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Myanmar's tourism: Sustainability of ICT to support hotel sector for online booking and digital marketing

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# Myanmar's tourism

## Sustainability of ICT to support hotel sector for online booking and digital marketing

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### Abstract

**Purpose** – Studies show that internet has become a major force propelling growth in tourism sector in many countries. An appropriate diffusion of the information and communication technology (ICT) services can facilitate visibility of hotels and lodges on search sites and third-party booking websites and thus influence demand. It also helps leverage the use of social media for promotion and customer acquisition purposes. Recently, Myanmar, with impressive historical world heritage sites, is witnessing a tourist boom; more hotels are opening up and achieving competitive advantage by offering free internet connectivity to guests and locating their premises in the vicinity of an ICT infrastructure. The purpose of this paper is to investigate ICT readiness to support the lodging industry in Myanmar by focusing on one sub-index of the Network Readiness Index (NRI, a term heavily used by World Economic Forum). The paper focuses on the “Network Use” component of NRI, pertaining to the effect of the “quality of the Internet connection” available to lodges, and its association with the following dimensions: customer service; the availability of ICT services to guests, such as internet connectivity and availability of ATM in the vicinity; digital marketing; the use of social media, keeping records of guests and analyzing aggregate data to extract business insights; and business-to-business online booking: the use of online booking via major third-party intermediary websites like Expedia, Booking.com and Agoda.com.

**Design/methodology/approach** – Surveys were conducted in three major touristic cities in Myanmar: Bagan, Mandalay and the capital city, Nay Pyi Taw. A total of 101 valid questionnaires were used. Survey questions were centered around the following themes: internet connection problems, digital marketing activities, and online booking directly or via third party digital intermediary. The data are presented and interpreted by descriptive statistics and regression analysis.

**Findings** – Though, Myanmar is new to internet and commercial use of ICT, the awareness of the importance of leveraging social media and online booking for business development is surprisingly high in the lodging sector. On average, about 80 percent of surveyed hotels are present on the WWW through a dedicated hotel website. However, most websites lack an online booking capability. As a result, and due to a global trend, online booking through third-party intermediaries has become the dominant option for hotel booking arrangements in Myanmar. Agoda, founded in Bangkok in 2002, was found to be the number one choice for online booking intermediary in Myanmar, followed by Booking.com. Analysis of the logistic regression revealed that it was highly likely that areas around ATMs have better internet connectivity. As expected, it was also found that it is very unlikely that hotels reporting a problem in internet connectivity will be able to provide internet service to their guests. Despite the presence of problems in internet connectivity in Mandalay and Bagan cities, located away from the capital; most hotels in these cities resort to leveraging social media for promotion and customer/guest development. The analysis also revealed that cities located away from the capital are more aggressive in leverage online third-booking intermediaries.



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**Research limitations/implications** – While researchers were hoping for a higher participation rate in the survey, especially in the city of Mandalay, data collection was challenging, a number of hotels/lodges denied participation. This may have some implications on the generalization of results. However, over 70 and 45 percent of hotels/lodges in the capital city and the ancient city of Bagan, respectively, had participated in the survey.

**Practical implications** – Tourism has a great potential for growth in Myanmar. This research recommends ways to achieve and sustain competitive advantage for the lodging sector, which is vital for tourism.

**Originality/value** – Though a considerable research exists on tourism and the recent advances of the ICT sector in Myanmar, the country's readiness for the actual usage of the internet for the development of tourism has not been specifically addressed. This paper explores this with compelling research findings useful for policy makers as well as players in the tourism sector.

**Keywords** Myanmar, Information communication technology (ICT), Marketing intelligence, Network Readiness Index (NRI), Online booking, Tourism and travel

**Paper type** Research paper

## 1. Introduction

The internet has become a major force propelling the growth in the tourism sector in many countries (Rayman-Bacchus and Molina, 2001), including Myanmar (Telfer and Sharpley, 2015). As the internet realizes its 18th year of introduction in Myanmar, customer acquisition in the travel and tourism industry has changed in many ways. A number of publications on the digital tourism landscape explored different facets of the economic, social and disruptive impact of information and communication technology (ICT) on non-manufacturing sectors including travel and tourism, excellent papers on this stream of work is found in (Gaur and Kumar, 2018; Dandison and Karjaluo, 2017; Hrubcova *et al.*, 2016; Kumar, 2012; Merchant and Gaur, 2008). Early influential books include Poon's (1993) *Tourism, Technology and Competitive Strategies*, and Sheldon's (1997) *Tourism Information Technology, and adoptability*. Understanding how hotels have utilized the internet in advertising, publicity as well as booking was thoroughly studied by (Tuten and Solomon, 2017; Leung *et al.*, 2013; Caliskan *et al.*, 2013; Xiang and Gretzel, 2010; Buhalis and Law, 2008; Dube and Renaghan, 2000).

Nowadays, the internet has arguably become the major source for information, especially information for the tourism industry. Social media and other online communication platforms are generating enormous influence on the demand in the travel and tourism industry (Yang *et al.*, 2014; Bethapudi, 2013; Xiang and Gretzel, 2010). Because of the expansive growth of the internet and the increasing adoption of smartphones, the availability of the internet anytime and anywhere has a profound impact on travelers' information search and planning behavior.

Ever since the introduction of the internet in Myanmar in 1999, the number of people using the internet has risen, but only 2.1 percent of the population in 2014 and 2.5 percent in 2015 had access to the internet and it's still the lowest in South East Asia (SEA) and among other developing countries globally (Popli *et al.*, 2017; Gaur *et al.*, 2014; Kumar *et al.*, 2012; Gaur and Kumar, 2009). As the internet connectivity is flourishing in Myanmar, one finds the influx of international tourists follows a similar trend. Over the coming ten years, the World Travel and Tourism Council (WTTC) projects that Myanmar's tourism industry will rank second out of 184 countries for long-term growth. This shows the vital role of tourism in Myanmar's economy. The WTTC is even more optimistic on prospects for the sector in the short-to-medium term. After decades of military rule, Myanmar opened up for free arrival of tourists only after the democracy reforms announced in 2009. Since then, the tourism sector has been growing at a very fast pace; between 2012 and 2013, total earnings increased by 73 percent. The World Tourism Organization UNWTO, in its report in 2015, reported that the number of international tourists to Myanmar increased by 6 percent in 2014, the highest growth rate in SEA. According to the WTTC's report, Travel and Tourism Economic Impact (2017), the direct and indirect contribution to GDP had reached

3.5 and 3.8 percent, respectively. The contribution of travel and tourism to GDP is forecasted to continue to rise through 2025.

This study is part of an ongoing project on tourism and travel industry in Myanmar and SEA region. The paper is organized into the following sections; the first section focuses on literature review, and the second outlays an overview of ICT and tourism industry in Myanmar, followed by data collection and data analysis and interpretation. The study is concluded in the conclusion and discussion section.

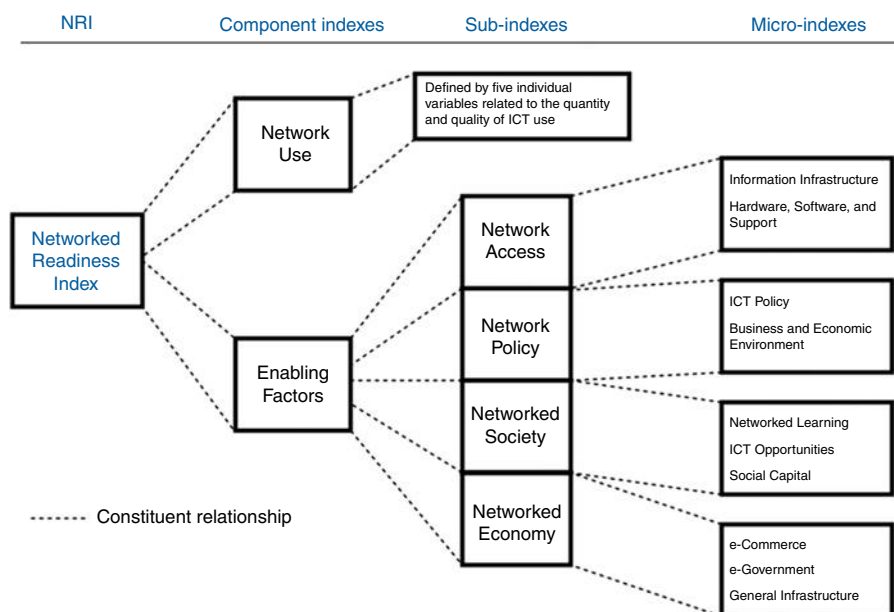
## 2. Literature review

### *Sustainability and benchmarking of ICT readiness*

The Networked Readiness Index (NRI) that was defined in the early 2000s by World Economic Forum is intended to measure the readiness of ICT usage in a nation, the actual utilization of the key stakeholder within that nation and the impact of the economy for that nation after ICT adoption. It is also considered as a tool to benchmark how well a country is deploying ICT to boost competitiveness and well-being.

Figure 1 shows the NRI's component indexes, sub-indexes and micro-indexes. For more information about the list of all variables and micro-indexes of the NRI, we refer the reader to the open-accessed reports of the NRI available on the World Economic Form website.

While general studies on the tourism industry in Myanmar exist, this is the first study that attempts to assess the readiness of Myanmar's ICT for the development of the lodging sector. A study by Google (2014) had found that more than 65 percent of travelers use internet to find where or how to travel, thus having a sufficiently ready ICT infrastructure would help Myanmar to attract the attention of potential tourists to the country. This paper intends to study the ICT readiness to support the lodging industry in Myanmar by focusing on the sub-index under the "Network Use" component pertaining to the "quality of the



**Source:** Information Technologies Group, Center for International Development at Harvard University

**Figure 1.**  
Network Readiness  
Index (NRI)

Internet connection” available to lodges, and its association with the following dimensions: customer service: the availability of ICT services to guests, such as internet connectivity and availability of ATM in the vicinity; digital marketing: the use of social media, keeping records of guests and analyzing aggregate data to extract business insights; and online business-to-business booking: the use of online booking via intermediary websites like Expedia, Booking.com and Agoda.com.

#### *On-line booking and digital marketing activities in lodging sector*

A number of academic studies and business cases emphasized the role of social media and the internet on trip planning for guests and advertising for lodge owners and innovation (e.g. Nuruzzaman *et al.*, 2017; Tuten and Solomon, 2017; Leung *et al.*, 2013; Singh and Gaur, 2013; Assaf and Josiasen, 2012; Xiang and Gretzel, 2010; Schmallegger and Carson, 2008; Law and Chan, 2004; Kirkman *et al.*, 2002; Gretzel *et al.*, 2000). Reviewing comments and material posted by travelers has become one of the most essential online activities for future travelers, and deemed crucial in future travelers’ planning and decision making (Bae *et al.*, 2017; Google, 2014, Gursoy and McLeary, 2003). From the practical standpoint, understanding how hotels utilize the social media to reach out to customers to eventually achieve higher customer acquisition rates can serve as a critical foundation for the travel and tourism business; it helps, for example, to identify and develop effective marketing communication strategies (Kim *et al.*, 2017; Brandt *et al.*, 2017; Oye *et al.*, 2013).

With the advent of what is called online travel agents (OTAs) or destination management organizations or online booking intermediaries, such as Expedia, Booking.com, Priceline.com, Agoda.com, TripAdvisor Inc., and others, tourism-related research has shifted grounds to focus on these centralized digital platforms rather than individual business websites (Mukherjee *et al.*, 2018; Mukherjee *et al.*, 2013; Baloglu and Pekcan, 2006; Chung and Law, 2003; Edwards *et al.*, 1998). The role of OTA as cyber intermediaries in formulating marketing strategies for pricing and reputation and branding was thus heavily studied (Rodriguez Diaz and Espino Rodriguez, 2017; Li *et al.*, 2015; Chung *et al.*, 2015; Tian and Wany, 2014; Herrero and San Martin, 2012; Yacouel and Fieischer, 2012; Kurihara and Okamoto, 2010; Byerley and Ewers, 2006).

Data analytics is also an important measure that provides valuable insights to marketing planning. In the new era of tight marketing budgets and the advancements of analytics, businesses do not have to spend on marketing without knowing what is working and what is wasted. Data-driven marketing is found to improve efficiency and effectiveness of marketing expenditures across the spectrum of marketing activities from branding and awareness, trail and loyalty, to digital marketing (Jeffery, 2010). The vision of smart tourism, which Myanmar can benefit from with ICT readiness, rests on the abilities of businesses operating in the tourism industry to not only collect enormous amounts of data, but to intelligently store, process, combine and analyze data to design tourism products (Fesenmaier and Xiang, 2016).

#### *Availability of ICT services to guests in lodging sector*

Hotel guests seek value, and hotel managers strive to create that value to derive business (Cosh and Assenov, 2007; Bonn *et al.*, 1999). Some traditional dimensions that drive the guests’ purchase decision are: guest-room design, location, brand name and reputation, physical property and public space (Dube and Renaghan, 2000). Nowadays, one of what has become a wide-accepted standard in lodging industry is the availability of free internet and free Wi-Fi in developed countries, and at least internet in LAN form in developing countries (Berne *et al.*, 2014; Kim *et al.*, 2013; Minghetti and Buhalis, 2009; Rayman-Bacchus and Molina, 2001). With the availability of in-room internet service and mobile internet access,

the tendency of booking in a hotel and visiting a destination becomes higher (Dandison and Karjaluoto, 2017; Derrick Huang *et al.*, 2017; Berne *et al.*, 2014; Kah *et al.*, 2008).

Myanmar is still struggling to enhance the penetration rate of the internet; only 2.1 percent of the population in 2014 and 2.5 percent in 2015 had access to the internet and it is still the lowest in SEA and among other developing countries globally. Some of the internet adoption obstacles that characterize developing nations are the inadequate and unreliable telecommunication and electricity infrastructure, the cost of the technology and the lack of knowledge and skills (Calderaro, 2014; Buhalis and Law, 2008; Buhalis and Zoge, 2007; Buhalis and O'Connor, 2005; Buhalis, 2003, 2004, 1998; Leung and Law, 2007; Karanasios and Burgess, 2008, Mills and Law, 2004; Corigliano and Baggio, 2004; O'Connor, 2003; O'Connor and Frew, 2001, 2002; Morrison *et al.*, 2001; Frew, 2000; Sheldon, 1997; Poon, 1993; Emmer *et al.*, 1993).

### 3. Overview of ICT and tourism industry in Myanmar

Myanmar offers six different internet line options. Table I shows the number of internet lines in Myanmar over the past six years. One observes that the dial-up has been discontinued starting 2016 as Myanmar started deploying the more advanced fiber and mobile internet.

A quick look at Table II shows an increase in the number of international tourists arriving at Myanmar, and their spending in US\$, there is a significant increase in the number of international tourists from 2013 onwards. An interesting observation from the previous table, Table I, is that from the same year the numbers of ADSL lines were doubled and mobile lines dramatically increased; this can be attributed to the privatization in the telecom sector by the Myanmar Government.

In order to examine Myanmar's NRI to that of neighboring countries in SEA, Table III depicts the rank of NRI of selected countries in SEA and the ranks of network use

Internet line	2010–2011	2013–2014	2014–2015	2015–2016	2016–2017
1 Fiber line	124	253	400	474	552
2 MPT satellite terminal	750	793	872	885	792
3 E1 line	47	189	264	210	218
4 B2B internet Line				349	921
5 ADSL line	3,792	8,442	12,824	16,653	18,811
6 Dial-up line	3,030	1,832	1,640	1,373	0
7 Mobile line	0	2,501,696	7,991,426	39,113,803	19,197,617

**Source:** Ministry of Transport and Communications

**Table I.**  
Internet lines in  
Myanmar (2010–2017),  
fiscal year from  
April to March

Year	Number of arrivals	Receipts (current US\$)	Receipts (% of total exports)
2010	792,000	91,000,000	1.18
2011	816,000	334,000,000	3.95
2012	1,059,000	550,000,000	5.82
2013	2,044,000	964,000,000	7.93
2014	3,081,000	1,613,000,000	12.13
2015	4,681,000	2,266,000,000	16.39

**Notes:** Receipts are international receipts are expenditures by international inbound visitors, including payments to national carriers for international transport. These receipts include any other prepayment made for goods or services received in Myanmar. The tourism sector's contribution to the GDP by visitors' exports is also included

**Source:** Ministry of Hotel and Tourism, Myanmar

**Table II.**  
International receipts  
over the  
period 2010–2015

Country	International tourism, receipts (current US\$-million)	Rank of networked readiness index	Usage sub-index	Rank of individual usage	Rank of business usage	Rank of government usage
Myanmar	2,266	133	2.3	131	138	137
Cambodia	3,411	109	3.1	101	104	116
Laos	713	104	2.9	124	89	110
Bhutan	137	87	3.3	99	111	83
Vietnam	7,350	79	3.7	85	81	61
Thailand	48,527	62	4.0	64	51	69
Malaysia	17,614	31	5.1	47	26	6
Philippines	6,418	77	3.9	79	36	63
Singapore	16,743	1	6.0	12	14	1

**Table III.** Rank of the networked readiness index in Southeast Asia for 2016

**Source:** Baller *et al.* (2016)

component's variables, i.e. the rank of individual, business and government use, and the international tourism receipts in million US\$. The first group of SEA countries represents those with high proximity and a closer demographic profile to that of Myanmar; this group includes: Cambodia, Laos, and Bhutan. The other set represents selected countries in the SEA region. Countries ranked relatively high in the NRI, such as Singapore, Malaysia and Thailand, have the highest tourism income in US\$. One also observes that the NRI rank of Myanmar is the lowest in the SA region but the international receipts or spending are not the lowest in SEA. Despite the low rank of Myanmar's NRI, the tourism sector is growing at a very fast pace; between 2012 and 2013, total earnings increased by 73 percent. The World Tourism Organization (UNWTO), in its report in 2015, reported that the number of international tourists to Myanmar increased by 6 percent in 2014, the highest growth rate in SEA.

To elaborate further on the growth of the tourism industry in Myanmar, Table IV shows the direct and indirect contribution of tourism to Myanmar's GDP. According to the WTTC's report, Travel and Tourism Economic Impact (2015), the tourism industry in Myanmar experienced a growth rate of 6.8 percent in 2015, with a 2.2 percent direct contribution to the GDP growth. In its Travel and Tourism Economic Impact (2017), the direct and indirect contributions to GDP are 3.5 and 3.8 percent, respectively. The contribution of travel and tourism to GDP is forecasted to continue to rise through to 2025. Over the coming ten years, the WTTC projects that Myanmar's tourism industry will rank second out of 184 countries for long-term growth. This shows the vital role of tourism in Myanmar's economy. The WTTC is even more optimistic on prospects for the sector in the short to medium term.

Myanmar	2014 US \$m	2014% of total	2015 Growth	2025 US \$m	2025% of total	2025 growth
Direct contribution to GDP	1,394.3	2.2	6.8	3,323.9	2.7	8.4
Total contribution to GDP	3,130.8	4.8	6.7	7,470.3	6.1	8.4
Direct contribution to employment	505.2	1.8	6.2	1,056.9	3.2	7.0
Total contribution to employment	1,344	4.0	2.9	2,003.3	6.0	5.6
Visitor exports	1,203.4	9.5	8.1	3,413.3	14.4	10.1
Domestic spending	1,198.3	1.9	5.5	2,274.5	1.8	6.1
Leisure spending	1,668.1	1.5	7.1	3,925.7	1.9	8.2
Business spending	733.6	0.7	6.1	1,762.1	0.8	8.5
Capital investment	125.2	0.7	3.2	294.1	0.7	8.6

**Table IV.** Direct and indirect contributions of travel and tourism sector to Myanmar's GDP

**Source:** World Economic Impact (2015)

#### 4. Data collection

A questionnaire was handed out during Summer 2015, at three major cities in Myanmar: the ancient city of Bagan, the city of Mandalay and the new capital Nay Pyi Taw. The criterion of city selection was based on the high number of international visitors reported by the Ministry of Travel and Tourism. Based on the data of 2012, Bagan and Mandalay received the highest number of international visitors, i.e. 162,984 and 160,975, respectively. It was also reasonable to include the capital city, Nay Pyi Taw, in this study. A brief description of the three cities is found in Figure A1.

Table V shows the population size of the lodges in the three cities (310 lodges/hotels). For time and budget limitation, the data collection was done randomly by asking hotels if they are willing to participate and complete the survey. Many hotels denied an interest in participation, and a total of 110 hotels completed the questionnaire with no monetary incentive. The total number of usable questionnaires was 101. Thus, the sample size has a margin of error of 8.02 with 95% confidence. The high percentages of response rate in Nay Pyi Taw and Bagan, corresponding to 72 and 45 percent, respectively, give a claim for a representative sample. The researchers also acknowledge the limitation of having a low response rate of 12 percent in the city of Mandalay. Overall, 32.5 percent of all hotels in the three cities were surveyed with a minimum of 12 percent of hotels in each city.

The data collection survey included 16 questions. The elements of the questionnaire included: general characteristics of guests, availability of internet for guests and ATM in the vicinity of a hotel, as well as items that are marketing specific, such as whether or not hotels keep databases of their guests' records and analyze the data, or whether or not they utilize social media to attract global travelers. The researchers refer the reader to Appendix 2 for the questionnaire form.

#### 5. Data representation and interpretations

Descriptive statistics of the elements of the questionnaire is done in the following manner; general description of hotels and tourists, ICT services available to guests, internet quality as a proxy of ICT Readiness, digital marketing activities and online booking via digital intermediaries.

##### *General description of hotels and tourists*

Most hotels in Myanmar are still a three-star hotels. The surveyed population included different hotel sizes; ranging from small guesthouse hotels with a capacity of 14 rooms to hotels with as many as 250 rooms. Most of surveyed hotels falls into the medium-sized, three-star hotels category with room capacity ranging from 14 to 68. Freedman–Diaconis rule is used to create a histogram for surveyed hotels grouped by room capacity (see Figure 2).

Business visitors account for 80 percent of the bookings in the capital city Nay Pyi Taw, 25 percent in Mandalay and just a few in Bagan. Elaborating on this further, 43 hotels in the capital city of Nay Pyi Taw reported that most of the guests visit for business (93 percent), and in the ancient city of Bagan, 34 of 35 hotels reported that most guests come for

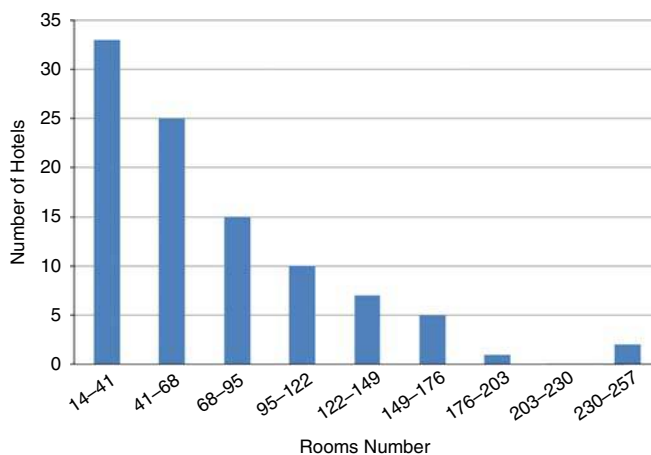
City	Actual 2015	Surveyed	Estimated percentage
Bagan	78	35	45
Mandalay	168	20	12
Nay Pyi Taw	64	46	72
Total	310	101	

**Source:** Ministry of Travel & Tourism

**Table V.**  
Number of actual and surveyed hotels



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**Figure 2.**  
Hotels grouped by capacity

sightseeing and leisure, and one hotel receives most of its tourists for research and academic purposes. In the city of Mandalay, 15 of 20 hotels reported most of tourists visiting for sightseeing and leisure, and the remaining 5 reported the purpose of visit to be business. About 82 percent of tourists have a short stay in any hotel for an average of one to three days. Only about 1 percent of tourists stay in one hotel for ten days or more (see Table VI).

From the standpoint of the tourists' diversity, 30 percent of tourists visiting the capital city of Nay Pyi Taw come from China. In the ancient city of Bagan, tourists from Europe are ranked first with 66 percent (UK included), 50 percent of which come from France. In total, 50 percent of tourists visiting Mandalay come from the SEA region (Japan included).

#### *ICT services available to guests*

In this section, the availability of ICT services to guests is reported. Specifically, under the network use component, the following variables are considered: internet connectivity and the availability of ATMs in the vicinity. As for ATM availability, 51 percent of hotels reported the availability of an ATM in the premises or in the vicinity (see Table VII). In total, 25 percent of hotels in Mandalay reported the availability of an ATM machine, followed by 43 percent in Bagan city and 61 percent in the capital city, Nay Pyi Taw.

**Table VI.**  
Average duration of stay in hotels/lodges

Period of stay	Frequently	Percentage
1-3 days	82	81.91
3-5 days	15	14.85
5-10 days	3	2.97
Over 10 days	1	0.99
Total	101	100

**Table VII.**  
ATM availability

	Frequently	Percentage
No	49	48.51
Yes	52	51.49
Total	101	100

Regarding the internet service availability for guests, 95 percent of hotels provide either Wi-Fi or LAN internet connectivity or both (see Table VIII).

The data collected in this section were coded as binary variables that take the values of either 1 if an ATM is available, and 0 otherwise. The availability of Wi-Fi and LAN internet connectivity was coded similarly.

#### *Internet quality as a proxy of ICT readiness*

The quality of the internet connectivity is proxied by the problems reported on the internet service such as: slow connection, high internet cost, no support staff and other problems (see Table IX). Participants were asked to report the direst problem. In total, 38.61 percent of hotels reported problems with internet speed and 12.87 percent reported high cost as one of the challenges. Other problems, including a lack of IT support staff, account for about 4 percent. A reasonable percentage of about 35.6 percent reported no problems or challenges. In the ancient city of Bagan, 25 of 35 surveyed hotels reported slow connectivity, i.e. a significant 70 percent. In Mandalay, 8 of the 20 surveyed hotels also reported slow internet connectivity, i.e. about 40 percent. On the other hand, in the capital city, where political power and all ministries are located, hotels reported no problems with the internet connectivity. The data collected in this section were coded in two ways; first, in a binary variable taking the value of 1 if an internet speed connectivity problem is reported, and 0 otherwise. The second way is by coding the variable as multi-categorical.

#### *Digital marketing activities*

In this section, marketing specific activities are reported, such as: ownership of a website, keeping computerized records of guests and analyzing accumulated guests' data for business insights. Among surveyed hotels 83 percent reported having websites (see Table X). In the capital city, only 3 of 46 hotels did not have a website. In Bagan and

Internet service	Frequently	Percentage
Wi-Fi	87	90.63
Wi-Fi and LAN	9	9.38
Total	96	100

**Table VIII.**  
Availability of Wi-Fi  
and LAN internet  
connectivity for guests

Internet connection problem	Frequently	Percentage
Slow connection	39	38.61
High internet cost	13	12.87
Lack of support staff	2	1.98
Others	2	1.98
No problem	36	35.6
Total	101	100

**Table IX.**  
Problems of  
internet connectivity

Website	Frequently	Percentage
No	17	16.83
Yes	84	83.17
Total	101	100

**Table X.**  
Hotels presence on the  
WWW through  
website availability

BJJ

Mandalay, 9 of 35 and 5 of 20 hotels did not have websites, i.e. 26 and 25 percent, respectively. However, a significant number of hotel websites are not dynamic and do not allow for online booking. Most websites show the contact information, including e-mail address and phone number.

In the capital city, Nay Pyi Taw, about 61 percent of hotels keep records of guests on a computer, while in Bagan and Mandalay, about 43 and 60 percent, respectively. Regarding the utilization of stored records or databases for data analysis, about 24 percent of hotels keep computerized records of their guests but do not analyze the data. On the other hand, around 31 percent of hotels that keep computerized records analyze their data to uncover trends. A low 12 percent do analyze their data despite not being stored on a computer (see Table XI). Hotels that do not keep computerized records or a database of their guests, and do not look into the data for insights, amount to the highest percentage, i.e. 34 percent, as shown in Table XI.

Table XII contains descriptive data on the number of hotels utilizing social media platforms for advertising and marketing purposes. About 50 percent of hotels in Myanmar utilize the social media (see Table XII).

#### *Online booking via digital intermediaries*

Hotels were asked to specify the use of the following online booking intermediaries: Booking.com, Agoda and Expedia. In the capital city of Nay Pyi Taw, 61 percent of surveyed hotels are using intermediary booking websites. Of a total of 46 hotels, 16 (35 percent) use more than one intermediary online booking website; 12 hotels use only one intermediary online booking, 9 of which are present on Agoda; 25 hotels use Agoda (54 percent); 17 are on Booking.com; and 5 on Expedia. In the ancient city of Bagan, 14 of a total of 35 (40 percent) hotels use more than one intermediary for online booking; 5 hotels are present on only one intermediary, 4 of which are on Agoda. A total of 18 hotels are present on Agoda, 13 on Booking.com and 9 are on Expedia. Similar observations are reported for the city of Mandalay, and all surveyed hotels that utilize online booking use more than one intermediary.

Booking.com and Agoda are the most common among surveyed hotels in Mandalay. The data show that Agoda is the number one choice for online booking intermediary in Myanmar, followed by Booking.com – Agoda, founded in Bangkok in 2002, indeed is better established in SEA. Other online booking websites are also present: 2 of 46 hotels in Nay Pyi Taw reported other social network websites, and 4 of 35 hotels in Bagan used other social

	Data analytics		Total
	No	Yes	
<b>Table XI.</b>			
Hotels with			
computerized record			
keeping and data			
analysis capabilities			
	<i>Computerized records</i>		
No	34	12	46
Yes	24	31	55
Total	58	43	101

	Use the social media		Percentage
	No	Frequently	
<b>Table XII.</b>			
Number of hotels			
utilizing social			
media for promotion			
No		49	48.51
Yes		52	51.49
Total		101	

media websites. Most of the hotels located in the capital city, Nay Pyi Taw, completed less than 10 percent of their booking through online booking intermediaries, 18 hotels (39 percent of total hotels) completed 10–40 percent of their bookings via online booking intermediaries, while 21.7 percent of hotels do not use online booking, and only 20 percent (7/35) of hotels in Bagan do not use online booking intermediaries (Table XIII).

## 6. Data analysis and results

The central aim of this paper is to investigate the ICT readiness in Myanmar to support the lodging sector. More specifically, it focuses on identifying associations between the effect of the “quality of Internet connection,” a sub-index of the NRI, and the following dimensions:

- customer service: availability of ICT services to guests; such as the availability of internet connection and an ATM in the vicinity and availability;
- digital marketing: leveraging social media for marketing purposes, and storing data and conducting analysis for business insights; and
- B2B online booking: utilizing online bookings for business.

The approaches of data analysis are in line with the recommendations of Hosmer *et al.* (2013), Hilbe (2011), Peng *et al.* (2010) and Gaur and Gaur (2009). This section reports on possible associations of ICT readiness, proxied by the quality of internet service, and survey variables. For the list of explanatory variables, see Table XIV.

A note to highlight here is that the variable *Percent\_3<sup>rd</sup>\_Party\_Booking* represents the collected data in its original form, and, based on it, the variable *Binary\_3<sup>rd</sup>\_Party\_Booking* was created with a threshold of 50 percent. The binary form of the original variable was necessary to sustain a model structure that represents all dimensions, the subject of study, with statistical significance.

The dependent variable in its original form – as collected by the questionnaire in Q.16, please see Appendix 2 – was coded in the following categories: cat.1: slow connection; cat.2: lack of technical staff; cat.3: internet cost and others’ and cat.4: no problems. For this form, a multi-nominal logistic regression is attempted to construct a significant model. In order to further investigate the effect of internet quality, two more forms of the dependent variables were constructed, i.e. first, poor internet quality coded as 1 when a hotel/lodge reports cat1, slow speed problem and 0 otherwise, and, second, high internet quality) coded as 1 when the hotel/lodge reports cat4: no internet problem, and 0 otherwise. The reason why cat.1 and cat.4 were selected is due to the high percentages of 38.6 and 35.6 of hotels reporting the aforementioned categories, respectively (see Table IX). Moreover, conceptually, quality of an

Percentage of online booking	Bagan	Mandalay	Nay Pyi Taw
100–90	2	0	0
89–80	1	1	0
79–70	2	1	1
69–60	3	2	1
59–50	8	3	1
49–40	3	0	1
39–30	6	1	7
29–20	3	3	4
19–10	0	3	7
9–1	0	4	14
0	7	2	10
Total hotels	35	20	46

**Table XIII.**  
Online bookings  
completed via  
intermediaries across  
surveyed cities

BJJ

Labels	Description
$Percent\_3rd\_Party\_Booking_k(i)$	Continuous variable representing the percentage of bookings completed via online booking intermediary
$Binary\_3rd\_Party\_Booking_k(i)$	Binary variable takes the value of 1 when the percentage of online booking via third party of hotel $i$ is reported to be greater than or equal to 50%, and 0 otherwise
$Use\_net\_booking_k(i)$	Binary variable takes the value of 1 when hotel $i$ deploys the internet for booking, and 0, otherwise. One notes here that this variable refers to direct online booking via hotel's own website and not third-party online booking intermediaries
$Own\_Website_k(i)$	Binary variable takes the value of 1 when hotel $i$ has its own website with contact information and a minimum of general description of hotel's facilities, and 0 otherwise
$SNS\_Mrkt_k(i)$	Binary variable takes the value of 1 when hotel $i$ is active on social media for promotional purposes, and 0 otherwise
$Database_k(i)$	Binary variable takes the value of 1 when hotel $i$ has its own computerized local database to keep guest records, and 0 otherwise
$Mrkt\_Intelligence_k(i)$	Binary variable takes the value of 1 when hotel $i$ is analyzing data on customers either kept in local database or via the online third party booking partner, and 0 otherwise
$Net\_Guests_k(i)$	Binary variable takes the value of 1 when hotel $i$ provides an internet service to guests, and 0 otherwise
$ATM_k(i)$	Binary variable takes the value of 1 when hotel $i$ has an ATM in the vicinity, and 0 otherwise
$Rooms(i)$	Continuous variable describing the capacity of hotel by its rooms' number

**Table XIV.**  
Definitions of  
explanatory variables

offering is an evaluation of expectations pertaining functional and emotional modules of an offering, while value includes the evaluation of the total bundle of costs and benefits including price and technical staff/after sale service (Kotler and Keller, 2014). Taking into consideration cat.1 only as a proxy of poor quality is thus sufficient.

Before diving into the analysis, the authors would like to acknowledge the possibilities of using different analytical techniques appropriate for the form of the dependent variable, such as the Probit model; however, due to the fact that the Probit model imposes a constant marginal impact, which may be unrealistic, the authors used logit regression for analysis.

#### *Internet quality as a multi-categorical variable*

We start our investigation by considering the dependent variable, quality of internet connection, in the form of multi-categorical variable. Because the dependent variable is multi-categorical (consists of more than two category), a multi-nominal logistic regression is attempted. The model did not show enough significance to answer the questions of the study; this is maybe due to the insufficient ratio of the number of data points and the number of categories of the dependent variable.

#### *Internet quality as a binary variable of reporting internet speed problem*

Two main categories were considered to construct the dependent variable, namely, poor internet quality: the presence of internet speed problem; and high internet quality: reporting no internet problems. Because the dependent variable in this case is binary, a logistic regression model is employed to investigate the association of whether or not hotel  $i$  in the data set  $D_{Hotels}$  has a high likelihood of reporting an internet connectivity problem, in specific an internet speed problem, denoted by  $Y_{Connectivity-Problem}$ , and the set of explanatory variables  $x_k(i)$ ,  $i \in D_{Hotels}$   $k = 1, \dots, K$  and  $\underline{x} = [x_1(i), \dots, x_k(i)]$  as previously listed in Table XIV.

Following the standard procedure for eliminating multi-collinearity, the correlation structure of the explanatory variables is illustrated in Table XV.

*R* open-source software was used to run a logistic regression model. The resulting model before applying a stepwise elimination is reported in Table XVI. The Akaike information criterion (AIC), for the goodness of fit (Akaike, 1979), is reported to be  $AIC = 120.9$ .

In order to discern significant variables with *p*-value (corresponds to “Pr(> |z|)”) in the above table) less than 0.05, a backward stepwise logistic regression is attempted, yielding the logistic regression model in Table XVII with a better goodness of fit of  $AIC = 118.46$ .

The interpretation of results is reported under the three key dimensions; customer service, B2B online booking and digital marketing. We take the odds ratios of the explanatory variables to interpret the associations with the dependent variable. Exponentiation of the log odds (corresponding to “Estimate Std.” in Table XVII) gives the odds ratio for a one-unit increase in the explanatory variables. Table XVIII shows the odds ratios of the explanatory variables.

*Customer service.* Regarding the customer service dimension, represented in the ability to provide ICT services like internet connection and ATM availability to guests, one sees that, in Table XVIII, hotels experiencing problems with internet speed connectivity (poor internet service quality) are more likely to be located away from an ATM (low odd ratio of 0.26), with a higher likelihood of not being able to provide an internet service to their guests (the lowest odd ratio of 0.19) compared to hotels that have lower likelihood of experiencing high-quality internet service.

*B2B online booking.* In regards to identifying association with using online booking for business, the odds ratio shows that, hotels that are likely to report internet speed problem have a high likelihood of deploying online booking capabilities either directly through their own websites, or heavily via online booking intermediaries (heavily refers to completing 50 percent or more via online booking intermediaries). As reported in the odds ratio table, such hotels are 7.69 folds more likely to directly complete bookings through their websites and about 4.24 folds via online booking intermediary compared to lodges with higher quality internet service.

*Digital marketing.* Pertaining to the association with leveraging data for analytics, the corresponding odds ratios, listed in Table XVIII, show that hotels that are more likely to report internet speed problem, are 2.75 times more likely to conduct data analysis for business insights than those that do not.

Regarding the use of social media for marketing purposes, we could not find significant association between reporting an internet speed problem and leveraging social media for promotion (we also investigated the association of the dependent variable in terms of a single dichotomous regression, and the simple model lacked significance as well). The next investigation is performed to identify possible association by considering the dependent variable to be a binary variable of “reporting no Internet service problems” in order to draw further insights on the use of social media in the lodging industry in Myanmar.

#### *Internet quality as a binary variable of reporting no internet problems*

By considering the dependent variable to be a binary variable that takes the value of 1 when reporting no internet service problems (reporting high quality internet connection) and 0 otherwise, a logistic regression model is attempted to investigate the association of whether or not hotel *i* in the data set  $D_{Hotels}$  has a high likelihood of reporting no internet problems, denoted by  $Y_{-Connectivity-Problem}$  (↔: no), and the set of explanatory variables  $x_k(i)$ ,  $i \in D_{Hotels}$   $k = 1, \dots, K$  and  $\bar{x} = [x_1(i), \dots, x_k(i)]$  listed previously in Table XIV. Table XIX reports the results of the model including the odds ratio.

*Customer service.* Consistent with the previous logistic regression, this model reported a high association between the likelihood of reporting high quality internet service and the

**Table XV.**  
Multi-collinearity  
structure of the  
explanatory variables

	<i>Use_net_booking</i>	<i>Binary_3rd_Party_Booking</i>	<i>Own_Website</i>	<i>SNS_Mrkt</i>	<i>Data-base</i>	<i>Mrkt_Intelligence</i>	<i>ATM</i>	<i>Net_Guests</i>
<i>Use_net_booking</i>	1							
<i>Binary_3rd_Party_Booking</i>	0.2043	1						
<i>Own_Website</i>	0.1513	0.0228	1					
<i>SNS_Mrkt</i>	0.2516	0.0731	0.3046	1				
<i>Database</i>	0.0137	-0.1436	0.2794	0.3056	1			
<i>Mrkt_Intelligence</i>	0.1198	-0.0490	0.3338	0.3550	0.3049	1		
<i>ATM</i>	0.1987	0.0278	0.3046	0.2072	0.1465	0.1948	1	
<i>Net_Guests</i>	0.3606	-0.0820	0.3606	0.1910	0.1834	0.2182	0.1910	1

likelihood of providing ICT services to guests. Hotels are found to be 16.4 times more likely to provide internet service to their guests and to have an ATM in the vicinity (with odds ratio of 3.7 times more likely) compared to those with poor internet service quality.

*B2B online booking.* Regarding B2B online booking, the model indicates that, with a high likelihood of a hotel enjoying a high quality of internet service, there is a lower likelihood

Variables	Estimate	SE	z-value	Pr(>  z )
<i>(Intercept)</i>	-0.1383	0.9171	-0.151	0.8801
<i>Use_net_booking</i>	1.8661	0.8921	2.092	0.03645*
<i>Binary_3rd_Party_Booking</i>	1.3969	0.559	2.499	0.01246*
<i>Own_Website</i>	0.2325	0.7347	0.316	0.75167
<i>SNS_Mrkt</i>	0.8896	0.5594	1.59	0.1118
<i>Database</i>	-0.6137	0.5455	-1.125	0.26052
<i>Mrkt_Intelligence</i>	0.905	0.5604	1.615	0.10632
<i>ATM</i>	-1.4758	0.5478	-2.694	0.00705**
<i>Net_Guests</i>	-2.2701	1.0899	-2.083	0.03726*

**Notes:** Significance codes of R software output: 0 “\*\*\*” 0.001 “\*\*” 0.01 “\*” 0.05 “.” 0.1 “ ” 1

**Table XVI.**  
Logistic regression  
results with all  
explanatory variables

Variables	Estimate std.	Error	z-value	Pr(>  z )
<i>(Intercept)</i>	-0.1717	0.9025	-0.19	0.84912
<i>Use_net_booking</i>	2.0409	0.8826	2.312	0.02076*
<i>Binary_3rd_Party_Booking</i>	1.4459	0.5406	2.675	0.00748**
<i>Mrkt_Intelligence</i>	1.0135	0.5114	1.982	0.0475*
<i>ATM</i>	-1.318	0.5061	-2.604	0.0092**
<i>Net_Guests</i>	-2.2166	1.0234	-2.166	0.03032*

**Notes:** Significance codes of R software output: 0 “\*\*\*” 0.001 “\*\*” 0.01 “\*” 0.05 “.” 0.1 “ ” 1

**Table XVII.**  
Logistic regression  
model with all  
significant variables

Variables	Estimate std.	Odds ratio
<i>Use_net_booking</i>	2.0409	7.6975
<i>Binary_3rd_Party_Booking</i>	1.4459	4.2457
<i>Mrkt_Intelligence</i>	1.0135	2.7552
<i>ATM</i>	-1.318	0.2677
<i>Net_Guests</i>	-2.2166	0.1090

**Table XVIII.**  
Odds ratios of logistic  
regression model

Variables	Estimate	SE	z-value	Pr(>  z )	Odds ratio
<i>(Intercept)</i>	-0.92	0.9159	-1.005	0.315137	0.3985
<i>SNS_Mrkt</i>	-1.2766	0.5457	-2.339	0.019314*	0.2789
<i>Binary_3rd_Booking</i>	-2.393	0.7183	-3.332	0.000864***	0.0913
<i>ATM</i>	1.3236	0.5492	2.41	0.015948*	3.7569
<i>Net_Guests</i>	2.7995	1.0036	2.79	0.005278**	16.4364
<i>Use_Net_Booking</i>	-1.8855	0.7934	-2.376	0.01748*	0.1517

**Notes:** Significance codes of R software output: 0 “\*\*\*” 0.001 “\*\*” 0.01 “\*” 0.05 “.” 0.1 “ ” 1

**Table XIX.**  
Logistic regression  
model of no internet  
problems and  
odds ratio



that this hotel will be using its own website for online booking compared to that of hotels reporting poor internet service quality (odds ratio of 0.15). One also sees a lower likelihood of completing more than 50 percent of bookings via online third-party intermediary, i.e. 0.09 lower than that of hotels reporting poor internet service quality.

*Digital marketing.* Surprisingly, one sees that the likelihood that a hotel enjoys a high-quality internet service is associated with a lower likelihood of leveraging social media for business compared to hotels with poor internet service. The subsequent section outlays the discussion and conclusion.

## 7. Conclusion and discussion

Since the 1980s, the rapid rate of technological development had been revolutionizing the way business is done in many regions and across different industries. An appropriate diffusion of ICT in the lodging sector can improve different aspects in the tourism industry in Myanmar as well. By comparing NRI data over the last several years, one could notice that Myanmar's ranking has gone down, despite the country making improvements in its ICT network's infrastructure. This is an indication that Myanmar is still slow when compared with other countries. On a positive note, despite the fact that Myanmar's NRI is the lowest among SEA countries, its tourism international receipts are not.

While the opening up of Myanmar to international markets and the country's many travel offerings (such as eco-tourism) have boosted the sector's contribution to the GDP, the rapid influx of tourists placed a strain on supporting infrastructure such as telecom and internet. As one travels farther away from the capital city toward ancient and active sightseeing sites, the lodges find it difficult to provide internet connection service to guests and will more likely report internet speed problems. The study shows that only 25 percent of surveyed lodges in Mandalay reported availability of an ATM in the vicinity, Bagan's reported 43 percent and 61 percent of hotels in the capital, Nay Pyi Taw.

In Myanmar, as a whole, the internet penetration is still a major concern – in 2015, only 2.5 percent of the nation has access to the internet, yet this research found that 95 percent of the surveyed hotels in major touristic cities had an internet connection and were utilized for business purposes. However, the quality of the internet speed connection seems to be a major problem but not across all cities. In the ancient cities of Bagan and Mandalay, 70 and 40 percent of hotels, respectively, reported problems with internet connection. On the other hand, in the capital city, hotels reported no problems with the internet connectivity.

The results of the analysis clearly support the importance of ICT quality to the enhancement of the lodging sector. The results showed how low internet quality impedes the capacity of hotels to excel in customer service. Hotels reporting poor internet quality have a higher likelihood of not being able to provide internet connection to their guests with a likely absence of ATMs in their vicinity compared to hotels that enjoy high-quality internet service. Regarding the practice of digital marketing in the lodging sector, hotels with poor internet service quality have a higher likelihood to store and analyze data for business insights compared to hotels that enjoy high quality internet service. The investigation also found that hotels enjoying poor internet service have a higher likelihood to resort to aggressively leveraging online booking for customer/guest creation either directly through their own website or via third-party intermediary compared to hotels with high quality internet service. This surprising result is maybe due to the following. Our survey revealed that most bookings done in the capital city of Nay Pyi Taw (80 percent of total bookings) are done for business purposes and the remaining for leisure, while business visitors account for only 25 percent in Mandalay, and just a few in Bagan. The data also indicate that most hotels in the capital city reported no internet service problems while almost every hotel in the cities of Mandalay and Bagan reported at least a problem with internet service. Moreover, most arriving tourists at Myanmar for leisure

make a stop in the capital city that is conveniently positioned near the airport. The lack of urgency to aggressively attract guests in the capital city – which enjoys high quality internet service – may explain the low likelihood of lodges/hotels to be active on social media platforms.

The vision of smart tourism rests on the abilities of businesses operating in the tourism industry to not only collect enormous amounts of data, but to intelligently store, process, combine and analyze data to design tourism offerings. The results of the analysis indicated a high potential for adopting digital marketing to achieve smart tourism despite the perceived low quality of internet connectivity by lodges. Leveraging data to achieve business innovation in the tourism sector in Myanmar is in its early phase but seems promising. A low 31 percent of hotels have a complete control over their data and practice marketing intelligence by keeping computerized records on a local computer as well as analyzing data for business insights.

Given the economic relevance of the tourism sector in the emerging economy and the fact that world tourism is heavily driven by the internet and ICT make this study a timely one for the sustainable development of the tourism sector of Myanmar, which has great treasures to show to the world.

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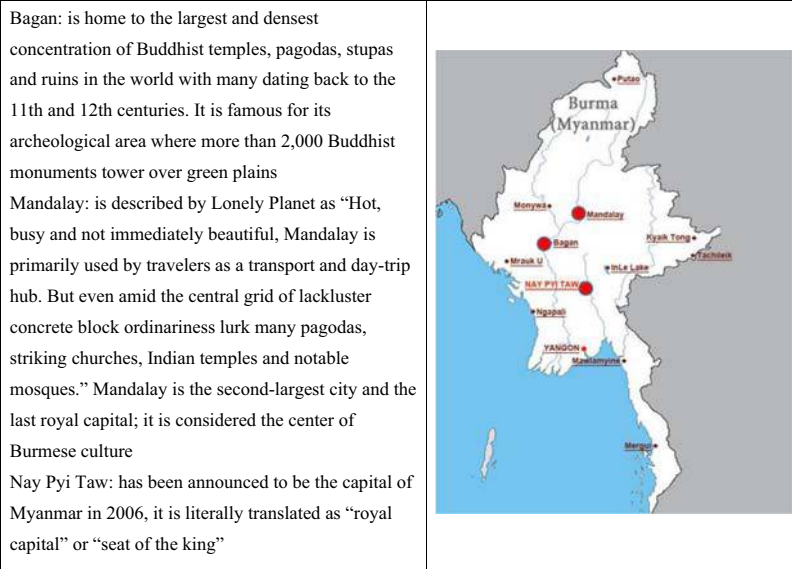
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**Figure A1.**  
Brief description of surveyed cities

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## Appendix 2. Questionnaire form

Myanmar's  
tourism

### Questionnaire for ICT Readiness in Lodging Sector in Myanmar

- (1) Name of hotel  
(2) Number of rooms   
(3) Do you have your own website? - Yes - No  
(4) Do you use your website for online booking?  - Yes - No  
(5) How much is the percentage of bookings completed via online 3rd party intermediary?  
(6) If you use 3rd party online booking intermediary, do you use the following sites:

Booking Site	- Yes	- No
Expedia		
Yagoda.com		
Booking.com		

- (7) Do you use social media for promoting your hotel/business? - Yes - No  
(8) What top five countries from which your visitors came from?  
a. -----  
b. -----  
c. -----  
d. -----  
(9) Most visitors come to your hotel/lodge for: (choose one only)  
a. Business  
a. Sightseeing and pleasure  
b. Medical  
c. Other  
(10) Does your hotel has an ATM in the vicinity? - Yes - No  
(12) Do you provide Internet service (wifi or LAN) for guests? - Yes - No  
(13) How many days most of tourists stayed in your hotel for?  
a. 1–3 days  
b. 3–5 days  
c. 5–10 days  
(14) Do you store your guest records on a PC? - Yes - No  
(15) Do you analyze tourists' data to uncover marketing trends for insights? - Yes - No  
(16) Which one of the following Internet problems is the direst to you?  
a. Slow connection  
b. Lack of technical staff  
c. Internet service cost  
d. Other  
e. No problem

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