

Citation for published version:

Sofia Reino, Aurkene Alzua-Sprzabal, and Rodolfo Baggio, 'Adopting interoperability solutions for online tourism distribution: An evaluation framework', *Journal of Hospitality and Tourism Technology*, Vol. 7 (1): 2-15, January 2016.

DOI:

<https://doi.org/10.1108/JHTT-08-2014-0034>

Document Version:

This is the Accepted Manuscript version.

The version in the University of Hertfordshire Research Archive may differ from the final published version. **Users should always cite the published version.**

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Adopting Interoperability Solutions for Online Tourism Distribution: An Evaluation Framework

Abstract

Purpose – Research identifying determinants of adopting Interoperability Solutions for Online Tourism Distribution by small operators is lacking. This paper identifies factors that make their adoption more likely. The resulting evaluation framework is then applied to evaluate a number of extant technological solutions focused on Interoperability Solutions for Online tourism distribution.

Design/methodology/approach – In an attempt to address this gap of research, this paper undertakes a series of interviews and focus groups of the European tourism industry.

Findings – Findings partly aligned with the suggestion made by previous research about technology adoption by SMTEs, they also highlighted some issues which are specific to the adoption of Interoperability Solutions for Online Tourism Distribution. These related to the scarcity of ICT applications specifically designed for mini and micro enterprises; the very limited capabilities available for using efficiently ICTs in B2B operations; and the difficulty in collaborating with other companies due to the number of different solutions used in the industry, especially when dealing with large aggregators (GDSs or large OTAs) and lack of standardization for data.

Research Limitations/Implications – The study has important theoretical implications. It provides a better understanding of issues affecting the adoption of Interoperability Solutions for Online Tourism Distribution by SMTEs, such as the scarcity of ICT applications specifically designed for mini and micro enterprises; the very limited capabilities available for using ICTs efficiently in B2B operations; and lack of standardisation.

Practical Implications – It facilitates making decisions about adopting Interoperability Solutions for Online Distribution Solutions, both by suppliers and destination managers.

Originality – Limited work has focused on understanding issues affecting the adoption of Interoperability Solutions for Online Tourism Distribution Solutions among SMTEs.

Keywords: B2B2C, Tourism, Interoperability, Online Distribution, ICT Adoption, SMTEs.

1 Introduction

Today tools providing tourism information, supporting decision-making and the generation of bookings are mainly provided online (Poon, 1993; Buhalis, 2003). These alleviate the historical and almost natural information asymmetry. Furthermore, they make destinations more attractive (e.g. Pan and Fesenmaier, 2006). A confirmation of this comes from WEF (2011), whose study shows a positive significant relationship between tourism competitiveness and the quality of the ICT infrastructure or Information and Communication Technologies (ICT) business usage level in tourism. The way main tourism actors interact has also been influenced by the advent of Internet and e-commerce and it continues to reshape this further. Tourism distribution has changed considerably since the first reservations systems in the 50s and the first tourism information systems like Gulliver in the 80s (Werthner & Klein, 1999). As suggested in previous studies (i.e. Minghetti and Buhalis, 2010) there are great differences across countries. This has important implications for tourism, due to the increasingly reliance of tourists on technology when booking and organising their holidays (Spencer et al. 2012) and the limitations in the role played by local businesses with limited access to technology in the distribution of products (Williams and Spencer, 2010).

Online Tourism Distribution supports e-commerce (B2B2C) through a complex structure of providers, including switches, GDSs, tour operators, travel agencies, Online Travel Agencies (OTAs) and Meta Search Sites (MSS) (O'Connor and Frew, 2002; Krach and Wang, 2010; and Christodoulidou et al. 2010). Technical issues, mainly related to interoperability have been addressed through a number of solutions.

These include projects for the standardisation of existing systems (Missikoff et al., 2003), i.e. Harmonise; and for the provision of new distribution portals with their own set of standards (Liu, 2005), such as Destination Management Systems (DMSs) (Rita, 2000) and OTAs.

Although solutions to address these technical issues have been provided, statistics suggest that the adoption of B2B and B2C technology remains at surprisingly low levels. For example, only 67.9% of the Spanish hotels (Fundetec, 2009) and 74% of the Italian establishments (ISTAT, 2012) have online booking facilities. Furthermore, according to PhocusWright (2011) the European online travel market has a penetration of only 36%.

The European tourism industry seems to be characterized by the high prevalence of SMEs. If the food and beverage sub-sectors are also considered, large enterprises (employing more than 250 persons) account for only 0.2% of the total number of active companies and the rest 99.8% are SMTEs (micro, small and medium tourism enterprises: respectively 1-9 employees, 10-49 and 50-249). The literature suggests some barriers of ICT adoption by SMEs and SMTEs (e.g. Boffa and Sucuro, 2012; Duffy, 2006; and Poon and Swatman, 1999). However, limited work has focused on understanding the issues affecting the adoption of B2B2C among SMTEs, and according to Reino et al. (2011) the adoption of different systems may be influenced differently by business characteristics.

Extant research has examined Online Tourism Distribution (OTD) in terms of understanding its structure (O'Connor and Frew, 2002), its evolution (i.e. Kratch and

Wang, 2010); the different transactional styles of their actors (e.g. Christodoulidou et al. 2010); and strategic approaches to strengthening sales (Toh et al. 2011). However, one very important issue related to OTD that has received very limited attention refers to examining the different approaches taken to address the issue of interoperability between players, and the impact that these different approaches has on the adoptability of OTD. This suggests a gap in research, which will be addressed through this paper.

Based on the results from a series of interviews and focus groups with European tourism operators, this paper develops and applies an evaluation framework for the *adoptability* of Interoperability Solutions for Online Tourism Distribution Solutions. *Adoptability* is here understood as the suitability of specific technology for its adoption by a target industry, taking into consideration the special characteristics of the given industry. The research was generated through the EU-funded project TOURISMLink, financed by the DG Enterprise and Industry. This paper is an extended version of the ENTER paper by Reino et al. (2013).

2 Literature Review

Most of the research on the barriers and drivers of ICT adoption builds upon Rogers' (1969) framework or at least takes it into consideration. Roger's (1969) work ("The diffusion of innovations theory") refers to a collection of models, explaining how innovation, including ICT, is embraced by users. He defines diffusion as the process by which an innovation is transferred through the communication channel to the members of a social system, and it's determined by: the characteristics of the

innovation (i.e. relative advantage, compatibility with potential user, complexity, degree to which it can be tested before its full adoption and visibility of its results); the social system (whether the adoption is optional, collective or an authority-based decision); the communication channels; and the time factor (defined by five different stages of adoption, the rate of adoption and the type of adopters).

Given the connection of most work examining barriers and drivers of adoption with Roger's (1969), this framework will be used to classify the relevant literature.

(i) The characteristics of the innovation has been the focus of Rehman et al. (2006), who applied the Theory of Reasoned Action (TRA) to study technology adoption among farmers. Their work identified drivers related to the perceived characteristics of the innovation (i.e. cost effectiveness and expectation of improved results). Boffa and Sucurro (2012) suggest that to be effective ICT tools must be flexible, widely distributed and used in a coordinated way in order to avoid unwanted consequences and reduce the search costs incurred by the users (Boffa and Sucurro, 2012). Furthermore, if the technology is easy to use its adoption is most likely (Davis, 1989; Venkatesh et al., 2003; Wang and Qualls, 2007).

An important characteristic of technology is interoperability. In the tourism context interoperability refers to the ability of different organizations to interact towards mutually beneficial and agreed common goals, involving sharing information and knowledge between organizations, through the business processes they support, by exchanging data between their respective ICT systems (European Commission, 2011). There are three levels: technical, semantic and organizational. Technical Interoperability involves linking computer systems and services through the use of

open interfaces, interconnection, data integration, middleware, and data presentation and accessibility functions (European Commission, 2004); Semantic Interoperability refers to ontologies, taxonomies and vocabularies (Kubicek and Cimander, 2009); and Organizational Interoperability is concerned with the modelling and re-engineering of business processes (Kubicek and Cimander, 2009; and European Commission, 2004). The benefits of interoperability relate to lowering barriers of entry; increasing “healthy” competition related to the openness of the market; enhancing innovation due to the opportunities brought in by an open market; improving tourism service delivery by facilitating cooperation and sharing of information; and lowering costs due to the efficient delivery of services (Gasser and Palfrey, 2007). Lacking interoperability may be a barrier to adoption, related to the lengthy process of developing/changing standards; the lack of flexibility and extendibility that fixed standards have; lacking a single architecture leading to interoperability; the interest of main players to market non-interoperable technology in order to lock markets; and the lack of a strong collaborative environment, stimulated by the private sector (e.g. through professional bodies) and/or by the government (e.g. enforcement of disclosure of information, enforcement of open source approaches for development, etc.) (Gasser and Palfrey, 2007).

(ii) In terms of the influence of the social system in which the individual organisations operate, pressure made by partners, costumers, the media, or competitors have been identified as a key driver of ICT adoption among SMEs (Iacovau et al., 1995; Kirby and Turner, 1993; Julien and Raymond 1994; Poon and Swatman, 1996; and Griffin, 2004). Furthermore, issues related to security have also been highlighted as potential barriers to adoption by SMTEs (Duffy, 2006).

(iii) The availability of the required technology, and the proximity to the channel of diffusion of the innovations have been regarded by Windrum and de Berranger (2002) as key drivers or barriers of ICT adoption, which are related to the channels of diffusion. These authors make special reference to the influence that the lack and cost of communication infrastructures, e.g.: broadband, both fixed and mobile, have on the adoption of the technology.

(iv) Focusing on the time factor, MacGregor et al. (1996) suggest that SMEs tend to avoid ICT adoption if seen as complex to use. SMEs generally lack training, and technical knowledge, and the ability to integrate technology into the business strategy (Reynolds et al., 1994; Cragg and King, 1992; Allison, 1999; and Griffin, 2004). Duffy (2006) suggests that issues specifically related to SMTEs, such as seasonality, lack of ICT applications for micro and small tourism enterprises, the design, maintenance and integration of old/new systems can be important barriers to adoption.

As shown, Roger's (1969) model provides a comprehensive framework for the identification of drivers and barriers to adopt technology. Therefore, it has been adopted for this study.

3 Methods

The research adopted a two-stages approach, designed to address the aim, i.e. to develop a framework for evaluating the degree of *adoptability* of Interoperability Solutions for Online Tourism Distribution. The first step consisted of a tourism industry survey and a focus groups, which provided an insight into the barriers and

drivers of adoption of online distribution technology. The questionnaire was distributed to the association's members of ECTAA and HOTREC., who distributed them among their members. The quantities estimated are of about 2000, the response rate was relatively low (15%). All queried companies can be classified as SMEs (average of 5-10 employees). These are estimated numbers as in many cases the questionnaire was answered by the association and therefore contains "aggregated" data. The questionnaire asked a number of open questions on major problems faced in using ICTs, mainly for what concerns online B2B operations. Questions included in the survey and focus groups were "What systems (tools and software) do you currently use to help you communicating with a potential supplier or business partner (B2B)?" ; "What are the main channels/tools/applications that you use to sell your services?" ; "When failing to adopt certain B2B and/or B2C tools, what tend to be the problems encountered with the technology?" ; and "When the adoption takes place, what tends to make the technology suitable for their adoption?" .

With regards to the focus groups (three), these were held as meetings and saw the participation of tourism operators and tourism associations' representatives. In addition, consortium members had a number (about a dozen) of individual conversations with local country tourism operators. Here too, the majority of the companies investigated were of small size but some of the large players were also consulted (GDSs, OTAs International Hotel Chains). Meetings were held under Chatham House Rule, by which researchers can use the information received, but neither the identity nor the affiliation of the speaker(s) may be revealed. Furthermore,

tape-recording was not permitted. Therefore, the results are based on notes taken by the researchers.

Summing all up, the countries covered in this series of investigations were: Belgium, Croatia, Finland, France, Germany, Greece, Hungary, Italy, Spain, Netherlands, Norway, United Kingdom.

The answers were manually coded to give answer to the research questions, and helped identifying the evaluation criteria. Following this, a framework for evaluation was developed. The second step consisted of the evaluation of major Online Tourism Distribution Solutions.

3.1 Major Online Tourism Distribution Solutions

Different approaches have been taken to facilitate a comprehensive distribution of tourism services online, by means of overcoming interoperability issues, including Terms Classifications (i.e. ontologies, vocabularies and taxonomies), Standardisation Specifications (i.e. set of standards or solutions are created to enable the communication among different systems) and eCommerce solutions (i.e. systems which support the communication between other technologies, and which are also or are connected to a platform of communication and can be directly accessed by the end user). Within this group, three different categories can be identified, these are B2B2C (i.e. those supporting business-to-business and business-to-consumer distribution), B2B-only (i.e. those focused on business-to-business distribution) and B2C-only (i.e.

those mainly based on business-to-consumer distribution). Term classifications address semantic interoperability only. However, both standardisation specifications and B2B2C portals are conceived to fully address the issue of interoperability and to support e-commerce. Therefore, only these two types of initiatives are presented. The following table presents examples of these and summarises their characteristics.

TABLE 1 GOES HERE

4 Results

4.1 Survey and Evaluation Criteria

The results confirmed the drivers and barriers to adoption suggested by previous studies but also highlighted additional ones. These have been classified following Rogers' (1969) model.

“The most important factor is whether there is an expected return on investment.. [and this relates to] optimising revenue or reducing costs considerably” said one of the participants. Additionally, “the system has to fit well with the business processes... we once adopted a PMS which was too complicated to use and did not allow us to set up both weekly and daily prices, as required by our business, so we had to get rid of it after having spent 3,000 euros”. “We use booking.com [to sell our rooms] because despite its high commission, it is one of the major online distributors and our PMS allows direct connectivity”. These suggestions aligned with the literature related to *characteristics of the innovation*, including cost effectiveness and expectation of improved results (Rehman et al. (2006), the flexibility of ICT tools and their wide

distributed and coordinated used (Boffa and Sucurro (2012), easy to use (Davis, 1989; Venkatesh et al., 2003; Wang and Qualls, 2007); and *the social system in which the individual/organisation operates*, including the pressure made by partners, costumers, the media, or competitors (Iacovau et al., 1995; Kirby and Turner, 1993; Julien and Raymond 1994; Poon and Swatman, 1996; and Griffin, 2004).

“They [software developers] don’t understand our needs, my hotel doesn’t have the same needs as large corporations, I cannot invest on a system designed for large companies which doesn’t fit the nature of my establishment” was suggested during the discussions, as well as “it is important that systems support processes rather than getting on our way”. The additional drivers which were identified all related to further *characteristics of the innovation*, including technology specifically designed for SMTEs, limited invasiveness in the procedures of suppliers, including capabilities for using efficiently ICTs in B2B operations, interoperable with large intermediaries and aggregators (e.g. GDSs and OTAs); and with seamless integration features for in-house systems. No time factor drivers acting as drivers of adoption were identified.

“We need technology to speak our own language, to be user friendly and easy to integrate with the systems that we already have”. Aligning with extant research, barriers mentioned were the *characteristics of the innovation*, including design, maintenance and integration of old/new systems (Duffy, 2006); the *social system* in which the individual/organisation operates, including security concerns (Duffy, 2006); the *communication channel* including the availability and cost of the required infrastructure, and the proximity of the organisation to the channel of diffusion (Windrum and de Berranger, 2002); and characteristics of adopters, which relate to

the *time factor*, i.e. the time that it takes to adopt technology, and which relate to lack of training, and technical knowledge (Cragg and King, 1993; Allison, 1999); lack of ability to integrate technology into the business strategy (Griffin, 2004); seasonality (Duffy, 2006). As suggested by one of the participants “many times we don’t understand the language of technology, it helps if someone we trust is able to make recommendations and suggestions”.

However, further suggestions include “we do not have many useful B2B platforms for SMEs, especially if you are a travel agent”; there is "not yet a common platform for accommodations"; "I wish an xml code integration with my site" and "No common standards for accommodation". These point highlighted a number of barriers not previously mentioned. In particular the participants stressed the the scarcity of ICT applications specifically designed for mini and micro enterprises, and the limited applications available for using ICTs efficiently in B2B operations. One more widely mentioned issue was the difficulty in collaborating with other companies due to the number of different solutions used in the industry, especially when dealing with large aggregators (GDSs or large OTAs), which is a consequence of a known lack of standardization for data and transaction formats.

4.2 Evaluation of Major Online Tourism Distribution Solutions

This evaluation is based upon the criteria identified through section 4.1, with regards to the *characteristics of the innovation*, the *social system* in which the individual organisations operate, and the *communication channels* through which the innovation is diffused. The *time factor* features (lack of technical knowledge, lack of ability to

integrate in business strategy and seasonality) will not be applied, because they relate to adopters' characteristics and would affect all systems equally.

Characteristics of the innovation

Ten different attributes determine adoptability, including:

- *Cost effectiveness*: adopting a new set of standards (i.e. OTA, ANVR and Caval Project) can be pricy for businesses. However, most private eCommerce solutions charge costly commissions, especially when *external pressure* is on their side (i.e. Venere, Expedia, Booking.com and Kayak), or are very expensive to adopt due to their very own nature (i.e. Amadeus, Microsfidelio). Mapping or eCommerce solutions whose *external pressure* is limited (e.g. Rezgo), or which are regulated by professional and public bodies (e.g. ANVR, Harmonise, VTG and TOA) are more affordable.
- *Flexibility*: This relates to whether the solution has a wide number and type of functionalities. This characteristic is not applicable to Standardisation Specification (i.e. ANVR, Harmonise, OTA and Caval Project) because they are not final tools and their flexibility depends of the characteristic of the system in which they are embedded. eCommerce solutions (i.e. VTG, TAP-TSI, TOA, Rezgo, Venere, Expedia, Amadeus, Booking.com, Kayak and Microsfidelio) have a mix of degrees of flexibility. Rezgo offers B2B but not B2C functionalities, while Venere, Booking.com, enable B2C but not B2B. In turn, Visit Technology Group, Travel Open Apps, Expedia, Kayak and Amadeus offer high levels of flexibility with tools supporting B2B and B2C commerce and applications for both dynamic and static packaging.

- *Coordinated use*: by their nature the use of these systems is highly coordinated, involving all stakeholders (i.e. consumers and providers of different types, intermediaries, etc.). However, only one solution, a B2B2C (i.e. TOA), is developing a social media facility to enable suppliers leaving reviews on their partners, to develop their reputation.
- *SMTEs specificity*: They are all specific for tourism operators, but only some eCommerce solutions, one B2B (i.e. Rezgo) and two B2B2C (i.e. VTG and TOA) have been designed for SMEs; making special emphasis on characteristics relevant to small operators, e.g. Pay-as-you-sell.
- *Limited invasiveness in procedures with suppliers*: all.
- *Efficiency in the use of ICTs for B2B operations*: Only some of the B2B2C portals (i.e. VTG, TOA, and Kayak) and the B2B-only solution included in the study (i.e. Rezgo, Amadeus and Micros-fidelio) include specific applications that facilitate B2B operations. Standardisation specifications, such as Harmonise, OTA, ANVR and Caval Project support B2B communications but because of their nature, they do not have specific applications to support these procedures. B2C-only portals, such as Venere and Booking.com do not support B2B operations.
- *Interoperability with large intermediaries and aggregators*: B2C-only portals such as Venere, Booking.com and Rezgo do not count with this type of interoperability because they do not support B2B operations with other aggregators. With regards to B2B2C portals, these tend to be interoperable with intermediaries and aggregators due to their very own nature. The interoperability of standardisation specifications though, such as Harmonise, Caval Project and

ANVR is very limited. There is only one exception, i. e. OTA, which accounts with high levels of adoptability by main aggregators and suppliers, making it highly interoperable.

- *Ease of use*: most eCommerce solutions (i.e. VTG, TOA, TAP-TSI, Rezgo, Expedia, Booking.com and Venere) are easy to use, except Amadeus and the connection of Micros-fidelio to external systems. Amadeus needs specific training, because it is MSDOS based, and the connection of Micros-fidelio to external systems entails the need to hire computer engineers. Standardisation specifications (i.e. OTA, ANVR, Caval Project and Harmonise) require high technical knowledge for their implementation.
- *Seamless integration with in-house systems* (when applicable): Most solutions provide connectivity with in-house systems. This includes all Standardisation Specifications, all B2B2C and most B2B. The only exceptions are one B2B2C solution (TPA-TSI) which aims to provide this type of connectivity in future and one B2B (Rezgo), which does provides this type of connectivity.
- *Security concerns*: none of them has been reported to present security issues.

Influence of the Social System

Two characteristics define the influence of the social system, i.e. the *External Pressure* (i.e. demand by the market and/or other members of the supply chain), and the level of penetration in the market (i.e. its *Wide Distribution*). This latter can be defined both with regards to its *Geographical Scope*, as well as *Sector-Wise* (i.e. the

number of tourism sectors which are considered in the solution). An analysis of the initiatives with regards to these two attributes is presented below:

- *External Pressure*: the highest level of external pressure relates to some eCommerce solutions (i.e. Venere, Expedia, Booking.com, Amadeus, Kayak) and one standardisation specification (i.e. OTA). This external pressure is due to their high penetration in the market. However, for Venere and Booking.com, this pressure relates only to the accommodation sector, the only service they distribute. Pressure to adopt OTA relates to the expansion of this standard throughout the industry. Nevertheless, systems may adapt OTA standards. Therefore, OTA does not imply a barrier of entry.
- *Wide Distribution*: Both Standardisation Specifications and eCommerce solutions groups account with examples of systems which are widely distributed. With regards to the former, this relates to OTA, and in terms of the latter, examples are Venere, Expedia, Booking.com, Amadeus and Rezgo. However, only Expedia focuses on a wide group of operators.

TABLE 2 GOES HERE

Influence of the Channel

- *Availability of required infrastructure*: the infrastructure required to implement solutions focusing on standardisation or on mapping solutions (i.e. Harmonise, OTA and Caval Project) is limited. This is because they imply that in-house solutions have to be in place. The shape of the industry (mainly framed of SMEs)

means that a large number of establishments do not have an in-house solution. Therefore, the availability of required infrastructure is limited. For all the others the required infrastructure is limited.

- *Low cost of required infrastructure*: similarly, the required infrastructure for the adoption of those solutions based on standardisation or mapping currently existing standards (i.e. see previous point), are highly costly for small operators. Cloud computing, used by Visit Technology Group, Travel Open Apps, and Rezgo, is a technology which presents limited requirements in terms of infrastructure (mainly a PC with access to the internet).

5 Conclusions

This paper presents the results from a study which develops an evaluation framework of online distribution solutions for the tourism industry. It does this on the basis of *adoptability* criteria, obtained through a survey and focus groups among European tourism operators. The results have important implications for academia, managers of the industry, as well as those involved in the development of software for the tourism industry. The theoretical implications relate to understanding issues affecting technology adoption by SMTEs. Although the findings partially aligned with those by previous research about technology adoption, they also highlighted the scarcity of ICT applications specifically designed for mini and micro enterprises; the very limited capabilities available for using ICTs efficiently in B2B operations; and the difficulty in collaborating with other companies due to the number of different solutions used in the industry, especially when dealing with large aggregators (GDSs or large OTAs)

and lack of standardization for data. These findings are also important for the industry, as it helps identifying aspects where improvement is needed. Furthermore, the study provides a method of evaluation for online distribution solutions for tourism. In relation to the managerial implications, the evaluation method provides a framework for making decisions about the adoption of online distribution solutions, by suppliers and destinations. Existing solutions for tourism online distribution have overcome technical issues (i.e. standardisation). However, their focus on the needs of the industry, and specifically on the requirements of SMEs have been neglected.

Furthermore, the findings suggested that the Online Tourism Distribution Solutions which are more likely to be adopted are publicly funded B2B2C portals, specially designed for SMTEs, which integrate all types of tourism sectors, and provide seamless integration with in-house systems, such as TOA. The reasons for this are that they tend to be more cost effective than adopting a new set of standards or privately-owned eCommerce solutions; they are more flexible than those solutions only offering either B2B or B2C but not both; they include features that make them accessible to small operators, such as the Pay as you sell; they allow their integration with other operators through their B2B functionalities; they are more easy to use than standardisation specifications; and they integrate seamless with in-house systems but they can also be adopted by businesses without in-house booking systems and overall they require the availability of limited technology.

Limitations of this study to be addressed through additional research would relate to the development of quantitative industry survey, in order to validate and generalise

the results from this study. Furthermore, additional systems could be included in the study in order to generalise the findings from the systems' evaluation.

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