Developing a model to select and rank sustainable workplace mobility plan measures

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WTP is a package of measures that an employer puts in place to encourage and enable employees to travel to work more sustainably.

Workplace Travel Plan (WTP)

1. Mission, Statement, Mobility concept
2. Building a mobility team
3. Analysis of existing situation
4. Planning measures
5. Implementation of measures
6. Evaluation
## Strategies of WTP in the literature

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Walking</td>
<td>Walking</td>
<td>Walking / Running</td>
<td></td>
<td>Non-motorized improvements</td>
</tr>
<tr>
<td>Cycling</td>
<td>Cycling</td>
<td>Cycling</td>
<td>Cycling</td>
<td>Public Transit improvements</td>
</tr>
<tr>
<td>Bus and Rail</td>
<td>Public Transport</td>
<td>Public Transport</td>
<td>Public Transport</td>
<td>Carsharing, Ridesharing</td>
</tr>
<tr>
<td>Carsharing</td>
<td>Carsharing</td>
<td>Carpooling</td>
<td>Carpooling</td>
<td>Parking pricing</td>
</tr>
<tr>
<td>Parking management</td>
<td>Parking</td>
<td>Car parking management</td>
<td>Company cars</td>
<td>Parking management</td>
</tr>
<tr>
<td>Reducing the need to travel</td>
<td>New conditions of employment</td>
<td>Reducing the need to travel</td>
<td>Tele-commuting</td>
<td>Teleworking</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Flexible work schedules</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Flextime</td>
</tr>
</tbody>
</table>

- **Mode type**
- **Strategies**
- **Approach**
Method

Measures collection
Creation of categories

Creation of mobility questionnaires

Creation of sustainability index

Developing connections of measures and input data

Ranking calculation based on measures scores

Input data
Questionnaires
Measures and categories
Sustainability Index

Output data
Measures
Ranked

Ranked
Method

- Connections are the interaction between input data, and they produce utility values.

- Utility values for all WTP dimensions are calculated and provide the final score.

- The ranking system is based on the final utility value of measure.
Classification system

Mode type
- Walk
- Bike
- Scooter
- Public transport
- Car
- Other

Strategy cluster
- Rationalization of car use
- Active modes incentives
- Promotion of public transport
- Reduction of the need for travel
- Parking rationalization
- Electrification
- Reduction of trips during peak hours

Approach
- Infrastructure
- Incentives
- Programs
- Information
- Other

Financial demand
- Financial incentives
- Investment level
- Investment periodicity

Time frame
- Time frame of implementation
The MSI is a tool created to assess the sustainability of measures based on the three dimensions of sustainability:

- Environmental (EMI)
- Social (CWB)
- Economic (FIN)
Utility Values

The utility values are the numerical results of the connections among the input data. The Utility Value of Measure (UVM) is the final measure score, which allows their ranking.
Results from the database

<table>
<thead>
<tr>
<th>Strategy Cluster</th>
<th>Mode Type</th>
<th>Approach</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active modes incentives</td>
<td>Bike 23</td>
<td>Incentives 20</td>
<td>34</td>
</tr>
<tr>
<td>Promotion of Public Transport 16</td>
<td>Car 20</td>
<td>Infrastructure 19</td>
<td></td>
</tr>
<tr>
<td>Parking rationalization 9</td>
<td>Scooter 16</td>
<td>Others 15</td>
<td></td>
</tr>
<tr>
<td>Electrification 9</td>
<td>Walk 14</td>
<td>Programs 6</td>
<td></td>
</tr>
<tr>
<td>Rationalization of car use 15</td>
<td>Reduction of the need for travel 8</td>
<td>Information 4</td>
<td></td>
</tr>
<tr>
<td>Reduced travel 8</td>
<td>Reduction of trips during peak hours 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>Public Transport 13</td>
<td>Total of measures 64</td>
<td></td>
</tr>
</tbody>
</table>
Measure and connection example

<table>
<thead>
<tr>
<th>Number</th>
<th>47</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Introduce parking pricing</td>
</tr>
<tr>
<td>Description</td>
<td>Parking Pricing means that motorists pay directly for using the company's parking facilities.</td>
</tr>
<tr>
<td>Mode type</td>
<td>Car</td>
</tr>
<tr>
<td>Strategy cluster</td>
<td>Parking rationalization</td>
</tr>
<tr>
<td>Approach</td>
<td>Others</td>
</tr>
<tr>
<td>Financial demand</td>
<td></td>
</tr>
<tr>
<td>Financial Incentives</td>
<td>No</td>
</tr>
<tr>
<td>Investment Periodicity</td>
<td>One-time investment</td>
</tr>
<tr>
<td>Investment Level</td>
<td>High</td>
</tr>
<tr>
<td>Reasons</td>
<td>Costs might involve placing a barrier system, electronic ticketing, card/permit recognition, or safety cameras.</td>
</tr>
<tr>
<td>Implementation phase</td>
<td>Medium-term</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>Question</th>
<th>Answer</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employer</td>
<td>Does the workplace charge for parking?</td>
<td>No</td>
<td>1.1</td>
</tr>
<tr>
<td>Site Audit</td>
<td>Is there a car parking problem with demand close to or exceeding supply?</td>
<td>Yes</td>
<td>1.1</td>
</tr>
<tr>
<td>Employee</td>
<td>Modal share – Driving alone / Parking garage usage</td>
<td>40% / 83%</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Measure 47 Factor = 1.1 × 1.1 × 1.1 = 1.331
Case study – KTI Transport Science Institute

Modal share

I drive alone 25%
I take public transport 47%
I share a ride with someone 3%
I walk 13%
I ride my bike 5%
I ride my scooter 1%
I work from home 6%

Mode preference

Driving alone
Sharing a ride / carpooling
Public transport
Riding the scooter
Riding the bicycle
Walking
Using taxi services
Private shuttle
Carsharing
Bike-sharing
Scooter-sharing
Working from home

0 (dislike the most) 1 2 3 4 5 (like the most)
**Case study – KTI Transport Science Institute**

**Encouragement for cycling**

- Shorter commute distance: 32%
- Locker and shower facility in or near the workplace: 30%
- Better bike parking facilities: 17%
- Better weather: 23%
- Safer bike routes to work: 37%
- More bike routes to work: 23%
- Better integration with public transport: 11%
- Easy/free access to a bicycle: 8%
- A company bike-share system: 7%
- Free/discounted passes for a public bicycle: 10%
- Financial incentives to bike: 22%
- Having other bicycle commuters to ride with: 3%
- Nothing would make me more inclined to bike: 0%
- Not an option: 0%
- Other: 16%

**Encouragement for Public Transport**

- Shorter commuting distance: 29%
- Cheaper tickets or discounts on plans: 29%
- Better integration with bicycle transport modes: 17%
- More Park & Ride facilities: 18%
- Better information/signalization of routes, connections, etc.: 6%
- More comfortable vehicles: 36%
- More comfortable stops/stations: 15%
- Less waiting time at stops/stations: 49%
- Safer stops/stations: 13%
- Safer walking/bicycling paths to work: 5%
- Better weather conditions / Better weather conditions: 14%
- Nothing would make me more inclined to use public transport: 4%
- Not an option: 1%
- Other: 20%
Case study – KTI Transport Science Institute

Encouragement for electric vehicles

- Nothing would make me more inclined to use an electric vehicle: 28%
- Designated parking spaces and charging stations for electric mobility other than autos: 16%
- Free or discounted parking fees for electric cars: 31%
- Designated parking spaces for electric cars inside or near the workplace: 33%
- Free or discounted charging fees for electric cars: 51%
- Charging stations available for electric cars in or near the workplace: 53%

Encouragement for shared alternatives

- Nothing would make me more inclined to use...: 48%
- Free or discounted passes for the public...: 16%
- Bike-sharing stations or dockless bike-sharing...: 13%
- Higher availability of car-sharing vehicles...: 36%
- Free or discounted parking fees for...: 22%
- Designated parking spaces for...: 20%

Commuting options awareness

- Are you aware of any corporate carpooling schemes or carpooling application?: 7% \(\text{Yes} \quad 93% \text{No}
- Are you aware of all the workplace policies and incentives regarding commuting?: 33% \(\text{Yes} \quad 67% \text{No}
- Are you aware of the cycling routes options to your workplace?: 42% \(\text{Yes} \quad 58% \text{No}
- Are you aware of the public transportation options to your workplace?: 98% \(\text{Yes} \quad 2% \text{No}
- Do you use any journey planner applications?: 76% \(\text{Yes} \quad 24% \text{No}

Graphs showing percentages for various commuting options and awareness levels.
## Case study – KTI Transport Science Institute

<table>
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<th>Ranking</th>
<th>Measure</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Free or low-interest loans for employees’ bicycle purchase</td>
</tr>
<tr>
<td>2</td>
<td>Reimbursement of cycle mileage for commuting trips made by bicycle</td>
</tr>
<tr>
<td>2</td>
<td>Financial benefits for cycling-related accessories and services</td>
</tr>
<tr>
<td>2</td>
<td>Create a bicycle commuter/user group to advocate for cyclists</td>
</tr>
<tr>
<td>5</td>
<td>Install a bike repair center or partner with nearby bike services shop</td>
</tr>
<tr>
<td>6</td>
<td>Create a walking commuters’ group</td>
</tr>
<tr>
<td>7</td>
<td>New employee induction kit</td>
</tr>
<tr>
<td>8</td>
<td>Financial benefits for Park and Ride</td>
</tr>
<tr>
<td>9</td>
<td>Implement traffic calming measures in the surroundings of workplace</td>
</tr>
<tr>
<td>10</td>
<td>Designated parking spaces for carpooling vehicles in company's parking lot</td>
</tr>
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Thank you for your attention!

Conrado Braga Zagabria