Chapter 9
An Exploratory Study on the Role of ICT Tools and Technologies in Tourism Industry of Nepal

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9.1 Introduction

Information and communication technologies (ICT) are indispensable technologies for the management, operation, and execution of a business [1]. The studies carried out by different scholars have found that there is a huge transition in the tourism industry due to the role and application of ICT [2]. These tools and applications have helped the business to expand beyond the global reach and blurred the dimensions of geographical boundaries. ICT has invented new business models and new supply chains and empowered a common man to become master of his own choices [3]. The tourism industry is the best example that finds a complete and multifaceted use of ICT helping businesses to sell and market its products and services and serving as the backbone for the industry. It connects the beneficiaries, the service providers, and consumers forming a value chain of cohesive nature [4].

ICT plays a very important role in underdeveloped countries like Nepal to get it connected globally and expose itself in various fields including business, education, culture, research, etc. [5]. Nepal is continuously witnessing development in information and communication technologies accounting to the high growing number of mobile and Internet users, web-based information management systems, e-commerce, and m-commerce applications which increase in the number of social site users and similar applications [6]. Studies have shown that tourism and ICT are

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deeply connected and make a great impact on each other; hence it is important to study the role of ICT tools and technologies in the tourism industry [7].

9.2 Literature Review

Macintosh and Goldner defined tourism as the sum of phenomena and relationships arising from the interactions among tourists, business suppliers, host government, and host communities in the process of attracting and hosting these tourists and other visitors [8]. It is an industry that benefits a country at all levels by supporting GDP, providing jobs, and integrating small to big businesses of a country. The data has shown that tourism development has played a vital role in the economic growth of developed nations and also as a vital tool for underdeveloped nations to foster the same. In the worldwide economy, the tourism industry has contributed 7.6 trillion US dollars, which means 10.2% of the global GDP and generated 292 million employment opportunities [9]. Tourism has created a greater benefit to developed countries than underdeveloped countries as per the studies of Seng (2015) and Ma et al. (2003), and they stated that the critical reason for the advanced tourism industry in the European nations is due to the emergence of technology and awareness of ICT capabilities [10].

Tourism is the key industry of Nepal that contributed 4.0% of total GDP and shared 3.2% of total employment in 2017 alone [11]. The government of Nepal has realized the importance of tourism in its economy and has initiated various projects, plans, and policies to promote it. Besides many other components, ICT is taken as one of the primary components by the government to plan and utilize it to its full capacity [6]. The current data regarding ICT development shows that this sector is booming in Nepal. The 10 years' data of communication industry in Nepal shows that all communication industries have grown with some showing drastic jump in the last 3 years which include mobile communications (5.04 million in 2008 to 39.2 million in 2019), Internet, and data services (0.54 million in 2008 to 19.8 million in 2019) as shown in Fig. 9.1 [12]. Similarly, the data regarding social site use has also increased in the recent years (Facebook 93.87%, YouTube 1.96%, Twitter 1.48%, Pinterest 1.45%, Instagram 0.95%) [13]. ICT and tourism are taken as important topics in research and academia. The results of the interconnectedness between the two have made them a compulsory part of one another. Many scholars clearly state that ICT has a profound impact on tourism and has led to a new form of business models, value chains, and new demands in this industry [14]. They also highlight the importance of ICT and digital technologies in the development of the tourism industry as a powerful industry of the twenty-first century.

Tourism has always pulled scholars of Nepal to study its various aspects including economic support, as a potential industry, trekking destination, and cultural hub, from religious aspect, but very few have tried to explore the relationship between ICT and Tourism [15]. Some notable academicians and researchers who have

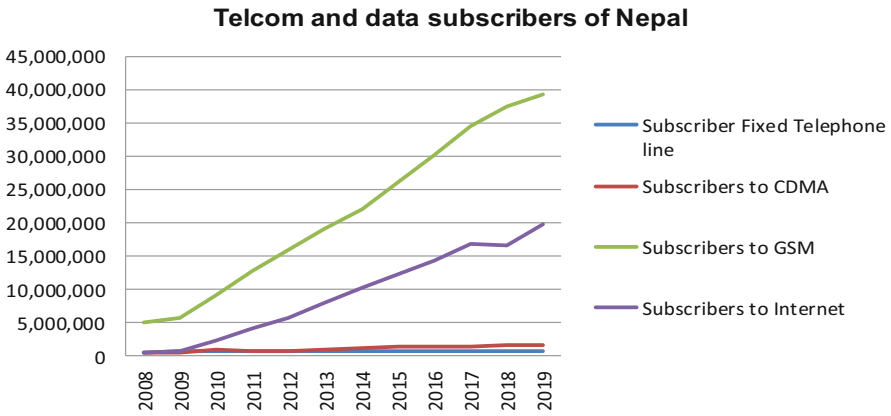

Fig. 9.1 Data representing 10 years growth and subscription of communication technology in Nepal. Compiled from NTA, MIS reports [15]

worked in different aspect of ICT and tourism industry of Nepal include Mahabir Pun et al. who talk about tourism development in his work on Nepal wireless project; Goodman who talked about Internet from top of the world in his case study in Nepal [16], Thapa, Devinder, Sein, and Maung K who discussed about ICT, Social Capital, and Development: the Case of a Mountain Region in Nepal [17], and Shrestha and Jeong's work which proposed an ICT framework for tourism industry of Nepal. This area still has many aspects that need to be studied and discussed to find a real understanding of ICT and tourism in the context of Nepal.

9.3 Research Framework

The research framework represents the overall study about the role of ICT in the tourism industry of Nepal as shown in Fig. 9.2 below. The study employs inbound tourism as the main source of data and uses secondary literature to supplement the facts and figures.

9.3.1 Research Framework and Methodology

The below framework depicts the overall scenario of the research undertaken to explore the role of ICT tools and technologies in the tourism industry of Nepal. Inbound tourism and secondary literature are the main inputs of the study that are analyzed and interpreted to find out the current status, role, and usage of these tools and technologies in the tourism industry of Nepal. Descriptive and inferential

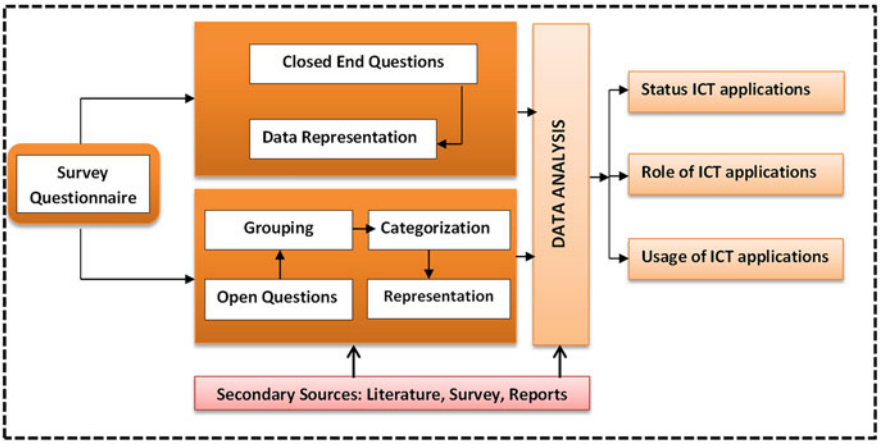

Fig. 9.2 Research framework regarding the study

statistics are used to analyze data and interpret results obtained from the respondents and secondary literature. The study is qualitative in nature and represents results in the form of tables, graphs, and charts of the subject under investigation as shown in Fig. 9.2.

9.3.2 Sampling

Convenience sampling is used for the study for a set of inbound tourists to find out what ICT tools and technologies they use in their course of planning and visiting and on the return of their journey from Nepal. A total set of 150 questionnaires were distributed online to tourists of 10 countries, and only 109 responses were received. The survey questions consisted of 34 questions which included the demography data like age, country, and name of the respondents, while income level, educational background, and marital status were ignored as they were not considered so important for the current study. The three open questionnaires were used to get the free views of the respondents which were grouped, categorized under suitable headings, and then represented in the form of the table to depict the scenario. The country of inbound tourists was considered based on data retrieved from Nepal tourism report 2018 published by the Ministry of Culture Tourism and Civil Aviation.

9.4 Data Analysis and Findings

The data analysis was done using statistical tool, and data was represented in the form of bar graphs, pie charts, tables, and figures. The demographic data depicted that all the ten countries chosen for data collection responded with more than 80% of respondents from India, Japan, USA, China and Canada, while others were in the range of 40% to 60% with France and Ukraine about 25% as shown in Fig. 9.3.

The second demographic data regarding age group show that most of the respondents belong to the two age groups between 26–35 making 44.8% and 36–45 making 45.7% of the respondents 8.4% between 18 and 25 and 1.1% between 46 and 55. It was interesting to find that most of the young people were frequent to visit Nepal as shown in Fig. 9.4. The data regarding the frequency of visit depicted that 64 respondents out of 107 visited Nepal only once, 11 visited 2 times, 8 visited 3 times, and 11 visited 5 times with 2 visiting more than 10 times (Fig. 9.5). The data represented that the frequency of repetition was low among the tourist as shown in Fig. 9.5.

The inbound tourist was asked about their purpose of visiting Nepal that had multiple choices. The data depicted that 59 answered for relaxation and recreation, 56 answered for trekking, 27 for a religious purpose, 26 for cultural exchange, 25 for visiting friends and relatives, 22 for adventure sports, and very less about 2 of them for health and meditation as shown in Fig. 9.6.

The basic questions regarding the tourism industry of Nepal were further investigated for the use of ICT tools and technologies. The respondents were inquired about how they booked for the accommodation in Nepal? (Fig. 9.7).

The 25.2% of the respondents answered that they booked it through phone with a travel agency in their own country, 21.1% booked through travel websites like

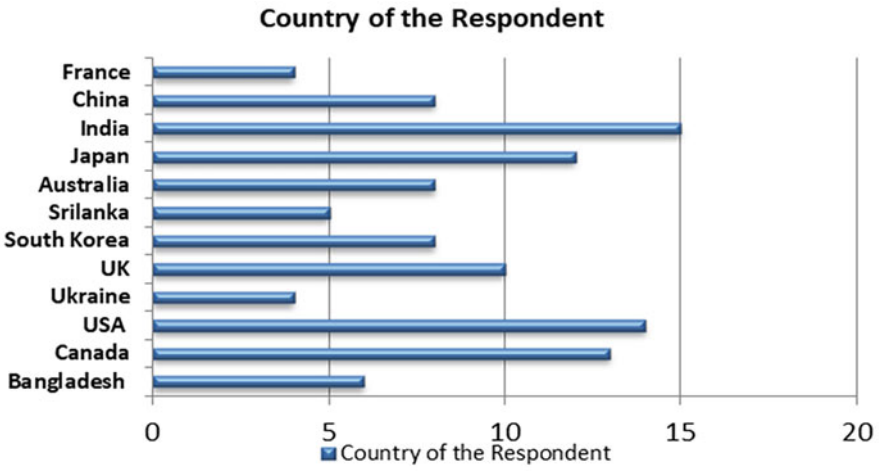

Fig. 9.3 Representation of respondents' country

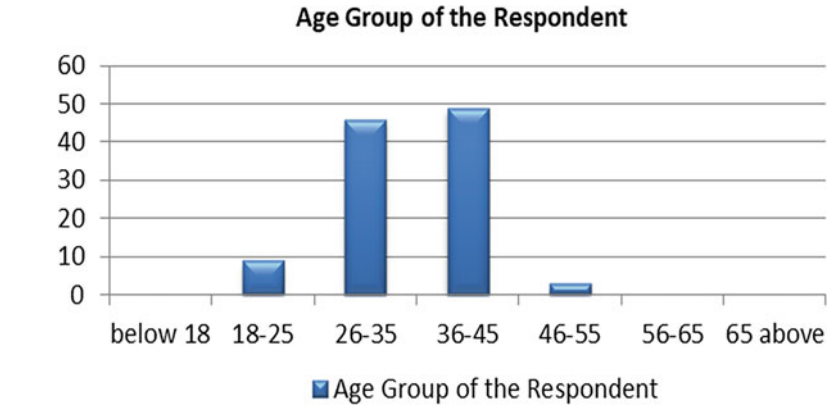

Fig. 9.4 Representation of respondents' age group

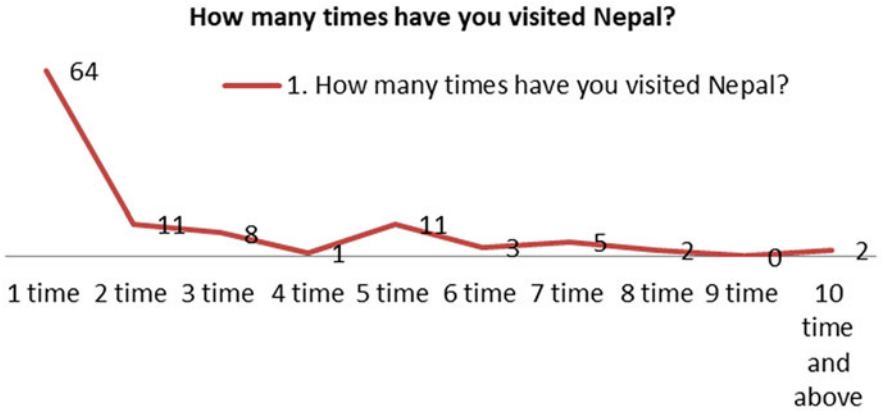

Fig. 9.5 Representation of respondents Nepal visit

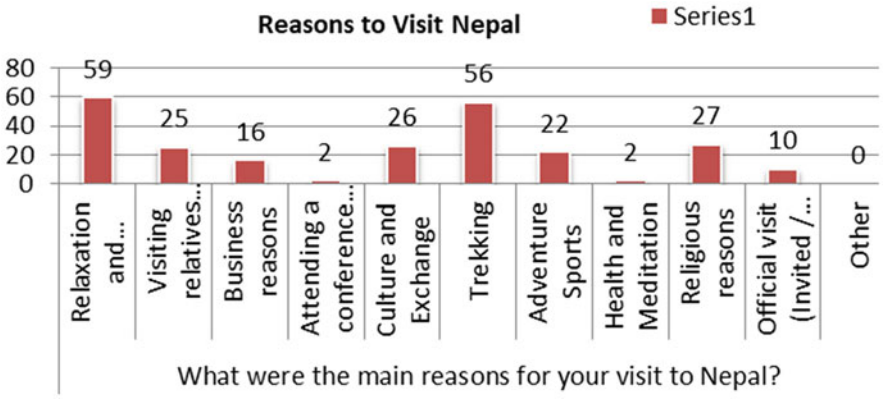

Fig. 9.6 Representation of tourist purpose of visit to Nepal

Fig. 9.7 Representation of tourist accommodation booking information

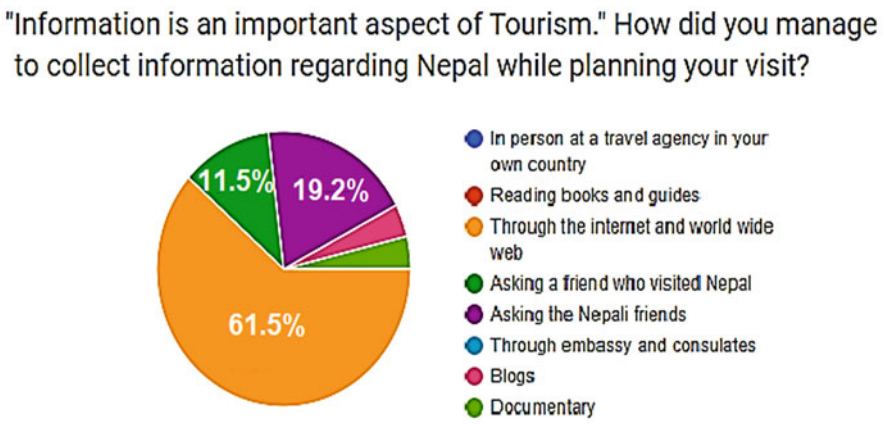

Fig. 9.8 Representation of information collection for Nepal through different medium

Agoda, Trip, Booking, etc., 13.1% booked with Internet with accommodation in Nepal, 7.4% through friends, and 7.4% in person with a travel agency in their own home country. There were other sources of accommodation booking that included through invitee, staying with friends and family, conference, and so on that made up a small number.

Information is an important aspect of tourism when the respondents were asked about how did they manage to collect information about Nepal; 61.5% said they used the Internet and world wide web to collect information about Nepal, and 19.2% collected by asking their Nepali friend, while 11.5% asked the friends who had already visited the country. The data of this aspect concluded that on average, 61.5% were using Internet technology to gather information as shown in Fig. 9.8.

Further analysis of the use of ICT in tourism was explored by asking the question to the respondents if they found any digital assistance systems in their course of the journey to Nepal. The digital system was explained to them as any system like

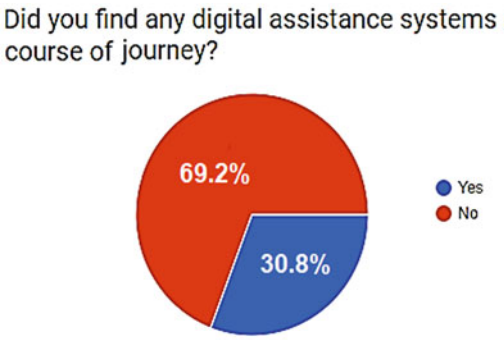

Fig. 9.9 Representation of digital assistance available in Nepal

location finders of destinations, language translators, or e-commerce-based systems, etc. to assist them in their course of the journey to Nepal. 69.2% answered as NO, and 30.8% answered as YES as shown in Fig. 9.9. The respondents who answered "yes" included Google maps, the use of digital payment cards, and other such software in existence. None of them found any specific digital application made in Nepal for their assistance. This indicates that Nepal is still way behind in terms of local and customized applications for specific use like in the tourism industry and others.

Communication is a vital component for human beings to exchange ideas, keep in touch, express their feelings, and get connected to each other. To find out how tourists kept in touch with their friends and family during their visit to Nepal, it was discovered that 33.3% used emails and instant messaging services, 22.2% social networks sites, 40.7% used mobile phones, and only 3.8% used fixed telephone lines. It was interesting to note that social network sites were having a good share in the communication activity of the tourist besides the traditional digital applications like emails as depicted in Fig. 9.10. Further when inquired about the use of social applications, the data showed that 88.9% of the respondents used social network sites like Facebook, Instagram, Twitter, etc. And only 11.1% of the respondents did not use the social sites as shown in Fig. 9.11.

Facebook was the most popular social site among the respondents with 50% using it, followed by Instagram 23.1%, 7.7% used twitter, 7.7% used WeChat, 3.8% almost all kinds, 3.8% LinkedIn and 3.8% line, and others as per Fig. 9.12. The data regarding the use of social sites for gathering information and communicating in Nepal was prominent as 70.4% of the respondents felt so, with 22.2% not sure and only 7.6% were negative as shown in Fig. 9.13.

When respondents were inquired about the future role of social network sites in tourism of Nepal, 33.3% felt that it will strengthen the global reach, 33.3% felt it will reach the global audience for both positive and negative information, 14.8% felt it will make Nepal tourism industry rich with abundant data, 7.4% felt that misleading and fake information will prevail and create negative impact, and 3.7% felt that it

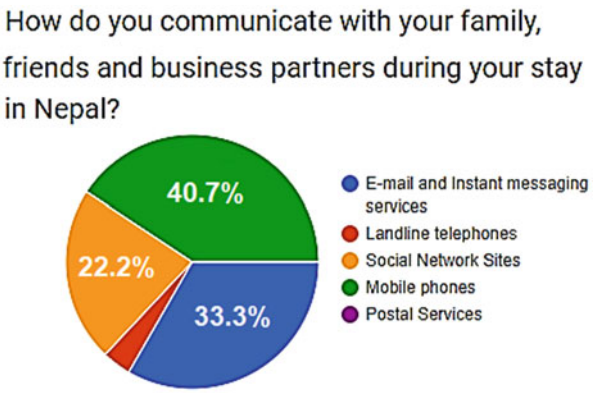

Fig. 9.10 Representation of communication tool used by tourist in Nepal

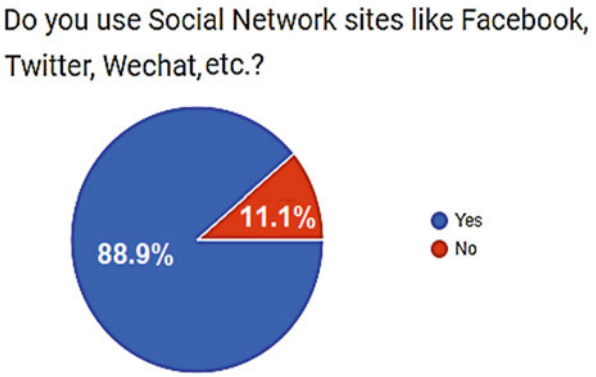

Fig. 9.11 Pie chart depicting the population of social site users from the survey

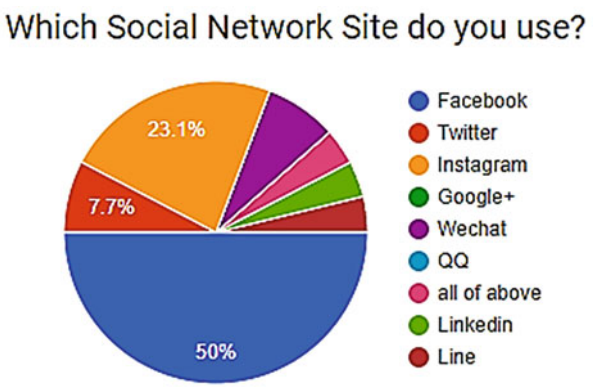

Fig. 9.12 Representation of popular social network sites used by respondents

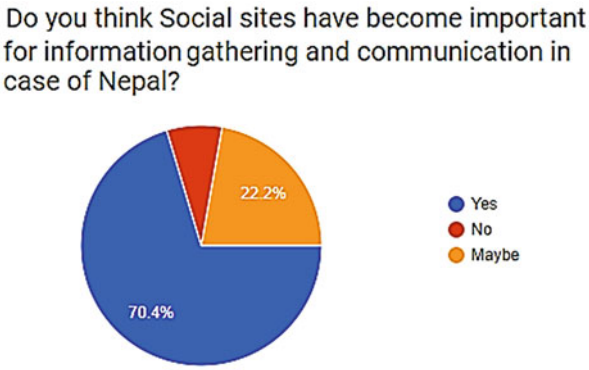

Fig. 9.13 Role of social network sites in information collection and communication

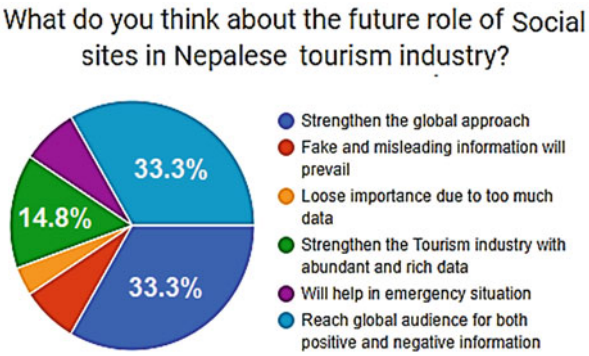

Fig. 9.14 Representation of respondents views regarding future of social network sites in tourism of Nepal

will diminish in importance due to too much data as depicted in Fig. 9.14. About 88.9% of the respondents suggested that the government should integrate social sites and other information data sources to promote tourism in its planning and policies, Fig. 9.15. Above figures make us conclude that social site is growing in popularity in Nepal, and the government should see these digital applications as an important part of their planning and policy making.

Social sites have become important for people around the world to share their feelings, experiences, knowledge, news, and other related information. The investigation into this component of the study revealed that 63% of the respondents shared their good and bad experiences of their journey, while 37% did not do so as shown in Fig. 9.16. Further, 100% of the respondents of the study agreed that reviews and information on the website do create an impact on the tourism industry (Fig. 9.17). This states that digital technologies have become an important part of the business, and users' feedbacks, information content, news and other such source of information should be considered and analyzed regularly.

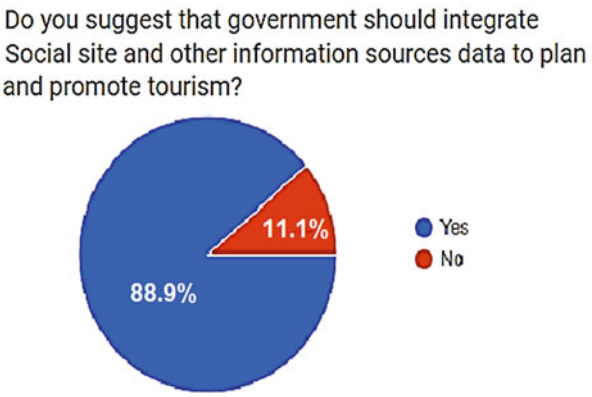

Fig. 9.15 Representation of respondents views regarding integration of social network sites in tourism of Nepal

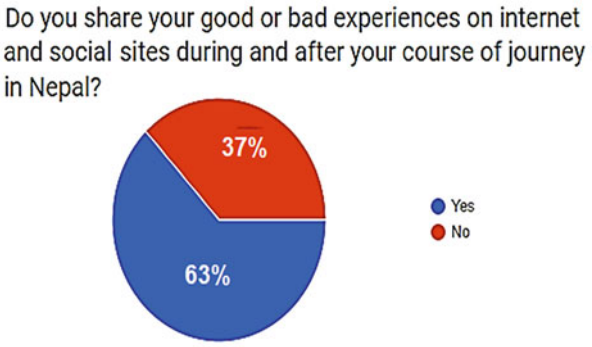

Fig. 9.16 Representation of social sites usage in sharing experience

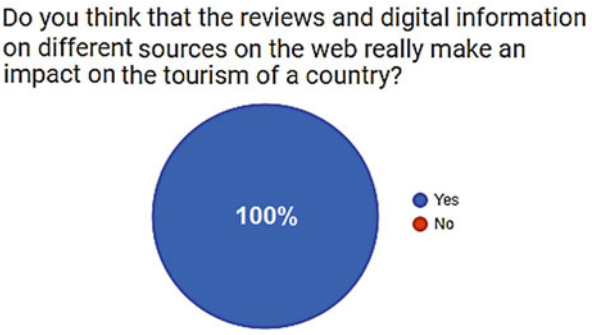

Fig. 9.17 Representation of respondents views regarding information on website

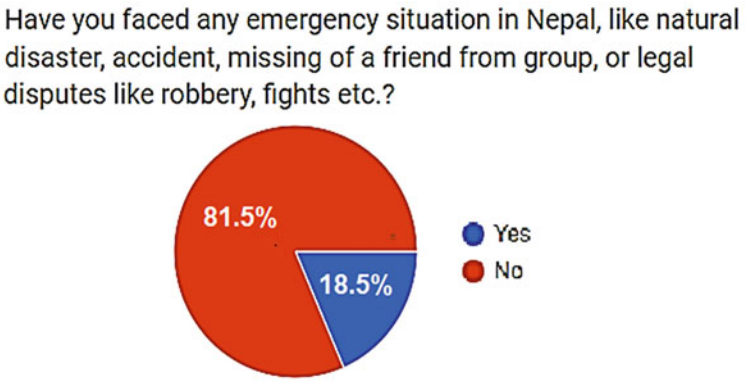

Fig. 9.18 Representation of respondents facing emergency situation in Nepal

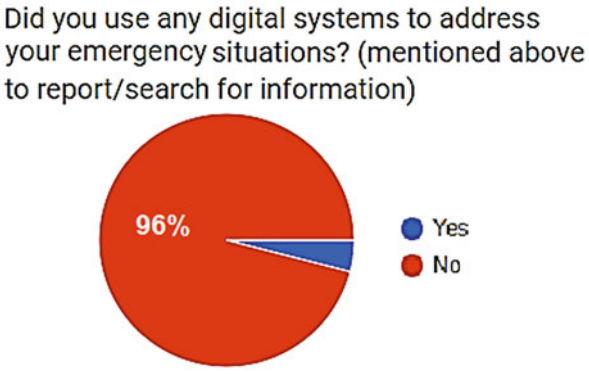

Fig. 9.19 Representation of respondents using digital systems during emergency

The study further analyzed the role of digital technologies in emergency situations in Nepal like natural disasters, legal disputes, accidents, etc. The data regarding this component in Fig. 9.18 show that only 18.5% of the respondents faced such situations in Nepal and only 4% (Fig. 9.19) out of them used digital systems for help. The main case that was reported was of friends missing during a trek and during an earthquake. Facebook was used to trace and rescue them back.

When the respondents were inquired about why they did not use any digital systems for assistance during such extreme situations? 27.3% said they had no idea if such systems existed, 27.3% felt they are not available, 36.5% did not face any such situation, 9.1% got local people assistance, 4.5% felt that mobile and telephones were better, and 4.5% felt it was more time consuming as shown in Fig. 9.20. Some questions were open, so there were different ways of answering that led to ultimately number of options depicted later in the table.

Nepal is known best for its mountains and the highest peaks in the world. It serves as a favorite destination for trekking, which can be fun as well as challenging

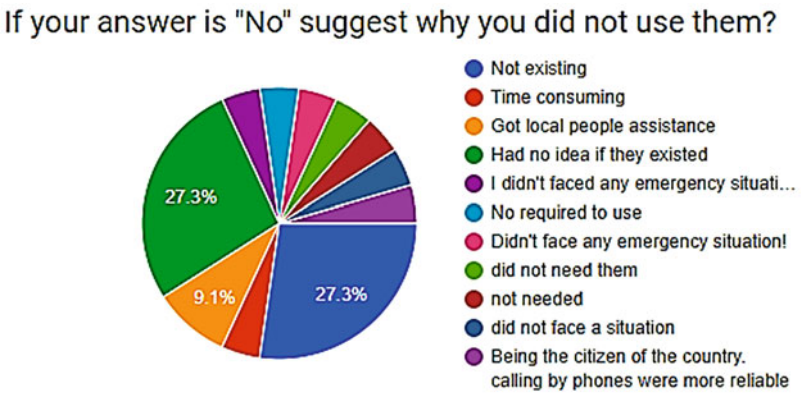

Fig. 9.20 Representation of respondents views on the use of digital system during emergency

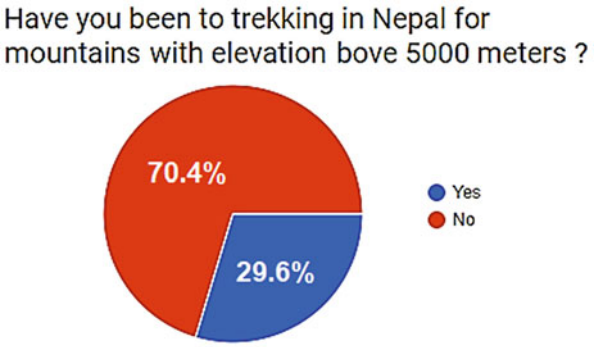

Fig. 9.21 Representation of respondents on trekking to mountains above 5000 m

due to its difficult structure. ICT technologies can serve as a boon for these kinds of destinations in many ways by providing the facility of navigation, information on climate change, and other related aspects. To find out this aspect of digital systems, respondents were asked if they have been on trekking and how ICT systems and technologies helped them? It was seen that around 29.6% (Fig. 9.21) of the respondents had been on trekking and 85.7% out of them did not find any assistance on their way. Only 14.3% out of the number agreed that they had found some sort of assistance as shown in Fig. 9.22 below.

The role of ICT and digital systems in providing security to the tourist was answered positively by the respondents. 81.5% agreed that these systems are important and can provide safety and assistance during travel to the tourist, while 18.5% were not sure as shown in Fig. 9.23. The tourist respondents were positive to see the development in the field of ICT and digital systems with 44.4% believed that it is improving and 14.8% believed that the technology is available, but the quality of service poor. 25.9% felt that it is way behind in comparison to the current

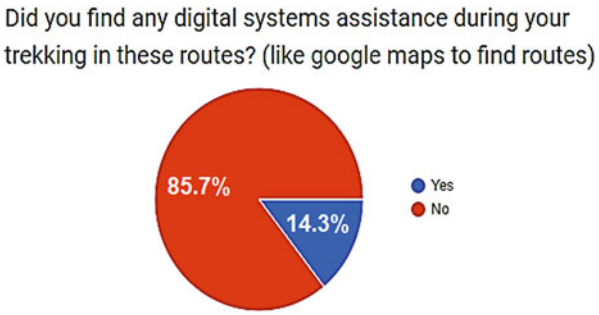

Fig. 9.22 Representation of respondents views on the use of digital system during trekking

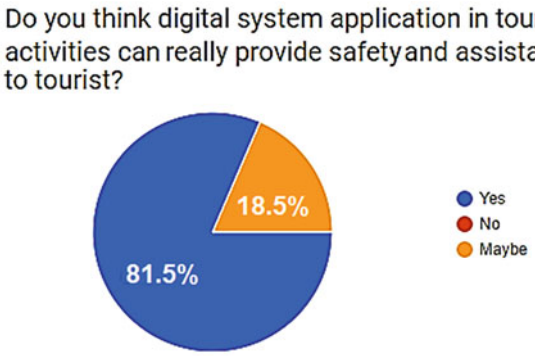

Fig. 9.23 Representation of views on the role of digital systems for safety assistance

developments in ICT around the globe, while 14.8% felt that the technology is not uniformly implemented and is available in fragments making the quality of service appears poor as shown in Fig. 9.24.

There are many different kinds of ICT and digital systems seen in existence around the globe today that help and manage tourism activities. The tourist respondents were inquired about what kind of digital system would they prioritize in Nepal based on their priority on a scale of 1 (low) to 5 (high) for some mentioned systems. It was discovered that Language Translator Systems was the first choice with 48.5%, Destination Information Systems as second with 46.7%, and followed by Domestic Travel Management Systems as third choice with 45.7% rating as the highest priority as shown in Fig. 9.25.

The respondents were asked to write free opinions to the two open questions that included "What are the obstacles and lapses that you see in the Tourism Industry of Nepal in context to ICT and digital systems?" and "What suggestion would you give to Government of Nepal, regarding digital implementation in Tourism?" The analyzed text with similar context and meaning was grouped under one theme and then converted into meaningful statements to make an understanding of the obstacles, lapses, and suggestions put forward by respondents in context to ICT and

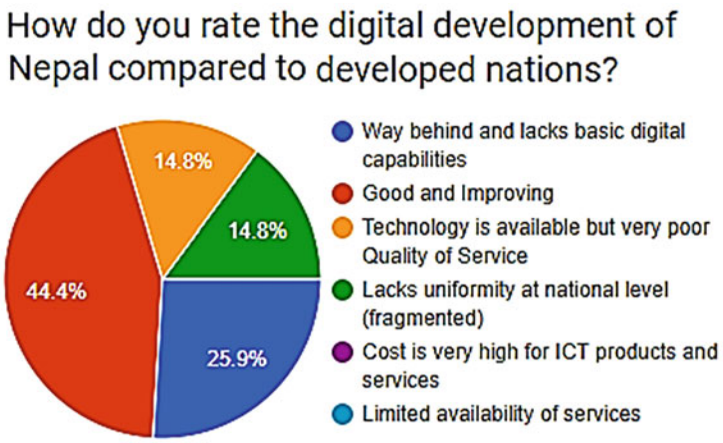

Fig. 9.24 Representation of respondents views on the development of digital systems in Nepal

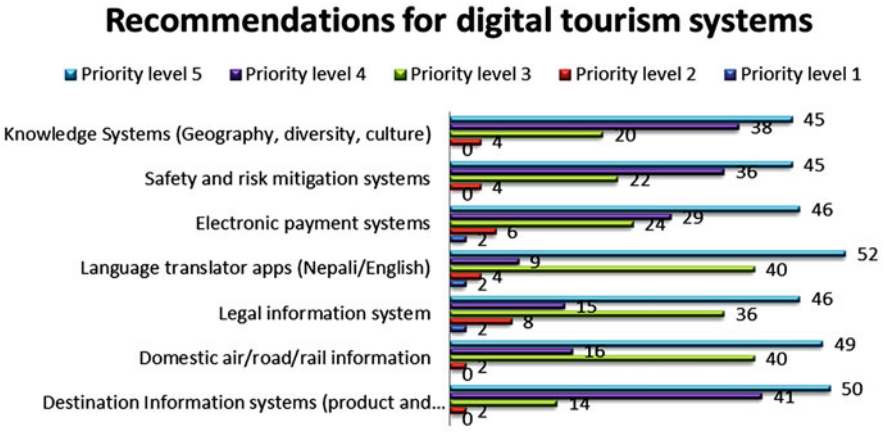

Fig. 9.25 Representation of respondents' recommendations for digital tourism systems in priority

digital implementations in the tourism industry of Nepal as shown in Tables 9.1 and 9.2. Altogether 21 obstacles and lapses were identified and 12 suggestions from the open questions answered by the respondents.

9.5 Conclusion

The study represented interesting facts and figures about the role of ICT tools and technologies in Nepal. The data of the respondents supported the growth and depicted the exponential increase of use of ICT technologies in Nepal as per Fig. 9.1

Table 9.1 Data representing themes for obstacles and lapses in ICT and Tourism

S.n	Keywords and themes (obstacles and lapses)	Frequency
1	Lack of digital payment systems	102
2	ICT education and awareness	96
3	Poor Internet connectivity in remote areas	93
4	Issues in information reliability, availability, and authenticity on food, health, and hygiene	92
5	Poor quality of ICT service	86
6	Less and not updated information on natural disasters, accidents, and risk	84
7	Digital divide and lack of education in rural and remote areas	81
8	Government agencies lack digital implementations	77
9	Lack of updated technology with global developments for digital implementation	76
10	Information update and information availability is poor for tourism destinations	71
11	No proper tourism applications for Nepal tourism are available	67
12	Lack of basic infrastructure	67
13	Lack of policies at the national level for development and implementation of ICT systems	66
14	The scattered and fragmented system in existence	61
15	Poor website, website should be interactive allowing real opinions	59
16	Fast Internet connectivity, better quality, uninterrupted digital services	54
17	Lack of support in technology (untrained men to troubleshoot problems in remote areas)	54
18	Technology and difficult terrain do not meet tourism needs	53
19	Lack of integrated approach for digital systems in tourism	46
20	Poor quality of apps available	43
21	Lack of availability and promotion of digital systems	34

Table 9.2 Data representing suggestions for ICT and Tourism Industry of Nepal

S.n	Keywords and themes (suggestions)	Frequency
1	Introduce e-commerce	97
2	Improve the infrastructure of ICT systems and services	91
3	Make Internet services accessible to remote areas and high altitudes	87
4	Integrate ICT as a component of tourism	83
5	Introduce simple but useful apps like language translators, shopping for food, travel, etc.	79
6	Update website with authentic and real information	77
7	Make websites dynamic with user personalize pages	74
8	Educate people in remote and rural areas about ICT use and applications	67
9	Provide enough information on health hygiene and food	76
10	Develop mobile-based apps for tourism navigation and information	71
11	Develop policies at the national level for compulsory use of ICT in tourism	67
12	Make better plans and approaches for digital marketing and reach	67
13	Government offices of tourism must use digital technology as their priority	66
14	Introduce risk mitigation and management systems	61
15	Make people aware of digital technologies and their use in tourism	59
16	Identify the national and global needs in digital tourism and develop plans	54

and online data statistics from the stat counter. This clearly shows that the demand is growing for digital systems, and people are slowly adopting ICT in their lives. The survey of inbound tourist also represented positive indication of ICT tool and digital technologies in use with 25.2% and 7.4% using Internet directly to look destinations; 61.5% used Internet and websites to gather information on Nepal; 33.5% and 22.2% used emails and social sites to communicate with their relatives and friends. The use of social sites in Nepal was also prominent. It was seen that almost all 88.9% of the respondents used some kind of social application in Nepal with Facebook being the most popular 50% followed by Instagram 23% and similarly other applications. This data projected an important aspect that future businesses including tourism must concentrate on social apps to promote, plan, and manage the business.

The implementations of digital technologies in remote areas, high altitude, and in emergency situations were not witnessed by the respondents. There were issues of Internet connectivity at remote locations combined with the quality of service. The support and awareness level in ICT was also seen at marginal state in the remote and rural areas. The respondents were interested in seeing digital implementation in travel arrangements (combining scale 4 and 5) 66%, language assistance 58%, destinations management 74.6%, safety and risk mitigations systems 70.3%, and knowledge management systems 73.7% as the most prioritized systems. The response regarding the role of ICT and digital systems was low, but, still, the respondents were hopeful as 59.2% said that it is improving and available.

The most frequent problems and suggestions were provided in the area of the digital payment system, ICT education and awareness, quality of service, and high accessibility. Respondents were of the view that the Government of Nepal should integrate ICT as a major and vital component in tourism to increase tourism services with better delivery models. Overall the study clearly highlighted that ICT and digital system have started to appear in different areas of tourism industry of Nepal and the future needs an integrated system design that should take care of existing technology, meet the global demands, and enforce plans and policies at a national level to fully harness the benefits of ICT.

References

1. Roztocki, N., Soja, P., Weistroffer, H.R.: The role of information and communication technologies in socio-economic development: towards a multi-dimensional framework. Inf. Technol. Dev. **25**(2), 171–183 (2019). https://doi.org/10.1080/02681102.2019.1596654
2. Sigalat-Signes, E., Palomares, R., Roig-Merino, B., García-Adán, I.: Transition towards a tourist innovation model: the smart tourism destination: reality or territorial marketing? J. Innov. Knowl. (2019). ISSN 2444-569X. https://doi.org/10.1016/j.jik.2019.06.002. http://www.sciencedirect.com/science/article/pii/S2444569X1930040X)
3. Cao, L., Navare, J., Jin, Z.: Business model innovation: how the international retailers rebuild their core business logic in a new host country. Int. Bus. Rev., 27(3), 2018, 543–562. ISSN 0969-5931, https://doi.org/10.1016/j.ibusrev.2017.10.005. http://www.sciencedirect.com/science/article/pii/S0969593117307692

4. Sastry, G.V.R., Sushil: Tourism industry depends on the technological integration: a study of product integration enhanced performance with banking and insurance products. J. Tour. Hosp. **7**, 373 (2018). https://doi.org/10.4172/2167-0269.1000373
5. United Nation Conference on Trade and Development Digital Economy Report 2019. UNCTAD United Nations, 4 Sept 2019, UNCTAD/DER/2019, ISBN 978-92-1-112955-7, eISBN 978-92-1-004216-1. Print ISSN 2664-2255, eISSN 2664-2263
6. Government of Nepal Ministry of Communicationand Information Technology (2018). Digital Framework Nepal, Unlocking Nepal's Growth Potential. https://mocit.gov.np/application/resources/admin/uploads/source/EConsultation/Final
7. Shrestha, D., Jeong, S.R.: An ICT framework for tourism industry of Nepal: prospect and challenges. J. Internet Comput. Serv. **17**(6), 113–122 (2016). https://doi.org/10.7472/jksii.2016.17.6.113.
%20Book.pdf
8. Hall, C.M., Jenkins, J.M.: Tourism and public policy. Cengage learning EMEA (2003). ISBN 1861529988, 9781861529985, Length 116 pages. UR – https://books.google.com.sg/books?id=hGDlFsD058sC
9. Alhowaish, A.K.: Is tourism development a sustainable economic growth strategy in the long run? Evidence from GCC countries. Published: 28 June 2016. Sustainability 2016, 8, 605. https://doi.org/10.3390/su8070605
10. Tsai, H., Song, H., Wong, K.K.F.: Tourism and hotel competitiveness research. J. Travel Tour. Mark. **26**(5–6), 522–546 (2009). https://doi.org/10.1080/10548400903163079
11. World Travel and Tourism Council: Travel and tourism impact 2019 world. World travel and tourism council. The Harlequin building, 65 Southwark street, London SE1 0HR (2019). www.wttc.org
12. Nepal Telecom: MIS annual reports, 2010 to 2019. Published by Nepal Telecom. https://www.ntc.net.np/pages/view/annual-reports
13. Hootsuite & We Are Social: Digital 2019 global digital overview, all the data, and trends you need to understand the Internet, social media, mobile, ecommerce behaviours in Nepal. Retrieved from https://datareportal.com/reports/digital-2019-global-digital-overview. Copyright Kepios Pte. Ltd. (2019)
14. Gretzel, U., Sigala, M., Xiang, Z., et al.: Electron markets, vol. 25, p. 179. Springer, Berlin/Heidelberg. July 2015 (2015). Print ISSN 1019-6781. https://doi.org/10.1007/s12525-015-0196-8
15. Nepal, S., Baral, N.: Cultural perspective of tourism in Nepal. Bachelor's thesis degree programme in tourism, Laurea University of Applied Sciences Kerava (2016). https://www.theseus.fi/bitstream/handle/10024/106611/FINAL-THESIS-On-cultural-perspectiveis-of-tourism-in-nepal.pdf?sequence=1&isAllowed=y
16. Ghimire, A.R.: Information, communication and social networks: the innovative role of telecenters in rural Nepal. Ph.D. thesis. UWS. Jan 2012. https://researchdirect.westernsydney.edu.au/islandora/object/uws:11730/datastream/PDF/view
17. Thapa, D., Sein, M.K.: ICT, social capital and development: the case of a mountain region in Nepal (2010). GlobDev 2010. 1. https://aisel.aisnet.org/globdev2010/1