EMPOWER

EMPOWERING a reduction in use of conventionally fuelled vehicles using positive policy measures

Grant agreement n°: 636249
Start date: May 1st 2015
Duration: 36 months
Area: Mobility for Growth: Societal Challenges
Project Officer: Mr. Walter Mauritsch

Living Lab Plan

Deliverable 5.1

Version: 1.0
Due date of deliverable: June 30th, 2016
Actual submission date:
Dissemination level: Public
Responsible partner: UTWENTE

Funding for the EMPOWER project has been provided by Horizon2020 Programme from the European Commission

A Summary

The Living Lab Plan introduces the EMPOWER approach to those who are looking for guidelines towards designing an incentive scheme in an experimental Living Lab. This approach has been applied to the design of four EMPOWER Living Labs in Enschede, Gothenburg, Helsinki and Manchester. The EMPOWER approach takes the local context (the ecosystem) as a basis to design an integrated incentive scheme. This design follows the nine steps of the EMPOWER Living Lab Design Cycle:

Problem definition – This is the point to start the design. If no problem exists, there is no reason to intervene.

Rough idea – Typically, there is a basic plan to start with based on on-going activities in a city. This way, the design doesn't start from scratch.

Business model – The key interest to achieve sustainability of the scheme is the involvement of stakeholders and a value proposition for each.

Target group – This is the group of people whose actions (in response to incentives) can have an impact in terms of relieving the problem. A clear definition of the target group is essential for the following steps of the design.

Planned interventions – To make the intervention as effective as possible. Within the scope of EMPOWER the focus is on the distribution of positive incentives to create a behavioural change.

IT services – The second EMPOWER focus is the automated delivery of the incentives through ICT services. The requirements for these services are based on the local plans derived from the previous steps.

Marketing and communication –As a substantial user base is a condition for successful results, sufficient marketing and communication efforts should be organised.

Operation – A solid operational set up should be organised that takes care of the user, incentive and data management and is essential for an integrated service setup.

Evaluation – To be able to evaluate the effectiveness of the scheme, the collection of essential data has to be organised up front

The following four EMPOWER Living Labs are as follows:

Enschede – The capital of the Twente Region in the Netherlands. The EMPOWER partners involved are the University of Twente (main Living Lab Operator) and the Municipality of Enschede. The focus in Enschede is on reducing conventionally fuelled vehicle mileage (CFV-mileage) by substitution of the shorter trips by bicycle. The linking of an existing behavioural change app (including its operational organisation) to the local employer network is the anticipated way forward to the operation of an integrated, sustainable scheme.

Gothenburg – The capital of the county of Västra Götaland in Sweden. Viktoria Swedish ICT is the managing partner from EMPOWER. Strong ties have been developed with the HASS innovation project (where the Gothenburg Region is one of project partners) with the objective to offer

incentives for using new mobility services. In order to stimulate the use of these services, EMPOWER focuses on the introduction of a point-based incentive scheme in co-operation with local stakeholders.

Helsinki – The capital of Finland. Forum Virium, the development agency of the municipality, is the Living Lab Operator. Helsinki aims to create a sustainable business model in which employers supply the (financial) incentives for the employees to travel in a more sustainable manner. The savings on commuting costs reimbursements is a great driver for employers to get involved in this scheme, as in Finland these are generally given to employees. By converting these savings into financial incentives for the employee, the business case is made solid

Manchester – The third largest city in the United Kingdom. The University of Leeds is the EMPOWER partner involved in the lab. In Manchester, the aim is to reduce the CVF-mileage through the substitution of car trips by bus journeys. A reward scheme has been designed in close cooperation with the local bus operator, linking the use of bus to an existing loyalty point scheme. The reward scheme runs parallel to investments in both infrastructure and vehicles for a new high quality bus route.

Despite the four Living Labs all having their own local characteristics, the common aspect is that all Labs aim to distribute positive incentives using ICT services in order to influence behaviour and reduce the use of conventionally fuelled vehicles. The involvement of local stakeholders is one of the main challenges, but a crucial prerequisite to create a sustained EMPOWER legacy.

B Document Information

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Deliverable

Work Package	5
WP Name	Experimentation and show casing
Deliverable	5.1
Name	Living Lab Plan

History

Version	Date	Changes
V0.1	10-3-2016	Initial setup
V0.2	17-5-2016	Alignment cross LL + finalising index
V0.3	24-5-2016	Setup of Living Lab chapters
V0.4	6-6-2016	First major draft of Living Lab chapters based on working documents
V0.5	8-6-2016	Wrapping up with open ends
V0.6	9-6-2016	All chapters finalised
V0.8	11-6-2016	Smoothing layout, numbering of figures, references, etc.
V0.9	13-6-2016	Ready for internal review
V1.0	30-6-2016	**Final version**

Distribution

Date	Recipients	Action
2016-06-13	EMPOWER Internal reviewers	Draft for comment
2016-06-23	EMPOWER partners	
2016-06-30	EC	Submission of finalised report

C Overview of Deliverable

Deliverable no:	D5.1	Deliverable Name:	Living Lab Plan	Deliverable Type:	Report
				Deliverable Format:	A

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2	Abstract
	This deliverable elaborates and illustrates the nine steps of the EMPOWER Living Lab Design Cycle in order to make the methodology available for application in the design of other labs. These nine steps are: Problem definition; Rough idea; Business model; Target group; Planned interventions; IT services; Marketing and communication; Operation and Evaluation. These nine steps could be a basis for designing any Living Lab ecosystem that aims to use positive incentives to create a behavioural change in a mobility context. The four Living Labs established within EMPOWER have a common aim to experiment with the distribution of positive incentives through ICT services. These incentives aim to create a behavioural change and reduce the use of conventionally fuelled vehicles. Alongside this common aim, each Living Lab has its own characteristics. The Living Labs are operated in Enschede, Gothenburg, Helsinki and Manchester.

3	Relation to other WPs
WP 1 & WP 2	Work packages 1 and 2 focus on the best practice of incentive design and social innovation. Both work packages have delivered a systematic review of literature which gives evidence and guidelines for the design of incentive schemes. Based on the reviews, micro level experiments are being carried out. The successful outcomes from these experiments will be scaled up in the Living Labs.
WP 3	Business model development within WP3 has been based on individual workshops held in each Living Lab city. This accelerated the process of stakeholder involvement. Based on the workshop discussions, the value for the different stakeholders became clearer and the basis for a longer term business model emerged. This result was the starting point for the Living Lab, from which we will work towards a continuation of the incentive scheme after the project life time. A further round of business model design will take place based on the experiences in the Living Labs.
WP 4	The software tools delivered by work package 4 have been designed in close cooperation with the Living Lab representatives in order to provide as close a match as possible to the requirements specified. These tools will be used to test the different incentive schemes in the Living Labs,
WP 6	Work package 6 will carry out the evaluation of EMPOWER, where the main task is an impact assessment of the different incentives used in the Living Labs. This work package will also look into the effectiveness of incentives, based on the different experiments undertaken throughout the project. The Living Lab provides this work package with data needed from both the before and the after situation.
WP 7	The results of the Living Labs will feed into the dissemination in work package 7. There is also a strong relation between the Living Labs and the Take-Up Cities, where the Living Labs will support the Take-Up Cities with guidelines, experiences and good practice whenever possible. This deliverable gives design guidelines which will be used by the Take-Up Cities.

4	Challenges and Risks
	The main challenge in the planning of Living Labs is to maintain momentum and work within the timetable constraints, particularly where non-project partners are involved in the process. When entering the operational phase, challenges are probably mostly related to recruitment (offering value to users) as well as the operation of the system over a longer stretch of time.
5	**Deviations from the proposal (positive and negative)**
	N/A

Table of Contents

1. Introduction

This document presents the EMPOWER Living Lab Design Cycle and elaborates on the four EMPOWER Living Labs, established in Enschede, Gothenburg, Helsinki and Manchester. This structured approach helps those who are about to start their own living lab. Within EMPOWER, different schemes and interventions will be trialled in the aforementioned Living Labs .

Beside the four Living Lab cities, seven Take-Up Cities (TUCs) have been selected and became part of EMPOWER. All eleven cities deliver incentives through an IT-service with the objective to reduce the use of conventionally fuelled vehicles and stimulate the use of sustainable transport modes. The Living Labs have a stronger focus on research, enabling several smaller scale experiments next to the introduction of the service, whereas the Take-Up Cities focus on rolling out an incentive scheme without a lot of experimentation.

The four EMPOWER Living Labs are in Enschede, Gothenburg, Helsinki and Manchester. The seven Take-Up Cities are Antwerp, Bologna, Budapest, Milan, Newcastle, Odense and Reading.

Figure 1.1 – Map of the Living Labs (circles) and Take-Up Cities (squares).

1.1 Goals and contribution to other tasks and deliverables in EMPOWER

The goals of this deliverable are to:

- present a structured approach to design Living Labs: the EMPOWER Living Lab Design Cycle;
- present the plans for the four Living Labs;
- share lessons learnt from the design process.

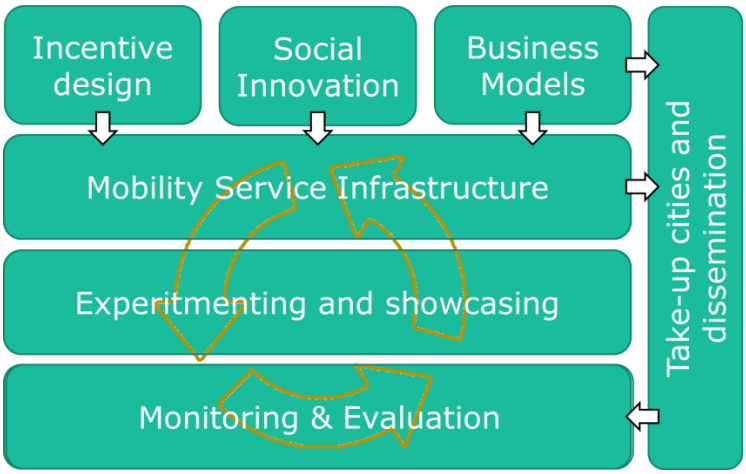

Figure 1.2 – Living Labs as central part in the EMPOWER work

The Living Lab plans have been developed in close relation with all other activities within EMPOWER. As shown in Figure 1.2, insights and results from Incentive Design, Social innovation and Business Models feed into the iterative design process in which Mobility Service Infrastructure, Living Lab and Monitoring & Evaluation interrelate. Simultaneously to the experiences in the Living Labs cities, the knowledge, tools and design experiences are shared with Take-Up Cities.

1.2 Main results and innovation

The deliverable focusses on the design process in the different Living Labs. The main output is the structured approach in this process and the considerations around choices to be made in the design. For the four Living Labs, the schemes to be implemented are presented based on this approach.

The next step, the actual implementation of these schemes, contributes to the main innovations of EMPOWER. The implementation results will be reported in D5.2 Living Lab Report, due in May 2018.

EMPOWER innovation output	Contribution of this deliverable
New EMPOWER mobility services to provide innovative positive policy measures	The requirements for the EMPOWER mobility services are (partly) a result of the design of the Living Lab implementations.
The EMPOWER toolkit that aims to support different stakeholders to choose and implement positive policy interventions in urban areas	Lessons learnt in the design process feed in to the toolkit as guidelines for different stakeholder to keep in mind during the design of positive incentive schemes.
Evidence of the impact of new positive incentives on behaviours	The (to be implemented) incentive schemes contribute to the evidence of the successfulness of the implemented incentives.
New and improved organisational models for successful implementation of positive policy measures	The (to be implemented) incentive schemes contribute to the understanding of how to organise an incentive scheme ecosystem.
Innovation in the evaluation method for new mobility services	-

Table 1.1 - Contributions of this deliverable to EMPOWER innovation outputs

1.3 Document structure

This document consists of three main parts: the EMPOWER Living Lab design cycle, the four Living Lab plans and the Lessons Learnt from this design process.

Chapter 2 starts by describing the EMPOWER Living Lab design cycle for setting up a Living Lab trialling new ICT-enabled incentive schemes. This starts from a high level perspective on the Living Lab ecosystem and drills down into the steps to take to detail the planned incentive scheme in terms of users, ICT-tools, intervention planned, evaluation criteria, etc.

Chapters 3 to 6 present the EMPOWER Living Lab plans of Enschede, Gothenburg, Helsinki and Manchester. Each chapter starts with a short introduction of the Lab ecosystem, including involvement of non-project partners and the management processes in place. The chapters end with the results of the EMPOWER Living Lab design cycle per Living Lab.

Chapter 7 concludes with the Lessons Learnt in this design process and reflect on to the legacy of the Living Labs; in terms of the ongoing activity at the Living Lab locations as well as knowledge transfer to other locations.

2. Living Lab Design Approach

This chapter describes the design of a Living Lab based on the EMPOWER Living Lab Design Cycle. With this, EMPOWER supports cities and organisations with design guidelines. First, we introduce the preconditions of a Living Lab ecosystem. Next, we describe the nine steps of the EMPOWER Living Lab Design Cycle in detail.

2.1 Living Lab ecosystem

When a local stakeholder wants to deliver positive incentives through the use of IT services in a Living Lab, three main aspects should be looked into before starting the design process: the background, the involvement of stakeholders and the management.

2.1.1 Background

The background consists of basic knowledge about the local situation. This includes the traffic situation, local policies and parallel projects. This knowledge will help the design in several ways. Alignment with local policies has a potential for synergy, being up to date about the traffic situation helps to create added value to the user, and working together with similar projects will ease any efforts towards involving stakeholders.

In the EMPOWER Living Labs, a local partner is involved for each of the Labs to ensure the close ties with the local situation.

2.1.2 Stakeholder Involvement

Involving stakeholders in the design process is essential to get a widely supported system up and running. For all roles that need to be fulfilled, a stakeholder or potential stakeholder should be on board early on.

Within EMPOWER, a key area of interest centres around the development of a sustainable business. It is foreseen that EMPOWER serves as a catalyst and that, after the project, other partners fulfil the necessary roles in the Living Lab ecosystem. Figure 2.1 shows an example of the roles to consider in a Living Lab ecosystem.

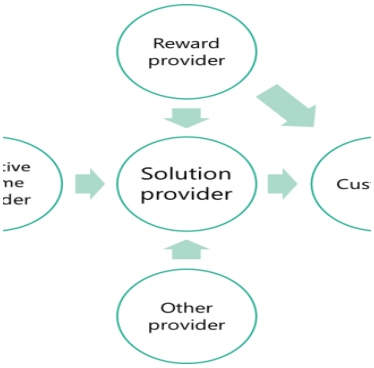

Figure 2.1 – Example of Living Lab Roles

Next to the organisational side of the Living Lab, users are essential in order to create the desired shift towards sustainable transport. Therefore, a clear value proposition is needed as well as a smooth experience with the provided services, and a sound message regarding the aims of the service. The EMPOWER Living Labs have a strong emphasis on this value proposition in the design phase, in order to get a large uptake of the service.

2.1.3 Living Lab Management

A key part of a sustainable model for incentives is to have the management roles and constraints in place. The Living Lab ecosystem needs a Living Lab Operator who brings different stakes in the ecosystem together and makes choices in the distribution of incentives. The manager is essential in this system, but quite often there isn't a clear value proposition for this role. Hjalmarsson (2015 (2) elaborates more about the management, organisational roles, and business models.

The manager has to enforce the existing policies. Most prominent in this case is the privacy framework. In line with the earlier research within the SUNSET project (Groenewolt et al, 2014); EMPOWER takes three approaches on privacy in different stages of the Living Lab:

- **A minimisation focus**. The collection of personal information is kept to a strict minimum in the design of the IT services and the Living Lab operation. Data anonymity is the default option for research-related analysis purposes.
- **An enforcement focus.** When users opt-in, personal data is protected by appropriate (technical and procedural) security safeguards against risks as loss or unauthorized access, modification or disclosure of data.
- **A transparency focus.** Users should be able to trust the system. EMPOWER Living Labs provide transparency to each user on how privacy preservation is ensured and what types of data are collected. Moreover, EMPOWER Living Labs provide user insight into all personal data gathered and a mechanism where user data is fully deleted from the system on request.

In line with the transparency focus, ethical considerations make informed consent essential in Living Lab work. Although the users should be treated as much as possible as regular costumers of the service, the fact that there data is used for research purposes makes it inevitable to inform them about the research taking place.

2.2 Living Lab Plan

In order to design sound Living Lab plans, we developed nine steps. Although depicted consecutive, this cycle is an iterative process where outcomes of previous steps might be reconsidered based on later steps. In the following paragraphs, we describe the nine steps of the EMPOWER Living Lab Design Cycle in detail.

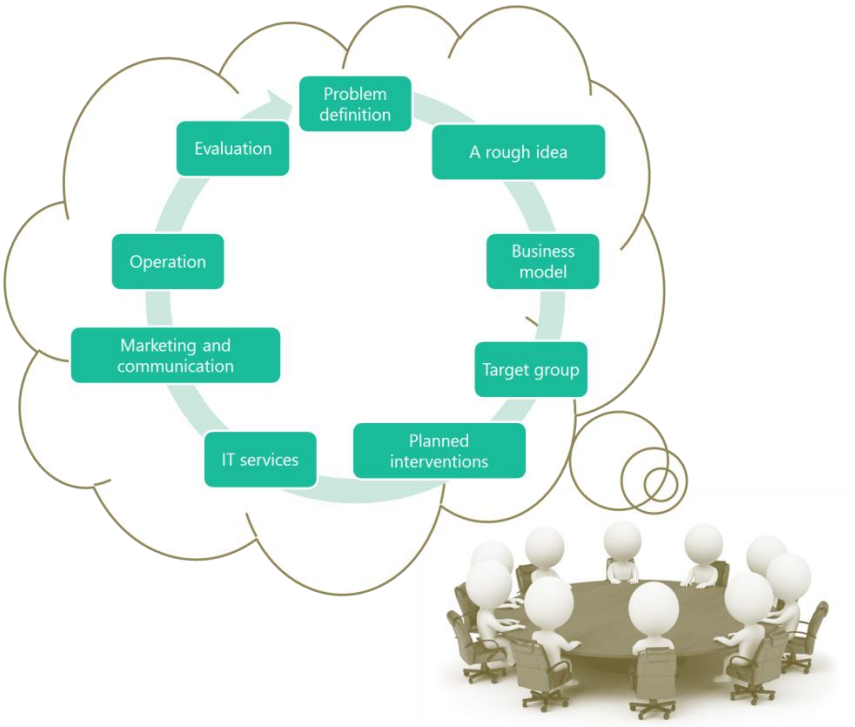

Figure 2.2 - EMPOWER Living Lab Design Cycle

2.2.1 Problem definition

- A wide range of stakeholders can experience urban mobility problems, which can trigger the idea to set up a Living Lab to try out solutions. For example: a municipality which faces highly congested roads in the morning peak;
- a service provide which has a (mobility) service available that helps to reduce the use of conventionally fuelled vehicles;
- an employer which faces a parking problem and wants to decrease the number of employees taking up the parking places;
- a public transport operator looking for new business opportunities by attracting car users to his service.

Only when someone feels there is a current sub-optimal situation, there is a trigger for change. Ideally the target group is experiencing this problem (e.g. car drivers experiencing delays due to congestion), as this way the need for the scheme is clear to all users. In other cases, there might be another stakeholder (e.g. the employer with a parking problem) which can contribute to a system which relieves their problem, in order to offer a benefit for the target group (and thus creating a trigger for change).

Within the problem definition, one or more Key Performance Indicators (KPI's) should be defined. This way the effect of the incentive scheme can be measured in the evaluation phase at the end (see 2.2.9). As different stakeholders have different objectives, a common vision of all partners involved caters for a smoother design process. When making design decisions, falling back on clear KPI's can be of great value.

2.2.2 Starting with a rough idea

Based on the problem and the related KPI's, the design of the incentive scheme will start with some rough sketching of the (proposed) scheme. Notions regarding target groups, stakeholders involved, interventions planned, IT-tooling needed, etc. will exist amongst the initiator; getting these on to paper helps to get a quick start.

During this step, all past experience and knowledge regarding the upcoming steps should be collected. The result is a first idea of what the scheme will look like and which open ends to further focus on.

2.2.3 Business model

During the entire design process, the business model should be considered. For the short term, (subsidised) project budgets can cover for start-up expenses (e.g. development of a solutions, tools, recruitment). But when the successfully trialled solution is to have a long-lasting impact, a (group of) partner(s) has to able to make business out of maintaining the solution.

In the review by Hjalmarsson et al (2016), ten key factors for successful incentive-scheme-based business models are defined.

An incentive-scheme-based business model should…

1. …include a strategic marketing approach to attract both users and incentive providers to the scheme.
2. …be viewed as an evolutionary process that involves continuous changes in the business model setup and also the organizational design.
3. …evolve in terms of the value proposition.
4. …be developed intertwined with the technical solution.
5. …be designed for a multisided market that goes beyond the dyadic relationship between one buyer and one seller.
6. …be a win+win+win enabler providing value to several different stakeholders and customers (service operator, incentive partners, and travellers).
7. …identify alternative and complementing commercial revenue streams when the system reaches a large user base, and only rely on operator funding in early stages.
8. …be developed based on available techniques and best practice.
9. …provide a comprehensive and attractive model for the business setup using a common vocabulary and taking "value" into account.
10. …be designed mindfully in respect to sustainability.

2.2.4 Target group

When the business model is set up, there is a general notion of which travellers are the customers of the service. This is the basis for defining the target group. A further definition can be made on a multitude of criteria.

Practical considerations for recruitment show three different approaches to the target group:

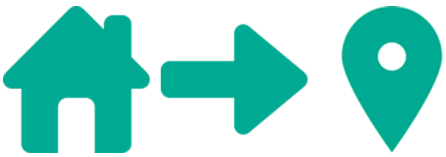

Figure 2.3 – Target group types

- **Origin**. This approach selects all people living somewhere. This can be a city, a neighbourhood, etc.
- **Route**. In this approach (part of) a route where the traveller has to travel is defined. One could think of a very specific definition: a congestion relieve scheme on an arterial road, as well as of a general case where you target all traffic in a city.
- **Destination**. In this case, all people with the same destination are selected. An employer sustainable travel plan is a typical example of this, where you recruit all employees working at a specific location.

Next to these groups, there are, amongst others, two characteristics to consider:

- **Socio-economic characteristics**. Targeting those people who are most likely to change behaviour. Either because they typically show the undesired behaviour or because they are most likely to change based on the incentive to be provided.
- **Past mobility behaviour**. If available, past mobility behaviour is a good criterion to select your target group on. This way, only travellers who show the undesired behaviour (e.g. car drivers on the arterial road) can be targeted. So you know all people in the target group have a potential to contribute to the solution.

2.2.5 Planned interventions

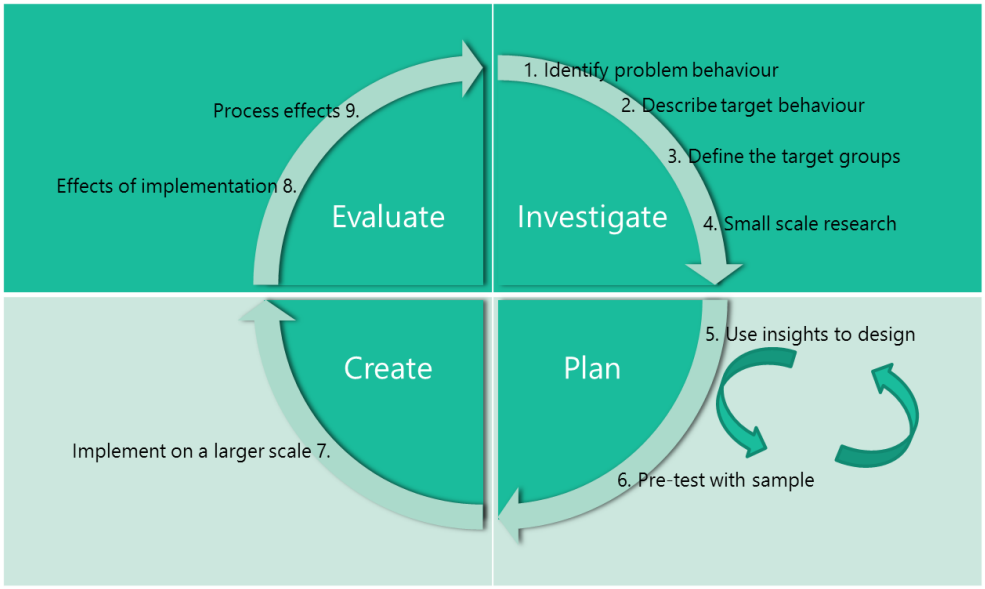

Figure 2.4 – Incentive design cycle

The planned intervention is a way to either relieve the problem of or create an additional benefit for the target group. The design of the intervention results in a type of (mobility) behaviour X that is rewarded with a benefit Y. Based on the small scale incentive design study in work package 1 and 2, the following process model is defined. This model shows some similarity with the Living Lab design process, but is focussed more on the research involved to see whether an incentive is successful. Organising some small scale trials before rolling out to the larger Living Lab target group is a valuable effort to take into account when designing the Living Lab whenever possible.

Sustainability of the scheme

Interventions can be one of two main types:

- Short actions to nudge people to new behaviour
- Long term added value to make the new behaviour more attractive

Nudging can be done for a longer period of time; in that situation it is a series of actions over time. The benefit of these actions is the limit resource needed for incentives. However, nudging only works for small changes where the alternative is (almost) within reach.

For long term incentives, the incentive provision is essential. When there is a good value proposition for an incentive provider, this type of intervention can create a more sustainable change.

Equity

When selecting travellers who qualify for an incentive, there are again two ways. Either base the incentive provision on past behaviour or reward everyone.

If rewarding based on past behaviour, one is able to actually only reward the changers. This creates most impact per distributed incentive.
However, equity considerations might suggest that treating all travellers equally might be a better choice. This way the impact is smaller, but the whole group (for instance all employees) are treated equally.

Sustainability of the impact

When people receive clear tangible benefits from the intervention (eg, money) the risk exists that this benefit become the new (perceived) driver for the behaviour. When the intervention end, the result might be a worse situation than the base case (eg, a cyclists who cycles because of health benefits, first gets used to a newly introduced monetary reward, and later might switch back to car when the reward is no longer in place).

User benefit

In order for the intervention to be effective, there need to be a clear message for the user; communicating a clear benefit. Based on the question "What's in it for me", the users shall decide whether or not to participate in the project.

Earlier research within the EMPOWER project has documented a systematic review of positive incentive-based interventions. This can be found in EMPOWER Deliverable D1.1 "Systematic review of positive interventions for sustainable urban mobility behaviour change" (Hof et al., 2015).

2.2.6 IT Services

The EMPOWER Living Labs deliver positive incentive-based schemes through the use of ICT. The Living Labs use existing and improved tools to deliver the right incentive to the right user at the right time and location. We refer to D4.1 Mobility Service Architecture (Vreeswijk et al, 2015) and D4.2 End-user Application documentation (Meeuwissen et al, 2015) for the types of services provided by EMPOWER. The use of these ICT-enabled services makes an automated incentive delivery possible, which enables the setup of a Living Lab which can handle large numbers of users.

In a successful living lab, there is an integrated ICT system which serves different purposes for different stakeholders.

- For the traveller, the main functions are to monitor behaviour, to be rewarded based on this behaviour and to receive information from the living lab.
- The Living Lab Operator wants to communicate with the user, to send out rewards based on the users behaviour and to have insights in the performance of the living lab (numbers of users, logging of incentive provision, etc.). Automation of the reward distribution is vital in these kinds of services, as the operator resources will increase rapidly if this has to be done manually.
- The reward provider wants to get business intelligence to base his reward proposal on. This typically includes socio-demographic characteristics of users as well as statistics on previously most interesting rewards.

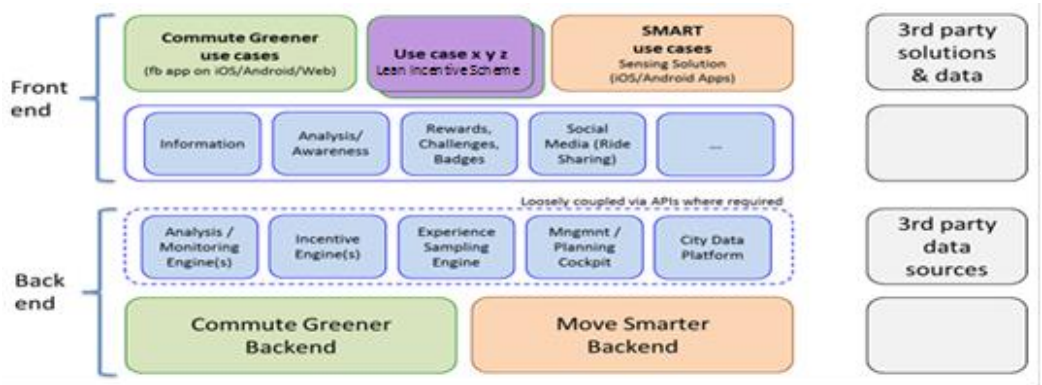

Figure 2.5 – EMPOWER Architecture

All services should be available in a closely linked or integrated system, as data flows from one to the other. Within EMPOWER the loosely coupled architecture approach (Figure 2.5) is used to deal with all these three aspects as needed. The focus is to work with already available tools as much as possible and see to link different system together where needed.

As software development is a big task if you'd have to start from scratch, the loosely coupled approach is the best way forward to deliver a Living Lab on the short term. In case new systems have to be developed, one should take sufficient time to develop, test, involve users and adapt, before a bigger roll out to the Living Lab is planned.

2.2.7 Marketing and communication

Besides rigorous planning and organisation, a basic requirement for the Living Labs is attracting people to participate. People, who perform the schemes, help to gather data, and in the end achieve results. Yet, attracting participants is not a straightforward matter. People are basically asked to change behaviour that is often rooted in daily patterns and habits. This does not only require an appealing value proposition; also, people have to be reached and motivated to join and stay so for the longer term. This is where marketing, or more specifically social marketing, comes into place. Social marketing relies heavily on traditional marketing theory yet distinguishes itself by what is being "marketed"; i.e. a behaviour change for a social cause such as CO2 reduction.

Applying fundamental marketing theory and the latest insights from marketing and digital marketing , we propose in EMPOWER to not only focus on the usual and rather "transactional" marketing principles such as who, what, and when, but also on four principles that support not only reaching people, but also motivate people to join:

- **Connection** means resonating with what the intended target group values in life. If people value their own health more than CO2 reduction, then health is the way to go in the marketing strategy; from communication to prioritising activities.
- **Presence** is being there at relevant occurrences in the lives of people (e.g. when an employer moves location; or provide information about the scheme at a local fitness club).
- **Efficacy** is about simplicity and easily executable actions; the target population has to feel no barrier to conduct the required behaviour. For instance "download the app" or "take the bicycle once this week" is a lot easier than asking people to completely abandon their car.
- **Recognition**: a recurring message and recognisable features help to plant the idea in people's head and create interest as it becomes more familiar. Think of repeating campaigns; but also using an ambassador for the scheme whom people trust and like to follow.

2.2.7.1 Tactical marketing plan

A tactical marketing plan is the link between a strategy (the aims of EMPOWER, the Living Labs and the schemes) and the actual marketing operation (from planning an event for recruitment to making flyers, etc.). What is needed to go from strategy to operation, is a solid plan which describes marketing activities themselves, but also who is responsible for the activity, what it costs, target figures, etc. A useful approach to creating such a plan, is by breaking the marketing process down in a few comprehensible steps. Per step, concrete actions can then be defined (and based on the four above-mentioned principles). The steps used in the EMPOWER Living Labs are:

- **Pre-launch**: the phase before the launch of the schemes themselves. From early surveys, focus groups, to teasers of what is coming and pre-sign-up are all ways to already gather some momentum among the population you eventually want to attract to the scheme.

- **Awareness**: just after launch of the schemes, a broad population is reached through more general triggers, such as a poster on a bus (Manchester LL). This already creates recognition for the next phases.
- **Interest**: a more targeted group is approached with more specific information, or an event perhaps that fits this group. For example, gift points for people who sign-up that have just moved house.
- **Action**: This phase turns more towards the active involvement of participants after initial recruitment. Continuous motivation to follow the scheme is not a given, and should be addressed by actions such as motivational feedback on performance.
- **Growth**: especially in the era of social media, the power of social spread online (for attracting more participants, getting feedback, influencing behaviour of non-participants, etc) should not be underestimated. Practical actions for achieving this type of growth are for instance giving bonus points for feedback or online referrals.

2.2.8 Operation

The operator of the Living Lab is a role which will quite often strongly relate to the manager. The manger makes sure the rules and regulations are in place, whereas the operator uses them to operate the Living Lab. Within the role of operator, three different aspects are drawn together:

- Users;
- Incentives;
- Data.

2.2.8.1 Users

Working with users generates interaction with these users after they are recruited. The aim is to retain all users by firstly taking away any dissatisfiers and secondly supporting the sense of community.

Taking away the dissatisfiers includes a proactive and a reactive part. Proactive management includes managing from a helicopter view to see what is going on in the Living Lab (e.g. noticing a peak in dropouts and acting upon it). Reactive management involves the operation of a helpdesk where users can ask any questions about the system. Depending on the size and nature of the lab, this can involve different channels (ranging from digital means to face to face contact).

Supporting the community includes any communication with the users not directly related to the incentives. This relates strongly with the growth phase of the tactical marketing plan, and includes presence on social media, sending out general newsletters and informing users about issues as planned IT maintenance, upcoming app updates, etc.

2.2.8.2 Incentives

The operator also takes care of the distribution of incentives. This is typically done by an automated system, but manual actions are needed in most cases. For instance the following activities:

- **Defining the specific incentive details.** Together with stakeholders choices have to be made in how many points which user should receive for what behaviour. This includes all choices from section 2.2.5: planned intervention.
- **Distributing rewards**. When tangible rewards are used, there needs to be a system in place which either ships these to the user or which allows a user to pick them up. To get towards a sustainable system, this should be as automated as possible. Involving existing loyalty schemes is a good way to relieve the effort of the operator on this task.
- **Guiding the Living Lab based on past experience**. The operator has the overview of what happened in the past and is able to act upon this information. Which incentives were successful in changing behaviour? Which where best received by the user?
- **Serving business intelligence to incentive providers**. Incentive providers get value based on the target group they serve. E.g. local shopkeepers might want to offer an incentive only to people living in the neighbourhood. The Living Lab Operator has insights in the target group and is the intermediary between the incentive provider and the user.

The actual tasks involved depend highly on the local situation.

2.2.8.3 Data

For all operating tasks, the operator has access to a lot a data. Within the privacy framework, the operator has to take care that all data is protected accordingly. Ideally, IT services are in place which help the operator enforce the regulations. This limits the risk of a data leak and still keeps functionality available. E.g. the operator could have a system to send an e-mail to all users, without having access to the individual addresses.

2.2.9 Evaluation

The evaluation takes place at different moments in time and allows for a check against the KPI's which are set up at the beginning of the EMPOWER Living Lab design cycle. There are several points to take into account when designing the incentive scheme, depicted in Figure 2.6.

- **Effect**. This links back to measurable KPI's. In order to measure, the definition of the indicator has to be as SMART[1] as possible.
- **Before and after**. In order to proof a change has taken place, an assessment of user behaviour (e.g. levels of cycling) before, during and after the intervention has to take place. As users are newly introduced to the service, data from the service itself cannot be used as base case.
- **Business-as-usual / Effects of other factors**. As the work is carried out in near-real-life conditions, the influence of the incentive provided is hard to filter out. To rule out the effects of other factors, for example bad weather, seasonal influences, assessing the targeted behaviour (e.g. levels of cycling) in a reference group of similar persons is needed. Also, it is very useful to have a bookkeeping system in place to track any other major activities in the Living Lab that might influence travel behaviour. This can include major

[1] In this case, SMART is the acronym of Specific, Measurable, Achievable, Realistic and Timely.

road works, extreme weather conditions, new infrastructure available, events which attract a lot of irregular travellers, etc.

- **Effect of measure**. Data is needed to measure the effect of the scheme. Ideally this includes insight in individuals' travel behaviour. Three main options are using a sensing app, tapping into a ticketing service or using a system for self-reporting. Table 2.1 shows some advantages and disadvantages of these systems. With all these systems, the effect can be measured at different moments in time to make variations over time visible. For instance the fading effects of an incentive or seasonal variations.

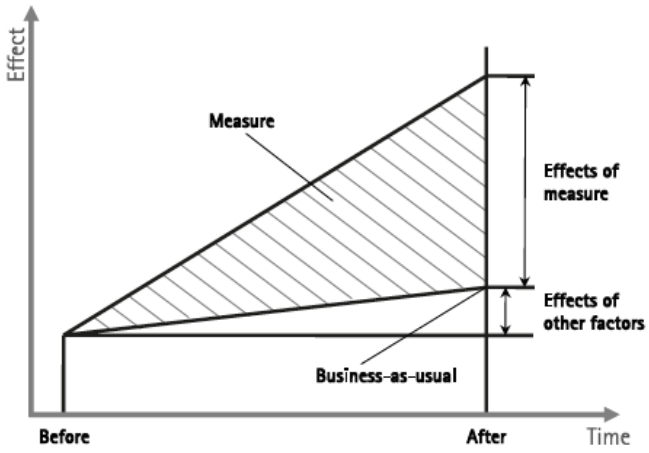

Figure 2.6 – Measuring the effect of an incentive scheme

	Sensing app	Ticketing system	Self-reporting
Adv.	• Including all modalities • High accuracy • Limited action by user	• No user input needed • Low costs as it uses an existing system	• Including all modalities • Technically easy system
Disadv.	• Technically complex system • Smartphone required • High battery consumption	• Only public modes • Not always time specific registration • Ticket sale does not prove that a trip is made	• Low accuracy • Easy to fraud • High burden on users

Table 2.1 – Pros and cons of different data gathering methods

3. Enschede Living Lab

3.1 Living Lab ecosystem

3.1.1 Background

Enschede is a city of 156,109 inhabitants, located in the province of Overijssel in the east of the Netherlands. A modern, vibrant university city, Enschede focuses on mobility management measures for a shift towards the more sustainable modes of transport.

Figure 3.1 – Enschede Living Lab

The city of Enschede has a modal split of 3 percent public transport; 42 percent cyclists; and 55 percent private motor vehicles within the city.

The city's mobility plan focuses on mobility management in order to create a modal shift from conventionally fuelled vehicles to more sustainable modes of transport. Measures aimed at bringing about this modal shift are currently being developed, the largest of which is SMART (Self Motivated And Rewarded Travel). SMART aims to persuade travellers to travel outside peak hours by offering personalised travel information and incentives. Other measures are the construction of a network of dedicated cycle routes, new bus lanes and the improvement of the quality of bicycle parking facilities. Besides mobility management, Enschede is also exploring the realm of clean fuels and vehicles. Enschede aspires to be a facilitator for sustainable mobility, rather than a service provider.

3.1.2 Stakeholder involvement

The municipality of Enschede aims for an integrated ecosystem for mobility management. Therefore, in the Enschede Living Lab Ecosystem we use two existing initiatives as a basis for further development of the mobility management ecosystem: the ongoing projects and employer involvement of the Twente Mobiel organisation and the up and running SMART app which aims for behavioural change by positive incentives. We strengthen the relation between these two, in order to create one strong system. Also, the municipality aims to limit its current role as manager and service provider, as these are not roles the government wants to fulfil on the long run.

During the EMPOWER business model workshops, we focussed on options to reduce of the municipal role in management of the SMART service. The cycle store which operates a cycle

reward scheme, the developer of the SMART backend (Mobidot), a national insurance company, a current incentive provider and the bus operator took part in discussion about the value they see in SMART. This workshop generated many new insights, but also made clear that there is a key municipal interest in changing travel behaviour towards a reduction of the use of conventionally fuelled vehicles. It made clear that there will always be a role for the municipality. However, the ownership of the total technical side of the system is transferred from the municipality to Mobidot since then.

3.1.3 Living Lab Management

The municipality of Enschede manages SMART. This was the case before EMPOWER, is the case during EMPOWER, but has to be defined after EMPOWER.

The initiation of the SMART ecosystem is triggered by the municipality. Therefore, the municipality is the main stakeholder which is involved in decision making and naturally took on the role of manager. In order to change behaviour towards a network optimum, the municipality seems a legit manager for the system. However, service management isn't a role the government regularly fulfils and questions arise whether this is a task which belongs to a government.

During the EMPOWER project, the municipality of Enschede is still the operator of SMART. However, we are in close cooperation with the management in order to share our knowledge on incentives, organise experimental set ups and explore the possibilities for the future.

Based on the outcomes of EMPOWER, the municipality will reconsider its role in management. A less prominent role in management seems ideal, as it is not the natural role of the government. However, a certain degree of control (e.g. incentives should work towards a sustainable system optimum) will always be of interest.

3.2 Living Lab Plan

Within the Enschede Living Lab Ecosystem, we will carry out several experiments in close relation to each other. These experiment are planned using the EMPOWER Living Lab Design Cycle, as described in the following sections.

3.2.1 Problem definition

Traffic problems in Enschede focus around the two peak moments of the day. In the morning there is a big inbound commute, which takes place in the opposite direction in the afternoon. The city's arteries are fully congested with cars, which also has a negative impact on inner city cycle traffic.
The research question related to this problem is: "How can we reduce to amount of kilometres driven with conventionally fuelled vehicles by giving positive incentives?" This overall question is divided in three sub-questions that will guide the interventions in the Living Lab:

- How can we use the SMART service to deliver personalised incentives to reduce car use?
- How can we involve employers in working towards this goal?

- How can a point and reward based scheme be organised so that it is long term valuable for engaged stakeholders: e.g. the scheme provider, solution provider, users, mobility service providers and reward providers?

3.2.2 Rough idea

The city aims for a de-coupling of the major car flows and major cycle flows (in order to limit the conflicting stakes on intersections) and for a behavioural change using positive incentives. The city wants to stimulate travellers to use the bicycle for short trips instead of the car. Using the SMART-app, the aim is to nudge these people into a behavioural change. Together with a series of bicycle related infrastructure investments, this should reduce the amount of kilometres driven with conventionally fuelled cars in the city centre.

3.2.3 Business model

The SMART business model is the basis to start working. This includes the SMART service paid by the municipality and a web shop with vouchers where incentive providers and the municipality work without financial reimbursement

Next to the vouchers, involved employers who are willing to contribute towards a change in behaviour of their own employees have the opportunity to introduce (tangible) rewards using the system. Reduced sick leave, lower parking fees and taking a societal responsibility are some of the triggers to get employers involved.

3.2.4 Target group

We distinguish to main groups within the target group: the general traveller and the employee.

The **general traveller** consists of all people travelling in Enschede who are able to travel by bicycle for part of their trips. This includes both the car driver who can substitute part of his trips by bicycling as well as cyclist who already cycle quite often. This group is chosen as they can be reached with general means like advertisement in public space.

The **employees** is a group of users related to a committed employer. This group overlaps with the general traveller, but they get extra opportunities as their employer is involved in the scheme as well. The employer will act as a proxy organisation and can share our call for action. As employers have a strong relation with their employees, their call will be more effective than a general message from the municipality.

In terms of vulnerable people, the general traveller includes many different vulnerable groups. Although it should be noted that there are people potentially excluded: people with less access to ICT tools (as EMPOWER is about delivering incentives using ICT, this is inevitable) and people with limitations on the use of active modes (as the most appealing alternative for conventionally fuelled vehicles is the use of the (electric) bicycle). In approaching employers, the ambition is not to only involve the higher educated knowledge worker, but also include support staff of the companies (cleaning, catering, security, etc).

3.2.5 Planned intervention

The intervention in Enschede will consist of different layers of incentives:

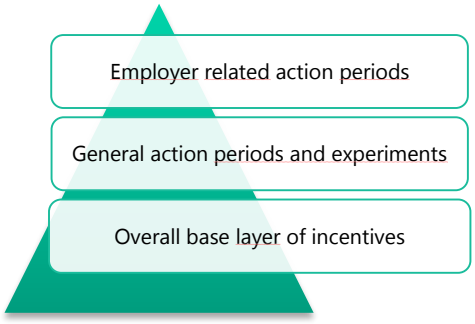

Figure 3.2 – Incentive structure in Enschede

The overall base layer of incentives: The general system in SMART is a scheme where users get points when specific challenges are met. For all users at any time, there are challenges available to participate in. This makes the system appealing for all users, not only those who can make a change. There incentives focus at involving users in the system, for instance: rewarding use of the system, games to use different modes for a first time, and quiz questions.

General action periods and experiments: On top of this, local actions will take place linked to events like the opening of new infrastructure or festivals. These actions focus on the change of behaviour and might be valid for only specific users. Also, specific experiments will be carried out with smaller samples of the users to investigate the effect of different ways to distribute incentives. Suggestions of effective methods from the literature study and micro-experiments will be trialled this way.

Next to these general individual challenges (meaning person X has to do Y to get Z), there are challenges in which people can participate together. These challenges introduce a social component as it is no longer only your own behaviour which contributes, but also others have to participate in order to get the reward.

Employer related action period:. A third layer of challenges is one-to-one related to employers who can set up special challenges for their own employees. These challenges could use the SMART point system, but also involve other types of (tangible) rewards.

All SMART points collected can be converted to vouchers in the SMART web shop. Currently, these are all freebies which are provided by local shopkeepers without any financial transaction. Linked to the municipal behavioural campaigns, the aim is to introduce more valuable rewards in the web shop as well. These shall be limited offers or only available to specific (more difficult) challenges in order to manage this budget wise.

3.2.6 IT services

SMART is the current operational tool in Enschede which focuses on changing mobility behaviour. The central user interaction takes place in the SMART app, which has a web presence to introduce the app to the users and to have a second means of access to the web shop.

For the Living Lab operator, SMART has a flexible backend which allows setting up challenges, sending out experience sampling questions (ESQ), manage users, manage the web shop and do bookkeeping of incentives provided.

Challenges can be given to specific target groups. This is a flexible solution where all travel modalities are included, frequently visited locations are recognised, time frames can be set as well as a multitude of other criteria. This ranges from a simple "Make one cycle trip and get 20 points" to "Choose PT or bicycle to commute to work this week at least three times and receive 100 points per trip". It also allows the operator to relate a challenge to the completion of earlier challenges or the answer on an experience sampling question.

Experience sampling questions can use the same flexible solution as the challenges to send out short questions to users.

Manage users and web shop gives basic tools to add, remove and edit users as well as web shop offers.

Incentive bookkeeping is a logging functionality which keeps track of all messages sent to users, all challenges accepted, all points distributed, etc. This tool is specifically valuable in monitoring and evaluating the use of the system.

3.2.6.1 Further development

SMART has a new 2.0 version launched early June 2016 and is working on further development. The knowledge, experience and input from EMPOWER will contribute to the further development of the system. This includes for instance the learnings from the mini experiments in work packages 1 and 2 as well as the input from discussions with different stakeholders.

3.2.7 Marketing and communication

In marketing and communication we build on the existing SMART presence in the city. This has an easy call to action: download the app. Once the user has installed the app, all further interaction is facilitated by the app. This way, a direct channel is available which eases communication.

The existing network of Twente Mobiel is the basis for involvement of employers. As they have a track record in involving employer as well as a well-known branding, this is best way to involve new employers. We invite the employers to use the SMART app for their mobility management and use their input for any further development.

A third level where we will introduce SMART is during the campaigns around "Enschede cycle city 2020". This is a common target in the future which is the basis of the behavioural cycle campaigns.

This will also be the case for the instances where we introduce SMART to stimulate the use of new infrastructure. The first new cycle route is to be opened in September 2016. More routes are to follow later that year and the year after.

In terms of the tactical marketing strategy, SMART in general is in the growth phase. However, the ongoing development will also trigger new awareness campaigns related to new functionality.

3.2.8 Operation

As SMART is the basis for the Living Lab, all operational tools are in place. Also, the related organisation is up and running already. The added value of EMPOWER is to bring new knowledge to the system and help to operators to introduce new incentive schemes. The main focus is on the personalisation of the current challenges in order to make them more effective as well as the introduction of employer specific schemes.

Retention of users is an ongoing activity as well, where there are two specific strategies next to providing the best service possible: providing an active helpdesk and introducing easy to reach challenges. The helpdesk is staffed with a dedicated operator who manages both e-mail as well as social media interaction. Easy to reach challenges are introduced in order to offer something for all users and to make it easier to get the gifts from the web shop.

3.2.9 Evaluation

The main evaluation systems are in place as an integral part of SMART: the tracking of trips and the logging of incentives provided. These serve as a solid basis for the evaluation and impact assessment. Next to these two systems which run continuously, evaluation questions are asked to the users as well. This is partially done using the ESQ-system, where in-app questions can be send triggered by specific events. In specific cases (e.g. employer involvement) dedicated questionnaires are used as well.

Proving change actually took place will also be the challenge in Enschede. As the service itself is a main data collector, there is no pre-use data available. Introducing the tracking functionality without any scheme is not a viable option in this case. Therefore, external data sources as well as stated preference questions have to be used to get a comparison between the before and the after situation and to evaluate toward the 15%-50% reduction in CFV use.

The in-app ESQ feature allows for an easy channel to the user to question them on topics related to the 75% Customer/user satisfaction with the EMPOWER mobility service as well as a 30% increase in travellers perception of urban accessibility and attractiveness.
A 10% response rate for vulnerable travel groups is managed by specific recruiting requirements and active monitoring on this topic.

3.3 Time plan

The development of the Enschede Living Lab started early on in the project with the alignment with the SMART project team. From M4 several business model workshops took place as well as

involvement of other stakeholders (employers, bus operator, cycle store) to explore the possible collaboration. Up to this moment these conversations continue to get to a sufficient level of commitment to be able to start the scheme. The time plan for Enschede for the upcoming months is depicted in Figure 3.3. There are several parallel activities which start in a staged approach, increasing the Living Lab size step by step.

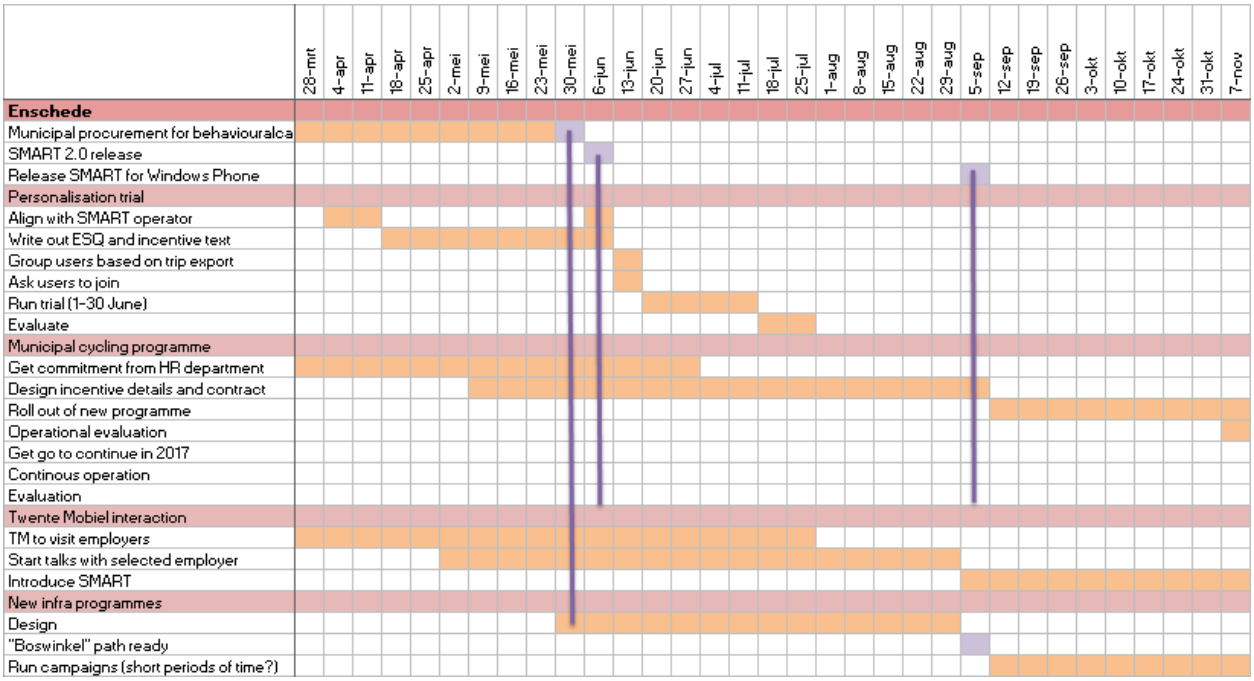

Figure 3.3 – Enschede time plan

After the initial campaigns are launched, we will involve more employers over time and start new campaigns related to events for the general public. The opening of new major cycle infrastructure is planned in M17, M20, M23 and M24. This allows us to start campaigns around these moments.

Also, from a more experimental approach, new types of incentive schemes are trialled within the Living Lab based on the research carried out as part of WP1 and WP2. Also, the EMPOWER team will work together with the SMART team on effectively using new functionality which is developed over the course of the Living Lab.

4. Gothenburg Living Lab

4.1 Living Lab ecosystem

4.1.1 Background

There are several communities around Gothenburg (GOT) that are reasonably well connected by train, but where the public transport is being underutilised. In order to anchor the project in Gothenburg, the Living Lab is operationalized in conjunction with the regional innovation project HASS. HASS is the Swedish abbreviation for *Sustainable and Attractive Transit Connected Communities*. The objective of this project is to offer climate-smart mobility services and use incentives to lower the barriers to these services. These services will be introduced in the communities of Ale and Lerum. This aligns very well with the EMPOWER object to reduce the use of conventionally fuelled vehicles.

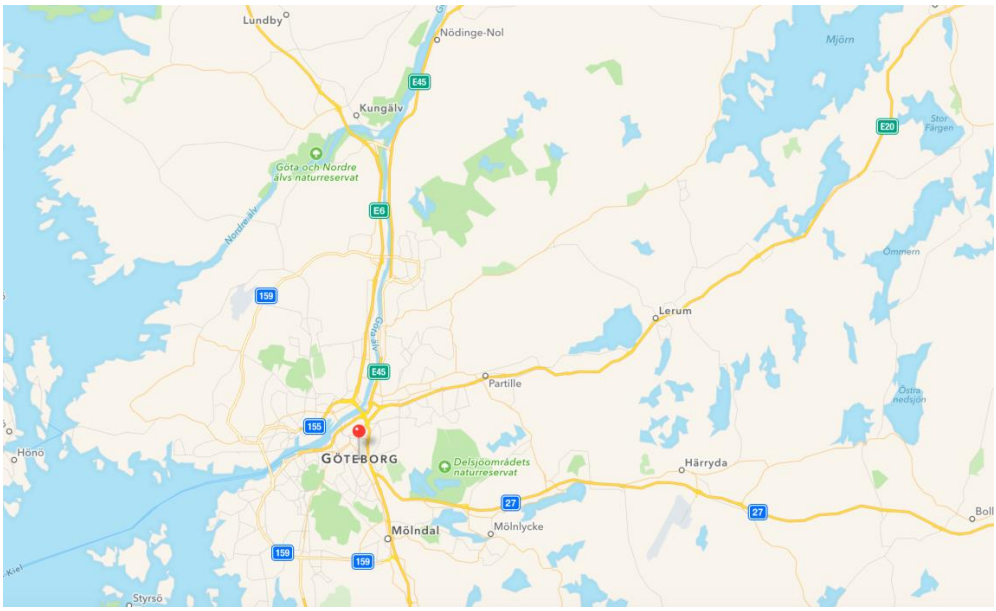

Figure 4.1 – Gothenburg Living Lab

Ale is a municipality in Western Sweden and is a member municipality in the greater metropolitan area of Gothenburg (see Figure 4.1). The number of residents is close to 30.000. The main urban area in Ale is Nödinge, which is intersected by the E45 between Gothenburg and Vänersborg/Trollhättan and has commuter-train connections to Gothenburg. Nödinge has a city centre with local businesses and commerce. Lerum is, similar to Ale, is a municipality in Western Sweden and is a member of the greater metropolitan area of Gothenburg. The number of residents in Lerum, which is also the main urban area, is 40.000 and the main urban area, Lerum, is located adjacent to E20 between Gothenburg and Stockholm. Commuter-train connections are available to Gothenburg. Lerum has a vivid city centre with local business and commerce and the city centre is located at the shore to the beautiful lake Aspen.

The car is the primary mode of transport in these two communities (in both Ale and Lerum the car is used for about 60%-65% of trips[2]). It is an attractive mode of transport to and from Gothenburg, even though these communities have good train connections with Gothenburg. The vision is to introduce a new service providing new climate-smart mobility services, including a point-based reward scheme to stimulate the use of these services. This service will reduce the perceived dependency on the car of the local residents. This change is needed in order to transfer these suburbs into sustainable and attractive communities, reducing CO2 emissions (environmental), making better use of central areas (social/economic), and increasing the liveability in the communities (social/economic).

4.1.2 Stakeholder involvement

Based on the business model activities performed in T3.3 "Business Models for Lead Cities" five key stakeholder types are identified to establish a value network for the service to be tested in the Gothenburg Living Lab. A platform is set up to enable value transfer between the stakeholders:

1. **Incentive provider** (an organisation that determines what behaviour is incentivised and in what way): the centre association which is assigned by the municipality to provide the system.
2. **Reward provider(s)** (an organisation that provides rewards based on changed mobility behaviour): e.g. local retailers that utilize the platform as a marketing channel to get new customers, public transport operators, or the municipality.
3. **Solution provider** (an organisation that provides the mobility and incentive platform): e.g. a third-party provider that receives revenue based on the offers added to the platform and per booking of mobility service made through the platform.
4. **Mobility service providers** (an organisation that offers climate-smart mobility services to inhabitants in the community): the mobility service providers use the platform to offer mobility services to inhabitants via a booking service. Every booking of a mobility service generates a charge to the solution provider.
5. **Inhabitants** (the target group of the incentive scheme): residents that are offered climate-smart mobility services for a fee that can be easily booked via the platform, the use of the mobility service will generate points that can be transformed into discounted offers in the local retail stores.

4.1.3 Living Lab Operation

Figure 4.2 provides a rich picture of the Living Lab in Gothenburg. The objective with the new service is to incentivise three target groups to change their travel behaviour and increase the use of climate-smart mobility services in different everyday situations. The Living Lab is organized in two introduction stages where users are introduced to the service and the service with its components is deployed in increments, tested and improved. These two stages are succeeded by a deployment and operation stage in which the complete service will be operated for a year in the two communities. This phase will end in M36 (April 2018) when the EMPOWER project ends. During all these stages, experiments are organized according to a three-phase intervention model that is introduced in 4.2.2

[2] Source: regional travel diary survey 2011

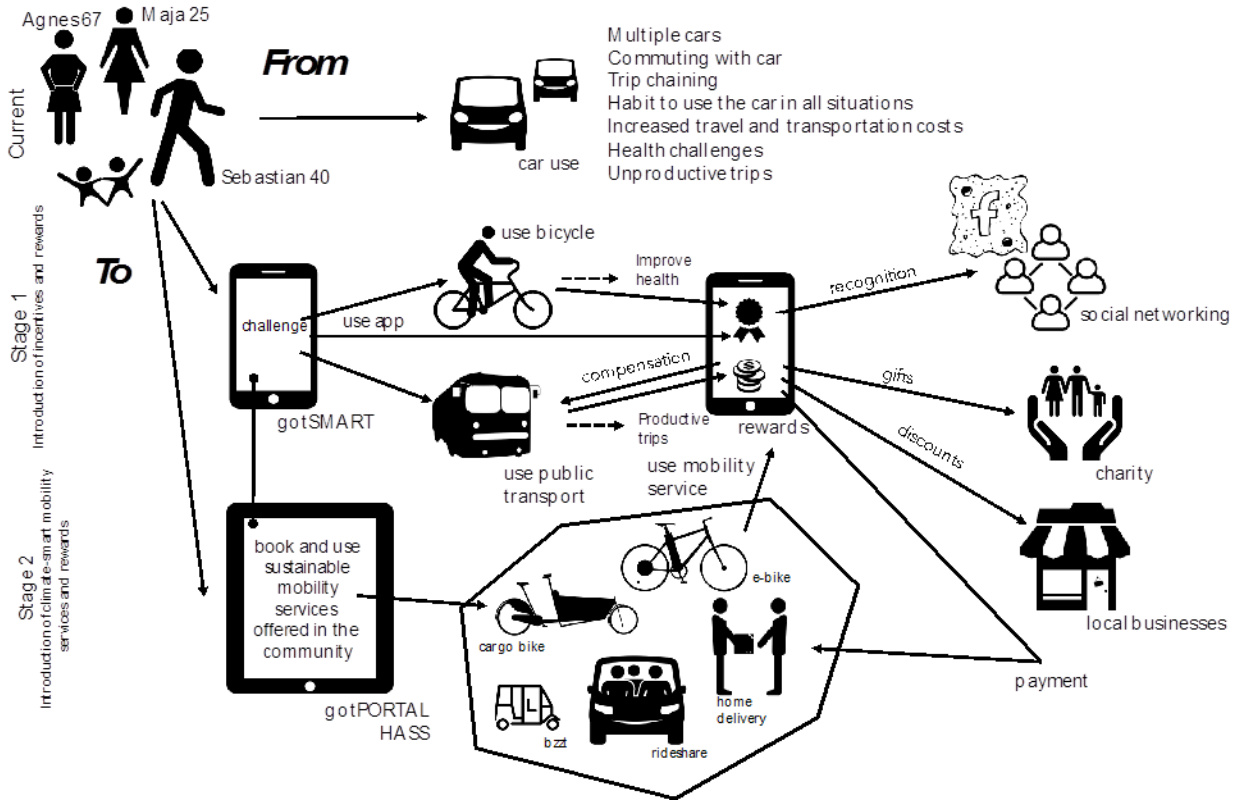

Figure 4.2 - From Car Dependency to Rewarded Use of Sustainable Modes of Transport in Gothenburg Living Lab

During the first stage, users will be rewarded for the increased use of bicycles and public transport and will be rewarded for the use of the service itself. In this stage, sustainable travel behaviour is rewarded by monetarized (e.g. gift cards for public transport) and non-monetarized rewards (recognition badges). At this stage, incentives will also be used to reward user adoption; i.e. enrolment in the scheme will be rewarded. The main motive for introducing both monetarized and non-monetarized rewards is to able to receive an early indication of the attractiveness of different types of incentives to be able to adapt the value offer during later stages in the Living Lab. During this stage a trial will also be performed in terms of the service and users interest to utilize a mobile service that track and trace their mobility behaviour.

In the second stage, climate-smart mobility services are introduced to the target groups and use of these mobility services will generate points, which can be transferred to rewards. With the objective to identify how different people are attracted to different rewards, additional types of monetarized rewards are offered to users. These include gifts to charity in name of the user, special offers from local businesses, and payments for mobility service offers.

The Living Lab Operation is supported by a bundle of IT services that consists of a locally developed portal for booking mobility services and distributing rewards ("gotPORTAL") and an adapted SMART services provided by EMPOWER ("gotSMART"). Viktoria Swedish ICT is the local

Living Lab Operator and operates the Living Lab together with several committed local organisations (see Table 4.1).

Organization	Support to the Gothenburg Living Lab operations
Municipalities Ale Municipality Lerum Municipality	Will legitimize the LL operations in the municipalities Provide support to recruit participants Support the LL to engage incentive providers Expertise about community conditions (commerce, social service, travel patterns, objectives, public value) Provide communication channels which the LL can use
Center associations Centrumföreningen Lerum Nödinge företagarförening	Will sanction the LL operations amongst businesses in the municipalities Will facilitate that specific members in the association provides rewards for the LL operations Expertise about customer behaviour and local business conditions
Mobility service providers Bzzt, ICA Nödinge, ICA Lerum, Jutabo, Ale Kommun, Lerum Kommun, Västtrafik, Sunfleet	Will provide climate-smart mobility services to be used in the LL Support to recruit participants Provide communication channels which the LL can use
Incentive providers Västtrafik, ICA Sverige, Bzzt (trips), Centrumföreningen Lerum and Nödinge, ICA Lerum ICA Nödinge Property developers	Will provide rewards in the LL operations Support to recruit participants Provide communication channels which the LL can use
Scheme (platform) provider Local business associations, Municipalities, Public transport authority	Possible future scheme provider
Digital technology / Solution providers Cleverapps, Sustainable mobility service providers, Västtrafik, EMPOWER tool providers	Will provide a platform to book and use the sustainable services provided in the LL Will provide IT-solutions to incentivise users and track/trace travel behaviour Support to recruit participants and market the platform Possible future technical/platform providers

Table 4.1 – Involved local organizations in Gothenburg Living Lab

4.2 Living Lab Plan

4.2.1 Problem Definition

Given the transportation background described in Section 4.1.1, the main research question addressed in the Gothenburg Living Lab reads: *How can sustainable mobility services, boosted by point based scheme, compete with private cars as the simple solution for everyday transportation in transit connected communities?* This overall research question is divided into three sub-questions that will guide the interventions in the Living Lab:

1. What are the barriers to accelerate the use of climate-smart and sustainable mobility services?
2. What are the key success factors to implement climate-smart mobility services with a reward scheme that compete with the use of private cars?
3. How can a point and reward scheme be organised so that it is long term valuable for engaged stakeholders: e.g. the scheme provider, solution provider, users, mobility service providers and reward providers?

4.2.2 Rough Idea

In Gothenburg, Living Lab operation starts in fall of 2016 and several experiments are organized throughout the Living Lab period. The experimental model, as depicted in Figure 4.4 consists of three sequential phases (engagement – experiments – evaluation) that will transcend the three deployment stages as described in section 4.1.3.

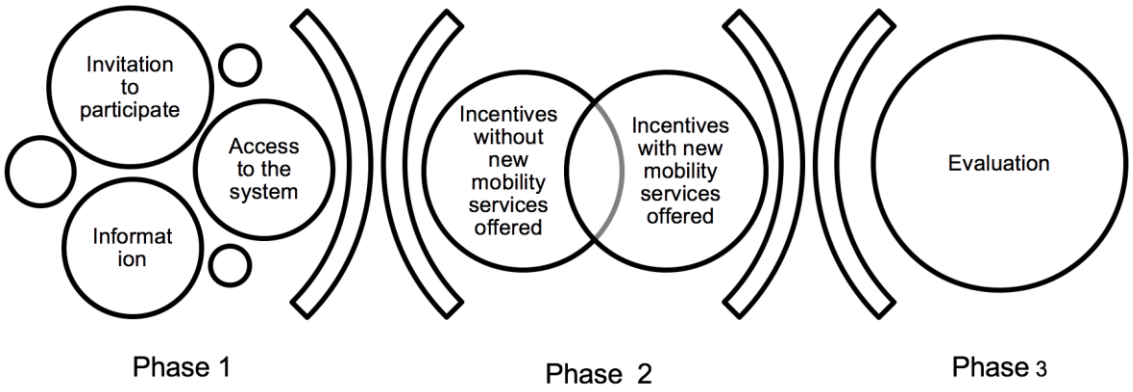

Figure 4.3 – Experimental model adopted in Gothenburg Living Lab

- *Phase 1* makes the step from unknown people in the communities to involved participants in the Gothenburg Living Lab and the specific experiments. The main steps are recruiting residents, informing them about the project, and getting them involved in the project.
- *Phase 2* is the experimental phase. It starts with a phase where users will use the digital platform and pendant digital tools. They will receive incentives and rewards for use of sustainable modes. However, they will not be offered any of the anticipated new mobility services. This way, they will have the chance to explore the different functionalities of the system and build up a mobility profile demonstrating their behaviour and receive rewards for using PT, walking or cycling. In the second stage climate-smart mobility services are added to the offer through the portal and the portal and app will be connected. During this phase the Living Lab Operator also monitors the activities using a strategy designed to retain users in the Living Lab and to prevent participants to drop out. The Living Lab Operator works together with incentive providers, municipalities and mobility service providers to setup the incentives as well as rewards to be offered during the intervention part of the experiment. When users are invited to join the scheme they are automatically provided with incentives for their changed behaviour.
- *Phase 3* evaluates the outcome from the experiment to answer the research question that is defined for the intervention. The evaluation is performed by using the evaluation framework designed within EMPOWER, see section 4.2.9.

4.2.3 Business model

Figure 4.4 presents an overview of the different value offers that enable stakeholder involvement in Gothenburg. The business logic is anchored in an assumption that a successful implementation of an incentive scheme requires the establishment of multiple roles and relationships that can win something based on the scheme introduced.

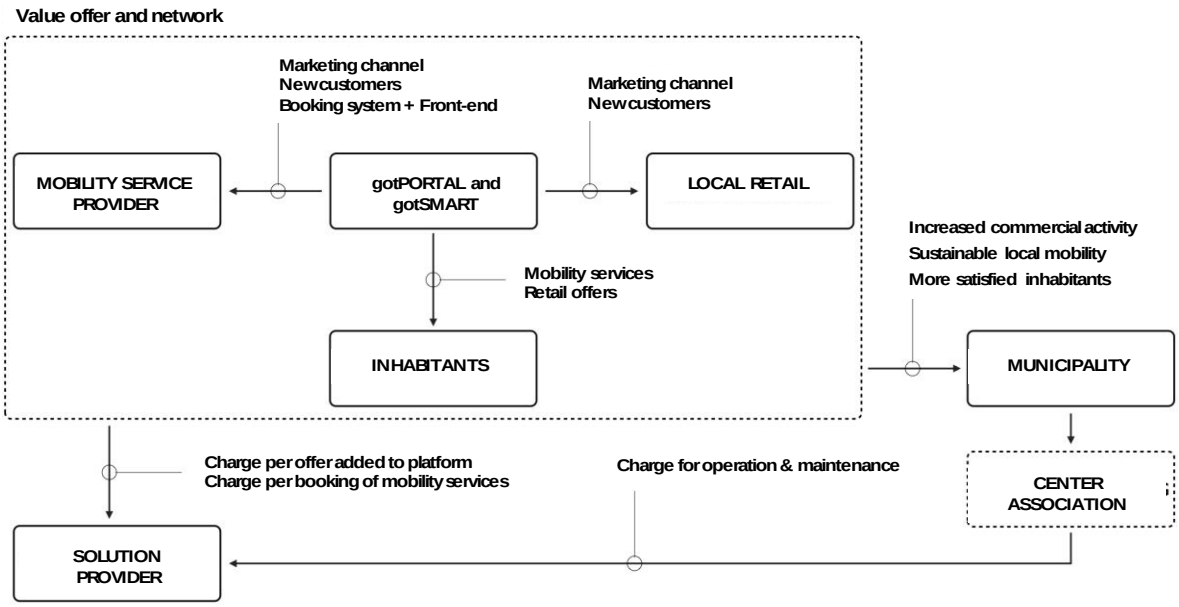

Figure 4.4 – Value network and value offers in Gothenburg Living Lab

4.2.4 Target group

In setting up the Living Lab, extensive work is performed to capture inhabitants' input regarding climate-smart services, digital support, transport behaviour and incentive schemes: 300 residents from the two communities have participated in a web-based questionnaire, 20 residents have participated in semi-structured in-depth interviews providing additional input, and residents, together with representatives from other stakeholder types, have participated in four stakeholder-workshops. Based on this input, three types of inhabitants have emerged acting as primary target groups of users in the lab: families, mobile elderly and commuters. To illustrate these target groups three user persona are developed to support IT-service design, marketing of the scheme to stakeholders and recruitment of participants.

4.2.4.1 Vulnerable user groups

In the Gothenburg Living Lab vulnerable groups are identified from a social definition rather than a traffic safety definition. The main groups that are identified and that will be targeted within the Living Lab operations are:

- Mobile elderly. Pensioned people that are still able to take of themselves, but may require additional assistance in heavier tasks, in organising more complex travel options, etc;
- Women travelling alone in public transportation. Especially access and egress to/from public transportation at late hours or in dark winters will be assisted within in the Living Lab with mobility services;
- Families with young children. Travelling with other modes than the car (both cycling and public transportation) is often a hurdle for families with small children, partly because of all the necessary items that need to be taken along and partly because of safety concerns.

4.2.5 Planned intervention

Stage 1 in the deployment of the service is used to test the service. Trials are also performed during stage 2 when new mobility services are introduced. After this stage, the focus shifts gradually to scale up the number of users and perform more advanced experiments. Different experiments are performed within Living Lab Gothenburg during stage 2 and 3 that adhere to the KPIs in EMPOWER. In order to align the experimental work, the standardised experimental model presented in 4.2.2 is used for the experimental design and management. Three topics that will be addressed in these experiments are:

- The influence of different non-monetary rewards (a point-based incentive scheme) of the use of conventionally fuelled vehicles;
- The influence of badges on the users' engagement with the system;
- The impact of a service where incentives are provided to boost the use of the newly introduced mobility services.

4.2.6 IT Services

The Gothenburg Living Lab is supported by digital support both developed locally and provided by the EMPOWER project (see Figure 4.5).

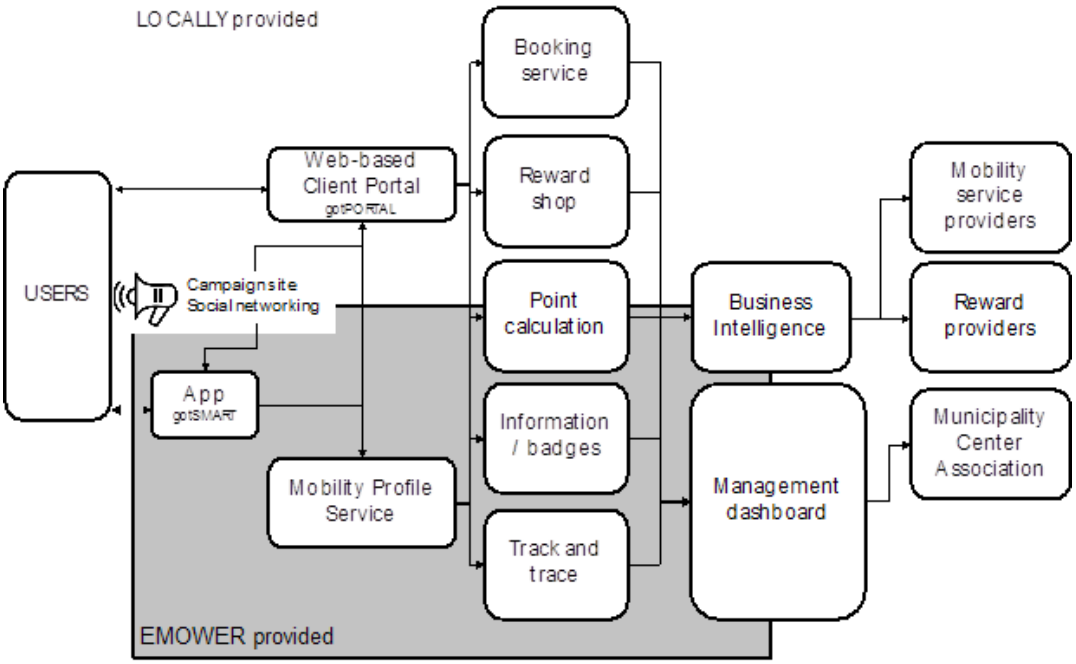

Figure 4.5 – IT Services provided in Gothenburg Living Lab

The gotSMART app is user to challenge users in stage one to switch to bicycle and public transport. This app creates a mobility profile of users in the two municipalities, calculate points, feedback information about travel behaviour and show challenge progress. In stage two a web-based client portal for booking mobility services is added. Beside the possibility for users to book the mobility services, this also enables us to offer users a reward shop in which they can use their points to get discounts in local shops, to donate to charity or to pay for mobility services. The digital support provided will enable the providers of the mobility service to keep track of the use of their services.

Through the system, reward providers will be able to offer rewards and receive statistics regarding the impact of their rewards. The Municipality / Centre Association can operate the scheme through the management dashboard. The locally developed portal is linked to the SMART system provided by EMPOWER.

4.2.7 Marketing and communication

The marketing activities at this first stage are directed towards the inhabitants that have shown an interest to contribute in the early data collection activities and that generated the three personas, as these are users that have already shown their interest. Actions involve direct advertisement to this group and offering rewards for participation. This initial marketing is anchored in a web-based campaign-site that will provide the necessary background information about participation as well as the added value for users. A next step is the use of social networking tools to attract new users to the scheme as well as retain enrolled users. This step includes rewarding the sharing of achievements on social networks and rewarding the invitation of new users.

To boost participation in the second stage and grow the user base, the marketing plan includes specific interlinked actions that will start when the second stage commences:

- User-driven recruitment of participants using the early adopters as ambassadors for participation. Compensation for recruitment is provided in terms of both points and badges.
- Social media-driven engagement of participants using the channels that local associations and municipalities as well as engaged stakeholders (mobility service providers) have established.

The third deployment and operation stage in the lab will start with a launch-event in each municipality. The marketing of the event as well as the event itself will enable the Living Lab to communicate the values for inhabitants to participate in the scheme. The events will be the focal point to rally engagement amongst involved stakeholders and will mobilize resources and support to boost participation.

The primary mechanism to retain users is to provide a service that adheres to a users' everyday life situation, as was learned in the SUNSET project. An important proactive activity to retain users is thus to ensure that the scheme and the services have high degree of efficacy and are present in their daily activities. After the initial marketing activities, the project will consequently manage communication through the service and by service quality engage more users to the scheme. The marketing plan in Gothenburg is thus strongly connected to the value offers presented in section 4.4.3.

4.2.8 Living Lab Operation

As the gotSMART app and back office are an important part of the Living Lab, the initial operational tools are in place. Later the gotPORTAL functionality will be added. This includes user, incentive and data management. The operational organisation is setup and can deploy the incentive scheme.

Attraction and retention of users as well as they management of incentive and rewards structures will be the main tasks of the Living Lab operators. The Living Lab operators will work on marketing, user management, incentive development, data management, attraction of reward providers and data analysis (e.g. for evaluation and management information).

4.2.9 Evaluation

The evaluation of the Living Lab performance is a key issue for all involved stakeholders and is covered by the management dashboard and business intelligence components in the system. In this section we consider mainly the evaluation of the Living Lab against the EMPOWER objectives. The key challenge is to gather the necessary data regarding before and after the introduction of EMPOWER services without overburdening the users. The users need to consider themselves as clients choosing to use services that provide value, not as research participants.

Before EMPOWER services with incentives are deployed, a variety of data is collected about the current travel patterns, perceptions, attitudes and values of potential users: 1) A first questionnaire (320 participants) is already conducted about current travel patterns and existing barriers for using alternatives to CFVs, 2) In-depth interviews about barriers and the potential contributions of rewards schemes are underway, and 3) user needs workshops are planned to identify packages of mobility services in connection to incentive schemes.

Evaluation on EMPOWER Key Performance Indicators is planned as follows:

- **15%-50% reduction in CFV use in cities**: Before the start of incentive schemes are group of people are compensated to install the gotSMART app just to collect travel diary data that can later be compared against the data from the experimental group. These data may be completed with existing travel diary data from the municipalities.
- **30% increase in travellers perception of urban accessibility and attractiveness:** Before-data on these issues is already collected in the first questionnaire, and a before and after-questionnaire is distributed to registered incentive scheme users.
- **10% response rate for vulnerable travel groups:** this is managed by specific recruiting requirements.
- **75% Customer/user satisfaction with the EMPOWER mobility service:** This is assessed through experience sampling questions in the gotSMART app.

4.3 Time plan

The process to start-up the Gothenburg Living Lab began in August 2015 (M4). Activities are performed until October (M17) to further engage stakeholders. In parallel the local development of the gotPORTAL in ongoing and stakeholder workshops are planned in August (M15) and September (M16). As depicted in Figure 4.6, marketing to engage inhabitants in stage 1 started in May (M12) and thus initiated the Living Lab, these activities are performed until September (M16) following the tactical marketing plan. Deployment of stage 1 will start in August (M15) by introducing gotSMART without mobility services to users. The process to adapt SMART to gotSMART began in May 2016 (M12) and the process to detail and test this part of the IT Services

that will enable the Living Lab is to be completed by September (M16). The adaption of gotSMART is done in parallel to the launch of the campaign site, which is used to inform users and attract residents in the two communities to participate.

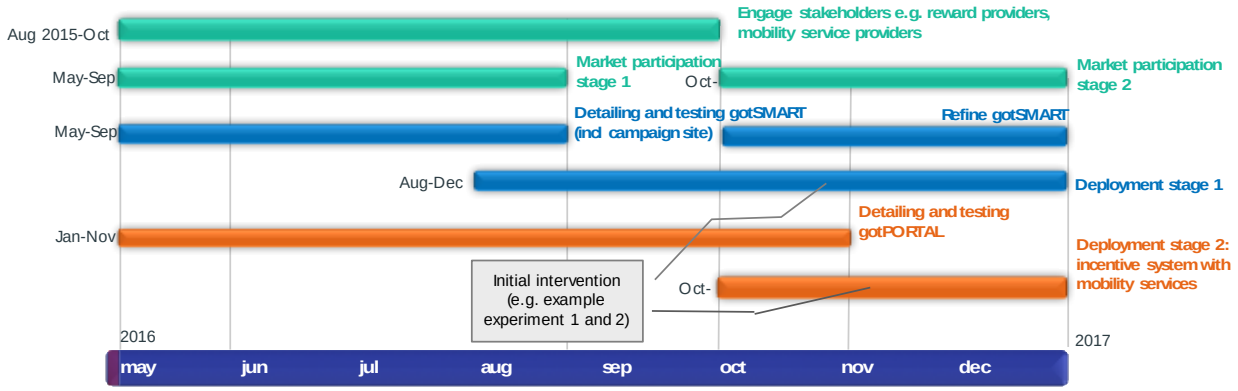

Figure 4.6 – Short term time planning for Gothenburg Living Lab

The experiments that are performed in the Gothenburg Living Lab begin with Stage 1 in October (M17) and are performed throughout the lifespan of the Living Lab. Stage 2 includes the launch of the gotPORTAL. The deployment of this stage will end in April 2017 (M23) with two launch events in each municipality. From April 2017 (M23) to December 2017 (M31) efforts are made to ensure user growth, improve the quality in mobility services and IT-services, and assess the impact of the incentive scheme. Additional experiments are performed in the timeframe January 2017 (M20) to December 2017 (M31) to provide additional data for evaluation purposes. The impact of the scheme is evaluated throughout the operation of the Living Lab. However, comparison of the main evaluation against the EMPOWER KPI's is performed from April 2017 (M23) to December 2017 (M31).

The continuation of the system is at this stage an open issue. However, the ambition from key local organisations, especially the municipalities, is that the system should be successfully embedded in one (or several) permanent organisational setting(s) beyond December 2017 (M31). The aspiration is that a designated organisational entity can act as a scheme provider that makes the portal, incentive scheme and the sustainable mobility services available to residents in the involved communities. This ambition includes that the solution can be scaled and transferred to other sustainable transit communities; if a business potential allows such expansion. The process to investigate how a continuation of the system can be organized begins in September 2017 (M28) when the full potential of the system can be assessed and ends in May 2018 (M36) when the EMPOWER project ends. This process is tracked by T3.4 "Generic business case and toolkit development" and used as input to develop generic business support provided by the EMPOWER toolkit.

5. Helsinki Living Lab

5.1 Living Lab ecosystem

5.1.1 Background

Helsinki is the capital, and business capital of Finland, situated in the southern coast of the country, with 83 of the 100 largest Finnish companies' headquarters in Helsinki region. It is the national centre for public sector and several industry sectors such as finance, IT and tourism. The Helsinki metropolitan area has 1.4 Million inhabitants and generates roughly 1/3 of Finland's GDP. Helsinki is ranked in top places for new business, start-ups and innovation. The unemployment rate in Helsinki is 8.1%, compared to 9.4% nationally.

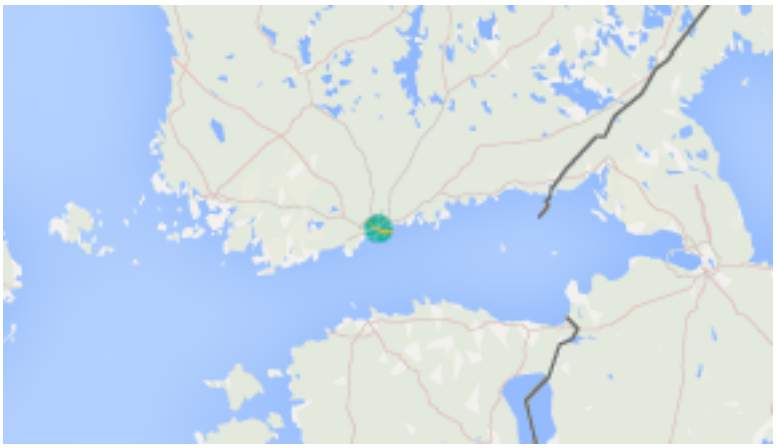

Figure 5.1 – Helsinki Living Lab

Helsinki is a peninsula with a limited number of main arteries into the city. Helsinki's public transport consists of one metro line, ten tram lines, an extensive bus line network and one ferry line. Helsinki's newly adopted transport planning strategy has clear priorities: pedestrians and cycling are most important, follow by public transport and logistics. Car traffic comes last.

Within Helsinki the modal share between public transport and car is 56:44. Helsinki is a decent performer in sustainable mobility. It often scores high on user satisfaction in public transport services. Recently, it made the decision to prioritize sustainable modalities over private cars (1% annual modal shift target). And Helsinki is home to world's first mobility-as- a-service ecosystem. It is also one of the fastest growing cities in Europe. While use of private cars is going down (now 22% of trips), certain areas still have a high share of commute car trips. The city of Helsinki uses new residential areas as testing platforms for new innovations and solutions.

Transport planning in Helsinki and Helsinki region is focusing mainly on infrastructure projects, with the main ones related to EMPOWER being:

- New ring-rail line connecting Helsinki-Vantaa airport to rail network. Completed in 2015

- Extension of the metro line to west to City of Espoo, to be completed in August 2016
- Ring tram line, which is to replace the current hugely popular metro-like bus lines. Awaiting last decisions by Helsinki and Espoo city boards, construction expected to start 2017.
- Bicycle lanes. Helsinki's aim is to create a network of bicycle highways leading into and across the city.
- City boulevards. Main arteries into the city are 80km/h or 100km/h multi-lane highways. The new proposed Helsinki city plan 2050 aims to convert these into 50km/h boulevards with separate lanes for e.g. trams, and new housing built next to them.
- Bridge to new suburb to east of city centre. The proposed plan has a bridge leading straight to city centre, with access only to bicycles and trams.

Apart from infrastructure projects, Helsinki works on cycle promotion, the introduction of a city bike scheme, many ICT-enable parking project and the collection of real-time traffic information.

5.1.2 Stakeholder involvement

EMPOWER's Helsinki Living Lab has cooperated mainly with Helsinki Region Transit Authority HSL as they are the primary actor in mobility management and have contacts to cycling enthusiast groups and a number of companies outside the transport consulting field (e.g. design, car sharing). They have two main interest areas in mobility management: Firstly they are aiming to induce behavioural change, which would result in more people choosing public transport over private car. Secondly, they promote cycling as the alternative for any other mode.

HSL had been assessing the possibilities for positive incentives, but no real actions with substantial incentives have been taken. During the EMPOWER business modelling workshops we managed to agree on the Living Lab's use cases and targets, and how they relate to HSL's agenda.

As the most successful HSL projects are focused on employers, where one main message is the availability and promotion of employer-subsidized public transport tickets to employees for commuting purposes, where funding for the incentive comes from the employer. Therefore, the focus of the Living Lab also goes to incentives provided by the private sector.

With the first phase of living lab started and initial experience gathered, the results are shown to HSL during a new round of discussion of further incentive schemes. HSL is keen to learn more, and we aim to organise a fully co-operational living lab scheme during latter stages of the project. Parallel, we develop a scheme with national organisations and the consulting sector.

5.1.3 Living Lab Management

Helsinki Living Lab is managed by Forum Virium. Specific management aspects relate to the equal treatment of employees, which will be addressed together with participating employers' HR departments. Details on incentive rules will be subject to negotiations between individual employer and their employees, with certain amount of variation expected.

With the chosen scheme the living lab's main partners are external, commercial companies. As they part of the project, the management must be flexible and adapt to their agenda as well. This can be a risk to the Living Lab's success.

The living lab scheme is designed very carefully to directly support the companies' strategy and development, while providing perfect use case for project's purposes as well as the individual participant. This arrangement gives EMPOWER a chance to tap into an information source for a longer period of time than with a normal time-limited living lab. With the cooperation successful this should also provide a source for further studies beyond EMPOWER's life cycle.

5.2 Living Lab Plan

Helsinki's Living Lab activities are focused around the Kalasatama district, a former commercial port now being transformed into a new housing area. It is Helsinki's designated Smart City area.

5.2.1 Problem definition

While not the most congested city, there is considerable traffic during peak hours, causing often a 30-45 minutes delay. From a city perspective this is the main problem, although the incentive scheme will not relieve this problem for the individual traveller. Therefore, money is introduced as extra benefit.

Employers are spending quite big sums to provide company cars and parking space for them. It has been demonstrated that there are possibilities for considerable savings by encouraging employees to take up other modes of travel, both for commuting and work-related trips during the day. Part of these saving can be converted to an extra salary, based on an employee's own travel choices.

For the project the KPI is the amount of change generated in terms of sustainable trips chosen over car or taxi. For participating companies, the KPI is the cost savings and employees' wellbeing. For participating employees, likewise extra money in their salary while benefiting wellbeing.

5.2.2 Rough idea

The Helsinki Living Lab focuses on a very simple and straightforward idea: Employees generate cost savings when their employers choose to use alternative transport, and then (part of) this saving is given back to employees as the incentive.

Money as an incentive can usually be used to motivate people in the short term. With this living lab scheme, employees can see in a very direct way the effect of their choices, which in turn is also expected to further enhance the motivation.

The Helsinki Living Lab cooperates with local SMEs and aims to promote and support new mobility management business throughout the Living Lab. With the advent of Mobility-as-a-Service (MaaS), the Helsinki Living Lab will investigate incentives being integrated into the one user interface that users will use to plan and manage all their travel.

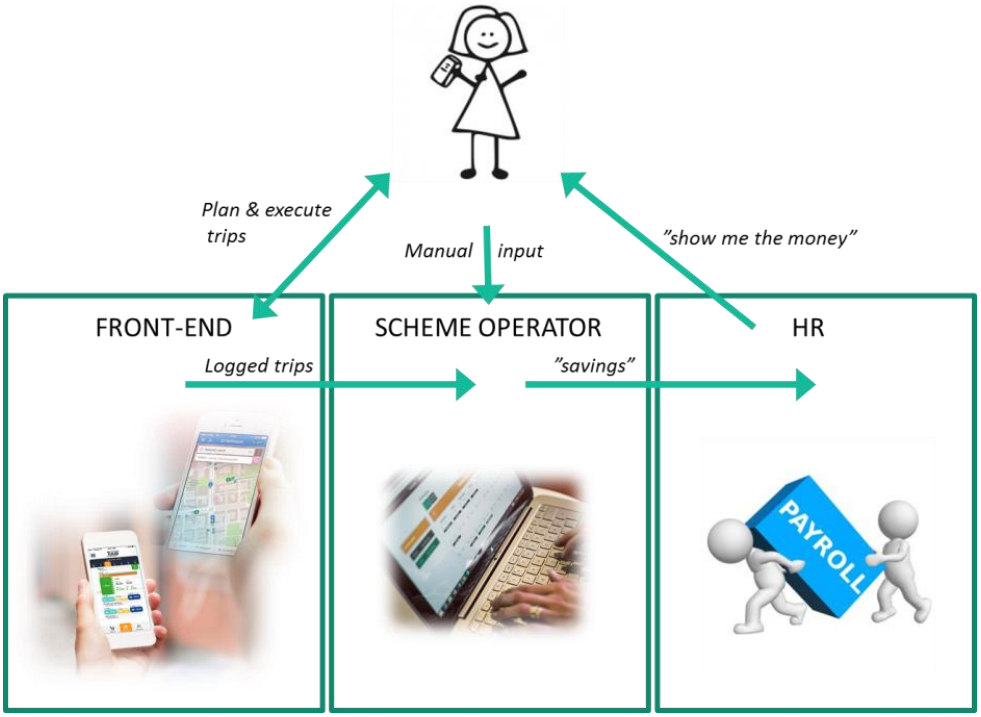

Figure 5.2 – The Helsinki scheme implementation

5.2.3 Business model

The Helsinki Living Lab's business model is quite straightforward. By employees choosing alternative transport modes than own car or taxi, there is a cost saving. Employees' trips are recorded in a (low-tech) diary, and the monthly saving is calculated and presented to companies' HR departments. According to an agreement within companies, a certain part of that total sum will then be added to the participating employees' salaries. In short, the employer pays their employees based on the savings generated by them. The Helsinki Living Lab will also investigate a business model for providing the scheme for employers as a commercial service which eases the operational task for the employer.

5.2.4 Target group

The Target group for the Helsinki Living Lab are primarily the companies already enrolled into HSL's (Helsinki region Transit Authority) program for employer cooperation. Having already shown enthusiasm towards sustainable mobility, we see them as a group most ready to experiment with the incentive model that the living lab proposes.

The Living Lab is naturally open to all companies. Since the HSL campaigns target mostly mid-sized and large companies, we see a market for SMEs and start-ups to join too. Quite often these are more open-minded, and eager to trial new concepts. There is no reason why the Living Lab should not be open to all employers.

Since the Living Lab is directly linked to employers' salaries, i.e. money is involved; it is of utmost importance to create an equal opportunity for all employees to participate. We realise that e.g.

people with handicaps, or those working mostly from home, are somewhat disadvantaged. This needs to be agreed between employer and employees, in a way that for example a person in a wheelchair would be entitled to a bonus that is the average of the bonuses of that particular month. Quite often the vulnerable groups themselves also come up with ideas how they could participate in a different way, which should be encouraged and supported in this case too.

5.2.5 Planned intervention

Employees will be stimulated to change away from conventionally fuelled vehicles by providing a monetary reward for this change. Early work with this scheme indicates that the idea of earning even little extra is often enough to motivate people quite well. Most likely, this also triggers a number of people who are thinking about or wanting to change their behaviour, but are not able to do so for some reason.

Initial pre-project trials indicate that a monthly interval coinciding with payroll works well. However, there is also a desire for both employees and employers to be able to monitor one's progress in real time, between the monthly milestones. Also, the detailing of the implementation is subject to discussions with the employer. We work with a flexible system which allows specific configurations per employer, in order to match the employer's specific wishes.

The scheme will start with acquiring one large employer to test and adapt the system. This provides proofing ground for upscaling from this one employer to thousands of users. In parallel, SMEs provide good test group to have the scheme expand horizontally to numerous employers. Micro experiments will further support expansion to new employers.

5.2.6 IT services

The Helsinki Living Lab does not necessarily require much in terms of tools. In the initial concept-proofing trials carried, the operation has been fully manual, i.e. users have logged in their travels manually in a simple Excel- sheet –like 'travel diary'. Likewise the 'back office' process of calculating savings per user and reformulating the figures to HR has also been done manually.

EMPOWER provides tools that can be useful in the Helsinki Living Lab. It is down to further negotiations with the living lab partners how much effort they are able to put in developing their systems during the course of project. The EMPOWER IT services can be used for management of user identities, accumulated points schemes, and other incentive management tools. Automation of incentive provision and the bookkeeping is a prerequisite for further upscaling of the scheme.

5.2.7 Marketing and communication

The Helsinki Living Lab targets on companies that have enthusiasm for sustainable mobility, as perhaps demonstrated by already engaging in such a program with HSL. HSL has an extensive list of companies and contact persons they have worked with or that have expressed interest in future cooperation in mobility management. The Living Lab's main marketing is done using these HSL's connections, directly with contact persons.

HSL's employer engagement campaigns may not have targeted the rapidly grown SME and start-up sector, where often people with positive attitudes toward sustainability and innovative measures work, where e.g. 'hipster culture' flourishes. This sector is targeted separately utilising Forum Virium's and City of Helsinki Economic Development Department's extensive connections.

Communication with the end user, the employee, is facilitated by the individual employers. They have an existing relationship with their employee, so the message will get across more easily when the employer is the sender. Also, this is a very targeted approach which prevents us from setting up larger scale advertisement campaigns.

5.2.8 Operation

Operation of the system splits into two parts: the general running of the scheme and the organisational work for the employer.

The daily running of the scheme will be set up by the external provider Trafix, who operates the diary-scheme. They also run a helpdesk for the scheme. As far as not yet automated, the input to the system will be done by the users themselves.

Once operational, the scheme is self-guiding for the participating companies. HR departments are keen to monitor the system themselves (e.g. the correctness of the information in the diary). While the employees are keen to make sure the process is transparent and working properly, thus ensuring they get 'what is due' for them.

5.2.9 Evaluation

Next to the assessment against the EMPOWER KPI's, there are several other interesting topics to cover by the evaluation:

- Next to user satisfaction, also employer satisfaction will be measured;
- A comparison will be made between the direct monetary rewards in the Helsinki Living Lab and the point-based schemes in Enschede and Gothenburg;
- The longer term effect of the monetary incentive. To what extent are we able to create a lasting change with this incentive?

In working on a project legacy, the main interest of the Helsinki Living Lab is to link the developments with ongoing Mobility-as-a-Service initiatives. It is interesting to see how incentives are being integrated into the one user interface that the user uses for managing all travel choices, and whether this does open up new possibilities for the incentives themselves too.

5.3 Time plan

In short term the Helsinki Living Lab will focus during summer 2016 on finalising the technical setup and gear up the employer recruitment in order to have the full system operational by October.

During Q4 of 2016 the focus is on operating the Living Lab, while simultaneously re-investigating the dropped themes (metro extension, cycling promotion) and work on the possibility for incentives provided by the public sector.

The Helsinki Living Lab is designed from the start to cooperate with local businesses, with the aim of supporting new economically viable services to be developed. The employer scheme is expected to transform from Living Lab to a constant mode of operation to the participating companies. This allows EMPOWER to access more long-term results from the scheme, beyond the projects life span.

6. Manchester Living Lab

The Greater Manchester area covers a large metropolitan district in the north west of England and encompasses a number of cities, the largest of which is Manchester. In 2014 the estimated area of Greater Manchester (Figure 6.2) was 1,276 (km^2) and an estimated population of 2,732,900 people. The area of the city of Manchester area is estimated to be 116 (km^2) with an estimated population of 520,200 people. (Source: TfGM, 2014, Transport Statistics Manchester, https://data.gov.uk/dataset/transport-statistics-manchester).

6.1 Living Lab ecosystem

6.1.1 Background

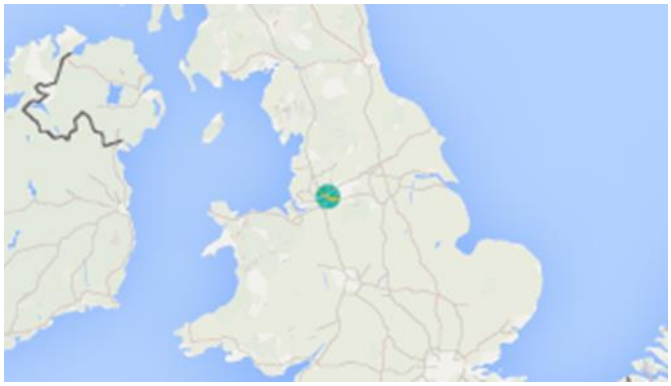

Figure 6.1 – Manchester Living Lab

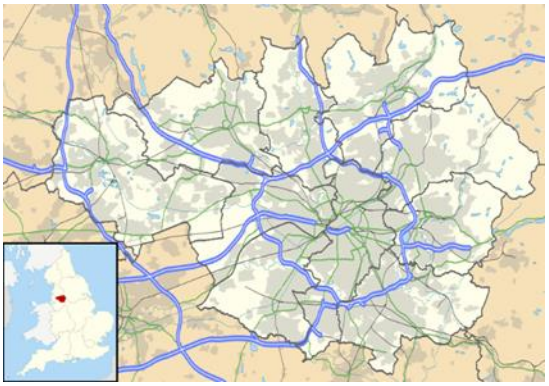

Figure 6.2 – Greater Manchester Area

The 2014 mid-year population analysis for Manchester estimated 70.6% were aged between 16 and 64 years, 9.5% over 65 years and 20% (rounding errors) were under 16 years of age. 49.4% of the population are female. The estimated number of students within the city is 70,875[3].

The city of Manchester has 44.5% of households without a car. There are 7.7% of households with dependent children but no adult in employment. The area is ethnically mixed and 'white British' is the largest ethnic group with an estimated proportion of 66.7%. Other ethnic groups include Asian, Black British, Chinese, Arab and mixed ethnic groups. The median weekly wage is £392 (£38 lower than the average for England).

The 30 mile catchment area for the city is estimated to be 6.9million people and 11,794,000 for a radius of 50 miles. It is estimated that during the weekday am peak there are approximately 1 million commuting trips within Greater Manchester area and 40,000 net trips from outlying areas. It is estimated that in Greater Manchester 7% or working residents work from home (LTP, 2011). The modal share in Manchester is estimated using the 'usual method of travel to work' and shows

[3] Sources: 2014 mid-Year Estimate of Population and 2011 Census, Public Intelligence (PRI), Chief Executive's Department, 2016, Available online at:
http://www.manchester.gov.uk/downloads/download/4220/corporate_research_and_intelligence_population_publications

71% using the car, 3% cycling, 9% walking, 5% using rail and 10% using bus or coach, and 2 using other modes including taxi[4].

The framework for transport policy in the UK is set out in the Local Transport Plans. The current Local Transport Plan (LTP3, 2011) for Greater Manchester, covers the fifteen year period, 2010-2025. (http://www.tfgm.com/ltp3/Pages/Local-Transport-Plan.aspx.) The economic downturn beginning in 2008 provides a challenging environment for public sector policy. The Local Transport Plan is underpinned by local strategies (e.g., 'Greater Manchester Transport Strategy 2040: Our Vision') and national strategies, with a key focus on the economy and economic prosperity. The specific aims for the transport strategy in Greater Manchester are "To ensure that the transport network supports the Greater Manchester economy to improve the life chances of residents and the success of business" whilst meeting the National UK Government targets on carbon emissions; public health including traffic accidents. It also aims to meet expectations on maximising value for money, ensuring social sustainability objectives for good quality neighbourhood and public spaces, and equality of travel opportunities.

6.1.2 Stakeholder Involvement

EMPOWER determined early in the design process that there were four main principles associated with ensuring successful stakeholder involvement. The first was to identify the key stakeholders, necessary to embed positive incentives into transport services. The second was to ensure that there was 'buy-in', that is commitment from senior members of those stakeholders. The third principle was to ensure that the motivation for being involved was because the project appealed to the value proposition of the stakeholders rather than simply to a sense of 'altruism'. The fourth was to ensure regular meetings using project management to deliver the implementations. EMPOWER identified two main stakeholders, Transport for Greater Manchester and First Bus. Transport for Greater Manchester is a public organisation managing delivery of transport infrastructure and services for Greater Manchester. First Bus is an international commercial bus operator with operations in rail as well as bus.
In addition we identified a group of other stakeholders who had expertise and knowledge and resources to offer that would enable the implementations including; Great Western Railway (GWR), Transpennine. Both stakeholders have experience with campaigns using loyalty bonus points and particularly the NECTAR (www.Nectar.com) card loyalty bonus point system for rail travel.

First Bus and Transport for Greater Manchester are involved because they see a value proposition that is consistent with their existing business strategy. For the bus industry that is the potential to develop new customers for bus services, to extend into different markets and to increase the attractiveness of under-utilised services such as off-peak public transport routes.

EMPOWER maintains close contact with First Bus and TfGM through bi-weekly meetings. First Bus participate actively in the project and recently presented on their involvement with developing

[4] Source: Labour Force Survey, Office of National Statistics, last updated December 2015. The figures in this table are National Statistics.

positive incentives through the 'Vantage bus service' in Manchester to a meeting of the Take-Up Community (31st May 2016). Our current list of activities and tasks involves:

- Expansion of the pool of incentive providers. First Bus is currently recruiting incentive providers. They are approaching specific venues to generate joint discount tickets. These incentive schemes work such that attendance at a specific location and travelling using the bus results in discounts at the venue either with reduced entry fee or other forms of rewards. As an illustration, someone travelling by bus to a cinema or leisure centre may be offered a reward
- Expansion of existing ICT services. First Bus are working with EMPOWER to develop the functionality of the First Bus app 'mTicket' to be able to offer a 'track and trace' services;
- Development of loyalty bonus points scheme. First Bus are utilising existing partnerships between First Bus and GWR (also owned by First Group) to explore the potential of applying existing supermarket-based loyalty bonus point schemes such as NECTAR (www.NECTAR.com) with bus ticket purchase.

6.1.3 Living Lab Management

The commercial bus operator First Bus manages mTicket. This was the case before EMPOWER and will continue throughout the EMPOWER project implementation and beyond. The mTicket app is an important pillar of their commercial strategy and First Bus have a business plan to grow the amount of purchasing that is done through the app. The positive incentives implementation schemes designed and developed by EMPOWER in collaboration with the stakeholders are embedded into the functioning of the mTicket app.

Existing practices at First Bus show that there is experience of using the email distribution lists associated with mTicket to market new ticket products (for example special discounts for young people) and those practices will be used to initiate marketing and offering of incentives. The delivery and awarding of incentives will be managed according to the rules established as part of the incentive (for example, who qualifies for an incentive according to which travel choices they make) and managed within the operation of mTicket. The incentive design and rules will be made using the principles of incentive design developed as part of the EMPOWER project (workpackage 1).

6.2 Living Lab Plan

The Living Lab in Manchester involves embedding positive incentive schemes into existing public transport services. The main aim is to reduce the use of conventionally fuelled private cars in favour of using public transport and the attendant walking associated with public transport use.

A key aspect of the approach in the Manchester Living Lab is to use a loyalty points schemes such as Nectar (www.nectar.com). Our rationale is to combine the scheme loyalty and attractiveness associated with existing loyalty point schemes with the transport offer to create positive incentives encouraging modal shift away from the use of conventionally fuelled private cars. We are actively pursuing an existing supermarket-based loyalty point scheme in which the points can be obtained

through the purchase of tickets for the bus but exchanged for a range of goods, thus separating the level of loyalty or attractiveness of the primary goods.

6.2.1 Problem definition

Transport problems in the Greater Manchester area include congestion and the resultant lost revenue, opportunity inequality, travel delay and uncomfortable journeys caused by congestion and over-crowded services; road casualties and increased public health problems (respiratory illness, heart disease, diabetes and obesity) associated with sedentary lifestyles; and an excess of carbon emissions due to use of sole-use private cars.

The main research question for the Living Lab Manchester implementation is: 'Can individuals be attracted out of cars to Public Transport with a loyalty points scheme?' And 'what population segments are most liable to tipping in their travel choice through a loyalty point scheme?'

6.2.2 Rough idea

The underlying approach for the EMPOWER Manchester Living Lab is to ensure that the positive incentive schemes are embedded into the existing public transport provision resulting in lasting modal shift among individuals to bus and attendant walking.

The EMPOWER approach is to use positive incentives delivered using ICT to attract, to retain and to embed change. EMPOWER intends to embed positive incentives into the provision of public transport services and into individual's everyday travel behaviour. Previous research (see D1.1) has shown that there are incentives which we know are likely to attract people to make a change such as discounted ticket prices. In addition, research suggests that incentives need to work for longer periods and up to 6 months to make that a permanent change. It is this area of permanency and retention that requires greater work. We intend to use a set of rewards and incentives that are combinations of: (i) discount ticket prices for public transport; (ii) existing loyalty bonus point systems such as Nectar; and (iii) discount prices for specific services or goods combined with bus ticket purchases. We intend to attract and reinforce any positive changes made in travel behaviour by providing incentives that fit into people's existing household budgeting behaviour and appeal to perceptions of 'value for money'.

The delivery of the incentives to end users is to be embedded into existing First Bus ICT services, such as the mTicket app and other social media networks to the extent that the value proposition continues for First Bus. The rationale for using the existing ICT services includes the established brand and reputation of MTicket in the Manchester region and the efficiencies that could be made by harnessing existing (and planned new) functionalities within the mTicket app.

6.2.3 Business model

The basis of the EMPOWER Manchester living Lab is to embed positive incentives into existing services. Workpackage 3 identified the value proposition for the stakeholders and for the end users using a series of workshops with key stakeholders (D3.3). In the Manchester Living Lab this work on the value proposition was integral to establishing commitment and 'buy-in' from senior members of the stakeholders.

It is clear that having stakeholders identify the value proposition for themselves and for end users, (that is, passengers who will ride the bus services), was an important stage in the development and design of incentive types.

The foundation of the Living Lab is already present in the commercial bus services. Positive incentives will initially be implemented with specific cases i.e. a particular route, a particular event or a specific user group (16-18 year olds). Following successful proving of the value proposition the schemes will be expanded to other groups, other routes throughout the city or for other events.

6.2.4 Target group

The Manchester Living Lab implementation is intended to attract those who, due for example to habit or poor perception, use public transport infrequently or not at all. We intend to attract users from any income group but will especially focus on never or infrequent public transport users who are also from the middle income group.

In addition we are aiming a positive incentive scheme towards the 16-18 year age group. This is an age group with two characteristics that indicate that this kind of incentive is attractive. Those characteristics are: relatively modest independent incomes and restricted opportunities[5] to earn an independent income; and secondly they are going through a transition phase as they move from being High School pupils to being in further education, or apprenticeship and are legally entitled to gain a driving licence. The aim of our work is to encourage this age group to become (and continue to be) public transport users during this transition phase.

6.2.5 Planned intervention

The planned intervention starts with small scale real-world implementations. These implementations will be (a) on one bus route (Vantage); with (b) specific populations (young people aged 16-18 and riders on the Vantage bus route); and (c) discrete events. . Once the value proposition for our key stakeholder, First Bus and the end user has been proven then it is expected that the life of the schemes will be extended beyond the lifespan of the EMPOWER Manchester Living Lab and also that the schemes will be rolled out to other routes and offered to a wider population.

The positive impact for the end-user is an improved public transport experience, improved value for money and increased opportunity to walk as part of the journey. Specifically they will experience enabled travel through enhanced wifi allowing them to use their time in different ways on the bus including working productively and keeping in touch with others. In addition we intend to deliver better value for money through incentives using discounts on goods and services and through the use of Loyalty bonus points.

[5] This population segment are offered very modest income if they remain in education or take a scholarship (Minimum apprentice wage is £3.30/€3.60 per hour, https://www.gov.uk/national-minimum-wage-rates). They cannot claim benefits and minimum wage per hour £3.87 for paid employment.

The Manchester Living Lab uses a number of specific implementation schemes within that framework including:

Public transport Schemes					
Application		Specific Incentive Schemes			
		Discount tickets	Discount services or goods	Loyalty Bonus points	Enhanced wifi
Specific events	Summer Weekend	X	X	X	
Specific groups	Years 16-18	X	X		
Specific routes	Vantage bus route	X		X	X
Specific times	Peak services	X		X	X
	Off peak services	X	X	X	X
		Attract	Retain	Embed	

Table 6.1 – Manchester Living Lab incentive scheme implementations 2016

6.2.5.1 Specific routes: Vantage bus route

The specific routes scheme focuses on the newly implemented Vantage bus scheme which runs from Leigh to Manchester via Salford.

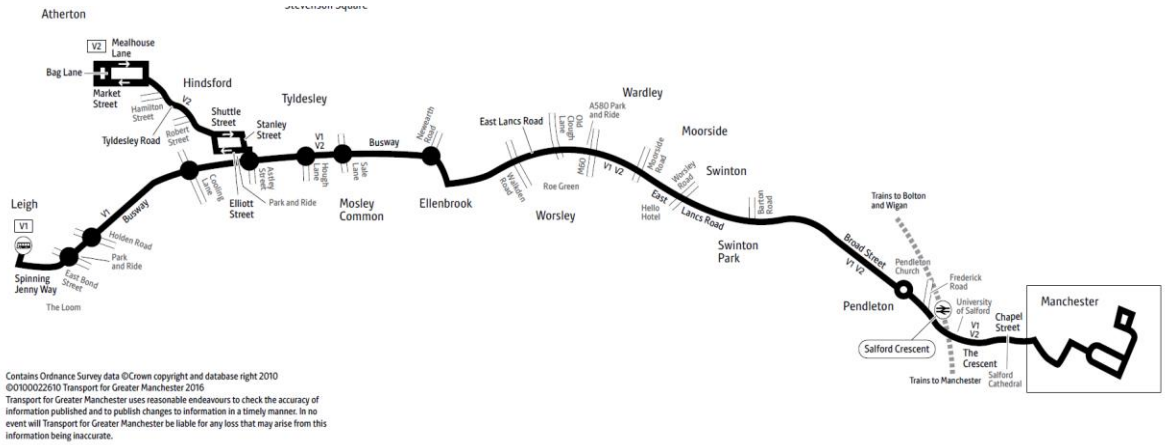

Figure 6.3 - Map of the Vantage bus route (TfGM, 2015)

It is intended that two incentive schemes are implemented on the Vantage bus scheme.

a. enhanced wifi; on all buses servicing the Vantage bus route;
b. Loyalty points (e.g., via NECTAR) for ticket purchase;

We are still designing options to increase use of off-peak services and may provide positive incentive schemes (a) and (b) solely for off-peak bus services. The positive incentive schemes (a) and (b) would be implemented with the discount ticket currently being offered on the Vantage bus that formed part of the introductory offer for the service.

6.2.5.2 Specific groups: Youth travel

It is intended that one positive incentive scheme is offered to the specific group of those aged 16 to 18 years. This positive incentive is to combine a discount weekly ticket (currently costing £10/€12) with discounts for particular goods and services at specific locations. This will be offered solely through use of the mTicket app.

6.2.5.3 Specific events: Summer Weekend

We will use specific events in Manchester such as the 'Summer Weekend' focussed on the centre of Manchester in July (22nd-24th) to offer positive incentives in the form of:

a. discounts for particular goods and services at specific locations in tandem with discounted ticket prices to encourage use of public transport to travel into and out of the city centre for the 'summer weekend' event;
b. Loyalty points (e.g., via NECTAR) for ticket purchase;

Our ethical considerations in implementing the positive incentive schemes are to ensure that there is equal access to all those in the relevant population segment to the discounts and the loyalty bonus points. Secondly to ensure that those using the incentive schemes have access to information on the potential impacts both negative and positive. Finally, that all data collated as a consequence of using the incentive schemes is managed and kept in accordance with the relevant national and EU legal requirements and guidelines.

6.2.6 IT services

We intend to use the existing app First Bus use for electronic ticketing, mTicket. This app allows users to purchase tickets. The ticket code is downloaded to the user's phone and that code is then presented to the bus driver when the user alights the bus, in a similar manner to use of a paper-based bus pass.

At present First Bus are adapting the mTicket to integrate with the bus timetable app they have available. First Bus are currently considering the business case for working in partnership with EMPOWER to integration with 'track n trace' functionality offered by Mobidot into the mTicket app. This will give us greater ability to track travel behaviour and to base incentives and evaluation around that.

An incentives application plan is needed to determine when, how, to whom, NECTAR points are delivered. This is required for mTicket integrated with the 'track and trace' functionality and for a situation without the 'track and trace' functionality. In which case it is a more 'fixed plan' and possibly less responsive to individual's travel behaviour. In addition the wifi functionality on buses needs to be increased to be able to improved functionality from the user's perspective. Experience sampling can be delivered using the email distribution list associated with the mTicket app; using the email distribution list associated with registration for free wifi on the Vantage bus and using the twitter network.

6.2.7 Marketing and communication

The Vantage bus route already has a concrete and clear marketing campaign which is run with contributions from the commercial bus operator, First Bus and by Transport for Greater Manchester. We intend to 'piggy-back', that is to attach the publicity for the incentives as part of existing marketing and advertising campaigns. This approach will create efficiencies and a streamlined channel of harmonised communication with the end-users. Our high level strategy is to:

a. Piggy-back existing campaigns
b. Target specific populations at times of change, for example 16-18 year olds transitions from one academic year to another;
c. Target specific one-off events such as the 'Summer Weekend' when people may change behaviour for that event;
d. Spatially specific targeting of publicity material so that it is relevant to those who receive it e.g., in the relevant area for the Vantage route or associated with the Nectar at Sainsbury's supermarkets;
e. Highlighting specific positive value messages associated with the implementation such as 'being healthy' or 'value for money' and targeting venues, services, or activities that are positively associated with that value message;
f. Combine conventional passive advertising with social media and interactive campaigns;
g. Social media interest generation through interactive or crowdsourcing campaigns;
h. Using bonus loyalty points as additional rewards for registration and referrals;
i. Using personal testimony accounts to generate 'familiarity' and stimulate social comparison and 'community'.

Overall our marketing and communication strategy is based on principles that include: targeting communication to particular groups or at particular events; using the opportunity created by life-change points; incentivising the recruitment process that follows from marketing; marketing in a spatially relevant way and creating message-relevance for the target populations.

6.2.8 Living Lab Operation

As the mTicket app is the basis for the Manchester Living Lab, most of the operational tools are in place. This reduces the risks that might arise from developing a completely new tool, for example delays, software glitches etc and together with the established brand reputation, is part of the rationale to work with the existing app. The added value of EMPOWER for the ICT tools and structure is the additional functionality of 'track and trace' for mTicket and the knowledge base gathered in Workpackages 1, 2 and 3 on the development and impacts of positive incentives.

mTicket has fully operating structures for management of products and marketing and dedicated staff involved in the management of the ICT tools. Positive incentives including discounted tickets and loyalty points will be manged through similar ICT mechanisms and process to those through which existing ticket products are currently handled.

Existing Helpdesk functions would be used to manage new users. EMPOWER will provide some support in addition if there is a substantial increase in enquiries, or to deal with particular types of queries and to assist with the retention of users. The management and support of related ICT

services in EMPOWER will be described in further detail in Deliverable D4.3 (Operational Management Services document and Test results).

6.2.9 Evaluation

As already described, the main aim of the Manchester Living Lab implementation is to reduce the use of conventionally fuelled private cars in favour of using public transport and the attendant walking associated with public transport use. The main research questions are: 'Can individuals be attracted out of cars to Public Transport with a loyalty points scheme?' and secondly 'what population segments are most liable to tipping in their travel choice through loyalty points scheme?' For each of the EMPOWER project Key Performance Indicators we have identified the data sources for the Manchester Living Lab, as shown in Table 6.2.

We will register when each of the incentives is implemented and to use that record to be able to identify and assess the relative impact of each of the different incentives on travel behaviour; perceptions of satisfaction, impact on vulnerable groups and perceptions of accessibility. This will allow us to estimate the relative impact and the cumulative impact of the incentive schemes. In addition to the data sources below, we will use a 'follow up' questionnaire to a sample of those using the incentives. This will allow further questions to be asked and a deeper penetration into perceptions, value beliefs about the incentives and impacts on travel behaviour.

EMPOWER Key performance indicator	Manchester LL Key data source
15%-50% reduction in CFV use in cities	• Existing traffic data / surveys from Transport for Greater Manchester • Mobility tracking ('track and trace')(API into mTicket) • Ticket sales (mTicket)
30% increase in travellers perception of urban accessibility and attractiveness	• In-app questionnaire (API to mTicket)
10% response rate for vulnerable travel groups	• In-app questionnaire / • User profile (API to mTicket)
75% Customer/user satisfaction with the EMPOWER mobility service	• In-app questionnaire (API to mTicket) • Additional XP survey among users • First Bus monthly customer satisfaction surveys

Table 6.2 – Manchester Living Lab KPI and data sources 2016

6.3 Time plan

The Manchester Living Lab is timed to take place from M1 to M36 of the EMPOWER project (Figure 6.4). Current efforts are focused in three main areas: recruitment of incentive providers (Tasks 'incentive scheme design' and 'Summer Weekend design'); development of IT services (Task ICT

services development'); and finalising incentive implementation design specifically the exchange rates for the loyalty bonus points (Task micro experiments).

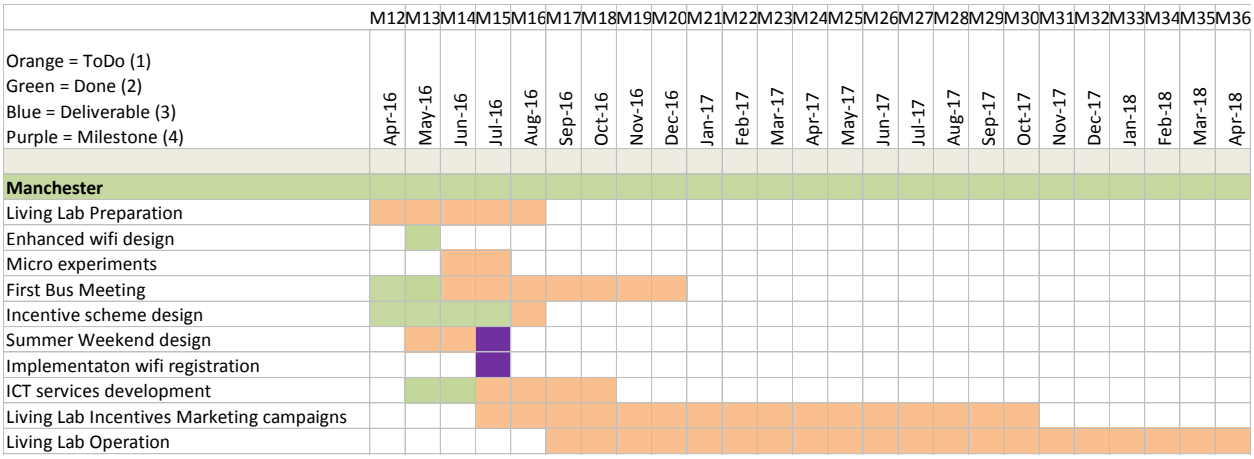

Figure 6.4 – Manchester Living Lab timetable

7. Lessons learnt and conclusions

The design of the four EMPOWER Living Labs has drawn on the outputs of the earlier work in the project concerning incentives (WP1 and WP2), the development of business models (WP3), the refinement of ICT tools for the offering of incentives (WP4) and the derivation of an evaluation approach for smart incentives (WP6). New knowledge has been gained during the process of design and specification for the four Living Labs and this has already been specifically fed into the design stages of the seven EMPOWER Take-Up Cities (TUCs).

However this knowledge has a potentially wider value and interest to a) the large group of registered EMPOWER Follower cities who are already connected with the agenda around the use of positive incentives to reduce CFV use and b) a broader European and International community in which cities and urban environments suffer similar issues to those typified by the EMPOWER Living Labs. This broader audience for the knowledge and skills involved in designing and implementing a positive incentives scheme also share in global problems relating to energy demand, conventional fuels, carbon and climate change. The goal of this chapter is therefore to describe the main lessons learnt in each step of the EMPOWER Living Lab Design Cycle in the style of generic principles and specific recommendations. Our aim is that the principles and lessons learnt can inform the development of positive incentives schemes delivered through ICT in other cities and localities.

A general feature of the EMPOWER Living Labs has been the close involvement of relevant stakeholders from the outset and at all stages of design and specification. The benefits of this strategy are numerous and we suggest it is an essential feature for any aspiring LL, TUC or incentives implementation. The involvement of relevant stakeholders creates a sustainable and profitable service environment which has a good chance of being sustainable after the immediate lifecycle of the project and the project specific catalyst functions end.

The involvement of external stakeholders at an early stage is required to ensure the design is relevant, practical, properly resourced, fully connected with the necessary contextual services and authorised. This creates the spark and momentum to launch the LL. However, this is a resource intensive activity and requires human resources, time and organisational commitment to embed the idea within the stakeholder organisation. Our general experience, however, is that the up-front investment in time together with the elapsed time needed to nurture these relationships pays a dividend in the successful implementation actions and likely impact of the LL.

A summary of the lessons learnt, the design implications and recommendations for future Living Labs implementations is given below, structured according to the framework for the design cycle described in the early part of this deliverable:

7.1 Lessons learnt using the Living Lab design Cycle

7.1.1 Problem definition

- Each city, region or organisation considering the implementation of a living lab will have specific transport and wider socio-economic, environmental and other problems. Whilst the problem may be initially framed in terms of a transport issue, it is important to relate the problem definition to the end users' value proposition. This facilitates the definition of a clear and commonly accepted purpose for the scheme and eases the involvement of the end user. If the problem is not directly related to the end users, the scheme should introduce another benefit for the end user in order to directly engage them.
- The societal problems in a particular location or region are generally well established and formulated prior to the design of an incentive scheme. Defining the problem from an end user perspective as well as from the perspective of other stakeholders' is recommended to secure their engagement in the project, as well as their appreciation of the perspective and needs of others. As a result the design is established on a 'win-win' basis for all stakeholders and end users rather than being one-directional.

7.1.2 A rough idea

- In most cases the input from multiple stakeholders is required to design and implement an operational incentive scheme. These stakeholders need to be included in developing the rough idea, and all stakeholders need time to embed the idea within their organisation. The scientific partners or experts (EMPOWER research partners in this case) should have facilitating roles in the process. The stakeholders will accrue experience and skills through designing the initial scheme. For subsequent Living Labs or incentive scheme implementations the role of these partners may be gradually diminished.
- An important contributor to success is to identify the potential value for each stakeholder from the outset. The rhetorical question 'What is in it for me?' should be easily answered by all stakeholders. The case for added value underpins the necessary level of commitment and the process of setting up roles and responsibilities between the various participants.

7.1.3 Business model

- The summary outline of added value for each stakeholder forms the basis for developing an elaborated value transfer system. This can be designed to enable a solid business case for all stakeholders.
- A clearly identified lead stakeholder is needed with the authority to take decisions. Whilst superficially this appears an obvious structure, in a multi-stakeholder context where new collaborations are needed, potentially across sectoral divides, this may be a non-trivial task. One of the challenges of positive incentives schemes delivered through ICT is the need to form new working collaborations outside established commercial and political structures, together with the need to establish new forms of data governance. The success of these new working collaborations will be driven by some complex factors including the prevailing ethos in each organisation, the higher level political pressures bearing in on the local context and the economic imperatives for success.

- At an early stage of the project, a joint identification of the roles is required to successfully achieve an operational incentive scheme. This makes clear how stakeholders can create value for their organisations by taking these roles.
- It is necessary to create cost estimates for system operations and scheme monitoring/impact evaluation, identifying which stakeholders can incur these costs within the value network in an economically sustainable manner. A different set of costs are likely to arise compared with more traditional policy measures, for example, upskilling the existing workforce to analyse social media data
- In order to offer the necessary diversity in the reward offering, for example in the conversion of points to rewards for end users, reward providers often need to be engaged in the design process.

7.1.4 Target group

- Narrowing the target group from "the general traveller" down to those sub groups with good (or strong) potential to reconsider their travel choices is likely to improve the efficacy of the incentives designed. The use of smaller scale scanning studies or surveys is likely to support the identification of which sub groups should be targeted. This process will also need alignment with broader local policy and priorities whereby particular subgroup needs or behavioural traits with respect to travel choices have already been identified.
- Positive incentives schemes are part of the genre of behavioural approaches to demand management. The established principle that no scheme is likely to trigger behavioural responses in all population subgroups applies here also. This implies that that most effective approach will be to consider a suite of schemes that are tailored towards different sub-groups rather than focusing on a single scheme with the goal of reaching the whole group. The development of several directed schemes in this way raises further challenges in terms of establishing the relative timings for implementation (simultaneous or in sequence), the balance of resource for each, user 'incentive fatigue' where the subgroups are not mutually exclusive and capturing the benefits according to the different possibilities for implementation.
- Typically there will be a population subgroup that already make conscious choices about travelling without use of CFV and therefore have a pre-disposition towards this type of scheme. These may be classed as 'forerunners'. A decision is needed on whether these forerunners should be involved (and rewarded) as frontrunners or should be omitted (and therefore unable to benefit from the scheme). The advantage of engaging forerunners includes the potential for this group to serve as 'ambassadors' in the social network and the perceived 'fairness' in the design of the scheme. The disadvantage is that unless they are a relatively small proportion of the initially recruited cohort, the scheme will essentially be rewarding current behaviour and choice without generating the value stream needed.

7.1.5 Planned interventions

- The scheme will, in practice, be almost certainly introduced against a backdrop of events, other interventions, disruptions etc. in the city such as festivals, sports games, new infrastructure opened, and other travel campaigns. Whilst this may make the evaluation of success and identification of impacts more challenging, the presence of other initiatives

creates an opportunity for success. This includes the opportunity that is generated by end users being compelled to re-think their current travel habits (e.g. due to roadworks), opportunities for shared marketing and opportunities to make both the travel challenge and reward relevant to particular subgroups (e.g. concert attendees). The sustainability of the scheme may be enhanced through 'intelligent' incentive design, so that incentives offered over a weekend are linked to a related offering for mid-week commuting, thereby reinforcing the choice and behaviour.

- For a variety of reasons, even a well-designed and generous incentive will not be taken by everyone it is targeted towards. This is reflected in a number of theoretical behavioural models which state that the decision to change behaviour is a multi-stage process with individuals moving from one stage to another depending on a number of personal factors that influence their perceptions, choices and the ability to retain the new behaviour. The business model and success of the scheme should not depend on a 100% uptake but rather on realistic expectations that may be established using smaller social science surveys at the outset.
- In the deployment of services with real customers and multiple stakeholders, the systems need to function and offer value directly. This limits the possibilities for experimentation, as the value offered to different users (particularly when these are offered simultaneously or close in time) should be equal. For this reason it is recommended that the experimentation that may be needed, for example to assess the 'best' level of an incentive, this takes place in small scale studies before a large scale roll-out of the scheme. Changes in presentation and changes over time (as long as they involve increases in value for users) are likely to be problematic.
- As a particular example of cash related incentive that can be readily administered within existing admin structures, travel expense reimbursement offers a great opportunity to save costs for an employer and use part of the savings to incentivise employees.

7.1.6 IT services

- The development of good management tools (including the issue of incentives and the ability to recognise the challenge has been fulfilled as examples of the various tasks to be covered) is crucial for a highly automated Living Lab, which can attract a substantial user base.
- The design of the user interfaces is important for success. Past experience highlights the need to focus on a clear and easy-to-use user interface, rather than integrating many features in one screen, to prevent display clutter and reduce the user workload.
- Users should be involved in the development of new functionality to get a fresh and honest view on the functionality and to maximise the ease of use.
- IT services are not a solution for all people and there is a need for awareness that there are likely to be individuals who 'miss out' with this type of system. The individuals and sub groups most likely to be left out may shift over time and may not conform to preconceptions of who may or may not be enabled or attracted to this type of service.
- In order to provide incentives with a monetary value to a diverse population of users (for example not within one company), it has become apparent that a trusted system is needed. In other words a system that gives rewards based on correctly observed behaviour. This

creates challenges in terms of the accuracy with which behaviour is observed and the contingency measures where errors do occur.

- In order to grow to larger user bases, labour-intensive manual actions should only be needed in case of incidents. All recurrent processes and actions should not rely on manual interventions. Aside from the large workload on the operator, this will also hinder the users experience because they will have to wait for the operator to perform this action (probably only during office hours).

7.1.7 Marketing and communication

- The use of proxy organisations in recruitment has been found to work very well. These organisations have an established communication channel as well as trust relations.
- As described above, there will be subgroups that are already disposed toward sustainability and a greener planet and the likelihood is that these already prefer sustainable modes. In order to reduce the use of conventionally fuelled vehicles, people who are motivated towards issues concerning health, time spent and easing life's puzzle may be a better target for incentivisation through EMPOWER type schemes.
- Professional marketing services are a recommended investment given the user-orientated nature of this type of behavioural scheme. Branding and a catchphrase are important and there may be merits in adopting positive incentives under the 'umbrella' of an existing scheme. Users may connect to a slogan that captures the feelings of the value that is being offered.
- Engaging users at an early stage in the design brings a number of advantages. Specifically there is an opportunity to draw their inputs into the design and value offers, but it also enables 'early bird registration' and the testing of the future services

7.1.8 Operation

- It is necessary to plan sufficient resources for the recruitment and engagement of users, on-going marketing and communication, incentives, data management and monitoring/evaluation. These tasks may not necessarily form a significant part of other types of transport schemes and tend to be under estimated.
- Sufficient human resource is needed to support users when the scheme is being launched or updated. Unexpected issues might arise and cause high dropout rates when not addressed promptly or adequately.
- In designing the incentive scheme it is important to address the possibilities of automation of tasks, aiming to reduce the operational burden as much as possible. This applies to regular user interactions as well as any support workflows.

7.1.9 Evaluation

- As evaluation requirements highly influence the design of the scheme in the Living Lab, evaluation should be addressed from the early stages of the design.
- It is important to identify what the key indicators of success are for each stakeholder and design the back offices systems so that these are monitored and can easily be reported on.

- The evaluation scheme should reflect the different spatial and temporal impacts that may occur with this type of scheme, the need to detect impacts by subgroup and all stakeholder types, and that different evaluation approaches may be needed for aspects such as social networking.

7.2 The EMPOWER Legacy

The EMPOWER Living Labs will operate until at least the end of the formal project lifetime. The EMPOWER Living Labs are, however, all designed to implement services that have a life-span which goes beyond the end of the EMPOWER project. To achieve this, the EMPOWER Living Lab schemes are embedded in the everyday operation and values of transport service provision and providers. In this way the EMPOWER project acts as a catalyst which enables others to work towards a self-perpetuating value network.

In order to be successful, the EMPOWER project has embedded the Living Labs into the everyday operation of transport service provision and providers in a number of key ways. Our design process shows clearly that a fundamental first step is to identify the value proposition for the key stakeholders, those stakeholders directly responsible for implemented the Living Lab initiatives. This has to be coupled with a common understanding of the value proposition for the end user. Embedding both value propositions into the implementation is a key step in the process of establishing a common vision of the end result.

Common vision of the value proposition is a necessary but not sufficient condition for embedding implementations into transport service provision. What is also needed is to ensure that the roles and responsibilities required for the initiatives to be implementation are also embedded in the organisations. In the EMPOWER Living Labs we have designed implementations reinforcing the ecosystem and using existing roles and responsibilities. However in the area of positive incentives EMPOWER has the knowledge capital. In this area we have to ensure that knowledge is passed on and to design a process for roles and responsibilities are taken over.

In general our strategy has been to either have a design that ensures that there is a partner who is already involved in the ecosystem and performs that role during the Living Lab operation or who can take over, or there is a business opportunity for a new company. In the situation where there is an existing partner, one of our current stakeholders, we embed the Living Lab in their ongoing value proposition and operations so the continuation integrates with their current business as close as possible. In a situation where there is no obvious partner available, then the value proposition has to be explicit enough to work towards a value transfer system with the other stakeholders, so business opportunities are as clear as possible.

As well as the local legacy exemplified in the Living Labs there is a legacy associated EMPOWER Take-Up Community and the EMPOWER Follower Cities. The successfully implemented incentive schemes and expert knowledge on positive incentives can be broadened and transferred to the locations associated with that community of around fifteen cities. This includes the EMPOWER Take-Up Cities who are implementing their own local positive incentive schemes. As well as the

EMPOWER Follower Cities, who have expressed their interest in positive incentives and learning from the EMPOWER expertise, but have not yet implemented their own incentive schemes. The EMPOWER legacy is to demonstrate positive incentives based schemes in which longevity and sustainability are integral to the definition of success.

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