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Design and implementation of tour guide portal for enhancing tourism in Tanzania

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**DESIGN AND IMPLEMENTATION OF TOUR GUIDE PORTAL FOR
ENHANCING TOURISM IN TANZANIA**

Deogratias Shidende

**A Dissertation Submitted in Partial Fulfilment of the Requirements for the Degree of
Master's in Information and Communication Science and Engineering of the
Nelson Mandela African Institution of Science and Technology**

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ABSTRACT

Tour guides contribute significantly to the enjoyment and satisfaction of tourist thereby promoting tourism worldwide. Unfortunately, in many developing countries, it has been problematic to locate a suitable tour guide for particular tourism or wildlife activities. Although in Tanzania, there are various efforts to ensuring tour guides are professional; however, there is no baseline information about tour guides that can help plan and promote tourism through a tour guide. Moreover, the registration process for tour guides are unnecessarily cyclical, costly and time-consuming. This study, therefore, seeks to design and implement a Tour Guide Portal that will facilitate access to tour guide information for the promotion of the tourism sector in Tanzania.

The study employed qualitative and quantitative methods and has found that User Generated Contents through learning library, discussion forums and reviewing and rating tour guides, can enhance the tour guide profession. In this work, we used agile methodology through extreme programming to develop a tour guide portal. Further, we used real participants to execute task scenarios in combination with think-aloud protocol and system usability scale to evaluate the usability of tour guide portal. This evaluation has found that the tour guide portal is usable and suitable for tour guide management in Tanzania. Additionally, this study employed a lean canvas to create a business model that will determine the operationalisation of tour guide portal in Tanzania.

The findings of this study imply that tour guide portal is a massive step towards promoting the tour guide profession in Tanzania. It will avail the tour guide statistics to the government, assist tourism stakeholders locating the right tour guide for a particular activity and consequently enhance tourism in Tanzania.

DECLARATION

I, **Deogratias Shidende**, do hereby declare to the Senate of Nelson Mandela African Institution of Science and Technology that this dissertation is my original work and that it has neither been submitted nor being concurrently submitted for degree award in any other institution.

.....

Signature

.....

Date

The above declaration is confirmed by:


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10.03.2020

Date

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CERTIFICATION

We, the undersigned certify that we have read and hereby recommends for acceptance by The Nelson Mandela African Institution of Science and Technology, a dissertation entitled, “Design and implementation of tour guide portal for enhancing tourism in Tanzania” in partial fulfilment of the requirements for award of the degree of “Master’s in Information and Communication Science and Engineering.”

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10.03.2020

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Date

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DEDICATION

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LIST OF ACRONYMS

ACRONYM	DEFINITION
CAWM	College of African Wildlife Management
ERD	Entity Relationship Diagram
GDP	Gross Domestic Product
HCI	Human-Computer Interaction
ICT	Information and Communication Technology
ISO	International Standard Organisation
KINAPA	Kilimanjaro National Park
MNRT	Ministry of Natural Resources and Tourism
PROTS	Professional Tour Guide School
SDLC	Software Development Life Cycles
SUS	System Usability Scale
TATO	Tanzania Association of Tour Operators
TCRA	Tanzania Communications Regulatory Authority
TG	Tour Guide
TGP	Tour Guide Portal
TTB	Tanzania Tourist Board
UCD	User-Centred Design
UGC	User-Generated Contents
UNWTO	United Nations World Tourism Organization
URT	United Republic of Tanzania
UVP	Unique Value Proposition
WFTGA	World Federation of Tour Guide Association
WTTC	World Trade and Tourism Council
XP	Extreme Programming

CHAPTER ONE

INTRODUCTION

1.1 Background of the Problem

Tourism is a service industry that comprises different components such as transport, hospitality, adventures, leisure, business and learning and other related services, including banking, insurance and security. The United Nations World Tourism Organization (UNWTO) defines Tourism as a set of activities by a person travelling and staying in places outside his typical environment not more than a year for leisure, business and other reasons not related to paid events in the site visited (Camilleri, 2018).

Tourism is among the sectors that grow very fast in Tanzania and on the globe. It contributes directly and indirectly to Gross Domestic Product (GDP), employment generation and foreign exchange earnings. According to the World Travel and Tourism Council (WTTC), tourism contributed about 10.4% of global GDP and generated about 9.9% of global employment in 2017 (WTTC, 2018b). Whereas in Tanzania for the same year, the sector contribution was about 9.0% of total GDP, 26% of overall foreign exchange earnings and 8.2% of total employment (WTTC, 2018a).

The evolvement of Information and Communication Technology (ICT) has created new approaches to the operation of tourism (Law *et al.*, 2014). ICT has been used to transform how tourism is conducted worldwide through information searching and sharing, purchasing decision and marketing. ICT has led to increasing of user-generated contents (UGC) such as blogs, social media, discussion forums and virtual communities. As a result, there are a massive increase in information sources, which has caused searching tools to become inevitable when tourists are planning for their safaris (Lu & Stepchenkova, 2015). Tourists use ICT to get reliable, accurate and relevant information through the internet, social media and online reviews (Law *et al.*, 2014; Toh *et al.*, 2011). In purchasing decision, ICT can empower the consumer to decide which airline to use, the hotel to book, the destination to visit, or which product to buy (Chiappa, 2013). Tourists also use UGC to share photos and information about the places they visited. On another side, the suppliers of tourism products use ICT to brand and promote their destination using social media,

websites and internets (Jeong *et al.*, 2012; Molinillo *et al.*, 2018). The shared UGC produced by tourists, tour guide, tour organisation, or strangers is intended to share experiences, knowledge and to educate other tourists or tour guides. In recent years, several websites have been developed to promote tour guide; however, they lack some features that would enhance the professionalism and competence of these guides.

Tour Guide (TG) is a person who guides tourist(s) using their language and interprets the cultural, natural, historical and contemporary heritage of an area, possesses the area-specific qualifications usually offered by a specific authority (WFTGA, 2012). Despite the vital role played by the tourism sector in sustainable development and alleviation of poverty, the tourism value chain has several gaps. For instance, the World Economic Forum (2017) reports that although Tanzania is 8th in natural resources and wildlife endowment globally; however, it ranks 91st in travel and tourism competitiveness index. Among the missing links in this value chain is the role played by tour guides. In fact, a tour guide's role is vital in the tourism sector. They are ambassadors of the nation in tourism (Holloway, 1981). They are the first to welcome and the last to bid a farewell to a tourist. They stay with tourists, point out the way to follow and leads on tour to a specific location (Cohen, 1985; Geva & Goldman, 1991). Furthermore, a tour guide can influence the tourist to revisit the nation by promoting the destination and recommending the duration of stay (Ap & Wong, 2001).

Recently, the Ministry of Natural Resources and Tourism (MNRT) of the United Republic of Tanzania (URT) and other tourism stakeholders have recognised the contribution of TGs in the tourism value chain. Each one, in different ways, has seen the importance of professionalism in the guiding profession and how it can raise the service quality, the TGs are offering in the tourism sector. For instance, in 2015, the ministry approved the TG regulation that elaborates on registration of TG, licensing procedures, code of conduct and operations of tour guiding. This regulation requires registered guides to continually develop their profession by attending guiding courses organised by recognised institutions. Furthermore, the regulations give power to Director of Tourism within the ministry to register and maintain the records of all TGs as well as deregister any TG who contravene the provisions of the Tourism Act (MNRT, 2015). Additionally, from 2016, Tanzania Tour Guide Awards started a system of recognising and rewarding the field service providers such as guides, chefs and porters who have been outstandingly professional to encourage

and foster professionalism among guides. In this event which runs annually, the guides themselves nominate the candidates who are voted by both members of various TG associations and other tourism stakeholders in Tanzania (Tanzania Tour Guides Awards, 2016).

1.2 Statement of the Problem

In spite of these efforts, the professionalism and standard of offered service by TGs are still questionable. For instance, the annual report of the association of tour operators indicated that tourists are not satisfied with the ability of elaboration and interpretation of things (Tanzania Association of Tour Operators, 2017). The report pointed out the complaints of unethical practices among guides such as reckless driving, wildlife feeding and misinterpretation of cultural activities. Such challenges have also been noted by Melubo (2017). Furthermore, there are many guides in Tanzania with a different attitude, skills and knowledge (Melubo & Buzinde, 2016). However, there is no baseline information about tour guide which can be used as a basis for planning and development of tourism in Tanzania. It was further mentioned that the Government of Tanzania plans to provide license for tour guides working in Tanzania (Robi, 2017).

Currently, there is no computerised system that handles tour guides data in Tanzania. As shown in Fig. 1, a TG has to visit all the entities in order to submit his/her information, be for registration or application of something. This process, however, is costly and consume a lot of time which still leads to duplication of data and inconsistent tour guiding information. With the current system, therefore, neither of the entity can claim to have complete tour guiding data.

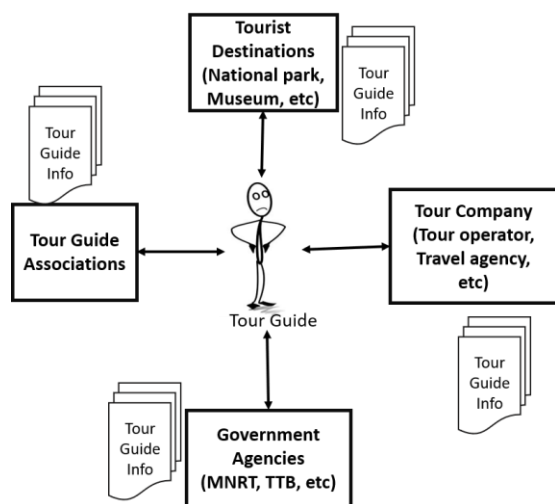


Figure 1: The Entity Storing Tour Guiding Information

In such situations, therefore, the need to have a tour guide portal that will integrate all tour guiding data in one place and disseminate this data to all tourism stakeholders and thus, facilitate identification, registration and licensing of tour guides across Tanzania, is apparent. Hence, this study aims at designing, developing and implementing a tour guide portal that will manage tour guides in Tanzania. The portal will offer tour guide registration, profile management, discussion forums, guide recommendations and training materials.

1.3 Rationale of the Study

Locating a proper TG for a particular activity is vital not only to tourists for luxurious activities and holidays but also to researchers and various people who need information and physical visits to wildlife, culture and safaris. Further, the tendency of anybody, provided knows the place, can be a TG is a common habit in many developing countries (Melubo & Buzinde, 2016). This habit dilutes the importance of professionalism in tour guiding profession and distorts the image of a tourist destination (Pereira, 2015). With absence of TG baseline information, the problem is magnified. This study therefore, wants to design and implement TGP to manage TG in Tanzania.

1.4 Research Objectives

1.4.1 General Objectives

The general objective of this research is to develop a user-friendly tour guide portal that will manage tour guides in Tanzania.

1.4.2 Specific Objectives

The specific objectives are:

- (i) To review tour guide practices in Tanzania and analyse the portal requirements.
- (ii) To develop Tour Guide Portal for managing tour guides in Tanzania.
- (iii) To evaluate the usability of the Tour Guide portal.

1.5 Research Questions

- (i) What are the current practices of tour guides in Tanzania?

- (ii) What are the requirements for the development of tour guide portal that will enhance tourism in Tanzania?
- (iii) How can a tour guide portal be designed and implemented to enhance tourism in Tanzania?
- (iv) Does the developed tour guide portal usable to its intended users?
- (v) What kind of business model can be developed to sustain the services offered by the tour guide portal?

1.6 Significance of the Study

- (i) This portal will be significantly useful to the MNRT, the tour guides and the customers of tour guides in Tanzania such as tour operators and tourists.
- (ii) It will facilitate the MNRT to quickly get the required statistics about TGs, which is necessary for planning and development of tourism in Tanzania.
- (iii) It will assist to manage the TGs and hence increase professionalism among TGs.
- (iv) It will serve as a common platform for TGs in Tanzania, which is a necessary environment for TG professional body.
- (v) Tourist destinations such as national parks will use the portal to identify and describe the competence of the TG.

1.7 Delineation of the Study

This study intends to design and implement a TGP that will assist in locating TG and creating a baseline information of TGs in Tanzania. Consequently, the portal will add value to tour guide profession and thereby enhance tourism in Tanzania. The research was conducted in Northern circuit of tourist destinations containing most attractive tourist destination in Tanzania such as Serengeti national park, Ngorongoro conservation area and Mt. Kilimanjaro national park.

The study has taken various security measures to secure vital information such as personal data, tour company records and tourist visits record against attackers. These measures include but not limited to authentication, encryption and protection against SQL injection. However, the evaluation of portal security vulnerabilities that ensure confidentiality of information, integrity of its processes and availability of the system has not been done.

CHAPTER TWO

LITERATURE REVIEW

2.1 Professionalism in Tour Guiding

Professionalism in tour guiding is essential and has brought attention to many researchers (Alani & Khan, 2017; Ap & Wong, 2001; Lai, 2014; Mak *et al.*, 2011; Prakash & Chowdhary, 2010; Weiler & Ham, 2002). Lai (2014) argued that professionalism affects service quality and tourist satisfaction. On top of that, Pereira (2015) adds that tourist satisfaction is intangible and depends on tourists' expectations and the personal judgment of the service. If his perception (judgment) exceeds what he expected, then he will be satisfied; otherwise, he will be dissatisfied. The professionalism of a TG as argued by Prakash and Chowdhary (2010) and Pereira (2015) can create or ruin the image of a destination, tour companies and the country. Hence, it is essential for employers of TGs such as tour operators, tourist destinations and travel agencies to make sure that their TGs are professional, motivated and receive enough training for higher tourist satisfaction.

Different authors propose different approaches to enhance and maintain professionalism among guides. Mak *et al.* (2011) suggest using standard methods of quality assurance such as accreditation, certification and licensing a TG who has acquired certain qualities. Both Ap and Wong (2001) and Weiler and Ham (2001) consider TG to have codes of conduct, an excellent licensing system and the carrier path that is clear and continuously developed. Whereas Black and Ham (2005) underpin the importance of ethics, tour guide associations, awards to the outstanding guides, licensing and professional certification in enhancing the TG's professionalism, Ap and Wong (2001) point out the right attitude toward work, excellent communication skills and proper product knowledge. Most of the enhancements proposed above can be found in Tanzania except licensing, which is in preparation as well as professional certification.

Depending on a country setting, the enhancement of professionalism is slightly different. Training can be through a conventional education system followed by licensing as is the case of many European countries such as Britain and France (Chowdhary & Prakash, 2008b) or specialised courses prepared for TG as in Tanzania. While in India, TGs are trained and licensed at local, state and regional level (Chowdhary & Prakash, 2008b), but in Taiwan, there is only certification

examination without training requirement (Lan, 2000). Furthermore, Tsegaw and Teressa (2017) argue that enforcement of regulations is essential in the enhancement of professionalism.

2.2 Tour Guide Portal (TGP)

In support of a licensing system, Chowdhary and Prakash (2008a) suggested the development of TGP in India as the means to recognise the licensed TGs. They further described the benefits of this portal such as enabling tourists to search and contact the TG; acting as the library for the dissemination of learning information and as marketing and promotion tool for TG's competencies, experiences and expertise. However, they didn't mention the feedback system through UGC within portal such as rating and reviewing of TGs by their customers.

A decade after Chowdhary and Prakash (2008a) proposed a TGP in India, many organisations such as tour guide associations, governments and private organisations have implemented TG portals for different reasons. Most of the vital organisation portals register and promote TG with the means of a UGC from customers through reviewing guides; however, they are not checking who is eligible and who is not. Any person claiming to be a TG can register in these portals. In some countries, tour guide associations or governments have developed portals that are registering their TGs and have means of validation before registration, for example, in Singapore, Israel and Austria. However, these portals were created in the settings of and for the TGs in a particular country. Table 1 summarises features of some of these TG portals.

Table 1: Features of Related Tour Guide Portals

Portal	Operates in	Features						
		Member Validation	TG Promotion	Search for TG	Discussion Forum	Learning Materials	TG's Rate and Review	License Application
www.visittanzania.co.tz	Tanzania		√					
www.toursbylocals.com	Global		√	√			√	
www.withlocals.com	Global		√	√			√	
tourguides.viator.com	Global		√	√			√	
Singapore Tour Guide Directory	Singapore	√	√	√				√
Israel Tour Guide Portal [www.israel-guides.net]	Israel	√	√					
Austrian Tour Guides Association [findaguide.at]	Austria	√	√	√				
Proposed Tanzania Tour Guide Portal	Tanzania	√	√	√	√	√	√	√

2.3 Usability Evaluation

The definition of usability according to ISO 9241-11 in HCI perspective is explained in terms of effectiveness, efficiency and satisfaction of users when attempting to achieve the specified objective in a specified environment (Bevan *et al.*, 2016). This definition reveals certain aspects of metrics that can be used to measure usability. For instance, the capability to complete a task is a measure of effectiveness, the time spent doing a task measures the efficiency, whereas the satisfaction connects the delightfulness, or generally the emotions of a user during task execution (Alshamari & Mayhew, 2008).

ISO 25010, which has replaced ISO 9126, include usability as the attribute of software quality. It defined usability as “*the degree to which a product used by specific users meets their needs to achieve specific goals with effectiveness, efficiency, safety and satisfaction in specific contexts of use*” (International Standardization Organization, 1998). Further, it describes usability through appropriateness recognizability, learnability, operability, user error protection, user interface aesthetics and accessibility (Hussain & Mkpojiogu, 2015).

Various researchers have categorised the usability evaluation methods into different classes. Petrie and Bevan (2009) grouped them into five categories include the automated approach of guidelines conformance, expert evaluations, models and simulations, evaluating with real users and analysing data from system usage such as logs. However, since expert or heuristic evaluations use guidelines and standards with models and simulations, the Petrie and Bevan (2009) methods can be narrowed into three groups namely heuristic evaluations, real user judgement and logs analysis. This argument is supported by Fernandez *et al.* (2011), who classified usability methods into only two groups, including empirical and inspection methods. According to Fernandez *et al.* (2011), empirical methods involve real users performing tasks along with analysing data captured either through ordinary recording or logs whereas inspection methods are experts evaluating the usability according to guidelines.

According to Nielsen (1992) and Wilson (2014), heuristic or expert evaluation is the inspection method that involves experts who evaluate the user interface to identify potential usability problems based on predefined principles or heuristics. This method is generally used with iterative development approach to discover usability problems earlier in the development phase than later

and hence avoid subsequent costs of rectifying the usability problems (Allen *et al.*, 2006; Wilson, 2014). Allen *et al.* (2006) simplified the Nielsen and Molich (1990)'s heuristics to make them suitable for evaluating paper-based web pages for testing the usability of online medical information whereas Verkijika and De Wet (2018) used heuristic method to assess the usability of e-government websites from countries in Sub-Sahara Africa. Though the heuristic method has been successful in many evaluations, however, it has some weaknesses (Essawy, 2005). Oppermann and Reiterer (1997) argued that inspection method depends entirely on the ability of the expert and might be subjective, along with Lin *et al.* (1997) explained that the guidelines might be translated differently by other evaluators and they consist of many items that can be harder for designers to abide by them.

Besides heuristic evaluation, another popular method is empirical methods or task scenarios. In this method, a real user executes a set of task scenarios at a natural environment and an observer records specific metrics of interests that are used to evaluate the usability of the system (Alshamari & Mayhew, 2008; Fernandez *et al.*, 2011). Although Nielsen (2000) argued that the task scenario method could discover 85% of usability problems with only five real users, many researchers counteract this argument (Alshamari & Mayhew, 2008; Spool & Schroeder, 2001; Woolrych & Cockton, 2001). For instance, Alshamari and Mayhew (2008) found that the five user magic number is not always working, rather the nature of tasks and how you conduct the usability test can affect the results. Furthermore, Guay *et al.* (2019) used a task scenario with real users to discover usability issues with university library website. They employed questionnaires at different stages of usability testing such as pre-testing, task scenario and post-testing. Nevertheless, Fernandez *et al.* (2011) argued that task scenario are typically performed at the last phases of SDLC, hence expensive to rectify usability problem when discovered, whereas Oppermann and Reiterer (1997) argued that it is difficult to access the thought of participant during task executions such that an observer cannot understand why a participant fail or succeed to execute.

Many authors employ more than one method to diagnose and solve usability problems (Oppermann & Reiterer, 1997). This argument is supported by Finstad (2010) who noted that while System Usability Scale (SUS) is useful in deciding whether the system is usable or not, it cannot detect the usability defects and hence it must be combined with other methods that would identify problems in the usability of a product. For instance, Essawy (2005) combined task scenario and

think-aloud protocol to discover the usability problems of hotel websites. He employed a think-aloud protocol to retrieve the participants' thoughts. ChanLin and Hung (2016) evaluated the usability of a library website by using structured task scenarios through structured combined with interviews to understand user reactions. Lastly, Zhang *et al.* (2009) combined task scenario and SUS methods to evaluate the usability of three digital libraries ACM, IEEE computer society and IEEE Xplore. Therefore, it is not uncommon for usability researchers to combine several methods to evaluate the usability of a system.

This study, therefore, elaborates the current practices of TGs in Tanzania and how the development of TG portal can help to enhance the professionalism of TGs and thus promote tourism in Tanzania. It then evaluates the usability of TGP by employing composite methods of task scenarios, think-aloud protocol, SUS and interview. These techniques are vital in diagnosing usability problems and fixing them.

CHAPTER THREE

MATERIALS AND METHODS

3.1 Research Strategy

3.1.1 Study Area

The geographic area of this study is the northern tourism circuit of Tanzania presented in Fig. 2. It is the most famous circuit in Tanzania with popular tourist attractions such as Serengeti National Park, Mount Kilimanjaro National Parks and Ngorongoro Conservation Area. It attracts about 80% of international visitors visiting Tanzania (Bayliss *et al.*, 2014; Hunt & Gorenflo, 2018).



Figure 2: Map of Tanzania with Tourist Destinations (Lonely Planet, 2019)

3.1.2 Target Population and Sample Size

The target population was mainly tour guides in the northern circuit of tourism in Tanzania. Other tourism stakeholders were included to broaden our understanding and get more information about the current tour guide practices.

A total of 146 respondents responded to questionnaires, 84 of them were tour guides and 62 were tourists. The sample size of tour guides was determined by using Cochran's formula (Appendix 3) that use confidence level, precision (marginal error) and proportion distribution to calculate sample size (Cochran, 1977; Israel, 1992). With a tour guide population of 5000 (approximated during the interview), confidence level 90% and marginal error $\pm 9\%$, the minimum sample size is 82. The survey was prepared and distributed using google forms and data were imported and analysed using the python panda package and Microsoft excel.

3.2 Data Collection Methods

In the collection of primary and secondary data, both qualitative and quantitative methods were employed between January to April 2019. The quantitative method was survey (Appendices 1 and 2), while document review and semi-structured interviews were qualitative approaches.

The questionnaires were distributed to tour guides and tourists to find out the current practices of guides in Tanzania and to understand the requirement of the portal in the perspectives of both tour guides and tourists. The questionnaire contained both open and closed-ended questions divided into three sections, namely demographic information, tour guiding profession, tour guiding portal and other general information. All items in the survey were independent variables. The dependent variables evaluated were whether the portal can be an essential tool for managing tour guides in Tanzania and whether this tool can help in increasing professionalism among tour guides and hence enhance tourism in Tanzania. Furthermore, the questionnaires targeted to collect requirements of tour guide portal.

The semi-structured interview was employed during data collection to get more insights into the current practices of TGs in Tanzania. The interviewing of both TGs and tourists was performed at Ngorongoro gate and inside Serengeti national park at the resting area. The interviewees were randomly selected after they finish answering the questionnaire. Whereas we interviewed instructors at their respective college premises, one instructor was from College of African Wildlife Management (CAWM), Mweka, Kilimanjaro, and another was from Professional Tour Guide School (PROTS), Arusha. The wildlife college at Mweka is government-owned and among the leading colleges of tour guiding in Tanzania (Wineaster, 2015) while PROTS is a private institution with experience in tour guiding and leadership training (PROTS, 2011). Two questions

asked were; what are your opinion regarding the practices and professionalism of tour guides in Tanzania? Can we enhance tour guide professionalism by developing a TG portal?

Additionally, the document review was performed to understand the legal standing of TG registration and licensing in Tanzania and therefore, to get system requirements of the portal. The document reviewed were Tanzania Tourism Policy of 1999, The Tanzania Tourism Act of 2008 and Tourism (Tour Guiding) Regulation of 2015.

3.3 Data Analysis

The analysis of data was twofold; first, data were analysed to know the current practices of tour guides in Tanzania and, second, to unveil the user requirements for designing and implementing a tour guide portal. We used the Pandas package in python software and Microsoft Excel to analyse the data. Further, the process of analysing the requirements was iterative according to extreme programming in Agile software development approach.

3.4 System Development Approach

We used the eXtreme Programming (XP) in agile methodology during all stages of designing and development of TGP. All agile methods embrace customer involvement, response to change and incremental development (Pham & Pham, 2016). With Agile, it is easy to keep track of both schedule and budget because it breaks down the work into small and manageable iterations. This Software Development Life Cycle (SDLC) is different from many other traditional SDLC such as waterfall model which are rigid to changes and does not involve customer except during requirement gathering and system deployment.

While the majority of traditional SDLC employ use cases to represent software requirements, Agile uses user stories (Ecar *et al.*, 2018). According to Cohn (2004), user stories are a short description of software functionality written in the high-level language of the customer. The popular agile methods are XP, Scrum and Kanban (Wińska & Dąbrowski, 2020).

Extreme Programming (XP) is a lightweight software development method based on the agile methodology for any team size that adapts to all types of requirements, including stable and rapidly changing ones. This type of agile methodology is based on five values, namely, communication, simplicity, courage, feedback and respect (Beck & Andres, 2005). Furthermore, XP teams, guided

by XP values, are doing day-to-day practices that depend on the situation of the team and the nature of the software. The practices are coding standard, the whole team, planning game, customer tests, small releases, system metaphor, pair programming, continuous integration, refactoring and simple design.

Additionally, XP practices can be viewed in their SDLC. An SDLC is a framework that defines the phases used in developing software. These phases for XP are exploration, planning, iteration to release and production phase. Figure 3 illustrates these phases.

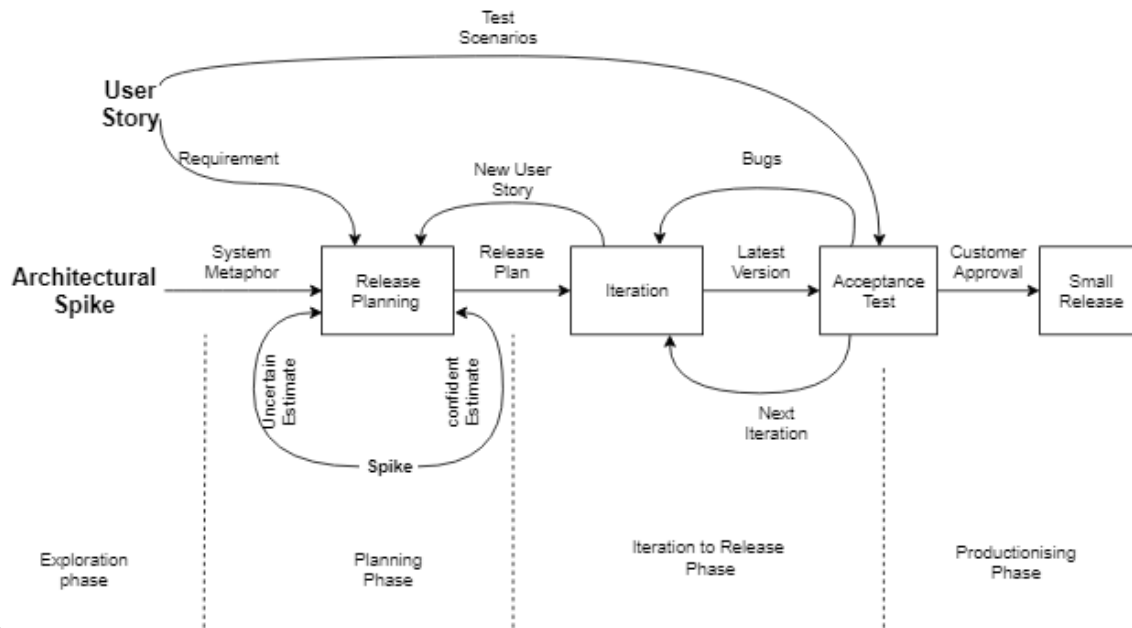


Figure 3: XP Life Cycle (Beck & Andres, 2005; Wells & Buckley, 2001)

3.4.1 Exploration Phase

Exploration is the first phase in the XP life cycle. It involves a collection of initial user stories and development of architectural spike. The user stories that are too large for an iteration, or whose library/third-party tools are not understood and hence cannot be estimated are called architectural spike or merely a spike. The initial user stories and architectural spike must be enough to complete a small release. We collected the initial user stories directly from the user through interviews and questionnaires and by observing other similar applications and reviewing the documents. Finally, we wrote the user stories by following the template obtained by combining Ecar *et al.* (2018, p. 9) and Cohn (2004) templates and get the following:

“As a <who/role>, I want to <what>, linked to <connections>; so that <reason> so/then <feedback>.”

Where who/role = user performing a functionality,

What = is the functionality of the portal

Connections = the other linked entities to that functionality

Reason = user’s reason for this functionality

Feedback = the feedback from the system

3.4.2 Planning Phase

During this phase of the life cycle, the project team, including customer and developers, meet and plan the various small releases. After initial user stories, customers identify the software features they want, programmers explore the required technology and make estimates. Lastly, both customer and developers prioritise the user stories and schedule the release plan (Wake, 2002). Appendix 5 illustrates the form the researcher used to organise the release plan. The iteration number was assigned according to user story priority and how it fits in the release plan.

3.4.3 Iteration to Release Phase

This is a construction phase of XP SDLC. During this phase, the development of models, various designs, coding, testing and integration occur. The small releases are integrated into a more significant software release. Figure 4 illustrates the interaction of XP practices from morning to evening, starting with a short meeting and finishes with a small release. This is a typical routine for XP software development.

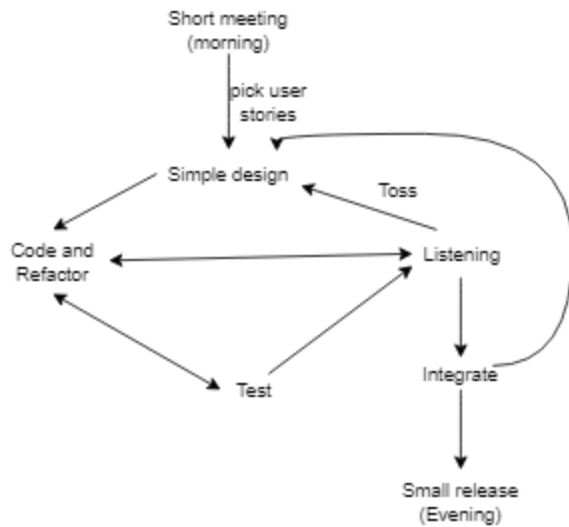


Figure 4: Daily XP Practice Interaction

(i) Short Meeting

The short meeting or daily stand-up meeting is done daily and are very short. The aim of these meetings is the whole team to communicate problems, talk about solutions and promote team spirit. Developers will typically report on yesterday achievements, the expected release of the day and if there is any delay (Wake, 2002). We were doing this meeting physically in most weekends; otherwise, we used WhatsApp group chat or zoom-online meeting to discuss the problems, daily plans and any problems that can cause delays.

(ii) Simple Design

At this stage, customer and designers design system interfaces and workflow by using a prototyping approach. Designer picks a group of user stories, creates an interface and presents it to the customer, who in return gives his/her comments for improvement. These design iterations are typically executed in three levels of fidelities, namely low fidelity paper prototyping, low fidelity wireframing and high-fidelity prototype. These three levels of design, not only involved the user but also resolved many usability problems earlier in the design stage.

Low Fidelity Paper Prototyping: At the lowest level, we used pen and paper to draw the design of a portal and discuss it with stakeholders. Customers would provide some comments that made the designer understand and improve the design. The low fidelity pens and paper can help the designer and customers to interact earlier during the formative stage (Snyder, 2003). Further, using

paper is fast and cost-effective as you delete and fix both design errors and usability issues before the real implementation. (Allen *et al.*, 2006; Tiong *et al.*, 2018). Figure 5 presents the pen and paper of the interface layout design for the home and other pages of TGP.

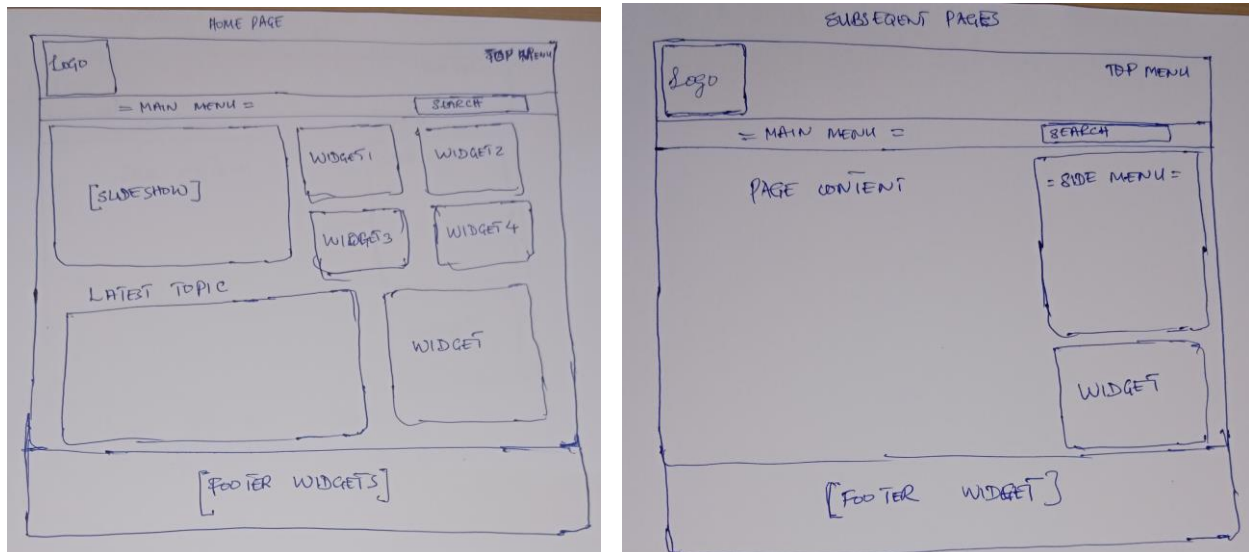


Figure 5: TGP Pen and Paper Interface Design

Low Fidelity Wireframe Prototyping: After understanding the structure and flow from paper prototyping, the next level was low-fidelity wireframing. In this User-Centred Design (UCD), the inexpensive wireframing was used to communicate the basic ideas of portal design (Silva *et al.*, 2017). In this stage, users got a chance of seeing the flow, structure and functionalities. Users interacted lively with the system by clicking and observing what happens. We used pencil software to design and implement the wireframe. The pencil is a free and open-source wireframing tool. It allows a user to develop the wireframe by drag and drop different components of the system such as label, text field, command button and tables without coding.

Further, it is easy to share the design with customers by exporting it as a webpage. The customer then can give feedback for the designer to improve it. In designing the TGP, we shared the wireframe to five guides, four tourists and four tour operators. These customers tested the portal and gave their comments which were incorporated to the wireframe and send it back to them. Finally, the customer agreed to our design and thus, we moved to the next stage. Figures 6 and 7 present the final interface design of the TGP home page and the internal page designed during low fidelity wireframe prototyping.

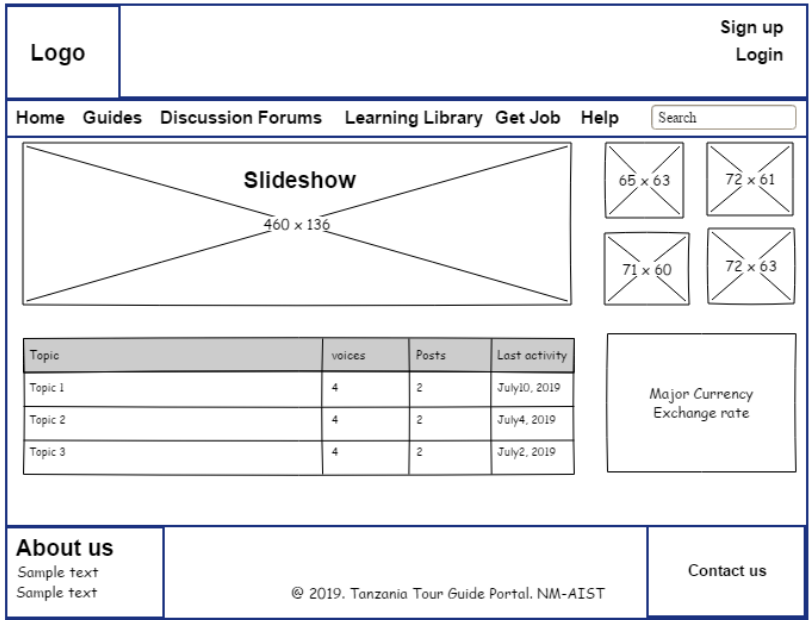


Figure 6: Wireframe Prototype for Home Page

Figure 7 is an example of internal pages that are displayed when opened. For instance, when the user clicks Get Job menu-item, the TGP would open a page shown in Fig. 7.

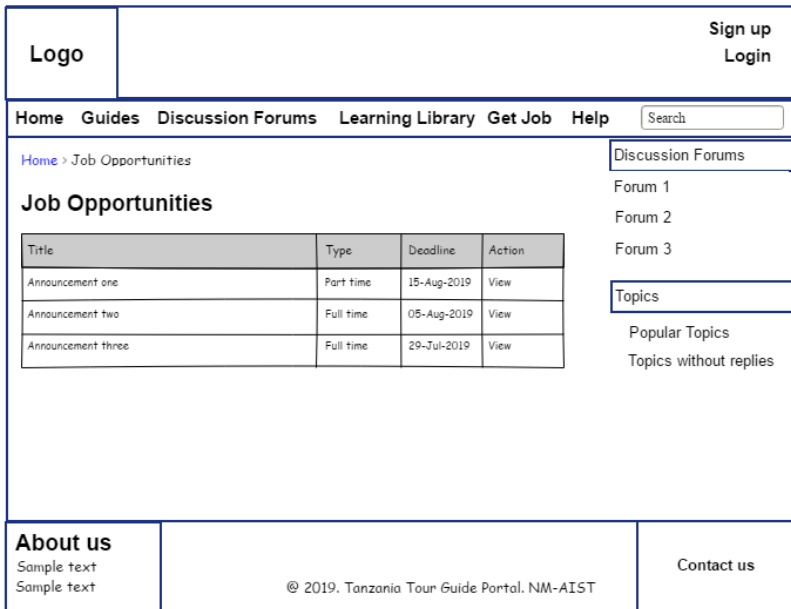


Figure 7: Wireframe Prototype for Job Opportunities

High Fidelity Prototype: The high-fidelity prototype, also known as mockup is very closer to real development. It interprets the design of a product to a user with higher accuracy. It allows the user not only click the button but also sees the changes in colour and contents (Nelson *et al.*, 2016). It is a final simulation of a product to be developed. It gives the user the real feeling of the system. This approach is very cost-effective as it presents to user near-final product and accommodates user’s modifications with very little to no costs (Camburn *et al.*, 2017). In implementing the mockup, we used the free version of Justinmind software. With Justinmind, you can easily create the mockup by dragging and dropping and then run the simulation. The simulation can be shared with the user. We shared the simulation with the same customers from the previous stage, who again gave their comments. We implemented the comments and after an agreement, we proceeded to real development. Figure 8 presents the TGP mockup showing the dropdown menu with active menu highlighted.

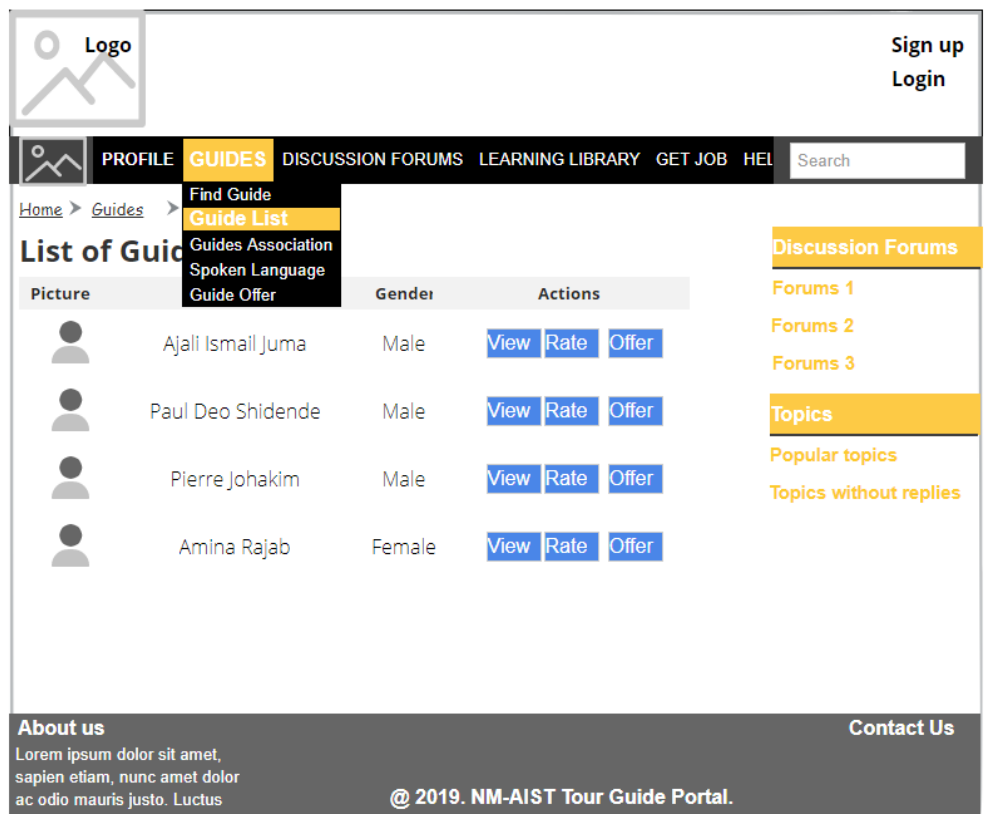


Figure 8: Dropdown and Active Menu in TGP Mockup

(iii) Coding and Refactoring

Coding is a core and collective activity in XP and it is a measure of the development progress. Every team member reviews the code and anyone able to code can add functionality, fix system bugs and refactor. Refactoring is the process of cleaning, simplifying the code design without compromising its functionality. This process saves time and improves quality, usability and promote simple design (Beck & Andres, 2005). With the environment we had during the development of TGP, we set up the repository for users to review the progress and used standardised naming scheme for others to understand what is going on.

(iv) Testing

Unlike other traditional software development models, in Agile methodology, testing is not part of development phases, but rather, it is an activity performed frequently in small chunks of software deliverables. Thus, customers test the system earlier during the development and their comments are incorporated to improve the application. The testing tasks include clarification of user stories, ensuring acceptance tests conform with software specification, assisting the team in test automation and participates in producing the testable code (Crispin & House, 2003).

(v) Listening

Listening is the part of the lifecycle in which customer or project manager continuously give feedback to developers. This feedback helps the team to improve the system continually or pass the acceptance tests. Thus, customer assessment can trigger the new design and make the cycle (design-code-test-listen) repeats. During TGP, we created a WhatsApp group and an email list for customers and other team members to give feedback in all stages of development.

3.5 System Implementation Methods

The portal was implemented by using arrays of tools such as editors, database management systems, database administrator tools, scripting language interpreters and their corresponding scripting languages. All tools used were open-source software to ensure smooth sustainability after completion of the project. The actual tools used were as follows:

3.5.1 Editor

The editor employed during the development of tour guide portal was Apache NetBeans IDE. It is an integrated development environment for Java and various scripting languages such as PHP. It can be used to write, compile, test and debug different kinds of applications. It is free and open-source with a massive community behind it. It can semantically and syntactically highlight the source code making coding faster. It has been developed in Java and hence, it can run in various operating systems such as Windows, Linux, BSD and macOS. NetBeans was selected because it is open-source, cross-platform and rich in features with modular development (Salter, 2015). The modular development was a necessary feature as the tour guide portal has many modules to be developed and maintained. Further, NetBeans is licensed under Apache 2, which means the product produced by NetBeans can be redistributed using another form of license apart from the Apache 2 license.

3.5.2 Database Tools

While we use MySQL for hosting the database, we employed phpMyAdmin for the administration of the database. MySQL is an open-source relational database management system with a massive community behind it. It is secure, cross-platform and scalable. MySQL is ACID (Atomicity, Consistency, Isolation and Durability) compliance, which means the data is safe even when crashes occur in the mid of a transaction. We selected MySQL for this portal due to its ACID compliance, the ability for supporting stored procedure and open source (Singh, 2017).

phpMyAdmin is a free and open-source database administrator for both MySQL and MariaDB. It is a portable web application written using PHP. It is a famous web-based MySQL administrator tool. phpMyAdmin was selected because of its ease of use, especially when administering MySQL database through the web. Furthermore, both MySQL and phpMyAdmin are freely available under the GNU Public License (GPL).

3.5.3 Scripting Language

For scripting language, the portal used PHP for server-side scripting and JavaScript for client-side scripting. PHP is a powerful and easy to use language that connects and manipulates MySQL database seamlessly. It is the most popular web application language currently on the planet.

During this study, PHP was used to communicate between the portal application and the MySQL database. JavaScript is a high-level, weakly typed, interpreted language that is used as a front-end technology to implement various size applications. In this portal, JavaScript was employed to support client-side validation before data reaches the server-side.

3.6 Usability Evaluation Methods

Usability testing is the process by which the representative users of targeted audience evaluate the system to find out how it conforms to specific usability criteria such as workflow, navigation path and interface (Rubin & Chisnell, 2008). To conduct usability evaluation, the researcher prepared and used the usability test plan (Appendix 5) that guided the testing process. This plan documents the purpose, procedures, scope, equipment, schedule, sessions, participants, task scenarios, metrics and role of evaluators.

The purpose was to evaluate the usability of the TGP by finding out the answers to the following usability research sub-questions:

- (i) Can the user complete his goal of using the tour guide portal?
- (ii) How fast can the user complete a task in using the tour guide portal?
- (iii) Can the user do the tasks in the tour guide portal correctly?
- (iv) What are the reactions of the users when using TGP?
- (v) What is the user feedback in terms of most likes, dislikes and recommendation?
- (vi) How do users rate the system using the 5-point Likert scale?

The equipment was a laptop, sound recorder and a stopwatch. The laptop contained a TGP and screen recorder program. The researcher examined 47 real users as test participants with the distribution of 25 tour guides, 12 tourists and 10 tour operators. These participants were selected randomly. The researcher briefed each participant before starting the test, during which he elaborated the think-aloud protocol that invited users to speak their emotions that exposed their cognitive processes. Then, each participant filled a pre-testing questionnaire that helped the researcher to understand the ICT background information of each participant. The participants then performed usability testing by executing task scenarios shown in Appendix 6, Tables 3, 4 and 5 of usability test plan. Tour guides carried out a total of 14 tasks, tourists 8 tasks and tour operators 5 tasks.

After the task execution, the researcher asked the participant to rate the system on a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5) by using the System Usability Scale (SUS) modified from Brooke (1996). Then follows the short interview of participants likes, dislikes and recommendation. The usability test was completed by the debriefing in which the researcher thanked the participant and promised them to work on their comments.

During all these procedures, both qualitative and quantitative metrics were collected to measure the usability of a TGP. The qualitative metrics were user reactions and participants overall feeling of the system, whereas the quantitative metrics included success-completion-rate, time-on-task, error rate and SUS. The success-completion-rate and error rate measures the effectiveness component of usability while time-on-task measures efficiency. Whereas the SUS measures the satisfaction of users towards the system (International Standardization Organization, 1998). The results and discussion of usability evaluation is presented in Section 4.4 of this document.

3.7 Business Model Formulation

To sustain the services offered by TGP, the researcher employed a lean canvas tool to formulate a business model. The lean canvas was adapted from Osterwalder's business model canvas by Ash Maurya to produce a fast, concise and compelling start-up. This tool addresses problems and solutions of potential customers by documenting a single-page visual chart which is quicker and compact compared to a traditional business plan (Maurya, 2012). Unlike lean canvas, the conventional business plan is extended, rigid and needs ample time and expertise to develop. This feature is against the normal behaviour of any start-up, such as TGP that are fast iteration and continuous experimentation. Figure 9 illustrates the blank lean canvas produced by Ash Maurya.

PROBLEM Top 3 problems 1	SOLUTION Top 3 features 4	UNIQUE VALUE PROPOSITION Single, clear, compelling message that states why you are different and worth buying 3	UNFAIR ADVANTAGE Can't be easily copied or bought 9	CUSTOMER SEGMENTS Target customers 2
	KEY METRICS Key activities you measure 8		CHANNELS Path to customers 5	
COST STRUCTURE Customer Acquisition Costs Distributing Costs Hosting People, etc. 7		REVENUE STREAMS Revenue Model Lifetime Value Revenue Gross Margin 6		

Lean Canvas is adapted from The Business Model Canvas (<http://www.businessmodelgeneration.com>) and is licensed under the Creative Commons Attribution-Share Alike 3.0 Unported License.

Figure 9: Blank Lean Canvas Model

To fill this canvas, we conducted the stakeholders' workshop that consisted of TGs, tour operators and tourists. This document presents the results of this workshop in Section 4.5 (Chapter 4).

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Current Practices of Tour Guide in Tanzania

This section summarises the results obtained when answering the research question: *What are the current practices of tour guide in Tanzania?* Both quantitative and qualitative results are presented.

4.1.1 Tour Guide Current Practices from Survey Results

(i) Demographic Characteristics of Tour Guides

The aim was to understand the demographic characteristics of our respondents. Table 2 demonstrates the gender and age group of tour guides in Tanzania. The results showed that the male (98.8%) aged between 18 years to 39 years (80.2%) mostly practice the profession of TG.

Table 2: Demographic Characteristic of Tour Guides

Demographic characteristic		Respondents	Percentage (%)
Gender	Male	83	98.8
	Female	1	1.2
Age group	Between 18 and 24	12	14.8
	Between 25 and 39	55	65.4
	Between 40 and 55	15	17.3
	Above 55	2	2.5

(ii) Education Level of TGs

Education contributes to the competence of tour guides. In this section, we wanted to know the highest education level of TGs, the courses they have studied, the nature of the course and the second profession apart from tour guiding as presented in Figs. 10, 11, 12 and 13.

The results in Fig. 10 show that most guides studied regular courses (75%) compared to short courses (25%).

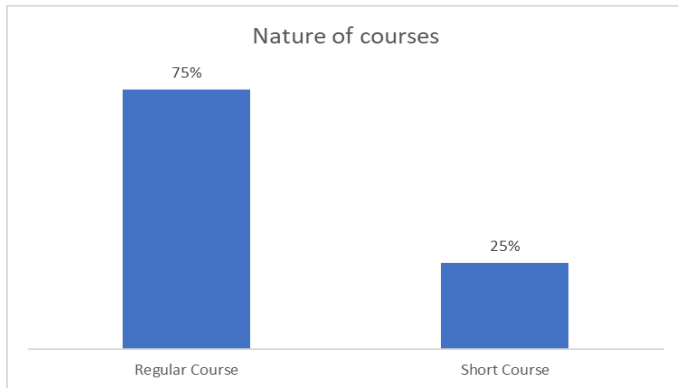


Figure 10: Nature of Courses Studied by Tour Guides

For most participants, the highest education level is a diploma (30.9%) and certificate (32.1%) (Fig. 11) and about 40% did not study any tourism-related course at all (Fig. 12).

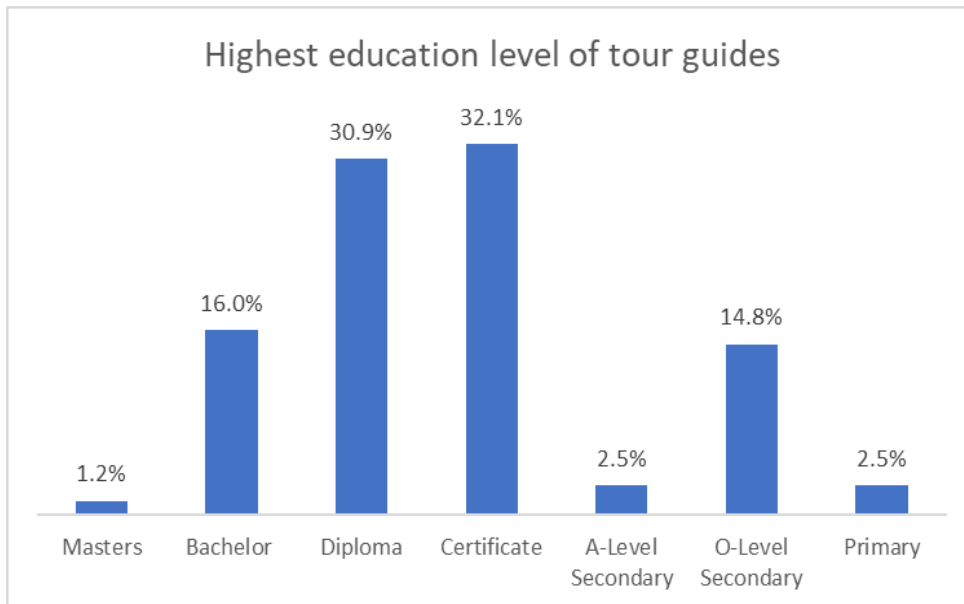


Figure 11: Highest Education Level of Tour Guides

For those who studied tourism-related programmes, Figs. 12 shows that 28% studied tour guiding operations and 16% studied travel and tourism management while 39.5% studied non-tourism programmes.



Figure 12: Programmes Studied by the Tour Guide

In the case of the second profession, most guides considered driving and mechanics (36.8%), tourism (19.3%) and accounting and finance (15.8%) (Fig. 13).

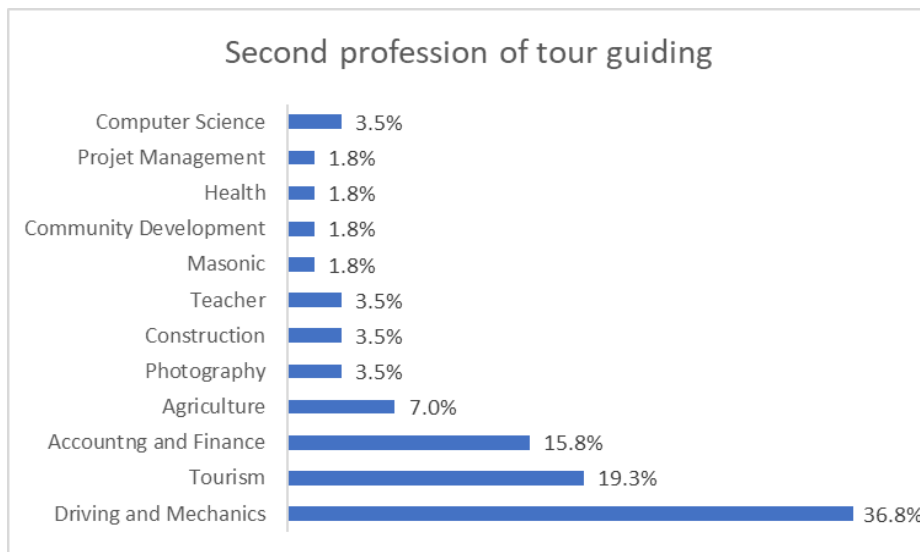


Figure 13: Second Profession of Tour Guides

(iii) Learning Material

Figure 14 presents what kinds of learning material to be included in the portal. Most guides suggested wildlife (83.3%), business planning (52.6%) and destination knowledge (51.3%).

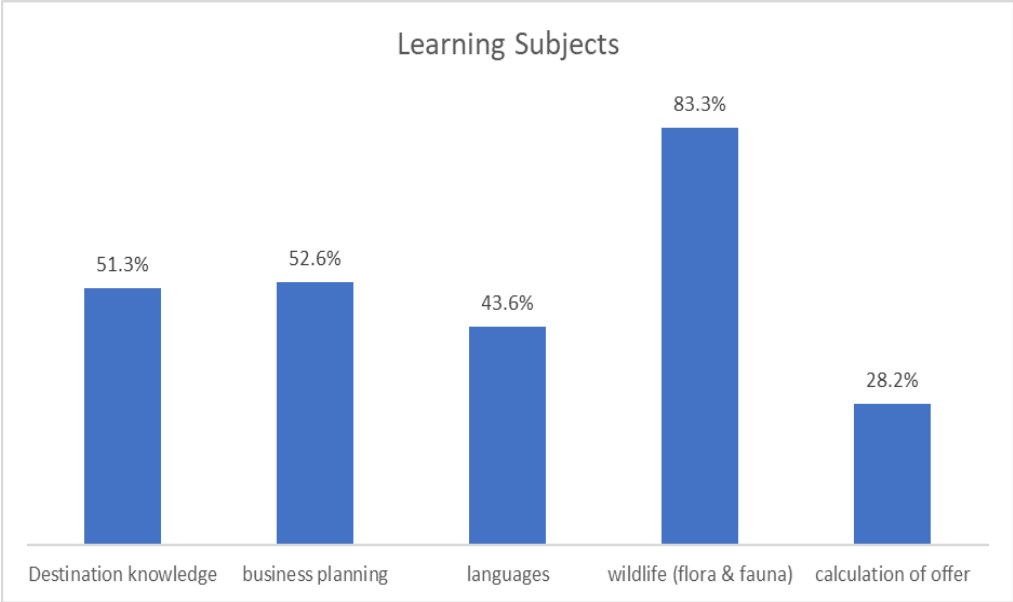


Figure 14: Learning Subjects Preferred by Tour Guides

To include which topic in the discussion forum of the portal, from Fig. 15, depicts guides preferred wildlife (67.5%), marketing and promotions (63.8%), conservation issues (51.3%), business (48.8%) and national parks (47.5%).

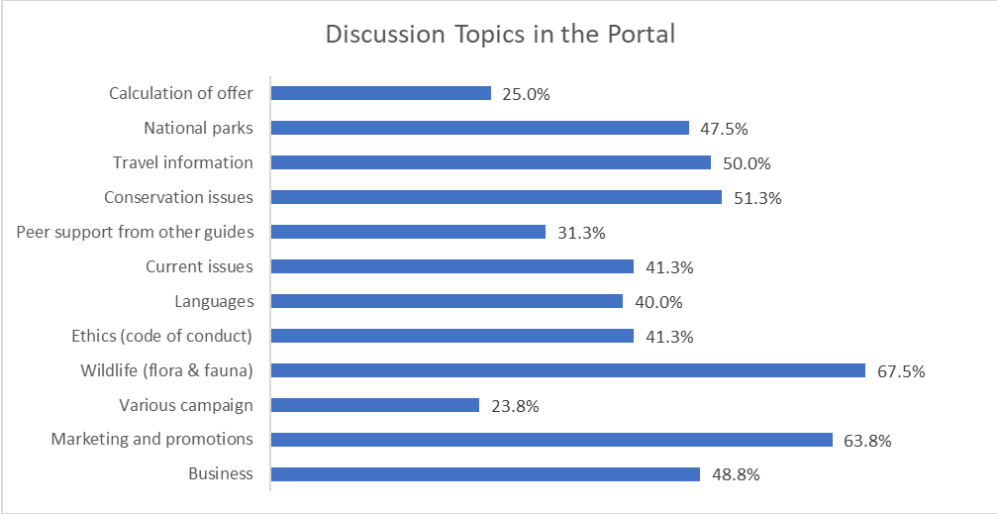


Figure 15: Discussion Topics Suggested by Tour Guides

(iv) Experience of Tour Guides

The aim was to understand the competence of guides in terms of their experience. Thus, we asked them about the number of years they have worked as tour guides, their guiding category and employer. Figure 16 presents the result of TGs working experience.

Results revealed that most guides in Tanzania are well experienced with more than five years (49.4%) of working as guides, the majority of these are safari guides (70.3%) and they are employed by a private company (Fig. 16). Nonetheless, there are 24.1% of guides with experience of less than one year.

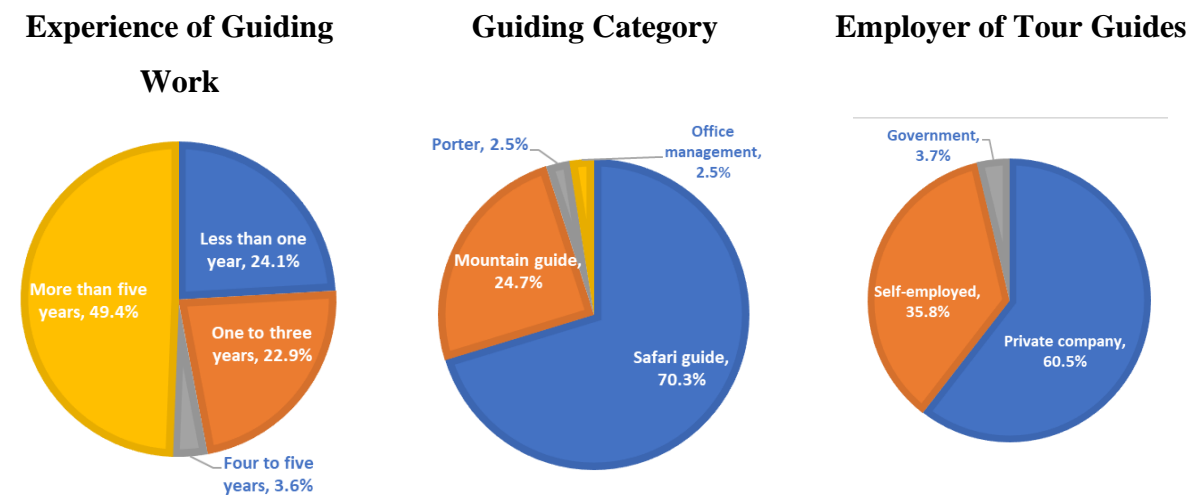


Figure 16: Experience, Guiding Category and Employer of Tour Guides

(v) Association Membership of Guides

Tour guides in Tanzania have many associations, as shown in Fig. 17. Among the respondents, 25.5% were members of Tanzania Tour Guides Association, 9.1% from Kilimanjaro Tour Guides Association and 7.3% were members of Entrepreneurship Guide Society. Further, about 40% were not members of any tour guiding association (Fig. 17).

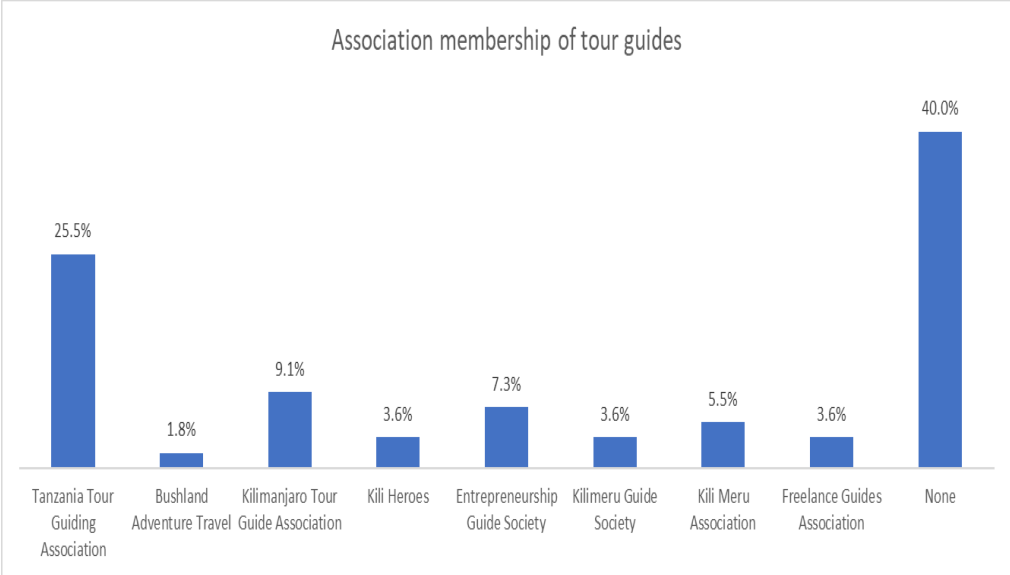


Figure 17: Tour Guide Association Membership

(vi) Language Spoken by Guides

The aim was to know the current practice of guide competence in terms of language. Thus, we asked guides to respond to the languages they can communicate with tourist and the language they want to learn. Figures 18, 19 and 20 present the results found. The survey in Fig. 18 showed that almost all tour guides in Tanzania could speak at least one foreign language (98.7%).

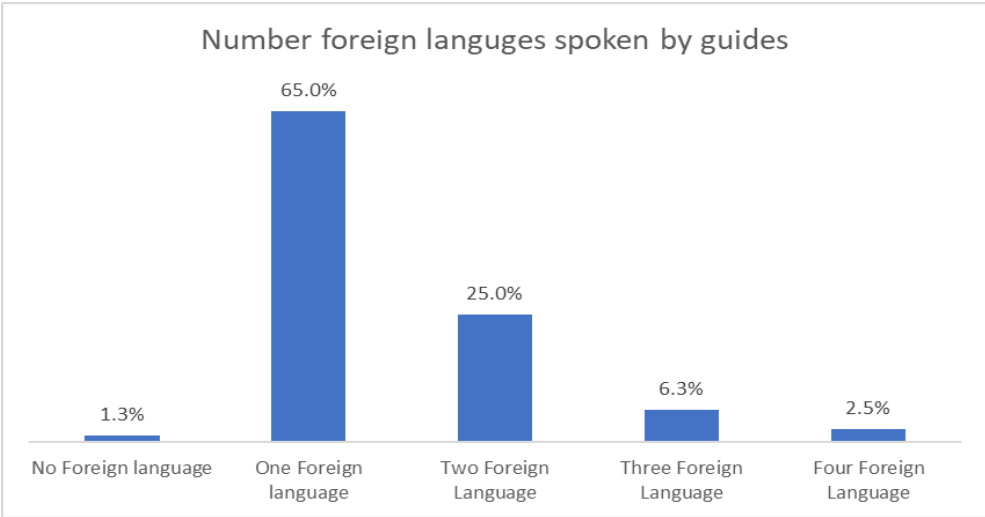


Figure 18: Number of Foreign Languages Spoken by Guide

The most spoken foreign language is English (96.3%) followed by French (17.3%), Spanish (16%) and German (9.9%) as shown in Fig. 19.

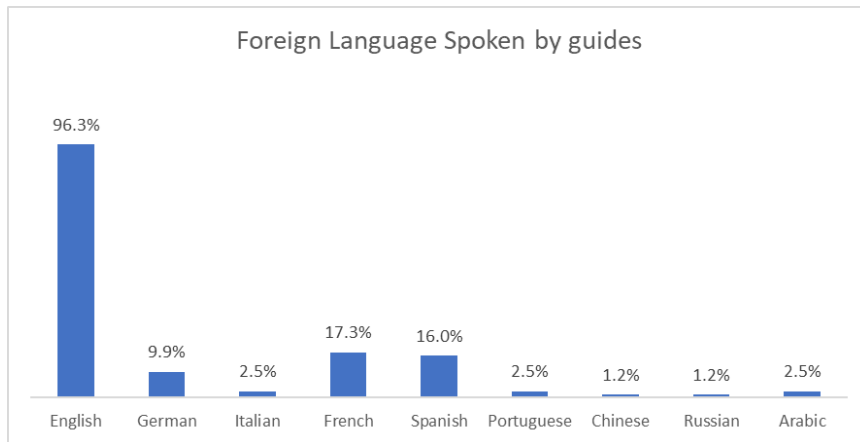


Figure 19: Spoken Languages from Guides

Further, Fig. 20 reveals guides would like to learn Chinese (47.5%), Germany (45.0%) and French (43.8%).

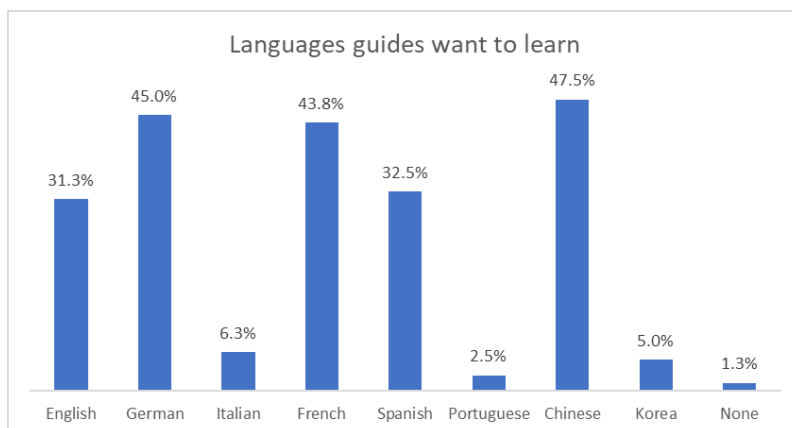


Figure 20: Languages the Guides Want to Learn

(vii) Internet Usage, Access and Device

The aim was to understand the current practices that would help to decide what kind of portal we should develop in terms of data requirements. First, we checked the internet usage and penetration for Tanzanians, Figure 21 shows the June 2019 quarterly statistics report from Tanzania Communications Regulatory Authority (TCRA). Then, we asked TGs about the data plan they use per week, the methods and device they used to access the internet and how do they prefer to communicate with tourists. Figures 22, 23, 24 and 24 present the results found. The results from Fig. 21 depicts that the number of internet users has been increasing from 9.3 million in 2013 to 23.1 million in 2018.

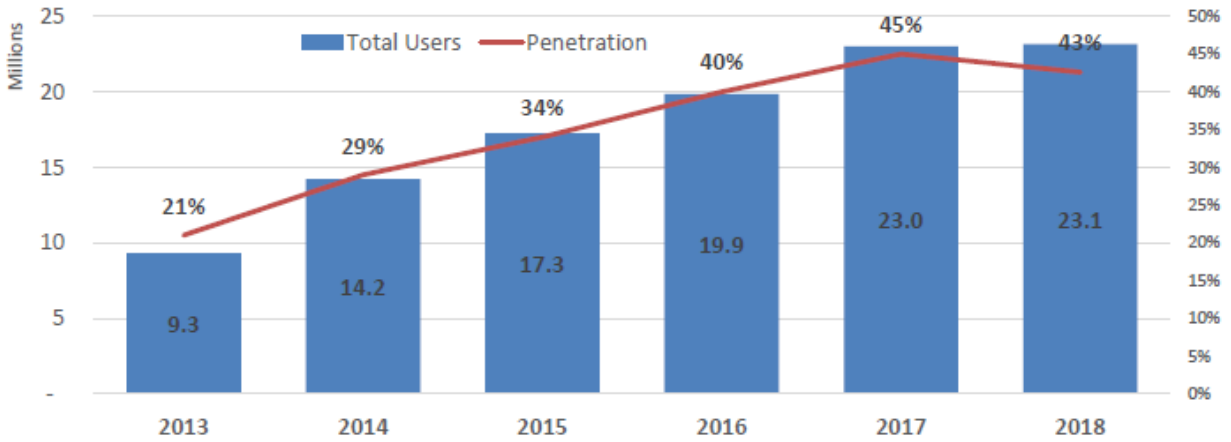


Figure 21: Internet Usage and Penetration in Tanzania by June 2019 (TCRA, 2019)

Further, 63% of TGs use at least 1 GB of internet data per week while their source of internet is through smartphone (93.8%) as can be seen from Figs. 22 and 23, respectively.

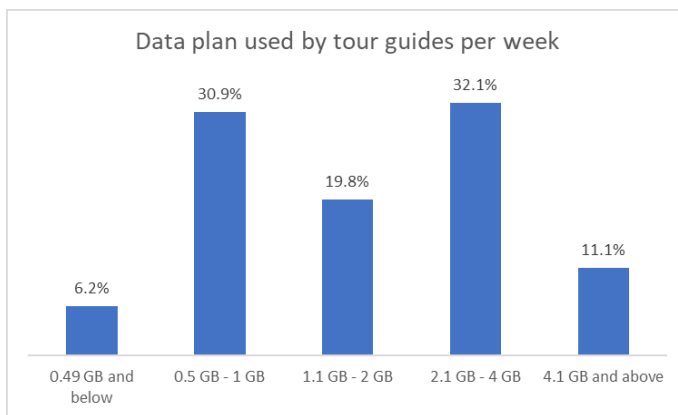


Figure 22: Data Plan Used by Guides per Week

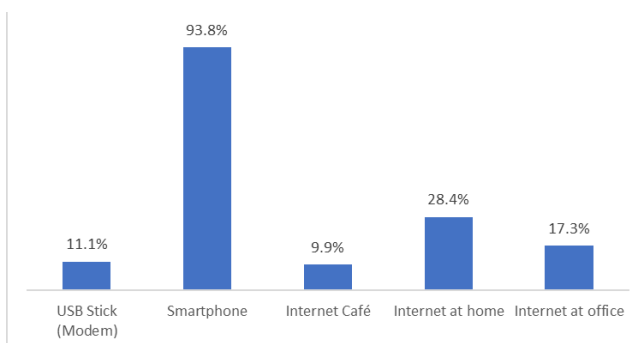


Figure 23: How Guide Access the Internet

Guides are mostly using a smartphone (97.5%) and personal laptop (43.2%) as their device to access the internet as can be attested in Fig. 24.

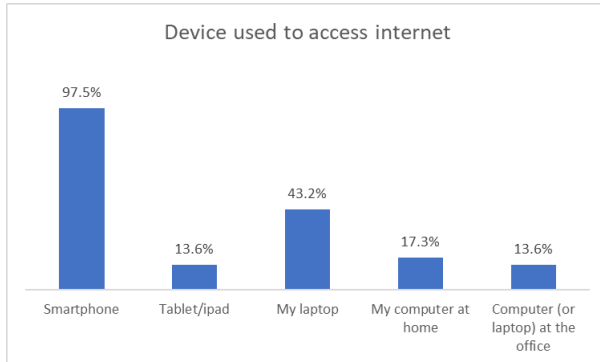


Figure 24: Devices Used by the Guide to Access the Internet

Correspondingly, Fig. 25 depicts that many guides would like to use email (83.8%) and WhatsApp (76.3%) to communicate with tourists.

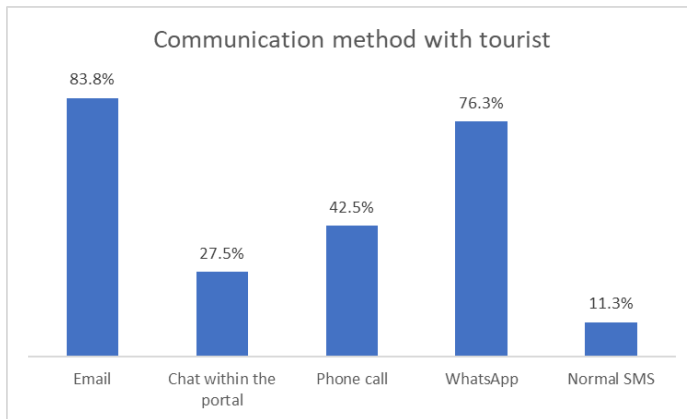


Figure 25: Communication Method with Tourist

(viii) Challenges Faced by Tour Guides and Tourist

Furthermore, we asked both tourist and guides to select the challenges they are facing from the list of problems. The result in Fig. 26 shows that the guides complain about low payment from employer (65.7%), lack of training opportunities (55.7%), lack of common platform (54.3%) and competition with untrained guides (42.5%).

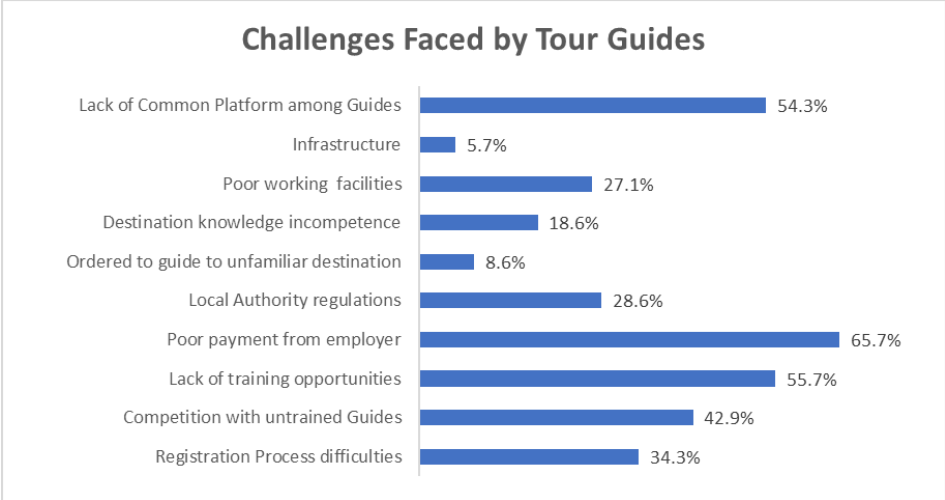


Figure 26: Challenges Faced by Tour Guides

However, tourist reported that wildlife knowledge (55%) and language problems (37.5%) were the significant issues the guides need to improve as can be depicted in Fig. 27.

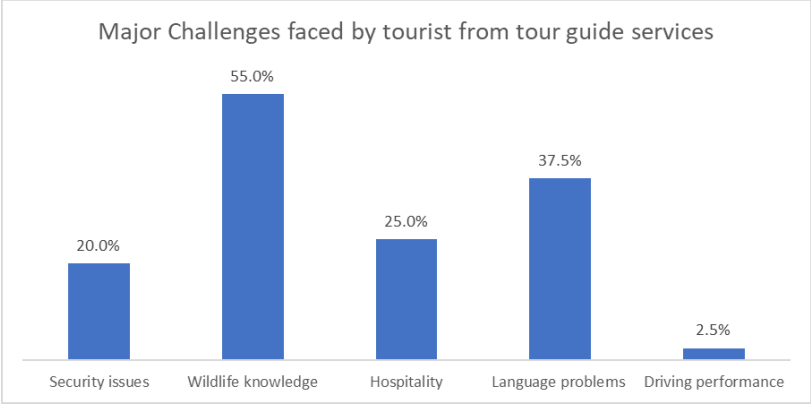


Figure 27: Major Challenges Faced by Tourist from Tour Guide

(ix) Advantages of Tour Guide Portal

To get a perception from guides whether the portal will be useful to them, we asked them to select benefits of the portal. As presented in Fig. 28, TGs believe that the portal will improve their guiding work both in quality (59.8%) and volume (52.1%). It will increase bonds among guides (60.2%), simplify the licensing and registration process (55.1%) and consequently, will increase the volume of tourists visiting Tanzania.

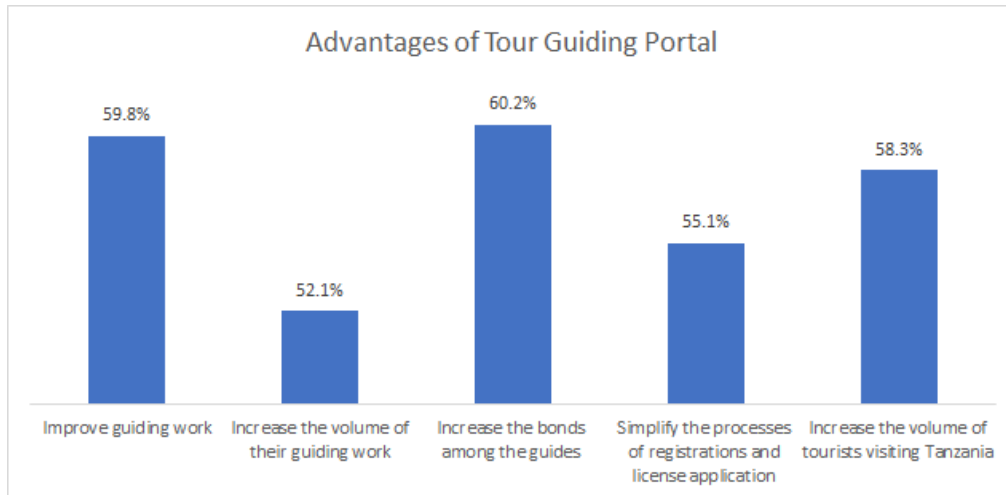


Figure 28: Advantages of the Portal

4.1.2 Tour Guide Current Practices from Interview Results

There are about 5000 tour guides in Tanzania, whereby most of them are located in tourist cities of northern circuit. Some of these guides are registered in different tour guide associations spread throughout the country. Those who are not members of any association claimed that the associations do not add any value to their guiding work. Since there is neither single umbrella association for all tour guides nor a common platform, it is difficult to disseminate information to all tour guides and even harder to impose professional rules and guidelines that would enhance professionalism. Currently, tour guides are using various WhatsApp groups, which also has a limitation of 250 members in one group.

Currently, the TGs in Tanzania are neither licensed nor certified since the MNRT is still preparing the licensing and certification system for them. Nevertheless, College of African Wildlife (Mweka), in collaboration with Kilimanjaro National Park (KINAPA) is offering specialised mountain tour guiding course and issuing temporary licenses to successfully mountain guides.

Furthermore, some TGs commented that the establishment of the TGP would make tourism development in Tanzania sustainable. It will unify all tour guides in a single platform and provide the means of easy identification of unprofessional guides. With the use of the portal, it will be easy for a TG to register and apply for licenses. Besides, they believed that the introduction of the portal would reward the professional guides by receiving positive recommendations from their tourists.

Tourists were happy with the portal as they will be able to know the competence of TGs for different tourist activities such as city tour, cultural tour and mountain trekking. Furthermore, they recommended features such as guide rating, checking guide competence and availability.

4.1.3 Legal Aspects of Tour Guide in Tanzania

We reviewed the necessary legal documents dealing with tour guides and found that for a person to be a TG he/she must be a Tanzanian of at least 21 years of age, has completed form four, must hold a certificate of first aid and possess adequate knowledge of an area requested for (URT, 2008).

The Tourism (Tour Guide) regulation explains in detail how a guide is registered, licensed and conducts his guiding operations. It further elaborates that the Director of Tourism under the responsible ministry will maintain the registered TG records. Besides, the TG must be enlisted in the relevant association, including guides associations and tour operators (MNRT, 2015).

4.1.4 Discussion on Current Practices of Tour Guides

The findings from the demography show that the TG profession is mostly practised by young men aged below 40 years. This finding might be due to either gender/age stereotypes among Tanzanians or existing work culture in Tanzania. Similarly, Nyahunzvi and Njerekai (2013) in Zimbabwe, Alani and Khan (2017) in Oman and Okello and Kipruto (2017) in Kenya affirm the existence of more young men in tour guiding profession.

The study has further found that the majority of TGs are holders of either certificate or diploma. Similarly, the same finding was reported by Melubo and Buzinde (2016) for TG in Tanzania. The observation that Tanzania has more diploma and certificate courses in tourism than those of degree courses (NACTE, 2019; Tanzania Commission for Universities, 2018; VETA, 2019; Wineaster, 2015) might contribute to this finding. However, Alani and Khan (2017) argued that society does not consider tour guiding as either prestigious or decent job; therefore, many bachelor holders do something else apart from working as TG. Nonetheless, TG skills such as site interpretation skills, interpersonal skills and problem-solving are essential in tourist experience (Huang *et al.*, 2010; Yu *et al.*, 2002). Hence, tour guides need further training (Sezgin & Duz, 2018). This argument is supported by the majority of surveyed guides who suggested learning library feature and the ability to search for learning material to be included in the TGP.

Further, the findings show that almost all guides can speak at least one foreign language and only 33% can speak more than two foreign languages; and the dominant international language is English. Furthermore, Ap and Wong (2001) argued that communication skills and language proficiency are among the qualities of tour guiding profession. However, it is difficult to establish the language proficiency levels of these guides, whether it is beginner, elementary, intermediate, or proficient. The fact that 31.3% of surveyed guides want to learn English and moreover 37.5% of surveyed tourists complained about language problems of a guide, this, therefore, proves that it is vital to establish language understanding levels of TG. Henceforth, the introduction of the portal will manage the establishment, not only the number of languages the guide can speak but also the language understanding levels.

The study revealed there are strings of challenges faced by guides in Tanzania which include low payment from the employer, lack of training opportunities, lack of common platform, competition from untrained guides and difficulties in the registration process. These results concur with the study done by Melubo and Buzinde (2016) who pointed out some challenges, including low salaries from locally-owned operators, improper training and inadequate health insurance coverage among guides in Tanzania. It is essential to realise that other authors from different countries have also reported most of these challenges of TG. For instance, Chowdhary and Prakash (2008a) enumerated poor remuneration and insufficient training in India; Mak *et al.* (2010) in Macau, China, mentioned low payment among TGs and Nyahunzvi and Njerekai (2013) reported low pay and unattainable training curricular and opportunities among guides in Zimbabwe.

The study further found that there are many tour guiding associations in Tanzania based on localities, friendship and employers. This finding confirms another finding that there is no common platform among guides in Tanzania and that a discussion forum feature within the portal can alleviate the problem. Common platform or tour guiding professional body is among the environment that fosters professionalism (Black & Ham, 2005).

Further, this study has found that most TGs in Tanzania are experienced. Indeed, according to Alani and Khan (2017), the experience is significant for the professionalism of TG. In the same line, Tanzania Tour Guide Regulation requires a guide to have worked as a TG for at least one year to be licensed (MNRT, 2015). Nonetheless, the findings also show that there is almost a quarter of guides who have experience of less than one year. Therefore, the authors suggest that a

new guide can work as a trainee under an experienced guide to acquire the required expertise. Further, the TG Portal can assist in managing these processes.

Moreover, this study finds that the majority of TGs owns a smartphone and they are using it to access the internet. Furthermore, most of them are using more than 1 GB of internet data per week. These findings concur with the (TCRA, 2019), which reported the massive penetration of internet usage and that mobile communication and internet services have massively increased in Tanzania. Therefore, these findings confirm that guides can interact with the online portal through both smartphone and private computer.

Findings have shown that tourist would like to check for guide competence, to rate and recommend TG and to be able to search for a TG through the portal. Moreover, many authors agree that product knowledge, language proficiency and experience are necessary ingredients of competence (Alani & Khan, 2017; Ap & Wong, 2001; Sezgin & Duz, 2018). However, with the evolution of social media, public rating and recommendation are considered and trusted by many customers as the informer of competence (Hlee *et al.*, 2018; Kim & Arguello, 2017; Narangajavana Kaosiri *et al.*, 2019; Racherla & Friske, 2012). Furthermore, although Tanzania Tourist Board (TTB) has proper rules and procedures of filing complaints against unprofessional TG, however, according to Salazar (2012) some tourists filed a formal complaint regarding incompetent TG which did not reach TTB. Thus, this raises an alarm that the management of tour guides through the portal is of paramount importance.

4.2 Requirement Specifications of TGP

This section presents the requirement specification of the TGP. It is a response to the research question: *What are the requirements for the development of tour guide portal that will enhance tourism in Tanzania?*

Requirement specification refers to the services that a developed system is going to offer and the constraints on how these services are provided. It is a vital phase as it lays the foundation for other stages in software development, including design, coding and testing. Further, it may act as the contract between developer and client (Wiegiers & Beatty, 2013). Before designing of TGP, specifying the requirements was necessary to ensure that all functionalities are implemented.

Furthermore, the requirements specification is comprised of functional and non-functional requirements. While functional requirements refer to the system behaviour, the non-functional requirements describe the constraints of these behaviours. The system behaviours can be modelled by using user stories in agile methodology (Ecar *et al.*, 2018).

4.2.1 TGP User Stories (Functional Requirements)

At first, we collected the preliminary user stories through questionnaires, interviews and observation of similar systems. Figures 28 and 29 demonstrate the features suggested by tour guides and tourists, respectively, during the survey. The results in Fig. 29 show that most guides prefer discussion forum (64.2%), learning library (61.7%), job opportunities announcements (60.5%), tourist destination information (48.1%), direct communication with tourists (46.9%), license application (44.4%), searching for material (43.2%), chat room (42%) and profile management (40.7%).

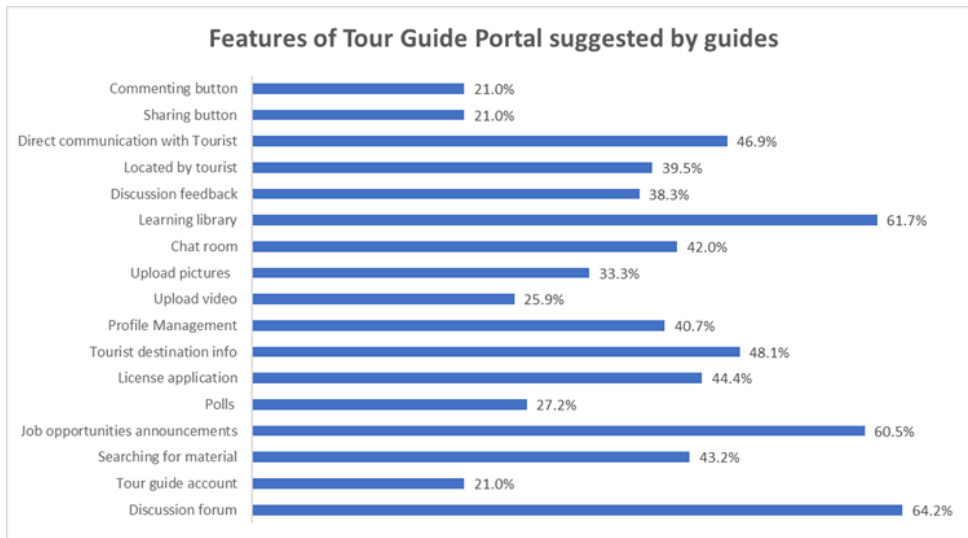


Figure 29: TGP Features Recommended by Tour Guides

Contrarily, the tourists preferred the searching of a tour guide (69.1%), check guide competence (69.1%), discussion forum (61.8%), tourist destination info (60%), check guide license (58.2%), rate and recommend tour guide (54.5%) and direct communication with tour guide (52.7%) as presented in Fig. 30.

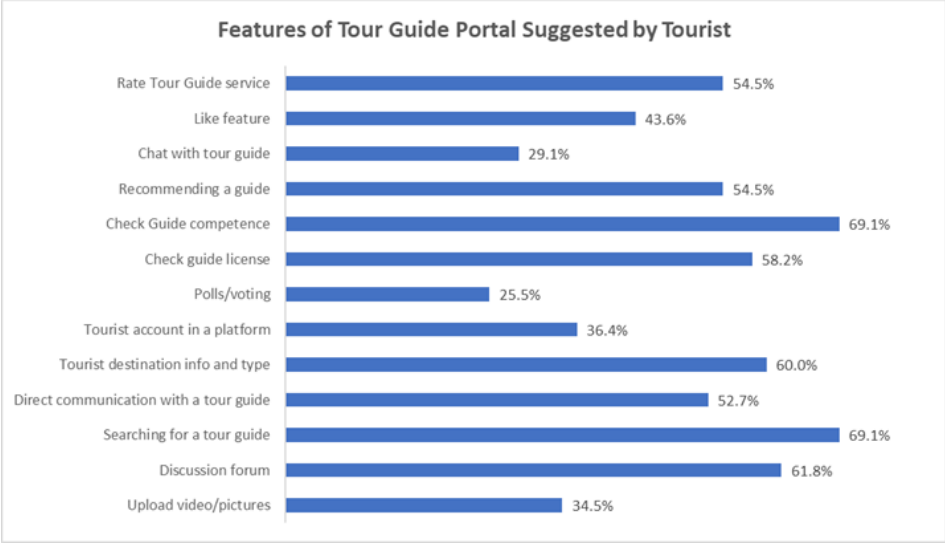


Figure 30: TGP Features Suggested by Tourists

After this preliminary data, we conducted a storytelling workshop during the planning phase to collect more user stories, to confirm those that had been collected, prioritising, scheduling and planning the iterations into small releases. Tables 3 to 9 show the release plan produced after analysing all user stories.

Table 3: Release Plan for User Stories of All Registered Users in TGP

Story ID	User Story	Iteration	Release Date
US101	As a user, I want to create an account on the portal by supplying my username, password, email and my role; connected to a discussion forum so that I can access the TGP; then be informed if the account creation is successful.	1	May 2, 2019
US102	As a user, I want to login into the portal using my username and password; connected to my role so that I can access my personal page; then be informed if login is unsuccessful.	1	May 2, 2019
US103	As a user, I want to logout from the system; so that my user session data are cleared from the browser.	1	May 2, 2019
US104	As a user, I want to reset my password by receiving a reset password link in my email; connected to my profile so that I can secure my account; then be notified if resetting is successful.	2	May 3, 2019
US105	As a user, I need a secure means of recovering password so that when I forget it I can still have access to TGP; connected to my account; then be notified if the password reset link has been sent.	2	May 3, 2019
US106	As a user, I want to update or delete my account connected to my profile so that my account information remains up to date; and be notified if the changes are successfully.	2	May 3, 2019

Table 4: Release Plan for User Stories of a Tour Guide

Story ID	User Story	Iteration	Release Date
US201	As a tour guide, I want to manage my personal detail; connected to my profile; so that tourists and others can view my profile; then be notified if management is successful.	3	May 4, 2019
US202	As a tour guide, I want to manage my guiding work; connected to my profile; so that tourists and others can view my guiding work history; then be notified if management is successful.	4	May 6, 2019
US203	As a tour guide, I want to manage my education accomplishments; connected to my profile; so that tourists and others can view my achievements; then be notified if the management is successful.	5	May 7, 2019
US204	As a tour guide, I want to manage the language I can speak; connected to my profile; so that tourists and others can view my language capability; then be notified if the management is successful.	6	May 8, 2019
US205	As a tour guide, I want to upload and edit my picture; connected to my profile; so that tourists and others can view my image; then be notified if the upload was successful.	7	May 9, 2019
US206	As a tour guide, I want to navigate from one profile item to another using previous and next button; so that I can see my profile items.	7	May 9, 2019
US207	As a tour guide, I want to preview all my profile items; connected to user reviews; so that I can edit/delete the wrongly entered information.	7	May 9, 2019
US208	As a tour guide, I want to apply for a license by using data I entered in my profile; connected to authorities; so that I can accomplish the legal requirement; then get feedback if the application is successful.	8	May 10, 2019
US209	As a tour guide, I want to manage learning library; connected to TGP; so that users can read the reading material; then notify me for failure.	19	May 23, 2019

Table 5: Release Plan for User Stories of a Tourist

Story ID	User Story	Iteration	Release Date
US301	As a tourist, I want to search for a guide in the portal by entering any information I know about tour guide; connected to the tour guide portal; so that I can find a competent tour guide; then be notified the results of my search.	9	May 11, 2019
US302	As a tourist, I want to list guides and view their details in the portal; connected to guide association; so that I can perform other actions on a tour guide.	10	May 13, 2019
US303	As a tourist, I want to recommend and rate a tour guide; connected to guide; so that other tourist will know the qualities of this guide.	11	May 14, 2019
US304	As a tourist, I want to know the spoken languages and names of a guide speaking; connected to guides; so that I know what languages are spoken by guides in Tanzania.	12	May 15, 2019
US305	As a tourist, I want to know the guide associations and their members; connected to guides; so that I can find a guide through an association.	13	May 17, 2019
US306	As a tourist, I want to make an offer to a tour guide; connected to TGP; so that I can work with this guide; be notified if the proposal failed.	20	May 25, 2019

Table 6: Release Plan for User Stories of the Tour Operator

Story ID	User Story	Iteration	Release Date
US401	As a tour operator, I want to manage my company profile; connected to my account; so that I can post jobs; then be notified of success.	14	May 18, 2019
US402	As a tour operator, I want to post jobs and manage job posting; connected to my company profile; so that tour guides can view the latest jobs posted.	15	May 19, 2019

Table 7: Release Plan for User Stories Interacting with the Discussion Forum

Story ID	User Story	Iteration	Release Date
US501	As a registered user, I want to create and manage topics; connected to a forum; so that other users can read and contribute to this topic.	17	May 21, 2019
US502	As a registered user, I want to create and manage replies; connected to a topic; so that other users can read and contribute to this reply.	17	May 21, 2019
US503	As a visitor, I want to view forums, topics and replies: connected to the discussion forum.	18	May 22, 2019

Table 8: Release Plan for User Stories of Government Official

Story ID	User Story	Iteration	Release Date
US701	As a government official, I want to manage tourist destinations; connected to TGP; so that users can view up to date destination information.	19	May 24, 2019
US702	As a government official, I want to view various statistics about tour guide; connected to tour guide profile; so that I can plan the development of this profession.	8	May 10, 2019

Most user stories of administrators were implemented in the same iterations as other user's user stories to support the release of these user stories. This is because the XP rules require the frequent small releases of the software. Table 9 presents the user stories of an administrator.

Table 9: Release Plan for User Stories of an Administrator

Story ID	User Story	Iteration	Release Date
US601	As an administrator, I want to set up the languages; connected to guide profile; so that guide can select the language.	6	May 8, 2019
US602	As an administrator, I want to set up the associations; connected to guide profile; so that guide can select the association.	3	May 4, 2019
US603	As an administrator, I want to set up the guide category; connected to guide profile; so that guide can select the category.	4	May 6, 2019
US604	As an administrator, I want to set up the education levels, school and programme; connected to guide profile; so that guide can select the education history.	5	May 7, 2019
US605	As an administrator, I want to approve user and change his role; connected to the user; so that user can have a new position in the TGP.	1	May 2, 2019
US606	As an administrator, I want to reset the user's password; connected to the user; so that user can receive the reset password link in his email.	2	May 3, 2019
US607	As an administrator, I want to create the forum; connected to discussion forums; so that users can contribute to this forum.	16	May 20, 2019

4.2.2 Non-Functional Requirements

Necessarily, non-functional requirements specify the conditions under which the system behaves. They are also referred to as quality attributes of the system. Table 10 presents the non-functional requirements of the TGP.

Table 10: Non-Functional Requirements of TGP

Requirement	Description
Authentication	When a user login for the first time in a TGP, he/she must change the password. The password must contain at least one digit.
Security	The TGP shall accept the legitimate executions only and deny any unintended or accidental processing of data.
Performance	The TGP should be able to process 10 million user account without retarding its speed.
Portability	It should be possible to move the TGP from windows operating system to another without any modification.
Accuracy	The TGP should always return accurate tour guiding data when queried by users by using different querying methods.
Interoperability	It must be easy for the TGP to interoperate with other systems.
Usability	The TGP must be intuitive to its users such that with very minimal learning effort user should be able to use the system.
Speed	The loading time for any page in the TGP should be less than 10 seconds considering the optimal bandwidth and browser latency of the user's device.
Screen adaptability	The TGP should adapt to the screen size of the device opening it. Thus, it should open friendly to the mobile phone as well as widescreen desktop.

4.3 System Design and Implementation

This section responds to the third research question that was asking: *“How can a tour guide portal be designed and implemented to enhance tourism in Tanzania?”* To answer this question, we present the architectural design of the TGP, the interface and database design. Finally, the implementation of database and interfaces of TGP are discussed.

4.3.1 Architectural Design

The architectural design of TGP allows the implementation of its functionality seamless and the usability intuitive. The architecture is composed of three layers, namely, presentation, business logic and data access layers, as illustrated in Fig. 31.

The top-most tier is the presentation layer. This layer interacts with users of TGP. The hardware in this layer are computers, smartphones and any device capable of running browsers, which

executes CSS, JavaScript and HTML. HTML and CSS are used to structure the page and present it to the user according to different sizes of devices, whereas JavaScript was employed for client-side validation. The bottom tier is the data access layer. In the TGP, this layer is implemented by using a MySQL database server.

In the middle tier, there is a business logic layer which deals with all the logic of processing the requests from the presentation layer to the data access layer and vice versa. This layer is made of apache tomcat server and PHP scripts.

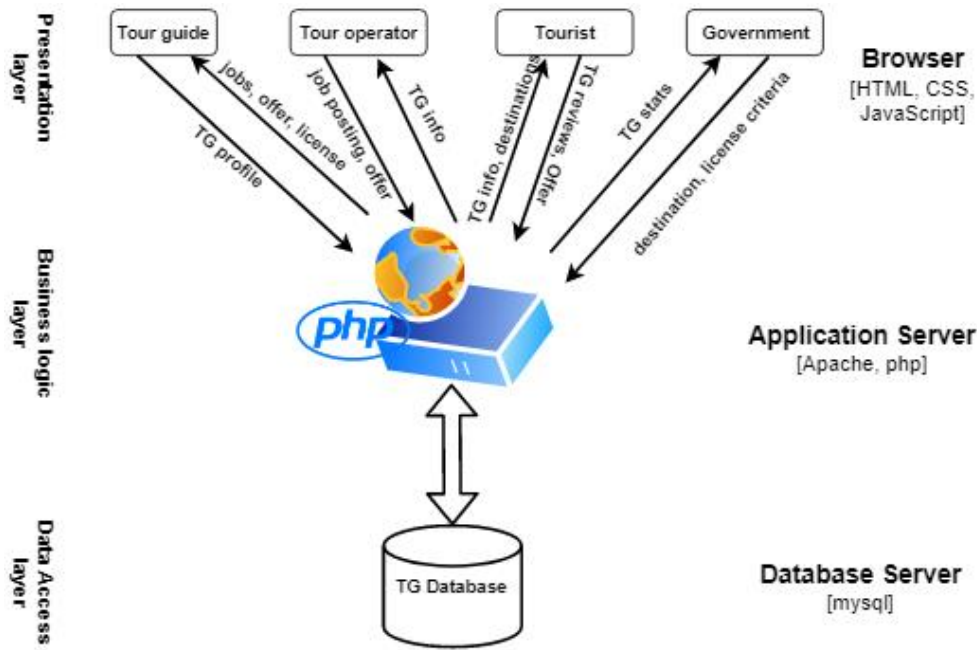


Figure 31: Proposed TGP Architecture

4.3.2 Interface Design

The interface design was iterative and was done by following the release plan described in Section 4.2.1, Table 4 to 9 of this Chapter. At this stage, each small release was iteratively designed from low fidelity paper prototype, through wireframe to high fidelity prototype. Section 3.4.3 elaborated this process in details.

4.3.3 Database Design

The database was designed incrementally by following the release plan. These small databases were integrated to form one database. The entity-relationship diagram (ERD) of the resulted database is drawn by using Chen and Crow's foot notations, as presented in Fig. 32.

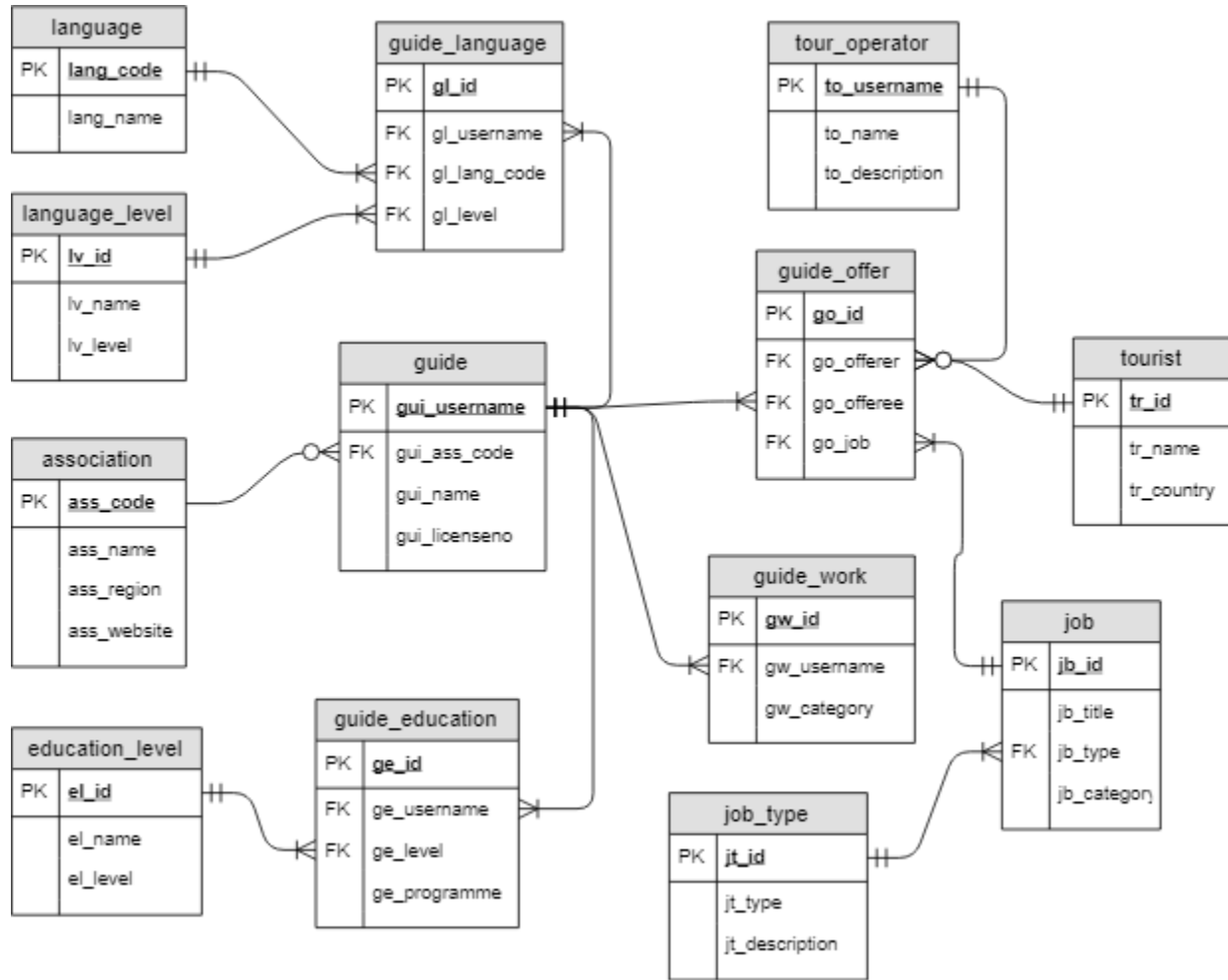


Figure 32: Entity Relation Diagram (ERD) of TGP

4.3.4 TGP Implementation

The TGP was implemented by using open source tools that can run across major browsers. It contains user-friendly interfaces that allow the user to interact with the portal seamlessly using devices of different sizes such as mobile phone, tablet and computer. Due to the nature of services the TGP is offering, there are limited services that the guest or un-login user can access (Table 11).

To have the full potential of TGP services, the user must log in into the system. Figure 33 presents the login page of the TGP.

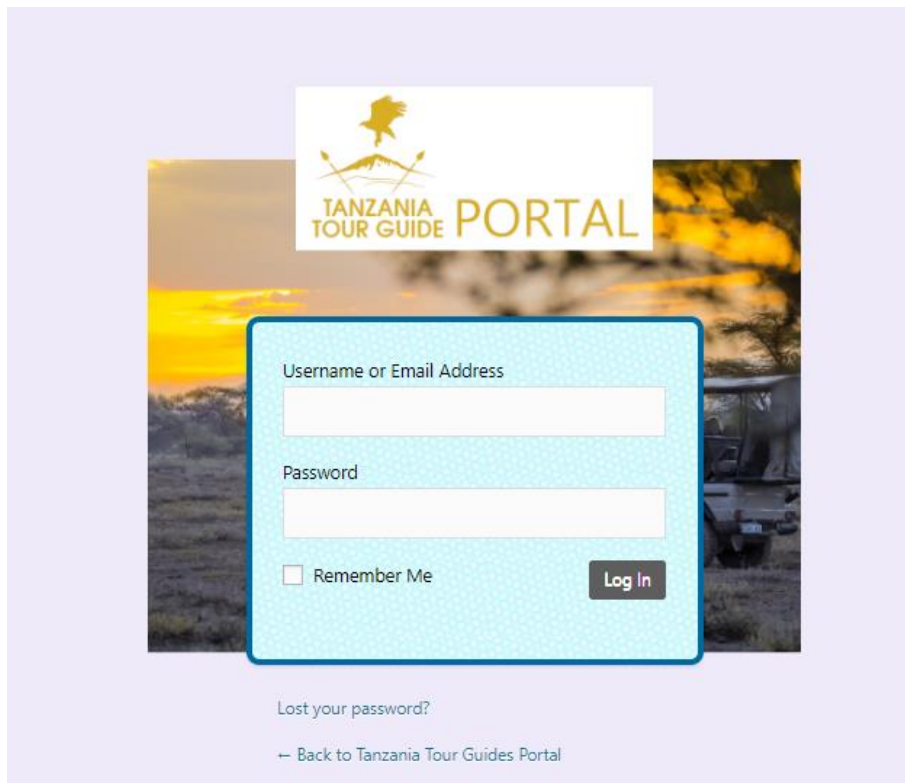


Figure 33: TGP Login Page

The TGP supports five user roles; namely administrator, tour guide, tour operators, tourist and government. These user roles have different access to some functionalities. Table 11 summarises the user role functionalities.

Table 11: User Role Functionality Matrix

Functionality	Administrator	Tour guide	Tour operator	Tourist	Government	Guest
Manage users of the system.	√					
Manage personal information.	√	√	√	√	√	
Manage guide profile.		√				
View guide profile.	√	√	√	√	√	√
Manage learning library.	√					
Enter and update learning material in the library.	√	√	√	√	√	
View learning material in the library.	√	√	√	√	√	√
Manage forums and topics.	√					
Discuss (Create and reply to a topic) within a forum.	√	√	√	√	√	
Read discussions (topics and replies) within a forum.	√	√	√	√	√	√
Review and rate tour guide.	√		√	√	√	
Read tour guide rating and review.	√	√	√	√	√	√
Make an offer to the tour guide.		√	√	√	√	
Manage tourist destination.	√				√	
View tourist destinations.	√	√	√	√	√	√
View TGP configuration information and statistics.	√					
Manage tour guide associations.	√					
View tour guide associations.	√	√	√	√	√	√
Manage job.			√			
View advertised job.	√	√	√	√	√	√

Key: √ Full supported feature.
 √ Limited supported feature.
 Not supported feature.

Furthermore, the TGP is composed of several components that are explained hereunder:

(i) TGP Setup

It is essential to set up the system before it is being used by users. The setup includes system initialisation and entering of values that users would need to select in a dropdown while using the TGP. These values are, for instance, user roles, tour guide associations, TG categories, TG school, education level, TG programmes, languages and language level. While only an administrator can add, view, update and delete these values, other users can only use them in a dropdown at different entry forms. This feature of pre-entering information for users reduces the rate of errors that user can commit and improves the user experience. These values are stored as key-value pair in a database. Figure 34 shows the tour guide association setup opened by an administrator.

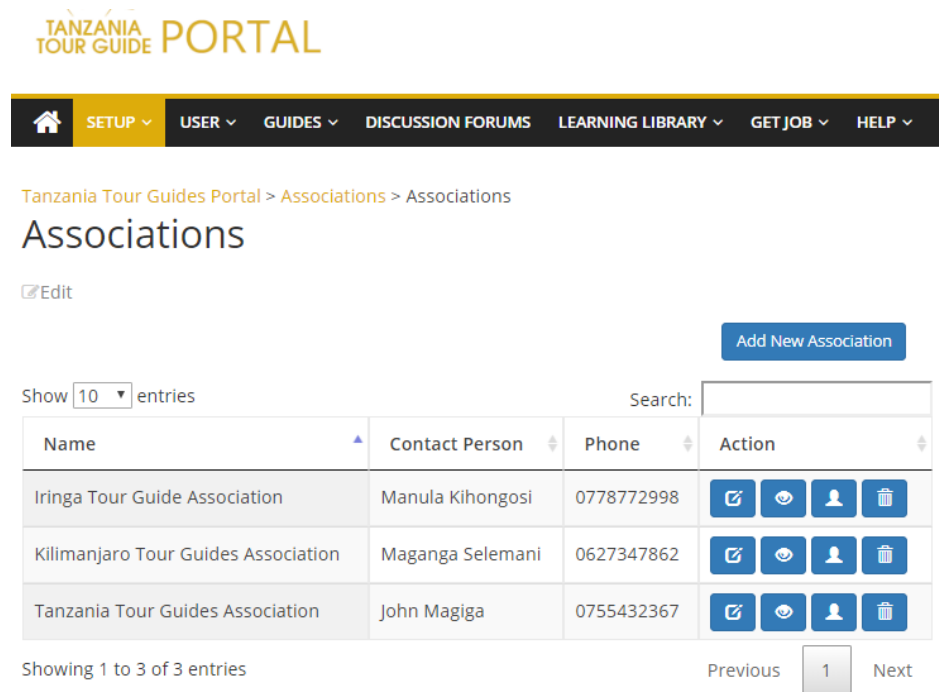


Figure 34: TG Association Setup Accessed by an Administrator

(ii) User Management

This module manages users of the TGP where it allows users to reset their password, administrator to activate password reset link and approving tour guide registration. Further, the administrator can view, update and disable/enable users; change the user role from one role to another and enable/disable users to participate in the discussion forum with write access. Moreover, this

module is responsible for user login, logout, registration and forget password tasks. Figure 35 presents the list of users with tour operator roles and the possible action performed by the administrator.

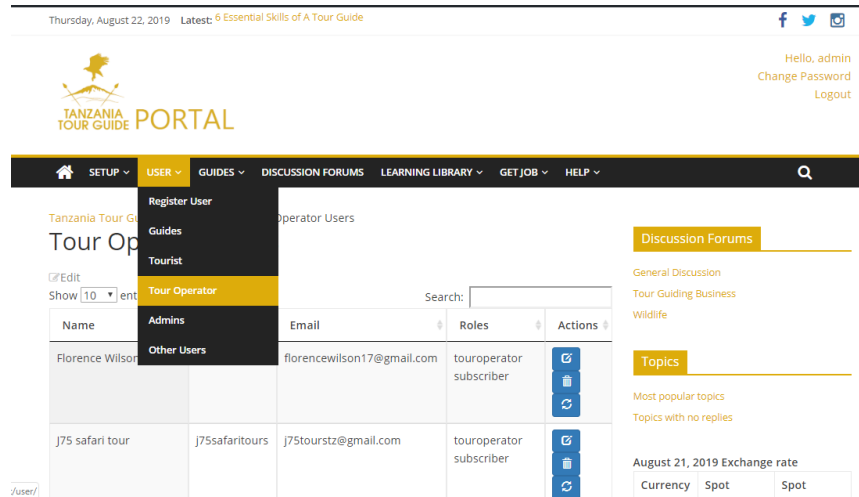


Figure 35: List of Users with Tour Operator Role Opened by the Administrator.

(iii) Guide Profile

The guide profile is a module of a TGP that allows the guide to enter his/her curriculum. Through this module, guides enter personal particulars, language capability, guiding work history, formal education and uploading pictures. Tourists and tour operators interact with this module by making an offer to the guide, review and rate the tour guide. Both guide information and reviews help to enhance the professionalism of tour guides which has positive effects on the quality of service offered by tour guides. Figure 36 shows the language understanding level, a component of the guide profile.

Tanzania Tour Guides Portal > Guide Profile > Language Understanding Level

Previous: [Guide Education History](#) Next: [Upload Photo](#)

Language Understanding Level

Please enter language understanding level. Tourist may contact you using the language you have entered.

[Add New Language](#)

Show entries Search:

Language	Level	Action
English	Intermediate	Update Delete
Swahili	Native	Update Delete

Showing 1 to 2 of 2 entries Previous Next

Discussion Forums

- [General Discussion](#)
- [Tour Guiding Business](#)
- [Wildlife](#)

Topics

Most popular topics
Topics with no replies

August 21, 2019 Exchange rate

Currency	Spot Buying	Spot Selling
USD	2,277.55	2,300.33
EURO	2,522.62	2,548.31
GBP	2,754.25	2,782.71

Source: Bank of Tanzania

Figure 36: Guide Profile: Language Understanding Level Component

Further, users can employ Guide Profile to search for guide by specifying the required qualities such as education, expertise and reviews and to view guides according to languages or spoken languages in the country. These can help tour guide customers to locate the guide they want. Figure 37 shows the search results when a user searches for “mountain guide.”

[HOME](#)
[PROFILE](#)
[GUIDES](#)
[DISCUSSION FORUMS](#)
[LEARNING LIBRARY](#)
[GET JOB](#)
[HELP](#)

To find a guide you may write his/her name, town, association, expertise, comments or how he was reviewed.

Show entries

Search:

Picture	Results	Actions
	Paul Deo Shidende Mountain Guide . 5 years Guiding group of Tourist across mount Kilimanjaro and Mount Meru Walking and doing physical exercises	<input type="button" value="Eye"/> <input type="button" value="Star"/> <input type="button" value="Share"/>
	Emmanuel Magesa Mountain Guide . 6 years Mountain guide at KIBO Talking and encouraging others	<input type="button" value="Eye"/> <input type="button" value="Star"/> <input type="button" value="Share"/>
	Pierre Pamoja Mountain Guide . 2 years Kili tours guide 2017 - today Trekking	<input type="button" value="Eye"/> <input type="button" value="Star"/> <input type="button" value="Share"/>

Showing 1 to 3 of 3 entries

Figure 37: Guide Profile: Guide Results from Searching

(iv) Learning Library

Learning library helps the tour guide to update their guiding knowledge on the different subject area. It consists of various topics of interests to tour guides. The guides themselves are entering and updating the materials in the library through a community of practice approach. This approach, according to Gannon and Prothero (2018), provides learning and social connection among peers. Figure 38 illustrates how some of the learning materials that have been posted in the TGP.

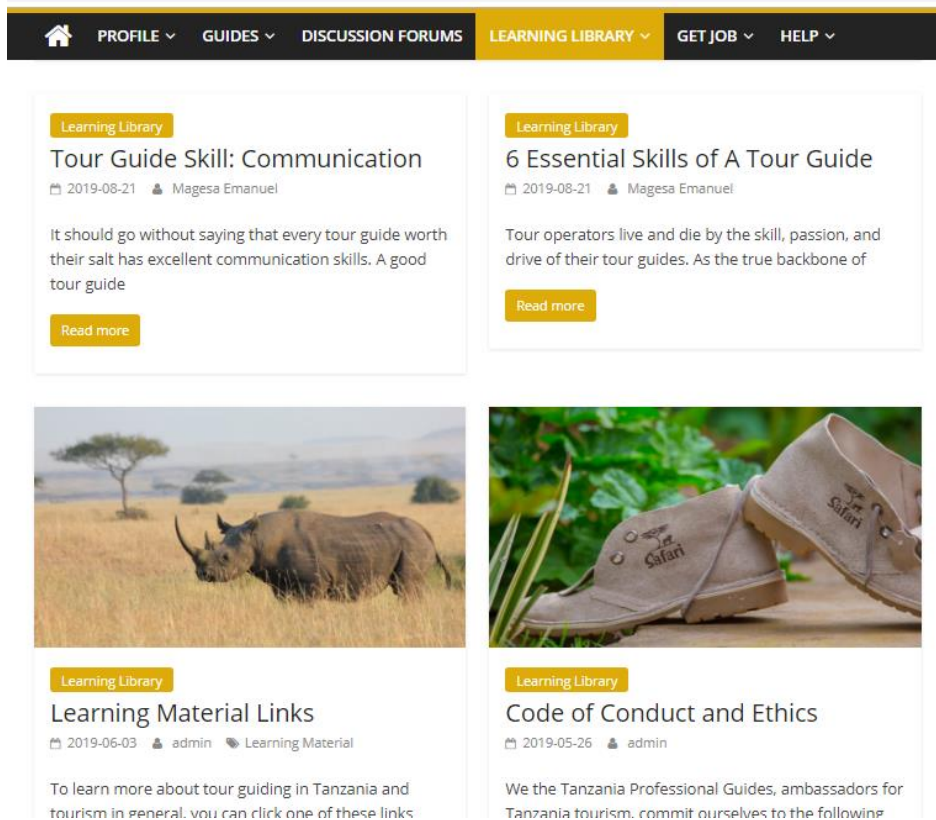


Figure 38: Learning Library

(v) Discussion Forum

The discussion forum is among the features that were top-rated by both tour guides and tourists. It brings all stakeholders of tourism in Tanzania in one platform to discuss several matters relating to tourism in Tanzania. The discussion forum is structured into three levels of hierarchy, namely forum, topics and replies. Forum is at the top of the hierarchy and consists of several topics whereas a topic is at the second level and consist of several replies. Only administrators can create forums while other registered users can create and discuss the topics and replies, respectively. Guests participate in discussion with reading access only. Figure 39 presents the discussion forum of the TGP.

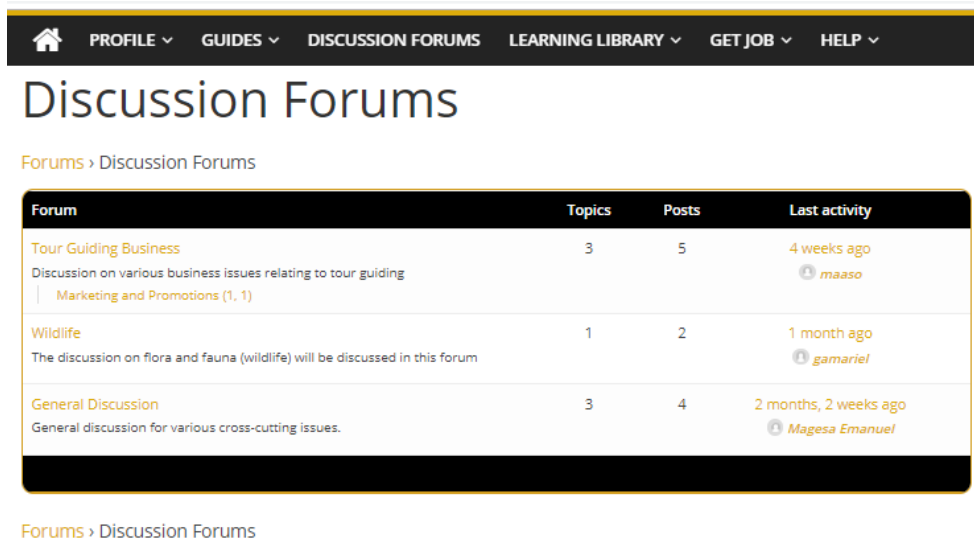


Figure 39: TGP Discussion Forum

(vi) Job Manager

The study revealed that most surveyed guides are working as either self-employed (35.8%) or employed by a private company (60.5%). Thus, the presence of a job manager, a tool that manages job opportunity announcements is essential for tour guides in Tanzania. Furthermore, 60.5% of surveyed tour guides proposed the job opportunity feature. In TGP, job manager allows the tour operators to post, update and delete job opportunities from job application board, whereas tour guides can only view the posted jobs. Figure 40 presents the job opportunity page opened by tour operators.

Tanzania Tour Guides Portal > Job Opportunities

Job Opportunities

You can add, delete, view or edit job opportunities.

[Add New job](#)Show entriesSearch:

Title	Type	Deadline	Action
marketing manager (Location: moshi)	Full Time	31-Jul-2019	View Edit Del

Showing 1 to 1 of 1 entries

Previous Next

Discussion Forums

General Discussion
 Tour Guiding Business
 Wildlife

Topics

Most popular topics
 Topics with no replies

August 21, 2019 Exchange rate

Currency	Spot Buying	Spot Selling

Figure 40: Tour Operator Job Opportunity Page

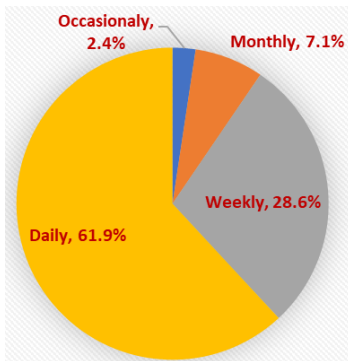
4.4 Usability Evaluation

This section responds to the research question: *Does the developed tour guide portal usable to its intended users?* To answer this question, we conducted experimental research for usability testing to find out whether the TGP is usable to its intended users. The test involved 25 TGs, 10 tour operators and 12 tourists totalling 47 test participants. The system testers were different from customers who participated in various stages of development. The results presented are organised as follows: first, we introduce the background information of the participants, then task execution results, followed by system usability scale and lastly the participants' likes, dislikes and recommendation.

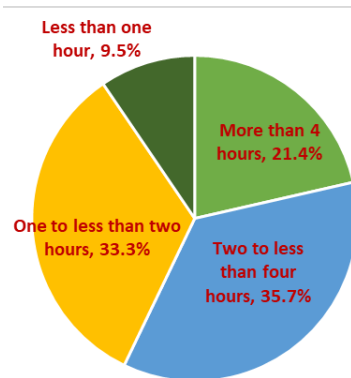
4.4.1 Participant Background Information

The background information of our test participants was essential because it could affect the test results. The results show that most participants had enough experience of using a computer and accessing the internet. As shown in Fig. 41, 69.9% of test participants are accessing the internet daily, 57.1% spend more than two hours on the internet per day and 69% have experience of more than two years of using a computer. Further, very few participants had less than one-year experience of using computer (5%), spending less than one hour on the internet per day (9.5%) and accessing internet occasionally (2.4%).

Frequency of Accessing the Internet



Duration of Internet Usage per Day



Experience of Using Computer

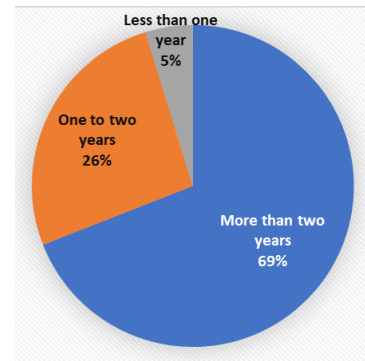
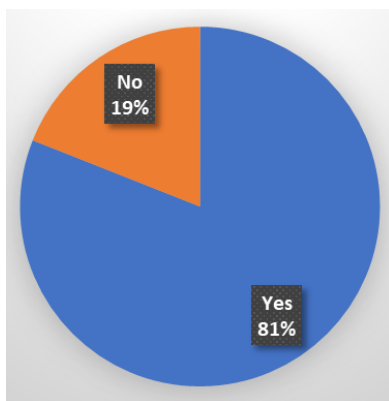


Figure 41: Participants' Experience in Computer and Internet Usage

Most test participants have experience and capability of doing an online transaction. The results in Fig. 42 show that 81% of participants have ever used the website to either apply for or buy something online. Moreover, 95% of these participants succeeded to complete the online transaction.

Have you ever applied for or bought something online?



Did you complete the application process successfully?

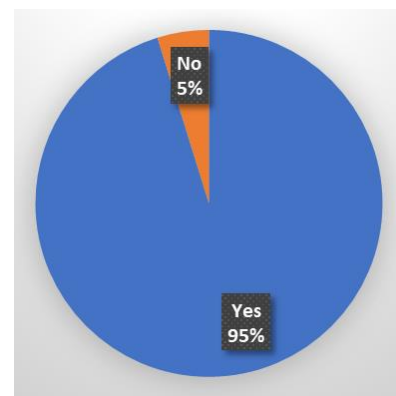


Figure 42: Test Participants Experience and Capability on the Online Transaction

4.4.2 Task Success-Completion-Rate

The task success-completion-rate measures the ability of users to successfully perform a task for the first time without assistance from another user. It is computed by dividing the number of participants who completed a task successfully (successes) to the total number of participants attempted the same task. The task failure rate is the opposite of the success-completion-rate. We can obtain the failure rate by dividing unsuccessful participants with the total number of participants attempting the same task. Tables 12, 13 and 14 summarise the success-completion-rate for tour guides, tour operators and tourists, respectively.

Most tour guides completed all tasks successfully with a success-completion-rate of 100% (Table 12). The tasks which didn't have 100% success-completion-rate include login into the system (96%), change your password (88%), find more about biodiversity (96%), create a new thread in the discussion forum (76%) and contribute to an existing topic in the discussion forum (76%). The lowest completion rate is 76% for two tasks, both dealing with the discussion forum.

Table 12: Success-Completion-Rate of Tour Guides

Task ID	Task Description	Attempts	Success	Success-Completion-Rate
T1	Home page review.	25	25	100%
T2	Login into the system.	25	24	96%
T3	Enter your personal detail.	25	25	100%
T4	Enter the language you use during work.	25	25	100%
T5	Enter guiding work.	25	25	100%
T6	Enter your education.	25	25	100%
T7	Upload your photo.	25	25	100%
T8	Preview your profile.	25	25	100%
T9	Look for job.	25	25	100%
T10	Change your password.	25	22	88%
T11	Find more about “Biodiversity.”	25	24	96%
T12	Create a new thread in the discussion forum.	25	19	76%
T13	Contribute to an existing topic in the discussion forum.	25	19	76%
T14	Find details of a guide named “Ajali.”	25	25	100%
Average success-completion-rate				95%

Tour operators completed all five tasks successfully with a success-completion-rate of 100%.

Table 13 shows the success-completion-rate of tour operators.

Table 13: Success-Completion-Rate of Tour Operators

Task ID	Task Description	Attempts	Success	Success-Completion-Rate
T1	Home page review.	10	10	100%
T2	Login into the system.	10	10	100%
T3	Post a job.	10	10	100%
T4	Edit one job.	10	10	100%
T5	Review and rate one guide of your choice.	10	10	100%
Average success-completion-rate				100%

Similarly, tourists have a success-completion-rate of 100% for all eight tasks they executed, as shown in Table 14.

Table 14: Success-Completion-Rate of Tourists

Task ID	Task Description	Attempts	Success	Success-Completion-Rate
T1	Home page review.	12	12	100%
T2	Login into the system.	12	12	100%
T3	Find out the number of guides who can speak “Italian.”	12	12	100%
T4	Find two guides from the “Kilimanjaro” region.	12	12	100%
T5	Change your password.	12	12	100%
T6	Find the names of two guides under the association named “Kilimanjaro Tour Guides Association.”	12	12	100%
T7	Find the expertise of one guide of your choice.	12	12	100%
T8	Review and rate one guide of your choice.	12	12	100%
Average success-completion-rate				100%

4.4.3 Error rate

An error is an unintended action, mistakes, slips, or omission that the user performs during task attempt. These errors can be minor, e.g., mistyping an email address, user interface problem, e.g., clicking some texts while thinking it is a menu or critical error that leads to a system failure. During usability testing, participants committed some errors while executing the scenarios. These errors were recorded and summarised, as presented in Tables 15, 16 and 17.

It was found that participants made several minor errors such as login failure, submitting empty field, entering texts in place of numbers, entering easy to guess password instead of strong one, uploading unsupported image format and uploading unacceptable image size. Participants didn't encounter an interface problem nor a critical error.

From Table 15, tour guides performed 50% of tasks with errors. Furthermore, the task "upload your photo" had a higher error rate (24%) followed by the task "Enter your personal detail" (20%). Other tasks with errors are "change your password" (16%), "login into the system" (12%), "Enter guiding work" (8%), "Enter your education" (8%) and "Create a new thread in the discussion forum" (8%). The task "upload your photo" had a higher error rate due to file format compatibility. Though there were explanations of which image format to upload, some users recommended more image types apart from the gif, png and jpeg that are supported by TGP. Most of the other errors were due to lack of attention from users, eg typing words instead of a number.

Table 15: Tour Guide Error Rate During Task Execution

Task ID	Task Description	Participants	Errors	Error rate
T1	Home page review.	25	0	0%
T2	Login into the system.	25	3	12%
T3	Enter your personal detail.	25	5	20%
T4	Enter the language you use during work.	25	0	0%
T5	Enter guiding work.	25	2	8%
T6	Enter your education.	25	2	8%
T7	Upload your photo.	25	6	24%
T8	Preview your profile.	25	0	0%
T9	Look for job.	25	0	0%
T10	Change your password.	25	4	16%
T11	Find more about “Biodiversity.”	25	0	0%
T12	Create a new thread in the discussion forum.	25	2	8%
T13	Contribute to an existing topic in the discussion forum.	25	0	0%
T14	Find details of a guide named “Ajali.”	25	0	0%
Average error rate				7%

At most two tour operators made one or two errors during scenario execution. Table 16 shows that “Post a job” had a higher error rate (20%) whereas “login into the system,” “edit one job” and “review and rate one tour guide of your choice” had a single error each (10%). Two tour operators mistyped the email address during the task “Post a job”, whereas, in login task, one tour operator forgot a password.

Table 16: Tour Operator Error Rate During Tasks Execution

Task ID	Task Description	Participants	Errors	Error rate
T1	Home page review.	10	0	0%
T2	Login into the system.	10	1	10%
T3	Post a job.	10	2	20%
T4	Edit one job.	10	1	10%
T5	Review and rate one guide of your choice.	10	1	10%
Average error rate				10%

Tourists completed five tasks without an error and three with errors (Table 17). The task with a higher error rate (25%) is “login into the system” when compared to others. Tasks “change your password” and “Find the expertise of one guide of your choice” had an error rate of 16% and 8.3%, respectively. The task login into the system required test participants to create first an account before login. Two tourists mistyped their email address and another forgot his password during login.

Table 17: Tourist Error Rate

Task ID	Task Description	Participants	Errors	Error rate
T1	Home page review	12	0	0%
T2	Login into the system	12	3	25%
T3	Find out the number of guides who can speak “Italian.”	12	0	0%
T4	Find two guides from the “Kilimanjaro” region	12	0	0%
T5	Change your password	12	2	16.7%
T6	Find the names of two guides under the association named “Kilimanjaro Tour Guides Association.”	12	0	0%
T7	Find the expertise of one guide of your choice	12	1	8.3%
T8	Review and rate one guide of your choice	12	0	0%
Average error rate				6%

As computed from Table 15, 16 and 17, the overall average error rate for all participants was 7%

4.4.4 Time-on-Task

Time on task is the measure of the efficiency in usability testing. It is time the participant uses to complete the task successfully or to be declared unsuccessful. Table 18, Figs. 43, 44 and 45 present the time taken by tour guides, tour operators and tourists on various tasks.

As shown in Fig. 43, most tour guides spent 40-59 seconds to complete most tasks. The percentage in Table 18 indicates the per cent of tour guides spending time on the specified task. The bottom row in Table 18 shows tasks with highest time-on-task (160-179 seconds) spent by some tour guides. These tasks are “Enter your personal detail” (12%), “Create a new thread in the discussion forum” (12%), “Login into the system” (4%), “Enter your education” (4%), “Change your password” (4%) and “Contribute to an existing topic in the discussion forum” (4%). The second row shows the lowest time-on-tasks (20-39 seconds). The tasks with this lowest time-on-tasks are “Home page review” (8%), “Change your password” (8%), “Find more about Biodiversity.” (8%), “Enter the language you use during work” (16%), “Preview your profile” (16%), “Enter guiding work” (12%), “Enter your education” (12%), “Upload your photo” (12%) and “Find details of a guide named Ajali” (44%).

Table 18: The time Spent by Tour Guides in Different Tasks

Time	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14
20-39	8%	0%	0%	16%	12%	12%	12%	16%	4%	8%	8%	4%	0%	44%
40-59	60%	56%	56%	48%	52%	36%	60%	60%	72%	28%	68%	12%	24%	56%
60-79	4%	8%	0%	12%	8%	8%	16%	8%	8%	20%	16%	12%	4%	0%
80-99	28%	32%	28%	12%	12%	24%	8%	16%	16%	16%	4%	40%	20%	0%
100-119	0%	0%	4%	0%	0%	4%	4%	0%	0%	12%	4%	12%	36%	0%
120-139	0%	0%	0%	4%	4%	0%	0%	0%	0%	0%	0%	4%	0%	0%
140-159	0%	0%	0%	8%	12%	12%	0%	0%	0%	12%	0%	4%	12%	0%
160-179	0%	4%	12%	0%	0%	4%	0%	0%	0%	4%	0%	12%	4%	0%
Mean time	59.9	68.7	77.5	64.7	68.7	77.5	55.9	54.3	56.7	82.3	55.1	95.9	96.7	40.7
Estimated time	60	120	120	120	180	120	60	60	120	120	120	120	180	60

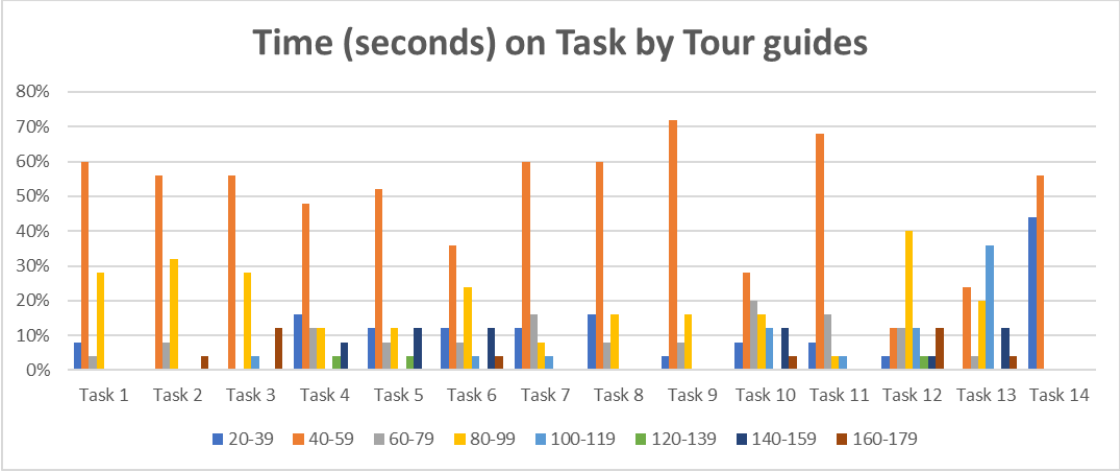


Figure 43: The Time Spent by Tour Guides in Different tasks

Many tour operators spent 40-49 seconds to perform most tasks (Fig. 44). As illustrated in Table 19, the tasks with the lowest time-on-task are “Home page review” (60%) and “Review and rate one guide of your choice” (20%), whereas “Login into the system” (20%), “Post a job” (20%) and “Review and rate one guide of your choice” (10%) have the highest time-on-task of 80-89 seconds.

Table 19: The Time Spent by Tour Operators in Different Tasks

Time	T1		T2		T3		T4		T5	
30-39	6	60%	0	0%	0	0%	0	0%	2	20%
40-49	3	30%	3	30%	0	0%	6	60%	4	40%
50-59	1	10%	3	30%	6	60%	4	40%	1	10%
60-69	0	0%	0	0%	0	0%	0	0%	0	0%
70-79	0	0%	2	20%	2	20%	0	0%	2	20%
80-89	0	0%	2	20%	2	20%	0	0%	1	10%
Mean time	39.5		61.5		64.5		48.5		53.5	
Estimated time	60		120		120		120		120	

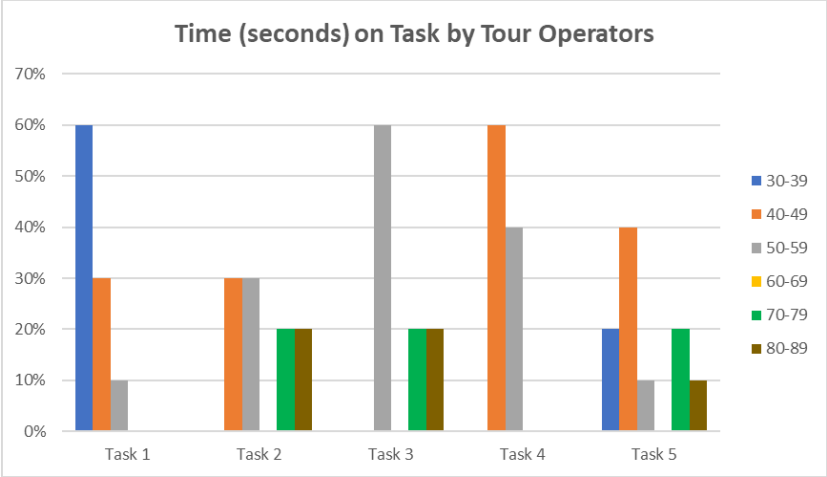


Figure 44: The Time Spent by Tour Operators in Different Tasks

As shown in Fig. 45 and Table 20, most tourists spent 40-49 seconds to complete the tasks. The lowest time-on-task is 30-39 seconds in almost all tasks except “Find the expertise of one guide of your choice.” Tourists spent the highest time-on-task (90-99 seconds) to only two tasks “Login into the system” (8%) and “Find the expertise of one guide of your choice” (8%).

Table 20: The Time Spent by Tourists in Different Tasks

Time	T1	T2	T3	T4	T5	T6	T7	T8
30-39	25%	8%	8%	33%	8%	17%	0%	17%
40-49	50%	33%	33%	50%	33%	25%	25%	33%
50-59	25%	17%	17%	17%	17%	25%	33%	33%
60-69	0%	0%	8%	0%	0%	8%	0%	0%
70-79	0%	17%	17%	0%	25%	17%	17%	17%
80-89	0%	17%	17%	0%	17%	8%	17%	0%
90-99	0%	8%	0%	0%	0%	0%	8%	0%
Mean time	44.5	61.2	58.7	42.8	59.5	55.3	63.7	51.2
Estimated time	60	120	120	120	120	60	120	120

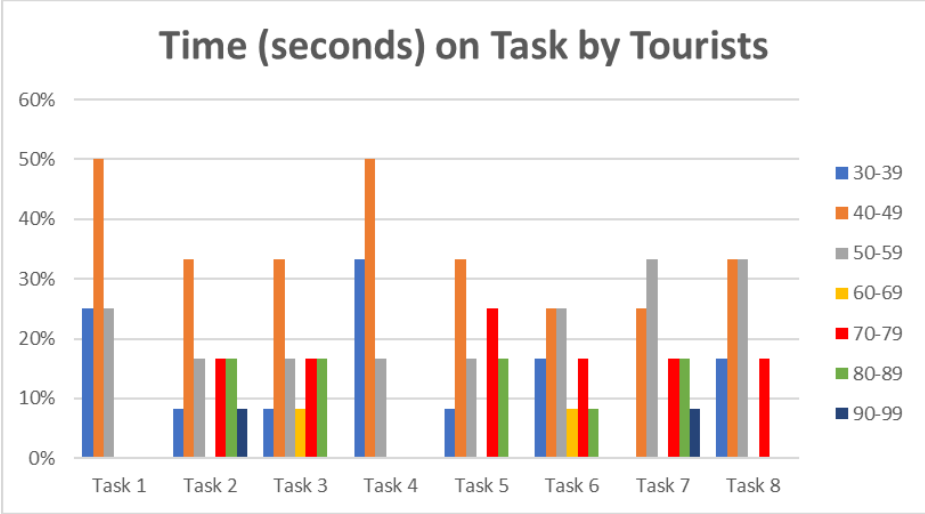


Figure 45: The Time Spent by Tourists in Different Tasks

4.4.5 System Usability Scale (SUS)

We used the modified version of SUS from the one created by John Brooke in 1986 to measure the usability of TGP. The SUS consisted of 10 questions, each with a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5) as shown in Table 21 (Klug, 2017). The results show that 73.1% of participants strongly agree to enjoy using the system interface (mean agreement rate =4.71) and 71.2% strongly agree that it is easy to learn using the system (mean agreement rate =4.69). Though the mean agreement rate for all usability factors is above 4.4, however, there are few participants (5.8%) who did neither agree nor disagree to both, the complexity of the system to the average computer user (mean agreement rate =4.56) and the need to learn many things before using the TGP (mean agreement rate =4.54).

Table 21: The Overall System Rating for Various Usability Factors

Factor	1	2	3	4	5	Mean	Total
The system was easy to use.	0.0%	0.0%	0.0%	34.6%	65.4%	4.65	47
The system was not complicated for the average computer user.	0.0%	0.0%	5.8%	32.7%	61.5%	4.56	47
I don't need support from technician to use this system.	0.0%	0.0%	3.8%	38.5%	57.7%	4.54	47
I found the flow of tasks in this system are well arranged.	0.0%	0.0%	1.9%	50.0%	48.1%	4.46	47
There was enough consistency in this system.	0.0%	0.0%	0.0%	40.4%	59.6%	4.60	47
The system is easy to learn.	0.0%	0.0%	1.9%	26.9%	71.2%	4.69	47
I don't need to learn many things before I managed to use the system.	0.0%	0.0%	5.8%	34.6%	59.6%	4.54	47
It was easy to find the information I needed.	0.0%	0.0%	3.8%	50.0%	46.2%	4.42	47
I enjoyed using the system interface.	0.0%	0.0%	1.9%	25.0%	73.1%	4.71	47
Information provided by the system is easy to understand.	0.0%	0.0%	0.0%	38.5%	61.5%	4.62	47

Note: 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

4.4.6 Participants Likes, Dislikes and Recommendation

After finishing the SUS, participants gave their feedback regarding the overall feel of the TGP. They elaborated on what they like most and least as well as the suggestion for improving the TGP.

(i) Liked Most

Most participants liked the ease of locating a competent and professional tour guide through the TGP. They commended the flexibility of searching tool that allowed them to search for a tour guide by writing anything they remember about a tour guide. Further, participants applauded the intuitiveness and learnability of the portal. They argued that the TGP is easy to use for both the first time and returning user. They gave an example of the job manager module that is easy to submit, locate and edit job application. Moreover, tour guides liked the navigation style that helped them to predict the contained contents and what is next.

Besides usability comments, participants admired the functionalities such as the promotion of tour guides profession, reviewing and rating of tour guides, bringing together of all tourism stakeholders on a single platform and opportunities of tour guides to continually update their knowledge.

(ii) Dislike

Some of the tour guides complained about the length of the registration process. They commented that the profile registration is longer and consume a lot of time. Further, guides protested on uploading feature that it supports few file formats and the maximum upload size was not apparent. Besides, participants did not like the complexity requirement of the password creation, that though stronger passwords are good for security, however, they are hard to member and may cause a legitimate user being blocked from using the system.

(iii) Recommendation for Improvement

Tour guides proposed to break down the registration process into small portions that would allow the user to save the completed sections. They further suggested that TGP should remind the TG of the steps remained to complete the registration process. On how to select language and capability levels, TGs advised that the TGP should allow users to choose many languages and then submit instead of choosing one and submit.

4.4.7 Participant Reactions

The participant reaction reveals their feelings towards the TGP. These data were collected during the execution of task scenarios. The results show that the responses of participants are generally positive and they would like to use the portal. The reactions included “wow, this is fantastic”, “the fonts are larger enough”, “The colours reflect the wildlife”, “even the occasional computer users can use this system”, “I like this live currency exchange rate.” Nevertheless, there were few negative comments such as “this registration process is long”, “Is that name of company or representative?”, “Why should I enter my name again?”. The researcher dealt with these adverse reactions by fixing the system.

4.4.8 Discussion of TGP Usability Evaluation

This study had measured the usability of TGP by using systematic methods suggested by various literature (Alshamari & Mayhew, 2008; Essawy, 2005; Jing *et al.*, 2015). It has employed the ISO usability standards to measure effectiveness, efficiency and satisfaction of TGP (Bevan *et al.*, 2016; Hussain *et al.*, 2015). The findings show that the average success-completion-rate was 97%, whereas the average error rate was 7%. These data reveal that users were able to complete the tasks with very few errors, hence proving that TGP is effective as it can support users to accomplish their goals.

Further, the results on participant's time-on-task disclose the efficiency of TGP. Though few users exceeded the estimated time to some tasks, the average time for each task was better than the estimated task. Moreover, participants were satisfied with TGP for both quantitative and qualitative measurements. In quantitative measure, the overall system rating, according to SUS score, was 4.6 out of 5 or 91.6%. This value represents strongly satisfaction, according to Bangor *et al.* (2009) and Brooke (2013). While in qualitative criteria, the participants' reactions were overall positive.

4.5 Business Model

This section responds to the research question: *What kind of business model can be developed to sustain the services offered by the tour guide portal?* To answer this question, we conducted a business model formulation workshop and went through the lean canvas to find out the different elements of the business model for TGP. Further, the researcher performed the break-even analysis to understand when will the revenue earned covers the costs incurred.

4.5.1 Lean Canvas

As shown in Fig. 9, the lean canvas has nine sections, namely problem, customer segment, unique value proposition, solution, channels, revenue streams, cost structure, key metrics and unfair advantage. The following sections describe briefly each component and the respective results obtained during the business model workshop of TGP.

(i) Problem

It is vital to understand the problems facing your customers so that you don't waste the limited resources in solving the wrong problem. In this section of canvas, we highlighted the problems faced by our customers that drove us to develop the TGP. These problems include the information about TG and their capabilities is not easily available and consumes a lot of time to search for them, lack of a common platform for TG and hence it is difficult for them to conduct discussion about their profession. Further, they cannot easily access the appropriate learning materials and job announcements. Moreover, the process of registering and recognising a TG is lengthy, time consuming, and require a lot of resources.

(ii) Customer Segment

This section is directly linked to the previous problem component and Maurya (2012) proposed to discuss the two parts together. The list of our customers is tour guides, tour operators, Government and its tourism agencies, and tourists

(iii) Unique Value Proposition (UVP)

This section of lean canvas answers the question of why should customers getting the attention of our product (Maurya, 2012). It is the line of text that tells the audience what differentiates our product from an existing alternative in the market (Johansson, 2017). It is a promise of value to our prospective customers. Some of UVP for TGP are: "One-stop centre for tour guides services", "Bringing all tourism stakeholders in one single point", "We are making a reliable tour guide information accessible", "Enhancing tour guide professionalism through user-generated contents", and, "Directly contact the individual tour guide through our portal"

(iv) Solution

This section exemplifies the answers to the listed problems. In most cases, it is the product or services that we are going to offer. Some of the services the TGP is going to offer are: "Provide information about tour guides through structured profiles", "Profile enhanced with a certified qualification certificate", "Provide direct and open discussion and exchange among guides, tour operators and tourists through discussion forums and learning community", "Provide learning library to tour guides through a community of practice", and "Bringing all guides together, regardless of their associations on a common portal."

(v) Channels

Channel is the path to use in order to reach customers. According to Maurya (2012), many start-ups fail because of an insignificant path to customers. There is a plethora of so-called free channels such as social media, however, they need investment of human capital to run them. The following are channels that can be used to reach TGP customers: “Face-to-face workshops, training and conferences”, “Peer-to-peer word of mouth”, “Social media including Facebook, Instagram and Twitter”, and “Links from participating guides and tour operators”.

(vi) Revenue Streams

These are the means of getting finances to support and sustain the business. It is the trickiest part because it can retain or discourage the customers. This section answers the question of what value will each customer be willing to pay (Osterwalder & Pigneur, 2010). In a TGP, we have free and paid section for our customers. The free section will remain free forever, thus our revenue streams will be through an annual subscription estimated to TZS 25 000 p.a. and TZS 100 000 p.a. for TG and tour operator respectively, partnership badge which is a recognition for financial support, sponsorship, job announcement fee estimated to TZS 10 000 per TG job and TZS 20 000 per non-TG job, both per month.

(vii) Cost Structure

In this section, we list all the costs to be incurred to sustain the services offered by the TGP. These costs are either fixed, once-off, or variable. Most operations will be automated and will require less human intervention to reduce operational costs. The expected fixed costs are hosting (USD 70 p.a.), domain name registration (TZS 25 000), marketing costs including advertisements and graphics design (TZS 200 000), and TCRA annual licence for content regulation (TZS 100 000). The once-off fee is only TCRA application fee (TZS 100 000) whereas the variable cost is webmaster umbrella contract estimated at TZS 100 000 per incident per month.

(viii) Key Metrics

Key metrics are used to measure the performance and progress of a company. For start-ups, key metrics are crucial as they help to know where should a start-up concentrates its resources (Nir, 2018). The metrics that will be used in TGP are new registrations, total number of members,

discussion engagement, number of jobs posted, site traffic, registered awards winners and Government partnership activities.

(ix) Unfair Advantage

It is a competitive advantage that your competitors cannot easily copy them. With TGP, competitors can reproduce a portal like this. However, they cannot establish the same partnership we have with the government. Thus, partnership with the government is our unfair advantage.

4.5.2 Break-even Point Analysis

It is vital to know at what point the revenue earned from the business covers the costs of resources used to make it. The break-even point analysis is the process of determining the number of units bringing revenue required to cover the fixed and variable costs of producing it.

(i) Revenue calculation

The revenue is calculated according sources presented in Section 4.5.1 (vi) above. We assume that there are no sponsors nor partners and hence all revenues come from subscriptions and job announcement fees. Table 22 presents the revenue calculation.

Table 22: The Revenue Calculation

Source	Amount per unit per year	Total Amount	comment
Tour operator annual subscription	100 000	100 000N	For N tour operator subscriptions
Tour guide annual subscription	25 000	250 00M	For M tour guide subscriptions
TG job announcement fee	360 000	360 000	3 announcements per month
Non-TG job announcement fee	240 000	240 000	1 announcement per month
Total revenue		600 000 + 100 000N + 25 000M	

M=number of tour guide subscriptions, N=number of tour operator subscriptions

(ii) Cost calculation

The cost is calculated according to cost items presented in Section 4.5.1 (vii) above. Table 23 presents the calculation of cost for running the TGP.

Table 23: The Cost Calculation

Cost item	Cost per unit per year	Total cost	Comment
Hosting	162 050	162 050	Fixed cost at USD 70 per year exchanged at 1 USD = TZS 2 315
Domain registration	25 000	25 000	Fixed cost
TCRA Fee	1 100 000	1 100 000	Fixed cost for the first year
Market cost	2 400 000	2 400 000	Fixed cost at 200 000 per month
Administrative cost	100 000	24 000M	Variable cost at 50 TGs cause 1 incident per month
Total cost		3 687 050 + 24 000M	

M=number of tour guide subscriptions

At break-even point,

$$\text{Total Cost} = \text{Total Revenue}$$

$$3\,687\,050 + 24\,000M = 25\,000M + 100\,000N + 600\,000$$

$$\text{OR: } 1\,000M + 100\,000N = 3\,087\,050$$

$$\text{OR: } M + 100N = 3\,087.05$$

Therefore,

- (i) If we assume no tour operator subscription, we will need 3087 tour guides to break even in one year. This number is about 60% of all tour guides in Tanzania.
- (ii) If we assume TG will be waived of subscription fee, then the equation will change to:

$$3\,687\,050 + 24\,000M = 25\,000 \times 0 + 100\,000N + 600\,000$$

$$\text{OR: } 100\,000N - 2\,400M = 3\,087\,050$$

- (iii) Thus, assume 75% of tour guides or 3750 subscribe (since the subscription fee is waived), giving $100\,000N = 3\,087\,050 + 3\,750 \times 24\,000 = 93\,087\,050$ or 931 tour operators.
- (iv) Thus, we will need 931 tour operators to break even in one year. However, it might need higher costs to get that number of tour operators. Therefore, if we want to waive the subscription fee to tour guides, then either we get sponsorship, or the subscription fee for tour operators is increased.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study aimed in addressing the challenge of locating a professional tour guide in Tanzania by developing a Tour Guide Portal (TGP) for the purpose of enhancing tourism in Tanzania. Both qualitative and quantitative approach were used to assess the current practices of tour guides and thus determining the requirements for the portal. The study has employed an agile methodology through extreme programming to develop the portal.

The research elaborated on the current practices of tour guides in Tanzania and how the development of a TGP will augment the professionalism of tour guides. The findings have shown that there are numerous tour guides with diverse knowledge, skills, attitudes and experiences. It is problematic to identify which guide is most appropriate for a particular task. Further, most TGs can communicate using at least one foreign language, but the language aptitude levels need to be established.

While licensing and certification have been used in different places to enhance the professionalism of TGs, this research has found that user-generated contents from customers can complement these methodologies. Moreover, the TGP will create baseline information of tour guides in Tanzania, recognising, registering and facilitating the license application as well as enabling feedback systems through user-generated contents from both, service providers and consumers of tourism.

The study findings imply that the development of TGP is a massive step towards promoting the tour guide profession in Tanzania. The rise of this profession will increase its value and thus more educated people of different ages will participate in tour guiding career. Further, TGP will help the government get the right statistics of existing TG in Tanzania and their needs and so they know the better approach of using tour guide as the catalyst for tourism development in Tanzania.

Furthermore, the TGP will assist the tourists, tour operators and other TG customers to know which tour guide to be employed for a specific job. For instance, a researcher researching in flowers may use the TGP to locate an appropriate tour guide with the necessary knowledge.

Developing and deploying TGP is not enough for solving the existing challenges if the TGP will not be usable and unsustainable. Therefore, by using experimental research, this study conducted a usability test to understand its TGP usability and areas of improvement. Further, the study established a business model that will help the sustainable operation of TGP.

5.2 Recommendations

Since the findings have shown the lack of baseline information of tour guides in Tanzania and the difficulty in identifying a proper TG for particular tasks and since the TGP has addressed these problems, the study recommends the usage of TGP. Further, the research suggests the awareness program be conducted among the clients of TGP by using various channels such as social media and peer to peer. These channels are cost-effective and will reach many people in a short time.

The business model has found that for sustainable operation of TGP, a good number of TGs and tour operators are required. While this is possible with an awareness program suggested above, the study recommends the presence of sponsors and partners that will cover initial costs, especially for the first year of operation. Moreover, the study recommends the pre-entering of TG data from tour guide associations and other relevant authorities that has been storing the valid TG data. This will reduce the length of the registration process and ensure the validity of tour guide data entry.

This study has proposed and implemented the use of UGC as a feedback system to enhance the professionalism of TGs in Tanzania. Further, the research has suggested the community of practice as the methodology for continuous education of TGs in Tanzania. These two proposals are expected to augment tourism in Tanzania. However, another study may be conducted to find out the impact of TGP to TGs professionalism and enhancement of tourism in Tanzania after the operation of TGP. Additionally, although the security measures have been imposed to TGP, however, its evaluation is missing. Therefore, the researcher recommends the study that evaluates the system security vulnerabilities such as SQL injection, cross-site scripting, broken authentication, brutal force attack and insecure direct object references.

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APPENDICES

Appendix 1: Survey Questions for Tour Guide

The Nelson Mandela African Institution of Science and Technology Development of Tour Guide Portal for Enhancing Tourism in Tanzania

Data Collection Tool for Tour Guides

Hello, my name is Deogratias Shidende. I am currently studying MSc (ICSE) specialising in Software Development and Management at the Nelson Mandela - African Institution of Science and Technology (NM-AIST). I am researching on "Development of Tour Guide Portal for Enhancing Tourism in Tanzania". My supervisors for this research are Prof Dr Sabine Moebs and Dr Shubi Kaijage

This questionnaire will take no longer than 10 minutes to complete.

All responses will be kept with confidentiality and no one will be identified in the research.

If you have any questions about this survey, please email me: shidended@nm-aist.ac.tz

Demographic Information

1. What is your gender

Male

Female

2. How old are you? (please check ✓ one):

Less than 24 years

Between 24

and 39

Between 40

and 55

Over 55

3. What is your nationality _____

Educational Background

4. What is your highest Education level (please check ✓ one):

Primary

O-level

sec

A-Level

sec

Certificate

Diploma

Bachelor

Masters

PhD

5. What was the name of the programme you studied? _____
6. Have you ever studied a tour guiding course? **Yes []** **No []**
7. If yes, was it a short course or a regular course? **Short Course []** **Regular Course []**
8. Do you have another profession apart from tour guiding? **Yes []** **No []**
9. If yes, what is the name of that profession? _____

Tour Guiding Profession

10. What is your position in guiding activity (please check ✓ one)

Porter	<input type="checkbox"/>	Safari Guide	<input type="checkbox"/>
Cook	<input type="checkbox"/>	Mountain Guide	<input type="checkbox"/>

11. How long have you done tour guiding work? (please check ✓ one)

Less than one year	<input type="checkbox"/>	1 – 3 years	<input type="checkbox"/>	4 – 5 years	<input type="checkbox"/>	More than 5 years	<input type="checkbox"/>
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12. Have you ever done another work apart from tour guiding? **Yes []** **No []**

13. If yes, what is the name of that work? _____

14. Do you have a tour guiding license offered by the department of tourism under the ministry of natural resources and tourism? **Yes []** **No []**

15. Who is your current employer?

- a) Self-employed [] b) Private Company [] c) Government []

16. Which languages do you speak in your job as tour guide? (Please check ✓ all that apply)

English	<input type="checkbox"/>	German	<input type="checkbox"/>	French	<input type="checkbox"/>
Kiswahili	<input type="checkbox"/>	Chinese	<input type="checkbox"/>	Italian	<input type="checkbox"/>
Portuguese	<input type="checkbox"/>	Spanish	<input type="checkbox"/>	Other	<input type="checkbox"/>

17. What challenges have you met in your work as a Tour Guide? (Please check ✓ all that apply)

Difficulties in acquiring registration process	<input type="checkbox"/>
Competition with untrained tour guides	<input type="checkbox"/>
Lack of training opportunities	<input type="checkbox"/>

Poor payment from an employer	
The incompetence of the destination knowledge such as knowledge of birds, animals and flowers	
Local tourism authorities (e.g., TANAPA) regulations	
Lack of common platform that unifies all tour guides in Tanzania	
I have been allocated to guide tourists in a geographical area that I am not familiar with	
Poor working conditions such as unavailability of tools (for example emergency and first aid kit)	
Other Challenges: (briefly explain)	

18. How much tip do you think is reasonable for your work per day?

\$1 - \$4	<input type="checkbox"/>	\$5 - \$10	<input type="checkbox"/>	\$11 - \$20	<input type="checkbox"/>
\$21 - \$49	<input type="checkbox"/>	\$50 - \$79	<input type="checkbox"/>	\$80 - \$100	<input type="checkbox"/>
\$101 - \$150	<input type="checkbox"/>	\$150 and above	<input type="checkbox"/>	No Tipping	<input type="checkbox"/>

19. Are you a member of any tour guiding association/group? **Yes** [] **No** []

20. If you are a member, what is the name of the association/group?

Tour guiding Portal

21. For the following sentences choose between 0 to 5 where 0=strongly disagree and 5 = strongly agree

a. Tour Guide Portal will improve my guiding work	0	1	2	3	4	5
b. Tour Guide Portal will help me get more guiding work	0	1	2	3	4	5
c. Tour Guiding Portal will increase interactions among tour guides (bring unity/strong bond)	0	1	2	3	4	5
d. With Tour Guiding Portal it will be easy to apply for the license	0	1	2	3	4	5
e. Tour Guide Portal will improve tourism in Tanzania	0	1	2	3	4	5

22. Which features of a tour guiding portal would you think are helpful to tour guides (Please check ✓ all that apply)

Discussion forum among tour guides	<input type="checkbox"/>
------------------------------------	--------------------------

Tour guide account for personalised space	
A searching tool so that tourists can search portal and find me	
A searching tool so that I can search for different materials from portal	
Job opportunities announcements	
Polls/voting for trending topics	
Applying for License through the portal	
Direct communication with a tourist	
Information about tourist destination and type of tourism	
Profile management so that I can update my personal information	
Upload video on my profile	
Upload pictures on my profile	
Chat with other tour guides	
Sharing button	
Commenting button	
Feedback on discussions and tour guide profiles with Likes etc.	
Tour guiding learning library for knowledge on various topics	
Other features: (briefly explain)	

23. How would you like to communicate with a tourist? (Please check ✓ all that apply)

Email	<input type="checkbox"/>	WhatsApp	<input type="checkbox"/>	Phone call	<input type="checkbox"/>
Chat within portal	<input type="checkbox"/>	Normal SMS	<input type="checkbox"/>	Other	<input type="checkbox"/>

24. What kind of information category (discussion topics/rooms) would you like to have from the portal? (Please check ✓ all that apply)

Business	<input type="checkbox"/>	Current issues	<input type="checkbox"/>
Marketing and promotions	<input type="checkbox"/>	Peer support from other guides	<input type="checkbox"/>
Various campaign	<input type="checkbox"/>	Conservation issues	<input type="checkbox"/>
Wildlife (flora & fauna)	<input type="checkbox"/>	Travel information	<input type="checkbox"/>
Ethics (code of conduct)	<input type="checkbox"/>	National parks	<input type="checkbox"/>
Languages	<input type="checkbox"/>	Calculation of offer	<input type="checkbox"/>
Other	<input type="text"/>		

25. What kinds of topics or learning notes would you like to find from the portal learning library?

(Please check ✓ all that apply)

Destination point	<input type="checkbox"/>	wildlife (flora & fauna)	<input type="checkbox"/>
business planning	<input type="checkbox"/>	calculation of offer	<input type="checkbox"/>
languages	<input type="checkbox"/>	other	<input type="checkbox"/>

Other Information

26. Which language would you like to learn? (Please check ✓ all that apply)

English	<input type="checkbox"/>	German	<input type="checkbox"/>	French	<input type="checkbox"/>
Kiswahili	<input type="checkbox"/>	Chinese	<input type="checkbox"/>	Italian	<input type="checkbox"/>
Portuguese	<input type="checkbox"/>	Spanish	<input type="checkbox"/>	Other	<input type="checkbox"/>

27. How do you usually access the internet? (Please check ✓ all that apply)

USB Stick (Modem)	<input type="checkbox"/>	Internet at home	<input type="checkbox"/>	Wifi at hotels	<input type="checkbox"/>
Smartphone	<input type="checkbox"/>	Internet at the office	<input type="checkbox"/>	Wifi at public places	<input type="checkbox"/>
Internet Café	<input type="checkbox"/>	Other means	<input type="checkbox"/>		

28. Which device are you usually using for accessing the internet? (Please check ✓ all that apply)

Smartphone	<input type="checkbox"/>	Tablet/ipad	<input type="checkbox"/>	My laptop	<input type="checkbox"/>	My computer at home	<input type="checkbox"/>	Computer (or laptop) at the office	<input type="checkbox"/>
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29. Which data plan (Internet bundle) do you prefer to use for internet in a week? (please check ✓ one)

Less than 500 MB per week	<input type="checkbox"/>	500MB – 1 GB per week	<input type="checkbox"/>	1.1 GB – 2GB per week	<input type="checkbox"/>	2.1 GB – 4 GB per week	<input type="checkbox"/>	Larger than 4 GB per week	<input type="checkbox"/>
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30. Do you have any other information you would like to share with us?

Appendix 2: Survey Questions for Tourist

The Nelson Mandela African Institution of Science and Technology Development of Tour Guide Portal for Enhancing Tourism in Tanzania

Data Collection Tool for Tourists

Hello, my name is Deogratias Shidende. I am currently studying MSc (ICSE) specialising in Software Development and Management at the Nelson Mandela - African Institution of Science and Technology (NM-AIST). I am researching on "Development of Tour Guide Portal for Enhancing Tourism in Tanzania". My supervisors for this research are Prof Dr Sabine Moebs and Dr Shubi Kaijage

This questionnaire will take no longer than 7 minutes to complete.

All responses will be kept with confidentiality and no one will be identified in the research.

If you have any questions about this survey, please email me: shidended@nm-aist.ac.tz

1. What is your gender?

Male Female Other

2. How old are you

Less than 24 years Between 24 and 39 Between 40 and 55 Over 55

3. What is your nationality? _____

4. What is your occupation?

Student Employee Self-Employed Retired Person Religious Other

5. Have you ever visited Tanzania Tourist Destination before **Yes** [] **No** []

6. Did you travel to Tanzania (or tourist destination) for? (select all that apply)

Holidays/Leisure Business Research Meeting friends/relatives Religious Other

7. How serious are the following challenges when you visited Tanzania's tourist destination?

(Choose between 0 to 5: where 0 = Not serious at all and 5 = Very Serious):

Note: The question is measuring the seriousness of the challenge. 0 means not serious challenge and 5 means a very serious challenge

Reliability in international money transfer	0	1	2	3	4	5
Total price of the tour	0	1	2	3	4	5
Hotel (accommodation) services	0	1	2	3	4	5
Travel services and arrangements	0	1	2	3	4	5
Services offered by safari or mountain guides	0	1	2	3	4	5
Points of interest (it didn't fulfil my expectation)	0	1	2	3	4	5
Language difficulties at travel, guides or hotels	0	1	2	3	4	5

8. How much tip would you prefer to pay to tour guide per day?

\$1 - \$4		\$5 - \$10		\$11 - \$20	
\$21 - \$49		\$50 - \$79		\$80 - \$100	
\$100 - \$150		\$150 and above		No tipping	

9. How important are the following factors when choosing a tourism destination?

(Choose between 0 to 5: where 0 = Not important at all and 5 = Very important)

Reliability of tour operators	0	1	2	3	4	5
Reliability in international money transfer	0	1	2	3	4	5
Total price of the tour	0	1	2	3	4	5
Travel (Safari) services and arrangements	0	1	2	3	4	5
Hotel (Accommodation) services	0	1	2	3	4	5
Mountain guide services	0	1	2	3	4	5
Services offered by safari or mountain guides	0	1	2	3	4	5
Points of interest (The place you want to visit)	0	1	2	3	4	5
Language proficiency	0	1	2	3	4	5

10. What do you prefer when you are visiting a place?

Go yourself -use a tourist guide book Hire an independent tour guide Use a tour company operator

11. Would you prefer to know your tour guide details when you are planning for your safari?

Yes [] No []

12. Have you used the services of a tour guide before?

Yes [] No []

13. If yes, were you satisfied with the services offered by a tour guide?

Yes [] No []

14. What are the major problems you have faced with tour guides services?

Language problems with a guide	<input type="checkbox"/>	Hospitality	<input type="checkbox"/>	Security issues	<input type="checkbox"/>
Destination knowledge	<input type="checkbox"/>	Wildlife knowledge	<input type="checkbox"/>	other	<input type="checkbox"/>

15. Which tool do you prefer when searching for a better place to visit?

website mobile app Other

16. Which tool would you prefer when you are looking for a tour guide for your safari?

website mobile app Other

17. Which features of a tour guiding portal do you think are helpful to tourists (tick all that apply)

Discussion forum among tourists	<input type="checkbox"/>
Tourist account (username/password for private space) for the platform	<input type="checkbox"/>
A searching tool that allows searching for a tour guide	<input type="checkbox"/>
Polls (voting) for different opinions	<input type="checkbox"/>
To know if a particular guide is licensed	<input type="checkbox"/>
The information that a particular tour guide is competent in a specific area	<input type="checkbox"/>
Direct communication with a tour guide	<input type="checkbox"/>
Information about tourist destination and type of tourism	<input type="checkbox"/>
Write a recommendation for a guide	<input type="checkbox"/>
Upload video on my profile	<input type="checkbox"/>
Upload pictures on my profile	<input type="checkbox"/>
Chat with tour guides at specific times	<input type="checkbox"/>
Feedback on discussions and tour guide profiles with Likes etc.	<input type="checkbox"/>
Rate tour guide services with stars	<input type="checkbox"/>
Other features: (briefly explain)	<input type="checkbox"/>

18. Do you have any other information you would like to share with us?

Appendix 3: The Calculation of Sample Size Using Cochran's Formula

Cochran's method for calculating the sample size consists of two steps:

Step 1: Sample size for an infinite population is given by

$$n_0 = \frac{z^2 pq}{e^2}$$

Where

n_0 = sample size for infinite population

z = z-score computed from the confidence level

p = estimated population proportion (normally 50% if unknown)

$q = 1 - p$

e = specifies the desired level of precision, where $e = 1 - \text{precision} = \text{marginal error}$

Thus, if confidence level is 90%, $z=1.645$ (from z-table), $p=q=0.5$, $e=0.09$

Then:
$$n_0 = \frac{1.645^2 \times 0.5 \times 0.5}{0.09^2} = 83.52$$

Step 2: Adjust the sample size for a finite population

For finite population N , the actual sample size is s , where

$$s = \frac{n_0}{1 + \left(\frac{n_0 - 1}{N}\right)}$$

Therefore, for the approximated population of 5000 tour guides, the actual sample size is given by:

$$s = \frac{83.52}{1 + \frac{83.52 - 1}{5000}} = 82$$

The minimum sample size is 82 tour guides

Appendix 4: Release Plan Form

**The Nelson Mandela African Institution of Science
and Technology
Development of Tour Guide Portal for Enhancing
Tourism in Tanzania**

Release Plan Form

Story ID:

Iteration:

Start Date:

Completion Date:

User Story

Signature

Developer

Signature

Customer

Appendix 5: Usability Test Plan

The Nelson Mandela African Institution of Science and Technology Development of Tour Guide Portal for Enhancing Tourism in Tanzania

Usability Test Plan

SCOPE

This test plan will be used to evaluate a Tour Guide Portal (TGP). The usability test will cover the navigation and contents of the system. Tour guides, tourists and tour operators will be involved to test the TGP according to their respective roles.

The test objectives of this usability study are to evaluate the portal relative to the user's ability to:

Tour Guides

- Create an account
- Manage the profile
- Search for relevant learning materials
- Discuss in the discussion forum
- Prepare for license application
- View job opportunities
- Post learning material in the learning library

Tourist

- Find a competent guide
- View guide profile
- Review and rate the guide
- Discuss in the discussion forum
- View guides languages
- View guides association members
- Make an offer to a tour guide

Tour Operators

- Post job advertisement
- Set a company profile
- Find a competent guide
- View guide profile
- Review and rate the guide
- Discuss in the discussion forum
- View guides associations and their members

PURPOSE

The purpose was to evaluate the usability of the TGP by finding out the answers to the following usability research questions (URQ)

URQ1: Can the user complete his goal of using the tour guide portal?

URQ2: How fast can the user complete a task in using the tour guide portal?

URQ3: Can the user do the tasks in the tour guide portal correctly?

URQ4: What are the reactions of the users when using TGP?

URQ5: What is the user feedback in terms of most likes, dislikes and recommendation?

URQ6: How do users rate the system using the 5-point Likert scale?

SCHEDULE & LOCATION

The test schedule is as indicated in Table 1.

Table 1: Usability Test schedule

Date	Location	Time	Targeted participants
22nd – 24th July 2019	Arusha cultural heritage	09:00 – 16:00	30 Tour guides
25th July 2019	Kibo Palace Hotel	16:00 – 20:00	15 Tourists

26th July 2019	Various tour operator offices at Arusha	08:00 – 16:00	15 Tour operators
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SESSION

Each test session will take 20 minutes, that will include:

- (i) Briefing about testing (2 min). A group of users will be briefed together whenever possible.
- (ii) Pretesting questionnaire (2 minutes) (attached at Appendix 5(ii))
- (iii) Task scenarios execution (10 minutes)
- (iv) Post-test questionnaire (2 minutes) (attached at Appendix 5(iii))
- (v) Likes, dislikes and recommendations (2 min)
- (vi) Debriefing (2 min)

EQUIPMENT

The following equipment will be used in a test session:

- The laptop which users will be using to access the portal. This laptop will be installed with both tour guide portal and screen recorder software
- Sound recorder for recording user's thoughts when they think out loud

PARTICIPANTS

The portal will be tested by a total of sixty (60) users. These users will be grouped depending on their user type. The user type are tour guides, tourist and tour operators. Table 2 describes the user selection.

Table 2: Participants

User type	Number of participants
Tour guide	30
Tour operator	15
Tourist	15

SCENARIOS

Participants will be required to complete the tasks by being introduced to several scenarios to meet the test objectives. The researcher should always remind and encourage the participant to think-aloud and express their feelings. The task scenarios for each group of users are as described in Table 3 to Table 8.

Table 3: Task Scenarios for a Tour Guide: Guide 1

Task ID	Scenario	Task	Estimated time
T1	Open home page: What can you do here?	Home page review	1
T2	Login into the system	Create an account	2
T3	Enter your personal detail	Manage profile	2
T4	Enter the language you use during work	Manage profile	2
T12	Create a new thread in the discussion forum	Starting a topic in the discussion forum	2
Total time			9 min

Table 4: Task scenarios for a tour guide: Guide 2

Task ID	Scenario	Task	Estimated tim
T2	Login into the system	Create an account	2
T5	Enter guiding work	Manage profile	3
T6	Enter your education	Manage profile	2
T9	Look for job	Find job	2
T10	Change your password	Change password	2
Total			10 min

Table 5: Task Scenarios for a Tour Guide: Guide 3

Task ID	Scenario	Task	Estimated time
T2	Login into the system	Create an account	2
T11	Find more about “Biodiversity.”	Search learning material	2

T7	Upload your photo	Manage profile	1
T8	Preview your profile	Manage profile	1
T13	Contribute to an existing topic in the discussion forum	Discuss in a discussion forum	3
T14	Find details of a guide named “Ajali.”	Find guide	1
Total			10 min

Table 6: Task Scenarios for a Tourist: Tourist 1

Scenario	Task	Estimated time
What can you do on the home page	Home page review	1
Log into the system	Create an account	2
Find out the number of guides who can speak “Italian.”	Spoken Language	2
Find two guides from Kilimanjaro	Find guide	2
Change your password	Change password	2
Total		9 min

Table 7: Task Scenarios for a Tourist: Tourist 2

Scenario	Task	Estimated time
Login into the system	Create an account	2
Find out the number of guides who can speak “Italian.”	Spoken Language	2
Find the names of two guides under the association “Kilimanjaro Tour Guides Association.”	Guides association	1
List all guides in the system. How many are they?	List guides	1
Find the expertise of one guide of your choice	Guide details	2
Review and rate one guide of your choice	Review guide	2
Total		10 min

Table 8: Task Scenarios for a Tour Operator

Scenario	Task	Estimated time
What can you do on the home page	Home page review	1
Login into the system	Create an account	2
Post a job	Job posting	2
View the list of jobs you have posted and edit one job	Job dashboard	2
Review and rate one guide of your choice	Review guide	2
Total		10 min

METRICS

Quantitative and qualitative metrics will be evaluated.

The quantitative metrics will be:

- System Usability Scale (SUS) – measures the overall usability of the system by using the 5-point Likert scale.
- Execution time (time-on-task) – It is a time taken for the user to complete a task. It measures the efficiency of the system
- Success completion rate – the rate at which users complete the scenario successfully.
- Error rate – the rate at which users commit errors during task execution.

The qualitative metrics include:

- User reactions – the reaction of the user while executing the scenario
- User dislikes, likes and comments – the overall comments from users

ROLES

Moderator will be responsible for:

- Setting the room and equipment
- Give a briefing
- Ask pre-test questions
- Introduce task scenarios
- Observe and record both quantitative and qualitative metrics
- Administer the post-test questionnaire and end the session

A research assistant will be responsible for

- Assisting the moderator in setting the room
- Helping the moderator in recording the qualitative and quantitative metrics

Appendix 5(i): Session Opening Script

Hello, my name is Deogratias and I am going to moderate this session. How is your day going?

Thank you for your valuable time to participate in this session and no doubt, you will find this experience stimulating. The meeting will take only 10 minutes.

Well, what we are going to do is a usability testing on a tour guide portal. We developed a web portal for tour guides, tourists and tour operators that allows the guides to present themselves and others (tourists and tour operators) to find the competent guide. It is for the tour guide, yes, but tour guides are working with other stakeholders in tourism. Hence, we will need tourists and tour operators to test their sections of the portal.

We want to get your impressions of this portal and don't worry about making mistakes because what we are going to test is not your ability to use the portal, but instead, we are testing the portal. We are interested in knowing how you do things, how you react to things and what you are thinking regarding different parts of the portal. We are going to test the portal by asking you to complete a series of tasks that you have to finish when you are using the portal to achieve your goal.

When you are completing a series of tasks in a portal, you may get confused, frustrated or be happy with how it works. We need to know these feelings too so we can come up with necessary improvement suggestions. We are asking you to share with us what you think of your experience with the portal by thinking out loud, whether it is positive or negative.

We are going to watch you completing these task scenarios, take some notes and ask you a few questions about your opinions after a task. The information will only be used to prepare the findings report.

I would like to know if you have any questions or concerns before we begin.

Appendix 5(ii): Pre-Test Questionnaire

1. What is your experience in using a computer?
 - a. Less than a year
 - b. 1 – 2 years
 - c. More than 2 years
2. What is your frequency of using a computer?
 - a. Daily
 - b. weekly
 - c. Monthly
 - d. Occasionally
3. How many hours do you spend using the internet per day?
 - a. Less than 1 hour
 - b. 1 – 2 hours
 - c. 2 – 4 hours
 - d. More than 4 hours
4. Which device do you usually use to open web sites?
 - a. Mobile phone
 - b. Laptop
 - c. Desktop computer
5. Have you ever applied for or bought anything using a website?
 - a. Yes
 - b. No
 - c. Maybe
6. If yes, did you succeed to apply for or buy anything through the website?
 - a. Yes
 - b. No
 - c. May be

Appendix 5(iii): Post-Test Questionnaire

		Strongly disagree		Strongly agree		
		1	2	3	4	5
1.	The system was easy to use					
2.	The system was not complicated for the average computer user					
3.	I don't need support from technician to use this system					
4.	I found the flow of tasks in this system are well arranged					
5.	There was enough consistency in this system					
6.	The system is easy to learn					
7.	I don't need to learn many things before I managed to use the system					
8.	It was easy to find the information I needed					
9.	I enjoyed using the system interface					
10.	Information provided by the system is easy to understand					