Augmented Reality Adoption by Tourism Product and Service Consumers: Some Empirical Findings

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Abstract There are evidences that, tourist adopt Augmented Reality (AR) for purchasing tourism products and services. Few holiday operators make this technology available for their customers. Arguably, AR as innovative technology supports tourists in pre, during and post-holiday mode and offer them better experiences. As far as, AR turns into an important research area, very few known studies are conducted. Thus, on the empirical ground, this study aims to bring out factors of AR adoption by tourists. Findings classify two different factor sets: positive factors of AR adoption by tourists and negative factors of not adopting AR by tourists. Innovativeness and user-friendliness features appear as the dominant reasons and positive factors of AR adoption by tourists while availability issue and technological issue appear as the negative factors of not adopting AR by tourists. This research offers some theoretical and managerial implications and thus a unique contribution to the limited knowledge of responsible factor studies of AR adoption by tourists.

Keywords Augmented reality · Adoption · Tourists

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1   Introduction

Augmented Reality (AR) is arguably becoming popular among tourism product and service consumers. This growth of AR is rather an example where innovative technological advancements are fueled by the unprecedented acceptance of the Internet. The adoption of AR is the positive outcome of wearable and handheld devices. Thus, AR adoption is sharply facilitated by wearable and handheld devices. There are some factors that allure tourism product and service consumers to adopt AR. Some of these factors are positive that supports the adoption of AR tourism product and service consumers where some factors are negative that lead to not adopting AR. However, from the consumption context, AR can hardly be featured as the most trouble-free and updated technology. Thus, there is a necessity to outline these positive and negative factors of AR adoption by tourism product and service consumers. Based on theoretical suppositions of both AR specific and general theories of technology acceptance/adoption, this research aims to bring out the key factors of AR adoption by tourism product and service consumers. This study then determines a series of factors appear into two distinct forms: positive factors and negative factors. AR as a valid research topic is explored in some relevant research works: AR application in museums, parks and heritage sites (Jung et al. 2015); tourism education (Hassan and Jung 2016); visitor management in tourism destinations (Hassan and Ramkissoon 2017); tourism marketing (Hassan and Rahimi 2016; Dadwal and Hassan 2015); tourism destination promotion (Hassan and Shabani 2017). However, a knowledge gap exists in the particular research area of positive and negative factor determination of AR adoption by tourism product and service consumers. This research area is yet to draw attention of researchers and scholars to contribute to narrow the identified knowledge gap justifying to conduct this research. This study along with the other on-going research (Hassan et al. 2017) is a constructive contribution to the limited literature of factor determination of AR adoption.

2   Literature Review

Literature studies show that, AR as an innovative technology has found its place mainly in scientific research. However, this is also evidenced that, AR is valid research topic both in the tourism industry and tourism literature but rather in a very narrow space. There are also evidences that, AR is adopted by tourism product and service consumers. On the contrary, there are also evidences that, AR as a technology has some issues that hinder its wider adoption.

2.1   AR and its Adoption in the Tourism Industry

In real time, AR integrates digital information with the user's environment (Dadwal and Hassan 2015). Both AR and VR are arguably adopted by tourists if they are attached to specific tourism product or service offers. In terms of feature analysis, AR offers a bit dissimilarity with Virtual Reality (VR). AR uses the present environment and overlays newer information on top of it where VR creates a fully artificial environment. The growth of both VR and AR is the result of Global Positioning System (GPS) that is made compatible with Smartphone devices to support and enhance AR usability. The unprecedented development of mobile telephone and handheld computing technologies result more adoption of AR. Also, increasing use of Smartphone expands the scope of AR adoption by tourism product and service consumers. They can access AR in Smartphone devices where this technology can direct them to local tourism amenities with the support of GPS. In the most recent time, AR as an innovative technology experiences popularity for its capacities to offer enhanced and positive experiences with the support of mobile, handheld and wearable devices (Jung et al. 2015). This popularity dates to the historic background of AR. According to Henderson and Feiner (2007), the development of AR is initiated in 1990. Boeing researcher Thomas Caudell notifies that, Augmented Reality illustrate head-mounted displays that the electricians used to apply to assemble complex wiring works. The very early commercial use of AR as a technology was the yellow 'first down' line. This line appeared in 1998 in televised football games. Accordance to Layar (2016), Google glass is probably the most notable and well-known example that brought AR for use by the general consumers. This glass is also accepted by tourism service and product consumers. In later stage, the use of AR expands to many other areas as: healthcare, public safety, marketing and tourism.

2.2   AR Adoption Factors Generated from AR Specific Theories

AR specific theories are very limited in number making the sufficient factors determination difficult. According to Rauschnabel and Ro (2016), ease of use, functional benefits and social norms are some factors of AR adoption where Chung et al. (2015) believe that, technology readiness, visual factor of AR and situational factor are few factors. Factors as personalised service, content, system quality affect users' intention and satisfaction are identified by Jung et al. (2015). In addition, Leue et al. (2014) find out high quality information, enjoyable features and content, perceived benefits, cost benefits and innovativeness. On the other side, tom Dieck and Jung (2015) identify personal innovativeness as factor of AR adoption. In principle, AR specific theories are largely indebted to conventional technology acceptance theories as (Table 1):

Table 1 The summary of Technology Acceptance Theories

1. The Diffusion of Innovations theory (Rogers 1962)	2. The Technology Acceptance Model (Davis 1986, 1989; Davis et al. 1989); with derivatives, as:
	i. The Technology Acceptance Model 2 (TAM 2) (Venkatesh and Davis 2000);
	ii. The Technology Acceptance Model 3 (TAM 3) (Venkatesh and Bala 2008);
	iii. The Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al. 2003);
	iv. The Task Technology Fit (Goodhue and Thompson 1995);
	v. The *Technology Readiness Index* (TRI) (Parasuraman 2000); *and*
	vi. The Technology Readiness and Acceptance Model (TRAM) (Lin et al. 2005; Walczuch et al. 2007)

2.3 Reasons of AR Adoption Generated from Existing AR Literature

To find out reasons and positive factors of AR adoption and negative factors of not adopting AR adoption tourism product and service consumers, researchers are diverse in their arguments because of limited AR literature. Few of such literature studies claim that tourism product and service consumers adopt AR for purchasing a tourism product or service. However, the exact reasons and positive factors of AR adoption and negative factors of not adopting AR adoption still remain unclear and unexplored. However, researchers have determined few reasons and positive factors of AR adoption.

Researchers opine that, reasons for AR adoption are diverse. According to Smith (2010), there are two such reasons as: first, AR can ensure success in new marketing campaigns; and second, easier access of AR through handheld/mobile computing devices. Larkin (2011) defines the reasons of AR adoption as: similarity with Virtual Reality (VR); user perception enhancement in a real-world environment; more opportunities generation for marketers; and information displaying or messaging is user-friendly. Hopkins (2009) argues that, the reasons to adopt AR are: it is simple and a user can adopt AR easily by turning on the Smartphone/computing device or pressing a button. AR is beneficial as users can see space and people around them by using the 'sensed' mobile device. Also, AR can offer location-based information for general users. Spillers (2009) defines several specific reasons of AR adoption as: this technology is mobile phone device supported; capable to enhance mobile device user-experience; able to meet customer expectations by using mobile phone or computing device; AR is simple, helpful and offers convenient just-in-time information. On the other side, Sykes (2013) argues that, AR technology is adopted because, AR delivers design interactive experiences; AR is supported by mobile phone devices and AR is capable to create place-based interactions.

Jackson (2014) believes that, AR is adopted for a series of reasons as: AR ensures a better return from business enterprises; AR combines traditional retail experiences with e-Commerce; AR introduces stronger and active branding campaigns; AR helps to navigate and cover wider areas of a business organisation; AR ensures both brand trust and brand loyalty; AR adoption offers more information to improve shopping experience; AR visualises real-time product or service catalogue; AR creates more selling opportunities with 3D product view support; AR positively supports customers; AR allures and encourages potential customers to buy more services and products. Johnson (2015) states some reasons to adopt AR as: AR has capacities to be merged with digital and print media; AR is an interactive technology to help tourist attractions, destinations and museums; AR obviously helps navigation and transportation; AR offers better retail experiences and AR is compatible with Google glasses. Also, Lord (2012) believes that, AR is supportive to Google Glass. In addition to this, Lord (2012) believes that, there are some reasons to adopt AR as: AR is friendly and fully compatible with Smartphones; AR can produce geo-location based information; AR is not a gimmick and thus replaces gimmicky apps and on top of all reasons, AR is an elusive app.

From an industrial context, the reasons to adopt AR are more application focused. A number of reasons are identified by Total Immersion (2016) as: AR is a virtual support for industries; AR appears with elaborated real-time information of relevant business areas; AR offers immediate benefits to industrial users; AR technology delivers unforgettable experiences to its customers promoting brand image; AR can create interests in consumers to purchase a product or service; AR is interactive and offers both relevant information and direction to purchase a product or service; AR turns a general user into an active user of a product or service. On the other side, Augment (2016) spots some reasons to adopt AR as: AR is capable to make eye-catching presentations and advertisements; AR assists in interactive learning; AR is user-friendly that requires less expensive and portable learning materials; AR holds a better or higher retention rate and AR nurtures intellectual capacities of the customers. Pauley (2016) believes that, AR is a sort of experiential marketing. Pauley (2016) determines some reasons to adopt AR as: AR is massively expanding with the support of 3D touchscreen technologies; AR allows customers getting a solid position in a business environment that is immersive; AR offers memorable experience for the customers; AR is an innovative and high-tech technology to ensure digital interactivity for the customers; AR transforms complex information into easier and more accessible for customers; in principle, AR is a futuristic technology that makes a product or service as eye-catching; finally, AR makes visual contents to be translated into many other languages and making them more accurate and consistent.

2.4 Positive Factors of AR Adoption Generated from Existing AR Literature

Researcher like Smith (2010) identifies uniqueness or difference, personalisation and increased content as positive factors of AR adoption tourism product and service consumers. Also, interactivity capacities with viral loop of AR is also defined as the positive factor of AR adoption (Smith 2010). Another researcher Hopkins (2009) identifies few positive factors of AR adoption as: improved mobile usability, redefined mobile technology experience, revolutionised experience, interface technique and enriched usability. Regarding positive factor identification of AR, the contribution of Larkin (2011) is notable as some key factors are emerged as: better personal experience, interactivity advantage, a new media platform, a new virtual sphere, a new sphere of opportunities, social media compatible, virality and visualised catalogue.

2.5 Negative Factors of not Adopting AR from Existing AR Literature

In terms of negative factors of not adopting AR by tourists, researchers show some specific factors that can be termed as negative. According to Larkin (2011), uncertainty about fully taking off is the key negative factor. Also, Andy (2014) argues that, poor performance on low spec mobile device, integration failure, limited scope of image recognition and gimmick are some negative factors where Pauley (2016) identifies technological similarity as the basic negative factor. Hopkins (2009) argues that, unexplored capacities of AR, privacy issue and restricted use for general people, narrow contents of AR are some major negative factors of not adopting AR. On the other side, researcher like Dribble (2014) opines that, disturbed binocular vision of depth perception, cartoonish image, limited use in movies, glitchy imaging, problematised object recognition and conflict with animation, disturbed compatibility with Smartphones are some negative factors of not adopting AR by tourism product and service consumers.

3 Methodology

3.1 Cases Under Investigation

Three holiday operators are selected as cases for this research as: Virgin Holidays, Kuoni Travel and Thomson Cruises. One of the key reasons for such case selection is that, customers of these holiday operators are given access to AR. Virgin Holidays, Kuoni Travel and Thomson Cruises have evidences to support their

customers by making innovative technologies as AR readily available. These three holiday operators also have a considerable customer base from diverse backgrounds. Virgin Holidays, Kuoni Travel and Thomson Cruises bring AR in their marketing campaigns.

Butler (2013) informs that, Virgin Group formed Virgin Holidays in 1985 in the United Kingdom having it's headquarter in the 'Galleria' in Crawley. Owned by Sir Richard Branson, this company is considered as one of the most successful long-haul scheduled tour operators based in the UK. Virgin Holidays also has partnership with more than 100 retail operators including Sainsbury's, Tesco, Debenhams, House of Fraser, Morrison's and many others. Virgin Holidays employs Aurasma, one of the most updated AR providers for bringing holiday retail experience to their customers. This holiday operator launches an app that allows customers for researching holiday destinations and thus making purchases (Virgin 2016). Technologically, this AR app functions on the brochure after placing on a specific destination. This app is said to be the first of its kind that is made available on iPhone for free downloading. After opening this app, a loading screen greets the viewer and allows them to see Virgin Holiday retail interiors. Users are then directed to AR functions and can browse holiday destinations and latest product or service offers. This app is activated by using the iPhone's in-built camera after the device is positioned at a specific place. For example, if the device is placed on the cover of a brochure, the brochure is seemed to have opened with a video of that specific destination on the screen. The customer is then moved to a specific destination when it is made lively. This is supported by sound and movement that are otherwise impossible in a conventional 2D brochure.

Anandan (2009) notifies that, the operational headquarter of Kuoni Travel is in Dorking after acquisition of Challis and Benson Limited in 1966. However, Kuoni Travel is originally established by Alfred Kuoni in 1906 in Zurich (Bywater 2001). After its establishment, Kuoni Travel is expanded within diverse geographical locations in the world turning it into a global brand. At present, this is world's one of the leading travel companies with more than 11000 employees and has business operations in resorts, hotels, package holidays, tailor-made holidays, cruise liners and many others. Kuoni Travel is the United Kingdom's leading tourism operator that has applied AR in its press advertising and magazines. Kuoni Travel is collaborated by Aurasma, an AR specialist that made AR available for Kuoni Travel customers. Kuoni Travel customers can view Kuoni Travel service or product offers on their Smartphone or iPad. This technology is supported by AR with image recognition technology. Online displays and advertisements of Kuoni Travel are made artistic and lively. Considering customer demands, Kuoni Travel website creates more than 240 diverse messages for its customers. These messages appear during the time customers are live on Kuoni Travel website for a booking holiday or making a tourism product or service purchase. AR app of Kuoni Travel aligns with a brand slogan '*Requested by you…Crafted by Kuoni Travel*' a part of this holiday company's integrated marketing campaign (Kuoni Travel 2016). The application of AR by Kuoni Travel manages to grab attention of increased number of customers with more sales.

Thomson Cruises is operated by Thomson that offers cruises across Europe with ships from Royal Caribbean International, Louise Cruise Lines and Holland America Line. Thomson Cruises was founded in 1973 and primarily entered the cruise market in the same year. However, suffering from rising fuel price issue this venture is terminated in initially in 1976. Later in 1995, Thomson reinitiated this cruise line. This is currently part of the TUI Group as a UK based cruise holiday operator. According to Cruise Market Watch (2017), in 2015, the world-wide cruise holiday industry is calculated as a US$39.6 billion industry (a 6.9% increase from 2014) carrying 22.2 million passengers (a 3.2% increase from 2014) where the market share of Thomson Cruises in 2015 is 1.8% of this industry and 1.3% of these passengers. This brand of Thomson Cruises with other TUI owned travel operators is expected to be phased out in 2018 and will operate under the single name of TUI. Mann and Ibrahim (2005), Thompson and Martin (2005) believe that, Thomson Holidays became the pioneer in business-to-business online shopping in 1981. Thomson launched its first Internet site for their Portland Holidays brochure on 19 October, 1995 (Debbage and Ioannides 2005). There is evidence that, Thomson Cruises applies AR for their customers. According to Thomson (2017), Thomson Cruises introduces AR brochures considering the sharp rise of holiday bookings using Smartphone, tablet or handheld computing devices. Thomson Cruises finds a unique way for bringing its ships alive and showcase the life aboard. To do this, an innovative technology as AR is embedded in its conventional brochure pages to modernise its customers' research experiences. Supported by AR, few photographs as seen on the latest Thomson Cruises' brochure brings to life having 6 films. Such films present classy gourmet dining and entertainment selections on board. These also highlight the Platinum offers on board Thomson Celebration and Thomson Dream followed by introduction of the Customer Operations Director of Thomson. For accessing such hidden footage, tourism product and service consumers are required to download the free Aurasma App as available from the Google Play and App Store. Then they have to search for, select and follow Thomson Cruises. By placing the Smartphone, tablet or handheld computing devices over specific images as recognisable through an icon on the brochure, the ships come alive. This offers tourism product and service consumers a real feel for their desired holiday that they wish to book. Thomson UK is headquartered in Luton of England. In the most recent time, Thomson is doing online business as well for retaining a major share in the high-street travel agency business (Canwell and Sutherland 2003; Needle 2004).

3.2   Research Design

To generate primary data, 20 face-to-face interviews are conducted supported by open-ended and informal discussion with target respondents. A semi-structured questionnaire is used for the purpose. Respondent selection is based on purposive sampling because of the nature of this research. For interview, respondents having prior knowledge in AR and loyalty for the selected holiday operators are selected.

This is to avoid risks of lack of knowledge about an innovative technology as AR. Adoption of this technology require specialised knowledge that general tourism products and service consumers might not have and thus purposive sampling is followed. The respondent profile is followed:

3.3 Data Collection

Main sample respondents of this research are customers of three selected holiday operators (i.e.: Virgin Holidays, Kuoni Travel and Thomson Cruises) are the respondents. These sample respondents are identified through careful selection and purposive sampling. In this research, careful attention is paid to respect business policy secrets and sensitive data are not disclosed of any of the 3 holiday operators. However, for the sake of keeping business policy secrecy, the researcher is not granted to make face-to-face visits with any official of the 3 holiday operators. The researcher is not allowed to access to the head office of any of these holiday operators to conduct formal or informal interviews even after several attempts. However, very generic information are passed over the telephone conversation with responsible officials of these holiday operators. Keeping in mind about such limitation, data collection is designed in meaningful and achievable ways that involved the customers of these holiday operators where the research only covered consumption/adoption side of AR. Selected stores of Virgin Holidays and Kuoni Travels both in and around London are targeted as the location for data collection. On the other side also, selected stores of Thomson in and around London are targeted for Thomson Cruises customers. This is because both in-land and cruise ship holidays of Thomson are found booked from these stores. Having verbal consent of the store management of these selected stores, only loyal customers of these holiday operators are selected having prior knowledge in AR. These respondents are approached for data collection on their way back from these stores. Thus, no interruption in day-to-day business activities in these stores are made. Respondents are clearly asked the reasons and positive factors of AR adoption with negative factors of not adopting AR. This is supported by open-ended discussions. Maximum length of these interviews are 10 min that is considered as sufficient to reach data saturation covering necessary data and information. The interviews are taken in person and audio-recorded. In addition, to collect secondary data, both online and offline resources including tourism industry reports are used. These 3 holiday operators are evidenced to allow their customers to adopt AR for marketing purposes.

3.4 Data Analysis and Interpretation

Collected data are self-transcribed. This offers the researcher to properly bring out the contents of these interviews. The researcher listened to each of these interviews

Table 2 Respondent profile table

#	Gender	Age	Customer of	#	Gender	Age	Customer of
R01	M	20–30	Virgin Holidays	R11	M	50–60	Kuoni Travel
R02	F	30–40	Kuoni Travel	R12	F	40–50	Kuoni Travel
R03	M	20–30	Virgin Holidays	R13	M	50–60	Virgin Holidays
R04	F	30–40	Kuoni Travel	R14	F	30–40	Kuoni Travel
R05	M	50-60	Virgin Holidays	R15	F	50–60	Virgin Holidays
R06	M	30–40	Virgin Holidays	R16	F	30–40	Thomson Holidays
R07	F	20–30	Virgin Holidays	R17	F	20–30	Thomson Holidays
R08	F	30–40	Thomson Holidays	R18	M	40–50	Kuoni Travel
R09	M	50–60	Kuoni Travel	R19	M	40–50	Kuoni Travel
R10	F	30–40	Thomson Holidays	R20	M	30–40	Kuoni Travel

for several times and then transcribed manually. Data analysis follows qualitative approach with an aim to make non-technical readers understand research findings easily and comprehensively. Thus, data analysis also avoids excessive use of technical terms and made clear explanation of any technical term used. Data analysis in this research has not involved any rigorous statistical analysis. However, findings of this research actually lead to further research with complex statistical analysis through using updated data analysis software (Table 2).

4 Findings and Analysis

Findings are presented in a more explanatory and analytical manner for general readership. Findings outline tourism product or service consumers are becoming more technology savvy relying more on updated technologies that are innovative. AR is an example of such innovative technology. On the other side of AR adoption, all respondents mentioned Virgin Holidays, Kuoni Travel and Thomson Cruises are the leading AR user in the United Kingdom for serving tourism consumers.

4.1 Reasons of AR Adoption by Tourists

Innovativeness appear as key reason as stated by respondent 11, 'innovativeness and service features are the main reasons to adopt AR'. Also, respondent 16 states that, 'innovativeness and uniqueness are the two basic reasons and positive factors to adopt this technology'. Respondent 1 identify a couple of specific reasons of AR adoption as, 'AR accommodates hidden reality that is exciting and AR is thrilling at the same manner'. In the almost related statement, respondent 2 says, 'AR is interesting and learning as well'. In another statement respondent 7 opines that,

'I think acceptance possibility and reduced complexities are the two basic reasons and positive factors'. Respondent 8 has almost similar opinion as, 'AR is reliable and AR is a valid technology'.

Usability comes as the next reason as, respondent 10 mentions that, 'AR is mainly used because, this is user-friendly and mobile phone usable and the user does not have to open my laptop every time to use AR'. Also, respondent 18 says that, 'AR is designed as capable to produce a good picture of the desired destination that a respondent wishes to visit'. On the other side, respondent 19 informs that, 'AR is easy to use and offers huge information'. In a similar manner respondent 20 shows that, 'easing off difficulties that a consumer normally faces to purchase a product or service is the reason to adopt AR'. Another respondent 15 stresses on that, 'AR is useful and effective in making a consumer to purchase a specific tourism product or service'. Respondent 13 particularly mentions its usability and eagerness to try a new technology. On the almost same position, respondent 17 mentions that, 'interest creation capacities and attractiveness of this technology are reasons and positive factors for using it'. Other respondent 6 asserts that, 'assessing the impacts of a newly introduced technology is the other reason to adopt AR by tourists'. This respondent believes that, as a new technology, AR can really benefit and uplift customers perceived expectations to a higher level to adopt this technology. Thus, respondent 12 thinks that, 'consumer expectations and aspirations to use a new technology are the vital reasons and positive factors'. Respondent 14 also believes that, 'AR as playful enjoyable and competitive to use to serve a purpose'.

Better content is the other reason to adopt AR by tourism product and service consumers as mentioned by respondent 5, 'contents of AR find an accepted position among the tourists'. This respondent also states that reasons and positive factors of AR adoption are contents and interactiveness. In addition, this respondent believes that, the contents of AR can be diverse accommodating many aspects while the interactiveness feature is also great, to some extent.

There are also some other diverse features of AR appear as reasons categories of R adoption by tourists in respondent statements. Respondent 3 coins that, reasons to adopt AR are: first, it offers a pleasant purchase journey and second, it offers personal experiences. In addition, lack of available technology to replace AR appear as the response as respondent 4 answer that, the dominant reason to use AR is the lack of effective technologies to help a tourism product or service purchase. Also, respondent 9 answers that, lack of effective and applicable technology are the reasons for AR adoption by tourists.

4.2 Positive Factors of AR Adoption by Tourists

Innovativeness feature of AR appears as the specific positive factor for its by tourism product and service consumers. Supporting this positive factor, respondent 11 says that, 'I would mention two features as: innovativeness and service features'. Also, respondent 16 mentions that, 'the very generic advantages of AR are:

innovativeness, uniqueness; and faster popularity'. In the same manner respondent 7 accepts that, 'this technology can be well accepted and can be readily available'. In addition, respondent 8 suggests that, 'I should say the two very important advantages of AR are reliability and validity of this technology'. Following innovativeness feature of AR, respondent 15 mentions that, 'AR is helpful but many consumers need to know that, AR needs to be granted as useful and general consumers should be aware about that'. Based on innovative features of AR, respondent 18 says that, 'AR can create a perceived image and can help to create a positive impression about a destination'.

Usability feature is the other positive factor found to adopt AR by tourism products and service consumers. This is stated by respondent 19 as, 'AR is easy to use and can accommodate a wide range of information'. Also, this respondent believes that, this technology is effective and usable. Also, respondent 13 coins that, 'from experience, I would that, better usability and effectiveness are the positive factors to adopt AR'. Stressing on trouble-free usability feature of AR, respondent 20 mentions that, 'the best advantage of AR is its capacity to ease off most of the troubles and difficulties related to time, costs and efforts'. Similarly, respondent 20 says that, 'the two advantages of AR as found are user-friendliness and easy to use'. According to respondent 4, 'I have found AR as promising and able to fill the existing gap of an effective technology. This technology helps a lot to allow consumers have a good product or service purchase'.

Several other factors are also mentioned by the respondents. Respondent 5 indicates that, 'wider range of contents and interactivity are the two basic advantages of AR'. Respondent 12 points that, 'this technology is capable to meet demands of tourism consumers where the expected performances are matched to their desired benefits'. On the other side respondent 14 mentions that, 'three basic features: playfulness, enjoyable and competitive are the key positive factors to adopt AR by tourism product and service consumers'. Experience generation is the other positive factor as explored by respondent 3 and this respondent states that, 'AR is capable to offer pleasant purchase experience'. This respondent also says that, 'this technology can generate memorable personal experiences'.

Feature of AR is found as interesting in the statement of respondent 1 as, 'with hidden reality, this technology is exciting and thrilling'. This respondent believes that, this is a technology that would benefit tourism consumers in a great way. According to respondent 2, 'AR is a technology that makes a product or service purchase interesting. This technology is a learning experience at the same time'. On the other side respondent 6 mentions that, 'AR is a new technology having diverse features where customer views and ideas about this technology are also positive as far as understood'. Respondent 17 argues that, 'some consumers have more interests in using AR'. Reasons and positive factors of AR adoption by tourists generated empirically are symmetrical to literature based reasons and positive factors mainly indebted to Augment (2016), Hopkins (2009), Sykes (2013), Jackson (2014), Johnson (2015), Larkin (2011), Lord (2012), Pauley (2016), Smith (2010), Spillers (2009), Total Immersion (2016).

4.3 Negative Factors of AR Adoption by Tourists

Availability issue appears as the negative factor of not adopting AR by tourism products and service consumers. In the statement, respondent 19 says that, 'in many cases, consumers are not fully aware that, AR is so easy to use and contains so much information and consumers need to know about it'. Likely, respondent 12 mentions that, 'in many cases, people expects too much from a new and innovative technology'. This respondent doubts that, AR can hardly be able to meet such expectations as in some cases, this technology may have limitations. Also, respondent 13 argues that, 'some features of this technology require adequate knowledge in computing and in some cases, these can turn as disadvantages'. Respondent 8 insists that, 'AR still needs to be familiarised as a reliable and valid technology where many people need to know about it'. Respondent 9 stresses that, 'the basic disadvantages of AR are its less publicity and less attractiveness and people know very little about it'. Similarly, respondent 17 says that, 'the two basic disadvantages of AR that, I can mention are: it is promising but still unable to attract massive number of consumers to adopt it and this is a disadvantage. Thus, AR can manage to attract only selective consumers having access of the Internet'. In a related manner respondent 6 highlights that, 'the very key disadvantage of this technology as believed is its unavailability and this technology is not yet fully available where some of the features are quite difficult to understand making this as widely complex for non-technical users'. Respondent 15 finds that, 'the great disadvantages as found from using AR are: common consumers do not often know that, this technology really helps'. On the other side respondent 16 finds that, 'the basic disadvantages of AR are: its less advertisement and consumers yet to know about this technology benefitting them in great ways'. Also, according to respondent 11, 'this technology needs to be readily available and till now it is less available to common tourism consumers'.

The other negative factor of not adopting AR by tourism product and service consumers is the technological issue as mentioned by respondent 5, 'as in some cases, AR can be a bit complex and misunderstood by tourists and this technology requires expertise in some cases that tourists may do not have'. Supporting this statement, respondent 1 mentions that, 'bringing reality in digital format is a complex and difficult matter to consider and in this regard, some tourism consumers may not find AR as heavily interesting'. Also, according to respondent 10, 'some people cannot download this technology in an easy manner due to technological difficulties and that can be the crucial disadvantage of AR'. On the almost similar opinion respondent 3 argues that, 'while making personal experiences, consumers' personal aspects become issues and personal artefacts can be disclosed in some cases and this is the key disadvantage of this technology'. This respondent also believes that, 'this technology is yet to be fully operational meaning that it needs further updates to make it fully accessible and operational'. In addition, respondent 20 remarks that, 'any specific disadvantage is not easy to find but this technology can be highly sophisticated and difficult in a sense'.

Usability issue is the other disadvantage as mentioned by respondent 2 as, 'the great disadvantages of AR are: some customers may find it less interesting and this technology may be less appealing to them as this in some cases requires advanced technological knowledge'.

There are some other disadvantages of AR as mentioned by the rest other respondents. In opinion, respondent 4 highlights that, 'the generic disadvantage of AR that, this can make customers lazy enough to visit a high-street travel agent and this can in turn reduce their business and even threaten their existence'. Also in accordance to respondent 7, 'some customers may not widely accept this technology because they may be fussy and thus, this is difficult to say that, this technology can be readily accepted by all'. In addition, respondent 14 argues that, 'this technology requires specialised knowledge mainly to enjoy those playful and enjoyable features. Also. Virtual Reality (VR) in some cases threatens it growth and popularity'. This statement is supported by respondent 18 as, 'AR in few cases can be difficult to use and understand where the usability can become issue in given contexts'. Apparently, empirical findings as negative factors of not adopting AR match with literature findings as outlined mainly by Larkin (2011), Andy (2014), Pauly (2016), Hopkins (2009) and Dribble (2014).

A summary based on empirical evidences supported by the literature generated data of key reasons and positive factors of AR adoption by tourism product and service consumers with negative factors of not adopting AR by tourism product and service consumers can be the below (Fig. 1).

Findings of this research supports that, AR is an innovative technology that enhances experiences getting supported from *mobile, handheld and wearable devices* (Jung et al. 2015). Results also align with findings from dominant theories as: the Diffusion of Innovations theory (Rogers 1962) and the Technology Acceptance Model (Davis 1986, 1989; Davis et al. 1989) with derivatives that AR is a technological innovation and also with AR specific theories in tourism (Chung et al. 2015; Jung et al. 2015; Leue et al. 2014; tom Dieck and Jung 2015; Rauschnabel and Ro 2016). The Internet has facilitated a relatively newer wave of advancements in mobile and personal computing resulting to increase the adoption of an innovative technology as AR for tourism product and service consumers. Supported by this wave of technological advancements, product and service consumers have witnessed more modified wearable devices as Smartphones, Smart

Fig. 1 Key reasons and positive factors of AR adoption by tourism product and service consumers and negative factors of not adopting AR by tourism product and service consumers
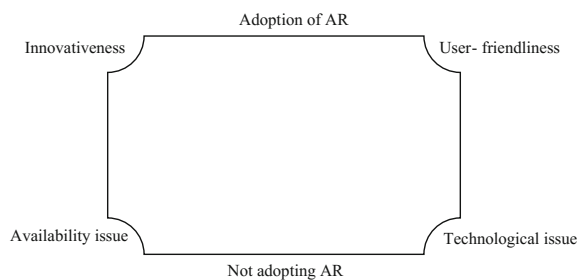
glasses, Smartwatches or even fitness bands. Also, the use of 3D head-mounted displays is mentionable in this regard that allows users to view data by looking straight ahead. These modifications are interesting for exploring a relatively new technology that offers incentives to users coupled with a bit more different experiences. Such experience can come in a computer generated, real-world environment as branded as 'Augmented Reality'. Thus, this research is conducted on a trendy and innovative technology as AR where innovativeness and user-friendliness appear as key reasons and positive factors of AR adoption by tourism product and service consumers where availability issue technological issue appear as negative factors of not adopting AR by tourism product and service consumers.

5   Conclusion

This research is based on an identified knowledge gap of AR literature in tourism. Thus theoretically, this research initiates factor determination research of AR adoption in tourism while contributing positively to this identified knowledge gap. On the other side of managerial perspective, holiday operators/managers can learn the reasons, positive factors ad negative factors while making an innovative technology available for the customers. Also, as managerial implications, findings can support tourism enterprises understanding customer demands and act in accordance to fulfil their expectations. Basic limitation of this research is the data and access restriction by the all 3 case holiday operators. Better data support could possibly enrich contents of this research. Results of this research can help them preparing more consumer-friendly approaches. The aim of this research is to delineate the features of AR while determining the reasons and positive factors for its adoption by tourism product and service consumers as well as negative factors of not adopting AR by tourism product and service consumers. This research clearly determines innovativeness and user-friendliness appear as key reasons and positive factors of AR adoption by tourism product and service consumers where availability issue technological issue appear as negative factors of not adopting AR by tourism product and service consumers as result of this research. In tourism, technological innovations are adopted by tourism product and service consumers. This research also explores a closer proximity between AR as an innovation and tourism consumers, in terms of their innovativeness, usability and availability of an innovative technology. Among many others, attractiveness, information generation, experience capacities, playfulness are some other influential reasons and factors of adopting AR by tourism product and service consumers. The, recent development of mobile phone and handheld computing devices is found as the most dominant factor of AR adoption. Virgin Holidays, Kuoni Travels and Thomson Cruises are found as competitive in making AR available for their customers. These holiday operators make AR as an innovative technology having potentials to be adopted by tourism product and service consumers. Further research can contribute to eliminate basic limitations of this research by including larger sample groups and including

voices of the target holiday operator management. Also, future research studies should incorporate both tourism service providers and tourism product and service consumer opinions on line of criticality.

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