

IOT IDEA BOOK



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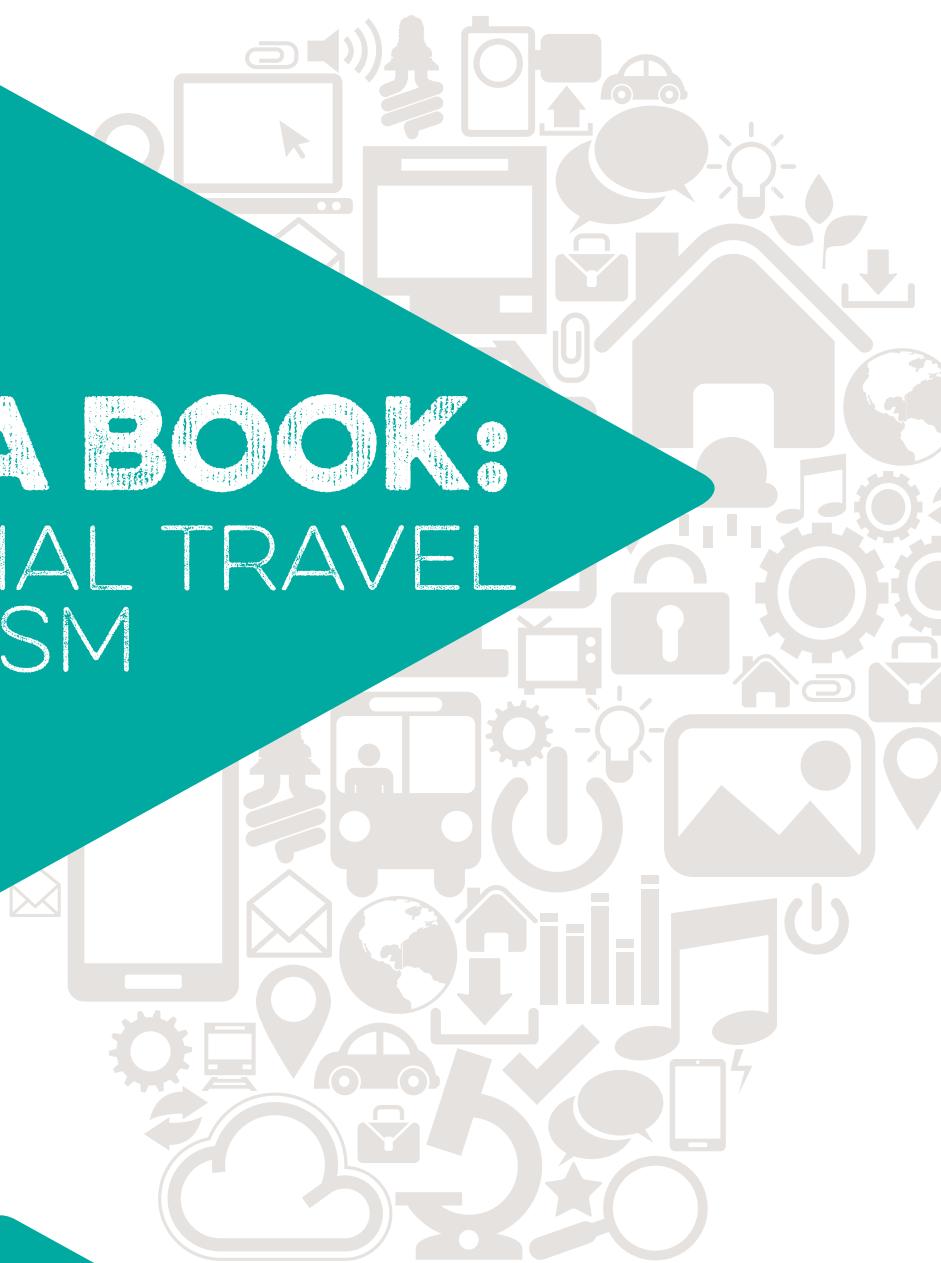


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IOT IDEA BOOK: EXPERIENTIAL TRAVEL AND TOURISM





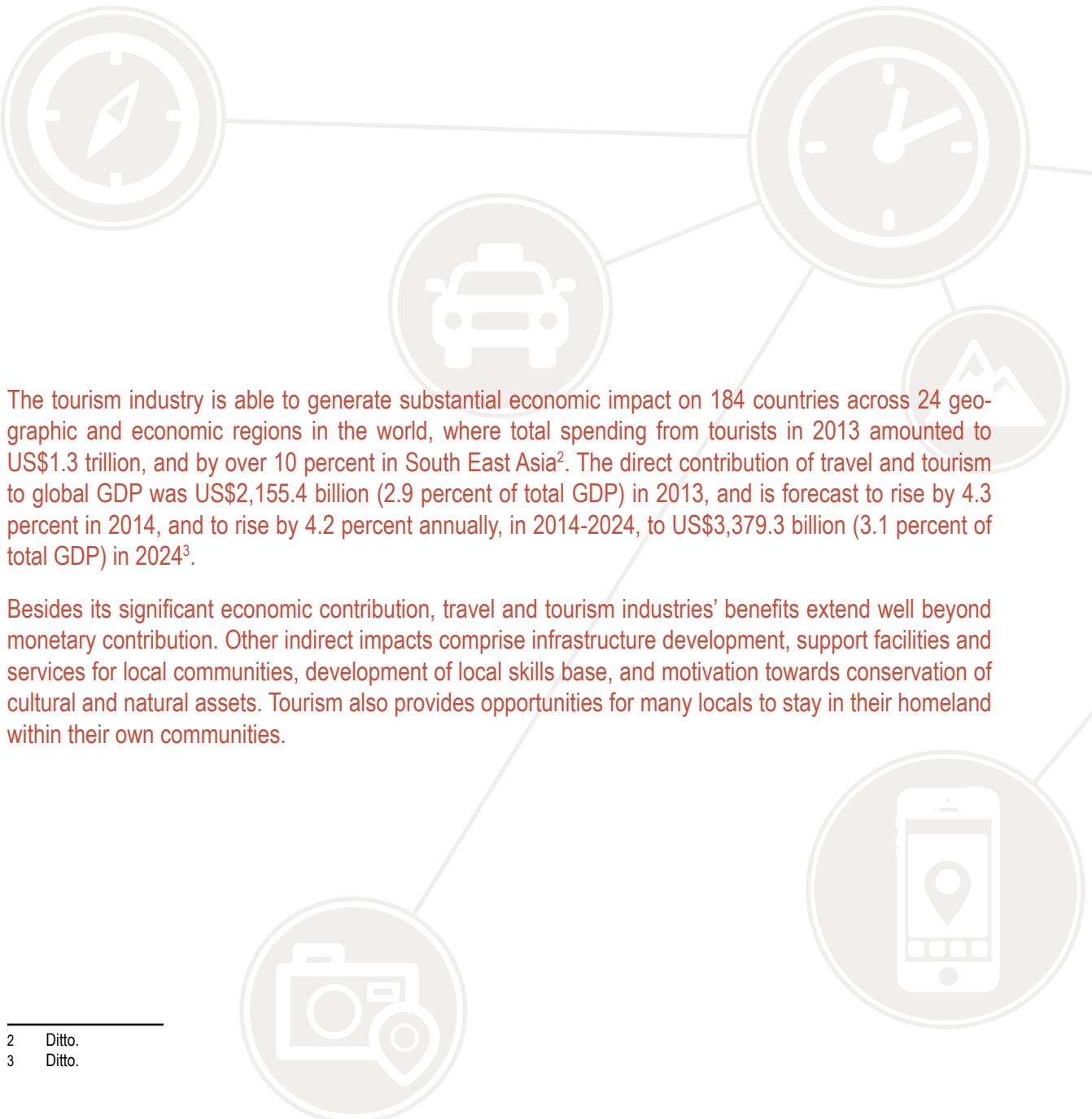
EXPERIENTIAL TRAVEL AND TOURISM

**PERSONALISED AND QUANTIFIED TRAVEL EXPERIENCE
FOR WORLDWIDE DESTINATIONS**

Travel and tourism is a diverse sector, where activities range from the pleasant to the extreme, and from personal to business-leisure (bleisure) purposes. Leisure travel contributes 75.6 percent to the total travel and tourism industry's revenue, and is expected to grow to 76.7 percent by 2024¹. Travelling is motivated by self-indulgence and self-rewards, which lead to psychological effects that in turn have positive effects on life in general, and possibly lead to personal development and increased appreciation of life.

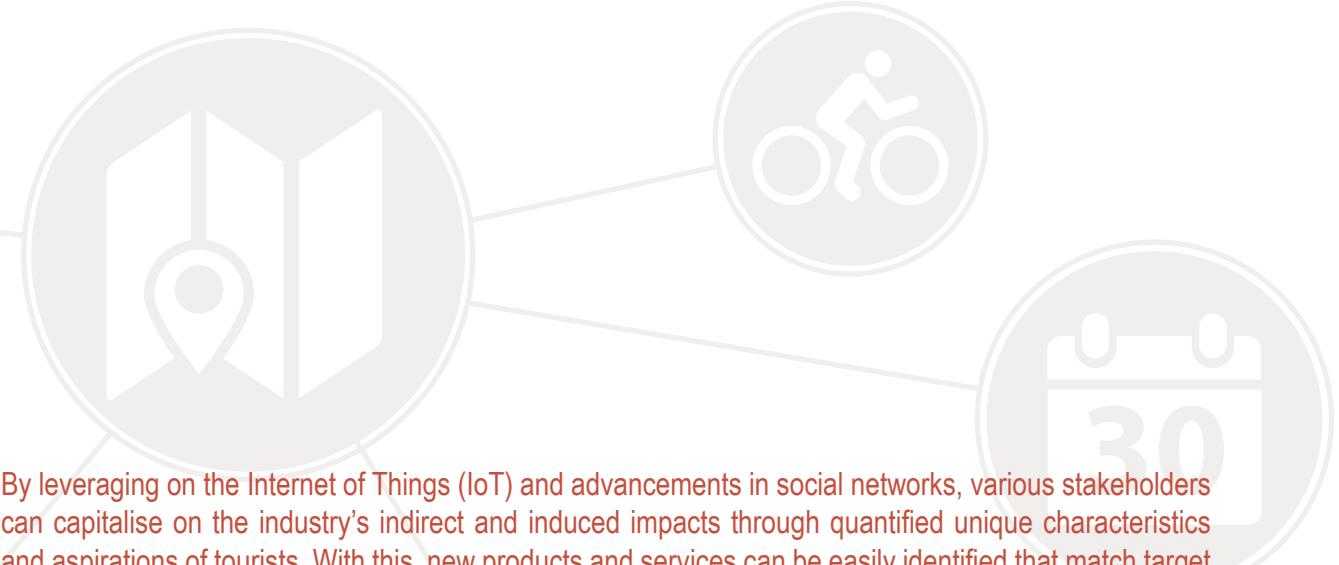
¹ Turner, R. (2014). 'The Economic Impact of Travel & Tourism 2014'. World Travel & Tourism Council.





² Ditto.

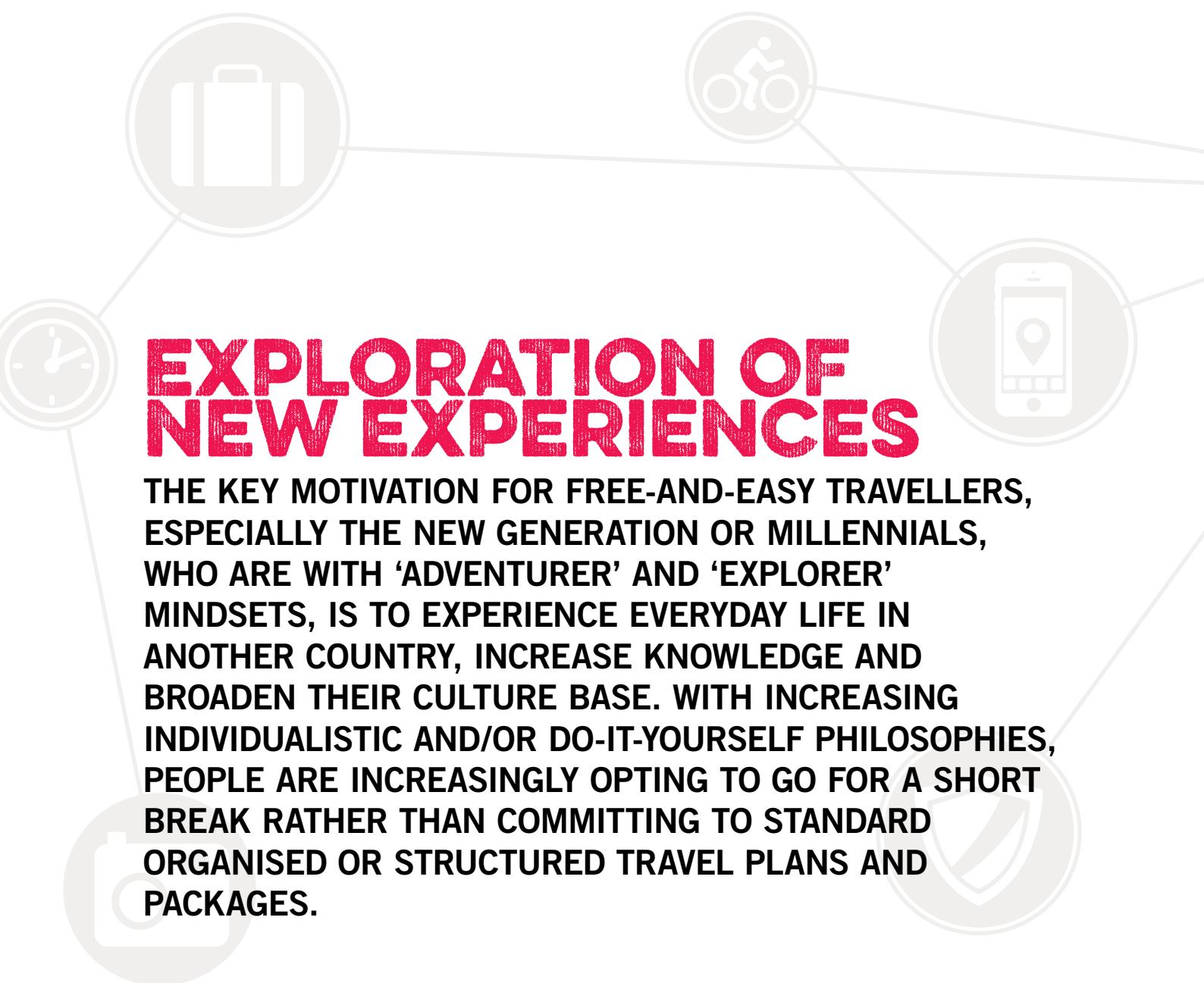
³ Ditto.



By leveraging on the Internet of Things (IoT) and advancements in social networks, various stakeholders can capitalise on the industry's indirect and induced impacts through quantified unique characteristics and aspirations of tourists. With this, new products and services can be easily identified that match target audiences and cater to their specific needs and wants. Because of the impeccable match, the conversion rate of a potential tourist/traveller utilising a B&B facility or visiting a tourist destination instantly becomes much higher therein translating into increased revenue and growth of the industry.

For the discerning traveller, the use of IoT technologies makes for a more immersive experience that more deeply involves the active participation of the traveller. This enhances the immediate intangible value of a travel escapade. With the advent of community sharing and social proliferation, a new genuine experience has the potential to go viral and spark a new trend spurring new businesses overnight such as in the case of Airbnb⁴ - a place rental application and Wander⁵ - a travel companion application. With each traveller going to a new destination, travellers become travel ambassadors in their own right and indirectly start new areas of growth and opportunity.

4 <https://www.airbnb.com>
5 <http://heywander.com/>



EXPLORATION OF NEW EXPERIENCES

THE KEY MOTIVATION FOR FREE-AND-EASY TRAVELLERS, ESPECIALLY THE NEW GENERATION OR MILLENNIALS, WHO ARE WITH 'ADVENTURER' AND 'EXPLORER' MINDSETS, IS TO EXPERIENCE EVERYDAY LIFE IN ANOTHER COUNTRY, INCREASE KNOWLEDGE AND BROADEN THEIR CULTURE BASE. WITH INCREASING INDIVIDUALISTIC AND/OR DO-IT-YOURSELF PHILOSOPHIES, PEOPLE ARE INCREASINGLY OPTING TO GO FOR A SHORT BREAK RATHER THAN COMMITTING TO STANDARD ORGANISED OR STRUCTURED TRAVEL PLANS AND PACKAGES.



Geo-location technologies that track whereabouts and information that enrich travel experiences – from route planning to lodging arrangement and journey planning – are in good demand from trendy gadget makers. Travellers want the comfort and security of knowing that if they get into any trouble at any point of their journey, they are able to reach out to someone who can help them. Ubiquitous gadgets help travellers to record time, speed/pace, distance, location, elevation and allow instant communication with similar peers en route or who have checked into the same location.

Millennials are twice as likely as non-millennials to consult online communities for destination suggestions and activities, in addition to sharing their travel experiences. Using IoT, the mining of travel experience data will enable travel agents or tour operators to co-create tourism spot packages and create attractions and experiences that better suit the incoming visitors to engender loyalty, engage consumers and enlist visitors who automatically become brand ambassadors for a place they liked.

While vacationing, individuals might participate in adventurous or extreme sports such as skiing, scuba diving, mountain climbing, and more. These activities are typically classified as complex, involving strong sensations, accompanied with danger, and thrill-seeking elements, which require advanced skills. With sensing technologies that sense human factors and environment factors, adventure sports operators can minimise the risk of the activities, leading to a state of enjoyment and well-being.

MEDICAL AND WELLNESS TOURISM

WITH RISING HEALTHCARE COSTS, HEIGHTENED HEALTH AWARENESS AND THE AVAILABILITY OF TREATMENT OPTIONS IN DEVELOPED COUNTRIES, WORKFORCE AND TRANSPORT GLOBALISATION HAVE BOOSTED THE DEMAND FOR MEDICAL AND WELLNESS TOURISM WHERE TRAVELLING PATIENTS SEEK GOOD QUALITY TREATMENT WITH AN EXTENDED HOLIDAY. THE MARKET POTENTIAL IS PROJECTED TO REACH US\$38.32 BILLION BY 2020 FROM US\$10.5 BILLION IN 2012, GROWING AT A CAGR OF 17.9 PERCENT FROM 2013 TO 2020⁶.

⁶ Business Wire. (2014). 'Medical Tourism Market to Reach US\$32.5 Billion in 2019: Transparency Market Research'. Accessed from : <http://www.businesswire.com/news/home/20141126005251/en/Medical-Tourism-Market-Reach-US32.5-Billion-2019#.VW2p2NKqqko>



For such tourists, the criteria for consideration in a destination are quality of healthcare infrastructure, waiting time and availability of highly-skilled medical professionals. They will also consider dependable and affordable treatments and services that include spas and wellness clinics and retreats; surgical procedures such as laser, cosmetic and cardiovascular; and post-medical treatment holidays to avoid risks of complications during travel. As such, a range of intermediary and ancillary services have grown to service the industry such as flights, transfers, accommodation, chauffeured travel and bilingual personal guides.

Using IoT technologies, patients' health conditions will be monitored remotely and continuously as they enjoy a vacation while recuperating after a medical procedure. The vacation phase of post-treatment will include follow-up for medical procedures via teleconsultation and support the continuity of care. Data collected on such tourists can boost industry competitiveness by generating and providing reliable and valid statistical reports on quality, safety and health outcomes, in addition to enabling healthcare providers to adopt best practices, processes and cost management effectiveness, and generate new market segments that involve more than just travel for travel insurance.

It is worth noting that the global market for travel insurance and assistance is expected to grow from US\$13.8 billion in 2013 to US\$22.18 billion by 2020. Medical expenses top the total travel insurance and assistance claim at 56 percent, and claims for cancellations are second largest proportion of the value of claim⁷. Thus, the travel insurance providers should leverage on connected technologies to empower and customise their insurance package to their customers.

⁷ Goodman & Goodman Fox. (2015). 'Travel Insurance Overview'.



ECOTOURISM, GREEN AND HERITAGE TOURISM

ECOTOURISM OR TOURISM ACTIVITIES BASED ON NATURE OR CULTURE, WITH AN IDEAL SCENARIO THAT USUALLY REQUIRES ECOLOGICALLY SUSTAINABLE MANAGEMENT SUPPORTS THE LONG-TERM CONSERVATION OF NATURAL RESOURCES AND THE ENVIRONMENT. TOURISM ACTIVITIES CAN PLACE ADDITIONAL STRESS ON THE NATURAL ENVIRONMENT THROUGH INCREASED USE OF POWER AND WATER, HIGHER DEMANDS FOR SEWAGE TREATMENT AND LANDFILL, AND UNSUSTAINABLE FARMING AND FISHING PRACTICES.



Sustainable tourism practices such as the use of recyclable or renewable technologies and the support for local communities generate additional business for local transport operators, restaurants, laundries, guesthouses and hotels.

With the high environmental awareness and consideration, sustainability is a key hospitality agenda that puts mounting pressure to travel and tourism providers to reorientate their daily activities to incorporate elements of sustainability. Such tourists usually support and have a preference to select destinations that practice sustainability such as the use of recyclable or renewable technologies to support local communities to generate additional business opportunities for local transport operators, restaurants, laundries, guesthouses and hotels. Therein, the pristine environment of which they have experienced will then be preserved for future visitations and the same can also be experienced by their peers in this generation and the next.

Another aspect is heritage tourism which involves travelling to experience a place for its artifacts, people, history and natural beauty, is another key sector. The key motivation for this

sort of vacation is the notion of an authentic, non-fabricated experience. Travellers aim to experience and explore new cultures and traditions through active cultural participation rather than passive observations.

Leveraging on ubiquitous devices using IoT, tourism destinations can be quantified through direct measurement and social network interactions that increase the attractiveness of a particular destination. The industry can then employ the services of communications/environmental design experts to provide 'services' such as e-demonstrator to offer unique cultural experience and activities, and e-ranger/e-tour guide for personalised travel guide services to enrich travel experience and ensure tourists' safety and security throughout the journey. These value-added services are plus points to enrich the interactivity of a destination and make it more meaningful for tourists as a whole.



CUSTOMS AND IMMIGRATION VERIFICATION

AT AIRPORTS, TRAVELLERS ARE REQUIRED TO PRODUCE THEIR TRAVEL DOCUMENTS AND PASSPORTS THAT REQUIRE MANUAL VERIFICATION BY GROUND PERSONNEL AT THE CHECK-IN COUNTER, IMMIGRATION AND CUSTOMS GATE AND FINALLY THE BOARDING AREA BEFORE ENTERING THE CABIN. THIS PROCESS IS MULTI-TIERED AND IS SUSCEPTIBLE TO HUMAN ERROR AND INTERVENTION WHICH DELAY THE CHECK-IN PROCESS AND IN THE EXTREME CASE LEAD TO WANTED PERPETRATORS ENTERING A COUNTRY ILLEGALLY.





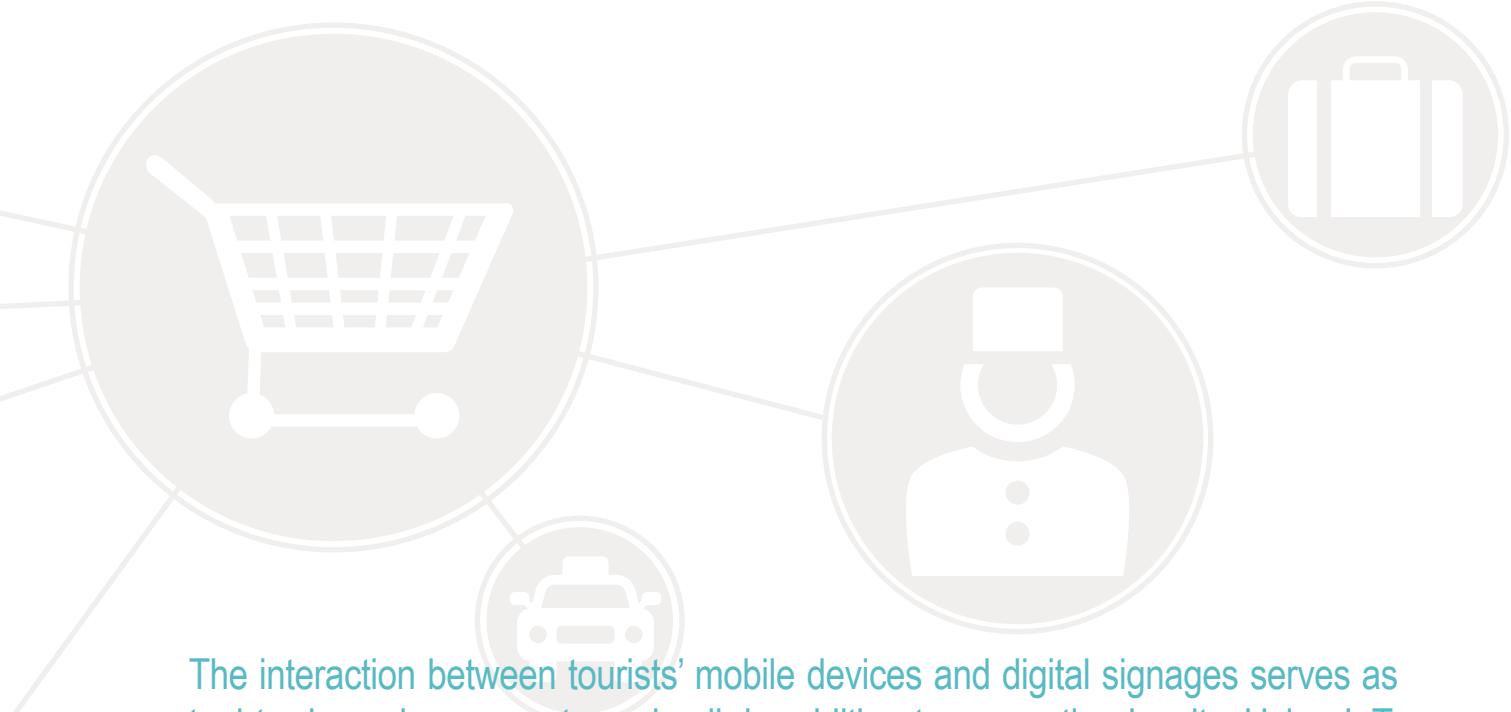
RETAIL TOURISM SERVICES

SHOPPING IS INCREASINGLY BECOMING A PRIME SUB-COMPONENT OF THE TOURISM INDUSTRY. THIS OPENS NEW MARKET OPPORTUNITIES FOR THE TOURISM INDUSTRY TO DEVELOP AUTHENTIC AND UNIQUE RETAIL EXPERIENCES. IT IS ESTIMATED THAT AN AVERAGE OF 42 CENTS OUT OF EVERY DOLLAR SPENT BY VISITORS IS SPENT ON SHOPPING⁸. MALAYSIA EXPECTS TO RECEIVE 36 MILLION TOURIST ARRIVALS AND RM168 BILLION IN RECEIPTS BY 2020⁹.

⁸ a. World Tourism Organization (UNWTO). (2014). 'Global Report on Shopping Tourism'.

b. Cripps, K. (2013). 'Chinese travellers the world's biggest spenders'. CNN. Accessed from : <http://edition.cnn.com/2013/04/05/travel/china-tourists-spend/>

⁹ Ditto, pg. 41.

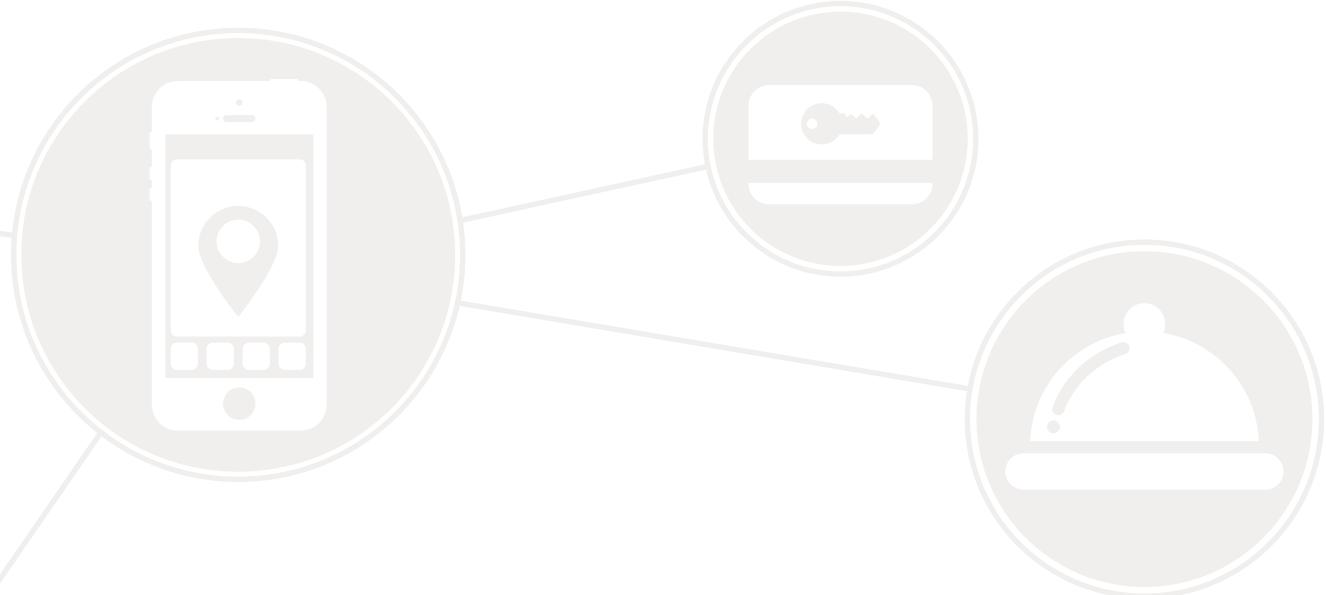


The interaction between tourists' mobile devices and digital signages serves as tool to dynamise, promote and sell, in addition to generating loyalty. Using IoT, these services enable tourist service providers – ranging from hotels, ground transportation retailers to amusement parks – to understand their customers well and respond to customer needs by offering customers location-based services.

The emerging hybrid operating model; part retail, part tourism business, underlines a total theatrical experience for visitors, encompassing every detail of their visit with strong partnership with local heritage, and features regional delicacies. With interactive mobility solutions, the tourism spots can offer 'trial-experiences' to potential tourists through virtual tours of a

destination, by offering 360-degree experiences and allowing guests to walk through a virtual space before placing a reservation. Using augmented reality technologies, a destination can offer interactive experiences to the tourist to enhance the travel experience and enriched via gamification-based interaction within the cultural and heritage destination.





Starting from the point of ticket reservation, using IoT, digital valets will offer customised services. For example, rooms are set up according to the guest's requirements upon arrival, at the preferred floor. Temperature and lighting are set to the guest's preferences; music is preselected for particular ambiances, welcome drinks waiting and perhaps even a hot bath already run for them. Should the guests require morning call services, instead of using alarm clock or phone call, the hotel room can be programmed to increase the brightness of the room at a specified time to awaken the guests.

Travellers who take long vacations that span various destinations can engage a virtual concierge service which stores, washes and repacks a traveller's wardrobe between trips, collects the traveller's suitcase from their hotel and delivers it to their next destination, minus the challenges of wrangling bags

through cumbersome security lines. The virtual concierge will help customise the traveller's itineraries while the smart luggage tag tracks the baggage from gate to gate and provides automatic weather forecasts from one destination to another.



TRAVEL DISEASE SURVEILLANCE

WITH INCREASING CROSS-BORDER MOBILITY AND MORE DIVERSE TOURIST DESTINATIONS, TRAVEL-RELATED DISEASES CAN OCCUR DURING OR AFTER TRAVEL. TRAVELLERS HAVE CONTRIBUTED TO THE GLOBAL SPREAD OF INFECTIOUS DISEASES, INCLUDING NOVEL AND EMERGING PATHOGENS. IN 2014 ALONE, THE WORLD ATTRACTED 1,134,130,000 INTERNATIONAL TOURIST ARRIVALS, AND BY 2024, INTERNATIONAL TOURIST ARRIVALS ARE FORECAST TO TOTAL 1,762,110,000¹⁰.

¹⁰ Turner, R. (2014). 'The Economic Impact of Travel & Tourism 2014'. World Travel & Tourism Council.



TECHNOLOGIES ENABLING SEAMLESS TRAVEL EXPERIENCES

EXPERIENTIAL AND SEAMLESS TRAVEL IS HIGH ON THE WANT LIST OF ALMOST ANYONE ON THE STREET NOWADAYS DUE TO AFFORDABLE TRAVEL AND THE EXPLORATORY HABITS OF NEW PROFESSIONALS JOINING THE WORKFORCE AND THE RISING DEMANDS OF JOBS REQUIRING FREQUENT TRAVEL. THEREIN, SEAMLESS TRAVEL IS ESSENTIAL TO ENSURE THAT THE TRAVELLER GETS TO A DESTINATION, GETS THE JOB DONE WHILST ENJOYING THE EXPERIENCE AND COMES BACK IN GOOD SHAPE. LEVERAGING ON MIMOS' CONNECTED AND SENSING TECHNOLOGIES CAN ENSURE THESE AND HELP SPAWN ADDITIONAL SERVICES AND HELP INTEGRATE THE COMMUNICATIONS BETWEEN TRAVEL SERVICE PROVIDERS.



On-The-Go Information Logging and Sharing

Mi-SIP, an IoT processor microchip, enables high-speed and secure communication and helps unlock more value-added travelling services to create a seamless device-to-device link therein connecting more travellers with their peers and allowing them to share biometric, location and even request for help or assistance. At the backend, while the information are being exchanged, a data mining tool, Mi-Clip, could harvest information which is shared by destination or tour operators to help them package their experience according to the needs of their clients. In another aspect, biosensors from Mi-Sensor help read human and environmental factors while the traveller is on the move or engaged in any activity. This will help medical professionals and insurance providers to act immediately upon accessing a database of the information that was previously logged.



Healthcare and Wellness Services Enhancement

The rise of affordable travel, especially by air, has given hope to those seeking treatment otherwise not available or deemed lacking in their own country. Medical and wellness tourists commonly seek a solution for their health woes at destinations far from their place or origin. Mi-SIP enables wireless communications coupled with Mi-Sensor to detect and log various health parameters to allow 24/7 monitoring of a patient prior to, during and after treatment, remotely. Follow-ups can involve teleconsultation enabled by Mi-AVComm. Reports on these can be derived from Mi-BIS that collects intelligence and puts these in a report to be shared across stakeholders who provide direct or ancillary services to tailor the experience to better suit the patient or wellness seeker.



Virtual Environments for Sustainability

Sustainable tourism has been on the rise of late due to the heightened awareness of the world's climate and environment state. Instead of erecting physical structures and powering them with generators and tapping on resources such as water and electricity, virtual services such as e-ranger or e-tour guide can be provided. Mi-Mobile's virtual services can replace the physical guide and instead of building signs and erecting replicas of historic places, a virtual augmented environment can be beamed in its place using Mi-Show and updated at any time. The use of environment sensors of Mi-Sensor and the management modules in Mi-Manage allow for accurate environment management to reduce wastage and promote energy and resource conservation.



Secured and Seamless Travel

Verification processes at customs and immigration at entry and exit points of a country can be sped up with the use of wearables embedded with Mi-SIP's high-speed secure communications. To further enhance this, a Mi-SIP tag on each traveller's check-in and carry-on luggage can contain information registered to its owner thereby enabling contactless inspection by officers and immediate detection of harmful or banned substances. For inspection, Mi-AVComm's teleconference terminals allow easy sharing of screens with other lanes or points at an airport to quickly verify the credentials of a traveller.



Tailored Retail Experience

The retail aspect of tourism can also be enhanced with digital information in the form of signages powered by Mi-Show's seamless presentation platform or enabled in a device powered by Mi-Mobile's mobility platform. The capabilities of Mi-Show can even be extended to incorporate augmented reality services that add to the realism of items on sale. Information gathered from the traveller's mobile device using Mi-Clip will give hints to tourist service providers the preferences of a tourist and how best to package their products to convert it into a sale.



Virtual Travel Assistants and Customised Stays

Information can be leveraged from data collected from Mi-Sensor's biosensors worn on wearables and preference settings in a traveller's mobile device coupled with information entered by a traveller prior to travel. This information can be disseminated via Mi-IDS to airline personnel, hoteliers and destination service providers to prepare for a guest's arrival and stay. Once there, rooms can be equipped with environment sensors of Mi-Sensor to detect and adjust the room's environment to suit the traveller. Upon departure, concierge services via apps from Mi-Mobile can easily know how to best assist a traveller to jet off to the next destination.



Travel Disease Awareness and Response

With the rise of travel-related disease especially the recent Middle East Respiratory Syndrome (MERS), there has never been a better time to emphasise on the criticality of the education and prevention of travel disease. Wearables embedded with Mi-SIP and Mi-Sensor can be used to monitor a traveller's condition and trigger alerts if unfit for travel. The traveller is reminded to take extra precaution and healthcare institutions and authorities are alerted via data collected and disseminated through Mi-Clip and Mi-IDS, structured through Mi-Semantic, and shared with regulatory and administrative bodies via Mi-Cloud.

CONNECTED RAPID TRAVEL INFORMATION



Mi-AVComm: A SIP-based multimedia application that supports video imaging, multiple cameras solutions, text input/output and processing of data for multiple sites.

- Seamless video and imaging equipment integration
- Flexible bandwidth for transmission
- Multi-party video conferencing support
- Remote pan-tilt-zoom (PTZ)
- Adaptive streaming
- Region-of-interest (ROI)-based streaming
- Annotation of still images support



Mi-BIS: A business intelligence platform for customised report creation and business analytics.

- Dashboard management
- Ad hoc reporting
- KPI management
- Location intelligence
- Parallel in-memory database
- Big data processing engine



Mi-Clip: A web scraping/harvesting application to create customised web bots.

- Wizard robot
- Generic robot
- Web-based and multi-user
- Scheduler



Mi-Cloud: A cloud infrastructure platform that allows virtualisation of physical hardware.

- Open and neutral architecture
- Comprehensive management modules
- Total service orchestration suite
- Hardware agnostic



Mi-IDS: A component that provides multiple-channel information dissemination services.

- E-mail, SMS and fax channel distribution
- Static and dynamic merging
- Supplementary web services



Mi-Manage: A control management system platform that provides web services that enables creation of applications for devices such as actuators and sensors.

- Commercial systems compatibility
- Local and remote presence
- Interaction capabilities
- Control and monitoring capabilities



Mi-Mobile: A mobile application management (MAM), mobile device management (MDM) and mobile content management (MCM) platform.

- Mobile application and enterprise content management
- Real-time enterprise mobile device management, policy, compliance and risk management
- Mobile analytics and reporting, and location services
- Mobile security management with anti-theft and data loss prevention
- Enterprise mobile location services



Mi-Semantic: An SOA-based semantic technology platform that supports the development of various kinds of intelligent applications that interface via the W3C web service standard.

- Structured development platform
- Reliable and scalable components
- Adopts open web standards



Mi-Sensor: A solution that comprises a sensor platform and sensor elements to provide real-time feedback of physical parameters.

- Robust and reliable for outdoor usage
- Real-time data measurement
- Wireless communications



Mi-Show: A presentation management system that allows users to centrally direct streaming of desktop content from monitor to monitor.

- Real-time desktop streaming
- Central screen management
- Configurable streaming performance
- Automatic node status indication



Mi-SIP: A state-of-the art miniature System-on-Chip (SoC) processor with extensive radio features and low power consumption designed for IoT applications.

- Platform for application development
- Small and low profile packaging
- Energy efficient operation
- High transmit power

MIMOS is supporting the growth and proliferation of IoT in Malaysia through Big Data IoT Technology Accelerator (BITX) which comprises core technologies that drive the development efforts in IoT in areas of Applications, Smart Devices and Network & Services.

To know more about MIMOS technologies go to: <http://www.mimos.my/tech>

