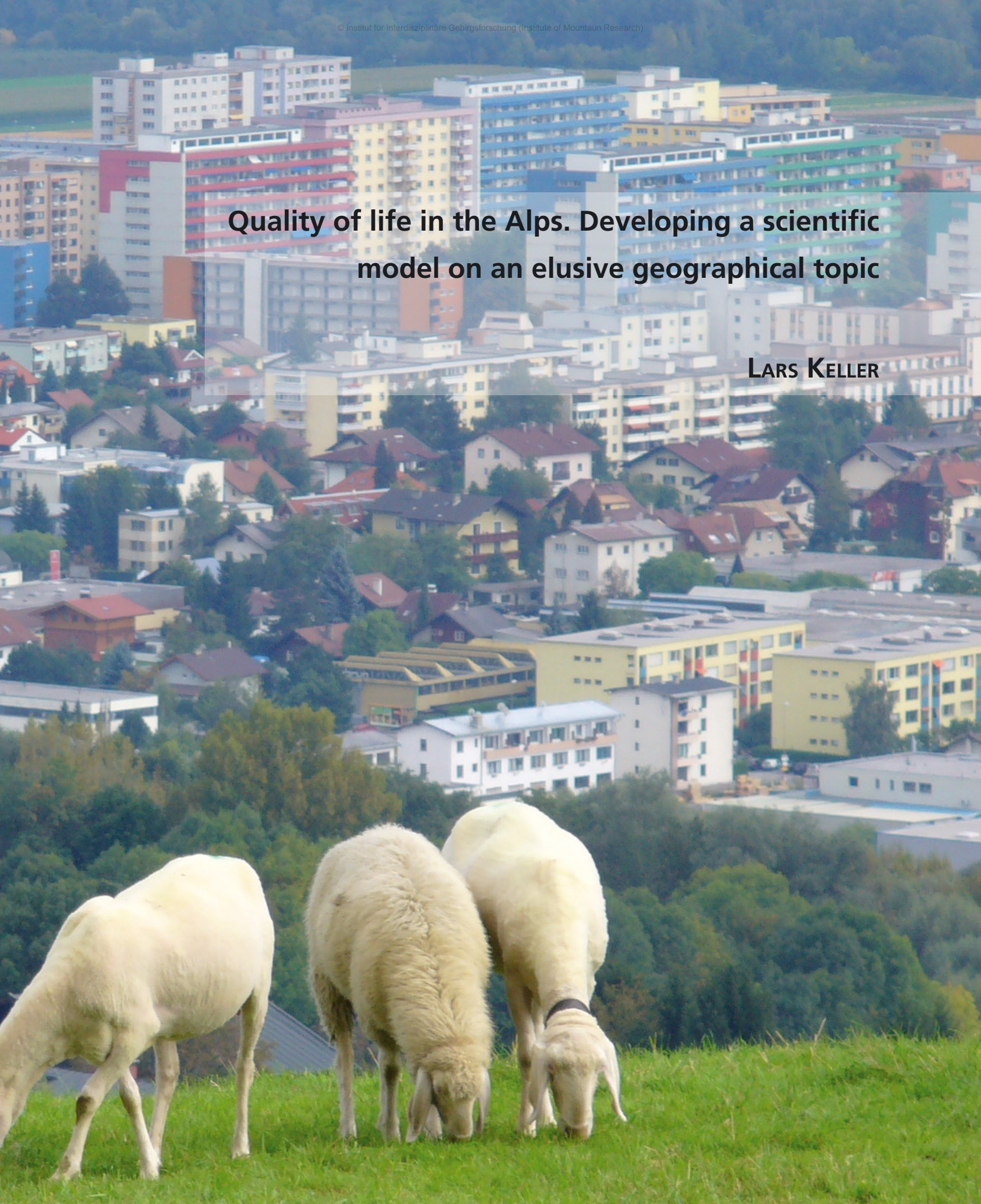

# Quality of life in the Alps. Developing a scientific model on an elusive geographical topic

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## Introduction

From its early beginnings in the 1920s, quality of life (QOL) research has always been a fascinating, but also a very elusive area. Many scientists – from fields as far apart as medicine, law, city and regional planning, psychology, tourism, architecture, sociology, or geography – have contributed findings. This is true for QOL research within the Alpine Space as well, where the topical focus has shifted over the years (cf. Tomasi 1987, Contro 1996 or Borsdorf & Paal 1999). Despite (or maybe because of) many sectoral studies, however, a comprehensive scientific model to measure QOL in the Alps has never been put into practice. Not until now, anyway.

One of the reasons for this might have been the fear of a rather strong element of uncontrollability and elusiveness which is always inherent in QOL studies. So many indicators seem to be needed for a comprehensive model and no matter how many indicators you may be able to collect you will never have included them all. And even if you had, you would still have to face the discussion about the extent to which these indicators really contribute to QOL. Sometimes it is not even clear whether they lead to an improvement in or a worsening of QOL, which triggers yet another frustrating realization: one and the same indicator can be interpreted as amelioration or pejoration depending on sensory and individual perception as well as on subjective assessment (see Fig. 1). Given theses facts, two options remain: either scientists just stay off this subject or they realize its actual importance and accept the necessity of compromise in modelling QOL. Any critical discussion within the scientific community resulting from this must be welcome.

Another challenge needs to be mastered in the context of QOL in the Alps: many people seem to have preset mental images which are very hard to dissolve. So there is one group who claims QOL in the Alps must be rather poor, as they still believe in the myth of the alpine inhabitant being a hard-working mountain farmer or because they uphold the image of the inhospitable, even unforgiving *montes horribiles* (cf. Bätzing 2005). On the other hand, you can find people who regard the QOL here as rather high. Either because they see the Alps in a very romanticized way – pretty landscapes dotted with tiny little villages where people still trust in and rely on each other – or, if they are keen on mountain sports, as some kind of playground of Europe. Looked at objectively, the Alps are above all the living

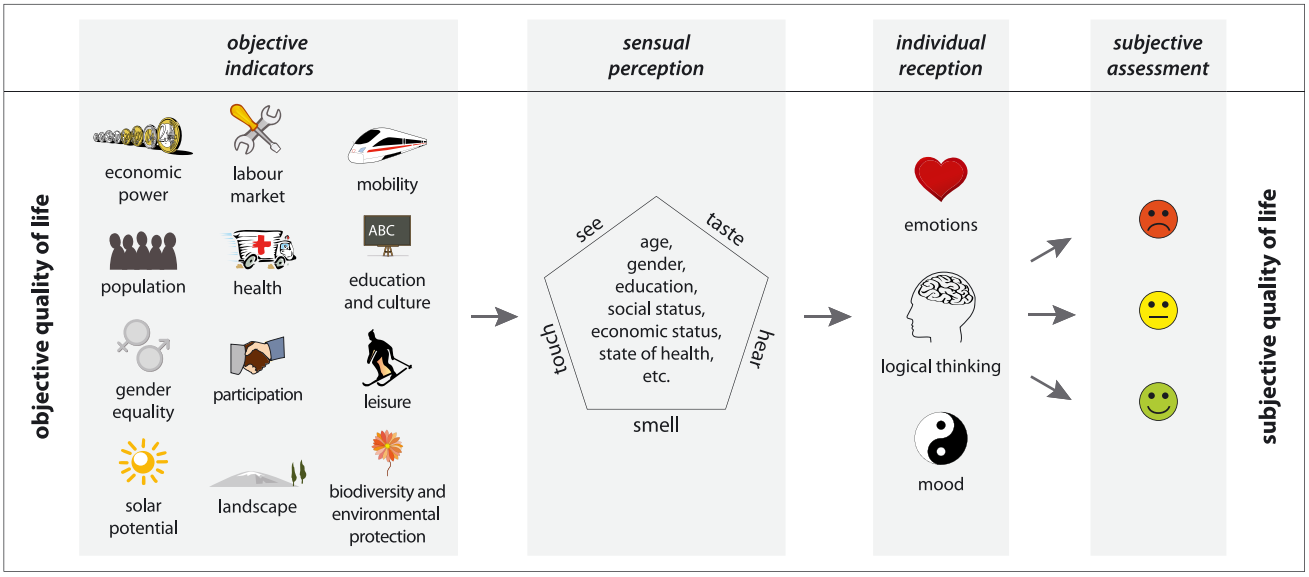


*Fig. 1: Objective quality of life filtered by individual perception, processing and evaluation mechanisms.*

space of about 14 million inhabitants. About 59% of them live in agglomerations which is also where 66% of all jobs are found (Bätzing 2003: 188). So what is QOL in the Alps really like? Does it actually differ from QOL outside the Alps? Even more important, how big are the differences in QOL between alpine regions?

At the beginning of the study "QOL within the Alpine Space", jointly realized by the Institute of Mountain Research: Man and Environment and the Department of Geography at the University of Innsbruck, more questions arose. Which subdomains of QOL must be analysed? Can QOL be measured by objective indicators alone or do we have to take a certain amount of subjectivity into account? Do data on QOL exist for the whole alpine arc or how long will independent data capture take? How many indicators are really needed? How can a weighting process of these indicators work? Can the Alps be split up into comparable regions as far as QOL research is concerned? Some time into the research, a couple of superordinate questions came up as well. Can a scientific model be developed to identify and determine QOL within the Alpine Space? Can such a model serve as an expression of the complex relationship between humans and the environment? Is it possible to deduce a direct correlation between QOL and sustainability? – Many questions which should lead to many answers and even more questions…

## Methodology

### *Dividing the Alps into comparable regions*

One of the problems to be solved was dividing of the Alpine Space into comparable regions. Studying several theoretical concepts, the Alpine Convention seemed most trustworthy in defining the outer boundaries of the Alps (cf. Keller 1998). Next, a reliable regional concept had to be identified. Here the classification of the Statistical Office of the European Commission would be appropriate, particularly its designation of NUTS 3 regions. Theoretically, these regions are home to 150 000 to 800 000 people (reality shows many exceptions from this rule) and they often correspond to existing regional units, e. g. "province" in Italy or "départements" in France (cf. Keller & Förster 2007). The study area is thus defined by a synthesis of the boundaries set by the Alpine Convention and the statistical NUTS 3 units, and comprises 100 'alpine regions' in seven states: Austria, France, Germany, Italy, Liechtenstein, Slovenia, and Switzerland (cf. Keller 2009). Monaco was excluded for statistical reasons.

### *Assembling the indicators*

Setting up the database of the model would eventually take over two and a half years. In a first step, we sifted through diverse studies on QOL and drew up a list with over 300 potential indicators. After checking the feasibility of the statistical investigation for the study area (completeness, comparability of indicators etc.), we arrived at a much shorter list.

One of the problems to be confronted stemmed from the regional rather than local approach applied in many other QOL studies. So, if, for example, you look at sunshine as one indicator, you can easily find data on the effective sunshine duration for certain places (e. g. Innsbruck: 1 764 h p. a.). At regional level, however, one has to contend oneself with data for the potential sunshine duration. In this special case, a digital terrain model with complex calculations taking in latitude, inclination and aspect of the territory had to be set up and analysed for every region.

Yet another difficulty was the transnational character of the study. Completing the data of one indicator for one, two or even six countries did not automatically mean that we would be able to complete the full set and we faced many disappointments.

It also became obvious pretty soon that, in addition to rather classic indicators, a whole range of innovative and pragmatic solutions had to be developed. When measuring the 'touristic attractivity' of regions, for instance, it did not seem enough to use the accommodation figures or the number of tourist over-

night stays. For one innovative indicator, we scoured Baedeker travel guides for the numbers of stars awarded for tourist highlights and allocated a total of 1 512 stars to these 100 regions. Similarly, we identified UNESCO World Heritage Sites as well as the regional share of water surface and the quality of ski resorts – once again all very time-consuming steps.

Looking at the overview given in Figure 2, another problem becomes clear: the dominance of socio-cultural and economic indicators as opposed to environmental ones. Here one should add that the configuration of each of the five environmental indicators took much longer than that of any of the other indicators. Future QOL studies will also face this challenge.

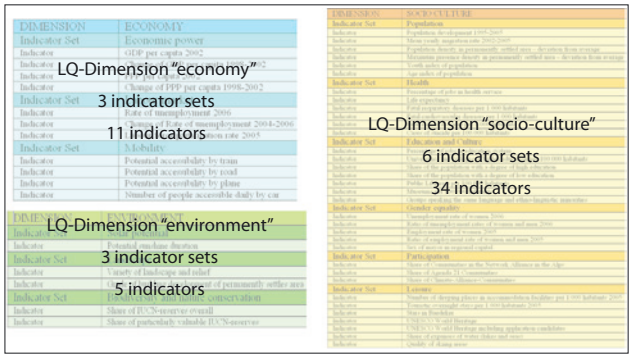


*Fig. 2: Overview of dimensions, indicator sets and indicators of the QOL model.*

## *Hierarchy of the QOL model*

Eventually, 50 complete indicator tables were compiled for all regions, and the indicators grouped into twelve indicator sets: 'economic power', 'labour market', 'mobility', 'population', 'health', 'education and culture', 'gender equality', 'participation', 'leisure', 'solar potential', 'landscape', and 'biodiversity and environmental protection'. These indicator sets are allocated to the three dimensions 'economy', 'socio-culture' and 'environment', thus following the basic idea of sustainability.

## *Expert interviews*

In the course of compiling the data it became evident that not all indicators could be regarded as equally important. Indeed, the significance of some of them was not at all clear. Therefore it seemed appropriate to interview experts in alpine research about it. The interviews are split into three parts: an introduction, the main section containing an ample weighting process and some concluding remarks. In the main part, each indicator and all indicator sets are weighted, the scheme is explained in Table 1.

*Table 1: Weighting scheme used in expert interviews.*

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| seems less important | seems important | seems very important | seems extremely important |

*Table 2: Experts from all countries of the Alpine Space are interviewed for the weighting process.*

| Expert | Institution | Language |
|---|---|---|
| Prof. Dr. Axel Borsdorf | Institute of Geography, University of Innsbruck and Institute of Mountain Research: Man and Environment Austrian Academy of Sciences, Innsbruck | German |
| Prof. Dr. Bernard Debarbieux | Geography Department, University of Geneva | English |
| Prof. Dr. Werner Bätzing | Institute of Geography, University of Erlangen-Nürnberg | German |
| Dr. Mimi Urbanc | Geographical Institute University of Ljubljana | English |
| Prof. Dr. Marie-Christine Fourny | Institut de Géographie Alpine, University Joseph Fourier, Grenoble | English, German (with interpreter), French |
| Andreas Götz | Managing director CIPRA International, Schaan | German |
| Prof. Dr. Ulrike Tappeiner | European Academy Bozen/ Bolzano | German |

At the end of the interview, the experts were also given the opportunity to exclude indicators or indicator sets completely. How the results of this weighting process finally found their way into the QOL model will be explained in the next section. The names of the seven experts (chosen from seven alpine countries) and the institutions they work in are listed in Table 2.

## *Rankings on QOL within the Alpine Space*

We illustrate how the ranking process in the QOL model works by taking the dimension economy and the indicator set mobility as our example. First of all, the inner order of the dimension and the indicator set are visualized in Tables 3 and 4.

Initially, maps are produced showing just the plain results of the data tables for each indicator and all alpine regions, e. g. the indicator 'potential accessibility by road' (Fig. 3). It is important to understand that no weighting has taken place at this stage. In the study itself, an extensive analysis is given for each map, with a special focus on the regions with the best and those with the worst results. Surprisingly enough, in many cases fairly clear patterns emerge rather than a wild mosaic.

In a second step, the first weighting process is showing its effect, here shown for the indicator set 'mobility'. Interestingly, the subjective opinions about the significance of each indicator sometimes vary greatly between the experts (cf. Tab. 4). Calculating the mean in every line, one can tell that in the indicator set of the indicator 'potential accessibility by road' is rated highest with 2.86. At 1.43, the indicator 'potential accessibility by plane' received the lowest significance rating. These arithmetical mean values are important when it comes to the ranking process.

Luckily, the number of regions is exactly 100, which makes things a little more convenient. If a region comes out top of an indicator table, it is awarded 100 points (the second place earns 99 points, and so on). According to the significance given to each indicator by the experts, these points are multiplied by the mean value of the weighting, say 2.86 for the indicator 'potential

*Table 3: Inner order of the dimension economy and the indicator set mobility.*

| **Dimension** | **Economy** |
|---|---|
| Indicator set | economic power |
| Indicator set | labour market |
| Indicator set | mobility |

| **Indicator set** | **Mobility** |
|---|---|
| Indicator | potential accessibility by train |
| Indicator | potential accessibility by road |
| Indicator | potential accessibility by plane |
| Indicator | (no. of) persons daily accessible by car |

*Table 4: Expert's weighting QOL indicator set mobility.*

| **Indicator set: mobility** | **Experts (initials)** | | | | | | | **Mean value** |
|---|---|---|---|---|---|---|---|---|
| | **AB** | **BD** | **WB** | **MU** | **MF** | **AG** | **UT** | |
| Potential accessibility by train | 3 | 3 | 1 | 1 | 2 | 4 | 2 | 2.29 |
| Potential accessibility by road | 4 | 3 | 4 | 3 | 3 | 1 | 2 | 2.89 |
| Potential accessibility by plane | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1.43 |
| (No. of) persons daily accessible by car | 4 | 3 | 1 | 3 | 2 | 1 | 2 | 2.29 |

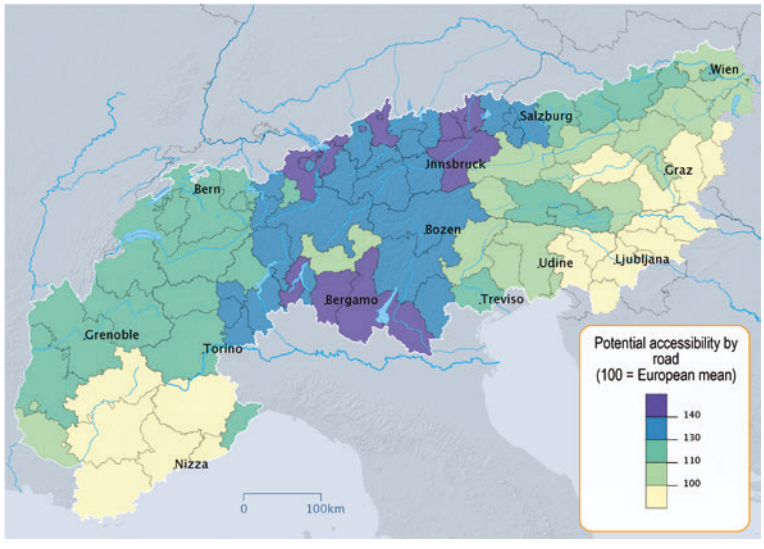


*Fig. 3: Map QOL indicator potential accessibility by road.*

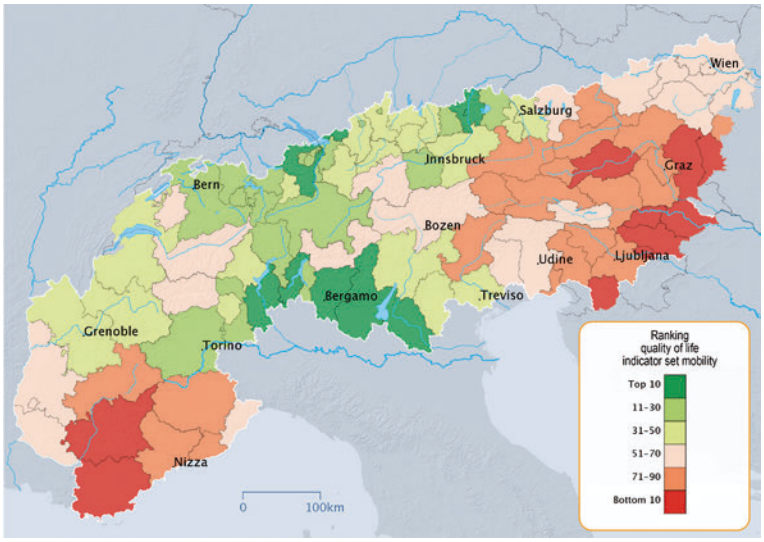


*Fig. 4: Map ranking QOL indicator set mobility.*

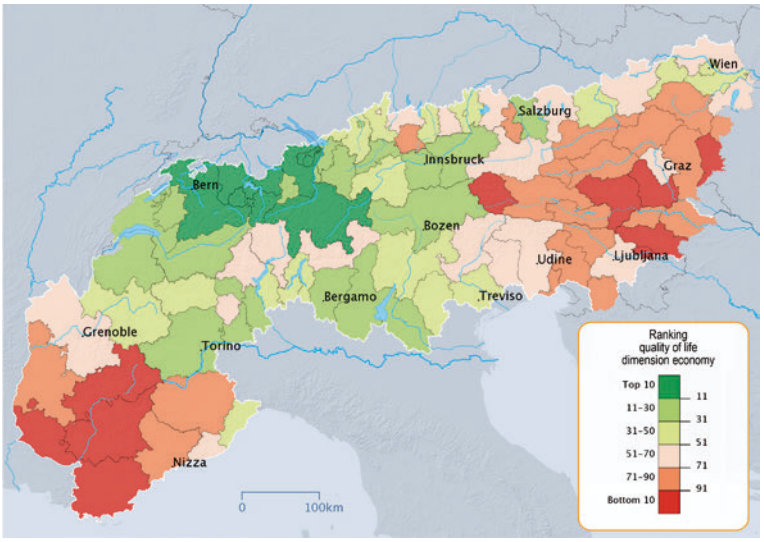


*Fig. 5: Map ranking QOL dimension economy.*

accessibility by road'. All in all, the winning region receives 100*2,86 = 286 credits for this indicator (the region in second place 99*2.86 = 283.14 points etc.). In the same way, the winning region of the indicator 'potential accessibility by plane' receives only 100*1.43 = 143 points.

Once all calculations for all 100 regions and all indicators of the indicator set mobility have been performed, all that remains to be done is to add the credits of a region and sort the regions according to their results. The region with the most points is top of the set and so on all the way down – the first ranking has been established (see Fig. 4).

Yet again, the map shows fairly distinct patterns that allow important analyses of QOL in the Alps (described in extenso in Keller 2009).This is not the end of the weighting process. In a second step the QOL dimensions are examined. Once again, the experts have had their chance to weight every indicator set individually, the results are summed up with an arithmetical mean value (see Tab. 5). This time the indicator set labour market comes out first with a value of 3.57. Economic power and mobility fall back on second and third place with values of 3.00 and 2.86 respectively.

*Table 5: Experts' weighting QOL dimension economy.*

| Indicator set: economy | Experts (initials) | | | | | | | Mean value |
|---|---|---|---|---|---|---|---|---|
| | AB | BD | WB | MU | MF | AG | UT | |
| Economic power | 4 | 4 | 4 | 3 | 4 | 3 | 3 | 3.57 |
| Labour market | 4 | 3 | 4 | 2 | 2 | 2 | 4 | 3.00 |
| Mobility | 4 | 3 | 2 | 3 | 3 | 3 | 2 | 2.89 |

*Table 6: Overview experts' weighting of all indicators and indicator sets.*

| Experts' weighting | 1 | 2 | 3 | 4 | Mean value |
|---|---|---|---|---|---|
| Indicators | 4 | 21 | 22 | 3 | 2.41 |
| Indicator sets | 0 | 1 | 8 | 3 | 3.08 |

Before these values can be used for multiplication, the final points for every indicator set from the first ranking process must be divided by the number of indicators in the set. This ensures that the number of indicators (which is different in each indicator set) does not influence the overall result. The indicator set mobility, for instance, comprises four indicators, so the final points of the first ranking must be divided by four. Then the credits for each region and indicator set are multiplied by the corresponding mean values.

These points are added up, and the regions sorted by the results. These rankings are visualized, and a comprehensive interpretation of the dimensions is given in the study. Now, broad areas of strength and weakness can be analysed more clearly (cf. Fig. 5).

## Results & Conclusions

### *Relevance of the topic*

All experts responded positively to the opening question of the interview: "Do you think the topic of QOL is important for Alpine Space?" (for the full interviews and results cf. Keller 2009). In many cases, convincing explanatory statements were explicitly added, for instance, "For years we have tried to increase the standard of living and have hit the limits of ecological, economic and social capacities. We must therefore address this topic from a different angle" (Axel Borsdorf in the expert interview). Many scientists agree with this opinion, e. g. Korczak (1995) or Kuckartz & Rheingans-Heintze (2006). Schnepf even regards QOL as a new paradigm in a world facing huge ecological and socio-economic challenges caused by globalization (derstandard. at 27.03.2006). Some of these effects may occur with some delay in alpine regions (cf. Craglia 1999; Tomasi 1987) but occur they will. A new orientation will thus be urgently needed in the near future and QOL research can play a decisive role here.

### *System and internal coherence of the QOL model*

The second question posed in the expert interview is, "Which indicators would an objective model of QOL have to include in your view?". From the answers two positive points become evident. First, the experts mention indicators which are either used in the model or for which data cannot be collected. Secondly, the inner order of the model with its three dimensions is confirmed. "It must be the classic aspects of sustainability (...). This means economy-society-environment as a trinity" (Werner Bätzing in the expert interview). The results from the quantitative part of the interview also clearly underline the inner coherence of the model (see Tab. 6). Furthermore, not a single indicator or indicator set was excluded by the experts in the third part of the interview.

### *The expert weighting method*

The introduction of the method "expert weighting" in a QOL study must be mentioned as a real innovation. Other surveys have neglected this process and simply weight all indicators equally (see e. g. Korczak 1995). The effects on the ranking are no doubt immense. In the indicator set 'population', for instance, the differences between a non-weighted and weighted ranking are such that only seven NUTS 3 regions did not change their positions in the ranking, whereas 33 regions moved by 1–4 places, 31 by 5–9 places, 13 by 10–14 places, and 16 regions by more than 15 positions. This shows that the involvement of experts in the weighting process strongly increases the reliability of QOL models.

### *Future adaptation of the model*

There is yet another advantage inherent in the setup of the QOL model. By addition, omission, change and replacement of indicators and indicator sets, the model can easily be adapted for future requirements, especially in connection with global change. Also, the experts can adapt their evaluations in future weighting processes. More and more experts – and also the man and woman in the street – can contribute their ideas of QOL. The informative value of the model will therefore be ever increasing.

### *Question of overall ranking "QOL in Alpine Space"*

As described above, expert weightings were carried out for indicators and indicator sets in order to create rankings for the indicator sets and the three QOL

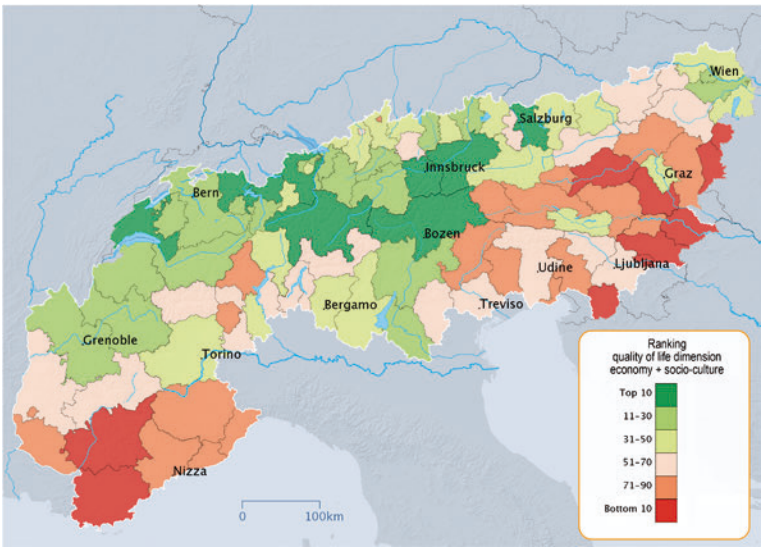


*Fig. 6: Map ranking QOL dimensions economy and socio-culture.*

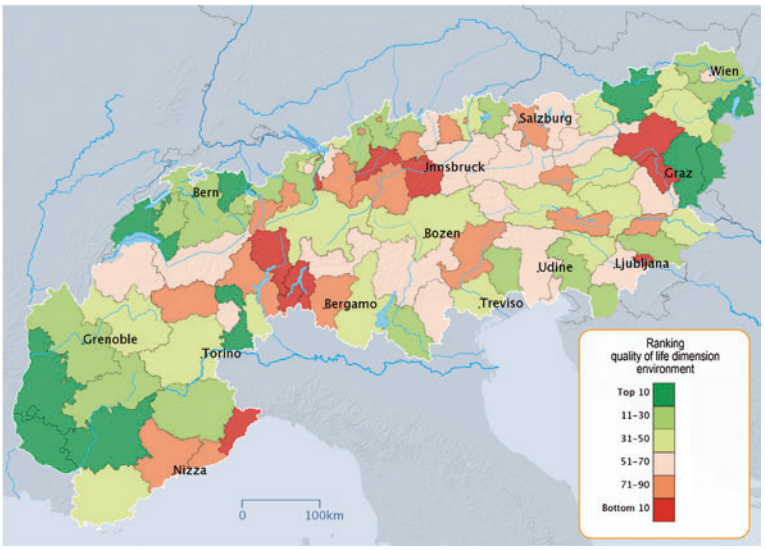


*Fig. 7: Map ranking QOL dimension environment.*

dimensions of the model. At the end of the interview, however, the question was asked whether the three dimensions themselves should be weighted for the overall QOL ranking. Opinions hereon differ greatly. Bernard Debarbieux, for example, just votes for a plain "Yes" and sees the ratio at 1 : 1 : 1. Ulrike Tappeiner, however, reports from her own experience in projects, "We have started to link things and have given up again, because it is just clear that (…) you compare apples with oranges. So… not that I find that, theoretically, the connection weren't necessary, I just believe that, due to the availability or lack of data, you find out something you cannot interpret at all or where you run the risk of misinterpreting the whole thing". The author of the study shares this view, especially as the dimension environment does not seem to be on a par with the other dimensions yet. Colleagues kept pushing the author though to produce a final result, so another compromise was made, i. e. a final ranking combining the dimensions economy and socio-culture.

Even a quick glance at Figure 6 makes it clear that QOL in the Alps is very unevenly distributed. There is a strong central belt, including western Austria, most of Switzerland, the northern regions of the French Alps, and many Italian regions between Treviso and Torino. In contrast, the eastern third of the study area and its southernmost parts end up on pretty low positions due to a combination of problems and weaknesses (a detailed analysis is given in Keller 2009).

However, if the third dimension – environment – were integrated this would lead to a striking change of the final ranking picture as many regions on lower positions in the dimensions economy and socio-culture can be found on the positive side of the tables there (see Fig. 7). Future QOL studies should be improved by integrating more and more of these aspects.

## *QOL and sustainable development*

There is definitely a very strong connection between the fields "QOL" and "sustainability", which is commonly reflected in the literature and also in the model at hand. The experts, too, provide what could be described as a "double validation" of the internal structure of the model by weighting and explicit answers leading directly to the main ideas of sustainability (see above). Sustainable development has become an accepted political concept worldwide but has not fulfilled the hopes set in it. This is where QOL, as a new paradigm, may come into play as it combines the normative guidelines

of sustainable development with a peaceful and joyful search for new orientation in a world worth living in. Important in terms of science and research is the potential capacity of any QOL model to serve as a strong expression of the complex man-environment-relationship, albeit on condition that further research is carried out, particularly in the dimension environment. Geography can take over a decisive role here, as many different questions still remain to be asked and answered…

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