

What does Web 4.0 Promise for Tourism Ecosystem? A Qualitative Research on Tourism Ecosystem Stakeholders' Awareness

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Abstract

The major motivation of this study is stemmed from the fact that web 4.0 will reveal new structures in consumer, service, stakeholder and business models in the tourism ecosystem. Technologies such as intelligent agents, big data, internet of objects and augmented reality will be important factors in this change. The main purpose of the research is to determine the stakeholders' awareness about the changes that the web 4.0 arguments may have on the tourism products and services, tourist profiles, business models and stakeholders in the tourism ecosystem. The study also aims to explore the stakeholders' predictions about this issue. The research was conducted through semi-structured interview with 18 participants including hotel enterprise directors, owners of travel agencies, public institution managers, non-governmental organization managers and academicians that play a supporting role in the tourism ecosystem in Izmir destination. The results revealed that the majority of stakeholders are aware of web 4.0 and its potential impacts. In addition, participants believe that web 4.0 will create new business models in which technology-producing stakeholders are involved, new tourist services that benefit from augmented reality and similar technologies and new tourist consumer profiles that will demand these tourist services.

Keywords: intelligent agent; augmented reality; semantic web; web 4.0; tourism

Introduction

When the development process of web from the beginning until today is taken into the consideration, every new era has emerged with new talents and opportunities. This development process can be interpreted as the fact that the internet is shaped by the change of the relationship between the creator and the user. The development process has been discussed in different ways by researchers. Fucsh, Hofkirchner, Schafranek, Raffl, Sandoval & Bichler (2010) identified the Web as a techno social system that enhances human cognition towards communication and co-operation. According to this understanding, they identified three types of Web based on an analytical distinction: Web 1.0 as a tool for cognition, Web 2.0 as a medium for human communication, and Web 3.0 as networked digital technology that supports human cooperation. They indicated that this distinction does not imply a temporal order (such as in versions of a software, where the upper version always exists at a later point of time) or an evolutionary process. As a continuation of this process Patel (2013: 410) mentioned that web 4.0 as a web of integration and Web 5.0 as web of Decentralized smart communicator.

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The idea of the semantic web, of exploiting the possibilities for serendipitous reuse of linked data, dates back at least to Sir Tim Berners-Lee's plenary talk at the first International World Wide Web (W3C) Conference at CERN in Geneva in 1994 (O'Connel, 2011: 36). Some call the Semantic Web as 'Web 3.0' (e.g., Socco, 2011; Weber, 2007; Cardoso, 2007) but some authors point out that the Semantic Web is just one of several converging technologies and trends that will define Web 3.0 and it deals with a series of IT applications and languages that have improved the intelligence of the Web (e.g., Berners-Lee, Hendler & Lassila, 2001; Spivack, 2006; Spivack, 2007; Fumero, Roca, & Vacas, 2007; Gruber, 2008; Cardiff, 2009; Hendler & Berners-Lee, 2010).

Web 3.0 includes all applications which belong to era of web 1.0 and 2.0. Every era of the web increased the web efficiency and benefits via adding the accumulation of previous era. The basic shift occurring in Web 3.0 is from information-centric to knowledge-centric patterns of computing. Web 3.0 will enable people and machines to connect, evolve, share, and use knowledge on an unprecedented scale and in new ways that make our experience of the internet better (Davis, 2008: 4). The fundamental difference between Semantic Web technologies and other technologies related to data (such as relational databases or the World Wide Web itself) is that the Semantic Web is concerned with the *meaning* and not the structure of data (Cambridge Semantics, 2017).

On the other hand, Web 4.0 presents a new web perception that artificial intelligence agents play a role in human and machine interaction. The most important feature of web 4.0 is that your computer contains applications that can run without installing any programs. It can be predicted that the potential of web 4.0, which is a result of the evolution of the Internet, will lead to significant changes in the tourism sector as well as in many sectors. The main purpose of the research is to determine the stakeholders' awareness about the changes that the web 4.0 arguments may have on the tourism products and services, tourist profiles, business models and stakeholders in the tourism ecosystem. This research undertook qualitative research method and exploratory research design since the notion of Web 4.0 in tourism is relatively new issue so that the study seems to be a preliminary study for the subsequent researches in this field. The semi-structured interview technique as the principle method in data gathering was utilized. The semi structured interview form consisting of open-ended questions was constructed by the authors to determine stakeholders' awareness about the changes that the web 4.0 arguments may have on tourism ecosystem considering the relevant literature and previous research evidence. Paragraph: use this for the first paragraph in a section, or to continue after an extract.

Literature review

There is no clear and generally accepted definition of web 4.0. But their basic features and possibilities are known. It is possible to make a definition move from these features and possibilities. Web 4.0 is a platform for personalized agents with artificial intelligence to manage the machine-machine and machine-human information cycle anytime and anywhere over the cloud systems. Web 4.0 can be defined as an internet with artificial intelligence that does not require a local disk, can operate over a web browser.

According to Wu & Unhelkar (2010: 548), the Web 4.0 generation, which has creative features, brings human and machine intelligence together in a ubiquitous environment. Designed with, Web 4.0, known by different names such as "Intelligent Web" or "Smart Web" allows software agents to communicate and negotiate with other agents and systems and collaborate with them to perform transactions on behalf of agents, by demonstrating an agent-centric structure. Users in this generation will not be just humans. Humans and machines will connect each other via smart ways and wirelessly to develop interactions, to work together and to help each other.

Web 4.0 is also called "Emotive Web" at the same time. The reason of this is high-bandwidth technology, which has a rich visual content that provides high satisfaction and success for the generation users (Martinez-Lopez, Anaya-Sanchez, Aguilar-Illescas & Molinillo, 2016: 9). Examples of Web 4.0 applications are; WebOS, EyeOS, YouOS, G.ho.st, Glide, Goowy, Desktoptwo and Google Docs and Spreadsheets. Facebook's agent M is one of the web 4.0 applications. Web 4.0 aims to increase the level of information acquisition by making the Internet more complex. For example, in a Web 4.0 application, for previous generations software agents that are roaming on the Internet and located on a computer can now communicate with, and understand other agents and systems and collaborate to achieve things (Murugesan, 2010: 4).

Web 4.0 indicates different features than previous generations of Internet by improving real-time integration between the virtual worlds and humans and the virtual worlds and objects that interact with. Webkinz or Second Life avatars will increase the chances of multi-tasking for humans and to live between physical and virtual worlds.

Another important advance in this area is Haptics. Haptics, provide a sense of touch for objects and interfaces to humans (Kambil, 2008: 57). Moving online functionality into the physical world is one of the most critical developments of Web 4.0's for the Internet (Patel, 2013: 416). In the future as the next stage of Web 4.0, it is highly probable that a sensory and emotive Web (Web 5.0) that is designed to personalize the interactions between computers and people (Benito-Osorio, Peris-Ortiz, Armengot & Colino, 2013: 281).

According to Tow (2011: 204), Web 4.0 will be ubiquitous powered by smart computational senses and computational connections, wrapping and connecting human life and covering all social and scientific activities. He stated that by 2050, 9 billion people living on the planet will connect and communicate with other biological and artificial life forms and electronic devices. Another purpose of Web 4.0 is to empower businesses with a variety of tools so that they can interact with their customers on the right time. It aims to enhance the customer experience in the offline world on the Internet. Businesses that can adapt to Web 4.0 will be able to cut their competitors effectively in the transition period and gain competitive advantage (Larson, 2012). It ensures global transparency, governance, distribution, participation, collaboration into key communities such as industry, political, social and other communities (Choudhury, 2014: 8100).

Intelligent agents which have personalized characters in Web 4.0 and match your character will face a new life form. They will prepare you a holiday package keeping in mind the features of your business, your individual preferences and other data about you. In other words, a new era will begin, far beyond the global search capabilities of holiday databases, such as web 2.0's passive hotel and agency pages and web 3.0's trip advisor.

The holiday information on the Internet will be structured according to the digital behaviors of the agents, not the tourists. Trip Advisor and similar web pages will not need to be reviewed by tourists. For this reason, such web pages will have to be restructured according to the web 4.0 standards. These sites will be forced to switch to a more subtle structure that will attract more intelligent agents. However, tourism operators will have to overcome business models.

Currently, the Web, despite provoking reactions from its users, is itself unaffected by the emotional reactions of its users. However, technologies are being developed that would allow the Web's effects on users to be measured by the Web in such a way that it could register their emotions (e.g., through the phrases that they write or from their facial expression), allowing for greater personalization of each Web-user (Martinez-Lopez et al., 2016: 15).

Methodology

Research design

The main purpose of the research is to determine the tourism ecosystem stakeholders' awareness about the changes that the web 4.0 arguments may have on the tourism products and services, tourist profiles and business models in the tourism ecosystem. The study also aims to explore the tourism ecosystem stakeholders' predictions about this issue.

In order to achieve these aims, the study adopts a qualitative research method and the research design is both exploratory and descriptive. As Gegez points out (2005) that exploratory research design which aims at identifying a problem and its aspects is used more widely in qualitative research methods. Exploratory research design gains importance when previous research on a certain topic is limited. This research undertook qualitative research method and exploratory research design since the notion of Web 4.0 in tourism is relatively new issue. The semi-structured interview technique as the principle method in data gathering was utilized. The semi structured interview form consisting of 5 open-ended questions was constructed by the authors to determine stakeholders' awareness and predictions about the changes that the web 4.0 arguments may have on tourism ecosystem considering the relevant literature and previous research evidence.

Data collection and sampling

The population of the research consists of tourism enterprises, public institutions, non-governmental organizations and other public institutions that play a supporting role in the tourism ecosystem in Izmir destination. Due to constraints on time and funds, the research was limited to participants from central Izmir and its provinces.

18 participants including 6 hotel enterprise directors, 3 owners of travel agencies, 4 public institution managers, 3 non-governmental organization managers, and 2 academicians that play a supporting role in the tourism ecosystem in Izmir destination were interviewed face to face in person. Sound recorders were used and the interviews lasted approximately from 45 - 90 minutes.

Methods of data analysis

Data in this study was analyzed via descriptive analysis used in qualitative researches. In the initial stages of data analysis, the qualitative data obtained from the interviews was transcribed from sound recorders to a written sheet. In the second phase, we analyzed the respondents' statements interpretatively considering their awareness and predictions about the changes that the web 4.0 arguments may have on the tourism products and services, tourist profiles and business models in the tourism ecosystem. The quotations selected from interview records and evaluations with regard to research findings are presented in the following section.

Results and discussions

In light of the demographic features of these eighteen participants, six hotel enterprises directors, three travel agencies owners, four public institutions managers, three non-governmental organizations managers and two academicians that play a supporting role in the tourism ecosystem in Izmir destination. The interviewees all of whom are university graduates consist of eight female and ten male executives.

In the study, the following open ended question was asked to determine the opinions of tourism ecosystem stakeholders on the current practices of tourism enterprises in Turkey regarding internet based customer services: *“Do you think that the existing practices that tourism companies in Turkey have made about internet based customer service are sufficient in terms of kind, quality and functionality? Would you disclose your positive or negative thoughts by example and justification? (Web pages, various android apps, TripAdvisor etc. membership, use of social media items)”*.

When the public institution stakeholders' responses are examined, it is determined that they have different opinions. For instance: “I find it adequate for the moment. Even small businesses are now able to advertise and book online using the internet. Especially in the last 1-2 years WhatsApp application is about fast return...” (P1); “...I do not find enough, because most of the websites are inadequate. They only have contact information. But the images are missing...They cannot use social media effectively...” (P3).

When the responses of the participants of NGOs are examined, it is seen that they have a common view on this issue. For instance: “It is clear that there is an awareness of this issue in many businesses. Certainly some businesses are quite successful in these matters, but some are extremely inadequate...I think it is a chaos especially for the use of social media for this purpose. This creates problems with the dissemination of reliable information” (P6).

When the responses of hotel enterprise participants are examined, it is seen that they do not find applications sufficient. Participants agree that the websites of tourism businesses are inadequate. For instance: “...Many hotels' web sites are made up of several hotel photos. In particular, there are outdated images on websites of companies that are longer than a few years old...” (P8). The other respondents (P9, P10 and P11) emphasized that website services are mostly based on sites like TripAdvisor or ETS. P13 responded as: “The chain hotels operating in Turkey follow the vision of their headquarters. In general, central offices are active in this area and chain operators are taking technological steps faster...” (P13)

They emphasized that especially chain hotels are successful in web-based services, but other hotels are inadequate. Disagreements among stakeholders have been identified in relation to the use of social media by hotel enterprises. P10 and P11 indicated that *“...hotel management is not very effective in using social media...”*. Both stakeholders emphasized that tourism enterprises' activities on using social media are low level of interaction and unplanned work. Unlike these participants P8 stated as: *“...the most active tools used by the hotels are social media accounts. In these areas, guests are returned to comments and criticisms, questions and suggestions very quickly... Apart from social media and online guest surveys, there is no different internet channel where hotel management interacts with its guests. For example, hotel and personal mobile phone applications can be used to diversify Internet-based customer service...”*

When the responses of travel agent participants are examined, it is seen that the travel agent participants think that the tourism companies' applications on the existing internet based customer services are partly sufficient. For instance P14 stated that *"These applications seem technically sufficient. However, I think that the activities are inadequate in terms of meeting personal requests or solving the problems that arise after the purchase..."*

When the responses of the academican participants are examined, it is seen that they find the applications sufficient. The respondents stated as: *"I think it has been quite effective in recent years..."* (P17); *"I think it is sufficient but applications should be diversified. ...there are some security issues..."* (P18).

In the study, participants were asked the following open ended question to determine the awareness of tourism ecosystem stakeholders on developments in web 4.0 and Web 4.0 in general: *"Can you track the evolution of Web 4.0? If you can track developments, could you share with us which resources you are pursuing in order to obtain information and how much information you have in this regard?"*

When respondents' answers to question 2 are examined, it appears that public institution stakeholders have followed the information on the development of web 4.0 in a partial and superficial manner. For instance P2 stated that *"I can follow from web news. Smart solutions are being produced in the hotels within the scope of smart tourism..."*

When the responses of the participants of NGOs are examined, it is seen that they do not follow developments related to web 4.0. For instance, while P6 stated that *"I cannot say that I follow regularly"* and P7 said *"I heard it for the first time"*.

When the responses of hotel enterprise participants are examined, it is seen that the developments in web 4.0 are regularly followed by three of the stakeholders (P9, P10, P12) and from scientific sources, compare to not followed by the other three (P8, P11, P13). For instance: *"I follow articles and news especially about Industry 4.0 and its effects on tourism..."* (P12); *"I can track developments on Web 4.0 through a number of tech sites / forums..."* (P10); *"I follow innovations through representatives of institutions and organizations, and conferences..."* (P9)

The travel agent participant P14 and P16 said that they had heard the concept for the first time, while P15 had tracked the developments from time to time. While the academican participant P17 indicated that *"I follow the development on Web 4.0 through the internet and conferences"*, P18 said that *"I have some knowledge, I do not follow developments regularly..."*

In the study, the following open ended question was asked to determine the opinions of tourism ecosystem stakeholders regarding the changes that Web 4.0 can make in business models of tourism enterprises in Turkey: *"In your opinion, what changes can Web 4.0 cause in the business models of tourism enterprises in Turkey (e.g. in marketing activities, stakeholders, cooperation, costs and incomes)?"*

The public institution participants pointed out that software and technology enterprises will gain importance in new business models and new cooperation will be formed between these two sectors, the roles of travel agencies will change and costs will decrease: *"...The concept of a classic travel agency can get out of the way; no doubt this is bad news for travel agencies... Businesses can invest on this technology..."* (P1); *"...First, it can reduce the workload of employees... Businesses are forced to develop technical infrastructure... In terms of the user, during the decision making phase, the first stage is easily overcome..."* (P2); *"...If Web 4.0 is applicable to businesses in our country, it means that everybody can get a holiday and travel. Because of the competition and the development of alternative tourism, prices will be lowered. Therefore, lowering costs will result in higher profits..."* (P3); *"The need to prepare content and adapt it to web 4.0 will increase the importance of software and technology enterprises...So the information and tourism sector seems to be in cooperation as never before. This cooperation may increase some of the costs at first, but I think that there will be significant savings areas in terms of businesses and destinations in the middle term, especially in time... software businesses can be an important argument in sector profit distribution"* (P4).

The NGOs participants P5 and P6 stated that there could be changes in business models, while P7 said there would not be any significant change. The responses of the participants are as follows: *... It can cause very radical changes in every field..."* (P5); *"... new collaborations will inevitably occur."*

It is especially between the enterprises that produce software on the internet and the ones that operate in the tourism sector..." (P6); "I do not think software companies will be one of the key stakeholders. I believe they will continue to serve as service providers again..." (P7)

As implied by the following statements, the NGOs participants P6 and P7 also pointed out that especially labor costs and customer complaints would decrease and revenues would increase: "... I think that business revenues in the tourism sector will increase because of the emergence of new marketing channels... Reduced error rates and complaints can also be seen as an indirect result..." (P6); "It can contribute to the decrease of the labor costs of the enterprises..." (P7)

As implied by the following statements, the hotel enterprises participants indicated that Web 4.0 applications could change business models. In addition, similar to NGOs participants, they also noted that it would reduce the need for labor and decrease the costs: "...Without thinking that 'I must go on vacation', the system could think about it in the name of you and say 'you must go on holiday', it can stimulate touristic movements... I think that a system that will think and decide on our behalf and guide us, like Web 4.0, can increase tourism revenues..." (P8); "...This will increase service speed while reducing costs and reducing error rates." (P9); "Along with the use of virtual reality and artificial intelligence, marketing activities and collaborations can gain a completely different dimension..." (P10); "...I think that the hotel sales departments will have no need for labor in a very short time with only one manager who manages digital channels effectively. We see new titles in many major brand businesses, such as Digital Learning Manager, Digital Marketing Manager. Freedom to travel without moving through virtual reality can destroy even the current trends like AirBNB, UBER in the long run..." (P12); "...The role of the internet in institutional reservations, MICE market and organizations will increase. These developments were rapid in the individual segment...Marketing activities will focus on online agencies..." (P13)

Similar to NGOs and hotel enterprises participants, travel agency participants indicated that Web 4.0 applications could change business models and roles of travel agencies. They also expressed the impact of Web 4.0 on tourism businesses as follows: "... I think more people will participate in tourism ..." (P15); "...I think the income of travel agencies will decrease..." (P16)

Academician participants, like others, believe that with web 4.0 applications new business models will emerge, the costs will rise in the short term but will fall in the middle term with increased service quality and demand: "...The use of social media, especially in marketing activities, and the viewing of the business in an attractive fashion on virtual platforms will be indispensable elements...Over time, it will be the case that users will be able to participate in many virtual environments as if they were real...These factors may increase the operating cost, but over time, in the middle term, the demand will increase and the costs will decrease..." (P17)

Findings such as the reduction of costs, the emergence of intelligent agents and new business models, which are found in the research results, are in parallel with many researches in the literature. The mentioned researches express similar changes in the research findings that would be caused by web 4.0. Many organizations define technology as a significant asset to generate income and control cost (Brynjolfsson & Hitt, 2000). Cost will be reduced by eliminating investment-intense data warehouses and redundant extraction processes performed by hired personnel with domain expertise (Watson & Wixom, 2007). Consumers obtain information to assist in the trip-planning process and to make informed decisions about destinations, accommodation, restaurants, tours, and attractions (Chung & Buhalis, 2008; Thevenot, 2007; Xiang & Gretzel, 2010).

Wang, Yu & Fesenmaier (2002) argued that 'since people now can surmount time and space and "be" anywhere, marketing organizations should adapt accordingly and embrace this new space, [virtual communities], as a marketing tool capable of organizing people's knowledge about, and desires for the places they may wish to visit. Business models are necessarily influenced by users' behavior in the use of the new technologies (Almedia, Santos & Monteiro, 2013). Information can be filtered by context, significance and relevance by humans and by computational devices. This characteristic is implicitly related with the individualized characteristic. Regarding the differences among individuals, information produces different reactions in different people (Almedia, Santos & Monteiro, 2013). Web 4.0 will be the read-write-execution-concurrency web. It achieves a critical mass of participation in online networks that deliver global transparency, governance, distribution, participation, collaboration into key communities such as industry, political, social and other communities (Cake, 2008).

The proliferation of the Internet and other technological innovations has transformed the structure of the tourism industry (Wöber, 2003; Buhalis, 2004; Chathoth, 2006; Chalkiti & Sigala, 2008; Kim, Lee & Law, 2008) as well as affected how tourism destinations are perceived and consumed (Bennett, 1993; Doolin, Burgess & Cooper, 2002; Sigala, 2005; Govers, Go & Kumar, 2007).

In the study the following open ended question was asked in order to determine the opinions of tourism ecosystem stakeholders about the possible effects of Web 4.0 on the development of new tourist products: *“In your opinion, with the possibilities provided by Web 4.0 what kind of new products can tourism businesses offer in terms of augmented reality, haptic technologies and similar developments?”*

There is a consensus among public institution participants that augmented reality, haptic technologies and similar developments will result in new tourism products to emerge and be effective:

“... a new sector will emerge with virtual tours...” (P1); “...The technological developments will cause enterprises to renew themselves and turn to new tourism activities that will enable them to adapt to this market environment...” (P3); “...a part of the destination can be presented with these technologies in addition to the actual experiences. For example, tourists who do not dive or go trekking but are curious can experience diving with these techniques in the afternoon after sunbathing and gastronomic tours...” (P4)

While NGOs participant P5 did not comment on this issue, P6 and P7 have different thoughts: “...The essence of tourism supply will consist of digital works...” (P6); “...Virtual reality practices can be detrimental to tourism... I think that if these practices can be realistic enough and can make tourists feel, they can be very effective in purchasing real products...” (P7)

Apart from P13, all hotel enterprise respondents think that these technologies will affect the formation of new tourism products: “...Pristine constructions of ancient civilizations can be presented to tourists with sightseeing tours supported by augmented reality...” (P9); “...In the mythological age, listening to the sirens connected to Odeysesus' ship pole would be an invaluable experience ...” (P11); “...for example, our own hotel building has a special structure of 65 years and many aspects that have witnessed the past,we are working on getting guests a 360-degree time tunnel tour in the near future...” (P12); “I do not think haptic technologies will have a significant impact on the industry. However, I anticipate that technologies such as virtual and augmented reality will lead innovations, especially in the public areas of hotels, museums and exhibitions ...” (P13).

Travel agency participants agree that these technologies will be effective in the tourism ecosystem and that new tourism products will be structured with these technologies: “...If we consider tourism as a way of selling imagination, these technologies will definitely influence the development of sales by increasing the influence and power of this imagination...” (P14); “...Individuals will be able to experience it without going to a destination...” (P16)

Similar to the other participants, the academics believe that these technologies will be effective in the emergence of new tourism products in the tourism ecosystem, and their ideas and suggestions are expressed as follows: “...When someone orders food, he/she can watch the way of cooking of his/her meal with the help of panels” (P17); “...The historical and antique places such as Konak square, Ephesus and Foça will be very impressive if they are revived...” (P18)

The findings of the research question show that web 4.0 will carry the web infrastructure to a new level where enhanced realism and 360 degree virtual visits can play an active role where dreams can be sold. Fritz, Susperregui & Linaza (2005) discussed that augmented reality technologies can enhance cultural tourism experiences by providing personalized and interactive multimodal information about monuments and historical buildings of a destination. According to Kounavis, Kasimati & Zamani (2012), augmented reality has proven so far to be a technology that can provide tourists, and citizens of course, with much more personalized content and services tailored to their particular needs. Utilizing augmented reality in the tourism context will maximize tourist satisfaction based on the assumption that tourists will actively accept and use augmented reality technologies (Chung, Han & Joun, 2015; Yovcheva, Buhalis & Gatzidis, 2012).

In the study the following open ended question was asked to the stakeholders of the tourism ecosystem to determine their views on the impact of 3D imaging techniques on tourism participation: *“In your opinion, how can 3D imaging techniques that will increase in effectiveness with Web 4.0 (such as having a destination sightseeing experience through 3D images specially prepared without going to the destination) affect people's participation in tourism?”*

will positively impact tourism movements. The common view of these participants is that 3D image technologies will play a role as a promotional and marketing tool and will increase demand for real destination: *“...It will have positive effects in terms of inbound tourism...”* (P1); *“...Virtual tours will create the desire to live the truth. For those who cannot afford for travel, it can provide benefits in developing knowledge and imagination and opening new horizons...”* (P2); *“...it will make a very positive contribution in terms of participation in tourism. I think people will be very happy when they see the truth of what they see in the virtual world when they go on vacation...”* (P3); *“...It is possible that in the long run it is a sales and marketing tool and an argument for creating attractiveness that will create a strong demand. This will make a positive contribution to the touristic movements towards that destination....”* (P4).

There is also a consensus among NGOs participants that 3D imaging techniques can negatively affect tourism movements and that a new tourist profile will emerge: *“...I think it will bring out a new type of customer while reducing the traditional tourism customer...”* (P6).

It has been determined that all hotel business participants are concerned that 3D imaging techniques will adversely affect tourism movements: *“...It has the potential to seriously undermine participation in tourism movements...”* (P9); *“... It seems to have negative effects on demand in the initial stage. I will then develop with the adaptation of the users...”* (P11); *“...Creating new travel packages that are suitable for the new generation, such as virtual tour, digital adventure track, discovery and renewal, which removes the time constraints and costs of the consumer, will cause more people to be attracted...”* (P12); *“...I think that there may be negative effects on going to destinations in person...a new market that may prefer this kind of tourism experience can be separated from the existing travel market ...”* (P13).

It has been determined that travel agency participants have different opinions among themselves regarding how 3D images can affect people's participation in tourism: *“...As a result, both groups will emerge as different market segments...”* (P14); *“...It may encourage a new tourist demand, especially for less well known destinations...”* (P15); *“...these developments will affect sales of travel agencies adversely...”* (P16).e of the academic participants believes that 3D imaging techniques will positively affect participation in tourism, while others believe that it will adversely affect: *“...the possibility of experiencing without traveling can adversely affect the request to go to the destination personally...”* (P17); *“...The ability to visit the destination in advance will support the purchase decision...”* (P18)

The 3D virtual world provides opportunities for destination marketing organizations to communicate with targeted markets by offering a rich environment for potential visitors to explore tourism destinations. However, as of yet, there is little understanding about how to effectively market tourism destinations to virtual world participants who are technology users as well as potential consumers (Huang, Backman, Backman & Chang, 2016). Williams & Hobson (1995) pointed out that virtual reality, equipped with visualization components offering interactivity and immersion into a virtual experience in tourism, simulated environments that affect tourists' trip planning and influence the tourism industry. Williams (2006) indicated that in response to the growing trend of experiential marketing, virtual reality technologies incorporating multimedia assist tourism marketers in creating a memorable experience that integrates meaning, perception, consumption and brand loyalty. Guttentag (2010) suggested that virtual reality technologies provide various applications to tourism professionals and researchers in terms of tourism policy planning, tourism marketing, tourist attractions, entertainment and heritage tourism site preservation.

Recent research suggests that the use of information technology in promoting tourism products and destinations provides tourists a virtual experience that influences consumers' travel intentions (Chen & Schwartz, 2008; Morosan & Jeong, 2008; Kim, Kim & Shin, 2009; Huang, Backman, Backman & Moore, 2013). The result of Huang, Backman, Backman & Chang (2016) research on the effects of virtual reality technology in tourism marketing revealed that perceived usefulness is positively related to the experience of enjoyment, indicating that useful information in 3D tourism sites – such as the visual resemblance and overall feel of the physical tourism destination, naturalistic elements and images of cultural authenticity – can enhance the consumer experience of enjoyment.

Conclusion, implications and suggestions for future researches

When the findings are evaluated in general, it has been determined that the majority of participants have the opinion that web 4.0 and affiliate development will have a negative impact on tourist movements. Stakeholders stated that it is possible to reduce touristic movements for reasons such as ease of use, low cost, the possibility of disadvantaged groups to participate, and travel to risky areas. Stakeholders stated that the reasons such as ease of use, low cost, the possibility of disadvantaged groups to participate and travel to risky areas could lead to a decrease in tourism movements. It is also envisaged that these developments may at the same time create a new type of tourist that will participate in tourism from their home or service centers without travel.

On the other hand, it is among the predictions of participants that web 4.0 and affiliate development will generally reduce the costs of tourism businesses, especially labor costs. Due to the decrease in faults, customer satisfaction is also expected to increase. New collaborations and business models that will inevitably emerge between Web 4.0 technology and software companies and tourism ecosystem stakeholders are marked as an important development that will accelerate these effects.

Another highlight of the survey's findings relates to the new tourism products can be offered through the use of new technologies and possibilities provided by web 4.0 . Stakeholders have stated that these technologies can be used to animate mythological stories and historical sites. They also anticipate that such technologies can contribute to gastronomy and museum applications. Some stakeholders have emphasized that touristic products, which are the fictions of tourists' dreams, can also be created.

In general, it has been found that new business models that will evolve from web 4.0 and related developments, and digital tourist services as a result of collaborations will reduce the costs of tourism ecosystem stakeholders. But on the other hand this new situation will adversely affect tourism movements by creating a different tourist profile even though it generates some demand for the destination.

The study was carried out with the participation of stakeholders who are closely involved in and implementing web 4.0 in Izmir. Future work is targeted to be expended to potential stakeholders (eg, transportation, health and education infrastructure and services regulators and decision makers) that are influenced by web 4.0 through a holistic network approach. It will also be important for future work to address an approach to optimizing web 4.0 applications (cost, time, speed, etc.), based on the role of stakeholders within web 4.0.

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