Local End-User Incentivization and Uptake Stimulation Methods Roadbook

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Summary sheet

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Organisation	Abbreviation	Country
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Promotion of Operation Links with Integrated Services aisbl (POLIS)	POLIS	Belgium
Taxistop asbl	Taxi	Belgium
Autodelen.net	Auton	Belgium
Bayern Innovativ GMbH	BI	Germany
Cargoroo	CA	The Netherlands
URBEE (E-bike network Amsterdam BV)	URBEE	The Netherlands
Gemeente Nijmegen	NIJ	The Netherlands
Transport for the Greater Manchester	TfGM	Great Britain
Stad Leuven	LEU	Belgium
TU Delft	TUD	The Netherlands
University of Newcastle upon Tyne	UN	Great Britain
Ville de Dreux	DR	France
Stadt Kempten (Allgäu)	Kemp	Germany
Universiteit Antwerpen	UAntwerp	Belgium
Mpact vzw	Taxi2	Belgium
Mobipunt vzw	Mobipunt	Belgium
Electricity Supply Board	ESB	Ireland
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Introduction

The success of eHUBS is partly determined on which kind of trips they are substituting. The main objective of local authorities is to reduce the car dependency of its citizens, reducing the average car use and ownership. Therefore, a particular focus is given to citizens owning a car. Their travel behaviour has to be addressed, implying that specific behavioural interventions has to be developed focused towards different kind of car users and owners.

Next to this large group, there is the group of citizens who do not require a car at this moment, but will have a future need if no reliable alternatives are available. eHUBS and its shared mobility services could address this need, but this also requires specific behavioural interventions aimed at this target group.

This document describes a toolkit that was developed by the Amsterdam University of Applied Sciences. This toolkit contains materials and guidelines for municipalities that support them in developing interventions to stimulate the uptake of eHUBS' services for different target groups. The toolkit includes a step-by-step approach, which enables municipalities to develop a behavioural intervention plan that is adapted to the target group's capabilities and motivation and the social and physical context in which the behaviour takes place. The different stages and steps of the toolkit adheres to steps from the SPARK research process, shown in Figure 1.

Figure 1: SPARK Research Process

The integral toolkit can be found as part of the blueprint, which is available on the eHUBS-website. This can be consulted to receive a complete overview of the material that is available to go through all the steps of the behavioural intervention toolkit.

Overview of the toolkit – The different steps to get to a behavioural change

1. Scoping

Making mobility more sustainable is a complex task in which several parties are involved, with various interests and with various ideas about (1) the problem, (2) the cause, and (3) the solution. Before starting to look for a solution, it is therefore important to first understand the specific problem. The basis for an effective behavioural intervention is a thorough problem analysis. This leads to a clear and realistic objective and a sharp picture of the desired behaviour. Step 1 of the toolkit is therefore to scope the behavioural problem. In doing so, it is important to give extra attention to whether behaviour is an essential part of the problem. If not, then behavioural scientists do not need to be engaged (at that point). The main objective of eHUBs is to reduce emissions from travel behaviour. Emissions are reduced when people use fewer polluting vehicles. The eHUB offers electric shared transport vehicles that are a cleaner alternative to private vehicles with combustion engines. Only if car owners stop using their polluting cars and start using eHUBs can this lead to a reduction in emissions. Behavioural interventions can help, because setting up an eHUB is by itself not enough. In order for the intervention to match the desired behaviour as well as possible, it is important to zoom in during the scoping phase and clearly define the concrete behaviour on which the preparatory research will focus. What behaviour is causing the problem (problem behaviour) now and what behaviour would solve the problem (target behaviour)? Step 1 consists of two sub-steps, namely: identifying the problem behaviour and defining the target behaviour. As research group Psychology for Sustainable Cities, we have worked together with different cities through both substeps and these are explained below with practical examples.

1.1. Identify Problem Behaviour

When it has been determined that there is a behavioural problem, the specific behaviours to be targeted are identified. This involves determining exactly what the problem behaviour is, who exhibits the behaviour, when and in what context. In order to properly map out the problem and objectively determine the severity of the problem, existing quantitative data can be used; for example, data on travel movements in the city. In addition, exploratory interviews can be held with all stakeholders to get a clear picture of the situation and to discover the involved behaviours. Potential eHUB stakeholders include city officials, implementing parties (e.g., charging infrastructure companies), citizens, entrepreneurs, public transport, network providers. Observation of specific situations is another useful source of information. The importance of a thorough problem analysis can be illustrated by the following example. The municipality has a problem: the public space in the city is in danger. There are too many cars in the city. Therefore, the municipality wants residents who own private cars to drive them less or get rid of them. So, the municipality directly proposes its own solution to the problem of too many cars in the city, namely, city residents should drive less – the assumption here being that it is the city dweller who is the cause of the congestion on the road. The problem analysis calls for an examination of whose cars are making the city so busy. When is it especially crowded in the city and where? Using existing data and exploratory interviews, Amsterdam residents' travel behaviour within the city was identified. The data show that relatively few Amsterdammers own a car (24%) and that car ownership is declining, especially among young people (18–29 years, 11%). Less than 10% use a car for short trips, with the exception of two districts (14% in Nieuw West and 15% in Noord). eHUBs with only shared e-bikes and e-cargo bikes aimed

at short trips will therefore probably not replace many car trips. So, by looking at the problem through a behavioural lens, one can critically question certain assumptions around eHUBs. For example, e-bikes and e-cargo bikes replace mainly short trips, but the average person in Amsterdam hardly uses the car for trips within the city, and, although it is mainly visitors that cause a lot of car traffic, cities tend to opt for neighbourhood hubs.

1.2.　Define target behaviour

A precise definition of the target behaviour follows the determination of the problem behaviour. The target behaviour refers to the desired behaviour that the target group must exhibit to solve the problem. Specify who will perform which kind of behaviour where and when. Be realistic in this. Try to ascertain the characteristics of this group and the context in which the behaviour takes place. Interviews and quantitative data can also be helpful here. When you and the person responsible for the project (the client) agree on the specific behaviour that will solve the problem, there is a clear goal and the scope of the research is clear. For example, the municipality of Nijmegen would like residents to use their private combustion engine cars less. They set a target for the desired behaviour: car owners in the municipality of Nijmegen should use an eHUB for half of their (recreational) travel movements. These municipalities addressed a number of questions that clarified the problem, the target group, the stakeholders, and the target behaviours. To zoom in and define the problem and target behaviours, you can fill in a worksheet that is included in the toolkit, available on the eHUBS website (Supplement 1.3 Worksheet Questions Problem Target Behaviours). It is important to coordinate the problem analysis with all parties involved, so that there is no confusion or disagreement during the development of an intervention. This coordination can be achieved by using a talk sheet (see toolkit, Supplement 1.4 Talk Sheet), which shows the problem behaviour, the target group, the stakeholders, and the target behaviours in a clear manner. An example of a completed talk sheet for the municipality of Amsterdam is included in the toolkit (Supplement 1.5 Amsterdam Talk Sheet).

Once the problem behaviour and the target behaviour are defined, a research question can be formulated. The intervention answers the research question. In the context of eHUBs, the research question comes down to: how to increase the likelihood that [the target group] in [context], [so much] more often exhibits [target behaviour]. In the eHUBs project, the research group Psychology for Sustainable Cities focused in general on the question of how to increase the likelihood that car owners would leave the car behind more often and use electric shared transport. In specific partner cities, the question was brought into sharper focus, for example: How can car owners in Amsterdam be encouraged to use a vehicle from the eHUB instead of their (own) car for trips shorter than 10km?

2. Mapping

Step 2 of the research process is about identifying the factors that influence behaviour. With the overview of these behavioural factors, it is possible to determine the interventions that are effective, i.e., the factors that interventions should address in order to change behaviour. Behaviour does not occur by chance or randomly but is determined by an interplay of factors. In the behavioural sciences, these factors are known as behavioural determinants. The different determinants that influence behaviour can be seen in the COM-B model [1]. This model is a widely used evidence-based behavioural model, see Figure 2, that shows the conditions that are necessary for behaviour to come about, namely, people must be able (Capability) and sufficiently motivated (Motivation) to carry out the behaviour. Also, the environment

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[1] Michie, S., van Stralen, M.M., West, R. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. Implementation Science. https://doi.org/10.1186/1748-5908-6-42

(both social and physical) must not get in the way of the behaviour (Opportunity). The COM-B model can be seen as a general framework, in which the three components should be filled in for specific behaviour. The conditions (COM) apply to each type of behaviour, but the concrete interpretation of the components can differ per behaviour. For instance, we know that the motives people have for using electric shared bicycles differ from the motives for using shared cars. In addition, the determinants of a single type of behaviour can also differ per target group. When stimulating carsharing, think of car owners and non-car owners, or of young people and the elderly for example. In mapping the behavioural factors, it is therefore important to zoom in on the target behaviour made concrete and the chosen target group (see Step 1, Scoping)

Figure 2: COM-B model

Mapping the determinants consists of two sub-steps: first, existing knowledge should be explored, followed by gaining insights from the local context. The COM-B model can be used for mapping and structuring the determinants. More information on the use of this model and a worksheet can be found in the toolkit on the eHUBS website (Supplement 2.1 Com-B Worksheet). The goal and method of the two sub-steps are explained below. Both sub-steps have been completed by the behavioural research group Psychology of Sustainable Cities at AUAS during their research on stimulating shared transport by car owners.

2.1.   Explore existing knowledge

To identify the behavioural factors, the first step is to consult existing knowledge. Both scientific and "grey" literature (e.g., reports, internal documents, etc.) can be consulted to gain insight into factors that are known to influence behaviour. This can be done by desk research, but also by consulting knowledge experts and/or experience experts. Often, similar studies have already been undertaken. These insights should be included. The insights and overview of behavioural factors that follow from this exploration serve as a basis for the next step, investigating the local context. To gain more insight into ways to stimulate carsharing by car owners, the research group conducted a literature study that focused on the behavioural determinants of the behavioural transition from individual to shared transport. The insights and thoughts on the triggers and barriers for stimulating shared mobility are presented in a paper included in the toolkit (Supplement 2.2 Literature Review Paper).

2.2.   Research the local context

Behavioural issues from practice are often difficult questions that occur in unique contexts with specific target groups. From the Scoping in Step 1, various behavioural factors have emerged. In Step 2, the goal is to investigate these factors in the specific context of the behavioural issue. It should be examined

whether the behavioural factors identified in the literature (in which context and target group are often not entirely the same as in practice) influence behaviour in practice, and to what extent these factors are present or not present. For this, practical research must be carried out with the target group in the specific context. Depending on the behavioural issue and the situation, quantitative methods (e.g., questionnaires with multiple choice questions or statements to ascertain numbers) and/or qualitative methods (e.g., interviews with open answers to ascertain motives) can be used. To illustrate: the literature shows that knowledge about the location of shared vehicles is an important condition for using shared transport. The next step is to find out whether the target group possesses this knowledge in practice. Is there enough knowledge? Or is there a lack of knowledge? With the results, an overview can be created of factors that play a role in behaviour and the extent to which these factors are present in practice. This overview can then be used to determine the factors that should be addressed in an intervention. This is done in the next step of the research process, see Step 3, Prioritising. During the research on stimulating shared transport among car owners, several practical studies were conducted. These studies zoomed in on the specific context, target behaviour, and target group. Questionnaires distributed among car owners in Amsterdam and Leuven (Belgium) combined with qualitative interviews provided insight into the factors that influence the use of shared transport. These insights have been compiled in a memo and a presentation, which can be found in the toolkit (Supplement 2.3 Memo and 2.4 Presentation eHUB Outcomes Amsterdam and Leuven). In addition, an intervention study was conducted in Amsterdam that looked at the effects of various behavioural change mechanisms on making travel behaviour more sustainable and on the use of shared transport. In this study, a Smart Mobility app was used: Fynch. This is a smartphone application that, after installation, automatically tracks all travel movements made, including route and vehicle. The app contains a dashboard on which the user can find personal travel information, such as distance travelled, time, and CO_2 emissions. In addition, the app contains a reward mechanism: the user can earn 'coins' from sustainable travel that can be exchanged for products in the app's 'shop'. In the study, the Smart Mobility application served both as a measuring instrument and as an intervention. More information about this research and the results can be consulted in the toolkit (Supplement 2.5 Sustainable travel behaviour and personalized feedback).

3. Prioritising

Step 2 elucidates the factors that hinder or stimulate the target behaviour. In Step 3, this longlist of behavioural factors is refined to a shortlist of factors that are most likely to be influenced in one or more interventions aimed at changing behaviour. Factors that have a relatively large impact on the target behaviour and are relatively easy to influence are the most suitable for intervention. An intervention can be implemented by means of various behavioural techniques. These are concrete ways in which the behavioural factors can be influenced. The decision about which behavioural technique to use depends on the behavioural factor, the target group, and the resources available for the intervention. For each behavioural factor, it is possible, using various sources (evidence-based tables), to identify behavioural techniques that form the basic ingredients of a behavioural intervention. The research group has selected various behavioural factors and behavioural techniques for changing behaviour.

3.1. Determine behavioural factors

The previous phase has yielded a multitude of determinants that influence the target behaviour. In this phase, the behavioural factors are selected that are most suitable to influence the target behaviour with an intervention. Not all factors have the same impact or can be influenced as effectively. By identifying

the factors that potentially have the greatest impact and/or can be influenced, one can get a clear picture of the behavioural factors on which the intervention should focus. To determine the most important behavioural factors, first it is important to have a good overview of the factors under which the target behaviour comes about. This overview is the result of Step 2, Mapping. Subsequently, the following questions are asked: Which factors have the greatest impact on the target behaviour? Which factors can be influenced (so that they promote the target behaviour)? If a factor has an impact on the target behaviour but can hardly be influenced, it is not an obvious behavioural factor to work with. This also applies to a factor that can be influenced relatively easily, but whose impact on the target behaviour is negligible.

To estimate the impact of the factors on behaviour, the first step is to look at the available data. The literature, for example, can give an indication of the size and robustness of the effects through effect sizes or frequently replicated results. Field research can also give an indication of the importance of a factor; for example, when a factor is repeatedly mentioned by participants or when participants indicate that something has a major impact on their behaviour. The research group has identified several behavioural factors that are important for a shift from polluting to more sustainable travel movements. Based on statistical analysis of survey results and interviews, a selection was made. The insights and recommendations based on these findings have been compiled in a memo and a presentation, which can be found in the toolkit (Supplement 2.3 Memo and 2.4 Presentation eHUB Outcomes Amsterdam and Leuven).

To arrive at a selection of suitable behavioural factors, information is ideally gathered from multiple sources (literature, field research, expert interviews, etc.). This makes the decision on the most suitable behavioural factors an iterative and intuitive process. To ensure the validity of the results as much as possible, it is advisable to use multiple sources and to involve (fellow) behavioural scientists in the selection and weighing process. Several approaches are possible to answer the question: what are the most important factors that cause or inhibit the target behaviour? You will find instructions on how to prepare and organise a convergence session that focuses on the selection of appropriate behavioural factors as part of the toolkit (Supplement 3.1 Worksheet Prioritising Behavioural Factors). The outcome of this process depends on the target behaviour, the target group, and the context in which behavioural change is desired. Research in Amsterdam revealed that prioritising behavioural factors yields the following selection that has been elaborated in behavioural techniques. Perceived usefulness is a very important factor. Many car owners do not see the utility of electric shared transport for themselves. In an intervention, it would be good to appeal to their gain motive (what is in it for them) and their normative motive (what is in it for society). The social norm also emerges as a promising factor. Finally, people's confidence in their ability to use electric shared mobility and their trust in the mobility providers is also of importance.

3.2.   Select behavioural techniques

Once the behaviour has been mapped and the shortlist of the most important behavioural factors has been determined, then a number of influencing techniques can be chosen that fit with the behavioural factors to bring about behavioural change. Often, several behavioural techniques are possible for one behavioural factor. The behavioural techniques form the strategy for influencing the behavioural factors that have the most effect on the target behaviour and therefore form the basis of the intervention. For many behavioural factors, the literature describes possible behavioural techniques (intervention

methods) that have been tested in other research (see, for example, Kok et al. (2015)[2] for an overview of intervention methods). Several tables can be used for behavioural factors with corresponding behavioural techniques as found in the Kok et al. (2015) article: 'A taxonomy of behaviour change methods: An intervention mapping approach', or: 'The behaviour change technique taxonomy (v1) of 93 hierarchically clustered techniques: Building an international consensus for the reporting of behaviour change interventions' by Michie et al. (2013)[3]. Find the behavioural factor in the table and study the behavioural techniques described there. When using the table, pay attention to the conditions under which the methods can be used.

For a behavioural change method to be effective: (1) it must target a determinant that predicts behaviour; (2) it must actually be able to change that determinant; and (3) it must be translated into a practical application in a way that preserves the conditions for effectiveness and fits the target group, culture, and context (Kok et al., 2015). This is because these behavioural techniques are often still described in the abstract and need to be further specified to use them properly in a concrete intervention. In this phase, it is also useful to involve the client to coordinate the feasibility of the techniques. This could include agreement on the budget and how much freedom there is to actually intervene in the reality of the target group. This step can also be used to think about how to secure or expand the intervention if it proves to be effective. In step 6 (safeguarding) you will follow up on that.

Perceived usefulness emerged as an important behavioural factor for the mobility behaviour of car owners. Car owners generally indicated that they do not see the benefit of electric vehicle sharing for themselves because their mobility needs are already met. The perceived usefulness for shared transport is therefore low. Perceived usefulness is related to people's profit motive, normative motive, and hedonistic motive. During the mobility study (described in Step 2), one of the objectives was to increase perceived usefulness through the gain motive. To this end, various behavioural change techniques were selected and elaborated into various messages that participants received during their participation in the study. An example of the techniques used and elaboration in text can be found in the toolkit (Supplement 3.2 Techniques Used).

4. Designing

From the previous phases, the most important determinants that influence the target group's behaviour have been identified. In the prioritising phase, the influencing techniques (an overview of possible influencing techniques is given by Michie et al., 2014)[4] that fit the determinants are ascertained. In the design phase, the actual intervention is designed, and a prototype is created that can be used for testing. A prototype can be hugely diverse, ranging from, for example, a communication expression with social norms, to an app that provides feedback, to a nudge in the physical environment.

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[2] Kok, G., Gottlieb, N.H., Peters, G.-J. Y., Mullen, P.D., Parcel, G.S., Ruiter, R.A.C., Fernández, M.E., Markham, C., Bartholomew, L.K. (2015). A taxonomy of behavior change methods: An intervention mapping approach. Health Psychology Review. DOI: 10.1080/17437199.2015.1077155

[3] Michie, S., Richardson, M., Johnston, M., Abraham, C., Francis, J., Hardeman, W., Eccles, M. P., Cane, J., Wood, C.E. (2013). The behavior change technique taxonomy (v1) of 93 hierarchically clustered techniques: Building an international consensus for the reporting of behavior change interventions. Annals of Behavioral Medicine. DOI: 10.1007/s12160-013-9486-6. PMID: 23512568

[4] Michie, S., Atkins, L., West, R. (2014). The behaviour change wheel: A guide to designing interventions. London: Silverback; 2014

4.1. Develop a behavioural intervention

The chosen intervention techniques can steer the development of intervention concepts (elaborated ideas) aimed at the target behaviour and the target group. In this phase, research results are translated into a tangible intervention. When coming up with ideas, do not look only at the influencing techniques for inspiration; you can look at the interventions that already exist or be inspired by interventions in an adjacent field.

A first step in developing the intervention is to come up with ideas whereby the question "How can you influence people's behaviour through an intervention in such a way that they start to show the target behaviour?" is at the heart of the brainstorming session. This can also be done in cooperation with a design agency, the target group, or other stakeholders. A guide that can be used for a first behavioural intervention brainstorming session can be found in the toolkit (Supplement 4.1 Brainstorming intervention ideas).

Finally, the ideas are assessed for feasibility (in terms of time and costs) and estimated effectiveness in influencing the target behaviour. When designing an intervention, it is important to go back to the goal of the project and to consider the preconditions that have been set. When choices for an intervention direction are made, the ideas can be further developed and combined into concepts (see Figure 3 for three concepts developed in a Smart Mobility app project). Finally, a decision has to be made about the concept (or concepts) that will be developed into a prototype, based on the conditions set (requirements, preconditions, wishes). In this phase, it is wise also to determine which party can carry out the intervention: an intervention via an app needs different expertise than an intervention in the form of a media campaign.

Figure 3: Three concepts developed as part of a Smart Mobility app project for the municipality of Amsterdam.

Concept I - Tip of the day

Push notificationn with "tip of the day"
+ Visible, attention to app "trigger"
+ Breaking down complex action into small (daily) steps
+ Personal message (based on info from app? Walked a lot > reference in tip?) > Attentional bias
+ Tips aimed at shared transport modes including various determinants
   hedonism: interesting cycle route through/near Amsterdam with museum discount.
   Profit: information on costs of shared transport in comparison with public transport/own car.
   Normative: film clip of well-known Amsterdammer, etc.
- Easy to ignore/irritating
- Push notifications must be anabled

Alternatives
• Message in application (under my profile?) in combination with badge notification
• E-mail

Behavioural determinants in concept
Attentional bias
Perceived usefulness - Profit motive
Perceived usefulness - Hedonistic motive
Perceived usefulness - Normative motive
Self-efficacy
Environmental influences and resources
Awareness of eHub
Multimodal travel
Previous use of shared transport
Breaking with routine

Concept II - (Social) challenge
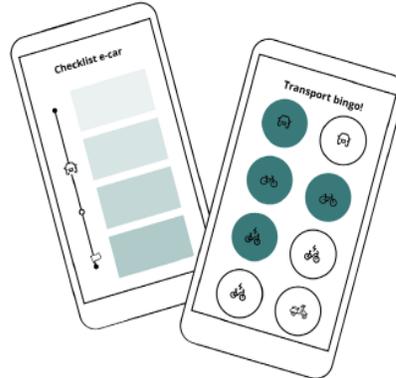
Offer challenges/activities with shared mobility

+ Invite someone from the app to a trip using shared mobility (e.g. day at the beach, to a museum outside the city, bike ride, event) > self-efficacy, hedonism, possibly profit (discount)
+ Transport bingo with delighters (confetti if you have a full row) > hedonism
+ Checklist (completion) for use of shared car > certificate, badge, sticker
+ Challenges based on information in app: save XXgr CO2 this week, use 1 shared car, etc.

Behavioural determinants in concept
Attentional bias
Perceived usefulness - Profit motive
Perceived usefulness - Hedonistic motive
Perceived usefulness - Normative motive
Self-efficacy
Environmental influences and resources
Awareness of eHub
Multimodal travel
Previous use of shared transport
Breaking with routine

Concept III - Information in App

Tab dedicated to shared mobility
+ Location of shared vehicles
+ Short videoclips on the use of shared mobility
+ Information per vehicle including step-by-step explanation (all existing information conveniently arranged on a separate tab "shared transport")
+ Experiences of other people, possibly also of "famous Amsterdammers"

- How do you ensure that people actually look there? Can this be measured? Send notification/mail if people do not look?

Behavioural determinants in concept
Attentional bias
Perceived usefulness - Profit motive
Perceived usefulness - Hedonistic motive
Perceived usefulness - Normative motive
Self-efficacy
Environmental influences and resources
Awareness of eHub
Multimodal travel
Previous use of shared transport
Breaking with routine

4.2. Build a prototype

When the interventions have been thought out in sufficient detail, a prototype can be developed, or the intervention descriptions can be transferred to an external party. Prototyping an intervention means testing the intervention on a small scale. It is recommended that the persons who were initially involved in developing the intervention concepts remain involved in the development to ensure that the prototypes address the behavioural factors appropriately. The exact form of the prototype and the next steps to be taken depend on the preliminary research, time, and budget. In many cases, the creation of a prototype is outsourced to a design agency.

An example of a prototype for eHUBs is the information columns developed by communication bureau Byron in collaboration with the behavioural advice bureau Dijksterhuis en van Baaren (D&B), see Figure 4. The columns were intended to increase the self-efficacy of potential shared transport users by communicating a clear step-by-step plan. Before the columns were deployed on a large scale, they were first tested by placing a column at several eHUB locations and comparing these with eHUBs without columns. The test showed that the columns made it easier for people to recognize the eHUBs and to understand how to use them, and columns were subsequently deployed at more locations.

Figure 4: D&B information and instruction sign eHUBs in Nijmegen

5. Intervening

The intervention phase is the actual implementation of the behavioural intervention with the aim of changing people's behaviour. The exact steps in this implementation phase depend on the type of intervention that is designed.

By intervention, we mean the best way to bring about the desired target behaviour. Setting up eHUBs can be seen as an intervention in itself. By offering attractive alternative means of transport, it encourages citizens to embrace behavioural change. The goal of placing an eHUB in a neighbourhood is that people will use fewer polluting private cars and more clean electric shared cars. To encourage sustainable travel, the municipality of Amsterdam launched an intervention called: "Amsterdam travels smart', with the use of a Smart Mobility app (Fynch). This intervention was recently investigated by the research group. The Smart Mobility app serves as both a measurement tool and an intervention and was introduced in Step 2 (Mapping). See the toolkit for more information on the intervention and our investigation of its effects on behaviour (Supplement 2.5 Fynch Products).

To stimulate the use of eHUBs, new interventions can be implemented in their own right. In a poster included in the toolkit, ten recommendations are given to promote the use of eHUBs (Supplement 5.1 Ten recommendations). Various influencing techniques are discussed in the poster. The techniques respond to psychological mechanisms with the aim of influencing behaviour.

5.1.   Implement interventions

In this phase, the intervention is implemented and goes live in the real world. As mentioned, the steps to be taken depend very much on the type of intervention. However, there are some generalities to consider.

• Planning: The implementation of an intervention in practice is difficult to predict. Practice-based research takes place in the reality of everyday life. For example, parties may withdraw unexpectedly. Interventions in public spaces can be destroyed by vandalism. Or think, for example, of acute Covid-19 measures. It is important to be flexible in dealing with changing circumstances. Therefore, always have a Plan B.

• Local differences: A small difference in the environment or situation can have a big effect on the functioning of the intervention. Therefore, pay attention to local differences. It is important to identify in advance the aspects and characteristics of the local environment that might affect the effectiveness of the intervention.

• Take a wider look at the municipality's policy: If the municipality is already doing something to stimulate electric shared transport, it is good to take this into account when implementing the intervention.

• Division of roles: It should be clear in advance who is responsible for carrying out the intervention. Does responsibility lie with the researchers or with the implementing party? It is important to clarify this in order to maintain the purpose of the intervention.

A worksheet regarding the above generalities for your intervention is available in the toolkit and includes a completed worksheet using the Fynch app as an illustration of how to fill it in (Supplement 5.2 Worksheet Intervention Implementation).

5.2.   Evaluate effects

To know if the intervention has worked, the effect has to be measured. This can be done in different ways depending on the intervention. These include pre- and post-measurement or the use of control groups. Often a mix of quantitative and qualitative evaluation methods is used, giving a combined result. However, please consider the advantages and disadvantages of each method. For example, with quantitative measurements, it is sometimes difficult to recruit enough respondents. This can result in margins of error in the data. Or circumstances may make it impossible to recruit a representative group of respondents because of selection bias. To be able to test whether the intervention has the desired effect, it is important to evaluate the effects.

For example, this report, included in the toolkit (Supplement 5.3 Sentiment Analysis), shows an analysis of City of Amsterdam's sentiment ad campaigns over 6 neighbourhoods: Per neighbourhood, the campaign had 6 sentiment frameworks with each 1 sentiment ad. This way, we could see which kind of frames were most effective for each neighbourhood. There was a minimum of 3,000 impressions for each of the ads.

6. Safeguarding

When the intervention phase has been completed and if the intervention has been effective in stimulating the desired target behaviour, you will arrive at the sixth step of the research process – Safeguarding. In step 3 (prioritising) you thought about how to sustain the target behaviour and, if necessary, how an intervention can be followed up or expanded. In this step (safeguarding) you are going to make it work.

In reality however, thinking about the perpetuation of target behaviour often does not receive the attention it deserves or is skipped altogether. As a result, independent initiatives follow one another without a clear connection to the target behaviour. In the end, this is more expensive and less effective in changing behaviour. Because the client of the intervention may benefit the most when people change their behaviour permanently, it is ultimately up to the client to determine the extent to which the new behaviour should be perpetuated, what follow-up steps are needed, and which stakeholders should be involved.

6.1. Sustain target behaviour

However, it is always possible that an intervention does not have the desired effect or is only effective temporarily in stimulating the target behaviour. In that case, it is worth going back a few steps and examining what caused the intervention to be ineffective. For example, an intervention may initially aim to break the habitual behaviour first, but establishing a new good habit usually requires even more commitment. The effect of an intervention may fade as time goes on, causing people to lapse into old undesired behaviours, for example when gamification is used as an intervention technique. Gamification is a way to get people excited about changing behaviour through the use of game elements. Stimulating the use of eHUBS through gamification could include, for example, the introduction of an eHUBS challenge in which different teams from an organisation compete against one another to become the 'best' eHUBs user team.

At the beginning, the intervention is still new and therefore fun, entertaining, and interesting. However, when people are exposed to the intervention over a longer period of time, habituation occurs and the intervention may no longer be stimulating or effective enough. Therefore, when securing the desired behaviour, it is important to also take into account what the long-term effects of your intervention might be and to what extent something needs to be added to the intervention to prevent people from slipping into their old habits.

It may also happen that the intervention successfully influences behaviour but, once the intervention period ends, the desired behaviour does not persist; for example, when a reward is associated with the desired behaviour during the intervention period and the reward is dropped when the intervention ends. In the case of stimulating correct use of eHUBs (handling vehicles neatly and parking correctly), one can choose to work with rewards and punishments to achieve such a behaviour change. For example, shared transport providers like Check and Felyx work with a reward system to reward correct parking behaviour of their shared e-scooters. On reaching 10 points through correct parking behaviour, the Check user gets the next ride for free. According to Check, the reward system is effective in encouraging correct parking – complaints about incorrect parking behaviour decreased by 40% (Check, 2021)[5]. However, the question is whether the desired behaviour sticks when the extrinsic motivator of a free ride is no longer present. Working with extrinsic motivators such as rewards can undermine intrinsic motivation over time – for example, a person may become convinced that it is not worth performing the behaviour when they no longer receive a reward for it. Therefore, when safeguarding an intervention, it is important to consider the effects on behaviour when the intervention technique is no longer present and to think about how to make a connection between the desired behaviour and people's intrinsic motivation in order to perpetuate the behaviour. In all cases – whether the intervention is effective for a long time, only

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[5] Check. (2021). Coins zorgt voor 40% minder klachten over foutgeparkeerde scooters. Retrieved 26 April 2022 from https://ridecheck.app/nl/newsroom/coins-zorgt-voor-40-minder-klachten-over-foutgeparkeerde-scooters

temporarily, or not at all – it makes sense to think about what the next steps should be. To know exactly what follow-up steps are needed in a specific situation, it can help to look into the flow chart included in the toolkit (Supplement 6.1 Flowchart Safeguarding).

6.2.   Scaling up the solution

If an intervention works well for a certain group or case and the target behaviour is desired in more places, a decision can be made to expand the intervention to new places. It is important to realise that an intervention may be specifically designed to fit a specific target group in a specific situation. It is not necessarily guaranteed that an intervention will maintain its effectiveness in a new context and for a different target group. It is therefore important to think carefully about how differences in the new situation may affect effectiveness. The previously mentioned example of an eHUBs challenge could also be used with new organisations after successful implementation – in that case the intervention would be scaled up. However, it is questionable whether the game element of a challenge is equally motivating for every team. After all, not only do people differ in the extent to which competition motivates them, but also the degree of closeness or cohesion within teams can play a decisive role in the success of the upscaled intervention. In other words, when scaling up a solution, it is always necessary to study carefully in advance the extent to which the new situation differs from the current situation (circumstances, time, and target group) and whether or not the specific intervention might be appropriate. In order to know exactly which follow-up steps are needed in this situation, it can help to look at the flow chart mentioned in 6.1 (Supplement 6.1 Flowchart Safeguarding).

Depending on how specific or how generic an intervention is, it can be implemented on a larger scale after some modification. This generally involves more people than the initial smaller-scale intervention. In some cases, it may be desirable to appoint a third party to carry out the implementation. However, this usually means that the final implementation is distanced from the team that originally developed the intervention, and there is therefore a greater risk that the effective elements of the intervention will not be fully or correctly implemented. Therefore, in this phase, it is once again important to ensure a good transfer of the effective elements of the intervention. In addition, there is value in being involved in a more controllable and monitoring manner during the process to ensure that the implementation is conducted on the basis of behavioural science supported methods.

Conclusion

Shared transport (eHUBS) is considered a promising innovation with the potential to solve several contemporary urban mobility problems. In order to maintain and improve accessibility, air quality, and liveability of cities in the future, a transition from fossil fuelled transport to clean shared transport needs to take place. Although technological possibilities and economic opportunities are necessary to enable the use of shared mobility at first, transition science and behavioural science teach us that these aspects alone are not enough to shift people's behaviour towards more sustainable modes of action. To promote the use of shared transport (eHUBS) – and to reduce fossil-fuelled transport – it is important to take into account the most important drivers and barriers for human behaviour. Knowing what motivates people to use this cleaner form of transport, and what keeps them from using it, ultimately determines the success of shared transport interventions in resolving urban challenges.

The materials in this toolkit have been designed to guide cities through the essential steps for facilitating the desired behaviour change. By first determining the kind of mobility behaviour that is actually needed

to solve the challenges a certain city faces and what current behaviour the target group needs to change (Step 1), a city is ready to dive more deeply into the specific drivers of, and barriers to, the desired behaviour (Step 2). Next, guiding them through the process of choosing the most relevant behavioural determinants (Step 3), examples of successful interventions and instructions are given to help cities think of interventions that target the relevant behavioural determinants of their target group (Step 4). Finally, cities are guided through the step of actually implementing an intervention, evaluating whether it has been effective (Step 5), and deciding what steps are needed to sustain the behaviour change in the long term (Step 6).

We hope that, by explaining the necessary steps for behaviour change and providing instructions and relevant examples, this toolkit will help cities realise all the benefits that shared transport has to offer.

The eHUBS Consortium

The consortium of eHUBS consists of 20 partners with multidisciplinary and complementary competencies. This includes European cities, leading universities, networks and electric and shared mobility providers.

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