e-Road Písek - Deggendorf

Materials for Standards and Recommendations for Further E-Mobility Development and Potential Replication in Other European Regions

Project # 093

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Evropský fond pro regionální rozvoj

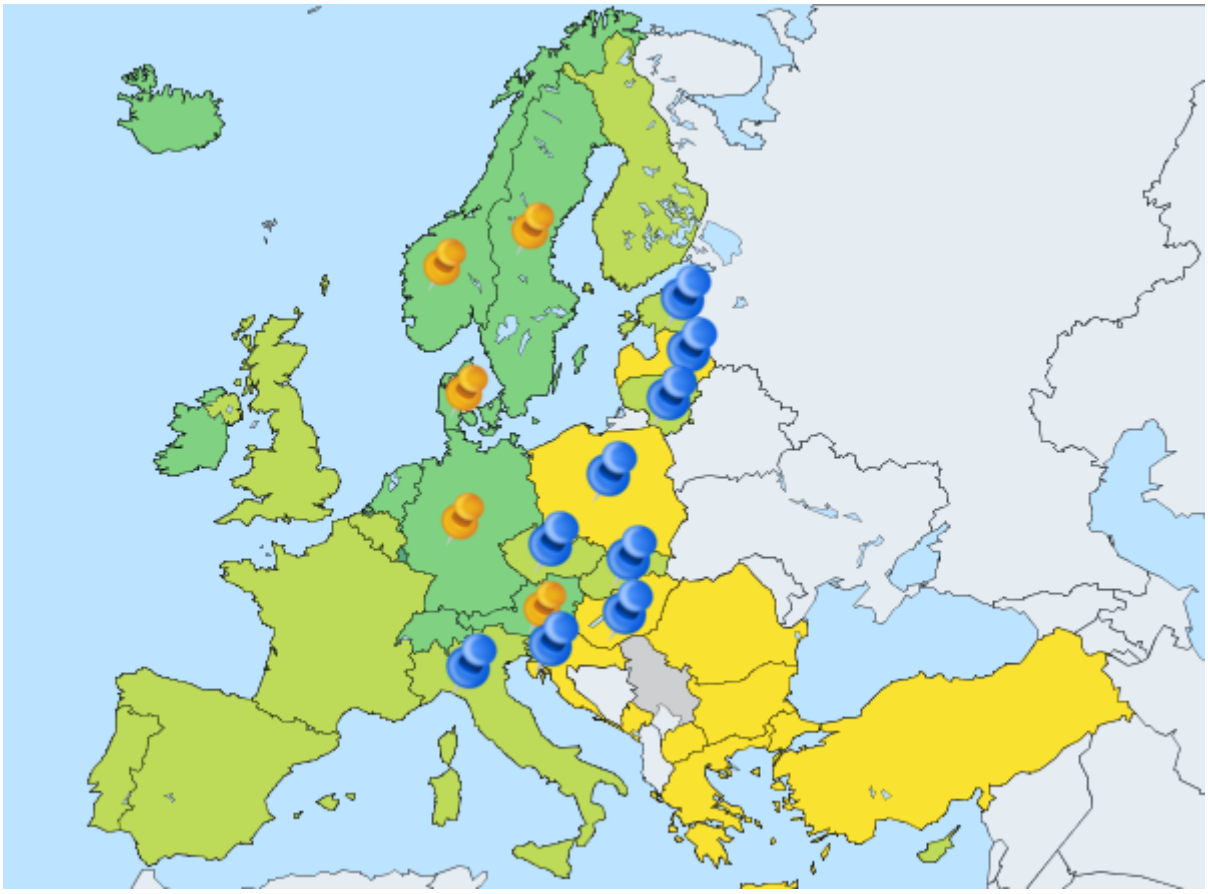
Table of Contents

Introduction

Given the divided European development in the last century, the continent still finds itself in a situation, where certain countries are more developer and some are still dealing with the consequences of planned economics. However, e-Road works with these impacts and utilizes the fact that the more developer Lower Bavaria can help the e-mobility development in the neighbor Southern Bohemia. This spirit can be transfered to projects throughout the whole European Union.

European Regions for Potential Replication

Eurostat regularly publishes statistics from various areas of life in Europe. One of the indicators collected by this institution is the purchasing power parity (PPP). Combined with the largest investments to innovation it can be seen that suitable know-how transfer partners are Norway, Sweden, Denmark, Germany, Austria, and Switzerland (orange pins). This means that countries that could benefit from the cross-border cooperation are neighbors to these countries and can be found in the second group based on PPP – Estonia, Lithuania, the Czech Republic, Slovakia, Italy, and Slovenia. Since Latvia, Poland, and Hungary are in the last ten in regards to the PPP, they are listed more as second choices.

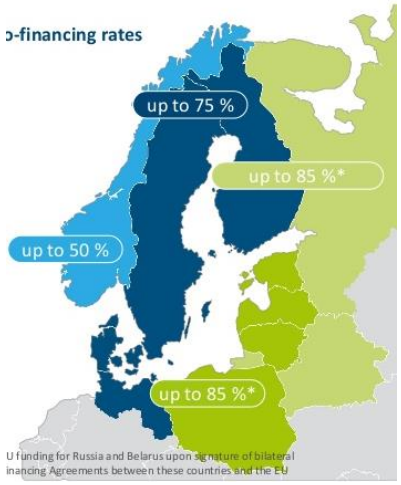


Picture 1 – Potential partners for e-Road replication (Eurostat)

The individual pairs for cross-border cooperation can be divided into geographical axis of the Interred programs – the Baltic Sea, Danube, and Central Europe (Interreg, 2014).

Baltic Sea

- Sweden – Estonia
- Sweden – Lithuania
- Sweden - Latvia
- Norway – Estonia
- Norway – Lithuania
- Norway - Latvia
- Denmark – Estonia
- Denmark – Lithuania
- Denmark – Latvia



Picture 2 - (Interreg Baltic Sea Region, n.d.)

Dunaj

- Austria – Hungary
- Austria – Slovakia
- Austria – The Czech Republic
- Germany – The Czech Republic

Picture 3 - (Danube Transnational Programme, n.d.)

Střední Evropa

- Germany – Poland
- Germany - The Czech Republic
- Austria – The Czech Republic
- Austria – Italy
- Austria – Slovenia
- Austria – Slovakia
- Austria - Hungary

Picture 4 - (Interreg Central Europe, n.d.)

Possibly the closest matching profile to the e-Road project can be seen in the areas with a country of the former Soviet Union and its satelites with a country untouched by last centrury socialism, on the contrary working for the last decades in the capitalist environment. THerefore, even though the Baltic region is quite remote, the country profile closely matches the e-Road project. Given that Norway i sone of the leaders in e-mobility on the global level, the Baltic Sea region countries found on European mainland could greatly benefit from cooperating with such a partner.

Another great choice would be cooperation with Germany, the joined states, because for example Bavarian partners are already included in the e-Road project.

It is also crucial to understand the interest ini e-mobility and the efforts put forth by potential stakeholders in the given area. If there are already charging stations being installed and the infrastructure being built, the e-Road replication could support these actions.

Checklist – choosing appropriate location for replication

When analyzing the subjects and areas for the e-Road project, it is possible to find general characteristics that could serve as basic indicators, whether or not an e-Road replication project is in order or not.

- Electric infrastructure present on both sides
    - e-Road example: The Bavarian side already has a vastly developer charging infrastructure including complex solutions for payments and contracts, including roaming. The Czech side has about twenty charging stations predominantly not connected to a larger network that are not even present in an updated list.
- E-mobility in regional and city planning
    - In Southern Bohemia there are cities like Budweis and Pisek that included electric and clean mobility in their strategic and development plans and are already in the proces of implementing planned changes, for example the upgrade of the public transportation vehicle fleet.
- Option to connect with cross-border partners
    - Thanks to the open approach on the Bavarian side, which is interested in further infrastructure development not only at home, it was possible to start the e-Road project.
- Free development investment funds
    - Outside of subsidies and other supporting financial tools, it is necessary to think about the amoungt of free funds the interested subjects have at hand, including the costs emerging due to the exchange rates fluctuations.
- Sufficiently developed road infrastructure

  - Even though there are many dirt roads in Southern Bohemia, the main nodes are connected via high-level roads or highways.

- Non-existence of complete e-mobility concept
  - e-Road tries to provide the municipal subjects information for e-mobility implementation but these materials lose their significance when a concept has already been put together.
- Fragmented charging infrastructure
  - The example of Southern Bohemia suggests that it i sone thing to instal the infrastructure, but it is something else to integrate it to a unified system. The project tries to aim at the latter and help not only with the development, but also with the intregration and connection.
- Fragmented ICT e-mobility infrastructure
  - The market contains many maps and apps, but enither currently fulfils supranational goals.
- No Intercharge connection
  - If the region is already connected to this initiative, then it has the e-mobility concept in a certain phase of work-in-progress.
- Development of the sustainable strategic partnerships with the cross-border partner region

Checklist – finding the right partners

- Combination of academic, non-profit, and commercial spheres
- Academic
  - Analysis writing
  - Data collection and evaluation
  - Tech background
  - Most suitable – technical colleges and universities
- Commercial
  - E-mobility stakeholder
  - E-mobility commercial solution provider
- Non-profit
  - Focused on the environment
  - Plus if also focused on technologies
- Public
  - Cities and regions
  - Implementation of clean mobility

ICT environment

Europe does not have a unified ICT system for EV management. The supranational level sees initiatives like Intercharge and several other applications, which do not cover the area of the whole continent. Even though it is possible to find charging stations for example on Google, the placement is not updated and these systems do not allow anything more than finding the station.

The national level sees more development, for example there are systems in Germany that enable full management. Despite the advances, such as charging cards, it is not possible to use this feature everywhere. The e-mobility app allows for the full EV management but is restricted to a certain geographic area.

The Intercharge system is a European initiative with one big disadvantage. In order for the provider to be able to register his charging station, he has to spend a significant amount of money, which may not be an issue for big providers but it certainly cannot be applicable to the whole continent.

Even though Intercharge tries to put together a complete supranational infrastructure, payments are still very fragmented. Some providers switch to direct app payments, some have their own system, others accept debit cards and cash. It is necessary to note that all of these options do not work everywhere. The same issue is present for charging authorization.

Recommendation

Authorization

Today not all charging stations are smart. Some are still unlocked with a regular key, some with a card but without access to the Internet. Despite these obstacles, even these charging stations can be converted to smart ones. First, it is necessary to enable communication with the charging station. This is done via the OCPP protocol. If the station does not have this functionality, it is necessary to purchase a sensor that allows this feature. This device can further enable access via a RFID card working on the universal RFID system.

Payment

The system should allow the use of various payment types via an app. It should be able to integrate debit cards, bank accounts, payment gateways, and special charging cards by providers.

Unified platform

The e-Road project sees a language mutation of the system developer by E-WALD GmbH. This platform works for the customers of this vendor and via HTML5 enables the management of EV charging, including payments. It works on a simple system of a publicly accessible charging map and a user access to book, pay, and view charging history.

This platform will be enhanced with an app that will have the planning feature and will be ready for the Czech market.

Given the variety of the current systems, it would be appropriate for the paneuropean system to be built on open technologies. First, openness allows better alignment with the current technologies. Secord, the whole system could be used for Crowdsourcing. Additional modules could be prepared by anyone and it would only be necessary to check the quality and accuracy.

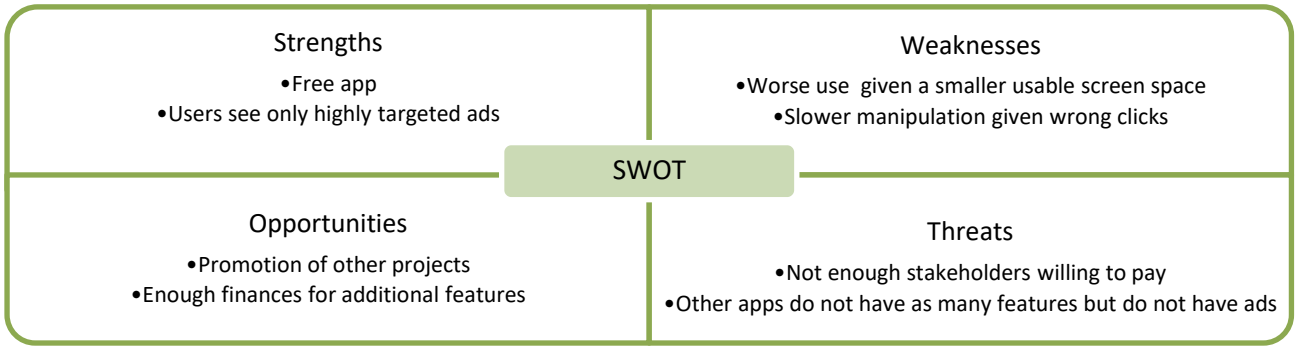
An advantage of this approach is also the fact that crowdsourcing can be used for language mutations as well. It will not be necessary to pay for professional translations since it will be possible to utilize the e-mobility community.

It will be necessary to ensure the interest of subjects devoting their time to a similar activity or working on it already. It will be needed to analyze the current system and design the best way to integrate it to the new system. The pilot project in this regard could bet he connection of the server EV mapa, which ensures the charging management in the Czech Republic.

Platform after sustainability

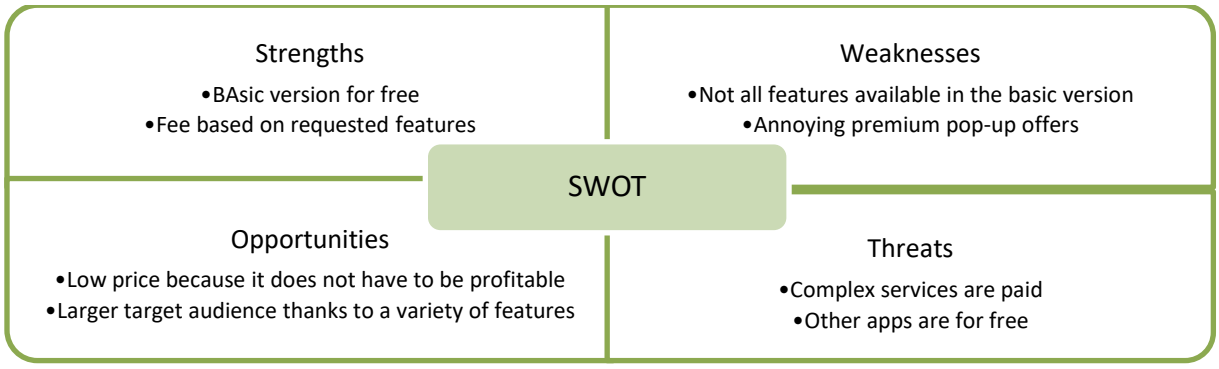
Since the project ends in 2019 and then it has two years of sustainability period, it is necessary to plan ahead and choose the business moderl based on which it will be possible to further operate the platform and the app. The options follow (Munir, 2014):

E-mobility stakeholder ads



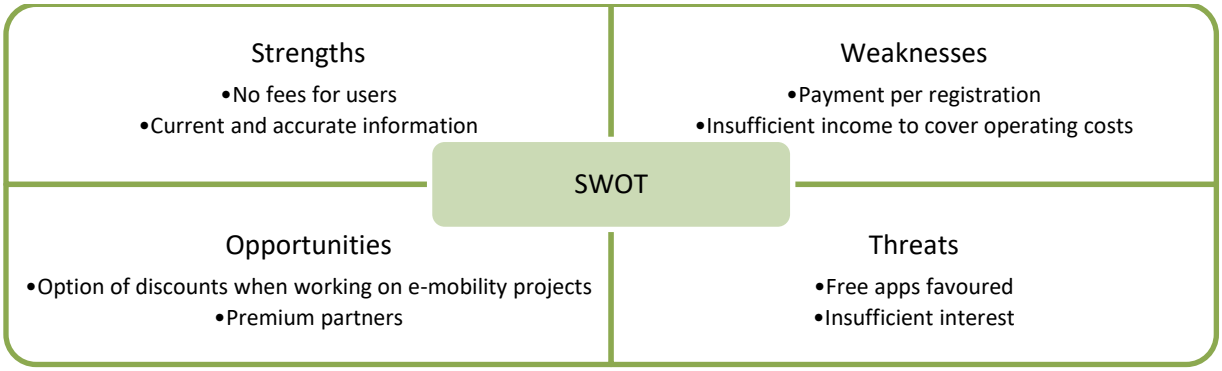
Picture 5 - SWOT – E-mobility stakeholder ads

Freemium



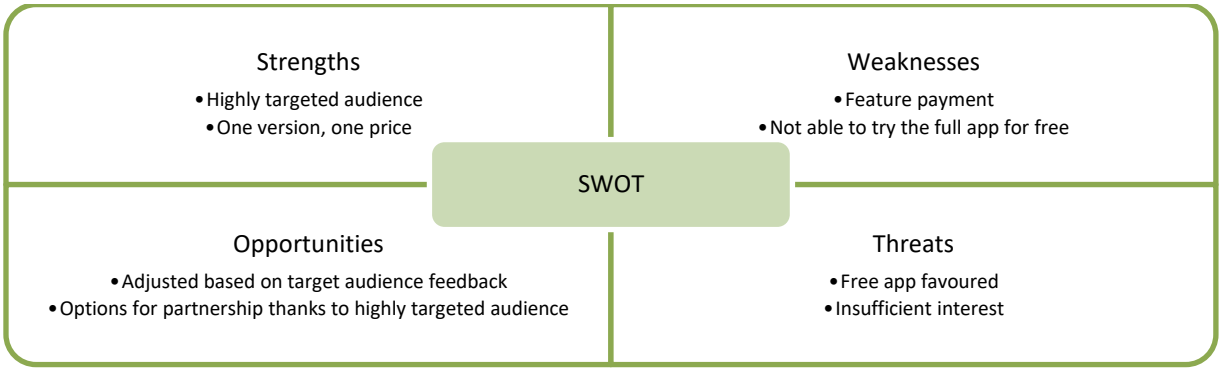
Picture 6 - SWOT - Freemium

Charging station registration fee



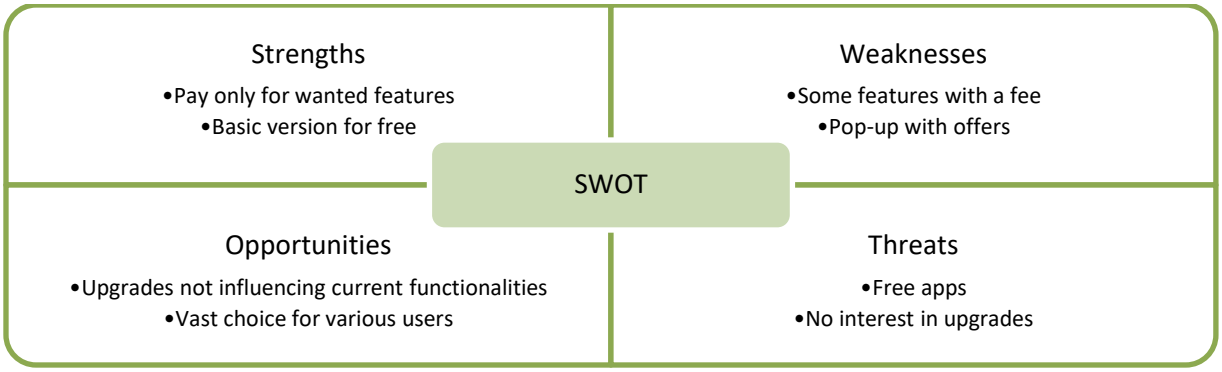
Picture 7 - SWOT – Charging station registration fee

App download fee



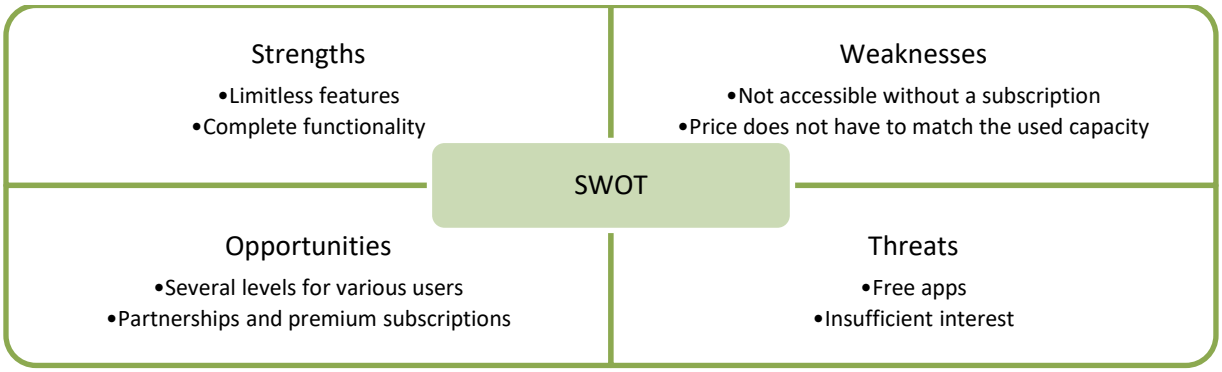
Picture 8 - SWOT – App download fee

In-app purchases



Picture 9 - SWOT - In-app purchases

Subscription



Picture 10 - SWOT - Subscription

The most suitable format for the app operation is

Image List

References

Interreg. (2014). *Six Programme Areas*. Získáno 12. 12 2017, z Interreg: http://www.interreg.de/INTERREG2014/EN/INTERREG/SixProgrammeAreas/sixprogrammeareas_node.html

Munir, A. (10. 09 2014). *App monetization: 6 Bankable Business Models that Help Mobile Apps Make Money*. Získáno 29. 11 2017, z Localytics: http://info.localytics.com/blog/app-monetization-6-bankable-business-models-that-help-mobile-apps-make-money