Tourism Service Portfolio for Smart Destination

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Abstract

Based on recent rapid advances of machine learning, big data processing and Internet of things, on-site and personalized tourist support services called smart tourism services (STS) are emerging. STS require regional data (RD) collected mainly in the destination from various date owners. Many regional parties that provide STS are so small that they cannot collect necessary data by themselves. For collecting the RD efficiently and employing STS strategically, a required STS list with priorities based on the regional consensus is needed. We propose the tourism service portfolio (TSP) as the required STS list. In this concept, we construct a TSP, and design a reginal data platform (RDP) that collects, stores, processes, and distributes RD to STS providers aiming for employing TSP. We call such a destination as a smart destination.

Keywords: Service portfolio; Smart tourism; Open data; Regional development; Public policy in tourism.

1 Introduction

Tourism services are changing with advance of information technology. In the early stage of the mainframe age in 1950s, flight booking systems went online from traditional manual booking system. In early 2000s, the advances of web-based technologies led to emergence of e-Tourism (Buhalis 2003; Werthner 2004). For instance, tourism guides and map services were globally distributed and web-based room reservation services were opened to consumers. However, these services are mainly used during planning and preparing stage before travel. And now, on-site services during staying in a destination can be realized because rapid advances of sensors, smartphones, big data processing, machine learning and Internet of things (IoT). As the results, real-time and personalized tourist support services like real time spot recommendation, evacuation support, and traffic congestion avoidance support can be realized. These are totally called smart tourism (Gretzel 2015a, Buhalis 2015).

For realizing the smart tourism, data collection and processing over a destination becomes important as Gretzel et al pointed out in their definition as follows (Gretzel 2015a). "*Tourism supported by integrated efforts at a destination to collect and aggregate/harness data derived from physical infrastructure, social connections, government/organizational sources and human bodies/minds in combination with the use of advanced technologies to transform that data into on-site experiences and business value-propositions with a clear focus on efficiency, sustainability and experience enrichment*." The definition indicates only concept of the smart tourism and, lacks concrete viewpoints for realizing the smart tourism. In addition, inhabitants live at the destination, therefore, not only tourists but also inhabitants should be taken into consideration for the smart tourism (Gretzel 2015b). In other words, what kind of services are necessary for both of them should be discussed in the destination. In fact, heavy traffic congestion in a peak season comes to an issue, and the local government

and communities are holding regular meeting for solving the issue (Kyoto City). Without consideration from viewpoint of service, we cannot discuss what data the technology required are, and eventually, how to collect the data for the smart tourism. Therefore, it is necessary for defining the smart tourism to consider relationships among service, technology and data.

Instead of the Gretzel et al. definition, we define *the smart tourism as tourism supported by real-time and personalized tourism services based on a list of required services in a destination with use of intelligent information processing, and regional data (RD) collected in the destination for promoting on-site experiences of tourists and coexistence with inhabitants and tourists*. We call the real-time and personalized tourism service as a smart tourism service (STS), the list of services as a tourism service portfolio (TSP). RD can be categorized into three types: a type of RD that changes in short time is defined as dynamic data like GPS trajectory, statistically processed dynamic data is defined as statistical data like tourist statistics, and the other type of RD that does not change for long time is defined as static data like time schedule of train. From different viewpoint, RD have an attribute whether the RD can be used globally or not, which is defined as the global attribute. The statistical data have the global attribute in general. A part of the static data can have the global attribute.

The available temporal range of RD is short, therefore, it is difficult for off-site parties to collect efficiently. The regional parties will be competitive to off-site parties to collect and use RD. Since there are various types of RD, it is impossible to collect all RD even for regional parties. Hence it is reasonable to consider the STS first and then, to prioritize what type of RD to be collected. Based on our interviews with some regional parties including local governments and venture companies, many regional parties that provide STS are so small that they cannot collect necessary RD by themselves. We developed and released an evacuation support and safety confirmation service for school excursions in alliance with a venture company and one of the biggest travel agencies in Japan, and the service collected less than 1,000 GPS trajectories in the first year (Kasahara 2014). In interviews with some AI based ventures, they answered that they used RD that their customers provided, and no RD they collected by themselves. For collecting RD throughout the destination, an entity which is responsible for collecting, maintaining, processing and distributing RD is inevitable. Since the entity should consider efficient scheme of collecting all required RD, STS should be prioritized mainly based on regional consensus, which is shown in TSP. In this concept, we first construct TSP, and design reginal data platform (RDP) that collects, stores, processes RD, and distributes data to STS providers aiming for employing TSP. We call such a destination as a smart destination. TSP is a key tool for realizing the smart destination.

2 Related Works

As existing data collecting frameworks, an Open Data is broadly adopted in many tourism destinations. Janssen et al. (Janssen 2012) defined Open Data as "*non-privacy-restricted and non-confidential data which is produced with public money and is made available without any restrictions on its usage or distribution.*" Most of Open Data is originally located in the RD which have the global attribute, and

eventually is growing to the dynamic data area like real-time public transportation location data or real-time disaster data.

Verhulst proposes the Data Collaboratives (GovLab), which is an enhanced concept of Open Data scheme. Verhulst and his GovLab project team propose Data Collaboratives, in which the public sector and the private sector are collaborating each other for sharing health care data in order to improve people's lives. For this work, we are interested in their public and private sectors collaboration. Since RD have already collected and owned by private and public sectors, both sectors have to collaborate for sharing the data. RD owned by private sectors include privacy, security or company secret, therefore, private sectors enclose their RD for their own purpose. Data giant companies follow this strategy. On the other hand, many social network service providers permit access to their data via API (Application Programming Interface). For making both sectors collaborate with each other, the purpose of data usage should be shown by using TSP.

3 RD Required for Smart Tourism

3.1 Characteristics of RD

Since RD show the status of objects such as humans, things and events in the region, RD have utility values for most of people who stay in the destination. RD can be categorized into three types: dynamic data, static data and statistical data. The dynamic data show real-time and individual condition of an object that changes in short time, and are available accordingly in short time, less than two or three hours in general. The static data show individual status of an object that does not change in long time, and the object is mainly environmental object like road network. The average temporal range of the static data is generally long. The statistical data is an integration of dynamic data like a number of tourists who visit a destination.

3.2 Data Ownership

The data ownership is an important factor that affects the RD collection by the regional entities. As the number of data owner increases, the cost of RD collection increases. Also, the data owner has motivation to keep the RD inside when the RD include individual identification information, company secret, or competitive information. We call the former issue as a multiple data owner issue, and the latter issue as a secret data issue. In case the multiple data owner issue, it is difficult to collect various RD from various data owners. There is a project which copes with this issue. Stenneth et al. proposed to estimate transportation modes of people with machine learning technology using three type RD (Stenneth 2011). They used people's trajectories, real time public bus trajectories and road network. They got permissions from people to use people's trajectories, and chose the experimental area where the local government provide the public bus location and road network map. In case the secret data issue, it is necessary for the RD users to negotiate with the data owners. Since the data owners have no motivation to deal the RD, it is not easy to obtain permissions.

3.3 Public Private Data Collaboration

For solving the data collection issues caused by the data ownership, we propose a new concept named "public-private data collaboration," which is defined as a collaboration for collecting RD with both of public and private sector entities in a destination supported by two data dealing schemes. The former scheme deals open-access RD that everyone can access such as the Open Data and SNS posts. The latter one deals closed-access RD that only limited member can access such as company secret. The closed access RD are mainly the dynamic data. There are some merits for collecting RD throughout the destination. Firstly, the collecting cost for each RD users can be decreased. Secondly, collected RD will become a strength for the regional society including tourism industry. Thirdly, RD will be a new administrative method for local governments to achieve governmental purposes like congestion mitigation in the peak season. The private sector entities have no duty to open their data collected while public sector entities have duty to publicize the RD. Since it is unrealistic expectation that the private sector entities provide the RD voluntarily without any payment, we should discuss data collection methods that provide any economical merits for them.

4 Tourism Service Portfolio (TSP)

TSP is defined as the list of STS required in the destination and correspondent RD to each required STS. STS listed in TSP are given priorities in order to indicate the importance of STS based on the degree that the STS improves the satisfactions of tourists and inhabitants. Since the priorities are expected to be decided by the consensus of all stakeholders including data owners, STS providers, inhabitants and local governments, TSP shows regional strategic objectives of tourism. Stakeholders can share the objectives via TSP. TSP is used for confining the quantity of collected RD to minimize.

The inhabitants should be considered as one of stakeholders because they suffer disadvantages, for example the traffic congestions, due to the increase of tourists. Regarding the inhabitants as a stakeholder of smart tourism, we can split STS into two types: the former one is STS for tourists, and the latter one is STS for inhabitants. Both type of services can be realized by using the RD. In this paper, we focus on describing the STS for tourists. Some of STS can be used for both of tourists and inhabitants. For example, if the tourists avoid the crowded public bus according to an advice from a congestion avoidance assistance service, disadvantages of inhabitants suffered from the bus congestion will decrease.

Determining who construct TSP is an issue. The organization that has a responsibility of the destination tourism management like destination management organisation (DMO) is the ideal decision maker. Though making TSP needs highly technical knowledges about STS and intelligent data processing, most of local governments and DMO lack enough ability. Collaboration with academic organisations which can select and filter the potential STSs for TSP will be a solution to construct TSP.

5 Regional Data Platform (RDP)

RDP is defined as a platform which collects RD from various data owners, and transforms the collected RD, mainly the sensor data to the symbol data that have semantic information by using intelligent information processing technology, and distributes the symbol data to STS providers.

As the RDP business model, three models are thinkable. The first model is a "governmental budget model", relying on a governmental budget, the second model is a "corporate model", obtaining funds by selling services and data by itself, and the third model is a "mixture model", a mixture of the first and the second models. The business models cover all activities of RDP system, but do not cover activities of each STS provider which uses the symbol data output from RDP. Costs of the RDP system mainly consist of database server maintenance, data collecting and data processing. As revenue sources, we guess two types of revenue sources. As the data sales, RDP can sell the RD for corporate users. As the data processing agency, RDP sells their data processing ability for small companies without the ability. Not small number of companies have RD but cannot process the RD by themselves.

6 Conclusions

This paper newly defines the smart tourism, and proposes TSP and RDP based on new data dealing concept named "private public data collaboration" for realizing the smart destination.

References

Buhalis, D., & Amaranggana, A. (2015). Smart tourism destinations enhancing tourism experience through personalisation of services. In *Information and Communication Technologies in Tourism 2015* (pp. 377-389). Springer International Publishing.

Buhalis, D. (2003). *eTourism: Information technology for strategic tourism management*. Pearson Education.

Gretzel, U., Sigala, M., Xiang, Z., & Koo, C. (2015a). Smart tourism: foundations and developments. *Electronic Markets*, *25*(3), 179-188.

Gretzel, U., Werthner, H., Koo, C., & Lamsfus, C. (2015b). Conceptual foundations for understanding smart tourism ecosystems. *Computers in Human Behavior*, *50*, 558-563.

GovLab, http://thegovlab.org/about/team/stefaan-verhulst/

Janssen, M., Charalabidis, Y., & Zuiderwijk, A. (2012). Benefits, adoption barriers and myths of open data and open government. *Information Systems Management,* 29(4), 258–268.

Kasahara, H., Kurumatani, K., Mori, M., Mukunoki, M., & Minoh, M. (2014). Evacuation support and safety confirmation sharing in disaster situations for school trips by mobile information system. *Information Technology & Tourism*, 14(3), 197-217.

Kyoto City, http://www.city.kyoto.lg.jp/tokei/page/0000204881.html (in Japanese)

Stenneth, L., Wolfson, O., Yu, P. S., & Xu, B. (2011, November). Transportation mode detection using mobile phones and GIS information. In *Proceedings of the 19th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems* (pp. 54-63). ACM.

Werthner, H., & Ricci, F. (2004). E-Commerce and Tourism. *Communications of the ACM*, 47(12), 101–105.