INTERREG Alpine Space Project

"Sustainable Mobility Behaviours in the Alpine Region – SaMBA"

Guideline for implementing the SaMBA Tool

(June 2021)

The SaMBA project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme.

Short Description
“Guideline for implementing (parts of) the SamBA simulation tool in other organisations/ regions/ countries. The guideline will include a content-based description and manual in order to facilitate its use and potential customization.” (Project Application Form 23/09/2020)

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Table of content

1. Introduction 4
1. Tool concept 5
   a) Goals 5
   b) Tool structure and building blocks 6
2. Implementation of the Excel component 9
   a) Overview of the sheets 9
   b) Information for developers 13
3. Implementation of the GIS component 20
   a) Spatial data and statistics 20
   b) Parameters 21
   c) Modelling results 27
4. Outlook and contact info 37

Annex: Overview of all implemented measures 38

1. Introduction

Within the scope of the SaMBA project, a tool to provide **decision support for planning experts and public authorities regarding mobility** has been developed.

The deliverable at hand (D.T1.5.1) belongs to WP T1 ("Policy impact estimation") and contributes to the work package's output O.T1.1 ("Behaviour change policies impact estimation and tool"). The tool guideline presented within this document is created as a **manual for the implementation and customization of the SaMBA tool for finding policies & estimating impacts in terms of mobility behaviour change**.

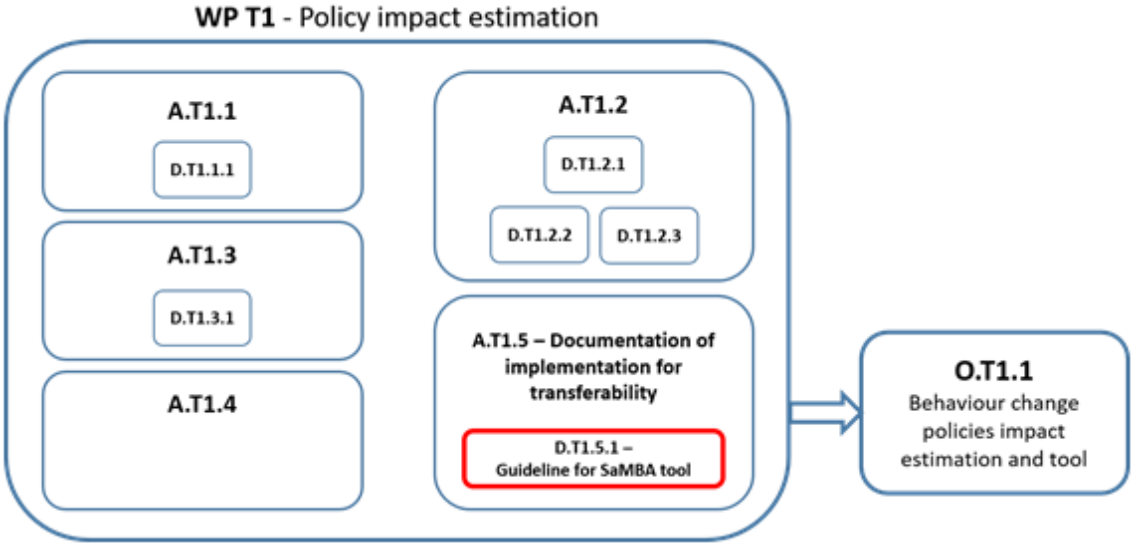


Figure 1: Placement of this deliverable within the project

The generated output (O.T1.1) should be of use for a broad target group consisting of local, regional and national public authorities, sectoral agencies and higher education and research. The responsible partner of this work package is RSA iSPACE together with the lead partner Piedmont Region. In addition, twelve project-partners are involved within this work package.

This document presents the guideline for the SaMBA tool. It starts with a summary of the underlying tool concept and describes the implementation of the Excel and the GIS components. Furthermore, it explains how the components can be adapted and enhanced, e.g. to increase the number of included measures or to fit the characteristics of a target area. Therefore, this guideline mainly addresses people who want to implement or customize the SaMBA tool for a specific purpose or a specific target area.

The SaMBA project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme.

1. Tool concept

This chapter describes the underlying concept of the tool. The detailed version is provided in deliverable D.T1.2.3.

a) Goals

The objective of the SaMBA tool is to **promote low carbon mobility** and to **raise awareness of the value of behaviour change policies**. It helps to promote sustainable modes of transport, to achieve a modal shift and to increase options for low carbon mobility by new policies.

Therefore, the tool aims at the **support of decision-making processes** and the choice of appropriate measures and incentives to encourage residents to change their mobility in favour of sustainable modes of transportation. The selection of measures depends on a goal defined by the user and a set of **parameters**, which describe regional characteristics with influence on mobility. The tool also helps to estimate **impacts** of measures with the help of indicators taken from best practice examples.

The tool concept is designed for **transnational applicability**, which means that the goals and parameters have no regional specification. Furthermore, it is important to note that a measure may not have the same effects in different target regions. The impacts depend on many factors and details beyond the scope of the SaMBA project. Therefore, the tool provides experiences and reported effects of best practices.

As an optional add-on, a **GIS-based framework** is included to improve and substitute user-input by pre-processed spatial statistics and data. Besides, GIS methods on potential mobility demand and action areas for behaviour change policies have been developed.

The tool primarily addresses **planning experts**, **policy makers** and **public authorities**. Furthermore, it can be interesting for **sectoral agencies** dealing with transport, sustainable development or land use planning, **higher education and research** and **infrastructure and service providers**. It also addresses the **general public** since the recommended measures and incentives are designed for the citizens. Therefore, with the help of national workshops, a Report on user needs (D.T1.2.1) has been developed. It provides a list of aspects that stakeholders consider important for the tool, e.g. a user-friendly interface, an export function, easy communicable results (e.g. through maps or lists) and best practices as results.

The SaMBA tool is **open to a wide audience without any restrictions** and **can be used without specific IT expert knowledge**. However, for implementing the optional GIS framework for a specific region, it is recommended to involve a GIS expert.

b) Tool structure and building blocks

The structure of the tool and the linkage of different inputs and outputs and the Excel and GIS components can be seen in Figure 2.

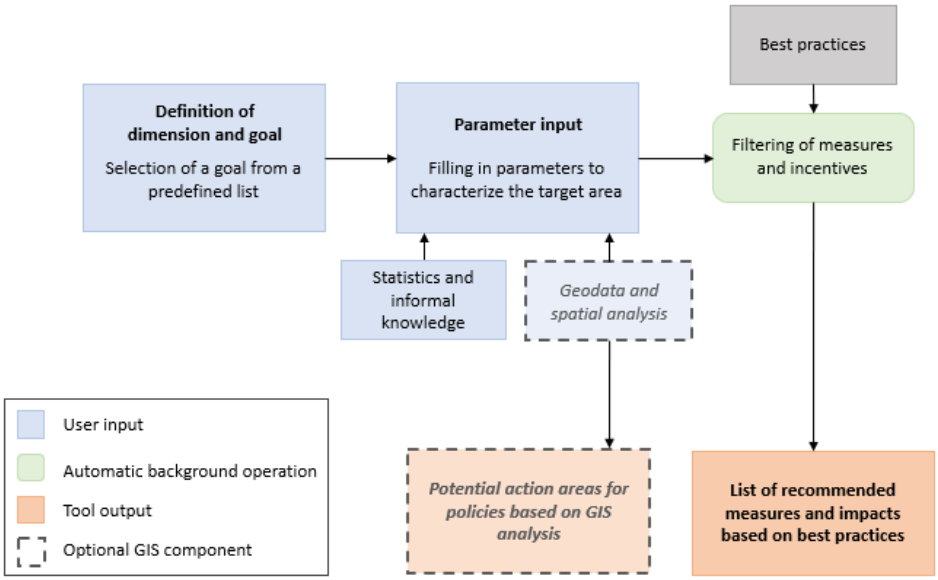


Figure 2: Overview of the structure of the SaMBA tool

Figure 3 provides an overview of the central building blocks of the SaMBA tool, which include **goals**, **parameters**, **measures/incentives** and **impacts**.

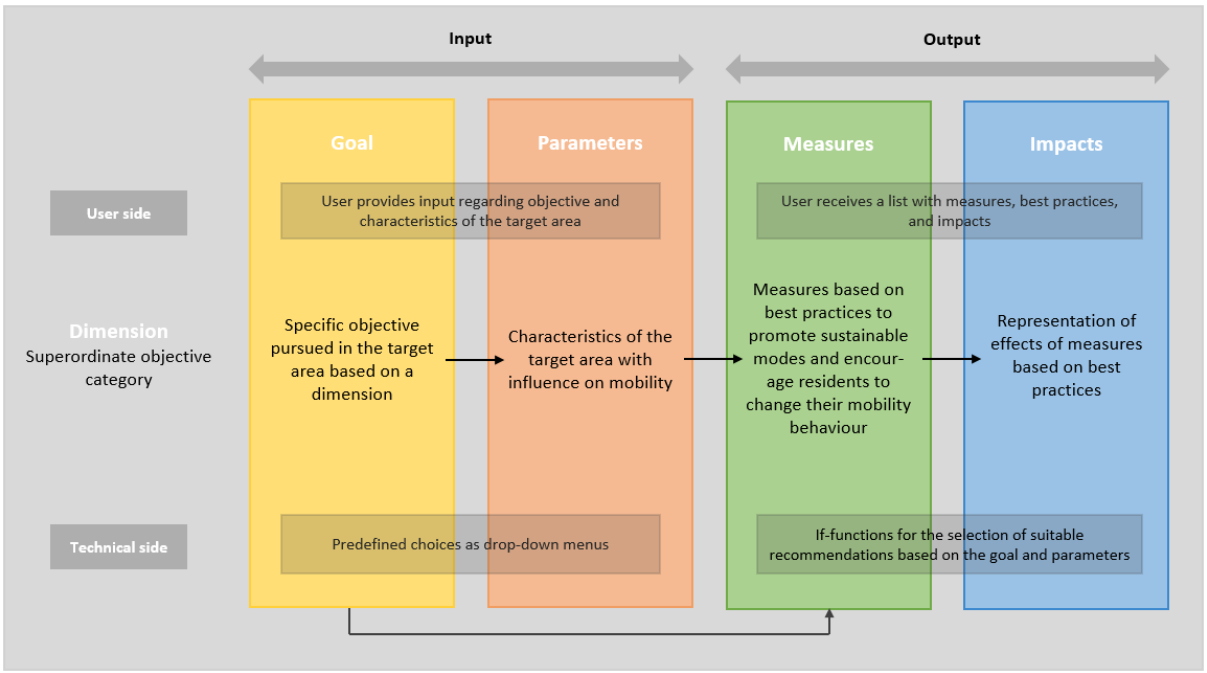


Figure 3: Central building blocks of the SaMBA tool

The SaMBA project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme.

Four relevant **dimensions** of mobility behaviour change have been defined for the tool: **promotion of PT (PT)**, **promotion of active modes**, **promotion of multimodality and access** and **promotion of sharing systems**. Every **goal** included in the tool is assigned to one of these dimensions for better clarity and structuring. The first step for the users is the selection of the dimension they want to address. Based on this input, the tool automatically provides a list of the assigned goals to make the tool more user-friendly. If users do not want to use a specification of the goal, they can select a category that includes all goals for the chosen dimension.

Figure 4 describes the dimensions and related goals.

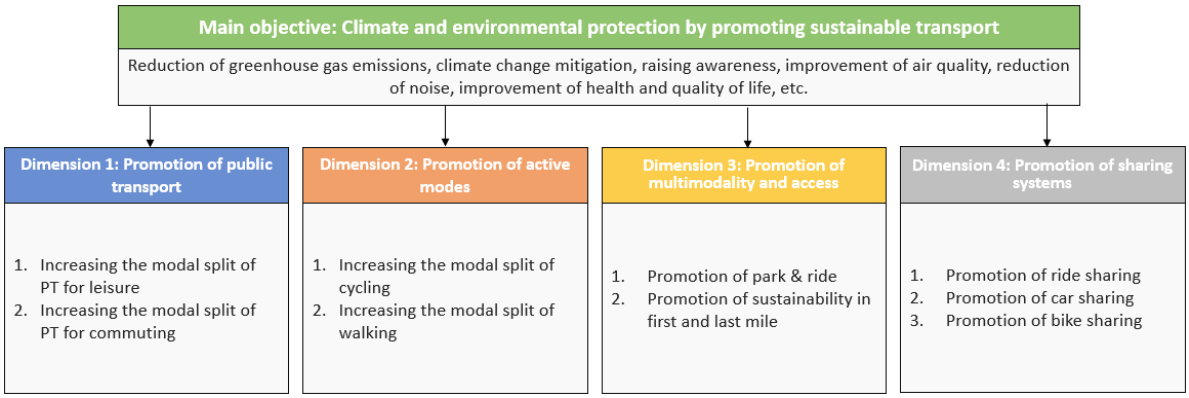


Figure 4: Predefined dimensions and goals for the SaMBA tool

Parameters are defined as **regional characteristics with influence on mobility**. They include e.g. **infrastructure**, **demography**, **topography** and **settlement** and help to filter measures that are suitable for a target area. As parameters, quantitative and qualitative variables are implemented. Parameter values can either be taken from internal sources such as municipal statistics and informal knowledge of the person in charge or they can be derived from a geographical analysis of the region, which can help to sharpen the input and consider areas beyond pre-defined borders.

The following parameters are used in the tool:

Parameter name	Categories
Type of the target area	Urban, suburban, rural
Topography	Flat, hilly, steep
Quality of footpaths and sidewalks (density of footpaths, presence of sidewalks, street lighting etc.)	High, medium, low
Quality of cycling infrastructure (density of bicycle lanes, presence of adequate bicycle parking facilities, street lighting, pavement quality etc.)	High, medium, low
Quality of public transport (frequency, vehicle type, persons living in walking distance to a public transport stop etc.)	High, medium, low
Presence of high commuter flows (in and out)	Yes, no
Presence of a university or a university catchment area	Yes, no
Presence of a primary school	Yes, no
Presence of a secondary school	Yes, no
Presence of a bike sharing system	Yes, no
Presence of a car sharing system	Yes, no
Presence of a park & ride system	Yes, no

Table 1: Parameters

In the context of the SaMBA tool, **measures** can be described as **policies that include an incentive/reward that motivates citizens to change their mobility behaviour in favour of sustainable modes of transportation**. The tool at first provides a simple list of the recommended measures and incentives based on the goal and the parameter values. Further details regarding implementation and the impacts can additionally be seen when the user clicks on a best practice example. For the case that no measure suits the target area, general suggestions (e.g. that it is required to improve the infrastructure before implementing behaviour change measures) are provided.

An **impact** of a measure demonstrates its **effect** with the help of an indicator (e.g. changes in the modal split or the amount of CO_2 saved). For the SaMBA tool, **quantitative impacts** are of major importance. Unfortunately, in many cases there are no specific studies on the impact and, therefore, no quantitative data. Therefore, also the **qualitative impact**, which can at least show a tendency, is presented.

2. Implementation of the Excel component

The Excel component uses **database technologies** to filter and assess an existing list of measures with their according impacts in regard of local or regional circumstances. The results are presented in an easy to read overview table, which includes measures, best practices and impacts to narrow down the flood of information to the most suitable solutions.

a) Overview of the sheets

Sheets for users

The tool starts with a sheet including an introduction with some background information regarding the SaMBA project, the tool purpose and relevant target groups. It also provides some brief instructions regarding the tool usage.

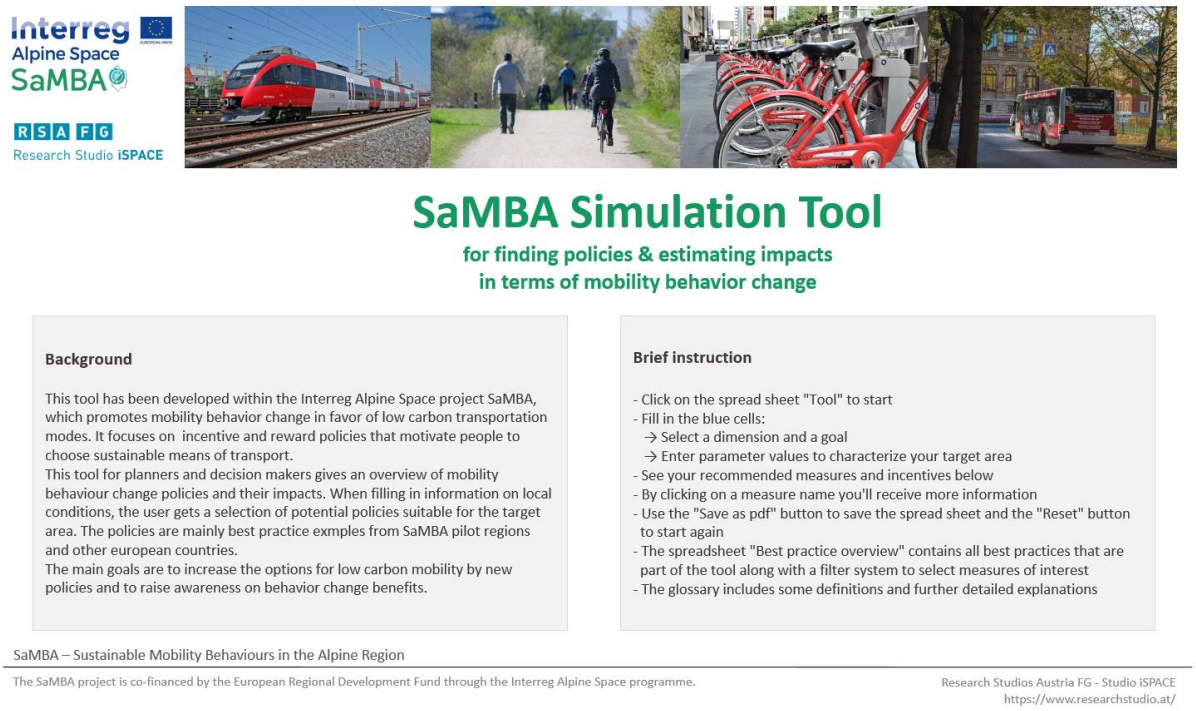


Figure 5: Introduction

The second sheet includes the main user interface of the tool, in which the user provides the inputs dimension, goal and parameters to characterise the target area and receive recommended measures as output.

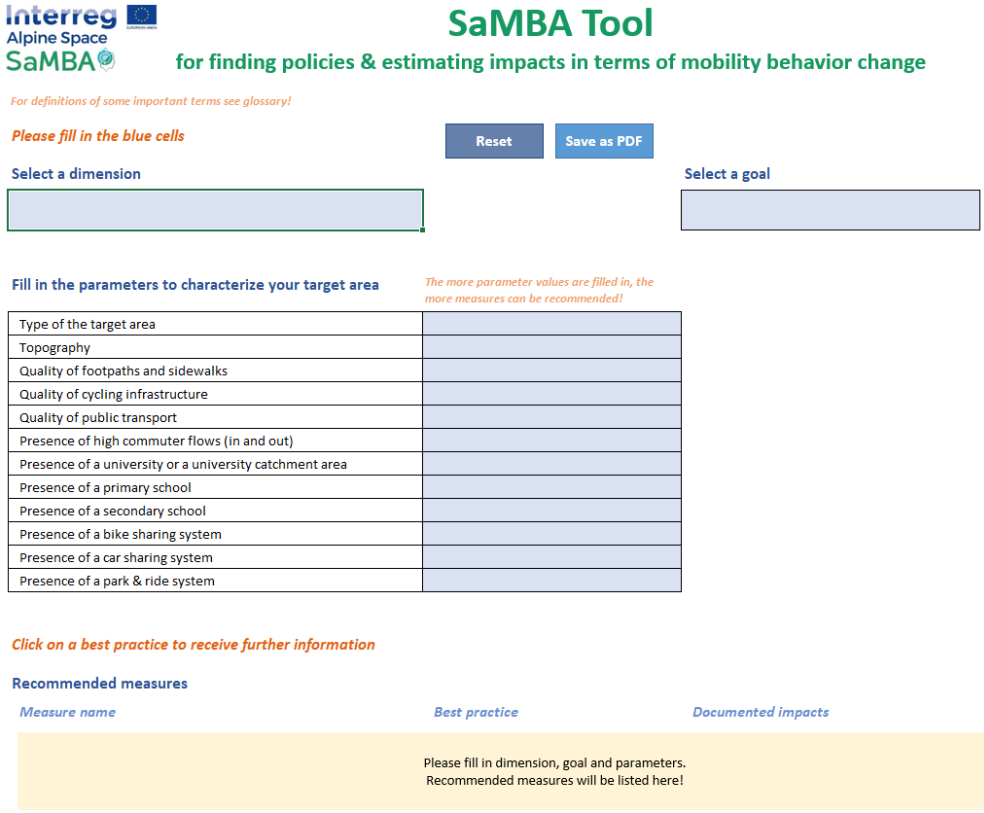


Figure 6: Main user interface of the tool

In an **overview of all measures and best practice examples**, which is included in the third sheet, interested users can get a more detailed overview of the contents of the tool. It also includes a system to filter measures by a goal. The sheet not only includes measures and their best practice examples, but also the goals they are assigned to, suitable spatial dimensions, a description of the implementation, impacts and a link.

Figure 7: Measure overview

The **glossary** provides definitions of important terms that help to understand some interconnections of the main building blocks of the tool.

Glossary

Definitions of important terms	
Dimension	Superodinate objective for better clarity
Goal	Specific objective being pursued in the target area
Parameters	Regional characteristics of the target area with influence on mobility including e.g. infrastructure, demography, topography and settlement
Measure	Policies that include an incentive/reward that motivates citizens to change their mobility behavior in favor of sustainable modes of transportation
Best practice	Application of a measure
Impact	Demonstrates the effect of a measure with the help of an indicator

Figure 8: Glossary

Sheets for developers

The tool includes two **databases**. The first one (database “Measures”) contains all measures along with their corresponding information. It is used to check whether a measure can be recommended according to the user inputs with the help of IF-functions. If a measure can be recommended, it is displayed in the main user interface. The second database (database “Dropdowns”) contains the content for the drop down menus in the user interface of the tool. It is recommended to make both databases available in a tool version only for developers in order to prevent any accidental changes that could cause errors in the tool.

no	Charges for vehicles	London, Stockholm, Milan, Gothenburg, Singapore	Modal split, traffic volume	Charges for driving a vehicle within a charged zone. In London, Stockholm, Milan and Gothenburg, the charge is collected on weekdays. In most cases, exceptions or discounts for residents or vehicles like taxis or buses are possible. In Singapore, every vehicle needs to be equipped with a device (In-vehicle Unit) for payment in order to be allowed to use priced roads. In London, the charge led to a 20% reduction of vehicles subject to full charge and an increased share of public transport from 29% to 37%. MIV decreased from 46% to 36%. Additionally, positive effects on cycling could be detected. Also in the other cities, the traffic volume significantly dropped.	https://tfl.gov.uk/modes/driving/congestion-charge
no	Incentives for residents to use less MIV	In motion program	Modal split	This program provided residents with incentives to drive less and raised individual awareness of alternative travel options. Participants committed to change 2 trips per week from MIV to another mode for 12 weeks and for every successful week they received a voucher to purchase public transport tickets, biking and walking gear or gasoline for carpooling. Participants in King County, Washington overall reduced MIV trips by 24%. Most trips were converted from MIV to public transport (40%), but the program had also high positive effects on walking.	https://www.nctr.usf.edu/wp-content/uploads/2013/12/77947.pdf
no	Promoting public transport for events	Mit dem Zug zum Match	Modal split	This program promotes journeys to sports competitions by train and has been initiated by the Salzburg Tennis Association. After the match, a communal meal with organic food is provided as a reward.	https://mobilitaetsprojekte.vcoe.at/mit-dem-zug-zum-match?suchstr=belohnung
no	Offers for new residents	Gscheid mobil	Modal split, CO2 emissions	The city of Munich provides information for new residents about existing public transport offers to encourage them to try and eventually completely switch. Incentives are trial public transport tickets and trial public transport subscriptions. The results of the pilot project from 2005/2006 showed that the share of public transport among the experiment group was almost 8% higher than the control group, while the share of MIV share among the experiment group was 3.3% lower than the control group. Furthermore, 700 tons of CO2 could be saved.	https://www.mvg.de/ueber/mvg-projekte/gscheid-mobil.html
no	Collecting points for sustainable mobility behavior	TrafficO2	CO2 emissions	A mobile application provides challenges and information to promote sustainable transport. Routes are described according to the distance travelled, cost in €, CO2, calories expended and O2 points (as credits). The app tracks personal sustainability goals based on the user's habits. The users can win prizes and discount coupons based on the O2 points. In 6 months 300 testers from Palermo registered over 18.000km and saved 55kg CO2.	www.traffico2.com
no	Rewards for using less cars per household	One less car program	Modal split	use other modes instead. Participants received 85$ per week as a compensation for recording their data as an economic incentive. The program was implemented in Seattle with 86 households over a period of 6-9 weeks. It helped to reduce drive-alone car miles of participants by 27%. Public transport mileage increased by 25% and the project additionally also had great positive effects on cycling, walking and carpooling.	https://www.nctr.usf.edu/wp-content/uploads/2014/11/77947_508.pdf
no	Voucher programs	Transit voucher program	Modal split	Third-party benefit administrators and/or transit agencies issue vouchers that riders give to participating transportation providers to acquire fare media. Employers may subsidized the costs of the vouchers to create an incentive to use public transport. Transit voucher programs are implemented in many US cities, e.g. San Francisco, Philadelphia New York. An analysis shows that commuter trips shifted by 20% from MIV to public transport.	https://www.nctr.usf.edu/wp-content/uploads/2013/12/77947.pdf

Figure 9: Database "Measures"

Dropdown1	Startpos	Elements		Pos	Dropdown2	Dropdown Overview
Promotion of public transport	1	3		1	Increasing the modal split of public transport for leisure	Increasing the modal split of public transport for leisure
Promotion of active modes	4	3		2	Increasing the modal split of public transport for commuting	Increasing the modal split of public transport for commuting
Promotion of mulitmodality and access	7	3		3	All public transport solutions	Increasing the modal split of cycling
Promotion of sharing systems	10	4		4	Increasing the modal split of cycling	Increasing the modal split of walking
				5	Increasing the modal split of walking	Promotion of park & ride
				6	All active mode solutions	Promotion of sustainability in first and last mile
				7	Promotion of park & ride	Promotion of ride sharing
				8	Promotion of sustainability in first and last mile	Promotion of car sharing
				9	All multimodality and access solutions	Promotion of bike sharing
				10	Promotion of ride sharing	
				11	Promotion of car sharing	
				12	Promotion of bike sharing	
				13	All sharing solutions	
Yes						
No						
Urban						
Suburban						
Rural						
High						
Medium						
Low						
Flat						
Hilly						
Steep						

Figure 10: Database "Dropdowns"

b) Information for developers

This chapter provides technical information and is intended to be used by developers. It describes important tool functionalities in more detail and demonstrates how the tool can be extended. The functionalities of the tool are implemented with the programming language **Visual Basic** (**VBA)** or with **functions and formulas** implemented in the cells.

Customizing dimensions and goals

At first, the user selects a dimension and a goal pursued in the target area. Both are implemented as drop down menus.

Figure 11: Selecting dimension and goal

Since the tool only provides goals that are assigned to the selected dimension, the dropdown menu containing these goals has to be dependent on the first. The content of the dropdowns is included in the database “Dropdowns” of the tool. An **additional dimension** can be added easily to the first menu since it is a “standard” dropdown menu defined by a simple list in the data validation.

However, **adding more goals** requires additional changes. The goals in the list that is included in the dropdown database are sorted by dimension. If e.g. a new goal for the promotion of PT has to be included, it is easiest to place it below the two already implemented goals for this dimension. It has to be noted, that also the starting positions of the dimensions and the number of elements per dimension change if new goals are included.

A	B	C	D	E	F
Dropdown1	**Startpos**	**Elements**		**Pos**	**Dropdown2**
Promotion of public transport	1	4		1	Increasing the modal split of public transport for leisure
Promotion of active modes	5	3		2	Increasing the modal split of public transport for commuting
Promotion of mulitmodality and access	8	3		3	New goal for public transport
Promotion of sharing systems	11	4		4	All public transport solutions
				5	Increasing the modal split of cycling
				6	Increasing the modal split of walking
				7	All active mode solutions
				8	Promotion of park & ride
				9	Promotion of sustainability in first and last mile
				10	All multimodality and access solutions
				11	Promotion of ride sharing
				12	Promotion of car sharing
				13	Promotion of bike sharing
				14	All sharing solutions

Figure 12: Adding a new goal

The dropdown menu is defined in the data validation with the help of the following Excel functions:

=OFFSET(Dropdowns!$F$1,VLOOKUP(B13,Dropdowns!$A$2:$C$5,2,FALSE),0,
VLOOKUP(B13,Dropdowns!$A$2:$C$5,3,FALSE),1)

For adding only new goals to existing dimensions, the formula does not have to be adapted. However, if a new dimension with new goals is implemented, the cell values defining the range of the dropdown menus in both VLOOKUP functions have to be changed according to the updated dimension list in the database.

Customizing parameters

After entering dimension and goal, the user has to enter parameter values for the characterisation of the target area with the help of dropdown menus. For the recommendation of measures, the parameter values need to have certain **categories** (e.g. yes/no for the presence of a certain feature in the target area).

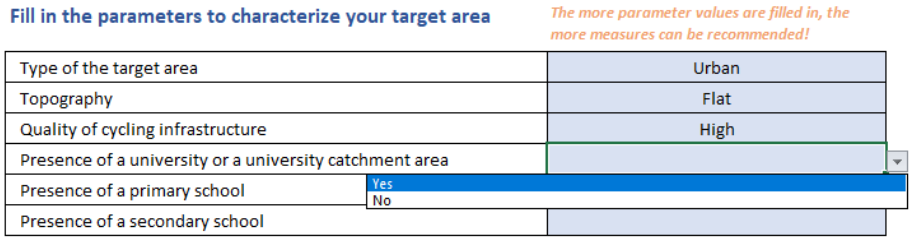


Figure 13: Filling in the parameter values

When entering the values, a further explanation regarding each parameter is provided in an input message.

The tool only asks the user to enter values for **parameters that are relevant to the chosen goal**. This means that irrelevant parameters are hidden as soon as the user selects a goal from the list. For this, a VBA code is used in a new module. The code below defines the lines in the Excel sheet containing the parameters that have to be visible, if the user selects the goal “Promotion of PT for leisure”. It uses the name of a goal as the basis and defines which parameters have to be visible and hidden.

```
' hide irrelevant parameters depending on the selected goal
Public Sub Hide()

   With ThisWorkbook.Worksheets("Tool")

      Rows("17:29").EntireRow.Hidden = False     ' rows containing the parameters

      ' PT leisure
      If LCase(.Range("D13").Value) = "increasing the modal split of public transport for leisure" Then
        Rows("17:29").EntireRow.Hidden = True     ' briefly hide everything
        Rows("17").EntireRow.Hidden = False       ' definition of rows that have to be visible
        Rows("21:22").EntireRow.Hidden = False    ' definition of rows that have to be visible
      End If

    End With

End Sub
```

Figure 14: Hiding and displaying parameters

To automatically start this function, it has to be called with a VBA code in the sheet.

```
Private Sub Worksheet_Change(ByVal Target As Range)
' automatically call macro to hide irrelevant parameters
Call Hide
End Sub
```

Figure 15: Calling a macro automatically

A **new parameter** has to be added at the end of the parameter list in the database “Measures”. The parameters that are visible or hidden have to be defined according to the example above.

Customizing measures and impacts

Based on these user inputs, the tool in the background filters the implemented measures and provides a list with recommendations along with the best practices they are based on. Furthermore, some indicators that are influenced by the best practices are listed. Users can get additional information when they click on a best practice name.

Recommended measures

Measure name	*Best practice*	*Documented impacts*	*Further information*	*Link/contact*
Commuter challenges for reducing traffic during peaks	MOBI	Modal split	**TrafficO2** Description: A mobile application provides challenges and information to promote sustainable transport. Routes are described according to the distance travelled, cost in €, CO2, calories expended and O2 points (as credits). The app tracks personal sustainability goals based on the user's habits. The users can win prizes and discount coupons based on the O2 points. Impacts: In six months, 300 testers from Palermo registered over 18.000km and saved 55kg CO2.	Click here
Rewards for commuters going by bike	Cycling kilometric allowance	Modal split, CO2 emissions		
Bicycle communication campaign	Radlhauptstadt München	Modal split		
Offers for elderly/at-risk people	Cycling on referral scheme	Health		
Rewards for using less cars per household	One less car program	Modal split		
Collecting points for sustainable mobility behavior	TrafficO2	CO2 emissions		
Programs for pupils	STARS, Rewards in the MUV app	Modal split, CO2 emissions		
Awareness raising among decision-makers	City Cycling+: Cycling for a Better Climate	Bicycle use		
Pop-up bike lanes	Pop-up bike lanes in Vienna	Bicycle use		
Including mobility offers in building projects	Building project Kendlerpark and refurbishment project Friedrich-	Modal split		

Figure 16: Tool output with additional information opened

In the first database (Database “Measures”), the tool checks whether a measure can be recommended according to the user inputs. This is done with the help of **IF-statements** in which the goal and the entered parameter values are considered. If a measure can be recommended, the value in the first column of the database changes from “no” to “yes” and the measure along with its additional information is displayed in the main user interface.

yes	Voucher programs	Transit voucher program	Modal split
no	Rewards for not using a parking space	Parking cash out program	Modal split

Figure 17: Identification of suitable measures in the database

In the following example, the tool checks whether a specific measure for increasing the modal split of PT for leisure activities can be recommended. The measure should also be displayed when the user does not want to distinguish between PT for leisure activities and PT for commuting.

=IF(AND(OR(Tool!D13="Increasing the modal split of PT for leisure"; Tool!D13="All PT solutions"); Tool!C17="Urban"; OR(Tool!C21="High";Tool!C21="Medium")); "yes"; "no")

This formula refers to the cells in the main user interface that contain the user defined goal and the parameter values that are relevant to this measure. The required parameter values need to be reached on order for the measure to be recommendable. AND-statements are used to connect several conditions. Some parameters with dropdown menus can have more than one suitable category. In this case, the OR-function is used to define every appropriate parameter value category.

New measures have to be added to the database “Measures” of the tool along with best practice examples and their impact. IF-statements have to be defined separately for each measure. However, some measures belonging to the same goal might have the same requirements. Some measures also are assigned to more than one goal. In this case, the formula has to be defined separately for each of these goals.

Recommended measures are shown in the user interface with the help of this formula:

{=IFERROR(INDEX(Database!$B$1:$B$78,SMALL(IF(Database!$A$1:$A$78="Yes", ROW(Database!$B$1:$B$78)),ROW(Database!B1))),"")}

The best practice example and the documented impacts are implemented with the same formula, but it needs to refer to the columns C (best practices) and D (impacts) in the database sheet. This formula needs to be included in every cell that should be able to show recommended measures from column B in the first database. It is an array that needs to be confirmed with Ctrl + Shift + Enter. Information regarding best practices and impacts in the two columns next to the measure name is displayed in the same way, however with reference to columns

C and D in the database. When adding additional goals in the database, the range of cells the formula refers to needs to be adapted accordingly.

If the user wants to get more details on a specific best practice, they need to click on its name and additional information will appear next to it. Furthermore, the selected line is highlighted. Additional lines can be highlighted according to the code shown in Figure 18.

```
' highlight best practice on selection
Range("B37:F50").Interior.Pattern = xlNone
If (Target.Address = "$C$37" And Range("C37") <> "") Or (Target.Address = "$C$38" And Range("C38") <> "") _
Or (Target.Address = "$C$39" And Range("C39") <> "") Or (Target.Address = "$C$40" And Range("C40") <> "") _
Or (Target.Address = "$C$41" And Range("C41") <> "") Or (Target.Address = "$C$42" And Range("C42") <> "") _
Or (Target.Address = "$C$43" And Range("C43") <> "") Or (Target.Address = "$C$44" And Range("C44") <> "") _
Or (Target.Address = "$C$45" And Range("C45") <> "") Or (Target.Address = "$C$46" And Range("C46") <> "") _
Or (Target.Address = "$C$47" And Range("C47") <> "") Or (Target.Address = "$C$48" And Range("C48") <> "") _
Or (Target.Address = "$C$49" And Range("C49") <> "") Or (Target.Address = "$C$50" And Range("C50") <> "") Then _

    Target.Interior.Color = RGB(218, 250, 236)
    Target.Offset(0, 1).Interior.Color = RGB(218, 250, 236)
    Target.Offset(0, -1).Interior.Color = RGB(218, 250, 236)
    Range("$E$37:$E$38").Interior.Color = RGB(218, 250, 236)
    Range("$F$37:$F$45").Interior.Color = RGB(218, 250, 236)
End If
```

Figure 18: Highlighting best practices on selection

To display the additional information, “Select Case” functions in VBA are used. For each goal, an individual function has to be defined, which includes all relevant best practice examples. Figure 19 shows a part of one of the “Select Case” functions. More detailed information about the best practice and its impacts are displayed in cell E38, whereas cell F38 includes a hyper-link to a website (e.g. a project website the best practice is taken from). F40, F41 and F42 are also included in the code since in some cases, multiple links are required. Cells E36 and F36 contain headlines to these columns. In cell E38, the cell in the database “Measures” including the text with further information about the best practice needs to be called. The hyperlink, however, needs to be embedded directly in the VBA code in order to function. If new measures are implemented, a best practices has to be included according to the example below.

```
If Target.Address = "$E$37" And Range("D13") = "Increasing the modal split of walking" Then
  With ActiveSheet
     Select Case Target
     Case "Walking bus":
        .Range("E38") = ActiveWorkbook.Worksheets("Database Measures").Range("E25")
        .Range("E36") = "Further information"
        .Range("F36") = "Link/contact"
        ActiveSheet.Hyperlinks.Add Range("F38"), Address:="http://www.walkingschoolbus.org/resources.html",
        TextToDisplay:="General information"
        ActiveSheet.Hyperlinks.Add Range("F39"), Address:="http://www.etmkoper.si/pesbus.html", _
        TextToDisplay:="Walking bus in Koper"
        .Range("F40") = ""
        .Range("F41") = ""
        .Range("F42") = ""
     Case "Beat the street program":
        .Range("E38") = ActiveWorkbook.Worksheets("Database Measures").Range("E26")
        .Range("E36") = "Further information"
        .Range("F36") = "Link/contact"
        ActiveSheet.Hyperlinks.Add Range("F38"), Address:="http://young-mobility.at/en/active-healthy", _
        TextToDisplay:="Click here"
        .Range("F39") = ""
        .Range("F40") = ""
        .Range("F41") = ""
        .Range("F42") = ""
```

Figure 19: Excerpt of a Select Case function

Additional functionalities

The main user interface includes two **buttons**: one for resetting the tool and one for exporting the sheet as PDF. Both are implemented by a VBA code in the module.

The reset button resets the entire main user interface. This affects dimension, goal, parameter values and some entries that are part of the recommended measures:

```
' reset button
Sub Clearcells()
Range("B13").ClearContents          ' dimension
Range("D13").ClearContents          ' goal
Range("C17", "C29").ClearContents   ' parameter values
Range("E37").ClearContents          ' description headline
Range("E38:E45").ClearContents      ' description
Range("F38:F42").ClearContents      ' links
Range("E36").ClearContents          ' further information headline
Range("F36").ClearContents          ' link headline
Range("B13").Select                 ' jump to B13 to select a new dimension
End Sub
```

Figure 20: Implementation of the reset button

The second button saves the entire sheet as PDF. It is implemented in the same module as the reset button with the following code:

```
' save as PDF
Sub Save()
    Dim FName As Variant
    FName = Application.GetSaveAsFilename( _
        InitialFileName:="Macro Output.pdf", _
        FileFilter:="PDF files, *.pdf", _
        Title:="Export to pdf")
    If FName <> False Then
        ActiveSheet.ExportAsFixedFormat Type:=xlTypePDF, Filename:=FName _
            , Quality:=xlQualityStandard, IncludeDocProperties:=True, IgnorePrintAreas _
            :=False, OpenAfterPublish:=False
        MsgBox "PDF file has been created " _
            & vbCrLf _
            & myFile
    End If
End Sub
```

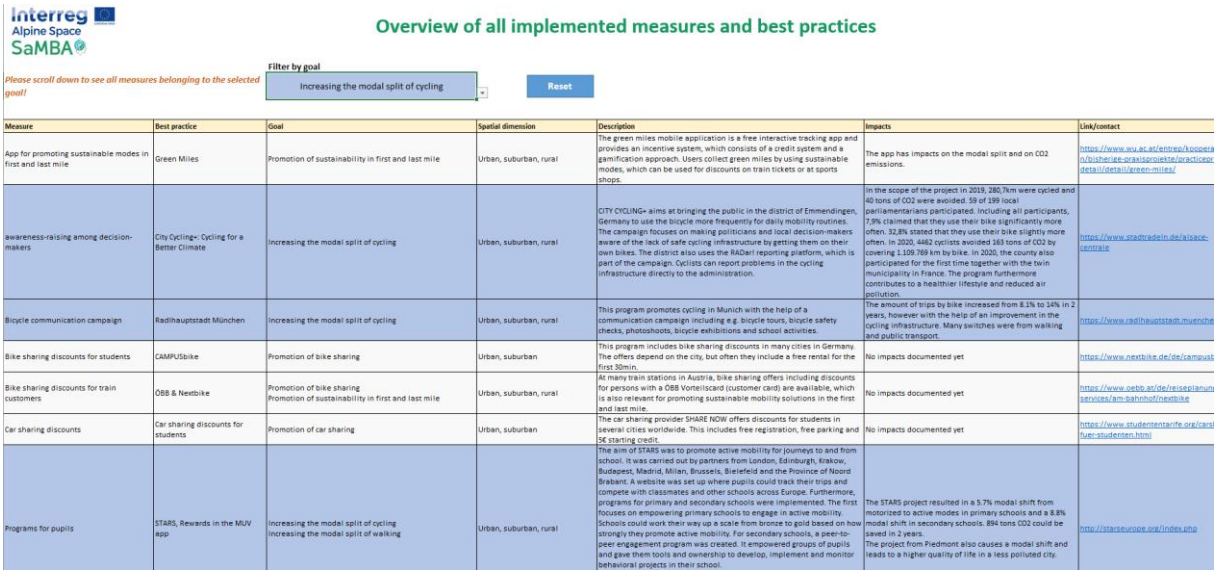
Figure 21: Implementation of the save button

The overview of all measures and best practices (third sheet) includes a **filtering system** that allows to highlight measures by goal by selecting it with the help of a dropdown menu. This is implemented by conditional formatting with the following formula:

=AND(NOT(ISBLANK($C$4));SEARCH($C$4;$A7&$B7&$C7&$D7&$E7&$F7&$G7&$H7&$I7&$J7&$K7))

C4 is used as a search field. The SEARCH-function finds measures appropriate for the selected goal.

Additional measures can be added to this overview. To include them in the search function, the cell range has to be adapted in the conditional formatting menue.



Measure	Best practice	Goal	Spatial dimension	Description	Impacts	Link/contact
App for promoting sustainable modes in first and last mile	Green Miles	Promotion of sustainability in first and last mile	Urban, suburban, rural	The green miles mobile application is a free interactive tracking app and provides an incentive system, which consists of a credit system and a gamification approach. Users collect green miles by using sustainable modes, which can be used for discounts on train tickets or at sports shops.	The app has impacts on the modal split and on CO2 emissions.	https://www.wu.ac.at/entrepj/kooperation/bisherige-praxisprojekte/practicecase-detail/detail/green-miles/
awareness-raising among decision-makers	City Cycling+: Cycling for a Better Climate	Increasing the modal split of cycling	Urban, suburban, rural	CITY CYCLING+ aims at bringing the public in the district of Emmendingen, Germany to use the bicycle more frequently for daily mobility routines. The campaign focuses on making politicians and local decision-makers aware of the lack of safe cycling infrastructure by getting them on their own bikes. The district also uses the RADar! reporting platform, which is part of the campaign. Cyclists can report problems in the cycling infrastructure directly to the administration.	In the scope of the project in 2019, 280,7km were cycled and 40 tons of CO2 were avoided. 59 of 199 local parliamentarians participated. Including all participants, 7,9% claimed that they use their bike significantly more often. 32,8% stated that they use their bike slightly more often. In 2020, 4462 cyclists avoided 163 tons of CO2 by covering 1.109.769 km by bike. In 2020, the county also participated for the first time together with the twin municipality in France. The program furthermore contributes to a healthier lifestyle and reduced air pollution.	https://www.stadtradeln.de/alsace-centrale
Bicycle communication campaign	Radlhauptstadt München	Increasing the modal split of cycling	Urban, suburban, rural	This program promotes cycling in Munich with the help of a communication campaign including e.g. bicycle tours, bicycle safety checks, photoshoots, bicycle exhibitions and school activities.	The amount of trips by bike increased from 8.1% to 14% in 2 years, however with the help of an improvement in the cycling infrastructure. Many switches were from walking and public transport.	https://www.radlhauptstadt.muenchen
Bike sharing discounts for students	CAMPUSbike	Promotion of bike sharing	Urban, suburban	This program includes bike sharing discounts in many cities in Germany. The offers depend on the city, but often they include a free rental for the first 30min.	No impacts documented yet	https://www.nextbike.de/de/campusbike
Bike sharing discounts for train customers	ÖBB & Nextbike	Promotion of bike sharing Promotion of sustainability in first and last mile	Urban, suburban, rural	At many train stations in Austria, bike sharing offers including discounts for persons with a ÖBB Vorteilscard (customer card) are available, which is also relevant for promoting sustainable mobility solutions in the first and last mile.	No impacts documented yet	https://www.oebb.at/de/reiseplanung-services/am-bahnhof/nextbike
Car sharing discounts	Car sharing discounts for students	Promotion of car sharing	Urban, suburban	The car sharing provider SHARE NOW offers discounts for students in several cities worldwide. This includes free registration, free parking and 5€ starting credit.	No impacts documented yet	https://www.studententarife.org/carsharing-fuer-studenten.html
Programs for pupils	STARS, Rewards in the MUV app	Increasing the modal split of cycling Increasing the modal split of walking	Urban, suburban, rural	The aim of STARS was to promote active mobility for journeys to and from school. It was carried out by partners from London, Edinburgh, Krakow, Budapest, Madrid, Milan, Brussels, Bielefeld and the Province of Noord-Brabant. A website was set up where pupils could track their trips and compete with classmates and other schools across Europe. Furthermore, programs for primary and secondary schools were implemented. The first focuses on empowering primary schools to engage in active mobility. Schools could work their way up a scale from bronze to gold based on how strongly they promote active mobility. For secondary schools, a peer-to-peer engagement program was created. It empowered groups of pupils and gave them tools and ownership to develop, implement and monitor behavioral projects in their school.	The STARS project resulted in a 5.7% modal shift from motorized to active modes in primary schools and a 8.8% modal shift in secondary schools. 894 tons CO2 could be saved in 2 years. The project from Piedmont also causes a modal shift and leads to a higher quality of life in a less polluted city.	http://starseurope.org/index.php

Figure 22: Measures selected by goal in the best practice overview

3. Implementation of the GIS component

The optional GIS component of the SaMBA tool was created to get a **detailed geographical analysis** of a region, which can support a user by filling in parameters in the Excel tool. The optional GIS framework also includes methods for assessing the **potential mobility demand and potential action areas for mode-specific mobility behaviour change policies**. Routing algorithms, spatial statistics and analysis results are used to assess potential trip lengths and affected target groups and to localise hotspots of potential modes. Based on these information, potential action areas for specific mobility behaviour change policies can be derived. Hence, this information supports the use of the Excel tool by identifying the planning dimensions and goals (comp. Chapter 1b).

The GIS component was implemented and tested in a part of the Salzburg Region Tennengau. Therefore, the visualisation in form of maps concentrates on this pilot region. This guideline works as a manual to implement the GIS component also in other regions. While the Excel part of the tool in many cases can be used without any adaptions, it is recommended to involve a GIS expert in order to implement the optional GIS framework for a specific region. The following models and calculations were done in ArcGIS, but described textually so that they can be implemented in any other GIS software.

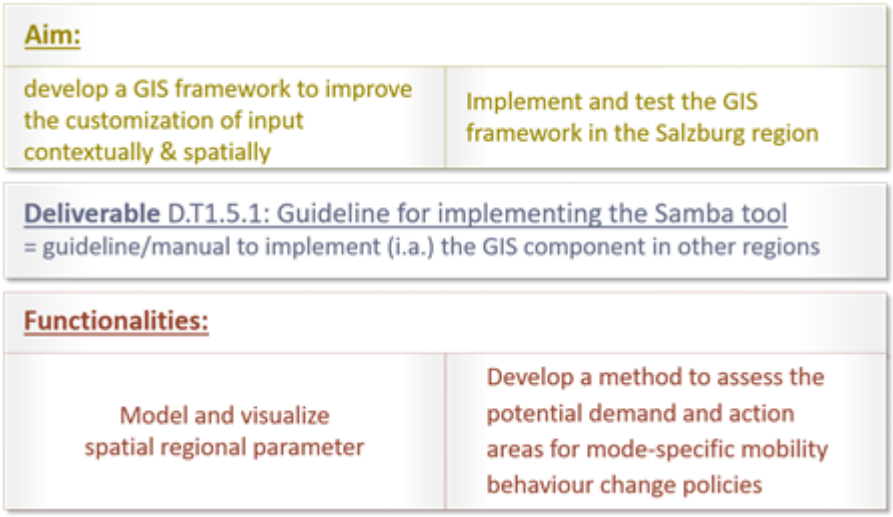


Figure 23: Overview of aims and tasks of the GIS component

a) Spatial data and statistics

The basis for analysing a region with the help of the GIS component are spatial and statistic data. The required data can be divided into four topics (cf. Figure 24

- **Structural data** on the area of investigation like topography, dominant settlement structure or existence of points of interest like schools

- **Transport data** like a road network for routing and infrastructures like bike lanes, PT stops, P&R sites etc.
- **Demographic data**: number of citizens structured by age
- **Commuter data** in form of a origin-destination-matrix

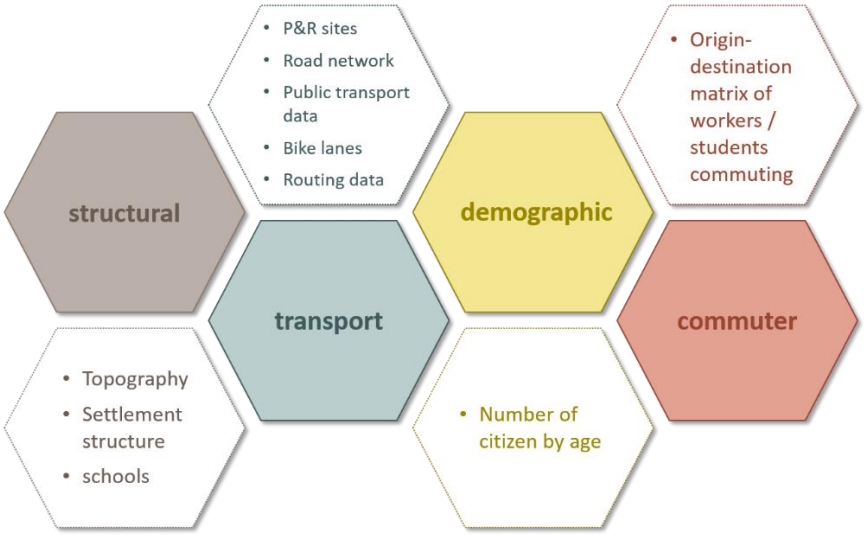


Figure 24: Categories of data needed for implementing the GIS component

b) Parameters

The GIS component of the SaMBA tool includes GIS-based methods for **modelling the required input parameters in space**. Thus, parameters, which have an influence on mobility and on the selection of measures and incentives within the SaMBA Excel tool (comp. Chapter 1b), can be modelled and visualised, based on geo-data and spatial analysis methods. Nevertheless, in some cases there can be different data or other ways to implement a parameter spatially.

According to the Excel tool, every parameter was taken and modelled based on spatial data. The solutions listed below fit best according to own assumptions and can be used with the available data in Austria/Salzburg. A few parameters that cannot be modelled spatially remain because of missing or not accessible data. In other pilot cases and countries, the availability of data differs strongly, so the list can be seen as orientation and as a guideline to find other solutions.

Figure 25 shows the complementarity of the GIS framework for modelling spatial parameters and the list of required input parameters of the SaMBA Excel tool. In summary, the implementation of the GIS framework allows the **focus on smaller areas that are not integrated in official statistics**. In addition, the data derived from the standardised analysis framework are a good **basis for a decision-making process as spatial areas can be compared**.

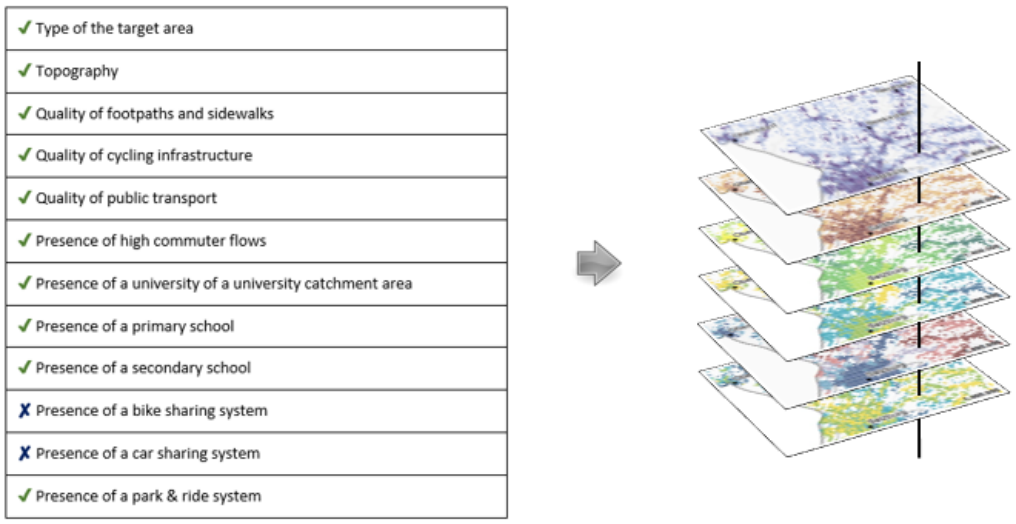


Figure 25: The GIS framework includes methods for modelling the parameters in space

The following table gives an overview of relevant parameters used within in the Excel tool.

Parameter (Excel Input)	**Excel**	**GIS**	**Spatially modelled parameter (on 250m Grid)**
Type of the target area [Urban/Suburban/Rural]	✓	✓	Urban-Rural- Typology
Topography [flat/hilly/steep]	✓	✓	Slope
Quality of footpaths and sidewalks (Based on density of footpaths, presence of sidewalks, street lightning, etc.) [high/medium/low]	✓	✓	Topography/(walkability)
Quality of cycling infrastructure (Density of bicycle lanes, street lighting, pavement quality, presence of adequate bicycle parking facilities, etc.) [high/medium/low]	✓	✓	Bikeability index
Quality of PT (Based on frequency, vehicle type, share of persons living within walking distance to a PT stop, etc.) [high/medium/low]	✓	✓	ÖV- Güteklassen (standardised, Austria-wide assessment scheme 2019) Service areas around PT stops (500m walking distance, number of residents aggregated)
Presence of high commuter flows (in and out, based on the total number of employed persons) [yes/no]	✓	✓	$\frac{Employed\ people\ commuting\ out\ of\ residential\ municipalities}{Total\ number\ of\ commuters}$

Presence of a university or a university catchment area	✓	✗	Not included in the GIS models because of later addition/modification possible way: calculating service areas around universities
Access to a primary school [yes/no]	✓	✓	Service areas around primary schools (1.250m walking distance)
Access to a secondary school [yes/no]	✓	✓	Service areas around secondary schools (1.250m walking distance)
Presence of a bike sharing system	✓	✗	No data available
Presence of a car sharing system	✓	✗	No data available
Presence of a park & ride system	✓	✓	P&R locations

Table 2: Spatial modelling of parameters

Type of the target area

The type of target area can be modelled spatially by using existing typologies available for European countries:

- Urban-Rural-Typology of the European Commission on NUTS 3 regions[1]
- Degree of Urbanisation of the European Commission on municipality level[2]

For implementing the GIS component in Salzburg, the national and more detailed Urban-Rural-Typology on municipality level (OGD, Statistik Austria 2020)[3] was used. The database provides a value for every municipality in Austria. In the next step, the municipality value was spatially joined to every 250m grid cell within the municipality (used tool in ArcGIS: "Spatial Join - Have their centre in"). In order to meet the categorisation of the SaMBA tool (Urban–suburban–rural), the values had to be reclassified according to own assumptions:

Type	Description	Tool category
101	Urban main centres	Urban
102	Urban medium centres	Urban
103	Urbane small centres	Urban
210	Regional centres, central	Suburban
220	Regional centres, intermediary	Suburban
310	Rural areas in the surrounding region of centers, central	Suburban
320	Rural areas in the surrounding region of centers, intermediary	Rural

[1] https://ec.europa.eu/eurostat/statistics-explained/index.php/Territorial_typologies_manual_-_urban-rural_typology
[2] https://ec.europa.eu/eurostat/web/degree-of-urbanisation/background
[3] https://www.statistik.at/web_de/klassifikationen/regionale_gliederungen/stadt_land/index.html

330	Rural areas in the surrounding region of centers, peripheral	Rural
410	Rural areas, central	Rural
420	Rural areas, intermediary	Rural
430	Rural areas, peripheral	Rural

Table 3: Modelling target area type

Topography

Topography is an important parameter with strong impact on our mobility behaviour. It can be derived from different sources. In the case of Salzburg, the slope was calculated based on a digital terrain model (DTM) with a resolution of 5m. A bilinear interpolation was used when extracting multi values to points to derive the slope from the DTM to values for every 250m grid cell (used tool in ArcGIS: “Extract Multi Values to Points”).

The slope values were then reclassified according to own assumptions presented in the following table (used tools in ArcGIS: “Reclassify”):

Parameter	**Values**	**Category in SaMBA tool**
Topography (Slope)	≤ 15	flat
	15 < x ≤ 45	hilly
	> 45	steep

Table 4: Modelling topography

Quality of footpaths and sidewalks

This parameter is very difficult to model completely and automatically because it is qualitative and can be interpreted in different ways. In the case of Salzburg, the parameter “topography” was used to describe also the quality for walking, named “walkability”. This is based on the assumption that a flat terrain is more “walkable” than hilly or steep ways, which require more time and physical effort. It would be interesting to refine/ extend the walkability with safety and quality aspects like the presence of sidewalks for example, but in our case, there is no sufficient data available.

Quality of cycling infrastructure (Bikeability)

This parameter can be modelled spatially using data on the presence and density of bicycle lanes and other infrastructure for cyclists like street lighting, bicycle parking facilities, etc. For Salzburg the “bikeability index”[4] is an adequate data base for representing the parameter „Quality of cycling infrastructure“. This is an index, developed by the University of Salzburg –

[4] https://gimobility.sbg.ac.at/wordpress/uml-bikeability/

ZGIS – GI_Mobility Lab, for assessing the road space regarding its suitability for cycling. All road-related information is stored in the graph integration platform (GIP) including slope, road surface, road category, bike speed, etc. and allows a uniform comparability on the basis of official data. The derived indicator that influences suitability for cycling (bikeability) is calculated for every segment of a road network or aggregated on raster cells. In the project the original range of values between 0 (best) and 1 (poorest quality) is reclassified to the qualitative categories Excellent, Good and Basic.

Parameter	Bikeability Index	Category in SaMBA tool
Quality of cycling infrastructure	0 ≤ x ≤ 0.55	Excellent
	0.55 < x ≤ 0.65	Good
	0.65 < x ≤ 1.00	Basic

Table 5: Modelling quality of cycling infrastructure

Quality of public transport (PT)

Whereas the user of the Excel tool has to make his personal evaluation of the quality of PT in the region under investigation, the parameter can me modelled spatially based on PT data and a road network. The presentation of this parameter for the pilot case of Salzburg is divided into two parts:

At first, the quality of PT is presented by the presence of PT stops and their quality in terms of vehicle type and frequency. These characterisations are summarized within the "ÖV-Güteklassen", a classification scheme for PT in Austria, which determines the quality of a PT stop based on vehicle type, interval and pedestrian access[5]. For getting the information on PT quality on raster basis, the classification scheme on polygon level was joined to the 250m grid cells (used tool in ArcGIS: "Spatial Join") and the "ÖV-Güteklassen" from A to G were reclassified to the categories Excellent, Good and Basic (used tool in ArcGIS: "Reclassify").

Parameter	Category (ÖV-Güteklassen)	Category in SaMBA tool
Quality of PT	A, B	Excellent
	C, D, E	Good
	F, G	Basic

Table 6: Modelling quality of PT

If such a classification scheme and the required detailed information on the PT infrastructure are not available, the quality of PT for a distinct region can be presented by the share of people living within 500m of a PT stop in the total number of citizens. This can be calculated by modelling service areas of 500m around PT stops on a road network (including footpaths). The 500m radius was chosen in order to present a distance, which can be easily covered by foot.

[5] https://www.oerok.gv.at/fileadmin/user_upload/Bilder/2.Reiter-Raum_u._Region/1.OEREK/OEREK_2011/PS_RO_Verkehr/OeV-G%C3%BCteklassen_Bericht_Final_2017-04-12.pdf

By intersecting the number of citizens (number of people with primary residence on grid cells) with the calculated 500m service areas, the share of persons living within 500m of a PT stop can be derived as follows (used tools in ArcGIS: “Summary Statistics”):

$$\frac{Number\ of\ people\ with\ primary\ residence\ and\ max.\ 500m\ distance\ to\ a\ PT\ stop}{Number\ of\ people\ with\ primary\ residence}$$

The classification can also be used for modelling other means of transport (bike & ride or park & ride / kiss & ride) by modifying the service areas (change speed, enlarge radius) in connection with the quality of the route for the selected means of transport (e.g. Quality of cycling infrastructure).

Presence of high commuter flows

Since this parameter was added later during the refining phase of the tool, it was not included in the model for the GIS component.

There are several solutions for modelling this parameter spatially. It may be an appropriate solution to refer to the share of commuters, who commute out of their residential municipality, which can be calculated on the basis of nationwide statistic data on commuters:

$$\frac{Employed\ people\ commuting\ out\ of\ their\ residential\ municipalities}{Total\ number\ of\ commuters}$$

Using this approach, threshold values have to be applied to define which share of commuters corresponds to high commuter flows.

Presence of a university or a university catchment area

Since this parameter was added later during the refining phase of the tool, it was not included in the model for the GIS component. An easy way to implement this parameter is to calculate service areas around universities with an appropriate radius that can be defined with the help of literature research.

Access to a primary school

This parameter presents the existence of a primary school within walking distance. This can be calculated by modelling service areas on a road network (including footpaths) based on a distance of 1.250m around primary schools. The 1.250m radius was chosen in order to present a distance, which pupils in the age of 6-10 years can cover easily by foot. The service areas were then joined on a 250m grid, so that every grid cell has the information “Access to a primary school within 1.250m” or “No access to a primary school within 1.250m”.

For Salzburg, Open Geo Data (Land Salzburg 2020) on school locations and a road network including footpaths were used to model this parameter (used tool in ArcGIS: Network Analyst tools like “New service area”, “Spatial join - Have their centre in”).

Access to a secondary school

This parameter presents the existence of a secondary school within walking distance. The data, thresholds and tools used for the calculation are the same as for the parameter above (Access to a primary school).

Presence of a bike sharing system

For modelling this parameter, no adequate data for the area of investigation was available. If there is available data, the parameter could be modelled in the same way as the parameter "Presence of a park & ride system" (see below): first defining a distance or travel time, then calculating service areas and joining the information of having a bike sharing system within a defined network distance or travel time to every grid cell.

Presence of a car sharing system

For modelling this parameter, no adequate data for the area of investigation was available. If there is available data, the parameter could be modelled in the same way as the parameter "Presence of a park & ride system" (see below): first defining a distance or travel time, then calculating service areas and joining the information of having a bike sharing system within a defined network distance or travel time to every grid cell.

Presence of a park & ride system

For this parameter, available data on P&R locations at PT stops was used. Service areas from 2 to 15min travel time were calculated. These values were chosen because it is assumed and most probable that a person, who has to drive more than 2 minutes and less than 15 minutes, will use a P&R. The service areas were then joined on a 250m grid, so that every grid cell has the information "Presence of a P&R within 2 to 15 minutes travel time" [yes/no] (Used tools in ArcGIS: Network Analyst tools like "New service area", "Spatial join – Have their centre in").

c) Modelling results

As a result, the GIS component does not recommend measures like the Excel component. This could be a further step. Using the spatial dimension in this case leads to a more complex result: On the one hand, the **potential demand and attractive mobility solutions** are calculated and on the other hand, the **framing conditions for the implementation of different transport modes are modelled according to predefined evaluation schemes**. The result shows **areas with high potentials for mobility behaviour change measures** which are presented as **maps** in the next chapter.

Modelling the potential demand and attractive mobility solutions (as a basis for modelling results)

The potential demand for mobility offers is an important aspect when thinking about mobility behaviour change measures. In the Salzburg example, this demand was calculated on a commuter matrix. This is a database for the province of Salzburg, containing the he number of commuters and students including the “from” (place of residence) and “where” (place of work / school) information on a grid basis.

Based on this matrix, a routing of all commuter connections was done in order to get the routes connected with a travel time information. Then these travel time information was classified in order to join it with potential attractive mobility solutions. As a result the most attractive solutions (transport modes) for every route according to distance, travel time, changing, waiting time, etc. are carried out.

Pointing out areas with high potential for mobility behaviour change measures

By assessing the framing conditions for different transport modes like settlement structure or quality of existing infrastructure, areas with high potential for mobility behaviour change measures can be pointed out. Following the assumption that measures and incentives can only work if there is already an appropriate infrastructure quality, existing infrastructures are assessed and evaluated together with other aspects in order to derive potentials. The results can be used as decision support for taking measures, providing incentives and supporting a distinct transport mode.

The following evaluation schemes were created for assessing the potential for the three combinations (mobility solutions) PT + bike & ride, PT + walking and PT+ kiss & ride:

- Evaluation scheme for the potential of PT & Bike and Ride based on PT quality, urban-rural typology and quality of the bike infrastructure

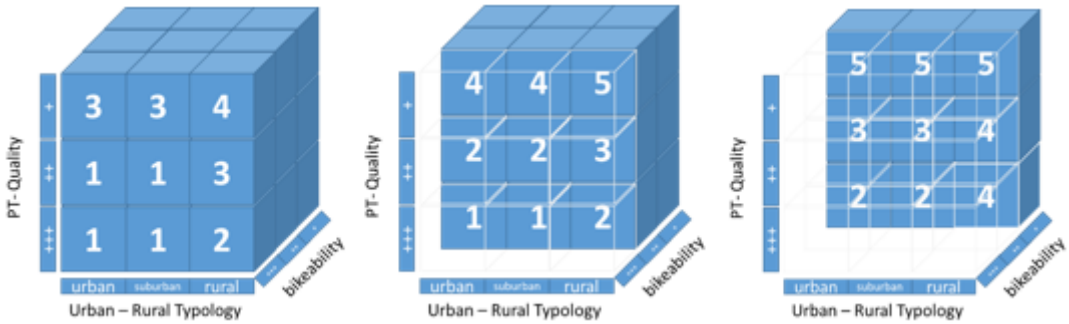


Figure 26: Evaluation scheme for the potential of PT & Bike and Ride

- Evaluation scheme for the potential of PT & walking based on PT quality, urban-rural typology and topography

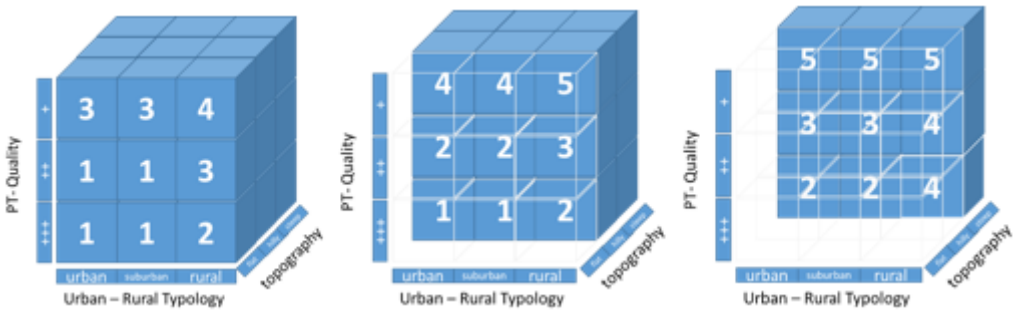


Figure 27: Evaluation scheme for the potential of PT & walking

- Evaluation scheme for the potential of PT & Kiss and Ride based on PT quality and urban-rural typology

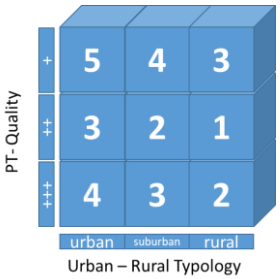


Figure 28: Evaluation scheme for the potential of PT & Kiss and Ride

Visualizing and interpreting results

The GIS component has been tested in the Tennengau region near the City of Salzburg. The following maps show parameters and calculated results in form of potentials for the municipalities Hallein and Kuchl.

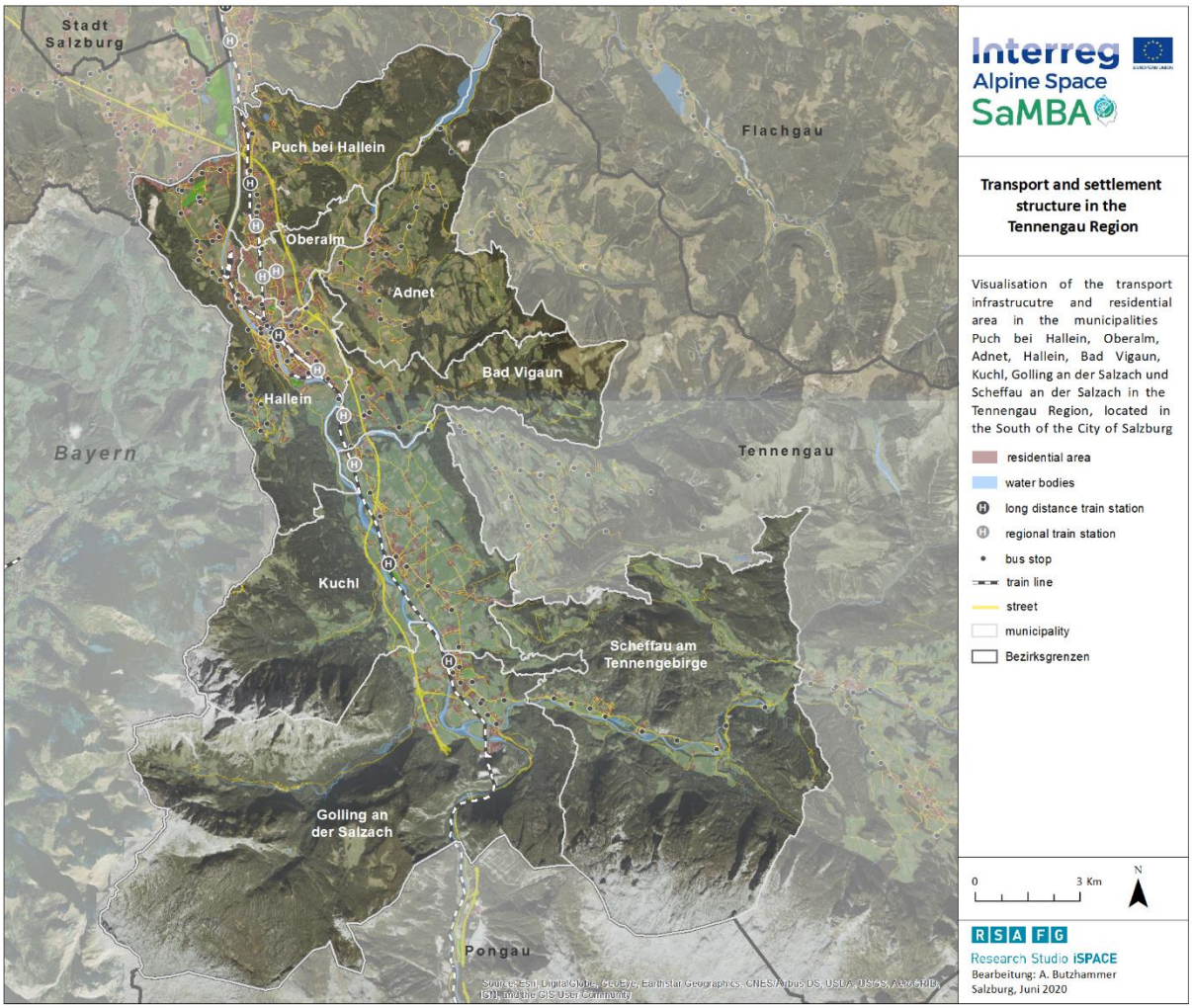


Figure 29: Transport and settlement structure in the Tennengau Region

It is recommended to start with an overview of the target area. Therefore, the first map represents general information about transport and settlement structure in the municipalities Hallein and Kuchl. It shows an overview of train stations and train lines, bus stops, streets, municipalities and residential areas.

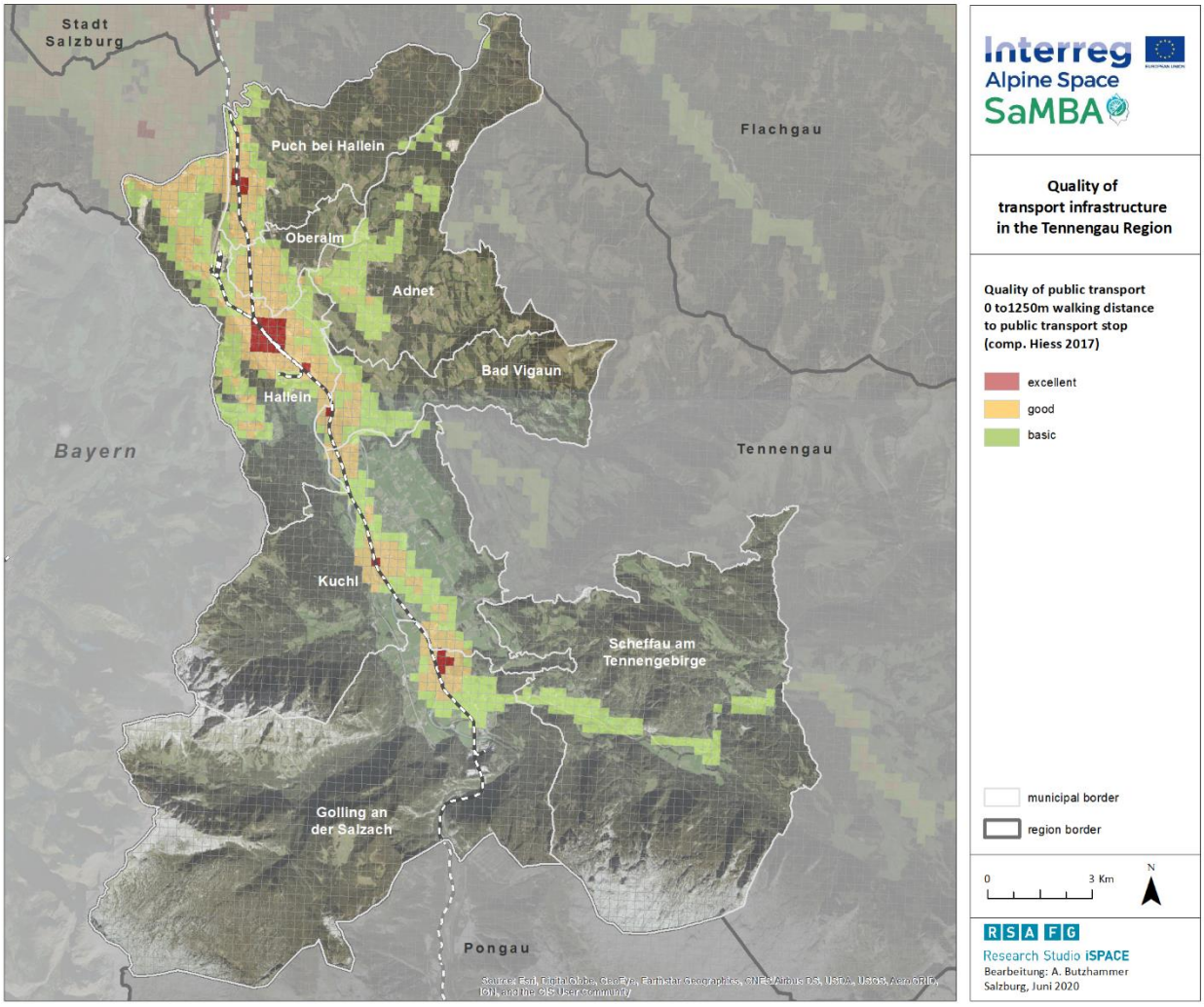


Figure 30: Quality of transport infrastructure

Parameters with influence on our mobility behaviour are modelled on the basis of a raster with a cell size of 250m. In the map example, the quality of PT is represented based on the “ÖV-Güteklassen” and the walking distance to a PT stop. Most residents at least have access to PT with basic quality.

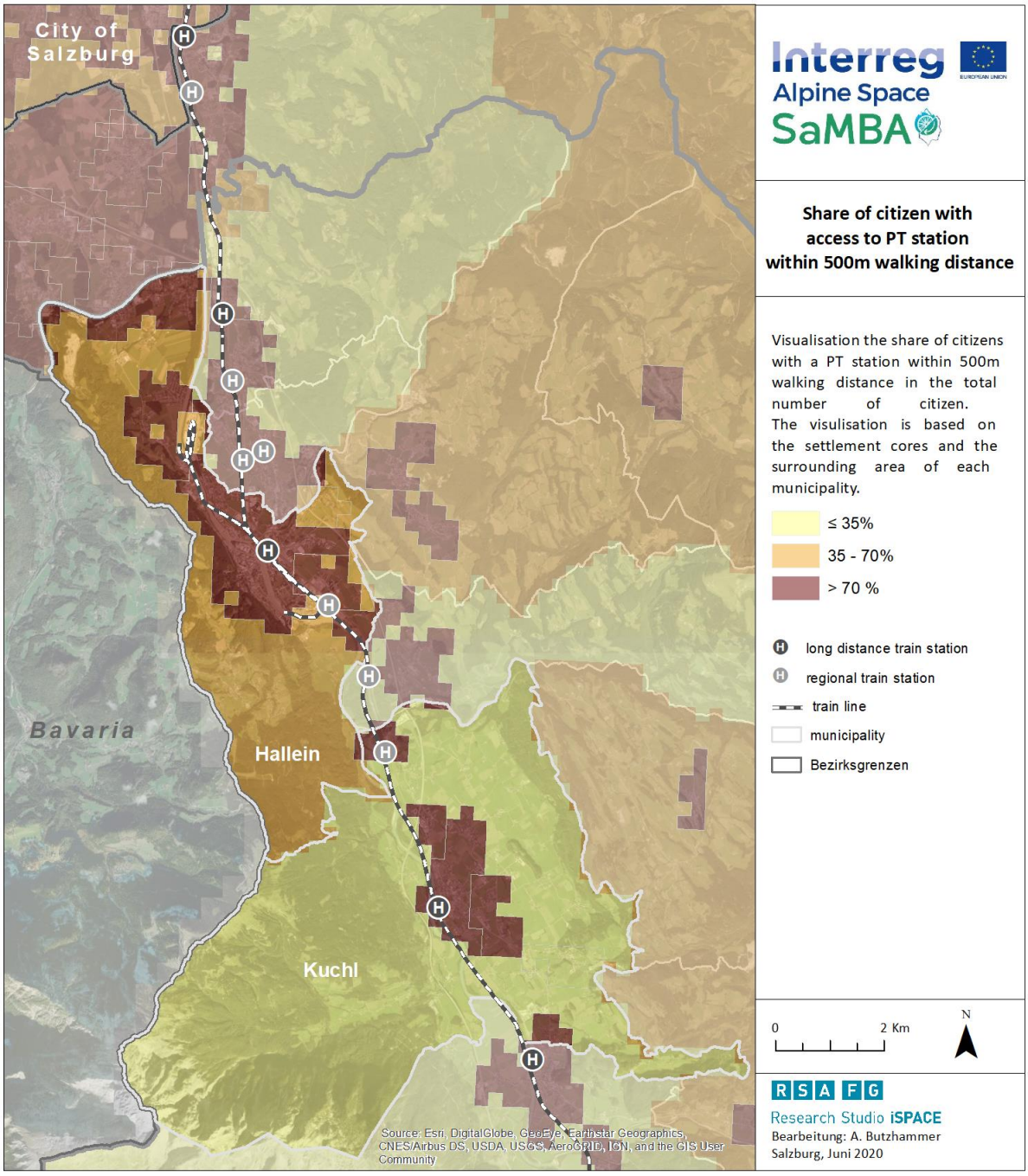


Figure 31: Share of citizens with access to a PT stop within walking distance

Parameters can also be visualised based on polygons. In this case, additionally, the share of persons living within 500m distance to a PT stop based on settlement cores has been calculated.

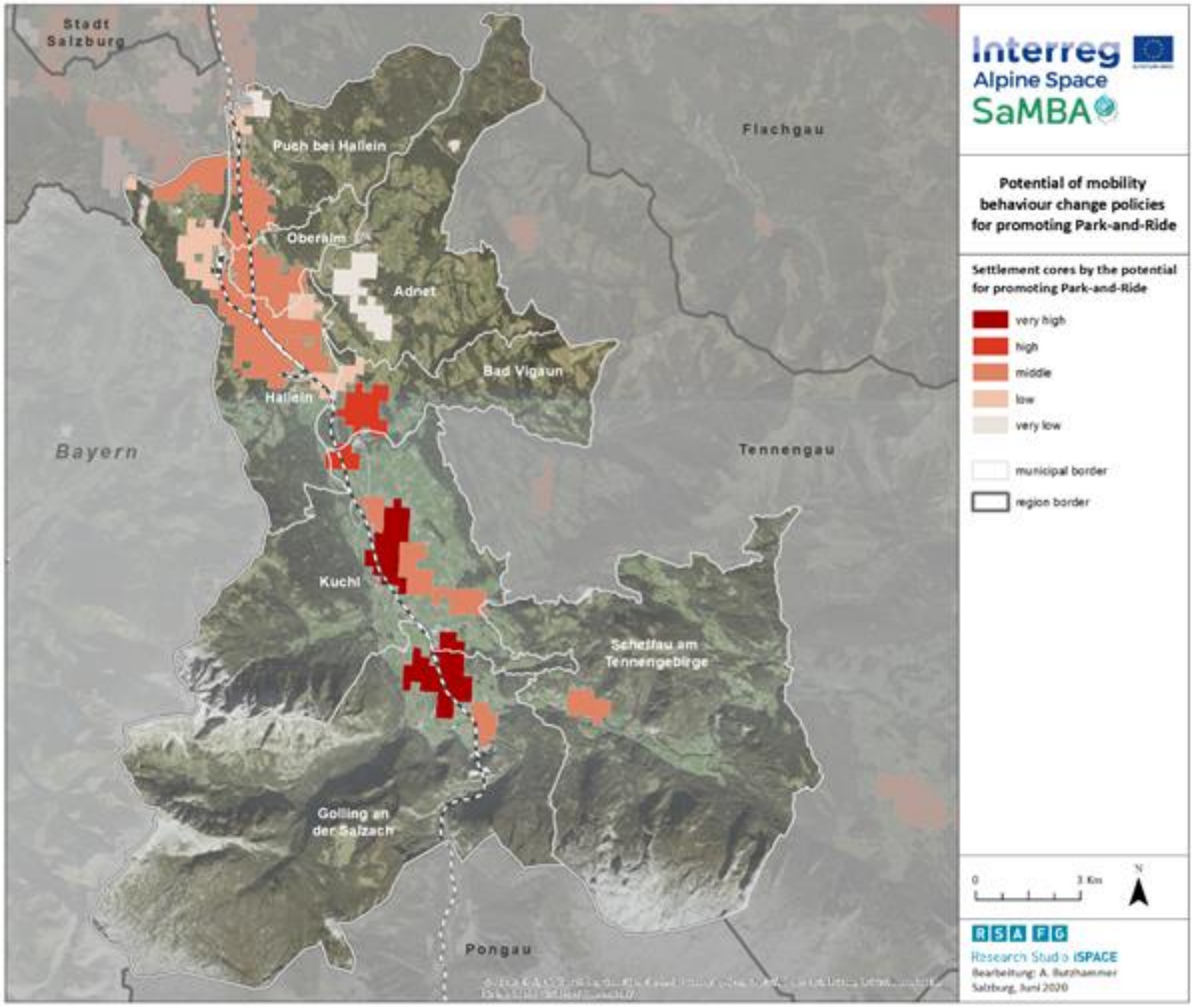


Figure 32: Potential for policies promoting P&R

This map shows the potential of behaviour change policies that promote P&R based on settlement cores. An important foundation for P&R is a high quality of PT.

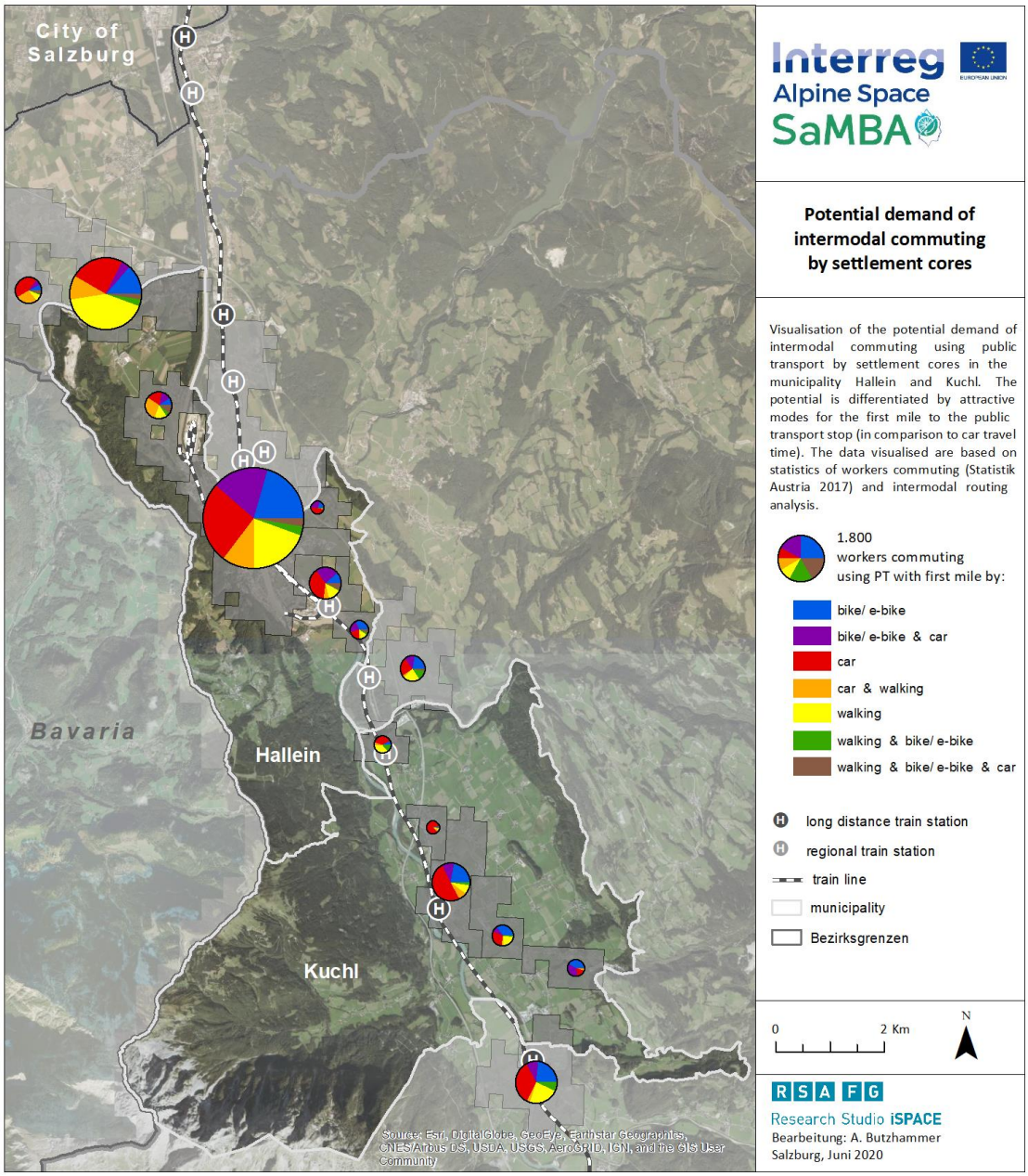


Figure 33: Potential demand of intermodal commuting by settlement cores

This map shows potential demands of intermodal commuting by settlement cores with the help of pie charts. The size of the pie chart represents the number of commuters with an attractive PT available. The chart segments show the potential of different modes for the first mile to a PT stop including bike, car and walking. In many cases, more than one mode of transport can be recommendable for a commuter. The map shows that many residents still are dependent on the car. However, there is also potential for cycling and walking, especially in the centre of the municipalities.

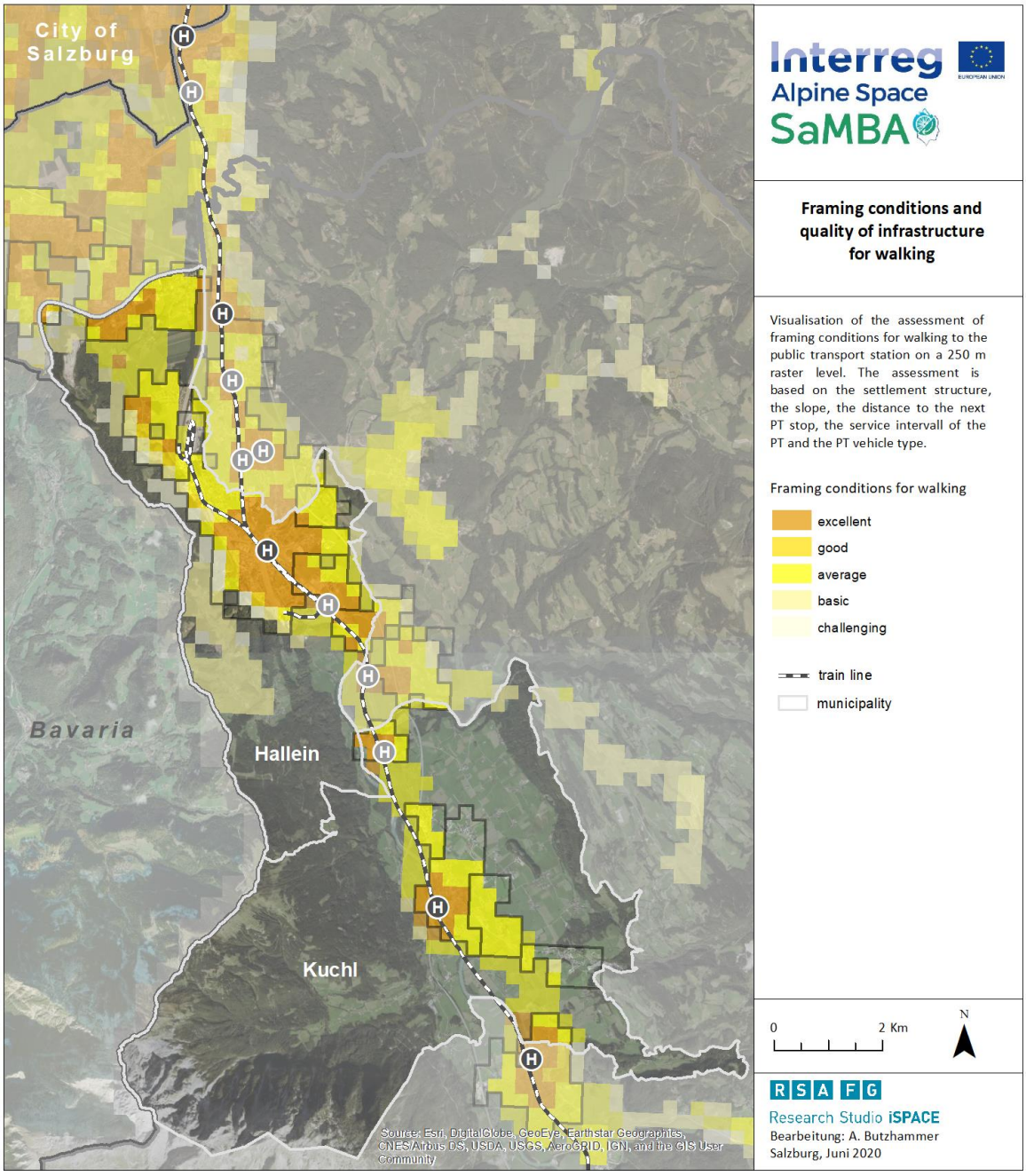


Figure 34: Framing conditions and quality of infrastructure for walking

This map demonstrates the conditions for walking to a PT stop based on settlement structure, slope and the distance to the next stop. In addition, the service interval and the vehicle type are considered, since most people are more motivated to walk to a PT stop with a good service quality.

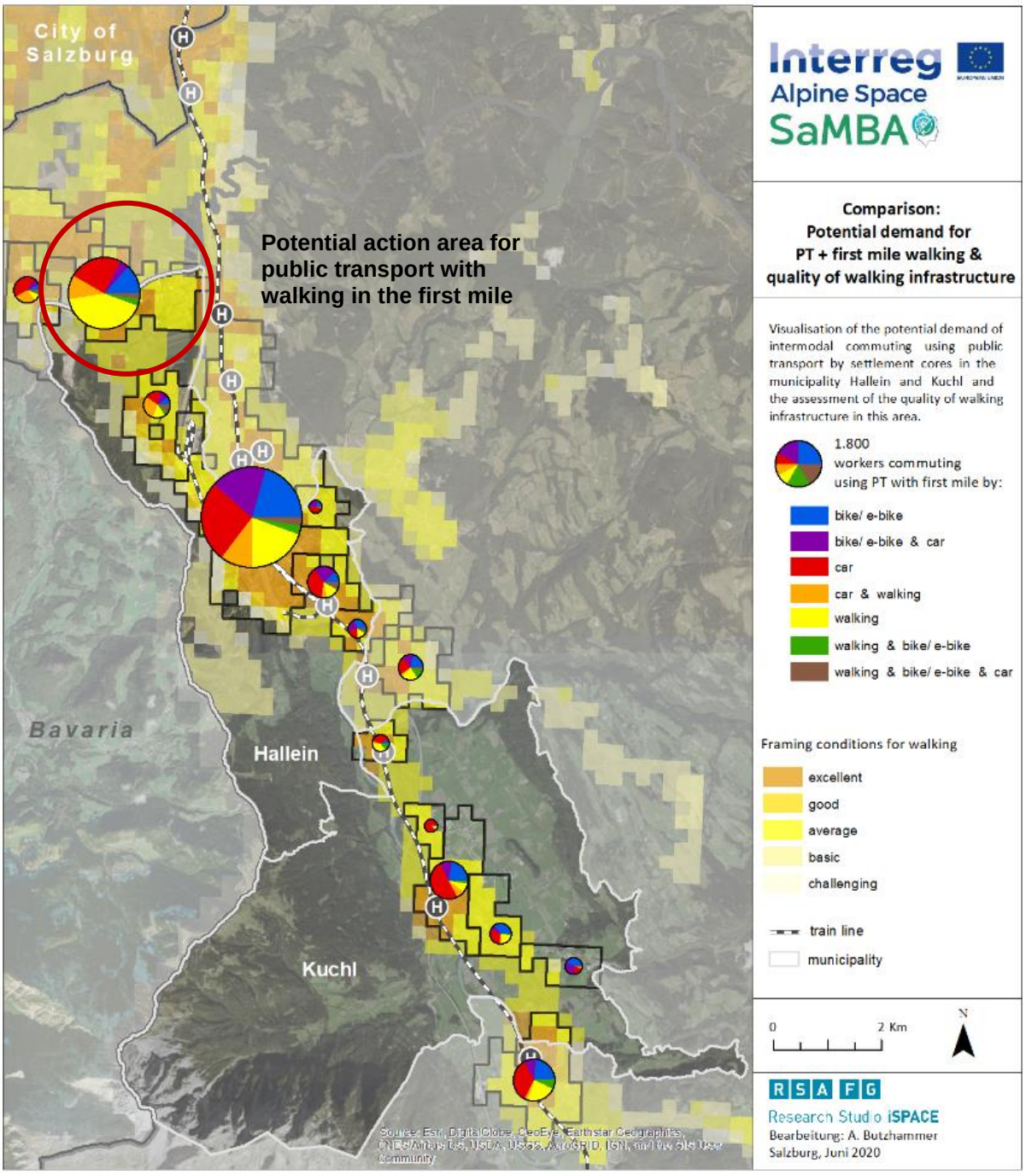


Figure 35: Potential action areas

In the next step, the framing conditions for walking have been combined with potential modes for the first mile to PT stops for commuters. This visual comparison helps to determine action areas for measures that promote PT and walking in the first mile. In this case, a potential action area in the north of the study region could be identified.

4. Outlook and contact info

The SaMBA tool can be used to ease the choice of suitable incentives and their applicability as a first step helping public authorities in planning their strategies to engage the public in choosing sustainable means of transport more often.

Future enhancements, especially by making use of geographical data, can also support the development of regional analytics to compare possible target areas for certain measures and the overall regional impact of the application of such measures especially if interconnected with traffic information, commuting traffic and calculating overall effects on modal split and CO_2.

If you want to know more details about the implementation of the tool, please contact:

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Johanna Schmitt: Johanna.Schmitt@researchstudio.at

Annex: Overview of all implemented measures

Measure	Best practice	Goal	Spatial dimension	Description	Impacts	Link/contact
App for promoting sustainable modes in first and last mile	Green Miles	Promotion of sustainability in first and last mile	Urban, suburban, rural	The green miles mobile application is a free interactive tracking app and provides an incentive system, which consists of a credit system and a gamification approach. Users collect green miles by using sustainable modes, which can be used for discounts on train tickets or at sports shops.	The app has impacts on the modal split and on CO2 emissions.	https://www.wu.ac.at/entrep/kooperationen/bisherige-praxisprojekte/practiceproj-detail/detail/green-miles/
Awareness-raising among decision-makers	City Cycling+: Cycling for a Better Climate	Increasing the modal split of cycling	Urban, suburban, rural	CITY CYCLING+ aims at bringing the public in the district of Emmendingen, Germany to use the bicycle more frequently for daily mobility routines. The campaign focuses on making politicians and local decision-makers aware of the lack of safe cycling infrastructure by getting them on their own bikes. The district also uses the RADar! reporting platform, which is part of the campaign. Cyclists can report problems in the cycling infrastructure directly to the administration.	In the scope of the project in 2019, 280,7km were cycled and 40 tons of CO2 were avoided. 59 of 199 local parliamentarians participated. Including all participants, 7.9% claimed that they use their bike significantly more often. 32.8% stated that they use their bike slightly more often. In 2020, 4462 cyclists avoided 163 tons of CO2 by covering 1.109.769 km by bike. In 2020, the county also participated for the first time together with the twin municipality in France. The program furthermore contributes to a healthier lifestyle and reduced air pollution.	https://www.stadtradeln.de/alsace-centrale
Bicycle communication campaign	Radlhauptstadt München	Increasing the modal split of cycling	Urban, suburban, rural	This program promotes cycling in Munich with the help of a communication campaign including e.g. bicycle tours, bicycle safety checks, photoshoots, bicycle exhibitions and school activities.	The amount of trips by bike increased from 8.1% to 14% in 2 years, however with the help of an improvement in the cycling infrastructure. Many switches were from walking and PT.	https://www.radlhauptstadt.muenchen.de/
Bike sharing discounts for students	CAMPUSbike	Promotion of bike sharing	Urban, suburban	This program includes bike sharing discounts in many cities in Germany. The offers depend on the city, but often they include a free rental for the first 30min.	No impacts documented yet	https://www.nextbike.de/de/campusbike/
Bike sharing discounts for train customers	ÖBB & Nextbike	Promotion of bike sharing Promotion of sustainability in first and last mile	Urban, suburban, rural	At many train stations in Austria, bike sharing offers including discounts for persons with a ÖBB Vorteilscard (customer card) are available, which is also relevant for promoting sustainable mobility solutions in the first and last mile.	No impacts documented yet	https://www.oebb.at/de/reiseplanung-services/am-bahnhof/nextbike
Car sharing discounts	Car sharing discounts for students	Promotion of car sharing	Urban, suburban	The car sharing provider SHARE NOW offers discounts for students in several cities worldwide. This includes free registration, free parking and 5€ starting credit.	No impacts documented yet	https://www.studententarife.org/carsharing-fuer-studenten.html
Programs for pupils	STARS, Rewards in the MUV app	Increasing the modal split of cycling Increasing the modal split of walking	Urban, suburban, rural	The aim of STARS was to promote active mobility for journeys to and from school. It was carried out by partners from London, Edinburgh, Krakow, Budapest, Madrid, Milan, Brussels, Bielefeld and the Province of Noord Brabant. A website was set up where pupils could track their trips and compete with classmates and other schools across Europe. Furthermore, programs for primary and secondary schools were implemented. The first focuses on empowering primary schools to engage in active mobility. Schools could work their way up a scale from bronze to gold based on how strongly they promote active mobility. For secondary schools, a peer-to-peer engagement program was created. It empowered groups of pupils and gave them tools and ownership to develop, implement and monitor behavioral projects in their school. In Piedmont, Italy, a project on the development of sustainable mobility for home/school trips is implemented. The main objective is to reduce the use of cars through the experimentation of single user/community rewards managed by the mobile application MUV.	The STARS project resulted in a 5.7% modal shift from motorized to active modes in primary schools and a 8.8% modal shift in secondary schools. 894 tons CO2 could be saved in 2 years. The project from Piedmont also causes a modal shift and leads to a higher quality of life in a less polluted city.	STARS: http://starseurope.org/index.php Rewards in the MUV app: https://istitutovittone.it/it/index.php/19-la-scuola/793-progetto-samba
Charges for vehicles	London, Stockholm, Milan, Gothenburg, Singapore	Increasing the modal split of PT for leisure activities Increasing the modal split of PT for commuting	Urban	Charges are collected for driving a vehicle within a charged (inner city) zone. In London, Stockholm, Milan and Gothenburg, the charge is collected only on weekdays. In most cases, exceptions or discounts for residents or vehicles like taxis or buses are possible. In Singapore, every vehicle needs to be equipped with a device (In-vehicle Unit) for payment in order to be allowed to use priced roads.	In London, the charge led to a 20% reduction of vehicles subject to full charge and an increased share of PT from 29% to 37%. MIV decreased from 46% to 36%. Additionally, positive effects on cycling could be detected. Also in the other cities, the traffic volume significantly dropped.	London: https://tfl.gov.uk/modes/driving/congestion-charge Stockholm: https://www.roadtraffic-technology.com/projects/stockholm-congestion/ Milan: https://www.comune.milano.it/aree-tematiche/mobilita/area-c#navpageinside Gothenburg: https://www.bloomberg.com/news/articles Singapore: https://development.asia/case-study/case-electronic-road-pricing

Collecting points for sustainable mobility behavior	TrafficO2	Increasing the modal split of PT for leisure activities Increasing the modal split of PT for commuting Increasing the modal split of cycling	Urban, suburban, rural	A mobile application provides challenges and information to promote sustainable transport. It was tested in Palermo. Routes are described according to the distance travelled, cost in €, CO_2, calories burned and O_2 points (as credits). The app tracks personal sustainability goals based on the user's habits. The users can win prizes and discount coupons based on the O_2 points.	In six months, 300 testers registered over 18.000km and saved 55kg CO2.	www.traffico2.com
Commuter challenges for reducing traffic during peaks	MOBI	Increasing the modal split of PT for commuting Increasing the modal split of cycling Promotion of ride sharing	Urban, suburban, rural	MOBI was implemented by partners from the Netherlands, Belgium, UK, Bulgaria, Romania and Portugal. It encourages a travel behaviour change in order to reduce traffic during peak hours. The users get feedback and information on saved energy and play as a team competing against other teams to see how many sustainable trips are made each week.	The project resulted in an increased share of sustainable modes from 58% to 80% among participants and a reduced share of MIV from 65% to 42%. PT increased from 19% to 28%, cycling from 4% to 8% and carpooling from 5% to 16%.	http://www.mobi-project.eu/
Comprehensive car sharing offers	Car sharing all inclusive	Promotion of car sharing	Urban, suburban	The car sharing provider ELOOP provides all offers with free charging, free parking, included kilometres, etc.	No impacts documented yet	https://eloop.at/de/preise/
Encourage the use of carpooling in tourism	Carpooling and hitchhiking - A new way of moving	Promotion of ride sharing	Rural	This measure is implemented in a regional park in the Auvergne-Rhône-Alpes Region, France. The goal is to reduce the number of cars on the road by increasing the number of persons in per car by carpooling and hitchhiking services. To encourage the locals, communication tools and incentives were developed. Concerning the tourists, a network of hosts and tourism professionals is set up to create measures to make customers come to the park with alternative modes. Stories are built to show how visitors can come and move in the region without a car. The park is collaborating with organizers of cultural and sports events to encourage the public to use carpooling for coming to these events (reserved parking, gratification, etc.).	The program increases the number of people per car and reduces the number of cars on the road, which also reduces car-related problems like noise, congestion and pollution. Carpooling leads to increasing social links and solidarity and improves the image of the territory.	https://www.rezopouce.fr/territoire/PNR_du_Vercors
Free bike sharing for pupils	Bike sharing in Stirling	Promotion of bike sharing	Urban, suburban	In Stirling, UK, pupils aged 14 and over get a free bike sharing membership for 12 months. The idea is to promote sustainable transport options starting from a young age to help to form habits that last a lifetime.	No impacts documented yet	https://www.nextbike.co.uk/en/news/stirling-schools-bike-share-scheme-is-uk-first/
Free cargo bikes	Grätzlrad Wien	Promotion of bike sharing	Urban, suburban	In Vienna, free cargo bikes can be booked online. Only a deposit is required.	No impacts documented yet	https://www.mobilitaetsagentur.at/jahresaktion/graetzlrad-wien/
Improvement of PT and fare systems	Hospital 'Madre Teresa Di Calcutta'	Increasing the modal split of PT for commuting	Urban, suburban, rural	The main focus of this program from the municipalities Monselice and Este in the Province of Padova, Italy is to improve PT connections to the Hospital Madre Teresa di Calcutta. 5 pairs of journeys were moved to the Monselice train station in connection with the Padova–Bologna line. The program also includes a new reward/pricing scheme and an advertising campaign to promote the initiatives. The fare modification includes a new ticket at the cost of 1€ valid for 4 hours.	The project led to an increase of the use of PT (276 transport users on 31 journeys with an increase by 33%). 20-25 students daily go to the hospital by bus after their train journey to the Monselice railway station. 140 transport users have the hospital as origin/destination (increase by 2.2%).	https://www.provincia.padova.it/samba-sustainable-mobility-behaviours-alpine-region-0
Incentives for residents to use less MIV	In motion program	Increasing the modal split of PT for leisure activities Increasing the modal split of PT for commuting Increasing the modal split of walking	Urban, suburban	This program was implemented in King County, Washington and provided residents with incentives to drive less and raised individual awareness on alternative travel options. Participants committed to change 2 trips per week from MIV to another mode for 12 weeks and for every successful week they received a voucher to purchase PT tickets, biking and walking gear or gasoline for carpooling.	Participants reduced MIV trips by 24%. Most trips were converted from MIV to PT (40%), but the program had also high positive effects on walking (25%).	https://www.nctr.usf.edu/wp-content/uploads/2013/12/77947.pdf
Including mobility offers in building projects	Building project Kendlerpark and refurbishment project Friedrich-Inhauser-Straße	Increasing the modal split of PT for leisure activities Increasing the modal split of PT for commuting Increasing the modal split of cycling	Urban, suburban, rural	The goal of this program is to foster sustainable mobility behaviour of new residents of new building projects in the City of Salzburg and to change the modal split. Following tools and information materials are conveyed: information and communication to citizens, awareness-raising (including an interactive cycling station, consulting services for the Salzburg transport app and a mobility consultation station), an information brochure and individual mobility advice for all interested residents. These activities are supported by incentives like brochures, but also financial ones like free tickets for the local transport and shopping vouchers. Further goodies include cloth bags filled with smaller incentives.	The project increases the usage of sustainable alternative modes and leads to a modal shift. It helps to reduce car-related problems like noise, pollution and congestion and contributes to an increase of contacts and social exchange between residents. Overall, this project contributes to an improvement of the quality of life in the city, a healthier lifestyle and the achievement of climate goals.	MMag. Gerhard Ainz SaMBA Project management City of Salzburg ainz@raumeval.at

Information as incentive	Mobility Info Package and testing of different incentives with MUV App	Increasing the modal split of PT for leisure activities Increasing the modal split of PT for commuting	Urban, suburban, rural	The focus of the policies regarding a promotion of PT in Munich, Germany and some municipalities nearby is on providing information as incentive and financial rewards as a supplementing motivation. It is based on an existing info package and relies on test results from the MUV mobile app competition, which was organized to test the effectiveness of incentives. Approaches that can work in this context are discounts at stores, free PT trial tickets or subscriptions, tickets for recreational facilities, partner PT ticket and tax benefits for using sustainable modes. Some possible digital incentives and rewards are collecting points in an app for travelling sustainably or emotional incentives (e.g. smiley in an app when buying a PT ticket). What was also found to be effective was an advertisement campaign, which targets the good conscience in people regarding environmental protection.	The project increases the use of PT and its modal split and reduces car-related problems like pollution and congestion.	Münchner Verkehrs- und Tarifverbund GmbH (MVV)
Kilometre collection game for pupils and parents	Beat the street program	Increasing the modal split of walking	Urban, suburban, rural	Pupils and parents collect footsteps/kilometres for their class by tapping so called beat boxes with a chip card. The school with the most footsteps/kilometres collected during 6 weeks wins the contest. During the 6 weeks, prizes are given away. The progress of every player, team or school is recorded with the help of a website. This program originates from England, but was already carried out in other countries like Austria.	This program has an impact on health as it promotes physical activity in a playful way.	http://young-mobility.at/en/active-healthy
Offers for bike sharing	Bicing Barcelona, Call-a-Bike	Promotion of bike sharing Promotion of sustainability in first and last mile	Urban, suburban	The Barcelona Bicing system promotes the use of bike sharing by giving registered users the opportunity to use bikes without any extra cost for the first 30min. The German Call-a-Bike system, which is implemented in cities like Munich, Berlin, Cologne and Frankfurt, credits the registration fee towards the first rental invoice. Such approaches are also relevant for the promotion of bike sharing as a solution for the first and last mile.	No impacts documented yet	http://www.konsult.leeds.ac.uk/pg/59/
Offers for elderly/at-risk people	Cycling on referral scheme	Increasing the modal split of cycling	Urban, suburban, rural	A program from London includes a free 12 week long program for patients with a variety of health conditions including fixed appointments with professional cycle coaches and instructors. The key aspects are pre-activity consultations, possibility of free use of bikes during the first 4 weeks of training, group cycle rides, gym exercise programs as alternative and a post-program assessment. Within the scope of the SaMBA project, cycling is promoted among elderly people in Koper, Slovenia.	4 out of 10 participants in London successfully took part, 3 of which have purchased a bike and one intends to. The benefits are improved mental and physical wellbeing, increased confidence to take part in physical activity and the ability to manage pain slightly better.	https://ec.europa.eu/transport/sites/transport/files/cycling-guidance/pasta_handbook_of_good_practice_case_studies_for_promotion_of_walking_and_cycling.pdf
Offers for new residents	Gscheid mobil	Increasing the modal split of PT for leisure activities Increasing the modal split of PT for commuting	Urban, suburban, rural	The city of Munich provides information for new residents about existing PT offers to encourage them to try and eventually completely switch. Incentives are trial PT tickets and trial PT subscriptions.	The results of the pilot project from 2005/2006 showed that the share of PT among the experiment group was almost 8% higher than the control group, while the share of MIV share among the experiment group was 3.3% lower than the control group. Furthermore, 700 tons of CO_2 could be saved.	https://www.mvg.de/ueber/mvg-projekte/gscheid-mobil.html
Park & ride discounts	Special park & ride tariffs for rail customers	Promotion of park & ride	Urban, suburban, rural	At the train station in Worms, Germany rail customers receive discounted parking tickets on presentation of a valid train ticket.	No impacts documented yet	https://www.worms.de/de/web/parken/P-R--Park-and-Ride--Parkhaus-Am-Bahnhof.php
Park & ride marketing campaign	MIMOSA	Promotion of park & ride	Urban, suburban, rural	The MIMOSA project promoted park & ride with the help of posters, flyers, etc. Shopping bags were given out to people using park & ride facilities to reward good behaviour.	The project led to an increase in the number of sold park & ride tickets and helped to reduce the traffic volume by 4900 cars per month.	https://civitas.eu/sites/default/files/measure_evaluation_results_2_1_park_and_ride_facilities.pdf
Park & ride ticket as PT ticket	Feinstaubalarm Stuttgart	Promotion of park & ride	Urban, suburban	In Stuttgart, for two car parks the parking ticket is also valid as PT ticket.	This program helps to reduce the emission of particulate matter and decreases traffic volume.	https://www.stuttgart.de/feinstaubalarm/
Pop-up bike lanes	Pop-up bike lanes in Vienna	Increasing the modal split of cycling	Urban, suburban	In many cities worldwide, e.g. in Vienna, pop-up bike lanes recently were created due to the trend towards cycling caused by the COVID-19 pandemic. The goal is to create more room and a higher safety for cyclists and to evaluate the use of these pop-up lanes and use the results as a foundation for the establishment of permanent bike lanes.	The pop-up lanes generally are strongly frequented. On weekdays during peak times, over 400 cyclists per hour were counted on the new lanes in one street.	https://www.fahrradwien.at/2020/06/24/pop-up-bikelanes-gut-genutzt-von-wiens-radfahrenden/
Pricing strategies for parking	Park & ride in Amsterdam	Promotion of park & ride	Urban, suburban	In Amsterdam, parking is expensive in the city centre. To promote park & ride, cheap offers in the suburban areas starting from 1€ per day (max. 4 days in a row) can be used when using PT for going to the city centre.	No impacts documented yet	https://www.nach-holland.de/reisen/in-die-stadt/amsterdam/amsterdam-parkplaetze
Promoting PT for events	Mit dem Zug zum Match	Increasing the modal split of PT for leisure activities	Urban, suburban, rural	This program promotes journeys to sports competitions by train and has been initiated by the Salzburg Tennis Association. After the match, a communal meal with organic food is provided as a reward.	No impacts documented yet	https://mobilitaetsprojekte.vcoe.at/mit-dem-zug-zum-match?suchstr=belohnung
Promotion of carpooling among parents of school children	Carpool to school program	Promotion of ride sharing	Urban, suburban, rural	This program was implemented in Contra Costa, California. Ride matching brochures are distributed in schools and parents who submit a request receive a list of potential matches.	The program helped to reduce daily vehicle trips by 3612. The approximate amount of vehicle kilometres saved is 5.7 million.	http://www.konsult.leeds.ac.uk/pg/03/

Promotion of carpooling to work	Carpooling to Work Makes You Get a Lot	Promotion of ride sharing	Urban	The Department of Isère, France, has developed and opened an incentive platform to provide incentives for shifting to alternative mobility modes for everyday travels. It makes people gain points, which can be traded for rewards, gifts and commercial offers on the integrated online shop. In a new project, a new service of carpooling lines has been connected to the platform. This carpooling line concept includes a geo-located mobile app and live information of drivers arriving and passengers waiting. Drivers receive points for proposing seats in their car and additional points for every passenger picked up. Passengers also get points for every travel.	The project helps to reduce congestion and the numbers of cars on the streets. It also promotes environmental protection.	https://illicov.fr/ligne/bievre/
Promotion of PT in touristic regions	Mobility in Gorenjska Region	Increasing the modal split of PT for leisure	Rural	Main focus in Bohinj, Slovenia is to decrease traffic by personal cars from the lake shores in and to enable sustainable travelling to the starting points of the hiking trails. Sustainable touristic mobility is promoted by improving PT, linking buses with hiking trails, hop on hop off systems, regional public buses and skiing buses. Public passenger services are planned to be free for local residents and visitors are encouraged to leave their cars at P&R places. Furthermore, active mobility is promoted and traffic safety is improved. The municipality Tržič aims at lowering the peak-hour occupancy below 85% on all municipal parking spaces by the introduction of paid and short-term parking regimes.	The project helps to decrease the number of cars on the street and leads to a modal shift, especially in tourism. It also decreases emissions and pollution caused by traffic.	https://www.bohinj.si/en/mobility/
Promotion of walking to school	Walking bus	Increasing the modal split of walking	Urban, suburban, rural	A walking bus is a program for young children to walk to school together with volunteering adults as leaders. This walking bus follows a fixed route with several stops on the way. Children can receive small presents like stickers as a reward for walking. The idea originates from Australia, but walking buses have been implemented in many other counties like Germany, France, Italy, Austria, Switzerland, Luxembourg, the UK and Canada. Within the scope of the SaMBA project, they are implemented in Koper, Slovenia.	Walking buses help to promote traffic safety, health and contribute to the reduction of traffic volume.	General information: http://www.walkingschoolbus.org/resources.html Walking bus in Koper: http://www.etmkoper.si/pesbus.html
Rewards for avoiding peaks	MIMOSA, Spitsmijden	Increasing the modal split of PT for commuting	Urban	In the MIMOSA project, Participants receive 4€ when they avoid main traffic axes roads during 6 and 10 AM. In the Spitsmijden program, commuters get rewards for avoiding car travel during peaks. They receive 7€ for avoiding the entire morning peak and 3€ for avoiding 7:30 to 8 and 9 to 9:30. The program was tested on the Dutch A12 motorway corridor from Zoetermeer towards The Hague.	The MIMOSA project helped to reduce the traffic volume between 500 and 700 cars during the morning rush hour in Utrecht. The Spitsmijden program led to a decline of total car-use from 70% to 65% mainly due to an increased use of PT.	MIMOSA: https://civitas.eu/content/mimosa Spitsmijden: https://www.vtpi.org/spitsmijden.pdf
Rewards for carpoolers	Fahr mit	Promotion of ride sharing	Rural	This project initiates carpooling by creating ride-sharing stops. People searching for lifts need to stand at designated places marked with green arrows and wait to be picked up. Drivers are encouraged to participate with the help of rewards during the starting phase. This program was developed for the Tennengau area in the Austrian federal state Salzburg.	No impacts documented yet	https://mobilitaetsprojekte.vcoe.at/fahr-mit-2019?
Rewards for children using sustainable modes on the way to school	Traffic Snake Game	Increasing the modal split of PT for commuting Increasing the modal split of walking Promotion of ride sharing	Urban, suburban, rural	This project was implemented in a great number of European countries. Children received a sticker for every day they walked, cycled, used PT or shared a car journey to school. The goal was to collect as many stickers on a banner as possible. The children got rewards for reaching key points on the banner (e.g. no homework) and completing it (e.g. cycling tour).	The project led to a reduction of CO_2 emissions and had the greatest impact on the modal split of walking with a total increase of 9% across the participating countries. Carpooling increased by 4% and PT by 1%.	https://www.trafficsnakegame.eu/
Rewards for commuters going by bike	Cycling kilometric allowance	Increasing the modal split of cycling	Urban, suburban	Employees who commute to work by bike got a financial reward. They received 0.25€ per kilometre and up to 200€ annually. A pilot study was carried out in 18 French companies.	The program led to a 50% increase in the number of active cyclists, which rose to 125% after one year. However, most switches were from PT, but also 20% switched from MIV and 9% from moped or motorcycle. 2.7 tons of CO_2 could be saved in 6 months.	https://ec.europa.eu/transport/sites/transport/files/cycling-guidance/pasta_handbook_of_good_practice_case_studies_for_promotion_of_walking_and_cycling.pdf
Rewards for giving up the private car	MOBILIS	Promotion of car sharing	Urban, suburban	Participants received financial rewards for scrapping their personal car and using car sharing instead. This involved a bonus to be used within 2 years to cover costs related to kilometric consumption only. The program was implemented in Venice.	Besides the reward system, the project also included the improvement of the existing car sharing scheme. Altogether, it led to an increase of car sharing users by almost 50% and, thus, an increase of car sharing mileage.	https://civitas.eu/content/mobilis
Rewards for not using a parking space	Parking cash out program	Increasing the modal split of PT for commuting Promotion of ride sharing	Urban, suburban	Employees are given the choice between a free parking space and cash. Parking cash out programs are e.g. implemented in California.	An analysis of 8 Californian companies shows that with the help of this program the modal split among participants decreased from 76% to 63%, while the modal split of PT (6% to 9%) and carpooling (14% to 23%) increased.	https://www.nctr.usf.edu/wp-content/uploads/2013/12/77947.pdf

Rewards for sustainable mobility during holiday	Käse für Kilometeraskese, Sanfte Mobilität im Urlaub	Promotion of bike sharing	Urban, suburban, rural	The program Käse für Kilometeraskese is offered by a hotel in Mittelberg, Austria. Hotel guests leave their car keys at the reception and receive a free parking space, a free rental bike and a piece of cheese at the end of the holiday. Tourists arriving by train also receive a free rental bike. Furthermore, the use of the free Walser Bus is promoted. The program Sanfte Mobilität im Urlaub was offered by a hotel in Zell am See, Austria. The hotel offered to pick up guests at the train station and provided rental bikes. Every guest got a green mile pass and a present as a reward. At the end of the year, the guest with most green miles received a prize.	With the help of the program Käse für Kilometeraskese, between 8000 and 10000 car trips can be saved per year.	Käse für Kilometeraskese: https://mobilitaetsprojekte.vcoe.at/kaese-fuer-kilometeraskese Sanfte Mobilität im Urlaub: https://mobilitaetsprojekte.vcoe.at/sanfte-mobilitaet-im-urlaub
Rewards for using fewer cars per household	One less car program	Increasing the modal split of PT for leisure activities Increasing the modal split of PT for commuting Increasing the modal split of cycling Increasing the modal split of walking	Urban, suburban, rural	The goal of this program was for households to park one of their cars and use other modes instead. Participants received 85$ per week as a compensation for recording their data and as an economic incentive. The program was implemented in Seattle with 86 households over a period of 6-9 weeks.	The program helped to reduce drive-alone car miles of participants by 27%. The mileage of cycling (38%), walking (30%), PT (25%) and carpooling (23%) strongly increased.	https://www.nctr.usf.edu/wp-content/uploads/2014/11/77947_508.pdf
Voucher programs	Transit voucher program	Increasing the modal split of PT for leisure activities Increasing the modal split of PT for commuting	Urban, suburban	Third-party benefit administrators and/or transit agencies issue vouchers that riders give to participating transportation providers to acquire fare media. Employers may subsidized the costs of the vouchers to create an incentive to use PT. Transit voucher programs are implemented in many US cities, e.g. San Francisco, Philadelphia and New York.	An analysis shows that commuter trips shifted by 20% from MIV to PT.	https://www.nctr.usf.edu/wp-content/uploads/2013/12/77947.pdf

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