21 Century Travel using Websites, Mobile and Wearable Technology Devices

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This paper begins with an account of how travel has changed primarily between the 20th and 21st century from the dominant role that travel agents played in the past to the travel functions that mobile and wearable technology devices perform in this century. It also discusses the many technological changes that prepared the path for mobile and wearable technology devices, and concludes with examples of how wearables and augmented reality experiences are being used by travel organizations and museums. Wearable computing is a natural evolution of the smartphone technology that has become so prevalent and indispensable. Samsung's Galaxy Gear, Apple's Watch, Microsoft's HoloLens, Epson's Moverio and others will vie for market share in the wearable technology space. Wearable tech devices have the power to transform the management of destination attractions in terms of information provision and the experience of a venue or destination. Examples of this are provided herein.

Introduction

Paradigm shifts in business operations instigated by the Internet two decades ago are now being further compounded via the prevalence of mobile devices and the emerging array of powerful wearable technology devices so that tourism venues need to realign their business practices and models to remain competitive and avoid being sidelined by advancing technology. Wearable tech devices are expected to change the fundamentals of human machine interaction. The paper firstly outlines the role of travel agents followed by changes in travel and technology that have enabled the adoption of wearables.

Even though the human need for travel has existed throughout history, before the 15th century most travel was for necessity rather than pleasure since it was an arduous and precarious activity. In the 1400s a process of formalization in the hospitality industry took place when England and France passed legislation that required hotels and inns to keep guest registries. This appears to be the first example of customer relationship management in the hospitality area. The industrial revolution started around 1760 and resulted in the expansion of rail infrastructure across Europe and North America. With the emergence of mass transportation there was a boom in the development of hotels centered on city cores (Joyce 2013).

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The travel agency industry began in the 1840s when Thomas Cook organized the first tour in England. Cook negotiated with the railroads to pay him a commission on tickets he sold for excursions to seaside resorts and spas along the Irish Sea and English Channel. His early tours introduced travel to the middle class. Long-distance travel was previously affordable only to the rich before railroads were built. The reach of Cook's tours expanded to the Holy Land and India as the British Empire grew. His innovations include the traveler's check, and roundtrip tickets. Cook is credited with founding the concept of organized tourism (Davidoff and Davidoff 1994, Tranter et al. 2009).

For a long time travel agents focused on booking tours and accommodations then later included other travel products. In the last thirteen years travel booking shifted online and the number of travel agents has decreased. The Bureau of Labor Statistics states there were 64,680 full-time travel agents in 2012 but just a decade before there were 95,360 (Jermanok 2014). However, according to the American Society of Travel Agents (ASTA), the number of travel agents has remained fairly steady amidst contraction and consolidation among brick-and-mortar travel agencies (http://bit.ly/1JhYTo6). Many travelers continue to book business and personal trips through travel agents despite the popularity of online booking sites. Revenues at travel agencies have increased from $9.4 billion in 2002 to $17.5 billion in 2011, reports the Census Bureau (Jermanok 2014). Travel agents are still a large channel for airline, hotel, cruise and car companies because travelers are more willing to turn to agents when they are faced with unusual destinations or high-end luxury and specialized travel. Also, business and wealthy travelers feel their time is valuable and so are reluctant to spend time on a travel website. Some business and leisure travelers prefer a personal human touch and the expertise of an agent (Jermanok 2014, Conyette 2012).

Imminent advancements in technology were to displace the reliance on agents by some consumers and facilitate the adoption of wearables by the travel industry.

The Beginning of E-Commerce in the 20th Century

The birth of E-commerce in travel had to wait for a few later developments. The first development involved the airlines which began to appear after WWI. American Airlines pioneered numerous technological and marketing innovations including the frequent flyer program and the introduction of a computer reservations system (CRS) by Sabre Holdings in 1960 to automate airline booking reservations followed by the development of sophisticated customer databases (Davidoff and Davidoff 1994). The reservation system ultimately became widely known as SABRE (Semi-automated Business Research Environment). In the seventies the *Sabre* system was installed in a travel agency for the first time. This allowed travel agents to have immediate access to flights, triggered the wave of travel automation and

made Sabre instrumental in inventing electronic commerce for the travel industry (http://bit.ly/1NhGGpb).

Along with the growth of the airlines came the advancement of travel agencies; many of these had become important sales and booking channels for the airlines. By the mid-nineties E-commerce grew rapidly until 2000 (Schneider 2007). Increases in travel agent hotel reservations and the dawn of smaller and more powerful desktop computer systems spawned the hotel reservation systems located at a hotel's front desk. Accordingly, Fidelio launched its first property management and hotel reservation system in 1987 (Joyce 2013).

Shortly after the airline industry implemented code-sharing agreements which enabled carriers to book each other's seats, they allowed travel agents to book directly into the computer reservations system which benefited the airlines by savings in labor costs (Davidoff and Davidoff 1994). Making available scheduling and fares to agencies proved to be a good move for the airlines (Joyce 2013). In the eighties, Sabre became a division of AMR, the parent company of American Airlines (http://bit.ly/1NhGGpb). Initially, computer programs used cryptic codes that only travel agents could understand and this ensured that consumers were dependent on an agent (Davidoff and Davidoff 1994). Computer reservations systems became more sophisticated permitting travel agents to view more airline inventories, prices and availability on numerous flights of various air carriers at the same time.

Origin of the GDS, Travel Websites, and IDS

GDS

Car rental reservations were added to the reservations systems and travel packages of air and car rentals emerged. Hotel companies (Sheraton, Holiday Inn and others) created central reservation offices (CROs) to take reservations for all properties within their organizations. Eventually, the hotel CROs merged with the reservations systems of the airlines and car rental agencies so that a travel agent could book any of these products through one CRS. The term CRS became the Global Distribution System (GDS) as technology advanced to enable travel agencies to sell products and services globally (Davidoff and Davidoff 1994, Tranter et al. 2009).

Due to growth in demand for travel, European airlines also began to invest in the field in the 1980s by deploying their own reservation systems. A consortium led by Air France and West Germany's Lufthansa developed Amadeus. In nineties other airlines formed alternate GDS networks such as Worldspan and Galileo. For many years the GDSes had a dominant position in the travel industry. To bypass the GDS and avoid high GDS fees, airlines started to distribute flights directly from their websites (Strauss 2010).

The First Travel Websites

In 1995 Viator launched its travel technology business by providing tours and excursion bookings via the World Wide Web. In 1996, a small division of Microsoft called Expedia launched its website offering online bookings for air, hotels, and car rentals (Joyce 2013, Expedia History n.d.). The Travelocity website, introduced in 1996, was owned by Sabre Holdings (http://bit.ly/1Nh GGpb). The success of the commercial Internet in the early 1990s was partly responsible for the development of websites by many leading travel brands some with online reservation capabilities (Joyce 2013).

In the first decade of the new millennium, *Sabre* spins off from AMR, and makes multiple strategic acquisitions such as an online corporate travel booking tool, numerous travel distribution businesses globally, a hotel room consolidation and distribution business, a provider of reservation management, distribution and technology services for hotels, a travel community website, a new Web-based agent booking platform which altogether gives travel suppliers, travel agents and travelers greater access to *Sabre* technology. *Sabre* also makes *Travelocity* a wholly owned subsidiary (http://bit.ly/1NhGGpb). Expedia makes similar acquisitions including Hotwire, Venere and TripAdvisor to expand globally and surpasses Travelocity as the number one online travel company in 2001. It introduces leading RSS travel alerts in 2006, becomes the largest travel agency in the world by 2010 with quarterly revenues approaching $1 billion, and launches mobile apps in 2011. In 2011 Expedia operates in 60 countries, has 54 million customer visits per month, and millions of people have downloaded its apps (Expedia History n.d).

The Sabre GDS enables numerous travel companies to search, price, book, and ticket travel services provided by airline, auto rental, rail providers, and tour operators around the globe (http://bit.ly/1NhGGpb). Airline computerized reservation systems (CRS) were the primary form of travel agency computerization in the world and travel agencies were mostly defined and controlled by airline CRS (Wardell 1991).

Travelocity was acquired by Expedia in January 2015 (http://bit.ly/1Nh GGpb). Travelocity was designed to serve the consumer market. Such online travel websites are referred to as third-party websites and act as intermediaries between the consumer and the hospitality provider or supplier.

IDS

Different GDS systems emerged and airlines divested most of their direct holdings to dedicated GDS companies (The Economist 2012), who make their systems accessible to consumers through internet gateways. Some GDSes became an electronic infrastructure that facilitated purchases of travel products by consumers and is referred to as an Internet Distribution System or IDS. The Modern Internet Distribution Channel System is a collection of networks consisting of more than 2000 internet reservation systems, travel websites, online reservation systems, online travel agencies (OTA), and travel portals

which specialize in internet marketing of travel and related services directly to consumers. Any consumer with access to the World Wide Web has the ability to book travel on their own in real time without the assistance of a travel agent or tour operator (IDS n.d). The IDS (Booking.com, Expedia.com, etc.) allows consumers to book hotel rooms, rental cars, airline tickets as well as activities and tours, railway reservations and bus reservations in some markets. The IDS is also extensively used by travel agents and some travel websites (http://bit.ly/ 1JhYZft).

In a European study more than one in four bookings is generated through online channels demonstrating that IDS are dominant. The proportion of direct bookings (telephone, fax, walk-ins, e-mail, Web form) without intermediaries for hotels in Germany, Austria and Switzerland is steadily decreasing. Online sales (IDS/OTA, GDS) are more important in urban and in business hotels than in leisure hotels in these markets (Schegg and Fux 2012).

Travelers Feel Empowered by the Internet

The popularity of the Internet to consumers and travelers and why some have abandoned travel agents is easily explained. Bellman et al. (1999) found the most significant predictor of online buying behavior is the desire to look for product information. The Internet helps educate consumers by providing vast amounts of information about destinations and different travel options. Another predictor is what they called a wired lifestyle. Because these consumers use the Internet for many activities it is natural for them to use it to search for product information, conduct comparative shopping, and to buy products. They also believed consumers value the Web's ability to save them time over its cost savings capability. Motivations play a greater role in Web usage than do demographics, although demographics have been demonstrated to be influential (Joines et al. 2003, Korgaonkar and Wolin 1999, Conyette 2011).

Travelers want to visualize their vacation and see what they are getting into. Haubl and Trifts (2000) report online tools assist consumers in decision-making, and improve the quality of their decisions. Also, respondents will allow the online intelligent travel decision aid (ODA) to influence them or give them ideas. An ODA performs like a travel agent by making trip planning easier, providing suggestions, answering questions, providing one-stop shopping, etc. (Conyette 2012). Bechwati and Xia (2003) found that the consumer considers an ODA an effort saver. Travel experience was shown to be the main predictor of online travel shopping (Jensen 2012). As consumers travel more their familiarity with travel destinations and products grows. This contributes to their travel knowledge and it positively impacts online booking of travel (Conyette 2014).

The continued growth in online bookings is expected in markets globally. Various socio and psychographic predictors that are known to affect online booking intention (Conyette 2012) as well as the advent of smartphones, tablets, and other Web-connected portable devices, and the Internet being available anytime and anywhere are contributing to the acceptance of the Mobile web.

Mobile Devices Arrive

The year 2008 marked a major milestone is the mobile revolution. Apple launched its first iPhone the previous year, and made the iOS SDK available for third party developers. This was a pivotal point in the history of mobile development allowing travel companies to create dedicated applications specifically for the mobile consumer (Joyce 2013). Continued advancements in Internet connectivity meant greater access to web content for mobile devices. Evidence of progress was seen with the company HotelTonight.com in 2010 through its last-minute mobile focused business model (Joyce 2013).

Initially to accommodate mobile devices, 4-5 star hotels, hotel chains and other enterprises used mobile forms of distribution more frequently by way of a website adapted to the mobile Internet rather than a specific app. Later, Hilton was the first to introduce its mobile app for iPhone in November 2009. IHG followed a few months later in April 2010 for iPhone and July 2010 for Android phones. Marriott later introduced its mobile app in August 2011 (Chen et al. 2012).

Tripcase.com reports that 85% of travelers use mobile devices for information during a trip. Tripcase was one of the early pioneers in the mobile industry, creating first-generation mobile-optimized web sites before building the first native app to come from within the travel industry. They started in the App Store in 2005 with an iPhone app, expanded to Google Play, and even created a first-of-its-kind connection between travelers and travel companies (http://bit.ly/1CrTfIf).

In 2010, the US volume of mobile phone sales surpassed PC sales according to Gartner, and by the end of 2011 smartphones escalated to 73 million in the US alone (Joyce 2013). Business travelers use mobile devices for post-check-in and checkout hotel services. Consumers use smartphones to find and contact businesses, while tablets are used for research, price comparisons, and reviews (Conyette 2013). Accordingly, travel agents have become sidelined by some travelers as consumers feel empowered with the Internet and mobile devices.

Wearable Tech Devices Emerge

The expected mass adoption of wearables by consumers means Big Data is set to become bigger. Pricewaterhouse Coopers (n.d.) forecasts sales of wearables could reach over 130 million units and gross almost $6 billion by 2018. Advertising companies are already conceiving ways to deliver marketing messages directly to people who wear computerized watches, glasses and headgear. When wearables become pervasive Big Data could see a rival through the new data created by such devices which this writer calls *Wear Data.* Both the consumer market and the B2B market stand to be radically changed by the mainstreaming of wearable technology.

Tussyadiah (2014) anticipates there could be a shift in the relationship between personal technology and the experience of humans where the role of technology will change from supporting mediation to embodiment. Some users of Google Glass for instance describe their use of the smartglasses as if the device is an extension of their bodily and cognitive senses becoming a part of themselves.

Wearable Tech Adopted by Travel Industry

Infrastructure changes including the adoption of lightweight messaging standards that push traditionally heavy messages to smaller devices (Joyce 2013) have encouraged the use of wearables by the industry. Efficient messaging has made it possible to send data (rich notifications including status updates, comments, photo tags, check-ins, data and more) to wearable devices like a smart watch (http://bit.ly/1HdihlL). Consequently, the Westin hotel chain is using bracelets/watches to track sleep patterns of guests. Westin has partnered with the tech company Lark to bring their "Heavenly" sleep system into hotels. Guests wear a watch while sleeping as it tracks sleep patterns and wakes you through gentle vibrations (Harkness 2015). Disney Resorts is using wrist bands instead of hotel room keys and Royal Caribbean Cruiselines is retrofitting cruise ships to accommodate a similar wrist band. Smartglasses will provide travelers with the ability to search and find local businesses, directions, and recommendations in their vicinity, connect to supplier and aggregation systems and book hands-free on location in real-time using their voice and a digital wallet or mobile payment system (Joyce 2013).

Sabre's leading travel itinerary management app is the first travel app of its kind to integrate with the Samsung Gear S smartwatch, launched November 7, 2014. The integration allows the traveler to click a notification on the watch to open the TripCase app or a click-to-call feature. In addition, consumers using Android Wear devices and the Pebble watches can receive TripCase travel notifications directly to their wearable devices. Smartwatch users with TripCase will receive real-time flight alerts, gate changes and other travel information on their wrists (http://bit.ly/1CrTfIf). Some information once exclusively provided by travel agents is now automated and sent to mobile or wearable devices.

Wearable Tech Devices Used in Museums

In the museum sector the National Endowment for the Arts (n.d.) reports audience participation in museums and art galleries have decreased since 2002 and the youngest age group (18-24 year olds) showed the steepest decline. Similar European organizations have the same challenges. As populations in the US and Europe diversify, fine arts compete for audiences with video games, movies and other entertainment. Smart glasses devices could help reverse declines in museum attendance by providing a multidimensional sensory, intimate, interactive and engaging experience with artifacts and

collection items as never possible before. Adoption of such wearable devices by museums and art galleries could assist them in attracting and keeping visitors and maximizing revenues per unique visitor in the digital age as they compete against an ever-increasing range of leisure time activity alternatives. The 21st century could provide opportunities for museums and galleries, as one museum observer put it, to switch from investments in travertine marble to terabytes, from erecting physical monuments to installing virtual infrastructure, and such changes will enable them to capture modern audiences.

Museums are precious institutions. "Without museums humankind would hardly understand its past, cope with its present, advance in its future, and enjoy and learn from transcendent experiences of beauty, history, nature, and the universe" (Kotler and Kotler 1998: 348). Museums must compete with other organizations in terms of quality, availability, and price and so they must continually add value to their offerings and meet the needs of a wide variety of visitors. Wearables could give new life to museums and galleries if they want to broaden their image, audience, programming and support by allowing users to rediscover art and exhibitions through digital means in an intimate, interactive and modern manner.

The disruption of the museum experience could become a major trend in wearable technology. Listed below are some examples of museums that have adopted the technology to good effect and these demonstrate how museums can compete successfully with information and entertainment conglomerates to provide unique, modern, and desirable experiences for visitors.

The Tech Museum of Innovation in San Jose, CA opened a permanent exhibit last year named Body Metrics that leverages the latest developments in wearable technology and combines it with data collection and analysis giving museum visitors a window into their physical and emotional selves as well as displaying the most promising health care techniques of tomorrow. It uses a Sensor Kit that includes three wearable devices: a customized iPhone, a NeuroSky wireless headset that measures brain waves using EEG biosensors, and a Somaxis EXG muscle tension and heart rate sensor. Visitors can use the kit to interact with other users by attempting to synchronize their heart rates and can wear the device around the museum to track their reaction to other exhibits. The museum's website describes the centerpiece of the exhibit called Data Pool, a custom 12-foot multi-touch screen that recognizes objects placed on it through the use of special symbols called fiducial markers. On the screen up to six people can watch a visual representation of their breathing and heart rate. Microsoft's Kinect technology powers large-scale projectors that lead a visitor through activities during which body position, activity and range of motion are measured (Body Metrics n.d.).

San Francisco's de Young Museum allows guests to participate in an exhibit featuring Google Glass. The museum partnered with GuidiGO and Google to develop special content that can be viewed as part of an artist's work. The content includes audiovisual materials that feature the artist speaking about his work and also includes interviews. The content facilitates a multimedia journey with visual archives, contextual music and testimonials

revealing the artworks' hidden stories. Visitors are reported to forget they are even wearing Glass as the screen subtly turns on only when needed. A reporter viewing the exhibit indicates feeling as though he had been invited to an important and intimate salon instead of passively viewing an exhibit as a general visitor. The exhibit is the first tour of a complete exhibition using Google Glass (Alton 2015).

Decimal Labs, the digital culture and media lab at University of Ontario Institute of Technology explores how wearable tech is affecting life, culture and the arts. Its META smartglasses Museum prototype allows visitors to see cultural artifacts at the Royal Ontario Museum's "Ming Tomb" by triggering digital objects that appear in the smartglasses using augmented realty (AR) markers (Emrich 2015).

Another project by Decimal Labs at the MaRS Discovery District Centre is exploring ways to sync the feelings of museum visitors as they react to art objects with those of a curator or artist through an interactive experience using brain-sensing wearable technology. Art goers could understand the mindset of curators and artists and experience a brain-based dialogue on art (Emrich 2015). Decimal's iMind experience uses the Muse headband which senses what the viewer is feeling about the art and then selects the next piece in the collection based on emotional tags attached to various paintings. The selection of digitized paintings shown to a visitor from this collection is based on their emotions. For instance, at the bottom of the screen is the word "happy" and it remains that way for most of the paintings since the paintings are selected by the curator to make you smile (Emrich 2015).

WearGeared.com has developed a *Museum Glasses* prototype application using the Epson Moverio BT-200 smartglasses platform and augmented reality (AR) software; a museum pilot project is scheduled by early 2016. The Moverio is unique due to its "look-through" lens that allows museum or art gallery visitors to easily switch between real objects and AR. A visitor could look at real artifacts through the glasses and also trigger associated digital content such as videos, games, photos, or audio on the smartglasses display screen by simply looking at a collection item. Motion sensors or a tethered interactive touch pad controller could also activate content (WearGeared.com).

Conclusions

Internet and mobile travel are clearly evolving. The Internet has become more mature as evidenced by the growing number of online travel agencies, Meta engine sites, merchant model sites, etc. Mobile travel is making great strides with the growing number of mobile and wearable tech devices comprising part of the Internet of Things (IoT). One of the outcomes of these developments is that travel agents are experiencing reduced power in the sales channel. In order to cope with these changes they are placing more emphasis on consulting, selling more complex products and charging higher fees.

Many predictions on the impact of the Internet have proven to be correct. Predictions were that more direct passenger bookings would be done through the Internet, a different role would develop for travel agents as a consultant of a more informed customer, and alliances among airlines and hotel chains would be prevalent (Henderson 1997). In the Internet medium, database marketing has emerged as a valuable marketing tool (Nash 1993). Internet travel sites are providing new market functionality and technology, focusing on personalized intelligent tools for travelers (Werthner and Ricci 2004). Leading companies of the marketing information revolution are those that use technology to make the firm a customer-driven organization (Blattberg et al. 1994).

Since travel is a mobile-friendly category by its nature, most passengers in the developed world now carry smartphones. This is stimulating demand for services such as self-boarding and flight information updates. Mobile devices provide flexibility and convenience in travel so they can help with bookings, as well as managing itineraries and expenses. Mobile devices are increasingly being relied on by travelers before, during, and after their trips. Thus, travel marketers have devised multiple ways to enrich and monetize the overall customer experience. Also, they are helping today's travelers stay organized by providing them more customized experiences such as mobile alerts, specials, and messaging through the integration of SMS, eMail, and social media (Conyette 2013). Harnessing mobile's convenience and relevance has been transformative in creating new opportunities for hotels (Joyce 2013).

It is now expected that the interactivity, intimacy, and ubiquity of wearable technology devices will encourage travel and tourism providers to exploit the nature of such devices and find opportunities to provide customized, enhanced, automated and new experiences for consumers. Five years from now we will look back and see how much things have changed.

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