

## Assessing Smart Locations – the MORECO Project

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### 1 ABSTRACT

A main criterion of intelligent and smart locations is the fact that they support a resource-saving way of life of the residents. Beside other aspects, the mobility of the residents is a very big part of this lifestyle. In big agglomerations the level of motorization is already decreasing, but in rural regions there is often a lack of public transport options which can be used from the inhabitants instead of their own car.

The European co-funded Alpine Space project “MORECO Mobility and residential costs” aims to improve sustainable mobility and to foster better accessibilities by supporting an optimized polycentric settlement development. The mainly addressed target groups are private households, planners, and mobility actors as well as politicians and decision makers. To fit all different needs, special tools were arranged and developed for each target group during the MORECO project.

These provided tools within the MORECO tool kit are generally possible to be used in every region or municipality to be a part of an overall and strategic mobility management. The adaption level of the tools can be fitted to all local framework conditions as far as the necessary data is available.

In regions where the mobility behavior is mainly car-oriented the tools can be helpful and motivating to improve sustainable mobility offers, especially because there is mostly no possibility to stop directly future urban sprawl according to law. The practical results out of the project can be an incentive for other European regions and municipalities which also prioritize an improvement in the field of sustainable mobility.

### 2 THE CHALLENGE

Economic and demographic dynamics lead to a decomposition and a change of long-known and traditional planning principles and individual behaviors. Trends like globalisation, an increasing number of older people, an increase of single households, more flexible working forms, and opening hours<sup>1</sup> cause peri-urban areas, rising rents, and changing requirements on public transport services. To counter this development it is more and more important to support a resource-friendly way of life. This becomes evident in the increased demand for smart cities, a paradigm which shall solve these problems.

When we talk about smart cities or locations, we have to think about the following questions:

- What are smart locations?
- Are smart locations always smart? For everybody?
- How can people be encouraged to move to smart locations?

Referring to the “European Smart Cities” project<sup>2</sup> a smart city is defined as “a city well performing in a forward-looking way in these six characteristics (see Fig. 1), built on the ‘smart’ combination of endowments and activities of self-decisive, independent, and aware citizens”. This definition can also be adapted for regions or municipalities.

<sup>1</sup> VCÖ (2003): *Mobilität 2020. Trends – Ziele – Visionen*, p.21.

<sup>2</sup> <http://www.smart-cities.eu/index2.html>

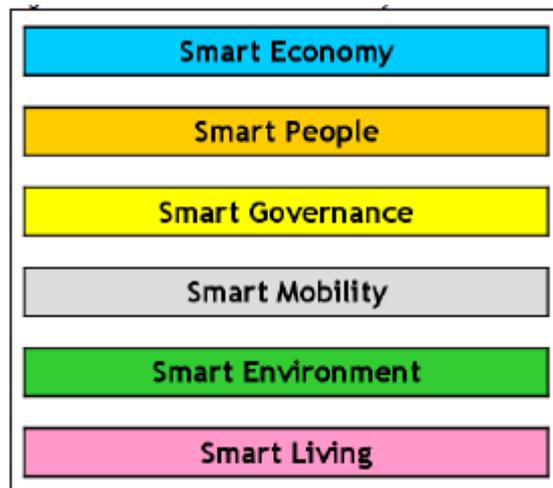


Fig. 1: Characteristics of a smart city (source: [http://www.smart-cities.eu/download/smart\\_cities\\_final\\_report.pdf](http://www.smart-cities.eu/download/smart_cities_final_report.pdf), page 11.)

When we now think about the parts “smart mobility” and “smart living” we realize that one part influences the other very intensely. An important criterion of Smart Living (e.g. Quality of life) covers beside others cultural facilities, social cohesion, and quality of housing. Smart Mobility involves local and (inter-)national accessibility,<sup>3</sup> which is especially important when making a long-term residential location choice. In the end, a city or a region is smart if the inhabitants and people in charge act smart. Corresponding to the question “what are smart locations?” it means that house-hunting individuals or families should choose the location which fits the best to their special needs, especially when it comes to accessibility of work place, school, leisure activities, or shopping facilities. This also includes a sustainable aspect and leads to the next questions: “Are smart locations always smart? For everybody?” A location which fits perfectly for one household referring to the daily ways done by the household members could be inappropriate for another household. It always depends on individual needs and standards of living. Smart locations are defined by the needs of their inhabitants and so there is no common answer or statement if one location is smart in general or smarter than another.

Furthermore, people often tend to move to suburban areas because real estates and rentals are often cheaper than in denser areas. This behaviour is the opposite of smart because the aspect of induced mobility costs is mostly not considered. Moving to suburban areas works fine if daily destinations are also in the surrounding area. But in many cases it causes long travel times to city centres which also means high costs for mobility. Although living space in city centres and other dense areas can be more expensive, it is compensated by decreased mobility costs because of improved accessibility. This knowledge leads to the third question “How people can be encouraged to move to smart locations?” The intention has to be asked here to provide information and tools for a better transparency of the relevant circumstances; not only for individuals or households which choose a location, but also for the responsible persons which have to plan or decide about the future of cities and regions.

The main goal of MORECO is to develop some strategies for these challenges.

### 3 THE PROJECT

The EU co-funded Alpine Space project “MOR€CO – Mobility and Residential Costs” started in June 2011 and lasts until June 2014. It is a cooperation of 10 project partners located in Austria, France, Germany, Italy, and Slovenia. Municipalities, regions, provinces, or institutes which work together with local, regional, national political, and administrative institutions are additionally involved as partners and external experts. All partners bring in different needs, experiences, skills, and backgrounds. Dense areas like the cities of Munich and Salzburg are presented in the project as well as sparsely populated and shrinking regions like Val Belluno. Especially this mixture is necessary to reach a winning mix of tools and strategies and to ensure transferability into Alpine Space regions or other areas. It is the declared aim of the partnership to find new solutions and reach an improved governance process for a better steering of spatial and mobility planning.

<sup>3</sup> [http://www.smart-cities.eu/download/smart\\_cities\\_final\\_report.pdf](http://www.smart-cities.eu/download/smart_cities_final_report.pdf), page 12.

## 4 THE TOOLKIT

To guarantee usable results at the end of the project, special target groups were defined in the beginning. Each target group should be supported by the MORECO tools to tackle their needs in the field of residential location choices. All tools applied together are the foundation for an overall strategy.

### 4.1 Households

Beginning on the individual level the MORECO toolkit involves a mobility and residential cost calculator for households to communicate the relation between a residential location choice and the induced mobility costs. Private households shall be motivated to analyze their mobility costs and shall be influenced to choose the most sustainable residential location. There already exist a few mobility costs calculators. Especially in Austria and Germany one can find some very in-detail developed cost calculators for smaller or bigger regions. Of particular importance are the mobility and residential cost calculators for the metropolitan areas Hamburg and Munich, which were developed from the privat planning office “Gertz Gutsche Rümenapp”, as well as the Austrian Mobility Pass for Residential Real Estate, developed from the research institute CEIT Alanova, since these calculators included essential requirements which were also used for the MORECO tools later on . These calculators are characterized by a well-designed, web-based user interface, and a big data base in the background. Beside these highly qualified web calculators of course other mobility and cost calculators do exist which were mostly designed for other (often special special) requirements.

All calculators have in common that a big amount of technical computer skills, money, and working hours is needed for the realization. Since MORECO is an EU Alpine Space project, the intention is to transfer and implement common knowledge to the attending pilot sites. So, creating another tool to calculate residential and mobility costs for individual households was not the professed goal, but rather to create a simple tool foundation which all pilot sites can use and work on. This is the reason why the tool for the individual households was created in Microsoft Excel, a programm which is easy to get and work with. This Excel document can be downloaded for free on the project website <http://www.moreco-project.eu/> and offers a quick and easy possibility for everybody to get a rough overview about individual mobility and residential costs. As it is not linked with local data to a special region it is not as detailed as one of the mentioned calculators above. However, the benefit is the transparent calculation presented in a separate tab of the Excel document. This calculation can be used for any further development, for example in a detailed local web-based version or a mobile application.

**WOHN- UND MOBILITÄTSRECHNER**  
DES MÜNCHNER VERKEHRS- UND TARIFVERBUNDES

HAUSHALT + ARBEIT > WOHNEN > MOBILITÄT > ERGEBNIS > STANDORTVERGLEICH

**Wohnorte**

A "Wohnprojekt 1"  
Einsteinstraße 3,  
München  
Miete, Wohnung, Bestand, 80qm

**Arbeitsplätze**

A "Arbeitsplatz 1"  
Arnulfstraße 54  
München  
Anfahrten je Woche: 5x

**Mein Verkehrsmittel**

Bitte wählen Sie für jeden Arbeitsplatz die für Sie passende Verbindung aus.

	ÖPNV	Auto	P+R	Fußweg/Rad
"Arbeitsplatz 1"	<input checked="" type="radio"/> 17min Fußweg 0x umsteigen	<input type="radio"/> 13min Fußweg	<input type="radio"/> 27min Fußweg 1x umsteigen	<input type="radio"/> 45min Fußweg 12min Radweg

**Nachbarschaftsvergleich**

Sie sehen, wie viele Autos Haushalte mit der gleichen Personenzahl in der Nachbarschaft besitzen.

kein Pkw	ein Pkw	zwei Pkw	mehr als zwei Pkw
46%	41%	12%	0%

So entscheide ich:

Autos: 1  
MVG-Abos: 1

< zurück > weiter

Fig.2: “WoMo” calculator Munich (source: <http://womo.mvv-muenchen.de/mobilitaet>)



**Mobilitätsausweis für Immobilien**

**Angaben zum Standort:**

- Wohnort (Strasse, Ort):
- Miete/Eigentum: Mietobjekt
- monatlicher Hauptmietzins inkl. USt: 250 €
- Monatl. Betriebskosten inkl. USt: 0 €
- Energiekosten für Beheizung und Warmwasser lt. Energieausweis: 0 €
- Verfügbares Eigenkapital: 0 €
- Nutzungsdauer: 10 Jahre
- Verzinsung: 2,70 %
- Maklerprovision: 0 €
- Wohnnutzfläche: 120 m<sup>2</sup>

**Persönliche Angaben:**

- Anzahl der Personen im Haushalt: 1

Fig. 3: Mobility Pass for Residential Real Estate (source: [http://www.mobilitaetsausweis.at/advanced\\_tool/modul2.php](http://www.mobilitaetsausweis.at/advanced_tool/modul2.php))

**3. Regular Trips (all household members)**

*This chart is the foundation for the calculation of your variable mobility costs. Please fill in the regular ways which are done in your household from all household members. You can chose between ways done with public transport or done with a car you own. You can specify the car attributes (engine, size, used fuel) in the section "4. mobility costs". You can also add the estimated time you need for one way, this helps to calculate the expected time budget for your chosen ways.*

Purpose	Trip			Estimated time; one way (in minutes)	Public Transport Additional ticket price (bidirectional if not covered by season ticket)	Means of Transport		
	Number of trips	Per				Specify car	Total Distance (bidirectional)	Driving profile
Work/School	5	Month		45	€	Car 1	km	Mixed
Work/School	5	Month		20	€	Car 2	km	Mixed
Shopping/Other Tra	2	Month		10	€	Car 1	km	Mixed
Leisure Activities	2	Month		15	€	Car 1	km	Mixed
Leisure Activities	2	Month		20	€	Car 2	km	Mixed
		Month			€		km	Mixed
		Month			€		km	Mixed
		Month			€		km	Mixed
		Month			€		km	Mixed
		Month			€		km	Mixed
		Month			€		km	Mixed

Fig. 4: MORECO Excel-based Cost Calculator for households (source: own graphic)

**4.2 Planners and mobility actors**

The second tool designated for the target group of planners and mobility actors aims to help the responsible persons to identify suitable locations for settlement development and to compare different locations regarding the level of local supply and public transport accessibility etc. The tool should help to support a sustainable settlement development by using geographical information systems (GIS), models, spatial indicators and geospatial data.<sup>4</sup>

This tool framework is divided into three parts:

- Regional Analysis

This part of the tool describes core indicators like public transport structure, land use, demographic and commuting data etc. Outputs are maps, diagrams and additional explanation texts. The tool indicators are for example distances in minutes and km, number of population, fuel prices, or density values of settlement.

- Settlement Assessment

<sup>4</sup> See: Haslauer, E.; Prinz, T.; Schnürch, D.: Frameworks of MOR€CO Tools for Planners and Mobility Actrs, p.3.

The settlement assessment analyses local areas concerning their suitability for residential locations linked to future induced mobility costs for the inhabitants. To produce qualified results the tool analyses distances between residential locations and possible work places, shopping facilities, schools, and other public infrastructure facilities.

- Mobility Planning

The third tool part aims to support sustainable mobility planning based on a well-working and well-conceived public transport system. Short ways and a mixed settlement structure are a foundation for an efficient and affordable mobility. Thus the tool tries to foster short ways by showing potentials for future expansion of transport axes or additional stations. The outputs are indicators like for example the accessibility potential, potential number of users (walking distance), or service areas.

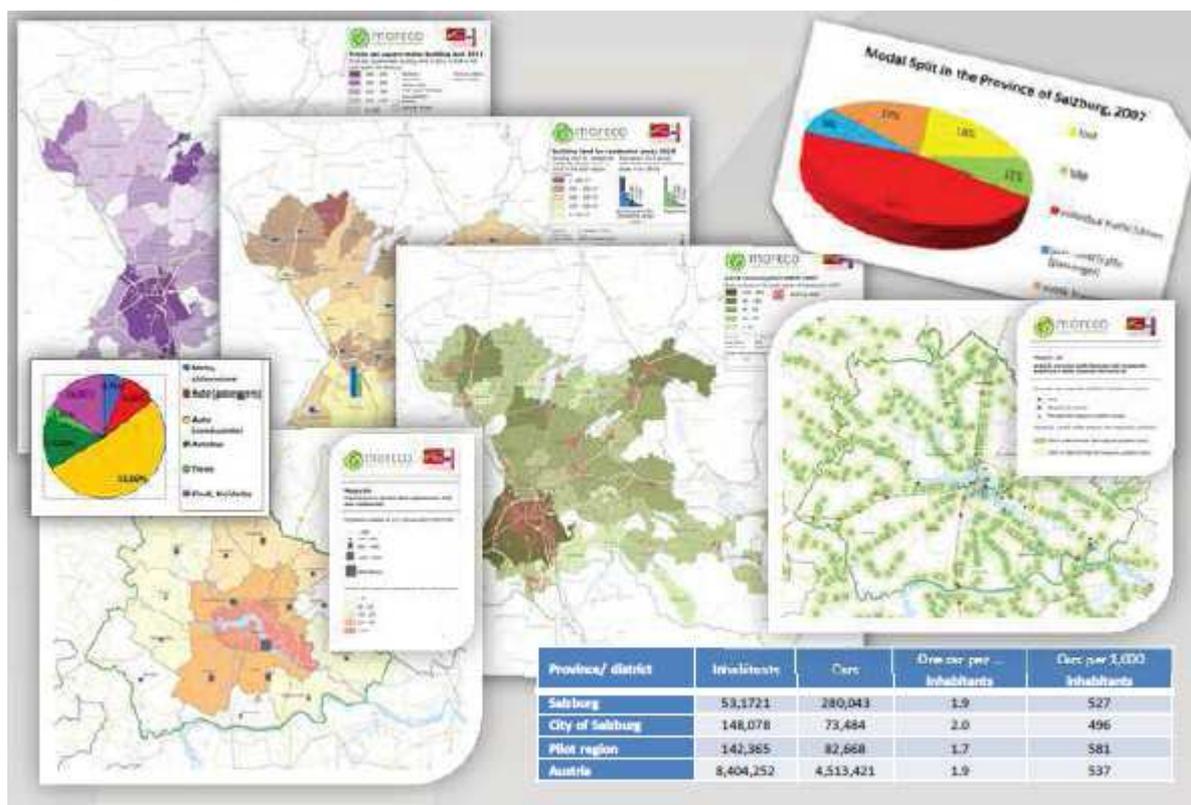


Fig. 5: MORECO tool for planners (source: MORECO Brussels Think Thank Poster, designed by ispace 2014)

During the development it was also the aim to create guiding frameworks for implementing the tools in the different pilot sites.

### 4.3 Politicians

For the target groups of local and cross-municipal policy makers, MORECO provides a lot of information material, like a broad slide pool to inform themselves and brief other stakeholders or inhabitants concerning the topic of sustainable mobility. This target group was chosen because of their responsibility for the future development of the local settlement structure which includes decisions concerning zoning or public transport aspects. These policy makers are usually politicians or other professionals which have to make themselves familiar quickly with expert knowledge for special occasions. They do not only have to inform themselves, but also transport important messages in a simple and understandable way to the population. The MORECO information tool, that came as a broad power point slide pool, can be a helpful assistance in the field of mobility and residential costs. These power point slides are available for free and are structured into the following subchapters.

- The MORECO project
- Why is MORECO of interest to you?
- Facts, background, trends

- Impacts on actors
- Good practices/Opportunities for the future
- Practical MORECO tools/MORECO tools for households
- MORECO tools for spatial planners and mobility actors
- MORECO tools for policy makers

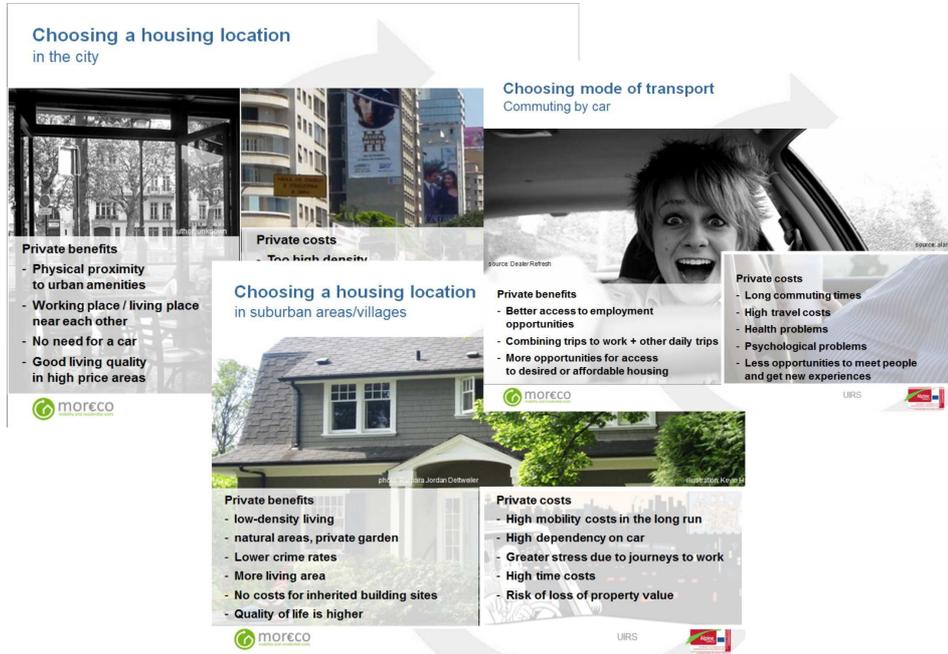


Fig. 6: MORECO slides for policymakers (source: MORECO Power Point deliverables, designed by SIR 2014)



Fig. 7: The household calculator version implemented in the Salzburg pilot site (source: www.moreco.at)

It is possible to use the whole slide pool or just selected files or images. The slides are designed in English language, but also available in German.

## 5 THE IMPLEMENTATION PROCESS

### 5.1 State of implementation

Within the MORECO project the pilot sites decided on their own which tools they want to implement. Depending on their local problems and potentials they did not only select the tools, but also decided about the way of implementation which was mostly important for the household calculator. There are already running several versions of the MORECO cost calculator for households in five different pilot sites. From simple translated Excel versions up to detailed developed web-versions various adaptations have been implemented. In the Salzburg region for example a web-based calculator was drafted which includes live interfaces to the local public transport organisation. The results includes suggestions for different public transport tickets which raises the quality of the usability.

In comparison to the Salzburg pilot site, the Slovenian project partners decided to provide at first a simple calculator version of the translated Excel document without live interfaces or maps. It is destined to develop another sophisticated version of the tool in a second step, but it was their intention to provide a fast and simple solution for private households. In the field of the household calculator the adaptations are very diversified, because the further technical development of the Excel version has to be done from the pilot site stakeholders themselves.

The screenshot shows a web-based household calculator interface. It includes a navigation button 'Nazaj na prejšnjo stran' and several main sections:

- Gospodinjstvo:** A section for entering household data, including a table for 'Število odraslih' and 'Število otrok'.
- Stroški stanovanja:** A section for entering housing costs, including a table for 'Naslov', 'Višina najemnine ali posojila na mesec', and 'Dodatni stroški na mesec'.
- Mesečna odplačila za posojilo:** A section for entering loan details, including a table for 'Cena gradbenega zemljišča', 'Cena hiše/stanovanja', 'Davki in stroški postopka', 'Drugi stroški', 'Skupni stroški', 'Lastna sredstva', 'Znesek posojila', 'Obrestna mera', 'Doba odplačevanja', 'Mesečno odplačilo posojila', and 'Celotni znesek obresti'.
- Redna potovanja (vsi člani gospodinjstva):** A section for entering regular trips, including a table with columns for 'Namen', 'Število potovanj', 'Na enoto', 'Čas potovanja/ena smer', 'Cena vozovnice', 'Vozilo', 'Razdalja', and 'Profil'.

Fig. 8: The household calculator version implemented in the Slovenian pilot site (source: <http://moreco.uirs.si/Domov.aspx>)

However, the planners tools of the pilot sites are designed as technical frameworks and the pilot sites have to deliver the respective data to the project partner iSPACE (an Austrian research institute) which is the designer of the tool. iSPACE implements the delivered data into the tools and provides the local version for the pilot sites.

### 5.2 Transferability

In general it is possible for each region or municipality to implement and use all developed MORECO tools. Especially the household tool and the slide pool for policy makers can be used without any great effort. The tool for planners and mobility actors also can be implemented everywhere – according to the available data, different levels of implementation are possible. There already exist a lot of Europe-wide surveyed data, but in a few countries there is still a lack of exhaustive information and in an international comparison the data availability becomes increasingly different. Therefore a general version without any data running in the background was developed as well as a more automatic version with some local data on municipality level was integrated resulting in a third, almost fully automated version with a large database behind.

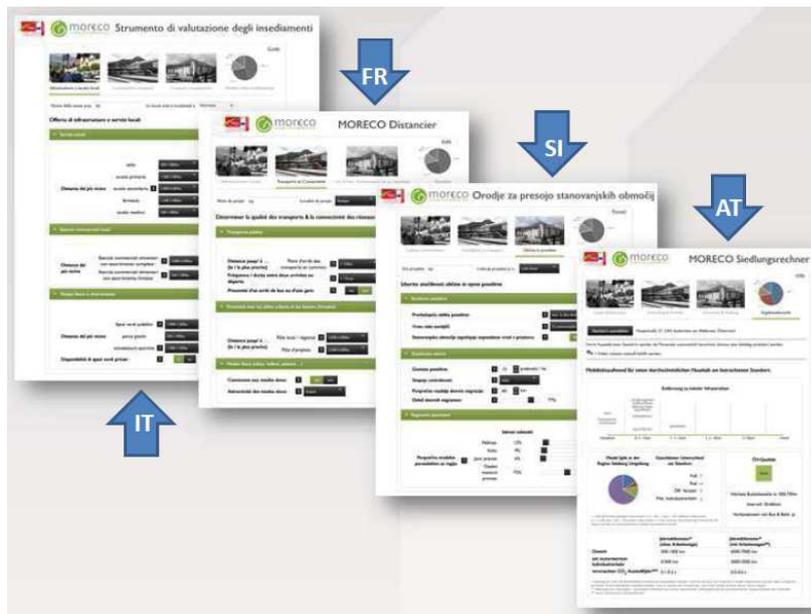


Fig. 8: Implemented planner tools (source: MORECO Brussels Think Thank Poster, designed by ispace 2014)

## 6 THE CONCLUSION

Out of the MORECO project resulted a handful of tools to raise awareness of the relation between mobility and residential costs from an overall perspective. By defining target groups at the beginning of the project it was ensured to focus on the needs of differently concerned people. The intention was also to offer possibilities to each municipality, organization, or other stakeholders which want to implement the tools regardless of their personal or financial resources. The aim of the project, namely raising awareness of the relation between mobility and residential costs as well as developing tools to inform and visualize, was thus achieved. Furthermore, the implementation process of the tools was part of the common work. Nevertheless, it becomes more and more important now to foster the target groups to use the tools. These tools are a good foundation to support smart cities and regions, but there still remain some unsolvable problems like for example unlogical decisions: individuals and households which are bonded to areas or places, maybe due to their family, friends, or other social networks, will probably not choose another residential location just because it is more cost-efficient. Social aspects play an important role in this context; but, on the other hand, it can also just be an image of a special area which enhances the attractiveness to live there since the responsible do not always decide in an altruistic way: Growing regions still have a better image than shrinking ones and this often leads to designations of new building zones in peripheral areas without a good accessibility to public infrastructure.

In general, the long-term goal of the project is to make the topic “mobility and residential costs” a daily matter for (re-)planning of settlement structures. These aspects influence the quality and smartness of residential areas a lot and MORECO can help to assess these smart locations.

## 7 REFERENCES

- VCÖ (Hrsg.): *Mobilität 2020. Trends – Ziele – Visionen*, Wissenschaft & Verkehr 3/2003, Vienna 2003.
- VCÖ (Hrsg.): *Mobilität und Transport 2025+*, VCÖ-Schriftenreihe “Mobilität mit Zukunft” 2/2013, Vienna 2013.
- CENTRE of Regional Science (SRF), Vienna, University of Technology: *Smart cities – Ranking of European medium-sized cities*, Vienna, 2007.
- HASLAUER, Eva; Prinz, Thomas; Schnürch, Dagmar: *Frameworks of MOR€CO Tools for Planners and Mobility Actors*, MORECO Project deliverable, Salzburg, 2012.
- CADUS, Sebastian: *A Housing and Mobility Cost Calculator for the Province of Salzburg*, Master Thesis at the Interfaculty Department of Geoinformatics Paris-Lodron University of Salzburg, Salzburg 2013.

