LIMES – Large Scale Innovative and Mobile European Services for Culture Tourism in Rural Areas

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1 ABSTRACT

The Roman Limes is the only European cultural heritage which interconnects ten European countries. Three of these countries have now decided to develop and implement a Mobile Information System for the tourism exploitation and marketing of this cultural heritage. Germany, Austria and Bulgaria will develop a "role model" for adaptation in order to connect all touristic sites in the ten European countries along the Roman Limes via mobile services. Since the Limes is often not accessible or not recognisable, new mobile service applications are vital to create an understanding and awareness of the historical setting that is often in the countryside. Designated target is to advance sustainable tourism and to support the mobility especially in rural European regions by the practical application of highly innovative mobile services. These services will enable information brokering, booking of rooms, travel mobility and additional functions for visitors as well as located people. Technologically it is about the interaction amongst mobile Internet, Global Positioning System, mobile phone camera and social networks. Therefore, a "Limes-App" will be developed including video player, navigation module, social media connection and an Augmented Reality Viewer. The Mobile Information System will base on Limes-relevant data and informations, displayed especially as historical reconstructions and other visualisations. Best practice models in context to the European LIMES project will be made public and applicable for the seven other European countries along the Roman Limes. In addition, the European Union has decided to launch a "data-roaming cut-off safeguard" [European Union 2010] for international mobile use and to cut the prices for calls and mobile Internet step by step in the next few years [European Union 2011]. This results in excellent conditions for the project which will help to valorize the cultural route of the Roman Limes, to capitalise its economic potential and to support sustainable tourism networks and structures in Europe.

2 THE LARGE SCALE DEMONSTRATOR CONCEPT OF THE EUROPEAN UNION

The "Expert Panel on Service Innovation" in the European Union (EU) published a report "Meeting the challenge of Europe 2020: The Transformative Power of Service Innovation". The strategy of Europe 2020 is a smart, sustainable and inclusive growth which in the context of service innovation leads to the vision of a "fundamental system transformation in almost all areas of the economy" [MAYO et al. 2011, p.1]. Technology innovation has to be combined with the development of policy through the lens of the customer. The role of the service element forms an important part of modern business and provides much of the technical and social infrastructure. Innovations in these service systems have the potential to profoundly influence other sectors [MAYO et al. 2011, p.7]. To support innovation in complex conditions the EU has improved the concept of demonstrators. These demonstrators – as innovation management tools – shall "provide a way of de-risking innovation by providing a staged process in which a range of solutions are initially developed, tested and then selected for further rounds of support" [MAYO et al. 2011, p.18]. There are numerous small-scale prototype demonstrators and a smaller number of large-scale near-market demonstrators. "Given the size of the European market, this should provide the basis for European standards to play an important role in developing global standards, thereby ensuring a level playing field for EU firms in global markets" [MAYO et al. 2011, p.18]. For different challenges there will be several demonstrators [MAYO et al. 2011, p.20f]:

- The focus on sustainable communities highlights the importance of ecological change and reflects the need for transition of industrial areas and the development of smart cities.

- The focus on the creation of dynamic regions takes care of the need to improve poorer, remote regions in Europe with particular reference to smart and sustainable tourism.

The focus on sustainable coordinated transport has the target to promote sustainable mobility by the reduction of carbon emission and the improvement of efficiency and predictability of the transport system.

The European Mobile and Mobility Industries Alliance (EMMIA) implemented the concept of large-scale demonstrators to prove the feasibility of exploiting innovative mobile services to foster sustainable tourism in rural areas. In 2011 two large-scale demonstrators were launched by the European Commission's Directorate-General for Enterprise and Industry: The demonstrator "CULTWAyS – CULtural Tourism WAys through mobile Applications and Services" [CAPRA 2011] and the demonstrator "LIMES – Large Scale Innovative and Mobile European Services for Culture Tourism in Rural Areas". The main objectives of the project are

- to network tourism sites along the Limes in all respective countries,
- to develop innovative mobile services along the route which support information, brokering, travel mobility and additional services for visitors as well as local people,
- to support via these services new businesses along the route,
- to create income and jobs for rural areas,
- to make the European identity and the common European history visible and perceptible for visitors from all over the world.

3 MOBILE SERVICE FOR CULTURE TOURISM

3.1 The Limes in the Demonstrator Regions

After defeating the Carthaginians in 241 BC the Romans began to expand their sphere of influence in the western Mediterranean Sea. By striking back the attack of Hannibal in 202 BC the Roman Republic ruled the territory of today's Spain and southern France. From now on the Roman expansion went on towards the east under the pretext of supporting small kingdoms against the attacks of big powers like Macedonia or Syria. Other kingdoms surrendered in preemptive obedience [DEMANDT 2003, p.73f].

Gaius Julius Caesar conquered Gaul in 58-51 BC and was appointed as dictator of the Roman Empire. This empire subsequently expanded until it surrounded the whole Mediterranean Sea. The expansion stopped in "Germania Magna", when the Roman army under Varus suffered overwhelming defeat in the Teutoburg Forest in campaign against the Cherusci in 9 AD. As result the Rhine and the Danube were the natural borders of the northern Roman provinces [DEMANDT 2003, p.79f].

Fig. 1: The Roman Empire at its greatest extent in 211 AD – source: CAVAZZI 2009

In 43-44 AD Britain and in 74-85 AD the territories between Rhine and Danube in today's Southern Germany were brought under Roman rule. To ensure customs revenue and security along the borders the Romans built a visible dividing line, which was built up in the period following. This "Roman Limes" represented the border line of the Roman Empire at its greatest extent until the beginning of the 3rd century AD. Partly it was fortified with walls, towers and forts – especially in Britain (Hadrian's Wall and Antonines Wall) and in today's Germany ("Germanic Limes" and "Raetian Limes"). In fact, the word "Limes" was not only used to indicate the imperial frontier or a fortified border. It was used as an administrative term, indicating a military district, commanded by a dux limitis [ISAAC 1988, p.125ff].

Now the Large Scale Demonstrators of the European LIMES project pick up the northern Roman border line to develop mobile services and revive the intercommunity along the Roman Limes. The three Large Scale Demonstrator Regions in particular are Rhineland-Palatinate in Germany with the "Limes Germanicus", Lower Austria along the Danube and the city of Rousse in Bulgaria, also located at the Danube.
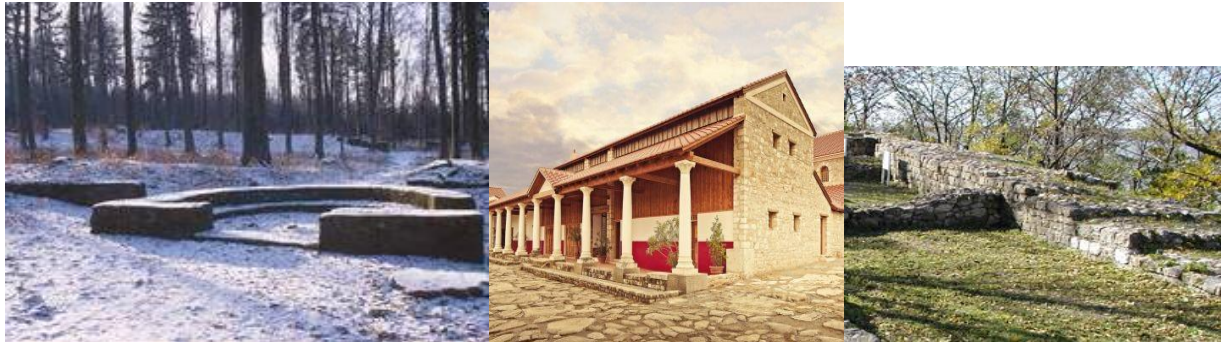

Fig. 2: Limes sights in Rhineland-Palatinate (Roman fort in Holzhausen), in Austria (reconstruction of thermea in Carnuntum) and in Rousse, Bulgaria (Roman fort "Sexaginta Prista"). Sources: JOST 2012, OLSCHINSKY 2011, KABAIVANOVA 2005.

3.2 Requirements of Mobile Services in the Demonstrator Regions

Based on a study of the "Branchenverband BITKOM" 83 % of the German population owns a mobile phone. At the end of 2011 there were about 112,03 million contracts in Germany. This shows that some users have more than one contract (e. g. surf-sticks, tablet PCs). In Germany there are four major mobile network operators [KURTH 2011, p.51]:

- Telekom Deutschland (31,2 % market share)*
- Vodafone D2 (32,9 % market share)*
- EPlus (19,8 % market share)*
- Telefónica Germany O2 (16,2 % market share)*

* retrieved 3rd quarter in 2011

To guarantee a save and fast data transfer rate, it is necessary to have at least UMTS connection (3G-network) at the major stations of the mobile information system "Limes". For textual information the EDGE data rate is adequate, but not for larger data like videos or Augmented Reality applications. As an evaluation of the network coverage in the three partner regions shows, there is a very good 3G-network coverage along the Limes in Bulgaria and Austria. The Limes in Rhineland-Palatinate runs through rural areas, where is often a lack of 3G-networks – so there isn't a well-performing Limes information system verified.[1] Therefore the Limes information system has to offer an open wireless Internet access point (e. g. WLAN) at the main sights. In addition some applications, like videos and textual information, should work offline – the user can download the data at the wireless Internet access points and get the information at places with no mobile internet access or with low network coverage.

The framework of smart phone usage in Bulgaria (only 9 % smart phone users in 2011) requires a mobile information system, which works with a "basic-version" on older mobile phones with only mobile internet access. So the system should base on a mobile website. This also guarantees the function of all kind of smart phone operating systems. Applications like Augmented Reality or offline navigation are only suiting to smart phones and should be part of an additional "App". This "App" should be provided for the operating systems

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[1] Own evaluation, based on data of the mobile network operators.

Android OS and Apple iOS – in the three partner regions this operating systems are very popular. Generally, there is still a problem of high cross-border costs for mobile internet usage: Because of the roaming costs, consumers are not willing to use the mobile internet in foreign countries. These problems show that the mobile service that will be developed in context to the LIMES project has to meet several requirements, which are very different from region to region and will hopefully get easier to handle in future.

Certainly, the European Union has decided to cut the roaming costs step by step in the next few years and the mobile network coverage will improve in all European countries [European Union 2011]. Another future perspective are mobile NFC (Near Field Communication) services that are generally able to stimulate future growth by involving transportation, ticketing, retail, access and more. The aspects of "Connected Living" can create new service concepts and business models that are being used to address a range of new markets [GSMA 2012].

New target groups – especially younger generations – can arise because of the majority of young smart phone and mobile internet users. In this context the system has to offer an additional value. Individual tourists need the profound information but also have to be entertained. To develop an attractive application which can be used more than once it has to include a social interaction tool and a playful element. According to the needs of outdoor tourists as well as historically interested culture tourists there should be a kind of "Story" that surrounds the mobile Limes application.

3.3 Contents of the "LIMES-App"

The information of a mobile application called "LIMES-App" has to be suitable for tourists and local people as well. There should be as much interaction as possible, so the users can give an input about gastronomy, hotels or events by rating, commenting, etc. At the same time the quality of information must be guaranteed. Additionally there has to be a booking option for accommodation and the opportunity to navigate to the next points of interest. To make the "LIMES-App" attractive to younger target groups it is planned to implement some playful elements such as collecting aspects or games, which might work on static PCs but evolute their full range of gratification only on-site at the Limes. Other multimedia like videos, 3D-models etc. should be part of the information and entertainment, too. Generally, social interaction is one of the major points the application has to offer to found a kind of "Limes community". In addition, the technology of Augmented Reality can be included for better orientation, navigation and as a playful tool, maybe as Augmented Reality game. In the first step these contents were sorted into four categories, which enable different ways of access to the Limes experience:

- Information about the Limes and additional aspects like weather, public transportation, etc.
- Offers like gastronomy, accommodation, events, etc.
- Social Media for the connection of users via Facebook, Google+, FlickR etc. or a special "Limes community".
- Games that work offline (like people are used to it), but also in combination with social media or Augmented Reality.
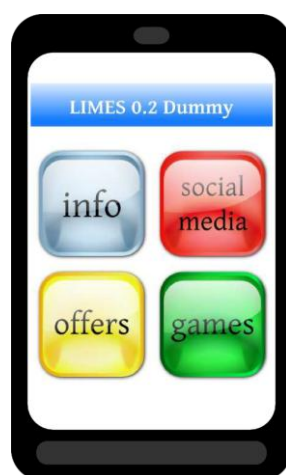

Fig. 3: "LIMES-App" ("Dummy"-Version), source: Own figure

4   IMPLEMENTATION AND REPLICATION IN EUROPE

The LIMES project will have extraordinary impact as the project organisation already includes all relevant players Europe wide. Limes representatives of the United Kingdom, the Netherlands, Slovakia, Hungary, Croatia, Serbia and Romania were invited to this proposal for fostering replication and extension of the project outcomes in their respective countries. They will participate in all partner meetings with the task for checking the transfer potential in their countries – either as actors or communicators.

Actually, the Limes is a premium destination for culture tourism although much of its potential has not been exploited so far. This is mainly due to the fact that only a small part of the Limes is accessible at the moment: the Limes runs through rural regions which are not fully developed for tourism. On the other hand, the European Limes countries have numerous museums, historic routes, archaeological sites and hidden places of interest along the Limes. These single places are not networked yet, and binding them together via mobile services offers an outstanding chance for developing especially rural areas.

The European Limes countries are very different in their access to the Limes: The United Kingdom, Austria and Germany represent countries which are very far in their tourism exploitation of the Limes, while especially Eastern countries are at the beginning of the development of tourism activities. Beyond these differences, none of these countries actually seems to have mobile services available for Limes sites in rural areas. The development of these areas is the common goal for all the member states which want to work together in the LIMES project.

Additionally, it is also part of the project to cooperate with other European Large Scale Demonstrators like the project CULTWAyS, which covers the topic of European historical, cultural routes – in particular the Way of St. James in Germany, France and Spain and the Roman Via Claudia Augusta in Germany, Austria and Italy. Overall, the mobile services developed in the context of the projects LIMES and CULTWAyS shall be adoptable for other European regions with other priorities.

5   CONCLUSION

The Limes has a big potential for tourism especially in times of general mobile availability. New ways of interregional communication between tourists and locals in Europe. Social media can bring virtual and real life into rural areas by playfully connecting people, who are more and more used to in smart phones and social media. The target is to create a wide community about the Limes on all leading social media platforms, like Facebook, Google+, FlickR etc. So the users will have the possibility to exchange their experiences at the Limes and the region (for example tips for sights, accommodation, events, etc.).

For the social media application it is useful to create a communication platform for Limes-tourists, Limes stakeholders and other, local people in the region. So on, there will be the possibility that they generate more and more content for the mobile information system and bring and keep the Limes community alive.

Finally, there should be a story told with the Limes application, which is interesting and participative for a lot of people and attracts them to come to the Limes region. At the same time the local people and economy has to be convinced to take part at the Limes community by advertising the system, offering information, sponsoring or participating by a benefit scheme or by offering attractive specials. This will lead to an added value, which satisfies tourists as well as local people and economy.

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