develop some work mainly on seven important drivers of subjective-well-being: work, gender, parenthood, migration, the environment, democratic government and cultural values (ESS, 2017).

Although not considered directly as indicators of subjective well-being in the framework put forward by Thompson & Marks (2008) and Abdallah et al. (2011), there are some questions in the ESS's core questionnaire that are appropriate for this objective. Indicators like "satisfaction with present state of the economy in country", "satisfaction with the national government", "satisfaction with the way democracy works in country", "evaluation of the state of education in country nowadays" and

"evaluation of the state of health services in country nowadays" (all of them included in the theme "Politics", after the indicator for "life satisfaction", in the core questionnaire) tackle satisfaction and individual evaluation focused on fundamental spheres and institutions of contemporary society, and may be considered crucial if we want to analyse subjective well-being related to its societal conditions (Diener et al., 2004) and political issues.

The respective questions in the ESS questionnaire matching these five indicators are the following: (1) "On the whole how satisfied are you with the present state of the economy in [country]?"; (2) "Now thinking about the [country] government, how satisfied are you with the way it is doing its job?"; (3) "And on the whole, how satisfied are you with the way democracy works in [country]?"; (4) "Now, please say what you think overall about the state of education in [country] nowadays?"; and (5) please say what you think overall about the state of health services in [country] nowadays?"

Indicators of "happiness" and "life satisfaction" are general and abstract, and are based on individual subjective well-being, but these above indicators are able to measure individual subjective well-being based on community resources which are very important to develop all the potential individual subjective well-being, and two of the most important pillars of the society are considered, namely education and national health system. For this reason, it can be concluded that these five indicators constitute a relevant complementary approach of "societal well-being" that incorporates somehow a national dimension.

Thus, following the analytical strategy of ESS, we use ESS's subjective well-being model on our study in Ecuador but with some adjustments, as the inclusion of these indicators of subjective societal well-being indicators in the Ecuadorian survey is considered crucial. The satisfaction on the level of the roads, as this has always been an endemic problem in a country which suffers from important mountain barriers that constraints the accessibility of some regional areas, is also finally included.

Local and regional culture are quite structured in Ecuador, when compared to national culture. Therefore, the five indicators previously described to address subjective well-being related to societal conditions were centred on a sub-regional level ("Cantón"). The Cantons of Ecuador are the second-level subdivisions of Ecuador, below the provinces. There are 221 Cantons in the country that are further geographically sub-divided into local parishes, which are classified as either urban or rural. It is out of the scope of the paper to analyse how the idiosyncrasy of the political power can affect the SWB of the Ecuadorians, as there are mainly four types of institutions that take some responsibility in some project development, as for example the national, the provincial, the cantonal and the parishes' government. Becker (2011) describes how the new Ecuadorian Constitution is based on the implementation of some social and economic strategies that would benefit the majority of the country's people taking into

account the opinion of the indigenous communities, as well as other social institutions. However, the realization of some of the objective has not been exempt of controversy and tension. The ambitious constitution based on the citizens' revolution" (Conaghan, 2008)[2], pretending to lessen inequality and to foster social justice, as well as to bring more stability to this small country of South America, has encountered multiple obstacles originated by the lack of a cohesive and well organized civil society.

These six indicators are also complemented with one additional national level dimension aiming at evaluating central government's performance. Thus, the corresponding eight questions in the questionnaire applied in Ecuador were the following: (1) "All things considered, how satisfied are you with your life as a whole nowadays?"; (2) "All things considered, how satisfied are you with the present state of the economy in your Canton?; (3) "How satisfied are you with the way the government in your Canton is doing its job?"; (4) "On the whole, how satisfied are you with the way democracy works in your Canton?"; (5) "On the whole, what do you think about the state of education in your Canton nowadays?"; (6) "On the whole, what do you think about the state of health services in your Canton nowadays?"; (7) "On the whole, what do you think about the system of roads and public works in your Canton?"; and (8) "How satisfied are you with the work that the current central government is doing?"

Proceeding as in the ESS model, these questions suggest a response on a 0-10 point answering scale. Then, the analytical model to study SWB in Ecuador will be mainly centred on a eudemonic approach, integrating two basic dimensions – satisfaction with life and societal subjective well-being – and focus on three analytical levels: general/abstract, national and cantonal.

Some research has been done recently on well-being and happiness in America Latina (Gómez & Ortiz, 2016; Vera, Celis & Cordova, 2011; Ocampo & Foronda, 2008), and in particular in Ecuador (Minteguiaga & Ubasart-Gonzàlez, 2013; Martin & Viñán, 2017; Ramírez, 2011). The main contribution of the present work is to study SWB in Ecuador underpinning the empirical application on the ESS's theoretical and methodological model based on Abdallah et al. (2011), Diener & Seligman (2004) and Thompson & Marks (2008), in particular its eudemonic approach, and the elaboration of a new further dimension focusing on the subjective societal well-being incorporating a dual geographical dimension using the national and cantonal institutions.

Thus, an original structured survey is applied to a sample of 416 Ecuadorians, using a questionnaire that includes those indicators of subjective societal well-being and social characterization of the respondents. These social characteristics are a relevant part of the drivers and objective external conditions of subjective well-being referred by ESS

---

[2] Correa pledged to put Ecuador on the road to achieve a socialism of the twenty-first century.

(2017) and in the model elaborated by Abadallah et al. (2011). As said, a particular focus is put in gender, age and marital status.

3   The questionnaire and data

As previously said, the questionnaire is based on some of the main modules from the European Social Survey (ESS) but it was adapted to the particular idiosyncrasies of the Ecuador. The questionnaire was administered in 2015 to a total of 417 Ecuadorians, using a random sample that was representative of the population over 15 years living in private households at the nine geographical areas of Ecuador regarding the gender, education level and age quotas at each of the areas. The survey is divided into different sections that include information about: (1) trust in institutions; (2) socio-demographic and economic variables that go from national identity, ethics, religion, ethnicity, nationality and political commitment, among others; and (3) SWB data based on the eight dimensions mentioned above.

The survey implemented in Ecuador uses a semantic Likert scale of 11 points (from 0 to 10) with verbal anchors at the ends, where 0 means that the person is extremely unsatisfied and 10 means that the person is extremely satisfied with the eight dimensions considered in the analysis: (1) life; (2) the economy in the Cantón; (3) the Cantón government; (4) the transparency and democracy of the Cantón; (5) the education at the Cantón; (6) the health system at the Cantón; (7) the roads and public works; (8) and the National Government.

A pilot test survey was conducted to a convenience sample of 30 Ecuadorians to check the validity of the survey regarding the comprehension of the questions as well as the scale used to make the satisfaction assessment of the eight dimensions. At this stage, certain issues were evaluated regarding the burden of the survey, and whether the respondents did have more knowledge about the governmental responsibility at the Canton, the Province or the National level. Thus, it was finally decided to leave most of the societal well-being at the local level of the Canton, with the inclusion of one dimension at the national level. The survey was finally administered face-to-face by a group of trained students at each of the geographical areas of Ecuador.

Data were coded, analysed and cleaned using SPSS (version 17.0). Some descriptive statistics are presented to give an overview of the profile of the survey respondents. Table 1 shows the general characteristics of the segmentation variables used in this research, name list gender, age and marital status. It can be seen that there are more women (51.6%) than men (48.4); the most representative aged group corresponds to those Ecuadorians who are between 21 and 30 years old (48.0%), followed by those whose age is between 31 and 40 (29.7%), with a less significant number of citizens whose age is higher than 60 (1.7%). In terms of civil or marital status, it can be seen

that the two larger segments are those who are single and married with a representation of 50.8 and 30.5 per cent, respectively.

< Insert Table 1 here>

4 The hybrid-fuzzy method

Satisfaction, SWB and quality of life are vague concepts that are difficult to measure and assess. The scales are usually based on semantic anchored Likert scales so in spite that the scales can be interpreted as a natural representation of the overall satisfaction that individuals have about a finite set of dimensions. Nevertheless, in spite of the numerous existing articles that research about individual and societal quality of life, taking into account different perspectives, as well as SWB, there exists still no consensus about how to best define the concept and measure it. Murgaš & Klobučník (2017) contend that most of the research is focused on partial instances, and they wonder to what extend it would be more appropriate to conceptualize the SWB as the quality of place.

Our methodological proposal is based on previous research that was first introduced in the literature of service quality (Lewis and Booms, 1983). Service quality is defined taking into account the fulfilment of the consumer expectations in regard to how a particular service is provided. Through a parallelism, this can be directly transferred to measure the SWB of individuals. In words of John and Wright (2006) who extend the conceptualization made by Campbell (1981), the SWB is related to a multidimensional construct that should be focused on the needs of all people for equity, participation, respect, and personal growth.

The methodological approach of this paper is based on a hybrid-fuzzy MCDM method that is implemented to treat adequately the imprecise nature of the responses provided by the interviewees. This method is denominated hybrid because it integrates two popular methodologies that have been extensively used in the analysis of the service quality (Awasthi et al., 2011; Benitez, Martín and Román, 2007; Kwo and Liang, 2011), and quality of life (Lazim & Abu Osman, 2009; Martín & Viñán, 2017): fuzzy logic and TOPSIS.

Zadeh (1965) is considered the father or founder of the fuzzy logic theory that extends the notion of the classical set theory which is based on a binary response membership function that expresses whether some element belongs or not to the fuzzy set theory in which a more general membership function is developed in which all the elements of the universe can have a certain probability to belong to a particular fuzzy set. Thus, the fuzzy set theory is characterized by the membership function that describes the degree of belonging of the elements. Since the origin of the theory, the approximate reasoning and rules based on semantic scales, very common in the questionnaires

administered in social science, have been largely benefitted (Mamdani and Assilian, 1975; Zadeh, 1975)

As previously said, fuzzy sets do not have clear defined boundaries, so the membership function is crucial to give the degree of uncertainty that a relative concept contains. Thus, fuzzy sets are very flexible in capturing the semantic scales used in social science. Our research is based on very popular fuzzy sets, the triangular fuzzy numbers TFNs, which have been applied previously to analyse QOL and SWB (Martín and Viñán, 2017). TFNs are defined by a triplet (a_1, a_2, a_3) of real numbers, and there is a map that assigns a TFN to each linguistic term of the semantic scale used in the questionnaire Table 3 shows the map that assigns the set of TFNs for the semantic scale, and it can be seen that with the exception of the endpoints that served to anchor the semantic scale, the range of the TFNs is equal to 20 and are centred symmetrically with respect to the most likely value. Similarly, it can be observed that the TFNs that represent the endpoints of the scale are degenerated and have relatively a less uncertain content as the range is reduced in ten units. Each studied segment is analysed according to the mean average of the TFNs, and the algebra of the TFNs is applied to obtain a new TFN that represent the satisfaction for each attribute and segment under analysis (Buckley, 1985). Thus, a new matrix of TFNs representing the satisfaction for each attribute and segment is obtained. For the sake of exposition, the next section presents the obtained results for the segments of males and females.

There are different models that can be applied in the field of MCDM, but TOPSIS is one of the most popular methods that have been applied in social science and management with different objectives and under very varied contexts. This method is based on one important input known as the information matrix that includes for the criteria i and the alternative j a real number x_{ij}. Thus, a clarification technique is needed to convert the matrix of TFNs into the information matrix. There are multiple methods to clarify this fuzzy information, but all are based on the simple principle of extracting the 'best-non-fuzzy' performance of the fuzzy set (Zhao and Govind, 1991). The method proposed by Chen (1996), using $v_{\%} = (a_1 + 2a_2 + a_3)/4$, is chosen in this research for its simplicity and because there is no need to make any additional a priori judgmental evaluation of the most likely values of each TFN, so the researchers make a more neutral position over the obtained interval.

The information matrix is then obtained, so then the application of TOPSIS (Hwang and Yoon, 1981; Zeleny, 1982) is possible. TOPSIS evaluates, taking into account all the elements of the information matrix, the ideal and anti-ideal solutions which are usually denominated as the positive and negative ideal solutions. The positive ideal solution is based on maximizing all the criteria associated with benefits and minimizing all the criteria associated with costs. On the other hand, the opposite logic is employed to obtain the ideal negative solution. Due to the nature of the research, all the criteria are

considered as benefits. Thus, all the alternatives can now be ranked obtaining the relative closeness to this positive ideal solution, taking into account the existing distance between these two ideal solutions.

The ideal solutions are computed as:

$$PIS_j = \left\{ \left(\max V_{ij} \mid j \in J \right), i = 1,2,\text{K},m \right\} \tag{1}$$

$$NIS_j = \left\{ \left(\min V_{ij} \mid j \in J \right), i = 1,2,\text{K},m \right\} \tag{2}$$

The positive *PIS* and the negative *NIS* ideal solutions are thus those obtained vectors conformed by the most and the least satisfied segments with each dimension considered in the study.

Then the synthetic SWB for each segment can be obtained through the relative closeness Euclidean distance between ideal solutions and each segment according to:

$$S_i^+ = dist(V_i, PIS) = \sqrt{\sum_{j=1}^{n} \left(V_{ij} - PIS_j \right)^2} \quad i = 1,2,\text{K},m \tag{3}$$

$$S_i^- = dist(V_i, NIS) = \sqrt{\sum_{j=1}^{n} \left(V_{ij} - NIS_j \right)^2} \quad i = 1,2,\text{K},m \tag{4}$$

$$SWB_i = \frac{S_i^-}{S_i^+ + S_i^-} \quad i = 1,2,\text{K},m. \tag{5}$$

Thus, all the population segments that can be of interest for the researchers can be ranked according to this ratio in descending order. This approach has been widely used in different decision contexts, like for example supplier selection (Chen et al., 2006), airlines service quality (Aydogan, 2011; Torlak et al., 2011), airports service quality (Wang and Lee, 2007), and personal selection (Boran et al., 2011), among others. More recently, Martín and Viñan (2017) use the same approach to determine the quality of life of the geographical areas of Ecuador.

As seen above, the SWB depends on eight different criteria or dimensions, and the synthetic index determines which of the population segments under analysis is more or less satisfied. Nevertheless, it is not always enough to calculate to what extent some demographic variable can determine the degree of satisfaction measured by the SWB proposed synthetic index, as it can be equally important to analyse whether some particular segments are more or less sensitive to some of the dimensions included in the synthetic index. For this reason, the elasticity quantifying the degree of sensitivity of the SWB towards changes in each of the dimensions considered in the analysis is also evaluated. The elasticity is usually understood or defined as the percentage change variation of a variable over one percent change in other variable.

Mathematically, the elasticity of the SWB for each segment *i* and each dimension *j* can be calculated as:

$$h_{ij} = \frac{\mathrm{D}\%SWB_i}{\mathrm{D}\%V_{ij}} = \frac{dSWB_i}{dV_{ij}} \frac{V_{ij}}{SWB_i}. \qquad (6)$$

The knowledge of the elasticity values are crucial for some stakeholders, like policymakers or politicians, to determine adequate strategies and policies that improve the SWB of the citizens which is usually an important factor to achieve an adequate level of social cohesion and consolidation of the democratic processes (Lechner, 2002).

5 Results

Table 3 shows the TFNs and the crisp information values obtained through the clarification method for the male and female segments. As said in the section of the methodology, the TFN matrix before the clarification method is not very informative, and policy makers or politicians who are not familiar with the method usually experience some discomfort with these results. Analysing now the crisp information, some very preliminary results can be obtained. Tonon (2008) contends that the involvement of the local governments through the stimulus of social policies is important to analyse QOL and SWB of citizens as social support generates health and quality of life, so it seems that policy makers and politicians have still room to improve in this particular dimension.

Analysing now the differences observed for these two segments, it can be concluded that the economy and the national government show the largest gap in favour of men and women, respectively. The first result is not strange as the female labour force participation is still weak in Ecuador. In the Common Country Assessment made by the United Nations, the situation in Ecuador is described (p. 7) as "it is the women, especially rural women, who suffer most deprivation. Inequality between men and women is still manifested in access to services, the labor market, and public life. Unemployment is greater among women and much of the work they do is poorly paid or unpaid." Bericat (2016) also finds that "revealing the existence of socioemotional gender inequality. The subjectivity of women, therefore, reflects the structural gender inequality of European societies. … The score for working women is almost 7 points higher than the score for women that do not work." (p. 647). The result can also be partly explained by the notion of a 'feminisation of poverty' that has been taken as a current of opinion in the world for the past twenty years, appearing as a global orthodox concept at the Fourth Women's World Conference at Bejiing in 1995 (Chant, 2016). After this conference, women took a principal role in the economic development discourse.

On the other hand, regarding the transparency of the local government and the education, men and women do not show different assessments on average. Similarly to these two segments, the information matrix is obtained for the rest of the segments in order to apply the HF-MCDM method.

Tab. 4 shows the positive and negative ideal solutions after applying equations 1 and 2. Although the analysis in this research is focused on the effects of gender, age and marital status, the table is obtained through the segmentation analysis based on 269 different segments. It can be seen that only for four dimensions (life, Local Government, transparency and roads), the PIS achieves the maximum score of 10. On the other hand, the dimensions for the PIS are lower than the maximum possible score that can be obtained (97.50). In particular, it is remarkable that the satisfaction with the health system only achieves a figure of 75.71, being the lower mark obtained for the PIS. On the other hand, the NIS is characterized by very low marks in all the dimensions, being the lowest possible value of the scale for all the dimensions included in the scale with the exception of the transparency and the roads.

The president Correa identified the need to reactivate the economy of some of the regions of the country in order to reduce and mitigate some of the important migration rates observed in the last twenty years. Mining activities were seen as an opportunity for private investments, in which new companies and job opportunities can be created. A good network of roads was not only needed to support these mining activities but also tourism (Walter, Latorre Tomás, Munda, & Larrea, 2016).

Regarding the heterogeneity of the dimensions, it can be seen that the two more heterogeneous dimensions are the satisfaction with the own life and the Local Government; meanwhile the more homogeneous dimensions are transparency and roads. It can be inferred from these results that the assessment of the own life and the Local Government exhibit the most extreme assessments for the groups considered in the analysis, but it is not easy to find a possible explanation for this. In the case of the Local Government, the assessment can depend very much on the type of sympathy that the political party in power has in each geographical jurisdiction. However, it is not always easy to infer the causality for not being happy with the own life, as the satisfaction or un-satisfaction can be grounded in different personal spheres. The results of transparency and roads can be seen as a consequence of the current situation lived in Ecuador where more resources have been put to create more democratic political processes, to construct new roads and to maintain the existing system of roads.

The SWB synthetic indicator based on the HF-MCDM TOPSIS model (Eqs. 3-5) is obtained for each segment considered in the analysis. Figures 1 and 2 show the results obtained for the segments based on the gender, age and marital status. It can be seen that: (1) males are more satisfied than women; (2) millennials (<18 years old) are more

satisfied than the rest of the segments; and (3) unmarried couple and married are more satisfied than the rest of civil states, and in this case the widowed are the least satisfied of all.

Our results regarding the gender differences in favour of men concur with those obtained in some post-socialist countries of eastern and central Europe (Baltatescu, 2014; Uglanova 2014) and some other location like for example China (Liang and Li, 2014; Liang, Niu, & Lu, 2017). Roothman, Kirsten & Wissing (2003) also find that men scores are usually higher on the majority of SWB measures reflecting the socially disadvantaged position historically held by women.

Regarding the marital status, other studies confirm our results (Haring-Hidore, Stock, Okun, & Robert, 1985; Liang, Niu, & Lu, 2017; Mastekaasa, 1994; Veenhoven, 1984). Diener, Gohm, Suh, & Oishi (2000) contend that, in general, married individuals experience greater SWB than never-married individuals, who in turn experience greater SWB than previously married individuals (i.e., divorced, separated, or widowed) (p. 419). Regarding the widowers, Bennet and Soulsby (2012) find that "both bereavement and widowhood can affect psychological and physical health and can have substantial influences on older people's interactions with the social world (p. 332)."

Regarding the results observed for those who live with an unmarried couple, our results concur with Diener, Gohm, Suh, & Oishi (2000). The authors show that individuals who cohabitate without being married experience less SWB than married people, that is, overall, married persons experience a higher SWB than those who live with a significant other. House et al. (1988) explain these benefits of marriage as a sort of social support providing the couple a feeling of belonging and purpose.

Table 5 shows the values of the elasticity of the SWB for all the segment analysed in this research, name list males, females, each year group and each marital status. It can be seen that SWB is inelastic with respect to all the included dimensions, although as analysed below there are certain remarkable differences for each group showing that not all the segments exhibit the same sensitivity to each individual dimension. In general, it can be seen that the degree of magnitude is very different. For example, analysing the gender, it can be concluded that these two segments show a very similar pattern, being more elastic with respect to the assessment of the own life and the Local Government, The analysis of the age serves to conclude that the segment of millennials show a very different pattern with respect to some dimensions, as for example the segment is not as elastic as the rest of the age segments with respect to the assessment of the own life. The segments are also more elastic with respect to the Local Government. Nevertheless, another interesting difference is that the group of millennials is more elastic with respect to the transparency which is in consonance with the dream of building a better world. Analysing the dimensions for which the

segments are more rigid, it can be observed that those are health system and roads as in the case of the gender. And finally, looking at the civil status, it can be concluded that all the segments are more elastic with respect to the assessment of the own life and the Local Government, but the segment of widowers exhibit a different pattern than the rest of the segments, being more elastic with respect to the economy. On the other hand, the segments are less elastic with respect to the health system and roads, but again the segment of widowers differs a bit from this general pattern as they are less elastic with respect to the National Government.

Horley & Lavery (1995) contend that the literature on SWB is sometimes confusing as contradictory results are obtained, and that age exhibits more controversy than other areas. Diener (1984) does not find any evident relationship between age and SWB. Meanwhile, Veenhoven (1984) finds that the hedonic component decreases with age and satisfaction of own life increases. Horley and Lavery (1995) analyse a number of SWB measures and find a positive and significant age effect. The authors also find that married individuals experience higher SWB than singles. Helliwell (2014) find, analysing SWB measurements, that when citizens rate the current physical health, the answers decline by age, but this decline disappears when citizens respond in relative terms with respect to others in the same cohort.

Local Governments need to promote social inclusion and the existence of social ties between the individuals of the community. It is well-known that there is a strong relationship between the social ties and SWB (Helliwell, Barrington-Leigh, Harris, & Huang, 2010). Helliwell (2014) contends that it is likely that causality runs in both directions. SWB is highly dependable on the local dimension. Heliwell and Wang (2011) find that the sense of belonging to the local, provincial and national realities, with the respective sense of identity, affect positively to the SWB in Canada, being the effect of the local community bigger than the sum of the other two effects together. Similarly, Walter et al. (2016) find that the inhabitants of a region of the north of Ecuador (Intag) are concerned about the access and quality of infrastructures such as roads, clean household water, education, and health services.

6   Conclusions

Our analysis, based on a questionnaire that has been adapted from the European social survey, taking into account some cultural peculiarities of the Ecuadorian society, measures the SWB of Ecuadorians by analysing eight dimensions that include two important constructs of the SWB, the eudemonic ("good functioning and satisfaction") and the "societal well-being": (1) Life; (2) Economy; (3) The Local Government; (4) Transparency; (5) Education; (6) Health System; (7) The roads; and (8) the National Government. It can be seen that some dimensions like education and the health system are part of the important pillars of the nowadays social welfare system. It is

also important to have in mind that some indicators belong to the individual sphere like the assessment of the own life, others to the Local Government that in the case of Ecuador is usually in the hands of the Canton, and one indicator is referred to the National Government.

This article calculates a SWB synthetic indicator of the Ecuadorian society analysing 14 different segments: 2 segments by gender, 6 segments by age and 6 segments by civil or marital status. The model is based on a fuzzy hybrid multi-criteria-decision-making TOPSIS method that sheds some light in this important topic in a very interesting political period that Ecuador is living. The results of the method give also important insights to policy makers and politicians in order to better understand what attributes are more important when the SWB of citizens is evaluated.

The results show how males and females have very different assessments of the economy and the National Government, and seem to be more than satisfied with the own life. It was also observed that the NIS contains more extreme observations as 6 dimensions were marked as the lowest possible figure of the scale (0) in comparison with only four dimensions for the PIS in which the assessment was done at the maximum point of the scale (10). The satisfaction with the own life and the Local Government are the two most heterogeneous dimensions meanwhile transparency and roads are the most homogeneous.

The main conclusion of this research can be read as follows: (1) males show more SWB than women; (2) millennials (<18 years old) are more satisfied than the rest of the age segments; and (3) Those citizens who live in couples married or unmarried experience more SWB, and widowers are those who experience the least SWB.

Regarding the sensitivity of the SWB, it can be said that a general trend is observed for the 14 analysed segments: the SWB is more elastic with respect to the assessment of the own life and the Local Government and less elastic with respect to the health system and the roads. There are two important differences that can be highlighted: (1) the segment of millennials is more elastic with respect to the transparency of the Local Government; and (2) the segment of widowers is more elastic with respect to the economy.

According to the research results, the policy makers and politicians should prioritize the areas of improvement of the Local Government. This research makes an empirical proposal that can be extended easily considering more dimensions that include other dimensions not contemplated in the present analysis. Furthermore, several suggestions for enhancing the SWB of the particular segments have been obtained: (1) there is a need to empower women in order to diminish the observed gap in the economy assessment made by gender; (2) there is a need to incentivize the political participation of the young generation in the consolidation democracy process of

Ecuador; (3) there is a need to implement some assistant policy measure to improve the SWB of the widowers that might result from the economic status of the recipients.

This study is not exempt from some important limitations, for example, this research needs to further explore the relationship between the assessment of the own life with the rest of the dimensions included in the study and other hedonic dimensions mentioned in the literature that have not been included in this analysis. Thus, an important venue for future research can be foreseen including other interesting dimensions that have been included by other scholars. Another interesting future line of research is to extend and compare our results with other boundary countries to Ecuador, like for example Colombia and Peru, countries that also share some cultural and traditional traits but different economic models.

7   Bibliography

Abdallah, S., Mahony, S., Marks, N., Michaelson, J., Seaford, C., Stoll, L., and Thompson, S. (2011). *Measuring our Progress: The Power of Well-being*. London: The New Economics Foundation.

Awasthi, A., Chauhan, S. S., Omrani, H., & Panahi, A. (2011). A hybrid approach based on SERVQUAL and fuzzy TOPSIS for evaluating transportation service quality. *Computers & Industrial Engineering*, *61*(3), 637-646.

Aydogan, E. K. (2011). Performance measurement model for Turkish aviation firms using the rough-AHP and TOPSIS methods under fuzzy environment. *Expert Systems with Applications*, 38, 3992–3998.

Baltatescu, S. (2014). Gender and age differences in subjective well-being: Romania 1990–2005. In E. Eckermann. (Ed). *Gender, lifespan and quality of life* (pp. 99–114). Social Indicators Research Series, 53. Dordrecht: Springer.

Becker, M. (2011). Correa, indigenous movements, and the writing of a new constitution in Ecuador. *Latin American Perspectives*, *38*(1), 47-62.

Benitez, J. M., Martín, J. C., & Román, C. (2007). Using fuzzy number for measuring quality of service in the hotel industry. *Tourism management*, *28*(2), 544-555.

Bennett, K. M., & Soulsby, L. K. (2012). Wellbeing in bereavement and widowhood. *Illness, Crisis & Loss*, *20*(4), 321-337.

Bericat, E. (2016). The Subjective Well-Being of Working Women in Europe. In , M. L. Connerly and J. Wu (Eds.), *Handbook on Well-being of Working Women* (pp. 633-651). Berlin: Springer

Boran, F. E., Genç, S., Kurt, M., & Akay, D. (2011). Personnel selection based on intuitionistic fuzzy sets. *Human Factors and Ergonomics in Manufacturing & Service Industries*, 1–11.

Boswell, B. B., Dawson, M., & Heininger, E. (1998). Quality of life defined by adults with spinal cord injuries. *Journal of Rehabilitation*, *64*(1), 27.

Campbell, A. (1981). *The sense of well-being in America*. New York: McGraw-Hill.

Chant, S. (2016). Women, girls and world poverty: empowerment, equality or essentialism? *International Development Planning Review*, *38*(1), 1–24. http://doi.org/10.3828/idpr.2016.1

Chen, C. T., Lin, C. T., & Huang, S. F. (2006). A fuzzy approach for supplier evaluation and selection in supply chain management. *International Journal of Production Economics*, 102, 289–301

Chen, S.M. (1996). Evaluating weapon systems using fuzzy arithmetic operations. *Fuzzy Sets and Systems,* 77(3), 265-276

Clark, A. E., & Oswald, A. J. (1994). Unhappiness and unemployment. *The Economic Journal*, *104*(424), 648-659.

Clark, E., & Senik, C. (2011). Is happiness different from flourishing? Cross-country evidence from the ESS. *Revue d'économie politique*, *121*(1), 17-34.

Conaghan, C. M. (2008). Ecuador: Correa's plebiscitary presidency. Journal of Democracy, 19(2), 46-60.

Costanza, R., Fisher, B., Ali, S., Beer, C., Bond, L., Boumans, R., ... & Gayer, D. E. (2007). Quality of life: An approach integrating opportunities, human needs, and subjective well-being. *Ecological economics*, *61*(2), 267-276.

Diener, E. (1984). Subjective well-being. *Psychological Bulletin*, 95, 542-575.

Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of personality assessment*, *49*(1), 71-75.

Diener, E. D., Gohm, C. L., Suh, E., & Oishi, S. (2000). Similarity of the Relationship between Marital Status and Subjective Well-being across Cultures. *Journal of Cross-Cultural Psychology*, *31*(4), 419–436. http://doi.org/10.1177/0022022100031004001

Diener, E., & Seligman, M. E. (2004). Beyond money: Toward an economy of well-being. *Psychological science in the public interest*, *5*(1), 1-31.

ESS - European Social Survey (2017), Measuring and Reporting on European's Wellbeing: Findings from the European Social Survey.

Gómez, D., & Ortiz, V. (2016), *El Bienestar Subjetivo en América Latina*, Guadalajara, Jalisco.

Guillemin, F., Bombardier, C., & Beaton, D. (1993). Cross-cultural adaptation of health-related quality of life measures: literature review and proposed guidelines. *Journal of clinical epidemiology*, *46*(12), 1417-1432.

Guttman, L., & Levy, S. (1982). On the definition and varieties of attitude and wellbeing. *Social Indicators Research*, *10*(2), 159-174.

Haring-Hidore, M., Stock, W. A., Okun, M. A., & Witter, R. A. (1985). Marital Status and Subjective Well-Being : A Research Synthesis. *Journal of Marriage and Family*, *47*(4), 947–953. http://doi.org/10.2307/352338

Helliwell, J. F. (2014). How can subjective wellbeing be improved? *Interventions and Policies to Enhance Wellbeing (Vol. VI).*, *VI*, 611–631. http://doi.org/10.1002/9781118539415.wbwell054

Helliwell, J. F., & Huang, H. (2014). New measures of the costs of unemployment: Evidence from the subjective well-being of 3.3 million Americans. *Economic Inquiry*, *52*(4), 1485-1502.

Helliwell, J. F., & Putnam, R. D. (2004). The social context of well-being. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *359,* 1435-1446.

Helliwell, J. F., &Wang, S. (2011). Trust and well-being. *International Journal of Wellbeing*, 1(1), 42-78.

Helliwell, J. F., Barrington-Leigh, C. P., Harris, A., & Huang, H. (2010). International evidence on the social context of well-being. In E. Diener, J. F. Helliwell, & D. Kahneman (Eds.), *International differences in well-being* (pp.291-350). New York: Oxford University Press.

Horley, J., & Lavery, J. J. (1995). Subjective well-being and age. *Social Indicators Research*, *34*(2), 275–282. http://doi.org/10.1007/BF01079200

Hwang, C. & Yoon, K. (1981). *Multiple attribute decision making: Methods and application*. New York: Springer.

John, L., & Wright, R. (2006). Quality of Life and Subjective Well-Being. *Social Work in Mental Health*, *4*(2), 47–65.

John, L., & Wright, R. (2006). Quality of Life and Subjective Well-Being. *Social Work in Mental Health*, *4*(2), 47–65. http://doi.org/10.1300/J200v04n02_04

Kraeger, P., Cloutier, S., & Talmage, C. (2017). Conclusion from the Editors. In *New Dimensions in Community Well-Being* (pp. 255-260). Springer International Publishing.

Kuo, M. S., & Liang, G. S. (2011). Combining VIKOR with GRA techniques to evaluate service quality of airports under fuzzy environment. *Expert Systems with Applications*, *38*(3), 1304-1312.

Lazim, M. A., & Abu Osman, M. T. (2009). A new Malaysian quality of life index based on fuzzy sets and hierarchical needs. *Social Indicators Research*, *94*(3), 499-508.

Lechner, N. (2002). *Las sombras del mañana. La dimensión subjetiva de la política*. Santiago de Chile: LOM Editorial.

Lewis, R. C., & Booms, B. H. (1983). The marketing aspects of service quality. In G. Shostack, L. Berry and G. Upah (Eds.), *Emerging perspectives on services marketing* (pp. 99-107). Chicago: American Marketing.

Liang, Y., & Li, S. (2014). Landless female peasants living in resettlement residential areas in China have poorer quality of life than males: results from a household study in the Yangtze River Delta region. *Health and quality of life outcomes*, *12*(1), 71.

Liang, Y., Niu, X., & Lu, P. (2017). The aging population in China : Subjective well-being of empty nesters in rural eastern China. http://doi.org/10.1177/1359105317717599

Maggino, F. (2015). *A new research agenda for improvements in quality of life* (Vol. 57). Cham: Springer.

Mamdani, E. & Assilian, S. (1975). An experiment in linguistic synthesis with a fuzzy logic controller. *International Journal of Man-Machine Studies*, 7(1), 1-13.

Martin, J. C., & Viñán, C. S. (2017). Fuzzy Logic Methods to Evaluate the Quality of Life in the Regions of Ecuador. *Quality Innovation Prosperity*, *21*(1), 61-80.

Mastekaasa, A. (1994).The subjective well-being of the previously married: The importance of unmarried cohabitation and time since widowhood or divorce. *Social Forces*, 73(2), 665-692.

Minteguiaga, A., & Ubasart-Gonzàlez, G. (2013). Revolución Ciudadana y Régimen de Bienestar en Ecuador (2007-2012). *Consejo Latinoamericano de Ciencias Sociales– CLACSO*.

Murgaš, F. & Klobučník, M. (2017). Community Well-Being or Quality of Place? A Few Notes and Their Application in Czech Republic. In Kraeger, P., Cloutier, S., & Talmage, C. (Eds.). *New Dimensions in Community Well-Being (pp. 29-61)*. Cham: Springer.

Ocampo, M. & Foronda, C. A. R. (2008). Estudio de la calidad de vida en Bolivia: metodología y medición. *Revista Investigación & Desarrollo*, *1*(7).

Ramírez Gallegos, R. (2011). *Socialismo del Sumak Kawsay o biosocialismo republicano* (p. 55). SENPLADES, Secretaría Nacional de Planificación y Desarrollo.

Ramírez Gallegos, R. (2011). *La Felicidad como Medida del Buen Vivir en Ecuador*, Documento de Trabajo N˚ 1, Secretaria Nacional de Planificación y Desarollo.

Roothman, B., Kirsten, D. K., & Wissing, M. P. (2003). Gender differences in aspects of psychological well-being. *South African journal of psychology*, *33*(4), 212-218.

Sousa, J., Casanova, J. L., Pedroso, P., Mota, A., Gomes, A., Seiceira, F., ... & Alves, T. (2007). Mais Qualidade de Vida para as Pessoas com Deficiências e Incapacidades-uma estratégia para Portugal. *Mais Qualidade de Vida para as Pessoas com Deficiências e Incapacidades-uma estratégia para Portugal*.

Thompson, S., & Marks, N. (2008). *Measuring well-being in policy: Issues and applications*. New Economics Foundation.

Tonon, G. (2008). *Desigualdades sociales y oportunidades ciudadanas.* Buenos Aires: Espacio Editorial.

Torlak, G., Sevkli, M., Sanal, M., & Zaim, S. (2011). Analyzing business competition by using fuzzy TOPSIS method: An example of Turkish domestic airline industry. *Expert Systems with Applications*, 38, 3396-3406.

Uglanova, E. (2014). Gender dimensions of subjective well-being in Russia. In E. Eckermann (Ed). *Gender, lifespan and quality of life* (pp. 135–155). Social Indicators Research Series, 53.

UNDP - United Nations Development Programmme, Human Development Report, 1990.

UNDP - United Nations Development Programmme, Human Development Report, 2010.

Veenhoven, R. (1984). *Conditions of Happiness.* Berlin: Springer.

Veenhoven, R. (2008). Sociological theories of subjective well-being. *The science of subjective well-being*, *9*, 44-61.

Vera-Villarroel, P., Celis-Atenas, K., & Cordova-Rubio, N. (2011). Evaluation of happiness: psychometric analysis of the Subjective Happiness Scale in Chilean population. *TERAPIA PSICOLOGICA*, *29*(1), 127-133.

Walter, M., Latorre Tomás, S., Munda, G., & Larrea, C. (2016). A social multi-criteria evaluation approach to assess extractive and non-extractive scenarios in Ecuador: Intag case study. *Land Use Policy*, *57*, 444–458.

Wang, Y. J., & Lee, H. S. (2007). Generalizing TOPSIS for fuzzy multiple-criteria group decision-making. *Computers and Mathematics with Applications*, 53, 1762–1772.

Zadeh, L.A. (1965). Fuzzy sets. *Información and Control*, 8(3) 338-353.

Zadeh, L.A. (1975). The concept of a linguistic variable and its application to approximate reasoning: I. *Information Science,* 8(3), 199-249.

Zeleny, M. (1982). *Multiple Criteria Decision Making*. New York: McGraw-Hill.

Zhao, R. & Govind, R. (1991). Algebraic characteristics of extended fuzzy number. *Information Science*, 54(1), 103-130.