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Department of Archaeology

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The Department of Archaeology has extended its history from 1973 as a sub-department under the Department of History. In 1977, the Department of Archaeology was established as a separate department. Our department offers Archaeology, Tourism and Cultural Resource Management, and Anthropology for BA (General) Degree Programme. Meanwhile, we offer Archaeology, Tourism and Cultural Resource Management for BA (Special) Degree Programme. Moreover, our department conducts MA and MSSc degree programs relevant to Archaeology.

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Megalithic monuments and ancestral sites: An ethnoarchaeological investigation of continuity of tradition among Austroasiatic communities of Jharkhand

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Abstract

Over the years, several megalithic sites have been reported from different regions of Jharkhand. The initial investigations were conducted during the second half of the 19th century and the early phase of the 20th century by colonial ethnographers and anthropologists. An excavation was conducted by the Archaeological Survey of India in the year 1965-66 at the site of Khuntitoli, where evidence of cremated bones of multiple individuals was found separately under a stone slab, indicating evidence of a secondary family burial. Recent investigations are carried out by the members of INTACH, Hazaribagh. The author has recently conducted an ethnoarchaeological study as part of the doctoral research, studying the continuing tradition and culture of raising megalithic monuments, comparing them with the archaeological parallels in light of evidence found through the survey of ancient sites and ethnographic analogy. This paper briefs the research of the present tradition of Austroasiatic communities; Mundas, Bhumij, and Hos in light of present monuments and ancestral sites, which indicate the distribution of megaliths on their possible route of the movement in Chotanagpur plateau throughout the past and existence of old and recent burial monuments over different ancestral sites.

Keywords: *Austroasiatic population, Megalithic tradition, ancestral sites, Menhirs, capstones, burials, human remains*

Introduction and history of megalithic research

The megalithic sites of Jharkhand have been sparsely studied by a few freelance explorers through annual surveys and explorations over the years (Ball 1872; Beglar 1872; Dalton 1873; Roy 1916a: 61- 77; 1916b: 481- 487; Mitra and Bose 1936: 394; Topno 1955: 715- 734; Patil 1963; Imam 2014). All of these works done by the authors are related to the ethnological and anthropological study of various ethnic groups of the region and not much archaeological aspect or methodology was followed by them, although they are important as pioneer works in the study of funeral custom and associated stone monuments, providing valuable archival data for the further research of the subject. Apart from one archaeological excavation at Khuntitoli by a mid-eastern circle of a survey of Archaeological Survey of India (now Patna Circle), way back in 1965- 66, no other proper excavation work is been carried out in the field of megalithic till now, though, the excavated site has yielded important evidence of multiple posts cremated burial from a single stone slab, along with grave goods in form of beads of copper, bronze and different semiprecious stones and ornaments of copper and bronze within separate urns (IAR 1965- 66: 10). Besides all these archaeoastronomical aspects of megalithic monuments was taken under consideration by the freelance researcher, Subhashish Das (Das 2009; 2014; 2018). The region was recently studied through an ethnoarchaeological perspective by the present author as part of his Doctoral research, which was an attempt to interpret various aspects of archaeological data of ancient megaliths by using ethnographic analogies of the available present tradition of megalithism among three branches of Austroasiatic communities; Mundas, Bhumij and Hos constructed and raised megalithic structures as secondary burial and for commemorative reasons (Shekhar *et al.* 2014: 705- 719; Shekhar and Joglekar 2015: 257- 269; 2016: 261- 278; 2017a: 19- 36; 2017b: 65- 74; Shekhar 2019: 347- 360; 2020a: 1- 12; 2021: 82- 94).

Study area and geological settings

The present research area comprises five districts of Jharkhand; Hazaribagh, Chatra Ranchi, Khunti, and West Singhbhum. Archaeological exploration and ethnographic study have been conducted in 24 blocks of these five districts, roughly 6,623 square kilometers. The area is diversely elevated, ranging from 200 meters/average mean sea level to 650 meters/average. Geologically, the area is mostly covered by sandstone and granite formations of Upper Gondwana and Gondwana sandstone in Chatra and Hazaribagh districts and Granite gneiss of Dharwar and Archean formations (Roy Chaudhury 1957: 38). The entire region is shaded by the water of different tributaries of Falgu and Damodar Rivers in Chatra and Hazaribagh and Swarnarekha and South Koel along with their tributaries and small Rivulets in Ranchi, Khunti and West Singhbhum districts. The soil type is mostly reddish lateritic soil with debris for ferrous contents and slightly alluvial yellow soil in some parts, particularly in the *Panch Pargana* plains of the southeastern part of the Ranchi district. The region is densely forested with *Saal* (Shoera robusta), Mahua (*Bassia latifolia*), Asan (*Terminalia tomentosa*), Gambhar (*Gmelinaarboria*), Kendu (*Diospyros tomentosa*) and Simal (*Bombax malabarincum*), Hara (*Terminalia chebula*), Karam (*Adina cardifolia*), etc (Haines 1925: 39-45). and mostly comprises reserve forests in Hazaribagh and Chatra districts and forested areas of Taimara, Saranda, and Porahaat forests of Saal, Saguan, and many other wild floras rich in various natural resources and wildlife, utilized by the ancient population since prehistoric times.

Present work

The present archaeological survey in the region was a part of the doctoral research of the author (Shekhar 2020) and the research is continued further (Shekhar 2021: 82- 94). Altogether 241 megalithic sites were surveyed in the region of all five mentioned districts talked above, which includes photographic documentation and plotting of the sites on the map through GPS etrex 10 was done (Fig. 1).

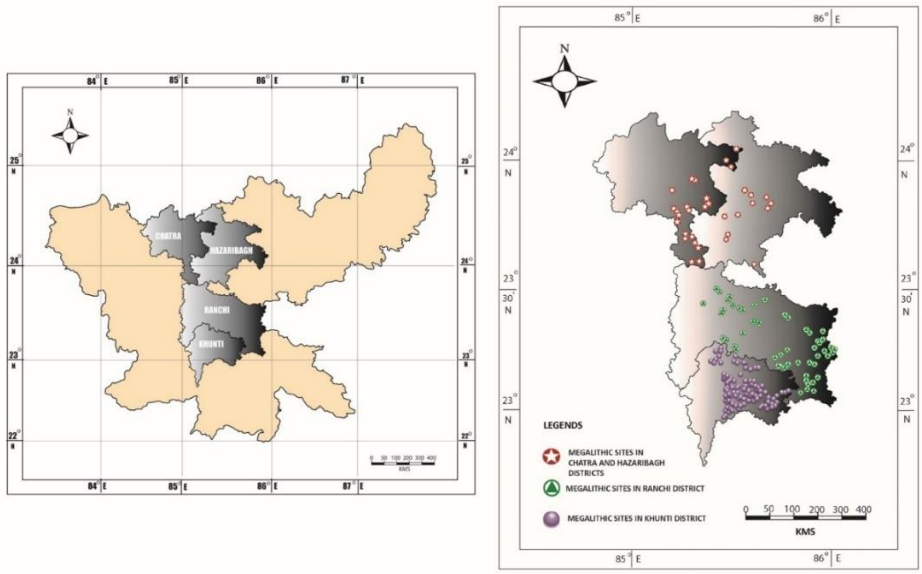

Fig.1. *Distribution of megalithic sites in the study area*

Apart from this, surface collection of cultural material from the weathered surface and disturbing section was done to understand the material culture of the sites. Apart from documentation of megalithic sites, two associated habitation sites containing identical cultural material to the burial sites were also explored. All these sites were properly studied by dividing them based on different clusters and features of megalithic monuments.

The methodology adopted to conduct the field survey and analysis

Toposheets and maps of the region were studied and published literature related to the sites was referred to. Documentation of the site was done with the help of GPS of Garmin etrex 10 for plotting the sites on the map. Photographic documentation is been done through Nicol Coolpix L810 digital camera. Counting and measurement of megaliths were done during the documentation of sites and the extension of the site was determined by GPS. The surface collection was done through random sampling from exposed burials and even from the weathered surface. Apart from the methodology adopted for archaeological survey and analysis, the ethnographic inquiry was also conducted in 207 villages in the region of Ranchi, Khunti, and

West Singhbhum of south Jharkhand. This includes the interview method to gain insights regarding the beliefs of the communities towards megalithic practice and the associated rituals and legends. Live photographic and audio-visual documentation of the funeral customs of different case studies and raising of megalithic monuments and related ceremonies and the commemorative feast was also done. Ethnographic analogies, both direct historical and general comparative were used to interpret the archaeological records of ancient sites by available present data collected through the ethnographic survey was also done.

Typology and distribution of megalithic monuments in the region

The typology of megaliths is primarily represented by Dolmens, capstones, or slabs in Ranchi, Khunti, and West Singhbhum districts, occasionally associated with menhirs of upright stones. Another dominant typology of megalithic structures in the region is menhir in cluster or alignment, with rare isolated occurrences away from the main cluster. The sites with continuity of tradition in the region have both, old and recently raised structures, with carved descriptions (in *Devanagari* script) of names and families of dead, as it is used as a repository of mortal remains of the whole family. Some of the sites have a clear demarcation of present and ancient megalithic monuments, as the recent ones are raised separately, slightly away from the ancient cluster of megaliths. In the region of Chatra and Hazaribagh region, they are represented by clusters of menhirs at a site, sometimes near capstones. Menhirs have another sub-type, with a supporting small stone and the sites have menhirs of different sizes, perhaps resembling the different social persona of the dead among the ancient megalithic community. Some of the menhirs have associated capstone, which seems to be a later addition, which is also noticed in the recent burial monuments of the Mundas in Ranchi and Khunti region (Shekhar *et al* 2014: 705-719; Shekhar and Joglekar 2016: 261- 278). At some of the sites, features of cairn packing to support the monument are visible over the weathered surface, indicating the inner architecture of the monuments (Fig. 2).

Fig. 2. *Menhir at Obra in Chatra district showing evidence of cairn packing around it*

Since the work also includes the living tradition along with ancient archaeological sites, for the convenience of research sites are sampled and divided into; a. ancient megalithic sites, b. ancestral sites of the present megalithic communities, c. Different localities of ancient and recently raised structures.

A. Ancient Megalithic Sites

Most of the ancient sites are located in the northern part of the study area with ruined and disturbed burial monuments due to natural and anthropogenic factors laid to the site formation. Weathered surfaces and disturbed sections reveal cultural materials and mortal remains, such as ceramics and fragments of charred bones.

Different clusters of megalithic monuments and evidence of habitation deposit is been observed in the outskirts of Obra village of Pathalgarha block Chatra district. It is situated on the bank of a small river, named Bakulia Nadi. The site also has evidence of Iron smelting nearby the burial locality, evident from traces of a broken iron furnace and heaps of iron ore (Fig. 3).

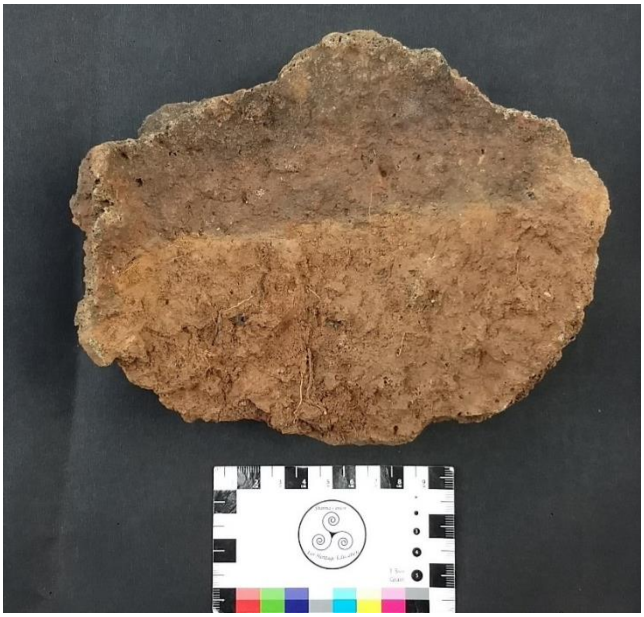

Fig. 3. *A broken piece of furnace recovered from the weathered surface of site Obra*

Traces of habitation deposit is been found in form of a disturbed mound, 150 meters west of the megalithic site. Megalithic monuments are found in different clusters, located at different distances from the habitation mound. Such distributions of megaliths at different distances from each other indicate the use of the landscape for living and the dead with different socio-economic personalities or based on different circumstantial death. A similar pattern of landscape utilization for burial and settlement is visible in present megalithic communities in their surviving tradition.

An exposed cross-section of one of the menhirs at the site, Survey gives clear evidence of the sepulchral nature of the menhir, which is been observed first time in the history of megalithic archaeology of India, as limited excavations reveal a non-sepulchral nature of menhirs at different parts of the Indian subcontinent (Allchin 1960; Thapar 1957; Nath 2002: 81- 88). Evidence of charred bones inside a broken urn was found approx. 35 cm below the surface in the exposed cross-section (Shekhar 2020: 154; Shekhar 2020a: 9).

The site of Purni Mandar in the Katkamsandi block of Hazaribagh district is represented by Menhirs of different sizes clustered in a north-south orientation. Some of them have lean supported stones and some have small blocks surrounding menhir in roughly circular form. Many miniature menhirs look like surface markers (Fig. 4).

Fig. 4. *Megalithic monuments at Purni Mandar in Chatra indicate inter-site variations*

The site indicates traces of spectacular intra-site typological variability in terms of the size of the monuments, perhaps raised for the people having different social persona or statuses.

A very well-known site of Pankhri Baruwadih in Barkagaon block of Hazaribagh districts was studied from an archeo-astronomical point of view by a freelance explorer, Subhashish Das (Das 2009; 2011; 2018). The megalithic typology is again represented by menhirs and slabs, arranged in a roughly circular fashion. Traces of habitation deposits and probable stone quarry outcrop of sandstone, located around

500 meters southeast of megalithic monuments were found during the survey conducted by the author. Evidence of habitation was revealed by anthropogenic activity (digging a foundation for the wall by the laborers) in form of identical potsherds during the survey in the year 2017 by the author from the dugout soil and weathered surface of the megalithic locality.

B. Ancestral sites of present megalithic communities

Such sites possess huge clusters of capstones and dolmens, either with four vertical stones to support the capstone or proper stone slabs or blocks that act as orthostats. Such sites also have an occurrence of recently raised monuments. The prominent sites that deserve to be mentioned here are Chokahatu, Marchadih, Barenda, Tetla, and so on. Edward Tutie Dalton (Dalton 1873: 112- 118) have reported over 7000 megalithic monuments from Chokahatu in Ranchi district, most of them are absent in recent time as the cluster of megalith seems to be very small, observed during the survey conducted by the author. The site has a cluster of large stone slabs and dolmens and even several modern structures are found at the site (Fig. 5).

Fig. 5. *Cluster of Ancient and recent stone structures at Chokahatu, an ancestral site of the Mundas in Ranchi district*

Another large cluster of megalithic slabs and dolmens was discovered by the author in the year 2015, on the outskirts of a nearby village, Marchadih (Shekhar and Joglekar 2015: 258). Barenda, Tetla, Kasidih, Besnadih, Burudih, Sillidih, Sirkadih, Soiko, Lupunghatu, and many other village settlements of the Mundas and Bhumij in Ranchi and Khunti districts have similar megalithic clusters with traces of ancient and modern monuments, resembling the ancestral site, even used by the community today for the raising monuments and depositing the mortal remains under them. Evidence of cremation, which is prevalent among the megalithic communities is been found nearby megalithic clusters (Fig. 6).

Fig. 6. *Recent cremation activity at the site of Chokahatu*

C. Different localities of ancient and recently raised megaliths

These are the sites having different localities in the same village area with old megaliths and the recently raised funeral structure in different times and spaces. Most of these sites are found in the southern part of the study area and distributed in and around the present settlements of the Munda and Ho tribes, who have a tradition of raising stone monuments. The sites like Baruhatu, Sirka, Murhu, Burju, Bandgaon, Ichahatu and Damudih in Khunti and West Singhbhum districts of south Jharkhand have different localities possess recent and old monuments, which are related to the present communities and their ancestors. Even stone monuments are now days replaced by cemented Samadhi type of structures (Shekhar and Joglekar 2017b: 67).

Grave goods and archaeological remains

Grave goods recovered from the present survey just comprises potsherds of Red Ware and Red Slipped Ware with different types of rims, and decorated sherds with incised designs. Sherd doesn't have paintings at all. Apart from this, some miniature vessels, like, lamps and urns containing fragments of human bones, and broken parts of spouts are an important part of rituals related to the funeral and burial customs of ancient megalithic people.

Apart from grave goods, there were few other archaeological remains gathered in through surface collections, including, funerary remains in form of fragments of cremated human remains, and charred animal bones, from the sites; Survey and Obra (Shekhar 2020: 154). A broken part of a perforated iron object from the habitation site of Obra, a Broken part of the furnace along with an abundance of iron slags from one of the localities at Obra.

The megalithic tradition of Munda, Bhumij, and Ho

Megalithic monuments are raised by these three communities as funeral monuments and many other commemorative purposes (Shekhar and Joglekar 2015; 2016; 2017a; 2017b; Shekhar 2019; 2020; 2021). The funeral custom of these communities is predominantly cremation and cremated remains are buried under ancestral stone repositories; Dolmen or capstone burials. Menhirs are raised as memorial stones and in commemoration. Sometimes, instead of cremated remains, a symbolic effigy is buried under the stone chamber (Shekhar 2020: 7). These stone monuments are appeased by annual worship, and sometimes animal sacrifices are offered to the monuments raised for a person who died due to unnatural death (Shekhar and Joglekar 2017b: 33 & 35) (Fig.7).

Fig. 7. *Ancient and recently raised menhir at different localities of Digri Village in Khunti district*

Ethnographic Parallels of ancient grave goods

The cremated and disarticulated bones selected from the funeral pyre and dug out grave through associated secondary funeral ceremony prevails at present, a symbolic effigy of the dead inserted under the monument, small ritualistic pots used during the funeral custom, etc. are the ethnographic complements of ancient grave goods found in ancient burials (IAR 1965- 66: 10; Das 2018; Shekhar and Joglekar 2017a). Such modern grave goods can be part of the archaeological records hundreds of years from now, showing during ancient times such articles were part of the funerary materials of ancient megalithic authors, which could have been used in the megalithic tradition of that time.

Concept of monumentality among the Austro- Asiatic population

As the recent linguistic and genetic research on the AA population suggests, they belong to the same language family with some sort of genetic similarity and have a long history of the movement between southeast Asia and the Indian subcontinent right from the pre-Neolithic and Neolithic period through different waves of migrations (Sidwell 2010: 117- 134; Choubey *et al*. 2011: 1013- 1024). The Austroasiatic language families are conventionally split into three different branches based on linguistic studies; The Munda, the Nicobarese, and the Mon- Khmer languages speaking communities (van Driem 2001: 262; Anderson 2006: 598). In south-east Asia, the Monic, the Khmer, the Khumic, the Katic, the Nias, Toraja, Nicobarese, and many more communities belong to the AA population and in India, the region of Northeast, eastern and central India is populated with the Khasis, the Jayantiyas, the Mundas and their different Branches, such as Bhumij, Ho, Santhal, Kharwar, Juwang, Sora, etc. Many of them share very similar sort of cultural traits on which their traditions and subsistence depend. According to recent genetic research on Indian AA population groups, they moved into mainland south Asia from Southeast Asia during the Neolithic period and went through sex-based admixture with a local population of the subcontinent (Chaubey *et al.* 2011: 1024). The concept of monumentality is an important trait, which has been shared between these communities, brought to the region of north-east, eastern, and central Indian regions. The AA communities cremate their dead predominantly, both in southeast Asia (Perry 1918: 35) and the region of the Indian subcontinent constructing and raising stone monuments as bone repositories and commemorative stones. Apart from the Mundas, Bhumij, and Hos, the Khasis (Godwin-Austen 1876-37-41; Hutton 1926: 333- 346;1933:167- 169; Roy 1963: 520 -556), the Karbis (Medhi and Choudhury 2015: 687- 699), of Assam and Meghalaya, Saora (Elwin 1955; Mohanty 2015: 732- 750), Bondo (Haimendorf 1943: 173), Gadabas (Haimendorf 1943:148- 179; Basa 2015: 751- 770), etc. have a very similar tradition with slight differences to raise megalithic structures in association with death custom and as a representation of commemoration.

Discussion and concluding remarks

Megalithic monuments in the region have been raised by the Mundas, Bhumij, and Hos, who belong to the AA population of the region and it is confined to them only. The monuments have a rich archaeological parallel, studied through limited archaeological investigations. In lack of such lacuna of archaeological research, the author has conducted an ethnoarchaeological model of research to understand the ancient past of the megalithic tradition of three AA populations of the same branch through the study of their ancestral sites and even to study the ancient megalithic monuments reported from the region through available ethnographic data.

The distribution of megaliths can be divided into three categories; a cluster of ancient sites with weathered surfaces and exposed cross-section due to the site formation process, ancestral sites of the AA population, i.e., Munda, Bhumij, and Ho, having inter-site continuity of landscape utilization for burial monuments, and the sites having different localities raised both old and recent monuments. Even these sites are further studied by dividing them according to the clusters and localities. A few ancient sites have also been studied by the view of landscape utilization for the living and the dead if there are traces of habitation deposits. They are further analyzed on the view of probable ancient mortuary variability, visible in different locations of clusters, which have been also observed in the landscape utilization of present megalithic communities in the region (Shekhar and Joglekar 2017a: 22). The work proposes that there are some similar cultural traits shared by both ancient and present megalithic communities, in terms of funerary architecture, nature of funeral custom and their remains and land use pattern for the living and the dead. The close affinity of the present population with the ancient can be seen in the cultural heritage of both present tradition and ancient sites. The ancestral sites of the Mundas and Bhumij indicate a long history of continuity of megalithic tradition, reflects in funeral remains and present funeral custom, showing a long history of cremation in the ancestral society even seen in ancient megalithic remains and ethnographic data. Cremation seems to be a common procedure as most of the AA population of India, such as Khasis, Karbis, Saoras, and Gadabas of the eastern and northeast regions of the subcontinent, and several AA communities of southeast Asia perform such tradition since ancient times, which still survive in their funeral procession. The concept of monumentality is been shared among the AA population of Jharkhand, another part of eastern India and north-east India and Southeast Asia, which can be witnessed in the megalithic tradition that prevailed in Indonesia, Laos, and so on, continued in the region of Assam, Meghalaya, Odisha, and Jharkhand region. Stone monuments are also raised by Tibeto-Burman communities of Northeast India and Dravidian-speaking populations of Southern and central India, because of two possible reasons; the universal phenomena of the concept of monumentality and long cultural interaction among these population right from the long history of migration and intermingling throughout the past.

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The impact of Public Relations on the Tourism Industry; a study based on Tourism in Sri Lanka

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Abstract

Tourism is a very historic industry in the world. At present tourism has booming demand among people who love to travel around the world. Public Relations (PR) is a distinct function that creates an organizational image, reputation, goodwill, and interactive understating among its key public. PR plays a big role in tourist destination marketing and attracts several tourists. It provides huge support for retaining tourists for a long period competing with competitive tourism countries and companies smoothly. This study mainly focuses on identifying what is public relations and tourism, the relationship between PR and Tourism, the Role of Public Relations in the Tourism industry, and identifying how Public Relations build a Sri Lankan country's image in the global tourism industry. A qualitative approach is used for this research. The research study concludes that Public Relations and Tourism have a very close relationship; it plays a big role in promoting tourist destinations and builds a positive image among world tourists consumers. Also, the study reveals that at present numerous Public Relations strategic plans and campaigns are implemented to uplift the Sri Lankan tourist image, to decrease the negative impact of the Easter Sunday terrorist attacks and the Covid-19 impact on the tourist customers.

Keywords*: Tourism, Public Relations, Role of Public Relations, Image Building, PR Tools*

Introduction

Tourism locally and globally plays a massive environmental, political, and social influence on the industry concerning social responsibility and community relations. (Yavuz.M,\Oter.Z,2016). The field of public relations assists many organizations for instance; trade unions, business communities, government agencies, educational foundations, hospitals, religious and social voluntary associations, and tourism sectors (Harlow, 1976). Today public relations have become very crucial in the communications and promotional activities of tourism. World tourism changes by the impact of economic, technological, and sociocultural changes. (Huertas. A, 2008). In 2013 Petrovici stated that tourism is an intercultural process and PR is a part of communication activities that help more than one understanding. He argued that participation in tourism is not a static experience, but a "life experience", that creates instances for imagination mind and life-changing understandings. It can affect the personality of a tourist intellectually, emotionally, and physically. Tourism is an economic and cultural behavior that leads to the growth of the country and public relations provide strength for tourism. Building the tourism sector's image, credibility, and trust among tourist consumers, maintaining goodwill and positive understating between tourist companies and the public, crisis communication and strategic crisis management is the key role of PR. The research problem of this study was assessing the impact of public relations on the tourism industry in Sri Lanka. The objective of the study was to determine the impact of public relations on the tourism industry in Sri Lanka and to identify the relationship between public relations and tourism.

Materials & Methodology

A qualitative methodology was used as the research choice. Qualitative data were gained from previous research journal articles, books, magazines, and computer resources. Mainly the conceptual analysis was conducted within this research to define and analyze the collected data. According to the conceptual framework, the independent variable was public relations and the dependent variable was tourism.

Result and Discussion

In 1987 Institute of Public Relations defined Public Relations as, “Public Relations are the planned and sustained effort to establish and maintain goodwill and understanding between an organization and its public” (Theaker A, 2004). Father of public relations, Edward L Bernays defined PR in 1923 as “information given to the public, persuasion directed at the public to modify attitudes and actions, and efforts to integrate attitudes and actions of an institution with its publics and of publics with those of that institution”. Persuasion of public attitudes and integration of institution efforts with publics is a major aspect of PR according to Bernays' definition. “Public relations are supposed to be considered as a task which takes part in creating company goodwill, engage itself in promoting the company brand or name maintaining continuity and snowballing profitability. (Eyrich. N, Padman. M.L, Sweetser. K,2008).” Tourism has become an attractive job field in recent decades among the global population due to globalization and the power of communication devices. Since ancient times people love to visit place to place and destinations. Tourism is the temporary movement of individuals from where their normal life or work environment to destinations outside the places (The Institute of Tourism, 1976). The United Nations World Tourism Organization (UNWTO) stated that “Tourism comprises the activities of persons traveling to and staying in places outside of their usual environment for not more than one consecutive year for leisure, business or other purposes” 1991. In 1994 Sharpley discuss that there are a variety of factors for tourism that affect peculiar to each tourist such as social, economic, demographic, and psychological. In 2017 Deeri and Schmuecker argues that the tourism sector provides a large influence to develop and strengthen the financial pillar of a country and gives direct effects on social and environmental growth. (Ceylan. M., 2007).

PR campaigns build an image of tourism organizations and countries. In 1998 Krapfl stated that “Images are built and created by public relations through print media, word of mouth, and the attitude of the targeted audience. If done properly, potential tourists will know how they will benefit, learn and grow from visiting a particular site or event" (Ceylan. M, 2007). There are many public relations tools use for tourism. Brochures, television advertisements, display advertisements, social media, pop-up ads, newspapers, magazines, public relations events, sponsorships, leaflets, cutouts, billboards, and web articles are some of them. "The most important of these tools is public relations which play a role in constructing images of locations, activities, and identities" (Morgan and Pritchard, 2001) Public relations means not only attracting visitors but keeping them happy after they arrive in the tourism industry. "Due to the explosive growth in technology in the last decade, people are buying their vacations on the net. As there are many opportunities, a tourism company must advertise the destination attractive with the photographs and also positive feedback on the Web site". (Ceylan.M,2007;Ward,2000). So, tourism and public relations have a strong relationship. But public relations can build a negative image of tourism in a country. So, the positive or negative impact of PR is very powerful to persuade tourists in good or bad ways.

L'Etang, 2006, explained that only a few researchers were interested in a review of literature about the role of public relations and tourism (Ceylan. M, (2007). In 2008 Huertas discussed that communication is the key to public relations roles. Especially he mentioned that public relations officers (PRO) played a big role in training and consulting, training and advertising on how an organization creates a suitable and favorable image using promotion in various mass media information. Today the developments of PR tools have come to an internet platform such as social networks that provide interaction and communication with tourists easily. (Sweetser,K.D.,E.Metzgar.2007). "All the tourism organizations analyzed have interactive websites that are capable of providing high levels of information and creating virtual experiences" (Ceylan. M, 2007; Klein, 2003). PR play important role in building the image and communication of tourist destinations and it helps to attract a lot of tourists. (Santoso, N.R., Negoro, S.H. (2019). PR is the predominant activity in the promotion and communication of tourist information. (Huertas A. 2008). In 2014 Jain and Chicago explained that PR drives the behavioral intentions of tourists toward destinations because building and strengthening a destination's image are significant factors that can support positively and improve tourists' trust, satisfaction, and commitment to the destination. Also, in 2013 Petrovici argued that building goodwill is the most effective way for PR to increase the prominence of tourist destinations and promote tourism products for the sake of attracting a lot of tourist arrivals.

Sri Lanka is a very famous tourist destination in the world. According to the Tourism Industry Report fourth quarter of 2019 Sri Lanka is ranked No.04 in the list of 10 most In-Demand Travel Destination in 2020 followed by the best warm-weather destination title by USA TODAY and CNN Travel has selected Sri Lanka as one of the best places to visit in 2020 and also Sri Lanka was chosen as the best wildlife destination in Asia. The tourism industry plays a significant role in the Sri Lankan economy while being one of the best critical pillars of an asset in its economic growth. According to the 2019 Annual Statistical Report of the Sri Lanka Tourism Development Authority, the tourism industry's direct contribution to the GDP was 4.5%. In 2019, the tourism industry was recognized as the third revenue generator in the country and employs around 135,000 to 150,000 in industry. After gaining independence from the British in 1948, there was continuous progress in the tourism industry in Sri Lanka. But it was stagnant until 2009 and suffered massively because of the adverse influences of the thirty years of the LTTE civil war. However, after the end of the Civil war in 2009, the tourism industry was booming. But this positive scenario was completely changed and tourism was badly affected, and took a tremendous beating due to the Easter Sunday attack in 2019. For the year 2019 April 21st, it was estimated to have more than 3 million tourist arrivals to Sri Lanka while having more than $5 billion by way of income. But due to the Easter attack, the statistics of the Sri Lanka Tourism Development Authority stated that tourist arrivals slumped by 70% in May 2019 and by 57% in June when compared to 2018. Furthermore, many small business entrepreneurs in the tourism industry had to close their businesses. "It is a well-known fact that terrorist attacks are beyond the controlling power of even the most advanced security systems. The only thing that can be done is to reduce the negative impacts of Easter attacks through proper planning and management practices of tourism. It is vital to pay consideration to the tourist destinations in Sri Lanka, as those places are more likely to be terrorist targets since they can get the attention of the whole world." (Gabriella. E, Sofia.R.2013) Also World Covid-19 pandemic has hugely affected the tourism industry in Sri Lanka. To manage this crisis Sri Lankan tourism needs a proper strategic PR plan. Physical and mental protection is more key need for tourists. Whatever the beautiful island is Sri Lanka, it is necessary to establish credibility and understanding in the protection of tourists who travels to Sri Lanka. Sri Lanka has a valued tourist brand around the world but it needs to reposition for care and protection. However, amid many obstacles, the Sri Lankan government is implementing many PR campaigns and global communication campaigns to uplift the tourism industry at present. To mitigate the Easter Sunday attack and Covid-19 impact, the government implemented many promotional PR projects in 2019-2020 with the support of the Sri Lanka Tourism Promotion Bureau (SLTPB) and Sri Lanka Conventions Bureau. Below projects are some of them. Developed the first Sri Lanka Tourism Mobile Version Travel App, Safe travel Campaign by world travel tourism council – under the So Sri Lanka Campaign, Provided sponsorships for Duruthu Perahera, Nawam Perahera, Kandy Esala Perahera and Ruhunu Kataragama Perahera to showcase the Sri Lankan culture to the world by promoting via digital media strongly, Content Development Project - Collected around five thousand places of tourist attractions to create an image and video gallery as a promotional tool, Wellness and Ayurveda Campaign with the support of European Union, Increase film tourism, Activities Organized By The Sri Lankan Missions Overseas, In Collaboration With Sltpb – In UK, Philippines, Japan, Austria, Russia, Germany, Implement Visiting Blogger Program (VBP) ,Travel influencer campaign - '"Keep Sri Lankan Dream Alive", Print Media Promotions – posted PR articles in Sweden, India, Australia, USA, Germany, Middle East, Russia, Netherland and UK and Implement Earned Media Coverage - CNN one-month Digital and TV Campaign for Sri Lanka Tourism free of charge are some of them.

Conclusion

Public Relations and the Tourism industry have a very close and strong relationship. PR plays a vital role in tourism. But literature review showed that few scholars have been interested to study PR and Tourism related topics. PR can support the positive and negative ways of building image and maintaining reputation It provides communication, crisis, and issues management consultancies, and implement many PR tools and tactics to attract new tourists and build trust. PR has a lot of strength to support tourism development. In Sri Lanka, the Tourism industry has faced many issues regarding covid-19 and Easter Sunday attacks. Currently, Sri Lankan tourism authorities and other tourist organizations implement many PR activities to mitigate its bad impact. Also, the global tourism industry has been hugely affected by the Covid -19 pandemic. So, PR should implement campaigns to gain a good impact on tourism.

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Preservation of information in Sri Lanka: A historical perspective

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Abstract

The article attempts to explore the shape of the preservation of information in Sri Lanka, from the Early Iron Age (1000-800 BC) to the beginning of Colonial Rule. Under the qualitative approach, the historical research method is employed in the study, while content analysis was used as a research tool to determine the presence of certain words, themes, or concepts within given qualitative data. Based on my focus, primary sources and secondary data were used to elicit data. Buckland's concept of information-as-thing was used to streamline the demarcations made by different collections handled. The perspective of the study is limited to the published translations and transcriptions of inscriptions, literary sources, and copper plate charters. Themes and concepts such as the selection of media, extending the life span of information, changing the format, or keeping the same information in different formats, and reformatting for information preservation emerged from the literature review and content analysis. Substantiations prove that effective preservation of information has ever never been in flow in Sri Lankan history. Well before the cultural institutions were established under colonial rule, ancient Sri Lankans were familiar with the concepts of libraries, archives, and museums. Information was converted, reformatted, and duplicated through different media consciously, while foreign invasions, internal conflicts, natural and man-made disasters as well as the introduction of printing challenged the existence of the indigenous system of information preservation. The study will provide a rich foundation for Archaeology, history, and Information Science students and scholars to understand what happened in the past to determine and expand their research horizons. The research highlights gaps and avenues for future research in this genre.

Keywords: *Preservation, Information, Palm Leaf Manuscripts, Inscriptions Sri Lanka*

Introduction

The significance of the preservation of information has ignited the interest and passion of most scholars and academics, especially in developed countries resulting in the development and implementation of actions and plans forming national policies and strategies in the recent past. Preserved Information contributes to validating memories and protecting the originality and authenticity of the document. As opposed to reproduction or surrogacy, it draws people in and gives them a literal way of touching the past. Cloonan (2007), points out that preservation is more than a technical treatment but should be placed in a broader social and interdisciplinary context. While preservation has been a subject of interest since the 20th century, a probe into the literature reveals that the concept of preservation is an age-old phenomenon. Many references to the idea of preservation are available in ancient literature. Spelman (2002, p.1) pointing out the preservation tendency of human beings describes “the Human Being is a repairing animal. Repair is ubiquitous, something we engage in every day and almost every dimension of our lives. Homo sapiens also Homo reparans.” This tendency in the preservation and providing access to information is also illustrated from Prehistoric times. Preserving of information by prehistoric man in the form of art, mostly in caves, has been interpreted as transmitting an educational or allegorical message for the benefit of future generations. Drawings that depict behavior, killing, or warning of animals in the milieu, method of collecting food, etc. certainly have aided other groups, clans, and posterity in making decisions about hunting and gathering. Three color charcoal drawings (Figure 01) available at the walls of the Chauvet-Pont d’Arc Cave, in southeastern France, that illustrate more than 420 animals, graphic motifs, and symbols, are belonged to the early Aurignacian period dating to 30,000-32,000 BP (Clottes, 2001; Azéma, & Rivère, 2012).

Figure 02 illustrates a cave art of smoking a bees' nest to collect honey, in a site near the Toghwana dam in Matapo Hills, Zimbabwe (Pager, 1976; Crittenden, 2011). Information depicting elephant domestication in ancient Sri Lanka (Figure 03), is preserved in the Hulannuge rock cave in Ampara District (Nandadeva,1992). A point of access to prehistoric man's symbolic vision of the world is provided through the preservation of information on hunting sequences, daily events, and an element of their myths in these Paleolithic graphic narrations, (Fritz, & Tosello, 2015).

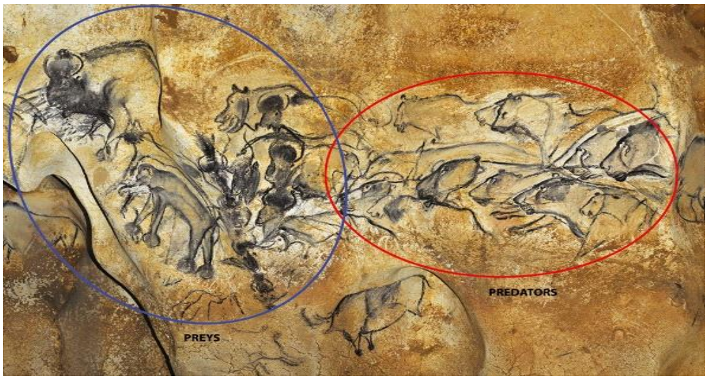

Figure 01. *Hunting scene: big cats track a herd of bison fleeing toward the left.*
(Source: (Fritz, & Tosello, 2015)

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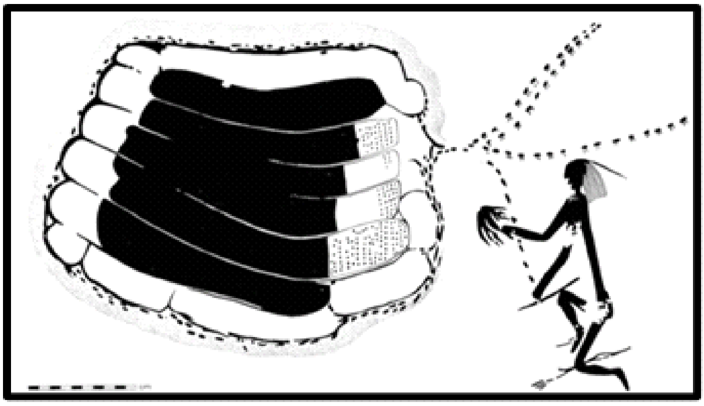


Figure 02. *Smoking of a Bee's nest*
Source: Pager, 1976; Crittenden, 2011

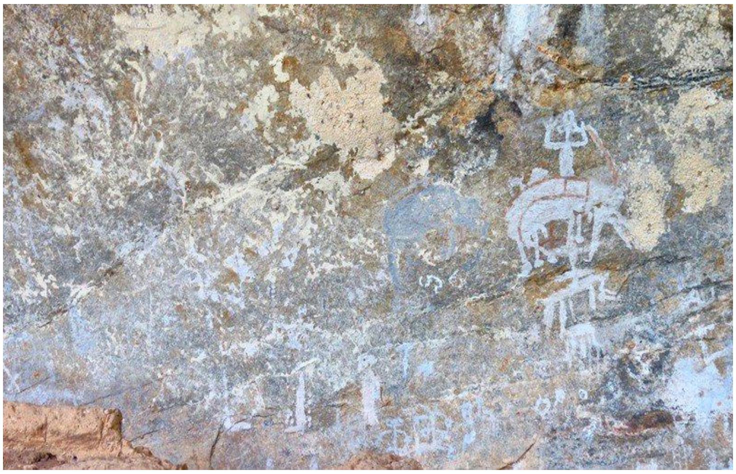


***Figure 03**. Source: https://amazinglanka.com*

Figure 04 (A) ***Figure 04 (B)*** ***Figure 04 (C)***

Sources: Parpola, (1917), https://www.spurlock.illinois.edu,&
https://www.worldhistory.org/Egyptian_Literature/

Nature of the study

"Before the mid-twentieth century, preservation referred to collecting. The very act of acquiring materials and placing them in an institution constituted preservation" (Cloonan, 2007, 132p.). Later on, the Preservation of collections has become one of the core responsibilities of Memory Institutions (MIs) (Dempsey, 1999; Poll, 2010).

It is commonly accepted that preservation and conservation were introduced to Sri Lanka with the establishment of MIs under colonial rule. However, a probe into the literature provides ample evidence that well before the inception of MIs under colonial rule, ancient Sri Lankans were familiar with the concepts of preservation. Rulers, State Officials, Buddhist Monks as well as learned lay scholars played a major role in the preservation and conservation of ancient documents. These practices and regulations were mostly taken religious face. Even though Sri Lanka inherits a wealth of information depository since ancient times, thorough scrutiny of the previous research revealed that there is an apparent paucity of studies on preservation education and particularly on how information was preserved in ancient Sri Lanka. A probe into Sri Lankan preservation literature shows that there is an overarching trend of embracing digital technologies among MIs in Sri Lanka. Several studies also emphasize that contemporary MIs of Sri Lanka drive toward reformatting of documents with special reference to digitization (for example Gangabadaarachchi and Amarasiri, 2009; Pushpakumara, 2007; Navirathan & Jeyakanthan, 2018). Although, digitization is considered an inseparable part of preservation as it becomes the major method to safeguard the original (Manzuch, 2008), no research is available on the specific area of preservation of information, particularly in ancient perspectives, which can provide a threshold to preservation studies in Sri Lanka. Hence the study is oriented to answer the question "what is the shape of preservation of information in ancient Sri Lanka?" The objective of the study is to explore ways and means of preservation of information from ancient times to the introduction of printing to Sri Lanka during the Colonial Period.

Under the qualitative approach, the historical research method is employed in the study, Historical research method is selected because the context under study is critical and provides the material for "immediate/direct and distant/indirect causes for chains of events they are documenting any length of time from a brief moment to events covering centuries or even millennia" (Porra, Hirschheim & Parks, 2014). Content analysis was used as a research tool to determine the presence of certain words, themes, or concepts within given qualitative data which is expected to provide valuable historical and cultural insights over time in an analytical way. Consequently, themes and concepts such as the selection of media, extending the life span of information, changing the format, or keeping the same information in different formats that are more resistant to prevailing environmental conditions and reformatting emerged from the literature review and content analysis.

Based on the focus of this study, primary and secondary sources such as ancient chronicles, inscriptions, literary sources, and charters were employed to elicit data. Since this study deals with varied informative materials, the term document is used based on Buckland's concept of information-as-thing. Considering the thingness-of information the term document is defined as “any source of information, in material form, capable of being used for reference or study or as an authority” (Buckland,1997) Accordingly, things are informative irrespective of the nature of materials such as massages, data, documents, objects, events, specimen record group or file. (Buckland, 1991; Ooghe & Moreels, 2009). The use of this definition will streamline the distinctiveness made by different documents handled in this study.

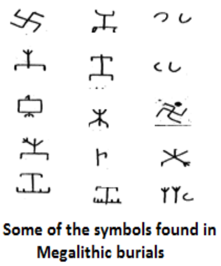
By tracing the roots of information preservation and transmitting the information from past to future generations, the study will contribute to outlining and defining the history of the discipline, delineating its boundaries, and understanding core identity. The study will provide a rich foundation for Archaeology, History, and Information Science students and academics to understand what happened in the past to determine and expand their research horizons.

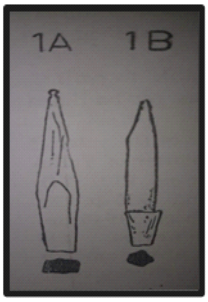
Modes and means of preservation of Information

Bones and Clay

Preservation has become a serious problem for the custodians of information throughout history since it is a complex and challenging process. Accordingly, more durable and movable materials were discovered for the preservation of information.

Seals found at Indus Civilization (2500–1700 BC) (Figure 04-A), cuneiform clay tablets of Mesopotamia (3200 BC) (Figure 04-B), as well as Egyptian hieroglyphs (4000 BC) (Figure 04-C), explain the preservation concerns that go back to ancient times. In the Sri Lankan context, clay and stone were the two vastly used materials to preserve information in the forms of pots, bricks, seals, intaglios, caves, rocks, pillars, slabs, etc. Before the adoption of writing, identity marks of one clan or certain groups of communities were inscribed on pottery and drip-ledged caves, as well as on capstones of megalithic burials (figure 05) (Seneviratne, 1984). The Discovery of an Early historic Bone stylus in the Anuradhapura Gedige excavation (Figure 06) heralds the history of the writing of Sri Lanka beyond the 1st century BC (Dereaniyagala, 1972). A much-debated post-firing potsherd which read as “Anuradi” discovered from Anuradhapura by Dr. Siran Deraniyagala through an excavation of Anuradhapura informs that written materials akin to Brahmi writing can be assigned to the third century BC (Deraniyagala, 1986). These writings are not only an indication of concerns paid over information preservation but also herald the challenging news that writing was in existence even before the advent of Buddhism in Sri Lanka. Brahmi and non-Brahmi letters, graffiti, and symbols incised on pottery throw light upon the fact that ancestors were concerned about the longevity of information. A Graffito of a vessel with a mast found in Akurugoda, Tissamaharama, (figure 07) has preserved centuries-old information to inform future generations about the knowledge of seafaring during the early periods (Weishaar, et. al. 2001).





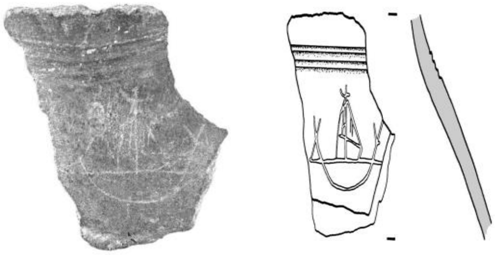


Figure 05 Figure 06 Figure 07

Figure 05: *Some of the symbols found in Megalithic burials, Source: Seneviratne, 1984*
Figure 06*: Bone style from Anuradhapura Gedige Excavation, Source: Deraniyagala, 1972*
Figure 07: *A Graffito of a vessel with a mast in Akurugoda, Tissamaharama, Source: Weishaar, et. al. 2001*

Stones: caves, slabs, and pillars

In ancient Sri Lanka, the donation of drip ledge caves to the sangha was considered a significant event. Thus, information about the donor, the purpose of the donation, and attributes of the cave were also incised. Ancient Sri Lankans, by describing the distinctiveness of the particular cave, such as Manapadasane (of Pleasing View), Mahasudasane (of Great Good View), Manorame (that Delighting the Mind), painted caves (lapana), demonstrated their interest in preserving particular information inherent to the cave (Paranavitana, 1970).

Godawaya two-line stone inscription of King Gajabahu (113-135 A.D), which furnishes the details about the donation of customs duties of the port of Godapavata to the temple nearby is plausibly the oldest evidence on Customs duties in the entire world. However, there was no noticeable evidence of a seaport visible at the time of the discovery of the inscription. Hence, a series of archaeological explorations and excavations were carried out to verify the information. As a result, evidence of an ancient port that had functioned from the 2nd Century AD to the 12th century AD in

Southern Sri Lanka at the old estuary of Walawe River was discovered. Thoughtful preservation of information in the form of an inscription facilitated filling a vital gap in Sri Lankan history, related to maritime links, and international as well as internal trade (Weisshaar. et.al., 2001).

Ancient Kings were well aware of the significance of preservation Conservation activities as well as record keeping. Once a particular conservation work is completed, an inscription has been engraved to proclaim the news to the information of future generations. Polonnaruva Lankatilake Guard-Stone inscription of king Vijayabahu IV (1270-1272 A.D declares the conservation activities carried out in the temple (Wickremasinghe & Codrington, 1933). Jetavanarama Sanskrit Inscriptions state when a person is assigned to supervise the temple renovation activities, the name of the person and his duties shall be recorded in the register known as pas-pot (Wickremasinghe, et. al.,1912). Slab-Inscription of the king Sahassamalla at Polonnaruva (1200-1202 AD) states that a declaration has been inscribed on a stone to let future kings not harm but to continue the grants as they are maintained during the time of the establishment of the inscription. (Müller, 1915).

Information preserved in the Badulla Pillar Inscription of king Udaya IV (946-954 AD), enlighten us on the preservation of administrative, trade, and socio-economic information in the 10th Century AD. It also informs us of the Officials those who are responsible for the information preservation of the state and the concerns of lay countrymen on the recording and sustainability of information during the period. The inscription deals with a petition made to the king by merchants and residents of the market town of Hopitigamu against subordinate officials of the magistrate in charge of the market. Accordingly, officials had transgressed the orders enacted during the reign of the previous king, which was not been incised or not preserved in written form. After examining the grievances of the countrymen, the ruling king passed a decree reinstating the regulations enacted by the previous ruler by inscribing an edict. The establishment of an Inscription in a public place providing public access to it leads to think us that ordinary citizens of the country were well attentive to the preservation of information related to rules and regulations institutionalized in the written form. Also, the incident mentioned in the inscription highlights the rate of literacy among laymen as high as it was also depicted in the Sigiri Graffiti during the 6th century AD.

Palm Leaves

Although the preservation of information on the stone was immensely used in the period, there was a requirement of using lengthy documents to store and preserve more extended information, especially during disasters. In early periods Buddha’s teachings were preserved in oral form and transmitted from generation to generation. However, due to several natural and man-made challenges, the requirement of long-term preservation of Dhamma stood out prominently. Difficulties involved in the incision of lengthy documents, portability, mobility, and exertion in finding suitable stones might have led ancient Sri Lankans to seek alternative media. Under the patronage of kings and the guidance of Buddhist monks’ information that was in the form of Buddhist scriptures passed orally was documented in Palm Leaf Manuscripts (PLMs), in the 1st century BC (Geiger, 1908) The selection of Palm leaves as an appropriate medium for preserving information marked a turning point in Sri Lankan history. This decisive step would have been taken not only due to the difficulty of writing long Buddhist texts on stone but also perceiving the difficulty in protecting the authenticity of the orally transmitted knowledge. Kings enacted laws and regulations to safeguard the Palm trees while encouraging Palm gardens in the country.

Accounts of history including two main chronicles written in Palm leaves originally, such as Dipavamsa and the Mahavamsa, other literary sources, and artifactual information provide an account of the perceptions and practices followed in ancient Sri Lankan society. While some contend that the contents of these records are mostly Buddhist, the information preserved by these sources also delineates the socio-economic, political, cultural, and administrative history of the island.

In the meantime, the preservation of non-religious documents also has been augmented. Recording of non-religious texts on leaves is mentioned in inscriptions. Heart Hammillava rock inscription accordingly furnishes details about preserving monastery accounts by writing down on a leaf (kolahi liya tabava) (Wickremasinghe, 1976). The word "kola" mentioned in the inscription according to Dias (2001) refers to a leaf, which was a common writing material in ancient Sri Lanka, that Palm leaves

Two tablet inscriptions of King Mahinda IV (975-991AD) at Mihintale, provide further information about the thoughtful preservation of information in a Buddhist monastery of the 11th century AD (Wickramasinghe, et. al., 1912). In addition to the information dealing with the administration and inner life of a Buddhist Monastery, these two tablets, preserve information on the emolument paid to the officials including a clerk of the monastery (Veher-leya), a registrar of the caskets (karand-leya) and keeper of caskets (Karandu at-samu) who rendered services of preservation of information of the monastery. Accordingly, officers were responsible for maintaining a register known as pas-pot to enter expenses on the renovation activities, expenditures on meals, and costs related to revenue collectors. Documents where the accounts of the monastery were entered, were recommended to place in a casket under lock and key (ibid) These caskets were instructed to deposit in the relic house, where reliquaries were deposited. The deposition of the registers [made of Palm leaves] that contained the accounts on the monastery in the relic house suggests the significance given by the ancestors to the preservation of information. They were well aware of the fragility and delicateness of the Palm leaves, as well as the significance of the information preserved in these documents. Thus, it was instructed to protect the balance sheets that were written on Palm leaves in a more secure place. Inscriptions further state that the sheets of accounts that are secured in a casket shall be compiled at the end of each year; these balance sheets shall be made public by reading out amid the community of the monks. Authorities were very much concerned about the preservation of these documents, therefore, the inscription emphasized that the fines shall be imposed, and dismissal of service is recommended for the employees who infringe the above rules.

Gold and Copper Plate Charters

To achieve successful preservation practical measures must be established to ensure its survival against potential decay. Enduring the life of documents is significant because, in addition to their economic value, the fragility of documents prevents users from accessing original materials. This modern-day concept could be seen in ancient Sri Lankan practice, as recording information in Palm Leaves was replaced by copper plates in a later period of history.

King Nissankamalla (1187 to 1196 AD). in his Polonnaruwa slab inscription (Wickremasinghe, 1928) mentions that the decisive step of writing on copper plates instead of Palm Leaves was initialized by him. There are previous instances that unveiled the availability of copper as well as gold plate inscriptions, however. Jetvanarama gold plate inscription, Abhayagiriya, Panakaduwa copper plate inscription, and a recent discovery of Dighavapi Gold Sheet inscription of king Kanittha Tissa (165-193 AD) appear before king Nissanka Malla period. However, King Nissankamalla was the foremost to particularly mention the reasons for the preservation of information on more endured materials instead of on Palm leaves. Accordingly, the Copper Plates were selected as a suitable medium to inscribe the grants due to their fragility of nature, and vulnerability to insects and rodent attacks over.

The life span of PLMs is rather shorter and vulnerable to natural and manmade disasters when compared to the other media chosen for the preservation of information. However, the inherent advantages of PLMs such as ease of mobility, portability, manageability as well as effortlessness of finding, led them selected as a writing medium. As a solution for its vulnerability to disasters and shorter lifetime alternative avenues were sought after. It proves that ancient Sri Lankans were well acquainted with the inherent strengths and weaknesses of each media. Registers that were known as pas-pot and lekam miti (land tenure registers) and other documents were maintained under the patronage of rulers throughout history. These documents later led to the development of a much more organized Sri Lankan archival system under colonial rule in Sri Lanka.

Conclusion

The study investigated the shape of preservation of information in ancient Sri Lanka through the evidence available from inscriptions, artifacts, PLM, etc. it revealed that ancient Sri Lankans were concerned about every single incident and had taken measures to preserve information regarding the event. Despite the view that "until recent past preservation simply meant collecting and the coordinated and conscious management aspects of the preservation is more recent" (Conway, 1996), corroborations prove that effective preservation of information has ever been in flow in Sri Lankan history. Well before cultural institutions were established under colonial rule, ancient Sri Lankans were familiar with the concepts of libraries, archives, and museums and made attempts to preserve information embedded in different forms. Mahavamsa mentions that King Devanampiyatissa established a building in ancient Anuradhapura to safeguard the parts of the ship, which brought the sacred Bodhi tree from India in the 3rd century BC (Geiger, 1908) indicating the world's oldest Museum that preserved significant historic information. In the meantime, copies of important documents, have been deposited in the ancient chapter house Lovamahapaya, a nine-storied massive structure located between Ruvanveliseya and Sri Mahabodhi that played the role of the archive. Each Buddhist monastery has consisted of a library enabling, teaching, learning, and preaching. Concerns for the preservation of information were taken into account throughout history when even designing the buildings such as Tampita viharas (temples on pillars) during the Kandyan period.

While foreign invasions, internal conflicts, natural and man-made disasters as well as the introduction of printing challenged the existence of the indigenous system of information preservation, information was converted, reformatted, and duplicated through different media. Pottery, stones in the form of caves, pillars, slabs, etc., Palm leaves, Copper, Silver, and gold plates were used to ensure the prolonged existence of documents over history very thoughtfully. As a result, a wealth of information ranging from the Early Iron Age (c. 1000-800 B.C) to the beginning of printing during the colonial rule was preserved in different materials Although the word preservation is not directly used in the ancient literary sources, the notion was practiced in the ancient Sri Lankan Society in line with the present-day definitions of preservation. Hence the study concludes that recording and preservation of information in ancient Sri Lanka as a concept is positioned in tandem with present-day preservation purposes, i.e., "the objective of preservation is to ensure that information survives in a usable form for as long as it is wanted" (Feather, 1996).

While exploring the shape of the preservation of information in ancient Sri Lanka, the names and duties of professionals involved in information preservation activities came across. historical sources bring together another silhouette of professionals engaged in preserving information till the end of the Kandyan kingdom. These officials are mentioned as scribes, chief secretaries and registrars, and record keepers such as Mahale, Muk-hi, Mukaveti, Sanhals Sivatta Nayinarun, Sanhas Sivatteva Kala Perumal and Sannissiwatte Kulaperumal. It appears that this information provides access to a new arena for research on the history of Sri Lankan information preservation. However, there is no effort has been taken up to study, the role of ancient Sri Lankan professionals involved in the preservation of information. Avenues to new research rises through this information.

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Augmented Reality-enabled Mobile Apps for enhancing Value-Based Interpretation at Cultural World Heritage Sites of Sri Lanka

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Abstract

'On-site interpretation' is a critical success factor in conveying the significance and multiple heritage values of a cultural heritage site to the visitors. The initial assessment done on the current status of the on-site interpretation at six Cultural World Heritage Sites (CWHS) in Sri Lanka under this study, unveiled the need for a 'Value-based interpretation strategy' and integration of 'appropriate' digital interpretation techniques with the existing techniques. Accordingly, the objective of this study was to explore the potential digital interpretation techniques and their applicability, aiming at enhancing the level of on-site interpretation of Sri Lankan CWHS. The data gathered through thirteen in-depth interviews with respective professionals, on-site observations, a literature survey, and a survey questionnaire of 505 respondents, were analyzed against 24 criteria, categorized under six themes (Site condition, Legal and Regulatory concerns, Technical and Financial feasibility, Content preparation, Implementation, and Sustainability), which were developed as the theoretical framework for the present study by referring the literature. It was determined that 'Augmented Reality (AR) enabled Mobile apps', a combination of Mobile apps and Mobile-AR technology, are feasible and appropriate for all six CWHS. This study recommends a dedicated app for each CWHS, enriched with Mobile-AR modules (virtual tour guide, virtual markers for visitor navigation, virtual reconstructions, AR filters), Comparisons to world context, Customizable itineraries, Side-tabs of heritage values, User engagement features, etc., to provide a tailor-made and innovative visitor experience in complying with the value-based interpretation strategy. In addition, the study presents a set of recommendations for the proposed apps under the themes of 'Content creation', 'Organizational adaptability', 'Policy changes', 'Partnerships and Promotion', and 'Post-Implementation Evaluation and Extended Uses' for a successful future implementation. The composite outcome of the present study could be followed as a reference model in enhancing the level of on-site interpretation at the CWHS of the country but not limited to.

Keywords: *Digital Interpretation, Heritage Values, Visitor Experience*

Introduction

On-site interpretation plays a vital role in cultural heritage sites in conveying the significance and multiple heritage values to the visitors. '*The public explanation on a discussion of a cultural heritage site encompassing its full significance, multiple meanings, and values* is considered 'Interpretation' as per the International Council on Monuments and Sites (ICOMOS) Charter for the Interpretation and Presentation of Cultural Heritage Sites (ICOMOS, 2008). Hence, heritage managers apply different on-site interpretation techniques such as physical interpretation signage, guides, audio tours, guidebooks and publications, mobile apps, etc. at the sites.

As per the Visitor Lifecycle Model proposed by Davis in 2014, a heritage visit is not merely considered an incident but a process of three stages namely: Pre-visit, Visit (On-site), and Post-visit. Pre-visit means the stage of 'Fact-finding and planning, in which the visitor looks for information to plan the visit and creates a personalized context. Visit (On-site) stage includes 'In-visit interaction and content delivery, where the visitor obtains the cultural experience. Post-visit refers to 'Feedback and recommendations, in which the visitor follows up on any information and shares experiences through feedback and recommendations (Davis, 2014). Accordingly, during the 'Visit stage', visitors interact and obtain cultural experience with the cultural objects, monuments, and sites; hence, the delivery of heritage information shall be in a highly effective manner. Further, as Tilden (1977), the modern father of Heritage Interpretation, highlighted in his principles, '*the chief aim of interpretation is not instruction, but provocation*. Therefore, interpretation shall stimulate people into a form of action, which makes people understand the heritage, appreciate the heritage and protect the heritage (Canal & River Trust, 2014).

The initial assessment which carried out on the existing interpretation techniques of the six Cultural World Heritage Sites (CWHS) in Sri Lanka namely, Anuradhapura, Polonnaruwa, Sigiriya, Kandy, Galle, and Dambulla, by employing the data gathering techniques of on-site observation, literature survey and a visitor survey questionnaire of 505 participants, revealed that those six CWHS mostly remain with the conventional interpretation practices, expect few pilot-phased mobile apps. Further, besides the religious and historical value, other heritage values namely, architectural, landscape, town-planning, engineering and technological, and aesthetic, including the 'Outstanding Universal Value (OUV)', are not adequately communicated to the visitors (Wimalasuriya, Kapukotuwa, & Ranasinghe, 2022). The results unveiled the gap/need for a 'Heritage Value-based interpretation strategy' and integration of 'appropriate' digital interpretation techniques into the existing techniques.

Accordingly, the research question for this study was taken as 'What and how digital techniques could effectively be used to facilitate Value-based interpretation strategy in CWHS of Sri Lanka', aiming at enhancing the level of on-site interpretation of the Sri Lankan CWHS. The research objectives were to explore the feasibility and applicability of selected digital interpretation techniques and to present necessary recommendations for potential future implementation.

Materials and Methods

Data Collection and Sampling

The study collected both qualitative and quantitative data through 13 in-depth interviews, field observation, participatory observation (for existing digital interpretation techniques), a literature survey, and a visitor survey questionnaire that was responded to by 505 (including 66 foreigners), during the period Dec 2019–Dec 2020. The in-depth interviews were conducted with heritage management professionals (05), experts on digital content creation and platform development (05), and professional tour operators (03), who were selected by 'purposive sampling' to obtain the most relevant and plentiful data for the selected phenomenon. The six CWHS of Sri Lanka namely, the *Sacred City of Anuradhapura, Sacred City of Polonnaruwa, Ancient City of Sigiriya, Temple of Tooth relic in Kandy, Old Town of Galle and its Fortifications,* and *Rangiri*

Dambulla Temple were taken as the sample for on-site observations, out of the hundreds of heritage sites in Sri Lanka, following 'purposive sampling'. Out of the digital techniques identified through the literature survey and in-depth interviews, *Mobile Apps*, *Augmented Reality (AR) Technology, Virtual Reality (VR) Technology, Interactive Digital Screens,* and *Digital Sound and Light Shows* were taken into consideration.

Data Analysis

By referring to the literature, the study adopted the theoretical framework containing 24 assessing criteria for On-site Digital Interpretation Developments in Cultural Heritage Sites (Wimalasuriya, Kapukotuwa, & Ranasinghe, 2022), classified under six themes namely, '*Site Condition', 'Legal and Regulatory Concerns', 'Technical and Financial feasibility', 'Content Preparation', 'Implementation',* and *'Sustainability'*, to analyze the collected data of the six CWHS of Sri Lanka and the selected digital techniques (Fig 1).

Results and Discussion

Upon the analysis of the data concerning the 24 criteria mentioned in the theoretical framework (Fig 1), it was determined that among the selected digital techniques, Mobile apps and Augmented Reality (AR) technology is feasible for all six CWHS of Sri Lanka. However, under the identified circumstances in the analysis, it was found that Mobile-based AR technology is more feasible than Headset-based AR technology. In addition, rather than implementing the Mobile-AR technology as a separate interpretation technique, the integration of Mobile-based AR modules into the general Mobile apps appeared more effective. Accordingly, the study identified that ***'AR-enabled Mobile apps'***, the combination of Mobile apps and Mobile-AR technology is the most appropriate solution for all six CWHS of Sri Lanka to accomplish the expected objectives

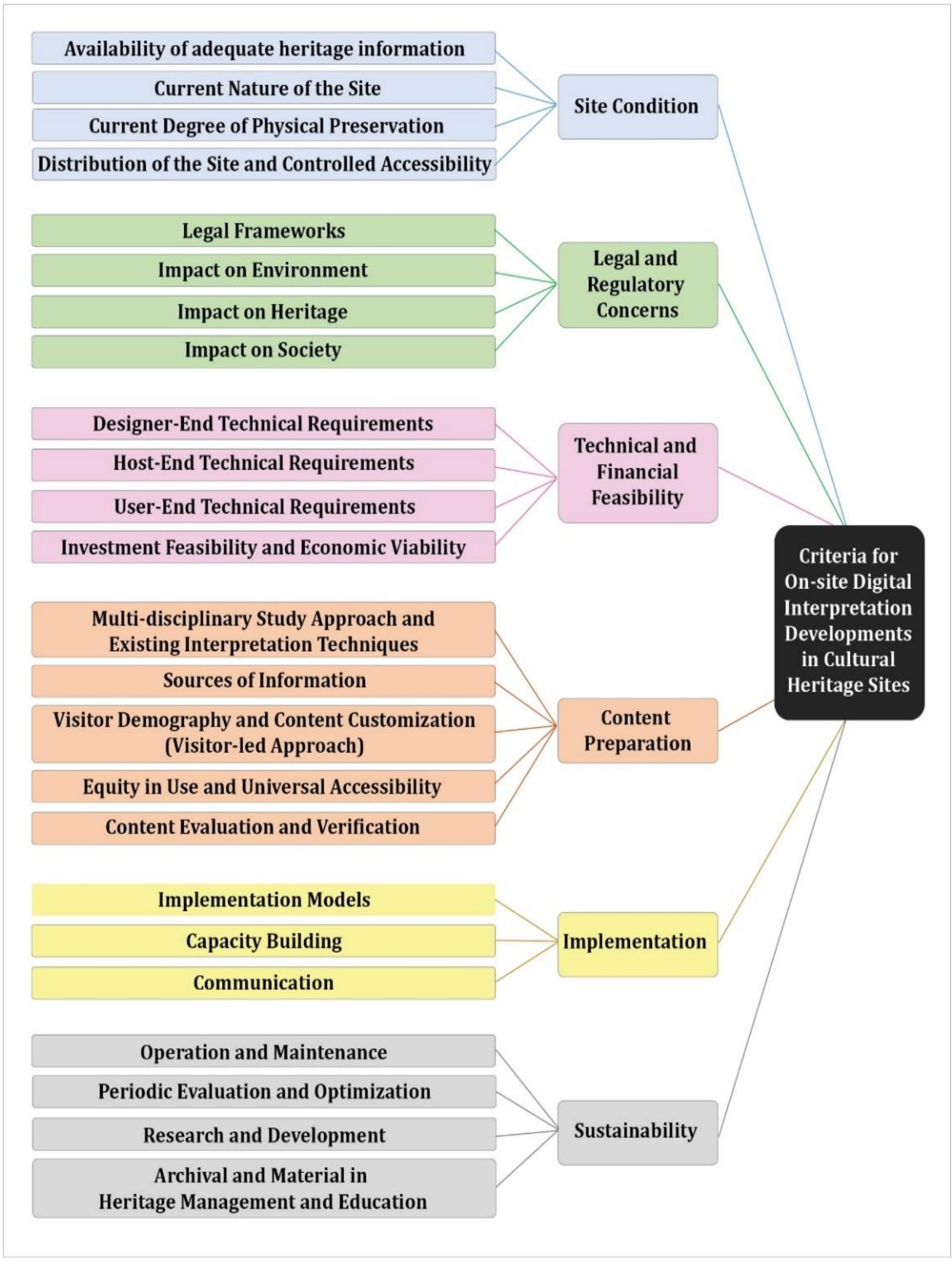

Figure 1: *Criteria for On-site Digital Interpretation Developments in Cultural Heritage Sites*
Source: (Wimalasuriya, Kapukotuwa, & Ranasinghe, 2022)

About the current use of Mobile Apps in the Sri Lankan Heritage field such as 'Heritage Sri Lanka App' and 'e-Info CCF App' which both are used as pilot projects, the practice is having a single app for all the hundreds of cultural heritage sites of the country. Considering the quantity of information to be delivered and the level of quality of the interpretation that especially meets the World Heritage status of the site, the present study suggests having a dedicated app for each CWHS. A customized User Interface (UI) and a flexible format shall be followed for each mobile app, based on a common structure.

The study next presents a set of recommendations under the developed themes of, *'Content Creation'*, *'Organizational Adaptability', 'Policy Changes', 'Partnerships and Promotion'*, and *'Post-Implementation Evaluation and Extended Uses',* in which the study employed itself to identify the proposed AR-enabled Mobile app technology as the best fit solution for the selected CWHS. Further, it is expected that these recommendations would lead to the development of a comprehensive reference model for On-site Digital Heritage Interpretation developments in Sri Lanka.

(i) Content Creation

The content creation for the proposed Mobile apps involves multiple Hardware, Software, and Human capability requirements from the Designer-end, Host-end, and User-end. Upon the identification of such requirements and feasibility for potential implementation, the present study recommends the proposed apps of each CWHS have the following modules to provide a tailor-made and innovative visitor experience complying with a value-based interpretation strategy.

For the visitors who wish to self-navigate at the sites and also as an assistant to the human visitor guides, the mobile apps shall consist of **AR-based Virtual markers** for visitor navigation (Fig 2). Even a **Virtual tour guide** can be used where the visitor is given the complete freedom to navigate the site and learn from the virtual tutor (Fig 3). There, Human-Computer Interaction (HCI) heuristics, Hand-

Gestures, and realistic audio material can be incorporated to provide the visitor with a realistic and immersive experience (Gammanpila, et al., 2019)

Figure 2: *Virtual markers for Navigation*
Source: https://dribbble.com/

Figure 3: *Virtual Tour Guide*
Source: https://sherpatours.com/

Since foreign visitors are not much familiar with Sri Lankan history and the context, most of the time they may not exactly understand the heritage site and its values as much as natives. Therefore, the researcher suggests embedding some **Comparisons to the world scenarios**, which would facilitate the foreign visitors to engage themselves with the Sri Lankan context much better by relating to their/world contexts, which will enlighten the local visitors as well. For instance, a height comparison may be presented between the Giza Pyramids of Egypt and the Jetavana, Abhayagiriya, and Ruwanveli stupas, to make visitors understand the ancient construction engineering value of the Anuradhapura WHS (Fig 4). Also, a chronological placement of the garden landscape design of the Sigiriya WHS about other royal gardens found in the world timeline (Fig 5) is another comparison.

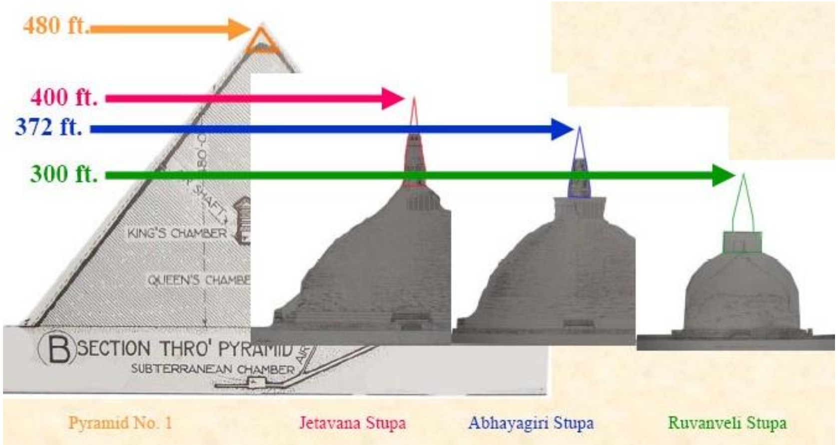

Figure 4: *Height Comparison of massive stupas with the Pyramid of Giza (Egypt)*

Moreover, the present study suggests having **Thematic and Customizable Itineraries** for visitors with special interests and expectations, and who have prior knowledge and prior visitor experience to the site (Fig 6).

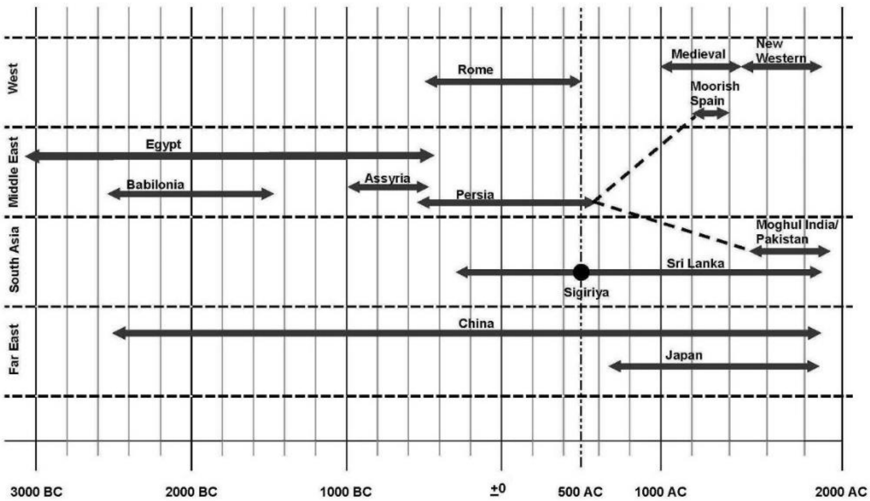

Figure 5: *Placement of Sigiriya in the international garden tradition*
Source: (Cooray, 2012)

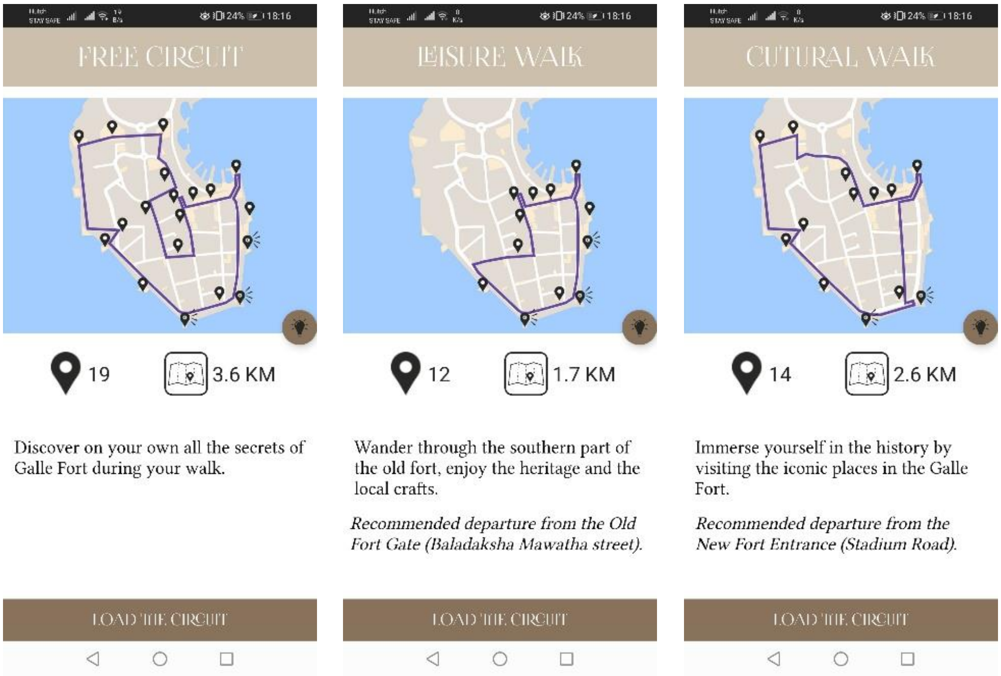

Figure 6: *Different itineraries suggested by for Galle WHS*
Source: 'Visit Galle' Mobile App by Yutsi

Visitors are often interested as well as curious to know the initial appearance of the heritage monuments or sites, which are in ruined states at present. The heritage professionals and digital solution developers are collaborating in accomplishing this requirement by conjecturing the possible monuments based on scientific evidence (Fig 7-8). Accordingly, the study suggests incorporating a module of **Virtual reconstructions** for relevant sites/monuments using Mobile-AR technology.

Figure 7: *Physical 3D model of Vatadage in Polonnaruwa Site Museum*

Figure 8: *Virtual 3D model of Vatadage created by FrammixVR*
Source: https://frammix.com/vrarchaeology.html

However, having almost intact monuments, like in Kandy, Galle, and Dambulla, does not always imply that there is no need for a virtual reconstruction but depends on the site itself. For instance, although the monument is physically intact if a certain perspective/ heritage value/ socio-environment context is missing, then there is a potential for a virtual reconstruction. For instance, the military context of the Galle fort can be virtually reconstructed where necessary (Fig 9).

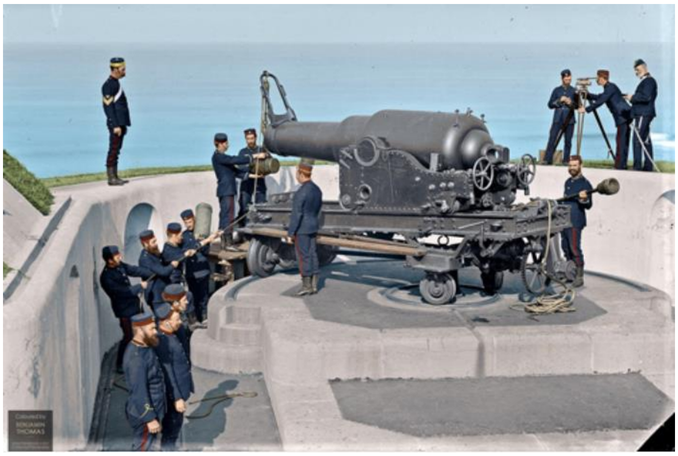

Figure 9: *Artillery gun and carriage to be replicated at Triton Bastion, Galle Fort*
Source: (The Sunday Times, 2020)

In addition, it is important that on the initial screen/ User Interface (UI), the general information about the monuments shall be provided while the in-depth information and relevant information sources shall be provided **only upon the request of a visitor,** as not every visitor category would be interested to go through the whole interpretation. However, the general information must be composed in a way that makes the visitors interested and lure them to request in-depth information. Nevertheless, the **Significance of the heritage (OUV and other heritage values)** shall be conveyed irrespective of the visitor demography, the purpose of the visit, visitor interests, etc., and should make visitors aware of why the site is of importance or declared as a World Heritage out of many.

Another important module that the present study recommends to be included in the proposed mobile apps is **User engagement features**, which certain visitor categories will be even more interested in, such as:

- Special AR filters (like in Snapchat/ Instagram/ Facebook) of dresses, accessories, weapons, etc. of relevant contexts (like Kandyan accessories, Dutch weapons, etc.) which allow visitors to take photographs in front of monuments and have the feeling of being in the historic context (Fig 10)
- Sharing options on social media

- Rating and feedback options, etc. (Fig 11).

Moreover, this rating and feedback are also important for the evaluation processes of visitor experience for optimizing the content.

Figure 10: *Use of AR Filters*
Source: https://www.wearehydrogen.com/ post/how-to-use-instagram-ar-filters-for-marketing

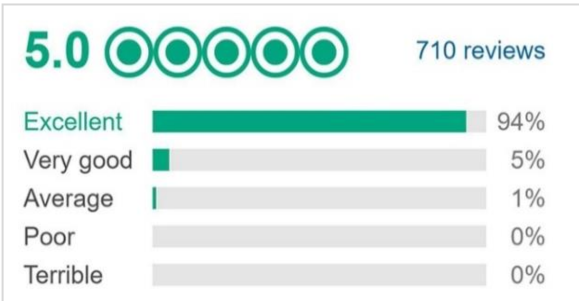

Figure 11: *Rating option in Trip Advisor app*
Source: https://www.tripadvisor.com/

Further, the composition of the Content planning committee shall consist of heritage experts from related multi-disciplines of each heritage site, a professional in Heritage Interpretation, Experts in technologies such as 3D art designing, AR development, User Interface (UI) designing/ App development, etc. Creativity is an essential competency in these implementations. "*No AR or VR development will be successful without a creative mind" (Interviewee T2, 2020).*

Moreover, it is suggested to have an order of prioritization. Sites like Anuradhapura, Polonnaruwa, Sigiriya, and Galle, which are of large dispersal, can obtain heritage experts' consultation and recommendations in selecting sites and prioritizing the contents to be developed first (phased development strategy). In addition, the **places with access restrictions** within these CWHS shall be interpreted with suitable media through these proposed apps (i.e., Black Fort of Galle (which is currently under the Department of Police), inside of the two-story Tooth Relic chamber building of Kandy, circumambulatory passage of Tivanka Image house in Polonnaruwa, upper stories of Tivanka and Thuparama image houses in Polonnaruwa, ruins of the shrine beneath the Siva Devala No. 01 in Polonnaruwa).

Furthermore, **audio listening features**, **sign language videos,** and **subtitles** are also to be included when and where necessary to cater to the visually and auditory impaired visitors respectively, following the universal accessibility principle. To avoid barriers to cultural accessibility such as language issues, the study recommends making available the proposed apps in the three languages of Sri Lanka (Sinhala, Tamil, and English) and the United Nations (UN) official and working languages: Arabic, Chinese, French, Russian and Spanish. Moreover, it can be extended according to the visitor demographical trends, for instance, by enabling the Dutch language for Galle WHS App. In addition, each technique shall carry **in-built pop-up notifications about the nearby heritage sites**, so that visitors may give a thought and adjust their itineraries to visit them as well. For instance, the Dambulla app shall carry a pop-up notification of the Ibbankatuwa heritage site.

(ii) Organizational Adaptability

Today, irrespective of their discipline, industry, services, or businesses, many organizations and institutes are getting adapted into the digital environments where the fusion of technologies and industries happens. As cited by Wimalasuriya (2018), the World Economic Forum (2016) has described this digital revolution as *'the fusion of technologies, blurring the lines between the physical, digital and biological sphere'*. The 'Acceptance of Change', 'Driving the Change', 'Employee

Adaptability', 'Workforce Competency', and 'Organizational Flexibility' are the key success factors that make organizations transform into the new ecosystem through the adoption of digital technologies (Wimalasuriya, 2018). Accordingly, the main heritage management authorities/ institutions in Sri Lanka shall have some adaptability in their institutions in this regard.

Therefore, it is suitable to set up an **'IT Division'** in the said heritage management institutions in parallel with the other operational units which enables the institutes in achieving the core scope of these institutions. Furthermore, competent human resources are required in the proposed IT Division to carry out the roles of Application Management, Database Management, System Administration & Operation, Information Security and Technical Maintenance, etc. Since these institutions do not generally possess these competencies, either some internal staff shall be trained or new staff shall be recruited for the said purpose. In addition, the organizational hierarchy of the IT division and associated site coordinators' roles have to be assigned with proper responsibilities, accountabilities, and the respective job descriptions for their roles. Clearly defined responsibilities ensure uninterrupted and smooth service to the visitors to make them delighted.

In the meantime, the proposed Mobile apps have to be hosted on web servers. However, since hosting a web server is out of the range of the heritage management institutions, it is suitable to outsource the web server/cloud computing services for the proposed apps, but the operation shall be handled by the IT divisions of the respective institutions. However, selecting a cloud computing service shall be reliable as well as scalable with high bandwidth connectivity. Moreover, upon the agreement with the digital developers, the staff of the heritage institutions shall have trained not only to operate the basic functions (operation management) but also to perform the maintenance of the systems (periodic software version upgrades, fixing of bugs/errors found in the apps, server and hardware devices maintenance) and content revisions of each digital solutions at each site, which may depend on the partnership agreement if any.

(iii) Policy Changes

Since digital interpretation techniques were developed in recent times, no notion is mentioned in this regard in any archaeological act or ordinance of the country. However, clause 4.5 of 'National Archaeological Policy of Sri Lanka (2008)' mentions that the "*internet and other communication mediums shall be used to enhance heritage knowledge among the general public*". Since, the legal provisions that are available at present, the use of digital techniques for on-site interpretation in cultural heritage sites in Sri Lanka is not illegal and does not violate any regulatory condition prima facie.

However, at the same time, it implies the timely necessity of having proper regulations for the use of digital techniques in interpreting the heritage of Sri Lanka. Since new technologies are developing daily upon the research and developments in technology fields, the clauses in the heritage legal frameworks of Sri Lanka also needed to be updated accordingly. Although digital techniques can be used for advanced interpretations of heritage, if any misinterpretation happens, the impact will also be immense. Therefore, proper guidelines shall be adopted and regulated properly. However, they shall not be too rigid which would make private entrepreneurs and researchers discourage. Therefore, the present study highlights the need for having **a Digital Heritage Policy for Sri Lanka** and the necessary amendments for the existing heritage legal framework in this regard.

Furthermore, to make the best use of these digital developments, having a **National Heritage Tourism Plan for Sri Lanka** is important, which will then continue Dr. Roland Silva's vision of making Sri Lanka a Heritage Tourist destination in the world. In addition, since Sri Lanka does not have appropriate **Data Protection and Privacy Legislation** (UNCTAD, 2020) at the moment, being adhered to the General Data Protection Regulation (GDPR) by European Union (EU) is an essential requirement as these developing digital interpretation services are catered to the foreign visitors. However, as a country, there is an utter need for a Data Protection Policy for Sri Lanka, which shall be addressed by the relevant authorities.

Moreover, it has to be developed a **Data Access Authority and Ownership Policy** along with each of these digital interpretation development projects by the heritage institutions.

(iv) Partnerships and Promotion

In today's world, partnerships have become a key factor that could lead an organization to more success with sources, knowledge, skills, and technology. Likewise, the heritage management institutions shall enter into partnerships [Public-public partnerships (PuP) and Public-private partnerships (PuP)] when and where necessary, especially in these kinds of Digital Interpretation developments (i.e., PuP of DoA and ICTA, Sri Lanka regarding the 'Heritage Sri Lanka Mobile App'). Accordingly, depending on the institutions' capacity to finance, operate and maintain the digital interpretation experiences, they can enter into partnership models like *'Design-bid-build', 'Build-own-operate', 'Design-build', 'Design-build-finance', 'Design-build-finance-maintain',* etc. Moreover, it is suitable to enter into partnerships with the Internet Service Provider (ISP) in Sri Lanka, to provide Wifi facility (currently provided in Kandy WHS) and enhance the mobile data quality, to let the visitors enjoy high-quality digital interpretation experiences in the proposed Mobile apps.

In addition, the external awareness/marketing strategy to promote these new interpretation experiences among foreign visitors and the local public should be very effective. Thus, it is suitable to have partnerships with Sri Lanka Tourist Development Authority (SLTDA), Tour operator companies, and Media channels. Furthermore, hoardings, X-stand displays, digital displays, leaflets, etc. can be kept in places where foreign tourists mostly visit, such as Airports, Hotels, Museums, etc. In addition, the use of digital marketing means such as Search ads, Display ads, and Email marketing are also possible strategies that could be used in this regard.

Social Media management shall also be paid much attention to as social media itself can create a huge impact on anything nowadays (Facebook, Twitter, Instagram, YouTube, Blogs, Vlogs, etc.). In addition, the comments, recommendations, and ratings by travelers on travel apps like 'Trip Advisor', 'Google Reviews', 'And guides by lonely planet' also can create a huge impact/influence in the field of tourism.

Moreover, academic conferences and lectures where domain experts, academics, researchers, and enthusiasts from different disciplines (both local and international) gather, are suitable platforms to demonstrate the developed solutions of each CWHS and to convince them how it can be utilized for their research and other academic purposes. Moreover, stalls can be set up at the exhibitions, book fairs, and events happening at the local, national and global levels to make the public aware of these new experiences provided at the CWHS of Sri Lanka.

(v) Post-Implementation Evaluation and Extended Uses

Evaluation is a critical quality assurance measure in heritage interpretation to be executed during the project period and the post-implementation as well (Department of Conservation, Wellington, 2005). Once the mobile apps are implemented, it is important to have a periodic evaluation to further optimize the service rendered. Thereby, several aspects such as 'Visitor Experience', 'Technical System', 'Cost and Revenue', and 'Impact' can be periodically evaluated for its optimization and eventually for sustainable operation. Herewith the present study proposes some data collection methods to evaluate the Visitor Experience of the proposed Mobile apps (Table 1).

Proposed Technique	Suggesting Data Collection Methods for Visitor Experience Evaluation	
	Indirect Methods (Visitor behavior)	**Direct Methods (Visitor Responses)**
AR-enabled Mobile apps	- Analytic tools like Google Analytics and Flurry	-In-app Visitor Feedback options -Link to Google Reviews and Trip Advisor apps -Feedback options on the main website and social media pages of the site

Table 1: *Suggesting Data Collection Methods for Visitor Experience Evaluation of the proposed Mobile apps*

Source: Developed for the present study based on the collected data

Further, during this research, it was identified that some CWHS do not have sufficient heritage information concerning certain heritage values which is essential to go for in-depth interpretations. Hence, to obtain such information, except for the chronical literary sources, the sites have to be extensively researched and more scientific research has to be carried out on different aspects (heritage values).

Moreover, the information collected to prepare content for these Mobile apps will be useful in Heritage Management, especially in Heritage Conservation and Documentation. For instance, a 3D scanned data set (3D model) of the Sigiriya fresco pocket captured to create a virtual reconstruction can also be used to analyze the deterioration of the paintings and to make decisions on further preservation. Besides, the heritage information collected or created for these mobile apps shall be a Heritage Documentation project of the site at the same time.

In addition, the digital interpretation content (Digital Heritage) will become a heritage asset of the country once it is developed. Accordingly, the content of these mobile apps shall be made used for Heritage Education of the country, which will become a great asset and a resource for extensive educational purposes. For instance, they shall be shared with the universities, academic institutions, and schools, or any other individuals for further studies and research purposes.

Most importantly, it is important to link all these into one website (web portal). According to an interviewee, it was said that the ICTA is expecting to create such a web portal under the e-Heritage Sri Lanka project *(Interviewee T3, 2020).* If so, the proposed six apps shall be linked to it, which will serve as the ***'National Heritage Tourism front portal'***.

Conclusion, Recommendations, and Acknowledgement

Given the condition of the six CWHS of Sri Lanka are in higher need of a Heritage Value-based interpretation and of a high level of interpretation strategy which should level up with its World Heritage status, rather than following the conventional approach of interpretation, it is more suitable to plan the site interpretation based on the site's heritage values irrespective of the manual or digital interpretation techniques. Since digital interpretation techniques allow to delivery of more information and features than manual techniques, they can easily be used for effective interpretation to make visitors understand and appreciate the sites from the perspective of their OUV and/or other heritage values.

However, that does not mean that every heritage site requires digital interpretation techniques. That decision shall be made based on what information needed to be conveyed. However, Mobile apps come in handy to be used for any heritage, even for sites that are small in dispersal. In planning content for the proposed six Mobile apps for each CWHS, it is of vital importance to get along with the existing interpretation strategies on the site. The content of the proposed Mobile apps shall not be a repetition of the content of existing interpretation strategies (especially of the informative panels) but an extra step beyond and address what is lacking at the site already. As cited by Rahaman (2018), Tilden (1977) also reminds us that, *'Interpretation should aim to present a whole rather than a part and Interpretation is conceptual and should explain the relationships between things*.

Adopting digital techniques for heritage interpretation is a long and complex process, which needs to evaluate multiple social, technological, environmental, financial, and legal factors and to plan in broad the implementation, operation, and sustainability stages of the project life cycle. Hence, the present study recommends to future researchers explore more potential techniques/ interpretation strategies for cultural heritage sites as the enhancement of heritage site interpretation is a continuous journey that never ends. Given that, the present study believes the composite outcome of this study could be followed as a reference in enhancing the existing level of on-site interpretation at the CWHS of the country but is not limited.

Finally, the present study would like to thank all the individuals who participated in the in-depth interviews and visitor survey questionnaires in the process of primary data collection. Further, the study would like to acknowledge and thank all the authors of the secondary materials used for this study as the reference section of this paper contains only selected ones out of a long list.

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An Investigative Study on the Use of Information and Communication Technology Techniques for the Preservation of Indigenous Medicine Palm Leaf Manuscripts

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Abstract

Sri Lankan Indigenous Medicine (IM) is a science of its existence. It is not a transmission of theoretical knowledge, but a practical set of rules, norms, and a proper knowledge system that help to preserve and maintain the well-being of the body and the soul of people. Preservation of Indigenous Medical knowledge consists of Palm Leaf manuscripts through modern ICT while preserving it with the latest technological know-how is time important. Accordingly, the research will be an exploratory study of the uses of ICT for the preservation of indigenous medicine Palm Leaf manuscripts in Sri Lanka. The main purpose of this paper is to study the role of ICT in the preservation of indigenous medical knowledge of Palm Leaf manuscripts in Sri Lanka. In addition to that, the study focuses on identifying the attitude of IM doctors towards the use of information technology for the Preservation Palm Leaf manuscript of Sri Lankan indigenous medical knowledge, identifying information technology issues faced in the Preservation of Palm Leaf manuscript, exploring traditional medical generations and genealogies in Sri Lanka, studying the measures to be taken by the government for the Preservation of Sri Lankan indigenous medical Palm Leaf manuscript and examining its current strategies for Preservation. In this study, the selected key IM generations using the latest information technology initiatives will be surveyed, and focus will be given to the latest trends in Preservation for their Palm Leaf manuscript and Medicine Knowledge. This research was carried out through a survey methodology using a qualitative research methodology. Research-related data were collected using structured interview methods. Quality data analysis was performed in data analysis using narrative data analysis and content data analysis. Generations of doctors in Sri Lanka in the subject will be used as the sample. Snowball sampling was used in this research to select a reliable sample from which traditional Sinhala Indigenous Doctors were identified comprised of 08 each. Data collection is done through interviews and observation. Data are collected through interviews with the chief medical practitioners.

Keywords: *Palm Leaf manuscript, Information Technology, preservation, Indigenous Medicine*

Introduction

Sri Lankan Indigenous Medicine is a study of the existence of life. Sri Lankan Indigenous medicine is not a transmission of theoretical knowledge, but practical rules that help to preserve and maintain the harmony of body, soul, and spirit, while helping to preserve daily existence. "Indigenous Medicines are a method of treating the root of the disease and not the patient" (Ape Hela Urumaya, 2008). Sri Lankan Indigenous Medicine can be identified as a practical system that has existed for centuries. Although the knowledge of indigenous medicine in Sri Lanka is seen as a new trend today, it is seen that it is limited to certain limited ranges. Although there is no active contribution to the communication and conservation of indigenous medical knowledge through the existing institutions on indigenous medical knowledge, various programs are being conducted under the Ministry of Culture through projects to protect the Sri Lankan Hela Urumaya (SLHU).

Thus, this indigenous medical knowledge is one of the most important components of the major indigenous knowledge genres in Sri Lanka. This medical knowledge has been preserved from the past to the present with the use of palm leaves. However, at present, it is possible to identify these Indigenous medical methods and how that knowledge is being lost in society. This traditional medicine has been used in Sri Lanka as a natural remedy or indigenous medicine since the time of Victimize era. It was preserved through open documents for future generations. According to Professor Arjuna Aluvihare, the hospital system was gifted to the world by the ancient Indigenous (Vidusara Science Magazine,1993). According to the Study, the ruins of Mihintale and Ritigala are the oldest known evidence of a hospital. Mihintale Hospital is the oldest hospital in the country (Historia Aspitalium,1975). Thus, the ancient Sinhalese first introduced hospital culture to the world during the reign of Pandukabhaya, who established his kingdom in Anuradhapura in the 4th century BC. King Pandukabhaya built various rest houses and hospitals throughout the country (Ape Hela Urumaya, 2010). In evaluating the nature of this traditional Sri Lankan Indigenous Medicine, it is necessary to study the treatment methods used there. According to traditional medicine, it is clear that the treatment is not for the patient but the root cause. Here the concept of trinity is used and used for therapeutic methods. It can be expressed as airway, bile, semen, etc. It has been shown that all diseases are created based on this. Traditional medicine treats these triads. In this treatment, surgery, pulse therapy, pulse therapy, and meditation techniques are all used for treatment.

At present, the knowledge of traditional medicine is being preserved for future generations by several generations, and services are being utilized to the best of their ability using that knowledge. Based on all these factors, many generations of doctors are still active in Sri Lanka, preserving the Sri Lankan identity. In addition to that, hose generations of doctors who give special value to the local culture are working hard to preserve medicine by showing exceptional skills for various diseases. They conserve this knowledge in their traditional ways and do their utmost to protect the palm leaves manuscript.

Although no formal conservation work has been done on the Palm leaf manuscript of the present generation of Indigenous Medicine in Sri Lanka, at present it is possible to identify veteran traditional Doctors in various fields. There, the Pottuvila Vedic generation, Nendungamuwa Vedic generation, and Balalla Vedic generation. Welalapitiya Medical generation, Hingula Medical generation, Mawella Medical generation, Awariwatta Medical generation, Lagamuwa Medical generation, Mapitigama Medical generation Kekirideniya Medical generation, Marapana Medical generation, Neelammahara Medical generation, Unawatuna Medical generation Kirineliya Medical generation, Thalgamuwa Medical generation, Hapugaskanda Medical generation, Sapuvida Medical generation, Siyambalagoda Medical generation, Attidiya Medical generation, Heenkenda Medical generation, Kahathuduwa Medical generation, Wadduwa Medical generation, Madiha Medical generation, Attaragama Medical generation, Ibbagala Medical generation, Vedic lineage, Pasyala Medical generation, Wellawa Medical generation, Thalagala Medical generation, Pamankada Medical generation, Banagala Medical generation, Walgama Medical generation, Pattiwila Medical generation, etc. can Identify present era. It is no secret that the palm-leaf manuscripts in the possession of this generation of Vedas do not contain the advanced medical methods traditionally found. Therefore, the knowledge contained in the palm-leaf manuscript of these generations should be properly preserved for future generations.

It is not a secret that without information communication today man cannot carry out the functions of daily life. To this end, from the beginning of mankind, there has been socialization that transcends civilizations using a variety of methods. Although man used various communication tactics in the exchange of information, the transformation of information communication through technological phenomena, which has now surpassed all of them, marked the emergence of the concept of information communication technology. Thus, it is evident that at present information technology is being used for all purposes.

In this way, information technology is a collection of different technologies used to capture, organize, store, process, and distribute computer applications and information" (American Library Association, 1983). In this way, information technology can be used to conserve knowledge as a whole. Furthermore, it can be seen from the existing evidence that information technology is being used extensively for propaganda purposes at present. The ancient nature of medicine and its scientific nature can be identified. Thus, the current technology should be used to preserve those medical knowledge books. As mentioned above, in carrying forward these studies on the preservation of palm leaf books with indigenous medicine, there are unseen ranges in this knowledge (Hela Wedakama) and it is necessary to preserve the knowledge available in those ranges in conjunction with modern technological knowledge for future generations. Through this research, the use of ICT techniques for the conservation of pomegranate bibliography of indigenous medicine in Sri Lanka is being investigated.

Significant of the Study

The Internet is one of the most advanced means of communication in the world today. Therefore, the Internet has become an essential factor in various fields today. Based on these facts, information technology, which is an integrated concept with the Internet, is seen today as a more important component as the main means of meeting the information needs of various sectors. Therefore, the use of information technology for the preservation of these indigenous medical palm leaf manuscripts plays a special role in this regard. Even in the face of new technology, the indigenous knowledge that existed in the past JHU is now as realistic as it is scientifically important. Therefore, this study identifies a wide range of factors for conducting research and dissemination of scientific information on palm leaf manuscripts containing Sri Lankan indigenous medical knowledge. Furthermore, with the development of technological tools, this study will focus on guiding researchers who are engaged in such conservation and Preservation of the Palm leaf Manuscript to create a variety of processes using communication technologies. This study is important for students studying medical technology to conduct research, preserve Sri Lankan Indigenous medical technology, and acquire information for the future advancement of the medical field through internet technology. Although there is currently no systematic approach to the preservation of the medical knowledge contained in these palm leaf manuscripts, the importance of this study can be highlighted in making the stakeholders aware of the importance of conserving that local knowledge. The importance of this study is to provide local physicians with an understanding of information technology and to encourage the use of ICT strategies to preserve that knowledge, and it is hoped that this research will enable them to preserve the knowledge of Sri Lankan Indigenous medicine in Sri Lanka and pass it on to future generations.

Methodology

The spread of Western medicine around the world can also be seen in the focus on the medical practices that are prevalent in the world today. The research that is being done to popularize these medical methods is being carried out in the form of formal knowledge conservation. As a developing country, Sri Lankans have inherited traditional medicine from the past in focusing on the indigenous medical traditions of Sri Lanka, which is dependent on the Western medical system. This traditional medicine is unique to Sri Lanka and there are several generations of doctors throughout the island who practice this medicine. These generations of physicians use a variety of techniques to preserve the knowledge they possess and traditional medical knowledge is preserved in palm leaf books. In maintaining such knowledge, there is a high probability that the knowledge contained in that knowledge will be eroded if it is not properly protected or used properly. Also, sometimes valuable rare medical books are provided to foreign traders at very high prices. Thus, due to the lack of proper preservation of palm leaf books, the knowledge contained in those books may be lost to mankind. To date, however, there is no formal record of the methods used to preserve the medical textbooks that contain this knowledge.

The study summary refers to the population we use to select the sample (Abeypala 2004). It is difficult for a researcher to reach the real population. The sample is selected from a population that can be truly accessible (Abeypala 2004). All Sri Lankan Indigenous medicine generations will be the subject of a research study on the use of ICT strategies for the preservation of palm leaf manuscripts of Indigenous medical generations. There are generations of doctors who nurture Sinhala medicine in all nine (09) provinces of Sri Lanka. The generations of Sinhala doctors in those provinces are summarized in this study. Since it is difficult to select the entire aggregate for the study, a sample is selected to represent the aggregate and the study is based on that.

In this research method, random sampling (snowball sampling) was used to collect data. The reason for using this snowball sample is that there are generations of Sri Lankan Indigenous medicine generation all over Sri Lanka. Dr. Herathham Wijesinghe, the 37th member of the Horiwila Medical Generation, a well-known name in traditional fracture medicine, was contacted by Senior Lecturer Chamara Kuruppuarachchi to identify generations of doctors under this snowball sampling very successful.

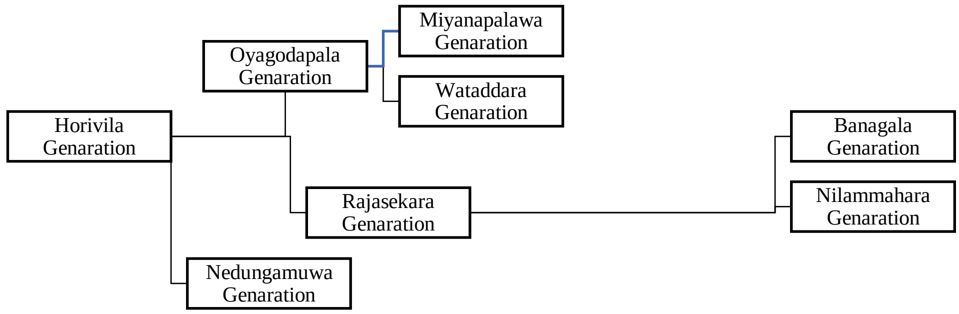

Figure 1. *Chart of Snowballing Sample*

Thus, the Chief Physician of the Horiwila Medical Generation was identified and the physicians of other generations of physicians were identified through him. Thus, 8 major generations in Sri Lanka were identified using this snowball sample.

Results and discussion

The following information is systematically analyzed by Mr. based on the data obtained from the structured interviews on the use of information technology for the conservation of palm leaves belonging to the Sri Lankan indigenous medical generations in this chapter.

Used of tools	HoriwilaIM Generations	Oyagodapala IM Generations	Rajasekara IM Generations	Wataddara IM Generations	Miyanapalawa IM Generations
Laptop computer	✓	×	✓	✓	×
Desktop computer	✓	×	✓	×	×
Internet	✓	✓	✓	✓	×
Tab computer	✓	×	✓	✓	×
Smartphone	✓	✓	✓	✓	×
Website	✓	×	×	×	×

Table 1: *Generations of Indigenous Doctor's Use of Information and Communication Technology*

Used of Tools	Horiwila IM Generations	Oyagodapala IM Generations	Rajasekara IM Generations	Wataddara IM Generations	Miyanapalawa IM Generations
Pharmaceutical leaflets	✓	×	×	×	×
CD/DVD	×	×	×	×	×
Voice recording	×	×	×	×	×
Video recording	×	×	×	×	×
Computer Document	✓	×	×	×	×

Table 2: *Generations of traditional IM Doctors used information and communication technology to preserve their palm-leaf manuscript*

It had been evident from the above tables that although generations of IM doctors have used IT as a tool of information technology, generations of IM doctors have seen the use of pharmaceuticals and computer documents to preserve the knowledge of the Horiwila indigenous medical generation only in the use of ICT for the preservation of their palm leaf manuscript.

Table 3. *Oyagodapala Generation palm leaf collection*

Table 4. *Wataddara Generation palm leaf collection*

In an investigative study on the use of ICT techniques for the preservation of IM Palm-leaf manuscripts in indigenous medicine, a sample of several traditional IM doctors based on snowball sampling was used to inform IT professionals about the use of information technology tools for the preservation of IM Palm-leaf manuscripts. According to, the problems and barriers in the use of ICT strategies for this conservation, the attitude towards the use of information and communication, the following are the conclusions that can be drawn from this.

- It had concluded that traditional IM doctors have an understanding of information technology and their information literacy is at a normal level.
- It can be concluded that the knowledge available to traditional IM doctors is very broad and has the potential to adapt to any existing technology.
- Concluded that doctors do not use IT equipment for the preservation of palm-leaf manuscripts that have traditional medical knowledge and do not have an understanding and expertise in such equipment.
- Before the destruction of the palm-leaf manuscript belonging to IM physicians and the need to preserve it properly.
- It can be concluded that there is no government intervention to protect these palm-leaf manuscripts.

- It is essential to organize awareness programs on the use of ICT strategies for the preservation of palm leaf books to make them more effective among the IM Generation.
- According to the data obtained from the research, with the technological revolution in a developing country such as Sri Lanka, the research on these book conservation concepts has been minimal. As a result, more research should be done on the new concept and everyone should be made aware of it.
- Convincing the dependents of traditional conservation methods on the effectiveness of new methods using IT tools.
- Government intervention should directly contribute to the preservation of palm leaf manuscripts of indigenous medicine. Here is a need to create an active governing authority for the conservation of this traditional medical knowledge under the present Ministry of Culture.
- Formulate policies to directly address this through factors within the library field in Sri Lanka.
- Systematically maintaining the existing conservation councils.
- Develop of Conservation Center in Sri Lanka where traditional indigenous medical knowledge is available.
- Assisting researchers in this traditional medicine.

One of the objectives of this research as well as one of the solutions proposed by Indigenous Medicine Generation was to create a digital library for the conservation of palm leaves manuscript owned by IM Doctors. Also Identified to the system should be set up to enable them to scan the palm-leaf manuscript in their possession. The format created by it can be seen as follows. These techniques make it easier for researchers to unearth the information contained in the palm-leaf manuscript of the Indigenous medicine generations and to expose the need for that knowledge. Furthermore, by enforcing such proposals, this traditional knowledge that is being hidden from the present society can be re-preserved and socialized.

Table 5. Sample web

Table 6. Sample web

Table 7. Sample web

Conclusion

These are just some of the goal-setting shareware that you can use in Sri Lankan indigenous medicine. A study on ICT strategies for the preservation of palm-leaf manuscript in indigenous medicine identifies the attitudes of IM Doctors towards the use of information technology for the preservation of palm leaf manuscript, identifies problems in the use of information technology for the preservation, and identify the indigenous medicine knowledge of the Sri Lankan medical palm leaf manuscript. Identifies steps taken for conservation, etc. The conclusion reached at the end of this research is that the level of use of IT tools is minimal. Identified the medical knowledge had been at a good level in terms of the amount and awareness used in publicity. Thus, it is clear that although traditional IM doctors are nominally aware of information technology tools, they have not been put to practical use. Furthermore, Indigenous Medicine is no longer obsolete knowledge but it is a vast body of knowledge that can be used to achieve the goals of sustainable development and improve the health of the individual through the use of paving the way for the progress of the entire human race. But in the face of the current global economy and certain technological trends, traditional medical knowledge is disappearing Palm-leaf manuscripts from our society. The basic requirement for the preservation of traditional medical knowledge consists of the palm-leaf manuscript to identify this valuable knowledge that exists in the society and to preserve and encourage the books of those indigenous medical generations and provide them with state sponsorships.

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An Industrial Archaeological Study of bridges built during the British period in Kandy and Suburbs (Based on Selected sites)

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Abstract

As a result of the Industrial Revolution during British Colonial rule, during the period 1815 – 1947 many bridges were built in Kandy and surrounding areas. With the commencement of the plantation Industry in the Upcountry, a highway was built from Colombo to Kandy in 1820 to transport the plantation produce to the Port of Colombo. The British built several Civil engineering structures, including bridges and culverts, along the highway and other roads. Sir Edward Barnes, then Governor of Sri Lanka, paid special attention to the construction of bridges and culverts in Kandy and surrounding areas. The craftsmanship and construction materials used in contemporary bridge technology varied from brick-arched bridges to iron bridges. There have been many examples of such erections in Kandy and surrounding areas. Major Thomas Skinner, John Fresher, Captain Gordon, and Captain A. Brown were at the forefront of the design and construction of bridges during the period under the supervision of the Royal Department of Engineering. At present, due to public negligence and various development projects, many bridges in Kandy and its Suburbs are being destroyed without any investigation into their values. In this regard, field, and non–field study methods were used to uncover information. The main objective of this research is to identify bridges built during the British era and around Kandy and its Suburbs.

Keywords: *Industrial revolution, British era, Bridges and culverts, Civil engineering construction, Kandy and suburbs*

Introduction

At the beginning of the 19th century, the British Colonial rulers in Ceylon focused more on military interests than the economy. However, around 1822, with the establishment of a coffee plantation in the Sinhapitiya area of Gampola by George Byrd. Coffee cultivation became successful, and commerce took precedence. (Silva, 1973, p303 – 304). A road network was constructed to bring the plantation crops cultivated in the upcountry to the Port of Colombo easily. For that, several Civil engineering constructions including bridges and culverts were established on those roads. With the construction of the Colombo – Kandy highway in 1820 under the leadership of Governor Edward Barnes, bridges were built over the rest of the existing network of roads in and around Kandy. Thus, in the period from the early 19th century to the 20th Century, there was no complete identification of modern bridge technology in ancient Sri Lanka. The techniques and construction materials used in the past were varied. Accordingly, the technology of tiled arch bridges was first established in Sri Lanka. During the second half of the 19th century, although the aforementioned bridge technology remained the same, with the slightest change the iron bridge technology became prevalent throughout the island. (Kodithuwakku, 2006, p66-67). There are several prior research on bridges built during the British Colonial period. Among them, Dr. Kusumsiri Kodithuwakku's research on "Road bridges in Sri Lanka" is important for his Master's Degree.

He has divided the history of bridges in Sri Lanka into three main stages, including stone bridges, wooden bridges, and rural bridges. Major Forbes (1840), Emerson Tennant (1860), Robert Knox (1911), M.B. Ariyapala (1968), Prof. Senaka Bandaranayake (1974), Y.W. Nicholas (1979), John Deloche (1984), R.C.De.S Manukulasuriya, R.K. De Silva (1988) and Ulrich Von Schroeder (1990) conducted researches. Dr. Kusumsiri Kodithuwakku has divided the modern period into three sub-phases preliminary, transitional, and post-translational. These researches also did not provide specific opportunities for bridges built during the British era in Kandy and surrounding areas. And P.M. Bingham, A. M. Ferguson, Henry W. Cave, and Emerson Tennant's reports from British civil servants contain brief information about some of the bridges built during the British era. This research aims to address the need for the identification of bridges built during British rule in Kandy and its Suburbs.

Materials & Methodology

British-period bridges in Kandy and its Suburbs are the main material of this research paper. In this regard, field, and non–field study methods were used to uncover information. The data record was created by the structural field survey, library survey, archival survey, Photographs, studying 1: 50,000 metric maps, and taking measurements. A Library survey and an Archival survey were done to get an idea of the colonial background of Kandy and its Suburbs, by studying previous research on this subject. The structural field survey was used to identify industrial archaeological data on bridges. Metric Maps, Photographs, and measurements were used to record the data.

Results and Discussion

In 1820 with the construction of the Colombo – Kandy highway, many of Sri Lankans' first bridge was built along this road. Sir Edward Barnes, then Governor of Sri Lanka, paid special attention to the construction of bridges and culverts in Kandy and its Suburbs. The craftsmanship and construction materials used in ancient modern bridge technology were varied and the brick arch bridges and iron grader bridges that were built. Existing bridges in Kandy and its Suburbs can be classified into three stages.

01. Early stage (1800 – 1850)
02. Transitional Period (1850 – 1900)
03. Post – Translational Period (1900 – 1950)
    (Kodithuwakku, 2006, p67).

Major Thomas Skinner, Lieutenant General John Fresher, Captain Gordon, and Captain A. Brown took the lead in designing and designing the bridges in Kandy during the period under the supervision of the Royal Engineering Department. (Kodithuwakku, 2006, p67).

Early stage (1800 – 1850)

In 1826, Captain A. Brown built a three-arched brick bridge across the Nanu Oya on the Colombo – Kandy highway. (Bingham, 1716 – 1913). In the lower part of the arches, the soil that collides with the stream is made of stone. The upper part of the arches and the bridge are made of brick. The bricks are bonded together with lime mortar and the brick surface is not plastered. The upper part of the arch is made of bricks in a semi-circle and the bricks in the arch are firmly fastened together using a stone. The length of the embankment of the bridge is 5.90m, the width between the two embankments is 7.6m and the height of the section which is supported on both sides is about 80cm.

__Fig. 1__. Nanu Oya arch bridge

Fig. 2. *Plaque of bridge*

Work on the Peradeniya Satinwood bridge, a masterpiece in the history of bridges in Sri Lanka. Founded in December 1826. It was completed by October 1, 1833. (Bingham, 1921: p194, Silva, 1985: 218). The arch of the bridge over the Mahaweli River was commissioned by Colonel Fresher. (Bingham, 1921: p194). It was a single arch, 20 feet (62m) long, 22 feet (67m) wide (Silva, 1985: p219), and approximately 70 feet above water level. (Tennant, 1859: p727). The wooden part of this bridge was designed at the Quartermaster General's office in Colombo and transported to Peradeniya and attached to the bridge. The wall was designed by Captain Brown, and under his command was Lieutenant Old Show. (Bingham, 1921: 203). The wooden arch here is made of single Satinwood without any nails or dents. (Cave, 1908: p249, Wimalananda (Ed), 1966: p105). About 1,200 workers were employed to prepare the access roads and fill in the soil during the construction of the bridge. (Skinner, 1890/ 1966: p105). 1: 30 model of the bridge, donated by Captain Edward Barnes in 1860, is currently on display at the Museum of Science in London. (Silva, 1985: p218).

During the reign of Governor Sir Henry Ward (1855 – 1860) the Satinwood bridge at Peradeniya was renovated under Captain Donald Graham. A model of the bridge is also on display at the South Kingston Museum. (Bingham, 1921: p194). In 1903, the Peradeniya Satin bridge was replaced by three iron arches, and the floodplain was made of bricks, with iron rings attached to it. For the construction of the earthen part of the bridge. It is said that the work was carried out from March to the end of April 1903. (Ceylon yearbook, 1960). The iron arched guider was 67 feet and 09 inches long. The width is 20 feet. The side walls and side walls were made of concrete, and the handrails were made of iron. The surface of the bridge is 17 feet and 6 inches wide. The road was paved with tar under the system. The bridge was built on double Octagonal concrete pits, measuring 35 feet 09 inches and weighing about 06 tons with an iron lattice.

The bridge also underwent some construction in 1904 for 81, 722. 63 is sold to have been spent. (Bingham, 1921: p204). The bridge was repaired and reopened on September 11, 1906. During the construction, an alternative bridge was built across the Getambe Port and it was designed and constructed by Head Office Architect by A, Woodson. The bridge was renovated again in 1915. (Highways and Road Development Authority, Kandy). A watchtower bridge was built outside the Colombo – Kandy highway in the year 1847. It is located in the Gurudeniya area on the Kandy – Haragama road, about 5 miles from the city of Kandy. This bridge was designed by Karsho’s bridge. It is 35 feet (11m) long and 9.5m wide width two north-south brick arches. (Bingham, 1921: p203). The bridge’s arches and bridges are made of brick and lime mortar, reminiscent of the British era. The arch is reinforced with a stone, and the wall on the arch is 90cm high and 45cm wide.

In the year 1848, a culvert with a brick arch was constructed across a canal flowing through the Pallemahaiyawa area on the Kandy – Matale road. (Highways and Road Development Authority, Kandy). The 63.08 m (205ft) long bridge at the Provincial boundary near Kadugannawa was made of sandalwood and designed by John Fresher. The bridge that currently stands at the location was built in 1854. (*kadurata praweniya,* 2000: p139).

Transitional Period (1850 – 1900)

In addition to the tiled arch bridge technology that existed in the history of ancient bridges in Sri Lanka, the construction of large iron girder bridges took place during the Transitional Period. By this time, the road from Colombo – Kandy was under construction, and bridges were started connecting Kandy and surrounding areas to transport the fertilizer, equipment, labor, and consumer goods required for coffee cultivation. The largest number of bridges were built during this period, during the reign of Governor Henry Ward from 1855 to 1860. (Balasingham, 1968: p39). In 1859, Governor Henry Ward first connected coffee-growing areas such as Kotmale and Dimbula, separated from the Mahaweli River, to Kandy by the construction of a suspension bridge at Gampola. The bridge, designed by Captain Graham, was 20 feet (62m) long and 50 feet above water level. In 1918 this suspension bridge was removed, and a lattice grader bridge was built. (Bingham, 1921: p203/ Silva, 1985: p220). Emerson Tennant notes that the bridge is one of Sir Henry Ward's Public Works. (Tennant, 1860: p236).

In 1859, a bridge was built across the Mahaweli River at Katugastota to connect the areas of Matale, Panwila, Kabaragala, Rangala, Knuckles, and Kurunegala with the city of Kandy. (Bingham, 1921: p38). The bridge was opened to traffic in the year 1860. J.A. Caley was appointed as the Chief Engineer during the construction of the Katugastota bridge. Work Clerk in the woods, As W. Lapen has also worked construction was carried out by the pioneer's 4th and 5th batches. Major Thomas

Skinner was then the commissioner of the Department of Public Works. Designed in the style of an iron garage, the bridge had three sections of 140 feet each and a total length of about 420 feet. (Silva, 1985: p222).

The Katugastota bridge was built during the reign of Governor Henry Ward and was the longest bridge in Sri Lanka at that time. The piers of the bridge are made of prefabricated granite and this bridge has 05 piers. E.C. Davis supervised the construction of the bridge. The Katugastota bridge was rebuilt in 1939. The bridge deck was reinforced with additional towers by Chief Design Engineer S.K. Mahadeva and Factory Engineer G.C. Oram. The minister in charge of Communication and Works, Major J.L. Kotalawala, and the construction of the Katugastota bridge was carried out under the Public Work Department of the Government Factory.

Fig. 3. *Katugastota bridge*

During the period 1858 – 1864, several bridges were built by the British on the road from Katugastota to Kabaragala. A bridge 120 feet across the Piga Oya in Katugastota in 1859. Built by J. Robertson. Also, on the same road in the year 1860, a 50 feet bridge was built across the Pussel Oya at Nawayalatenna, built by W. Velupillai. In 1859 J.A. Caley built a 40-foot bridge across the Hulu Ganga river on the Bambarella road, a 50-foot bridge over the Lenagal Oya, and an 80-foot bridge over the Daluk Oya. That it is said that Caley himself built 80 –a footbridge across the Maha Oya on the Hanguranketha road between 1859 – 1860 and also built an iron bridge on the Kelebokka road between 1855 – 1860. (Bingham, 1921: p204).

By 1858, many bridges were built across the tributaries of the Mahaweli River to build a road to Teldeniya, Rangala, Kabaragala, and Panwila. It is said that 75 feet and 130 feet long iron grinder bridge was built across the Haragama Oya on the road from Kandy to Maturata. (Hudson, 1935: p120). The bridge was built between 1859 – 1860 by J.A. Caley it was built by and is said to have cost around $23,000. (Bingham, 1921: p205). Near Teldeniya during the period between 1858 and 1860, a 140 feet long bridge was built across the Hulu Ganga river at Orutota. It was built by C, Mason and cost $ 52,000. (Bingham, 1921: p205). In 1861 on the road from Kadugannawa to Alagalla, near the Kadugannawa Railway Station, there was a small bridge 6.45m long and 4.4.m wide with a stone wall. An 80-foot bridge across the Galmal Oya in 1862 was built by J.A. Caley. (Bingham, 1921: p205). It is said that in 1876 a bridge was built across the Kospotu Oya at Udalagama. (Lowrie, 1896/ Administration Report 1876).

Post – Transitional Period (1900 – 1950)

In the year 1900, a single brick arch was constructed across the Bolagala Oya which flows near the town of Hedniya on the Kandy to Kurunegala road. The bridge over the Thalathu Oya was built on a 30 feet long span in 1902 and the surface was paved with granite blocks. The bridge is 13. 62m long and 06m wide and has two iron girders. (Bingham, 1921: p205). The uphill arch bridge is believed to have been built across the Alakolanga Oya on the old Pilimathalawa – Poththapitiya road. The bridge is made of large steel beams and is 44.6m long and 3.60m wide. There are seven arches above the bridge and the height of one arch is 3.43m. In 1904 E.C. Davis built the Ulapane downward bowstring bridge, one of the rarest modern bridges in Sri Lanka. The bridge is located on the Ulapane – Kotmale road across the Mahaweli River and is about 58.90m long. It is said that a 40-foot bridge was built in 1906 on the Haragama – Kurundu Oya road. (Bingham, 1921: p205). A bridge called Dumbara bridge was built in 1909 in the Teldeniya area. It is a bridge with 04 spans and is 32 feet long and 13 feet wide. The bridge is said to have been built by Government Factory. (Bingham, 1921: p205).

During British rule, a single-span 19.9m long bridge was built across the Rambukkan Oya in 1929 at Hatharaliyadda. It is a bridge with iron beams made of N- Trust type carpets. Several bridges can be seen on the retaining wall built on the earthen embankment of the bridge. On the 1932 types, Peradeniya to Gampola road a six–arched granite bridge was built over the railway line in the Angunawala area. Also known as the *Meewathura palama*, the bridge has an arch on either side that is 11.4m long and the four arches in the middle are about 9.4m long. There is a local legend that forged wood was used for the base. On November 15, 1936, a 17m long and 4.13m wide bridge with two spans was constructed across the Ovissa Oya on the Pujapitiya – Alawathugoda road. It is believed that Sir Ivor Jennings built a 9.2m long and 9.15m wide bridge across the river near the University of Peradeniya on a road built from Peradeniya to Deltota in 1871 using three arched stone blocks. The bridge is known as the *Gajasinghe palama* since four panels are engraved with the handrail of the bridge. There are also eight pipe systems on the bridge to drain the upper retaining water of the bridge using an artistic stone carving found in Hindu temples. The road also has a single arch bridge made of bricks across the Gal Oya in 1940 and the same year known as the *Kona palama with* three horseshoe-shaped arches across the Hal Oya. In the Wariyagala area, there is also a single-arched granite bridge. It is 14.36m long and 5.3m wide, In the Nilambe area, near the town of Galaha, there is a 40 feet long iron grader bridge made of iron through a small waterway. (Hudson, 1935: p120).

Fig.5. *Gajasinghe palama*

Fig.6. *Kona palama*

Conclusion

During the British Colonial rule, a highway system was built to easily bring coffee and tea crops grown in the Upcountry to the Port of Colombo, as well as for the transportation of fertilizer, equipment, labor, and consumer goods to the estates. It is seen that an integrated bridge technology has been restored and developed in Kandy and its Suburbs. These bridges were originally built on the Colombo – Kandy highway and later with the emergence of other road systems, this bridging technology became associated with it. It is clear that bridges were built in these areas during the early days under Major Thomas Skinner, John Fraser, Captain Gordon, and Captain A. Brown under the Royal Development of Engineering, and that bricks and various timber were used for those bridges during that period. By the transitional period, the design of iron grader bridges had begun and the technology of the existing arch bridges was also in use at the time. Granite blocks are used in the design of iron grader bridges. Box culverts as well as double culverts can be seen across the shallow ridges and waterways using granite slabs. Many bridges in Kandy and its Suburbs were built by the Engineers J.A. Caley, Captain Graham, C. Mason, J. Robertson, and W. Velupillai.

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Nature and extent of degradation and deterioration of Medavela Rajamaha Vihara Palm Leaf Manuscript Collection

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Abstract

Palm Leaf Manuscripts faced the threat of deliberate as well as unintentional destruction since ancient times. Custodian individuals and personnel protected the collections from natural and manmade disasters by adhering to the traditional conservation and preservation methods that prevailed for generations. However, the advent of printing, absence of patronage, lack of know-how, less priority paid, and attitudinal changes led Palm Leaf Manuscript collections to deteriorate fast, especially after the beginning of colonial administration. Hence, this study is carried out to identify the condition of the Palm Leaf Manuscript available at the Medavela Rajamaha Vihara based on the nature and extent of the degradation and deterioration. To investigate the collection of qualitative data collection techniques such as survey method and observations was employed to draw data. Palm Leaves as a natural organic material, has been deteriorated owing to several factors. Chemical, physical, and biological degradation, caused by improper storage, incorrect climatic conditions, inappropriate handling, and damage instigated by pests are among the many circumstances that caused the condition of these manuscripts. Safeguarding the collection is suggested by adhering to both modern and traditional techniques. Future research avenues are open for documentation, conservation, and preservation of the collection.

Keywords: *Medavela Rajamaha Vihara, Palm Leaf Manuscript Collection, Deterioration, decaying, environmental conditions and infestation*

Introduction

Palm Leaf Manuscripts (PLMs) bear a prominent place among the Sri Lankan national documentary heritage. Until the advent of printed papers, PLMs served a primary function in the preservation of Sri Lankan written heritage. PLM collections were protected mainly in Buddhist temples under the benefaction of ancient rulers. Some collections were also under the custody of lay scholars. PLMs faced the threat of deliberate as well as unintentional destruction since ancient times. Despite their significance as informative material, they are more vulnerable to natural and manmade disasters. Hence, the life span of PLMs is rather shorter when compared to the other mediums chosen for writing. Therefore, the available manuscripts are rarely older than a few centuries. Both secular and ecclesiastical upholders protected the collections from natural and manmade disasters by adhering to the traditional conservation and preservation methods that prevailed for generations. However, due to the advent of printing, the absence of patronage, lack of know-how, less priority paid, and attitudinal changes led PLM collections to deteriorate fast, especially after the beginning of colonial administration. Despite the conservation and preservation endeavors initiated by some institutions such as the National Science Foundation, the University of Peradeniya, the University of Kelaniya, the National Library and Documentation Centre, and the University of Sri Jayewardenapura, in the recent past, the rest of the unattended PLM collections are scattered over the island in Buddhist temples and the custody of private owners. Preliminary studies depict that these collections face the danger of deterioration that is mainly caused by changes in the original form of material through interaction between the object and the agents of destruction (Bankole, 2010). It is a dire necessity to provide the correct temperature, maintain appropriate relative humidity levels, and proper maintenance to prevent the deterioration of this rare documentary heritage (Schito, 2019; Alegbeleye, 1993; Walker, 2013). Infestation, air contamination, incorrect relative humidity, poor handling, and poor ventilation are some of the causes of degradation and deterioration of information resources as quoted by scholars. (Harvey, 1993; Bankole, 2010; Madu and Adeniran, 2015).

Atmospheric factors, wear and tear, dust, biodeterioration due to insects and microorganisms, mishandling, stains and discoloration, and improper storage are among other factors identified in previous studies (Gupta, 1974; Harinarayan 1995).

Study Setting

PLMs took part in significant responsibility in the preservation of Buddhist scriptures and canonical literature as well as indigenous traditional knowledge that has been passed orally from generation to generation. Many Manuscripts were destroyed during foreign invasions from time to time. An attempt has been taken to rewrite the PLMs that were destroyed during invasions under the guidance of Buddhist monk, Welivita Sarankara Thero in the 19th century. Medavela Rajamaha Vihara PLM collection is one such collection. The collection contains newly written PLMs under the rejuvenation of ancient literature under Welivita Sarananka Thero. It also possesses a few PLMs inherited from its predecessors. Situated in Medavela village, 12kms from Kandy town, Medavela Rajamaha Vihara, is said to have been founded by King Walagambahu (A.D. 103-102 BC and 89-77 BC). However, no concrete evidence is furnished about the contributions made by rulers to the temple until the 14th century A.D. Its strategic location in the middle of the road to Kandy from Galagedara Pass made it face different invasions during the colonial period. Owing to the significance of the temple from ancient times, several donations and grants were made by ancient rulers to the temple. The temple was periodically renovated and new grants and donations were made by the different rulers since the 14th century. The significance of the temple is underscored not only by the legends associated with the temple and village, but also by the availability of inscriptions, religious edifices representing the typical Kandyan period, and historical records such as PLMs and copper plate charter and stone inscriptions available in the temple. Studies on the temple are mainly devoted to publications of *Tampita vihara* wall paintings and the historic importance of the temple (Godakumbura, 1964; Chutiwong, Silva, and Prematilleke, 1990); Urugodawatta, 2019). Regular maintenance of the temple has been undertaken by the Department of Archaeology paying attention to the old craftsmanship, paintings, architecture, and epigraphy.

Despite the historical value, it appears that the PLM collection at the temple was overlooked in the previous studies and conservation endeavors. Hence, this study is carried out to study the PLM available at the temple in terms of identifying the condition of the Medavela Rajamaha Vihara PLM collection based on the nature and extent of the degradation and deterioration. To investigate the collection qualitative data collection techniques such as survey method and observations was employed to draw data from the selected collection. The study was carried out from January to June 2018. The total collection of PLMs was 62 when initiating the study. No sampling method was followed since the whole collection was selected for the study. The status of the collection was investigated under the headings of storage, the extent of tear and wear, infestation by living organisms, and stains. Damages instigated by the extent of the tear and wear, storage conditions, infestation by living organisms and stains, incorrect relative humidity, temperature, and light were examined. Degradation of deterioration originating from oil patches, pigments, and remnants left by pests was also explored in detail. Discolouring, fading, and dust attacks were taken into consideration to determine the level of degradation and deterioration by studying the status of the collection. The study was conducted in two stages. While the first phase of the study was focused on studying the nature and extent of the deterioration of the collection, the latter was engrossed with the conservation, preservation, and documentation of the collection. This study is confined to the provision of results obtained from the first phase of the study.

Results & Discussion

Nature of the Collection

As mentioned before, the collection was twofold; some of its manuscripts have been donated by the benefactors while the rest was written in the temple itself in the 19^{th} century. These manuscripts are stored on the upper floor *Dharma Sala* building of the temple in glass-fronted wall cupboards under lock and key. This set of the collection was named the Main Collection for study purposes It contained 8612 leaves in 62 PLMs. One palm leaf folio measured around 45–55 cm in length and

4–5 cm in width. The collection has not been documented in detail; no catalog was available. Only a title list was prepared by the temple authorities. No conservation or preservation measures were followed since their acquisition of the temple. Temperature control was not taken into consideration when stowage manuscripts. Provisions of access to the manuscripts were rarely facilitated to protect the collection. If access was granted to refer to the collection, it was closely monitored by the Chief Incumbent of the temple. However, it was found that the PLM collection was badly handled. Some of the Manuscripts have been stolen a few weeks before the investigation was initiated. When the covers (*Kamba*) of the manuscripts of the Main Collection were damaged chiefly by infestation such as white ant attacks, leaves of certain manuscripts were placed in an adjacent room to stop the spread of harm to other manuscripts. No preventive conservation method was practiced other than that. PLMs that were found in the adjacent room were named Supplementary Collection during the course of the study. Although the study was initially intended to confine to the Main Collection that was stored in the glass-fronted walls cupboards, the supplementary collection was also taken into consideration after its subsequent discovery. As a result, both collections comprised 12600 manuscripts brought on 121 individual PLMs. The considerable number of manuscripts that were in the glass-fronted cupboards and hundreds of loose leaves kept in an adjacent room were found deteriorated due to several causes which will be discussed in the following sections.

Factors Behind Degradation and Deterioration

Relative humidity, temperature, and light

Located in the central part of the island and at a high elevation, Kandy has relatively wetter and cooler temperatures than the tropical climate of the rest of the country. From May through to July and October to December the region experiences its monsoon season. The temperature of the area fluctuates between from18°*C* to 32°*Cwhile it* experiences *extreme* cyclic variations in monthly rainfall. The average rainfall is about 1,582mm per annum with *some* periodic differences in the perceived humidity (Dept. of Met, 2021). As a whole, Kandy weather is rough, unstable, and unpredictable; rains could be expected even during the driest months. Under such settings, as mentioned earlier there were no climate control mechanisms employed in the building. To understand the prevailing condition, temperature and humidity were measured by the hydrometer. Relative humidity in the storage area was between70% to 79% and the temperature was *28°C to 30°C*. Hence it appears that the collections were subjected to continuous dry and humid environments. Investigation of the two collections resulted in finding 2331 leaves damaged due to incorrect climatic conditions (figure 01). Leaves that were twisted (222), folded (198), warped (153), swollen (670), brittle (452), and fused (214) were the common characteristic of the collection. Horizontal breaks were visible in 422 leaves.

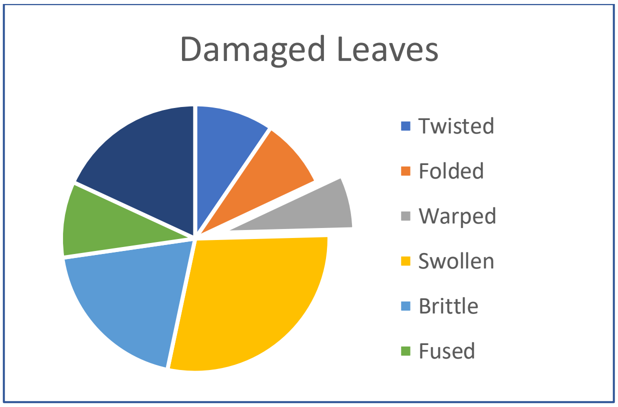

Figure 01

Brittleness and loss of flexibility are among the common problems in the collection, which paved the way to an increased potential for damage when leaves were subjected to inappropriate climatic conditions. Breaking down of the leaves that lead to loss of flexibility could be prevented by regular oil treatments. Studies also point out that physical damage is caused due to the loss of natural oil present in the leaves because of time factors and atmospheric conditions (Suryawanshi, Sinha, and Agrawal, 1994). As Van Dyke (2009) noted, "... aged PL can be very desiccated and brittle, especially around the edges that have been most exposed to oxidation processes.” The swollen leaves faced the threat of breaking and ultimate crumbling under the prevailing fluctuating climatic conditions.

Harinarayan (1995) states that “high temperature accompanied by low humidity often causes dryness of the leaves as a result of which essential oil present in the leaves evaporates and the leaves become hard and brittle”. It is suggested that manuscripts must be kept in a dustless, pollution-free environment with an optimum temperature of 23^0C and a humidity range of 50-60 % (Prajapati, 1995). Scholarly articles infer that PLMs, being a natural, organic product in nature, should not be stored in very dry conditions “as they are susceptible to degradation and deterioration instigated by changes in climatic conditions i.e., temperature, relative humidity, light as Fluctuations in temperature and humidity contribute to deterioration by causing material deformations” (Agrawal, 1984; Joshi, 1995).

Tear and wear

25% percent of the total collection was found damaged due to tear and wear with stains, broken leaves, and parts damaged due to mishandling of the Manuscripts. It was found that 3123 leaves were damaged and broken into pieces, while some parts are already missing irreplaceably due to mishandling. Broken along edges (352 leaves), and folios with faded scripts/letters (1981 leaves) respectively physical damage could be seen in the collections. Improper and mishandling of manuscripts is one reason among many that caused stains in the leaves. Stray marks caused by codes (162 leaves) that were used to tie the manuscripts and clothes that were wrapped around the manuscripts (11 manuscripts) paved the way to another damage. There are two holes in the PLMs that are used to pass the cord through its wooden cover and leaves that gathers folios of the document. With continuous and frequent use of the manuscript without proper care, the size of the hole becomes large leading to breaking the leaves around the hole. PLMs that have no wooden covers

(Kamba) face the threat largely. This type of damage can be seen on 628 folios of the collection.

Figure 02

Although the collection was treasured under close supervision, no mention of the visitors or scholars who have used the collection for scholarly purposes. Hence, custodians of the collection have no clue about how and when the damages were caused. Also, they were not aware that the manuscripts were damaged due to incorrect handling. It was also found that codes (*huya)* were not properly placed which led leaves to scattering and damage eventually. PLM turns out to be fragile and brittle with the age. Lack of regular treatments to increase the softness and flexibility of the leaves also caused easily damaged when handling is not taken care of and at the slightest touch.

Infestation and microorganisms

Major challenges to the longevity of PLMs that have been identified in the tropics include insect attacks by termites, silverfish, bookworms, and cockroaches (Sah,2002, Sharma, 2015; Cabral, Ravikumar & Ramanan,2018). Insect larvae can perforate and destroy manuscripts rapidly (Sharma, 2015). Similarly, the Medavela RajamahaVihaara PLM collection had 6370 affected folios by insect and fungus attacks making 51% damaged by an infestation. Termite's attack was the most prevalent bio deterioration which was irreparable. Chemicals were applied in fumigation chambers as a treatment for the extensive damages caused by white ants in Tamil manuscripts selected for Samuel's (1994) study.

Cigarette Beetles (*Lasiodermaserricorne),* silverfish, weevils, booklice, ants, and cockroaches damage were also visible in the collection. A similar study conducted by the PLM collection of the National Library of Sri Lanka revealed that insect attacks were the major threat to the collection. (Cabral, Ravikumar & Ramanan, 2018). Evidence of infestation in the Medavela Rajamaha Vihara PLM collections includes the presence of neat, pinhead-sized holes, irregularly eaten edges, [or] the presence of larvae which eat the leafy matter... as visible in the study carried out by Sah,2002. It is proposed that the source of the insects that damage the leaves may be from the surrounding environment as well as the wooden covers of the manuscripts (ibid). Impurities from ants and cockroaches had led the manuscripts to suffer from stains and discolorations. Damages by rodents such as rats were also present.

Figure 03. *Leaves Damaged by Rats*

Figure 04. *Leaves Damaged by White Ants*

Fungus replication which is the most injurious was also noticed. The presence of fungi was identified on more than440 folios of the collections. The humid climate of the storage area has provided an ideal environment for the growth of the fungus leading folios to fuse. It is pointed out that besides "dust, an indirect source of fungus is the adhesive used in the Palm leaf manuscripts" (Sharma, 2015).

Faded leaves

344 folios were found undecipherable since they were faded and becoming brown and yellowish owing to the oxidation of lignin. Palm leaves have become bleached and or darkened under UV light, and are composed of cellulose and lignin. As pointed out by Nair (1981) these factors pave the way to mechanical impacts such as splits, breaks, folds, and scratches. It was found that no regular black polishing and oiling employed since the acquisition of the collection to the temple. Hence, lack of proper maintenance and negligence led to the manuscripts being illegible. Black polishing followed by oiling will reassure the readability as well as the flexibility of the leaves that endure the lifetime of the materials.

Stains

Fungal growth and wound areas are the main cause of stains visible on the surface of manuscripts. Most of the stains, smears, and spots are bluish, greenish, blackish, and brownish in color. Dust particles and insect remnants also caused stains on the PLMs. Improper and inadequate manual handling (4%) also caused stains. The code used for tying the folios and cloth used to protect PLs also left marks that contribute to stains. Dust accumulation, remnants of insects and *lavae*, lamp shoots, or any other pigments, or paste that is used in the process of PLM making, are resulted in damages (Gupta, 1974; Krist & Nair, 2020). A recent study carried out in the National Library of Sri Lanka finds that75% of the collection was stained due to fungal activities out of the 47,250 leaves. Similarly, 7560 folios or 61% were stained due to the presence of Mold in the collections at Medavela Rajamaha Vihara. Hence it can be suggested that Mold is a very common factor that plays a vital role in contributing to stains in PLMs located in warm and humid tropical environments.

Conclusions and suggestions

The collections were mostly damaged by the termites. While the considerable attack was done by silverfish, weevils, booklice, ants, and cockroaches, some folios have been damaged by rodents such as rats. Molds and fungi are also largely visible in the collections.

Being a natural organic material, among the many circumstances that can promote deterioration, incorrect climatic conditions; fluctuating humidity, and high temperature, have become the major threat to the protection of the collection. Leaves are found to be stuck together while the damp condition is responsible for the growth of living organisms. As a result, PLs deteriorated. This was noticed in the both main and supplementary collections. Hence controlled environment is of dire necessity to conserve and preserve PLM collections. In addition to the incorrect environment, inappropriate temperature, incorrect humidity, improper storage constant handling, as well as lack of supervision, have caused the manuscripts to deteriorate largely.

Biological and microbiological damages that were present in the collection led to physical and chemical damages eventually in the PLMs, making the causes of deteriorating factors interrelated. Hence, the extent of deterioration and degradation of Medavela Rajamaha Vihara PLM collection shows that factors that contributed in damaging are linked to each other and instigated chemical, physical, and biological degradation. For example, incorrect environmental conditions catalyze the growth of fungus, etc. while that promotes the fragility of the leaves. Therefore, when adhering to conservation and preservation measures. It is suggested to store the collection in a friendly environment to safeguard and protect the collection in long run.

Considering the value of the collection, systematic documentation measures are suggested. Manuscript folios that are mixed due to loss of wooden cover required to be sorted out. Future research may be carried out to conserve and preservation of the collection. This collection's intangible knowledge could be immense and therefore, further studies should be carried out for the benefit of future generations interested in conducting studies and research on this written heritage and sharing and disseminating newly found knowledge among themselves and others.

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Financial Discipline of the Tourist- Linked Small-Scale Businessmen in Sri Lanka. (With Special Reference to North-Central Province)

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Abstract

Background: In invigorating the tourism industry in Sri Lanka, one of the best strategies is pushing existing tourism-linked small-scale businessmen due to the hardship of capitalization. Here, as the small-scale businessmen, only those who are occupied in selling handicrafts and demonstrating a different wide variety of scenic animals were emphasized. So, it is worthwhile to grasp the nature of the financial discipline of these businessmen and propel them towards fecundity. The key purpose was to identify the perception of money management of tourism-related small-scale businessmen in Sri Lanka and their intention to improve it further. Based on the outcomes of the preliminary survey, initially, this work was planned. The research design was exploratory cum descriptive. A mixed approach was applied, and deductive reasoning was helpful for postulation. Administering questionnaires with the aid of electronic means and enquiring focus groups and opinion leaders via telephone discussions when possible primary data were collected and for secondary data, documentary sources were associated. Using the scattered sampling method, out of around 564 businessmen 150 businessmen were selected from popular tourist sites in North Central Province. For analysis, independent sample t-test and one-way ANOVA were applied. Cronbach's alpha for each item viz financial knowledge, attitudes, and behavior was 0.884, 0.892, and 0.794 respectively. The existing level of financial discipline of respective businessmen is not at a fully appreciable level due to adverse outcomes of demographic factors like poor education and lack of business experience. The new data is that majority of tourist-linked small-scale businessmen in Sri Lanka are financially illiterate, and their thrift is not at a satisfactory level. The study was conducted subject to fewer limitations and eventually, some policy implications have been suggested.

Keywords: *Behavior, Discipline, Financing, Knowledge, Literacy, Thrift*

Introduction

Sri Lanka is one of the most popular tourist destinations in the Asian Region owing to its natural and cultural heritages such as the sacred city of Anuradhapura, the hill capital Kandy, the golden rock temple of Dambulla, the Dutch fort of Galle, the city of Polonnaruwa, Horton plains and other heritage sites, etc. The tourism industry is a vital income-generating source in Sri Lanka. And also, in attaining rural and regional development, a great place is taken by this particular sector. In the Sri Lankan context, it seems that at the rural and regional levels around tourist destinations, different businesses have emerged for selling different domestic products. This is of course a better self-employment opportunity. In 2017, there were 2040 tourist shops, and this number increased to 2231 in 2018 (Sri Lanka Tourism Development Authority). Total tourist arrivals have gradually increased with fluctuations from 400414 to 2333796 from the year 2000 to 2018. During the period ranging from 2001 to 2012, certain fluctuations have taken place. Beyond 2012, arrivals have successively increased (Sri Lanka Tourism Development Authority). These statistics assure the potentiality of developing this industry. It can be assumed that each season and offseason, these businessmen may achieve an attractive turnover and usually they claim high prices or charges too. Some may earn well using a wide variety of mammals, birds, snakes, fish, butterflies, elephants, leopards, sloth bears, blue whales, sperm whales, etc. Some are engaged in doing business around the scenic beauty of thrills, pristine, festivals, wild, bliss, and heritage. Thus, it was supposed to search for the economic well-being of considering businessmen today.

Each of us is a student of behavior. Persons begin to find that they are searching too much. In the end, they never find a mate. A person can correct all wrongs with one intention. Unattached to speculations, views, and desires, with a clear vision, such a person will never be reborn in the cycles of suffering (The Lord Buddha). There is a saying that never follows the crowd without change there is no development (Ubayachandra, E.G, 2018). A family is the hub of any society. A family's functions can be categorized as religious, affectionate, economic, recreational, protective, and educational functions (Ubayachandra E.G, 2020). Further, people are demanding money to satisfy major three motives namely transaction motives, precautionary motives, and speculative motives. Accordingly, they shape their money management and financial discipline. Here, the term, discipline comes from obedience, and it improves further with the authenticity of the survival of a person. This virtue is almost common to the thrifty life of a person. In speaking of financial discipline, it is obvious that to get any business developed, as a prior requirement, money management is unavoidable. This reveals that vendors ought to be well-equipped with financial literacy or money management process. In the case of financial management, the term finance refers to the processes, instruments, institutions, and markets (Ubayachandra E.g., 2021). Accordingly, it mainly involves the transfer of money among nations, businesses, and governments. For making sound financial decisions, a deeper understanding of finance is an essential condition to be satisfied. Those who are financially educated and engaged in financial jobs, obviously yield benefits via better interactions taking place among processes, personnel, and proper procedures. Furthermore, in concerning major fields of finance, two areas can be pointed out viz financial services and managerial finance. These are common to considering sectors too. Thus, the key purpose of this study was to identify the existing perception of money management by considering businessmen in Sri Lanka and their intention to improve it further. This condition was the base of the present study.

Research Problem

In identifying the issue area, in addition to the pilot survey, different ways and means were associated. Accordingly, it was the problem that some of these businessmen still struggle with their financial transactions and money management. Thus, it was the curiosity that owing to what circumstances such a poor climate has taken place.

Research Gap

To the rigorous search of the knowledge in literature made regarding money management, it was identified that though related studies have been made so far, it is hard to find fully substitutable or identical studies made on considering the aspect or focal point of this study, especially in Sri Lanka. Thus, this study was expected to bridge this gap with the aid of its outcomes.

Objectives

In support of diagnosing the problem, two types of objectives namely key objectives and specific objectives were established.

Key objective

To identify the existing nature of the financial discipline of tourist-linked small-scale businessmen in Sri Lanka.

Specific objectives

- To examine the current financial knowledge of the respondents regarding money management
- To get an idea of their financial attitudes
- To identify financial behavior
- To examine the relationship between demographic factors and financial discipline

Research Questions

- What is the attempt made to maintain financial discipline?
- How about the know-how of money management?
- How about the attitudes of tackling earnings and adjusting financial behavior?
- How do you shape the behavior with your earnings?

- What do you think of your demographic profile?

Limitations

- The study was restricted to North -Central Province including a sample consisting of 150 tourist-linked small-scale businessmen from several of the most popular tourist sites.
- Various products had to be taken into the same set for analytical purposes.
- Those who had the reluctance to reveal financial details had to be motivated by inspiring the purpose with great effort.

Methodology

The research design was exploratory cum descriptive. For discovering ideas, insights, and different aspects of the problem, and formulating the research problem more precisely, exploratory design was employed. To describe the characteristics of individuals, it was decided to employ descriptive design. Deductive reasoning helped do this study. For collecting respective primary data, questionnaire administering, holding focus group interviews, and enquiring opinion leaders were made with the aid of electronic means. For more information, secondary data were also captured via related documentary sources.

For this study, 150 sample size was chosen from the respective province. In selecting the sample, a scattered sampling technique was used. In certain cases, some factors in a particular category may have relatively less correlation with factors in other various categories. Likewise, in this study, the demographic factors including different sub- elements may have relatively slight differences(variances). Therefore, it was supposed to apply independent samples t-test and one-way ANOVA to analyze the data.

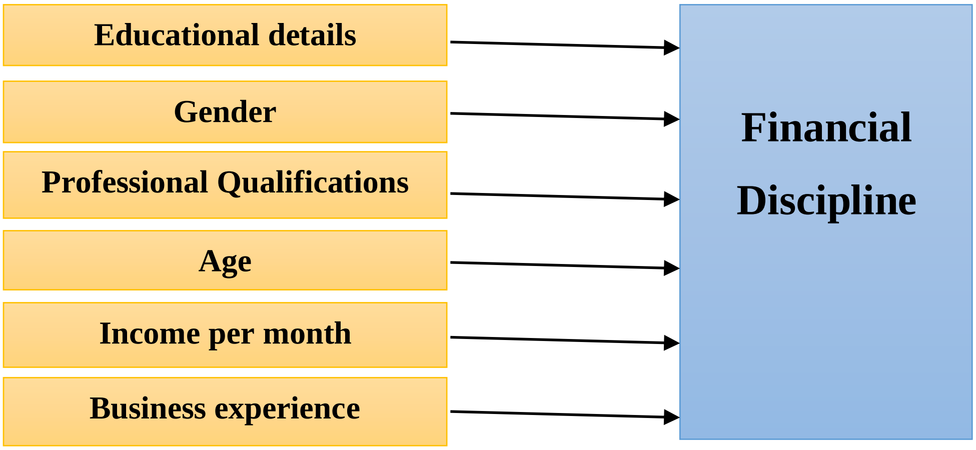
Literature Review

In the literature on financial management, a person's capability to handle finance-related activities is referred to under the financial discipline. Finance can be explained as capital, investments, funds, and so on. Further, money management can be referred to as properly handling money on time. Here, the concept of money management includes funds, money, and amount as the elements. To the Oxford Dictionary "it is the quality or state of being literate; knowledge of letters". The operational definition includes a continuous process of learning which supports persons to reach expected outcomes.

Conceptually say financial knowledge means, "The understanding of market principles, instruments, organizations, and regulations". (Financial Industry Regulatory Authority, 2003). Individuals are considered financially literate if they are competent and can demonstrate the usage of financial knowledge that they have. Money management is obtained through practical experience and active integration of knowledge. When people become more literate and increasingly more financially sophisticated it is conjectured that this may also mean that an individual may be more competent". (D.L.Moore, 2003). On the other hand, according to (NCEE), 2005), financial literacy which is essential for money management refers to "Familiarity with basic economic principles, knowledge about the U.S. economy, and understanding of some key economic terms". Further it says money management means "the most basic economic concepts needed to make sensible saving and investment decisions". To (Mandell, 2008) it can be defined as "The ability to evaluate the new and complex financial instruments and make informed judgments in both choice of instruments and extent of use that would be in their own best long-run interests" (pp. 163-164). More specifically say money management refers to "the ability to make simple decisions regarding debt contracts, in particular how one applies basic knowledge about interest compounding, measured in the context of everyday financial choices" (Lusardi A. &., 2008). According to the definition given by (ANZ Bank, 2008), drawn from (Schagen, 1997) money management means "The ability to make informed judgements and to take effective decisions regarding the use and management of money". As defined by (Lusardi A. , Financial Literacy: An Essential Tool for Informed consumer choice?, 2008b, June), financial literacy leading to financial discipline refers to "Knowledge of basic financial concepts, such as the working of interest compounding, the difference between nominal and real values, and the basics of risk diversification". Opinion of (Greenspan, 2002), it can be said that financial literacy supports largely tackling money management rationally. (Bosma, 2006), on the other hand, states that many firms in the world fail to sustain their ventures due to poor financial discipline. In considering the ideas of (Mason, 2000), it seems that financial discipline consists of different skills and technologies, know-how, and awareness of monetary affairs necessary for making money-related decisions. To the opinions of (Financial Industry Regulatory Authority, 2003), it is obvious that financial literacy is the ability to perceive market norms, instruments, organizational regulations, etc. In taking the explanation made by (Emmons, 2005), into account, financially literate people must be able to handle cash resources and get loans, simply say, it implies "Mathematical ability and understanding of financial terms. Money management refers to familiarity with the most basic economic concepts needed to make sensible saving and investment decisions.". From the views of (Mandell, 2008) money management is the ability to assess complex financial instruments and the ability to choose them. Further say, money management refers to the ability to perceive financial concepts at the maximum level. Financial literacy can also be defined as "a combination of knowledge, attitude, and behavior necessary to make sound financial decisions and ultimately to achieve individual financial well-being." "In addition, financial literacy can be identified as sufficient knowledge about facts on personal finances and is the key to personal financial management" (Garman, 2002). Financial literacy is the ability to keep track of cash resources and payment obligations, knowledge of how to open an account for saving and how to apply for a loan, a basic understanding of health and life insurance, the ability to compare competing offers and plan for future financial needs (2005). Financial literacy indicates the ability to evaluate new and complex financial instruments and make informed judgments in both choices of instruments and extent of use that would be in their own best long-run interests (Mandell, 2008). Many studies say it is hard to define financial literacy conceptually anyway this concept must consist of skills to work with financial transactions occurring inside the business as well as outside. As indicated by (OECD), 2005) in general people think they know more than they know. Financial literacy means the ability to make informed judgments and to take effective decisions regarding the use and management of money (Noctor Michel, 2006). Financial literacy means a combination of awareness, knowledge, skill, attitude, and behavior necessary to make sound financial decisions and ultimately achieve individual financial well-being (OECD, 2009). Financial literacy refers to a person's ability to understand and make use of financial concepts (Servon, 2008). Financial literacy refers to knowledge of basic economic and financial concepts as well as the ability to use knowledge and other financial skills to manage financial resources effectively for a lifetime of financial well-being (Hung, Parker & Yoong, 2009). Financial literacy is a measure of decision-making of the degree to which one understands key financial concepts and possesses the ability and confidence to manage personal finances through appropriate, short-term decision-making and sound, long-range financial planning, while mindful of life events and changing economic conditions (Remund, 2010). Financial literacy is a combination of awareness, knowledge, skill, attitude, and behavior necessary to make a sound decision and ultimately achieve financial well-being (Atkinson & Messy, 2012). It has been almost revealed by (Alba, 2000) also. As said (Parker, 2008) the evidence in knowledge foresees retirement planning and savings. (Hussein A. H.-T., 2009) has attempted to search influence made of financial discipline on one of the components namely financial knowledge. As per his conclusion, it can be cited here that personal actions taken by people make influence the level of financial discipline. He further added that demographic factors directly affect financial discipline. In addition, in considering about the conclusion given by (Kidwell, 2004) it is implied that good financial literacy helps financial discipline and maintaining financial documents, reaping benefits from outside funding, etc. Eventually, from the financial discipline major three parameters namely financial knowledge, financial behavior, and financial attitudes are reflected.

Research Model

Independent variables (Demographic factors) **Dependent variable**



Source: *Constructed by the researchers*

Hypotheses

H_1 – There is a significant impact of gender on financial discipline

H_2 – There is a significant impact of educational qualifications on financial discipline

H_3 – There is a significant impact of professional qualifications on financial discipline

H_4- There is a significant impact of age on financial discipline

H_5 – There is a significant impact of business income on financial discipline

H_6- There is a significant impact of business experience on financial discipline

Results and Discussion

The following results indicate that Cronbach's alpha for each dimension is above the required minimum value of 0.7. So, it can be concluded that the instruments are reliable.

The dimension	**Cronbach's alpha**	**Reliability**	**Conclusion**
Financial knowledge	0.884	0.884 >0.7	Reliable
Financial attitudes	0.892	0.892 >0.7	Reliable
Financial behavior	0.794	0.794 >0.7	Reliable

Table: a: *Reliability statistics*
Source: Survey data

Gender

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Discipline	Female	60	3.6600	.80330	.10371
	Male	90	3.2314	.85198	.08981

Table 1: Group Statistics

Source: Authors' computation

As indicated by the above table, it is understood that the financial discipline of females and males is 3.6600 and 3.2314 on average respectively. These results prove that gender highly affects financial discipline. As per these average values, it seems that the level of financial discipline of females is better than that of males.

The following table also proves the results given by the above table.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Discipline	Equal variances assumed	.063	.802	3.087	148	.002	.42854	.13882	.15421	.70286
	Equal variances not assumed			3.124	131.606	.002	.42854	.13719	.15716	.69991

Table 2
Source: Authors' computation

As per the above table, the significance (p-value) is 0.002. It implies that the difference in means is statistically significant at 0.05 ($p<0.05$). This result proves that financial discipline is influenced by gender. In considering the mean difference shown in the above table this result can be further clarified and perceived.

Educational details

The following table (table 3) obtained from the ANOVA output was applied to reviewing five educational levels stressed to consider the relationship between those levels and financial discipline.

Descriptive

Discipline

Source: Authors' computation

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
Graduate	15	3.7143	.78727	.20327	3.2783	4.1502	1.60	4.42
Undergraduate	10	3.6040	.77772	.10125	3.4013	3.8066	1.40	4.78
Passed GCE A/L	59	3.3623	.76128	.13458	3.0879	3.6368	1.20	4.78
Passed GCE O/L	34	3.0696	.97970	.16802	2.7277	3.4114	1.23	4.63
Below GCE O/L	32	3.0120	.86214	.27263	2.3953	3.6287	1.30	3.90
Total	150	3.4029	.85642	.06993	3.2647	3.5410	1.20	4.78

As per the table above, in the case of 15 graduates mean value becomes 3.7143 and it is deviated by 0.78727. On the other hand, the 10 undergraduates' mean value is 3.6040 and std. deviation becomes 0.77772. Also, for 59 GCE A/L passed individuals' the mean value is 3.3623 and it is deviated by 0.76128. In respect of GCE, O/L passed persons' mean value is 3.0696, and respective std. deviation becomes 0.97970. 32 persons who are below GCE have a mean value, of 3.0120 while it is deviated by 0.86214. As a whole, these results indicate that financial discipline is influenced by different educational levels.

The following table (table 4) from the ANOVA output further provides Levene's Test to check the assumption that the variances of five educational levels are equal.

Test of Homogeneity of Variances

Discipline

Levene's Statistic	df1	df2	Sig.
.823	4	145	.513

Table:4

Source: Authors' computation

In referring to the above table, it is noticed here that since sig. value is larger than the 0.05 alpha level the homogeneity of variance is met.

The table below (table 5) is the principal table because it depicts whether the F ratio for the ANOVA is significant. As per the table below F ratio becomes 3.331 ($p=0.012$) with the 0.05 alpha value. The 4 and 145 are the df1 and df2 values for the educational level effect and errors between the groups and within the groups respectively. In this particular case, it is understood that since means for all five levels are equal and as $p \leq 0.05$ alpha level it can be said that at least one of the means is significantly different from others.

ANOVA
Disciplines

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	9.198	4	2.300	3.331	.012
Within Groups	100.088	145	.690		
Total	109.286	149			

Table:5

Source: *Authors'computation*

Professional qualifications

The following table (table 6) reveals descriptive statistical details corresponding to professional qualifications.

Descriptive

Discipline

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max
					Lower Bound	Upper Bound		
Followed a course in National Apprentice Board (NAB)	45	3.1880	.96446	.14377	2.8982	3.4777	1.23	4.63
Professional courses (AAT, CIMA, Chartered, SLIM, etc.)	10	3.4184	.77214	.13242	3.1490	3.6878	1.20	4.78
Any other career training institute	61	3.6168	.77015	.09861	3.4195	3.8140	1.40	4.78
Not at all	34	3.0120	.86214	.27263	2.3953	3.6287	1.30	3.90
Total	150	3.4029	.85642	.06993	3.2647	3.5410	1.20	4.78

Table 6

Source: Authors' computation

In the case of 45 respondents' (NAB qualifications) mean value becomes 3.1880 and it is deviated by 0.96446. On the other hand, 10 persons' (professional qualifications) mean value is 3.4184, and std. deviation becomes 0.77214. Also, for 61 individuals' (any other career training) mean value is 3.6168 and it is deviated by 0.77015. In respect of 34 persons who do not have any professional qualifications, the relevant mean value is 3.0120, and the respective std. deviation becomes 0.86214. As a whole, these results indicate that financial discipline is influenced by professional qualifications also.

The following table (table 7) from the ANOVA output provides Levene's Test to check the assumption that the variances of four levels are equal.

Test of Homogeneity of Variances

Discipline

Levene's Statistic	df1	df2	Sig.
.721	3	146	.541

Table 7
Source: Authors' computation

In referring to the above table, it is noticed here that since sig. value is larger than the 0.05 alpha level the homogeneity of variance is met.

The table below (table 8) is the principal table because it depicts whether the F ratio for the ANOVA is significant. As per the table below F ratio becomes 3.030 ($p=0.030$) with the 0.05 alpha value. The 3 and 146 are the df1 and df2 values for the educational professional qualifications effect and errors between the groups and within the groups respectively. In this particular case, it is understood that since means for all four levels are equal and as $p\leq 0.05$ alpha level, it can be said that at least one of the means is significantly different from others.

ANOVA

Discipline

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	6.405	3	2.135	3.030	.031
Within Groups	102.880	146	.705		
Total	109.286	149			

Table 8

Source: Authors' computation

Age

The respective descriptive statistical details about different age categories are given in the following table (table 9).

Descriptive

Discipline

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
20-30 years	58	3.6294	.84127	.11046	3.4082	3.8506	1.23	4.78
30-40 years	47	3.6144	.81702	.16340	3.2772	3.9517	1.45	4.78
40-50 years	25	3.3738	.59809	.14506	3.0663	3.6813	1.76	4.40
50-60 years	17	3.0366	.89214	.13013	2.7746	3.2985	1.20	4.78
60 years and above	3	3.1633	.01528	.00882	3.1254	3.2013	3.15	3.18
Total	150	3.4029	.85642	.06993	3.2647	3.5410	1.20	4.78

Table 9

Source: Authors' computation

In the case of 58 respondents' (20-30 years) mean value becomes 3.6294 and it is deviated by 0.84127. On the other hand, 47 individuals' (30-40 years) mean value is 3.6144, and std. deviation becomes 0.81702. Also, for 25 individuals' (40-50 years) mean value is 3.3738 and it is deviated by 0.59809. In respect of 17 persons' (50-60 years) mean value is 3.0366 and respective std. deviation becomes 0.89214. Three persons' (60 years and above) mean value accounts for 3.1633 and it is deviated by 0.01528. As a whole, these results indicate that financial discipline is influenced by different age levels. Accordingly, it can be expressed here that those who are about age category, 50-60 years have low financial literacy. In this case, the age category, 60 years and above shows a mean value, of 3.1633 because certain literate retired persons are represented in this group.

The following table (table 10) from the ANOVA output provides Levene's Test to check the assumption that the variances of different age levels are equal.

Table 10

Test of Homogeneity of Variances

Discipline

Levene's Statistic	df1	df2	Sig.
2.155	4	145	.077

Source: Authors' computation

In referring to the above table, it is noticed here that since sig. value is larger than the 0.05 alpha level the homogeneity of variance is met.

The table below (table 11) is the principal table because it depicts whether the F ratio for the ANOVA is significant. As per the table below F ratio becomes 3.889 ($p=0.005$) with the 0.05 alpha value. The 4 and 145 are the df1 and df2 values for age level effect and errors between the groups and within the groups respectively. In this particular case, it is understood that since means for all age levels are equal and as $p\leq 0.05$ alpha level, it can be said that at least one of the means is significantly different from others.

ANOVA

Discipline

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	10.589	4	2.647	3.889	.005
Within Groups	98.697	145	.681		
Total	109.286	149			

Table 11

Source: Authors' computation

Income

The following table (table 12) was constructed by using the descriptive statistical details computed by the researchers.

Descriptive

Discipline

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Below Rs.100000	9	2.7456	.84820	.28273	2.0936	3.3976	1.20	3.57
Rs.100000-.300000	75	3.5712	.76035	.08780	3.3963	3.7462	1.25	4.78
Rs.300000-500000	41	3.3331	.88182	.13772	3.0547	3.6114	1.23	4.42
Above Rs. 500000	25	3.2488	.97548	.19510	2.8461	3.6515	1.30	4.78
Total	150	3.4029	.85642	.06993	3.2647	3.5410	1.20	4.78

Table 12

Source: Authors' computation

As revealed by the above table, in the case of earners (9 persons) who earned below Rs.100000 scored a mean value, of 2.7456. It is deviated by 0.84820. This implies that the influences made by this group on financial literacy are low. On the other hand, 75 persons earning between Rs.100000-300000 per month have a mean value of 3.5712 and a standard deviation of 0.76035 respectively. These data indicate that the influence made by this group is high on financial discipline. Compared to this group the influences made by other groups such as Rs.300000-500000 and above Rs. 500000 are less respectively because their mean values are gradually becoming low. As a whole, it is understood that financial discipline is oscillating between low- and high-income levels.

The following table (table 13) from the ANOVA output provides Levene's Test to check the assumption that the variances of four income levels are equal.

Test of Homogeneity of Variances

Discipline

Levene's Statistic	df1	df2	Sig.
.577	3	146	.631

Table 13

Source: Authors' computation

In referring to the above table, it is noticed here that sig. value is larger than the 0.05 alpha level the homogeneity of variance is met.

The table below (table 14) is the principal table because it depicts whether the F ratio for the ANOVA is significant. As per the table below F ratio becomes 3.233 ($p=0.024$) with the 0.05 alpha value. The 3 and 146 are the df1 and df2 values for the income level effect and errors between the groups and within the groups respectively. In this particular case, it is understood that since means for all four income levels are equal and as $p \leq 0.05$ alpha level, it can be said that at least one of the means is significantly different from others.

ANOVA

Discipline

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	6.807	3	2.269	3.233	.024
Within Groups	102.479	146	.702		
Total	109.286	149			

Table 14
Source: Authors' computation

Business experiences

The descriptive statistical details relevant to business experience are revealed in the following table (table 15).

Descriptive

Discipline

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
Less than 5 years	3	2.7410	.79982	.25293	2.1689	3.3132	1.20	3.57
5-10 years	10	2.7767	.90523	.52263	.5280	5.0254	1.86	3.67
10-15 years	25	3.2848	.97098	.19420	2.8840	3.6856	1.30	4.78
15-20 years	72	3.5932	.74878	.08825	3.4173	3.7692	1.25	4.78
20-25 years	40	3.3464	.88886	.14054	3.0621	3.6307	1.23	4.42
Total	150	3.4029	.85642	.06993	3.2647	3.5410	1.20	4.78

Table 15

Source: Authors' computation

In the case of 40 individuals, the mean value becomes 3.3464 and it is deviated by 0.88886. On the other hand, 72 persons' mean value is 3.5932, and std. deviation becomes 0.74878. Also, for 25 individuals' the mean value is 3.2848 and it is deviated by 0.97098. In respect of 10 persons,' the mean value is 2.7767, and the respective std. deviation becomes 0.90523. Also, 3 persons' mean value is 2.7410 while it is deviated by 0.79982. As a whole, these results indicate that financial discipline is influenced by different business experience levels. Anyway, those who are having less business experience like less than 5 years and between 5-10 years bear low financial discipline compared to other experience categories.

The following table (table 16) from the ANOVA output provides Levene's Test to check the assumption that the variances of five experience levels are equal.

Test of Homogeneity of Variances

Discipline

Levene's Statistic	df1	df2	Sig.
.419	4	145	.795

Table 16

Source: Authors' computation

In referring to the above table, it is noticed here that sig. value is larger than the 0.05 alpha level the homogeneity of variance is met.

The table below (table 17) is the principal table because it depicts whether the F ratio for the ANOVA is significant. As per the table below F ratio becomes 3.113 ($p=0.017$) with the 0.05 alpha value. The 4 and 145 are the df1 and df2 values for the educational level effect and errors between the groups and within the groups respectively. In this particular case, it is understood that since means for all five experience levels are equal and as $p \leq 0.05$ alpha level, it can be said that at least one of the means is significantly different from others.

ANOVA

Discipline

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	8.642	4	2.160	3.113	.017
Within Groups	100.644	145	.694		
Total	109.286	149			

Table 17
Source: Authors' computation

Hypothesis Testing

***H_1 –** There is a significant impact of gender on financial discipline.

As per the above individual sample t-test results (table 2), the significance (p-value) is 0.002. It means that the difference in means is statistically significant at 0.05 ($p<0.05$). This result proves that financial discipline is influenced by gender. Thus, the relevant alternative hypothesis is accepted while the null hypothesis is rejected.

*** H_2** – There is a significant impact of educational qualifications on financial discipline.

As per the above ANOVA results (table 5), the F ratio becomes 3.331 ($p=0.012$) with the 0.05 alpha value. It is for the ANOVA is significant. In this particular case, since means for all five levels are equal and as $p\leq 0.05$ alpha level and they are significantly different, the respective alternative hypothesis is accepted while the null hypothesis is rejected.

***H_3** – There is a significant impact of professional qualifications on financial discipline.

As per the above ANOVA results (table 8), it seems that the F ratio is 3.030 ($p=0.030$) with a 0.05 alpha value. It is for ANOVA is significant. In this particular case, since means for all four levels are equal and as $p \leq 0.05$ alpha level (and they are significantly different), the relevant alternative hypothesis is accepted while the null hypothesis is rejected.

***H_4-** There is a significant impact of age on financial discipline.

As per the above ANOVA results (table 11), it seems that the F ratio becomes 3.889 ($p=0.005$) with the 0.05 alpha value. It is for ANOVA significant. In this particular case, since means for all age levels are equal and as $p \leq 0.05$ alpha level (and they are significantly different), the considering alternative hypothesis is accepted while the null hypothesis is rejected.

***H_5** – There is a significant impact of business income on financial discipline.

As per the above ANOVA results (table 14), the F ratio becomes 3.233 ($p=0.024$) with the 0.05 alpha value. It is for ANOVA significant. In this particular case, it is understood that since means for all four income levels are equal and as $p \leq 0.05$ alpha level (and they are significantly different), the respective alternative hypothesis is accepted while the null hypothesis is rejected.

***H_6-** There is a significant impact of business experience on financial discipline

As per the above ANOVA results (table 17), it seems that the F ratio becomes 3.113 ($p=0.017$) with the 0.05 alpha value. It is for ANOVA significant. In this particular case, since means for all five experience levels are equal and as $p \leq 0.05$ alpha level and they are significantly different from other relevant alternative hypothesis is accepted while the null hypothesis is rejected.

Findings

- It was found that under gender, there is a significant difference in the financial discipline between females and males. The mean values for females and males are 3.66 and 3.23 respectively. This situation indicates that the average financial discipline of females is better than that of males. This is further supported by the mean difference, 0.42854. As per the above individual sample's t-test results (table 8), the significance (p-value) is 0.002. It means that the difference in means is statistically significant at 0.05 (9p<0.05). This result proves that financial discipline is influenced by gender.
- Next, it was noted that financial discipline is influenced by educational levels. Particularly, means of financial discipline are low (3.3623,3.0696 and 3.0120 respectively), especially in the case of GCE A/L, GCE O/L, and below GCE O/L compared to those of graduate and undergraduate levels (mean values 3.7143 and 3.6040 respectively). As per the above ANOVA results (table11), the F ratio becomes 3.331 (p=0.012) with a 0.05 alpha value. It is for the ANOVA is significant. In this particular case, since means for all five levels are equal and as p≤ 0.05 alpha level (and they are significantly different), it can be said that financial discipline is impacted by educational level.
- It was further identified that financial discipline is impacted by professional qualifications. Accordingly, those who do not have any professional qualifications are poor in financial discipline because the mean value is at a low level valued at 3.0120. There is a significant difference between this category and financial discipline. As per the above ANOVA results (table15) it seems that the F ratio is 3.030 (p=0.030) with a 0.05 alpha value. It is for ANOVA is significant. In this particular case, it is understood that since means for all four levels are equal and as p≤ 0.05 alpha level, it can be said that financial discipline is influenced by professional qualifications.

- Another finding is that age levels also affect financial discipline. Those who are the ages 40-50 years,50-60 years, and 60 years and above are weak in the case of financial discipline. Their respective mean values are 3.3738,3.0366 and 3.1633 respectively. Relevant to these categories, a significant difference between age levels and financial discipline was noted here. As per the above ANOVA results (table 19), it seems that the F ratio becomes 3.889 ($p=0.005$) with the 0.05 alpha value. It is for ANOVA significant. In this particular case, since means for all age levels are equal and as $p \leq 0.05$ alpha level (and they are significantly different), it can be said that financial discipline is impacted by different age levels.
- Different income levels cause financial discipline. l It was found that usually low-income earners have low financial discipline. This is proved by the mean value of 2.7456 represented in the calculated table. As per the above ANOVA results (table 23), the F ratio becomes 3.233 ($p=0.024$) with the 0.05 alpha value. It is for ANOVA significant. In this particular case, it is understood that since means for all four income levels are equal and as $p \leq$ 0.05 alpha level (they are significantly different), it can be said that financial discipline is influenced by different income levels.
- Different business experience levels also affect the financial discipline. Particularly, those who are about two pairs of less than 5-year and 5-10-year categories are poor in financial discipline. In the calculated table, the mean values of those categories are 2.7410 and 2.7767 respectively. As per the above ANOVA results (table 27), it seems that the F ratio becomes 3.113 ($p=0.017$) with the 0.05 alpha value. It is for ANOVA significant. In this particular case, since means for all five experience levels are equal and as $p \leq 0.05$ alpha level (and they are significantly different), it can be said that financial discipline is impacted by different business experience levels.

In considering the numeracy of these businessmen, it was identified that out of 150 respondents 23 persons are poor in this particular case. Here, it was further understood that some are struggling with poor numeracy. In addition, 26% of businessmen subjected to the sample survey expressed they are not aware of fluctuations in general price levels. Here, it was perceived that some do not think of inflationary pressure seen in the country. It was further noted that some (49%) are not aware of the behavior of the rate of interest. This indicates that those involved in business activities, do not make care of rates claimed by the respective financial institutes. According to the sample survey, 36% of individuals answered by saying that they do not have any idea about dealing with financial instruments. This is also an adverse situation revealing their poor financial discipline. In this regard, 86% of participants stated that they do not have sound knowledge of share market dealings. In response to questions raised regarding banking habits 43% of vendors answered by saying that they do not have a better understanding of transactions to be done with banks. A more salient point noted from the given answers is that 118 participants do not have any perception of insurance activities. This is a highly adverse situation.

Certain respondents (38% of the sample) thought that the money is to be spent. Thinking so, they spend money irrationally. And also, it is the opinion of 68% of participants that they feel making saving is highly painful. Meanwhile, another important finding made here is that 38% of participants are in the view that living today is more important than thinking of tomorrow. It was found that 56% of respondents stated money management is essential to a certain extent. Further, as per the answers given by 42% of respondents, the relationship between investments and future returns has been understood moderately. Additionally, 53% of persons do not have thorough knowledge regarding that "high risks follow high returns". 57% moderately answered that being thrifty is essential.

Certain noticeable behavioral aspects were also identified. 44% of persons responded by indicating that they are neutral in paying bills in due time. Furthermore, 48% of respondents moderately answered the question raised regarding the maintenance of records of transactions. This indicates the extent to which they are concerned in respect of their due bill payments. In addition, it was noted that half of the sample moderately answered the question raised regarding money management made as a routine job. Moreover, 45% of participants moderately answered the question set around managing income and cost. This also points out the extent to which they are aware of income and cost control. And also, half of the sample moderately answered the question relevant to awareness of the prices of competitors. From this answer, it was found that half of the sample is not making care of the prices of rivals. Regarding the question related to the spending of additional income, 49.33% of persons answered they spend that income for only their consumption. Next, the most important question was about getting maximum use of life experience for succeeding in their businesses. 44% of persons moderately answered this question. It is also not a satisfactory answer to reveal their good financial discipline. In the case of usage of media and the internet for collecting business information, 47% of participants stated that they are at a moderate level regarding this. Further, 43% of respondents moderately stated that they consider short-term financial aims. Lastly, 47% of persons moderately answered by saying that they consider social prestige in spending their business income.

Conclusion

This study attempted to make the search for the degree of existing financial discipline of Sri Lankan tourist-linked small-scale businessmen and to bring strategically worthwhile conclusions enabling them to enhance further their existing level of financial discipline. Becoming financially literate helps vendors to perceive financial protection and rights, risk-taking, eliminate financial distress, and secure financial well-being.

In making a deeper review of the results of the discussion, it was able to conclude that the existing level of financial discipline considering businessmen in Sri Lanka is not at a fully satisfactory level. For this unpleasant climate, their profile or demographic factors must compensate. Out of demographic variables, mainly lack of education and lack of business experience of certain businessmen have caused their poor money management process. Thus, along with dimensions of financial discipline namely financial knowledge, financial attitudes, and financial behavior, resulting outcomes were reviewed. As per those results, it was further understood and fully clarified that the majority of these businessmen in the country are financially illiterate and seeking opportunities for enhancing their financial know-how.

The salient cause behind the problem is chronic adverse influence coming from demographic variables inherent to respective vendors. Merely poor education, poor caliber, and low level of business experience have led to poor money management. And also, all predetermined objectives were achieved along with the results. The findings led to bridging the noted research gap and bringing solutions to the issue faced by considering businessmen Majority are in the need of improving their financial literacy and reshaping their financial discipline. This is a critical and severe matter to be concentrated on in getting this sector developed. This is of course the major new knowledge produced by this study.

Policy Implications

- Implementing a national financial literacy strategy and financial education program.
- Educating them regarding the thrifty life.
- Introducing collaborative programs relevant to money management.
- Introducing financial literacy awareness programs.
- Motivating them towards banking habits.
- Educating them regarding the importance of making savings.
- Improving positive thinking and attitudes of these businessmen.
- Introducing new vocational training organizations at the regional level.
- Restructuring informal education.

Future Studies

It is said that women have better financial discipline than those men. Thus, one can conduct a study on "financial literacy among women occupied in tourist-linked business in Sri Lanka. On the other hand, research can be done on "the effect of in-house education in respect of tourists linked businessmen in Sri Lanka".

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An Investigative Study of Trade relations between Sri Lanka and South India mentioned in Tamil inscriptions of Sri Lanka

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Abstract

According to Tamil inscriptions in Sri Lanka, we can get to know some information on trade relations between Sri Lanka and South India. In this study, the information on the trade relations between Sri Lanka and South India in the Tamil inscriptions found in Sri Lanka is studied investigative. This study was conducted under the research problem of, what information is contained in Sri Lankan Tamil inscriptions about the trade relationship between Sri Lanka and South India. And this aimed to obtain information on the economic connection between Sri Lanka and South India through Tamil inscriptions found in Sri Lanka. This whole research depends on the readings of Tamil inscriptions found in Sri Lanka. Hence, this could be categorized as desktop research and conducted as qualitative research. To collect data, I used library and museum studies under the secondary data collection method and later analyzed them. In this study, I got data from Tamil inscriptions found in the Anuradhapura, Kalutara, and Kurunegala districts and, the Sinhala inscription of Queen Lilawathi. Those inscriptions mention some South Indian trade corporations, that have been involved in foreign trade in Sri Lanka such as Ainnurruvar, and Nanadeshi. Weerakoti and Nanadeshi, which can be trusted as Ainnurruvar trade corporation and its affiliates, also appear to have been involved in foreign trade. The inscriptions state that the trading companies built and sponsored Buddhist and Hindu temples in the country. There were trade cities in Sri Lanka that were associated with trade corporations in Real-time and also tax collection was associated with those corporations. It can be concluded that during the Polonnaruwa period, South Indian trade corporations were active in Sri Lanka and Sri Lanka remained an economic hub.

Keywords: *Tamil inscriptions, trade relations, Sri Lanka, South India, trade corporation*

Introduction

The inscriptions play an important role in confirming the facts mentioned in the literary sources. And also, they are extremely important for the study of certain contemporary information not found in literary sources. Tamil Epigraphs found in Sri Lanka date back to pre-Christian times to the modern era and most of the Tamil inscriptions found in Sri Lanka from the Anuradhapura period date back to the 10^{th} century AD.

Most of the Tamil inscriptions found in Sri Lanka mention various donations. Information in those inscriptions can be divided into four main categories such as economic, religious, social, and political. Among these, economic information is very important, because they include information about trade relations between Sri Lanka and other countries in the world. According to chronicles like Mahavamsa, since the pre-Christian period Sri Lankan economy has been maintained systematically. There is also literary and archaeological evidence that Sri Lanka has been used as a major trading center in the Indian Ocean since pre-Christian times. Sri Lanka had trade relationships with India, China, Arabs, Persia, Greece, Rome, Myanmar, etc. The Mahavamsa mentions that Kuveni captured the merchants who came by ship as "…rice and other (foods) and goods of every kind that had been in the ships of those traders whom she had devoured" (Mahavamsa,1912, p.57). As this text, it seems that foreign trade existed in Sri Lanka even in the 6^{th} century BC. Also, the fact that internationally renowned ports such as Matota and Gokanna have covered all the coasts of Sri Lanka since ancient times, is evidence that Sri Lanka's foreign trade was in a good situation.

According to sources Sri Lanka and India had a great trade relationship. Also, according to Tamil inscriptions in Sri Lanka, we can get to know some information about trade relations between Sri Lanka and South India. In this study, the information on the trade relations between Sri Lanka and South India in the Tamil inscriptions found in Sri Lanka is studied investigative.

Inscriptions are often written at the same time, so Historians and Archaeologists are confident in the accuracy of the information they provide. This study was conducted under the research problem of, what information is contained in Sri Lankan Tamil inscriptions about the trade relationship between Sri Lanka and South India. And this research aimed to obtain information on the economic connection between Sri Lanka and South India through Tamil inscriptions found in Sri Lanka.

This whole research depends on the readings of Tamil inscriptions found in Sri Lanka. Hence, this could be categorized as desktop research and conducted as qualitative research. To collect data, I used library and museum studies under the secondary data collection method and later analyzed them. It was important to study the sources as the research was done based on inscriptions and it was done under two main sections. The first one was studying literature sources, and under it, I referred to the inscription's directory in the Department of Archaeology. To study the Tamil inscriptions, I used Epigraphia Zeylanica and Inscriptions of Ceylon volumes, published books, articles, and research papers by Prof. Senarath Paranavitana, Prof. A. Veluppillai, Prof. S. Pathmanathan, and Prof. K. Kanapathipillai. Beside those main literary sources, I used reports, articles, and books by H.C.P. Bell, Prof. K. Indrapala, H.W. Codrington and E. Mullar. When collecting real-time data, I used primary sources such as Mahavamsa, Rajavaliya, and the History of Ceylon and secondary sources such as books, articles, research papers, and records about Tamil inscriptions in Sri Lanka. As archaeological sources, I referred to stamp pages of Tamil inscriptions in the Department of Archaeology. A museum study was conducted as a field study. I studied Tamil inscriptions at Colombo national museum.

For this study, I got data from Tamil inscriptions such as the Anuradhapura Nankunattar inscription, Vahalkada, Padaviya, Viharahinna, Kalutara, Budumuttawa, Galtempitiya, Detiyamulla, Ilakkattu Eba and Sinhala inscription of Queen Lilawathi.

As data, I got from inscriptions and other literary sources, I got to know about some trade corporations. Other countries, especially South Indian trade corporations, have been involved in foreign trade in Sri Lanka. According to Tamil inscriptions, it seems that such trade corporations existed from the Anuradhapura period. The earliest Tamil inscription found from Anuradhapura mentions the construction of a Buddhist temple by a South Indian trade rank named 'Nankunattar', and according to it we can understand, from the 9th century AD, the South Indian trade ranks had direct links with Sri Lanka (ඉන්ද්‍රික,2014,පි.335). And that inscription mentions these merchants donated a lamp for Lord Buddha beside building this temple. Also, they did those things in the name of some Tamil people in their country who faced something dangerous.

314 epigraphs found from South India, Sri Lanka, and southeast Asia refer to the South Indian trade ranks (ඉන්ද්‍රික,2014,පි.336). Among those trade ranks, the main trade ranks were 'Aiññūrruvar' which is also known as 'Aiyavole', 'Thisaiyairattu ainnurruvar, and 'Nanathesiya thisaiyairattu ainnurruvar', 'Nanadesi' trade corporation which also known as 'Veera Valanciar' and 'Nanatheciar' and also sometimes known as aiññūrruvar, trade corporation named 'Manigramam' or 'Wanikgramam' and trade corporation named 'Nakarattar' (Indrapala,1971, pp.102,103).

The Tamil inscriptions situated by trade rank named Walangiar, Balangiar, Balangi, Banagiya, or Baliga that had branches all over South Asia, found from Wahalkada, Padaviya, a village near Hettipola, Moragolla in Matale District, Anavilundawa in Polonnaruwa and they have given a contingent of troops to the Velaikkara army (ලංඉ.,1972,පි.523). A Slab inscription of Queen Leelawathi from the Polonnaruwa period mentions 'Nanadeshi Viyaparan', a trade corporation formed by various countries (EZ.,1912, p.179).

Aiññūrruvar was a powerful trading corporation that later expanded throughout South Asia and South East Asia (Wijetunga,1966, p.494). And according to Prof. Veluppillai, in the middle age, there was a trading corporation named

‘Ticaiyāyirattu aiññūrruvar’ in India and Sri Lanka (Veluppillai,1971, p.44). Before the expansion of Chola power in India, the corporation spread across the Indian subcontinent and later spread throughout South Asia using their naval power under the auspices of the Chola kingdoms (Veluppillai,1971, pp.46,47). Inscriptions that mention this corporation have been found in South India, Thailand, China, Indonesia, and Myanmar (Indrapala,1971, pp.1 02,103). Prof. Veluppillai translated it to English and known as ‘The five hundred of thousand directions’ corporation, and it was abbreviated as ‘The five hundred’(Aiññūrruvar) (Veluppillai,1971, p.44). The inscription from Kalutara mentions this corporation. And according to the inscription we can assume, the Kali temple in Kalutara was built by this corporation. *Parevi Sandeshaya* also mentions this Kali temple by asserting to the pigeon to cross the Bentota, and sleep in Kali Kovil. (පසං.,කවිය.68).

Inscriptions found from Budumuttawa, Gltempitiya and Detiyamulla mention a gang called ‘Weerakoti’. Also, they were mentioned in inscriptions that mention ‘Aiññūrruvar’ corporations like Vahalkada, Padaviya, and Viharahinna. According to Prof. Veluppillai, inscriptions from Rankot Viharaya in Polonnaruwa and other two inscriptions found from Padaviya also mention both ‘Weerakoti’ and ‘Aiññūrruvar’ (Veluppillai,1971, pp.46-57; Veluppillai,1972, pp.9-12,21). Besides them, these two names were found in inscriptions of Atharagalla and Anavilundawa according to Prof. Indrapala (Indrapala,1971, p.105). According to Prof. Pathmanathan, the Detiyamulla inscription mentions an agreement between the municipal council and the Weerakoti trade corporation and also about a donation that they did for a Buddhist temple. Also, the Budumuttawa slab inscription mentions Weerakkoti and a Buddhist temple built by them.

Weerakoti was a collection of high-ranking members of society who maintained close ties with the ‘Nanadeshi’ traded corporation, and Prof. Veluppillai thinks that they may have been a military corporation or society (Pathmanathan,1994, p.25). ‘Weerar’ and ‘Weera-kodiyar’ words were used to describe an army of a trade rank in inscriptions (ඉන්ද්‍රික,2014,පි.336). Although several inscriptions on Weerakoti have been found in Sri Lanka, this was not a well-known trading company in South India at that time (Indrapala,1971, p.105). According to Prof. Pathmanathan, about 20 inscriptions referring to 'Nanadeshi' have been found and all except the inscription of Queen Lilawathi and the Anavilundawa inscription have been made in Tamil (ඉන්දික,2014,පි.336).

The Budumuttawa inscription mentions 'ainnurruvan pattanam'. 'Pattanam' means both city and port, so it is often referred to as a port city owned by the ainnurruvar corporation. It is also possible that there was an army to provide security for the city, as the inscription mentioned that an army paid a fee. This inscription mentions a port city located in the Magala area of Nikaweratiya (Pathmanathan,1994, p.20). And it mentions the Goddess Parameshwari as Nanadeshi's Godmother. The Nainativu Tamil inscription, founded by King Parakramabahu I, a status that due protection was given to the merchants who roamed the ports of the country (Rasanayagam,1926, p.208). Because of Budumuttawa inscription belongs to Polonnaruwa Period, that same rule should be applied in real-time. Therefore, that army must be Weerakoti.

In the Detiyamulla inscription, there is the word 'cāyar', which conveys the idea of 'Collector of money due, so it must be about a tax collector. This inscription belongs to the 12th or 13th centuries AD. Taxes have been the main sources of revenue for the Royal treasury during this period. And Queen Lilawathi's inscription mentions tax collected on merchandise near the gate of Anuradhapura town. Since the Detiyamulla inscription mentions a port city, taxes may have been levied on it as well.

Inscriptions found in the North Western Province about these trade corporations date to the 12th and 13th centuries AD. Also, inscriptions from Viharahinna, Padaviya, and Vahalkada belong to the same period (Veluppillai,1971, p.46). Weerakoti and Nanadeshi, which can be trusted as Ainnurruvar trade corporation and its affiliates, also appear to have been involved in foreign trade in Sri Lanka. Since all these trade corporations are of South Indian origin, it can be assumed that Sri Lanka had a close trade relationship with South India.

The inscriptions state that the above-mentioned trading companies built and sponsored Buddhist and Hindu places of worship in the country. Accordingly, it appears that a group of foreign Tamil origin sponsored Buddhism in this country. The specialty here is the sponsorship of Buddhist temples by a trade corporation at a time when the South Indian invasion was rampant in the country. Therefore, it can be believed that they were not a group that aimed to invade Sri Lanka, but a group that respected Buddhism. And Ainnurruvar must be a strong and wide trade corporation in South Asia.

It can be identified that there were trade cities in Sri Lanka that were associated with trade corporations at Real-time. Weerakoti, a military trade class, has provided security to the trade cities. Weerakoti is referred to as a collection of high-ranking members of the society, so it is possible that their trade corporation existed as a company with shareholders as it exists today.

Although the inscriptions do not describe what the merchandise was, it is believed that the import and export functions were carried out by these trade corporations, such as gems. Inscriptions established by these corporations are found in various parts of Sri Lanka and it seems that these trade corporations may have been active in those areas. It also appears that tax collection was associated with trade corporations.

From the above, it can be concluded that the merchants mentioned in the inscription from Nainativu must be Weerakoti, and it must be an army of a trade rank and also a merchant group with shareholders, who made donations for Buddhist temples in Sri Lanka. Therefore, it can be believed that they respected Buddhism. And there was a Kali temple in Kalutara, built by a South Indian trade corporation named Aiññūrruvar, and it was owned ports and cities in Sri Lanka. And they may have levied taxes on ports also.

Finally, it can be assumed during the Polonnaruwa period, the most famous and wealthy South Indian trade corporations were active in Sri Lanka and Sri Lanka remained an important economic hub in South Asia. Also, Sri Lankan trade may have been controlled to some extent by these trade corporations.

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Potentials and Challenges for Cycling Tourism as a Sustainable Model of Transportation for Tourist Destination Promotion– Case Study in Ella-Sri Lanka; An Exploratory Study

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Abstract

Presently, lots of countries have initiated sustainable approaches to destination development. As result, cycling is also promoted due to the enormous environmental benefits it offers to ensure a smokeless tourism industry. Accordingly, this study aims to identify the potential and challenges of cycling tourism as a sustainable mode of transport for destination promotion. Further, the study explores the challenges of promoting cycling along with the tourists' perception. Ella-Sri Lanka was chosen as the main study location, and for in-depth analysis, the scenario study employed a qualitative approach. Purposive sampling and semi-structured interview techniques were applied for the data collection and at the data saturation point, 20 cycling tourists' responses were recorded for data analysis. The thematic analysis method was used for data analysis. Findings associated with the benefits of cycling were divided into four main themes economic, social-cultural, environmental and health, and other benefits. Additionally, tourist perception and the related challenges were categorized under three themes namely, safety and security-related issues, product, and process-related issues, and infrastructure facilities. Finally, implications for developing a more participatory policy approach towards sustainable destination development are highlighted considering the cycle renters, tourist guides, travel agents, accommodation providers, tourist services and facility providers, local authorities, government, and other relevant stakeholder groups involved in the tourism sector.

Keywords – *cycling tourists, tourism development, sustainable transport, destination promotion*

Introduction

The tourism sector is one of the main income-generating sectors in the Sri Lankan economy. At present, it is developing rapidly around the globe. In the Sri Lankan context, tourists are using various methods to reach their desired destinations. Such as cars, vans, motor bicycles, cycles, and so on. Therefore, in the tourism sector, transportation is taking a significant place and it is an inevitable part of the tourism system (Currie & Falconer, 2014)

The transportation sector accounts for one-third of carbon emissions (Rodriguez, 2009).and cars are the main contributor to atmospheric pollution in the world (Aldred, 2010) (Karanikola *et al.*, 2018). A move from automobiles to other transportation methods, called 'active transportation' (Teschke *et al.*, 2012) has several benefits. Walking and cycling are the most popular modes of active transportation. Many European countries encourage tourists to use cycling as an active transportation method as it offers lots of health benefits and also helps to protect the environment. It is recommended as one of the best methods to use for short journeys. Bicycling for leisure, recreation, and tourism is seeing a worldwide renaissance, according to a growing body of research (Lamont, 2009; Lumsdon, 2000; Ritchie, 1998).

Many young travelers are independent, and health-conscious, (Scol, 2016). Therefore, cycling could be an ideal means of transportation for younger modern-day travelers as it acknowledges sustainability with all other travel requirements. Sri Lanka tourism also experiencing a boom in cycling tourists. Thus, cycling is expanding as a niche segment (Gunasekara, 2008) and is a sizable market for several destinations like Kandy, Hikkaduwa, Ella, and Arugambay. This study focuses on cycling in the Ella area as it is ranked as a major tourist destination in the Badulla district of Sri Lanka and is popular among national and international tourists alike. Additionally, Ella was announced as a tourist zone (Ekanayake, 2021). Ella is a well-famous tourist destination among cycling travelers due to its isolated nature, natural attractions, bio-diversity, and budgeted services.

Cycling tourism can be classified as a green, sustainable tourist activity on its own. That indicates a type of tourism that respects both nature and the environment, and that does not pollute or harm the tourist business relationship with the authorities or the tourism area (Peter Saabye Simonsen et al., 1998).

Since most people know relatively less about cycling tourism, its purpose, and its other benefits this study aims to examine the factors influencing tourists to cycling tourism and in return how it benefits sustainable destination promotion. The study further explores the challenges associated with the promotion of sustainable cycle tourism.

Literature Review

Cycling Tourist

Knowing the behavioral characteristics of cycling tourists would be significant in tourism planning, product designing, segmentation, and promotion. According to the UNWTO, a tourist is defined as "*Any person, who travels to somewhere that is not his or her usual surroundings for less than 12 months, and for whom the most important objective of the journey is other than salaried activities at the destination.*"

Scholarly articles define a cycling tourist as a "*person of any nationality, who are at some stage or other during his or her holiday uses the bicycle as a mode of transportation, and to whom cycling is an important part of this holiday. However, short trips to the "corner shop," etc., are not included."* Yet, the general definition differs for cycling tourists as they use the bicycle as a mode of transportation. Accordingly, scholars emphasize the importance of focusing on the number of days that tourist plans to use the bicycle during their anticipated stay. In addition, there are sub-categories of cycling tourists. For example, those who cycle only for one or a few days consider it as an alternative and enjoyable mode of transportation when exploring a destination. Another is hardcore cycling tourists for whom the cycle is the sole form of transportation and the only method to enjoy their vacation. Considering the above background, this study only considered tourists who use cycles as a main mode of transportation during their tour at Ella and who stay more than 24 hours away from their usual place.

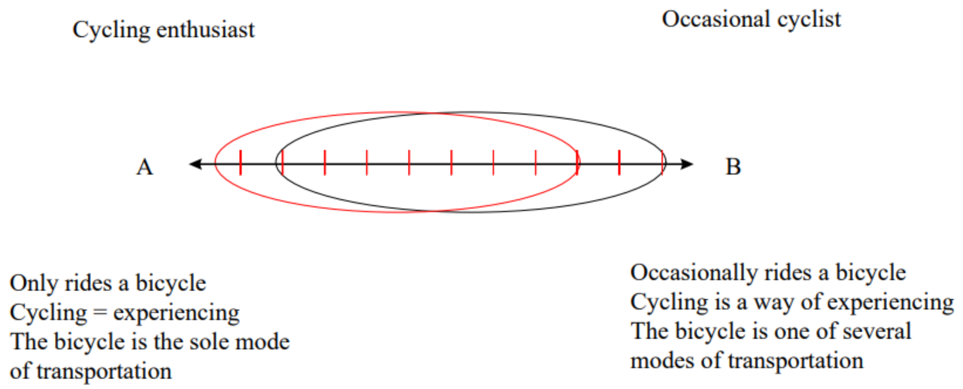

Figure 1. *Types of Cycling Tourists. Source - (Simonsen, 1998)*

According, to Simonsen et al., (1998), the above figure demonstrates that the cycling tourists can be graded according to the level of their commitment to the cycling tourism concept and according to the purposes of the cycling holiday. When considering cycling tourism, some tourists would like to tour anywhere with their cycle. The main aim of attracting cycling tourists is to ensure that it is enjoyable for them to cycle. This study focuses on the potential of a destination for cycling as a sustainable mode of transportation for tourist destination promotion.

Figure 2. *Map of Ella Tourism Zone and the Study Sites.*

Source: Google images (2021)

The above map details the data collection sites for the study. 1. Little Ravana Falls, 2. Kithal Ella Falls, 3. Ella Spice Garden, 4. Nine Arches Bridge and 5. Demodara railway loop. Ella area is a mountainous area, and it is situated in a valley at about 1000m elevation, surrounded by higher mountains and hills. Further, Ella was considered for the national tourism development master plan for the year 2020-2030, considering its unique destination attraction features and the significance of the other surrounding attraction sites. The magnitude, climate, natural and man-made attractions, etc. increases the Ella potential and significance relevant to Ella's tourism industry. Therefore, most cyclists can enjoy nature, culture, adventure, etc, while riding and touring.

Sustainable Transportation

"sustainability" is intended to make the balance of economic, social, and environmental. Sustainable transportation is also derived from the sustainable concept, and in the contemporary world, humans are seriously considering these concepts *(World Ocean Review,2019).*

Sustainable transportation is generally referred to as "Green Transportation." It is essential to know that sustainable transport utilizes renewable energy rather than the use of coal, petroleum, or other fossil fuels that can harm the earth. However, sustainable transportation is safe since it makes use of renewable energy sources. Walking, sailing, and cycling are examples of sustainable modes of transportation. (Rankesh, 2018)

Cycling is been taken as the best method of sustainable tourism. Because it is a means of transport that reduces costs, improves health, and offers environmental benefits for tourism destinations (Lancaster, 2020). Many scientists have proven that it is one of the best methods to reduce obesity and the best way to enjoy nature other than walking (Blau, 2008). Cycling just creates very insignificant environmental damage compared to other modes of transportation including air, road, railway, cruise, etc. Moreover, it takes up a small amount of area, and it is one of the most cost-effective methods of transportation, both in terms of immediate user expenditures and public infrastructure expenses. Therefore, it is clear that cycling promotes a lot of benefits including environmental, social, and economic, and health and well-being of persons. In urban settings, sustainable transportation can refer to active transportation options. As a result, cycling is perhaps the most environmentally friendly mode of urban and rural transportation. It is very feasible for short trips and medium-distance trips (John Pucher, 2008).

Socio-Economic, Health, and Other Benefits of Promoting Cycling Tourism

Presently, travel motivations and consumption patterns have been largely transformed. For example, the shift from mass to FIT tourism in the recent past and now moving towards special interest alternative-travels emphasizes the people's demand and engagement in tourism. (Nepal 1997; Mansuroğlu 2006; Cengiz 2007; Pirselimoğlu Batman 2013). Social changes greatly impact the lives of people in every aspect. Thus, people used to go on vacation to escape the usual daily -routines and busy work schedules. Since cycling offers opportunities to enjoy nature, and culture while riding it is very much popular among foreigners in Ella.

According to a study conducted by the Austrian Ministry of the Environment, sightseeing and shopping by cycles account for EUR 2.53 billion in annual consumption, and that increasing the model share of cycling by one percentage point would increase local retailer turnover by 0.2 percent, or EUR 87.6 million per year in Austria. If the entire potential of cycling for shopping excursions were realized, local shops' turnover would increase by EUR 1.3 billion. This would primarily assist the city and village retailers. Additionally, without spending money on any oil, gasoline, etc. cycle can be used and it is a pocket-friendly way to go on short journeys.

Moreover, the distinguishing features of cycling tourism such as diversity, integrity, and multiplier effects it has a great potential to contribute to the economy (Blondiau, T et al, 2016). Rapid social and lifestyle changes increase economic gains through manufacturing, developing and modifying cycles and creating sustaining constructions and designing, etc. (Scotini et al 2017). Additionally, the promotion of cycling tourism at destinations provides great benefits while opening up doors for new services and businesses which contribute to generating new direct and indirect job opportunities for locals, such as mobility managers, cycle tourist guides, repair shops, and so on. Klemmer et al. (2018) discovered an increase in recreational cycle tourists make a considerable contribution to new stores and local businesses in transit regions and amenities situated in recreational areas.

In the recent past, with the growing interest in the field of sustainable transportation and destination promotion scholars have explicitly studied this phenomenon and found that energy incentive, active travel has a positive contribution towards the health and wellbeing of people (Pucher, Buehler, et al., 2010). There is no doubt that cycling can be identified as a significant potential means to promote health and wellness among all (Bassett et al., 2008; Bauman & Rissel, 2009)

Tourist Destinations

A tourist destination is a collection of tourist products, services, and public goods sold under the same brand name to provide a seamless experience for the customer (Buhalis, 2000). Rather than describing it in terms of a well-defined geographical area such as a country, island, or town (Davidson, 1997). According to current definitions, a destination is a combination of a tourist environment and tourism products and services that provides a holistic experience that is subjectively evaluated based on the traveler's touring itinerary, the purpose of the visit, tour experiences, cultural background, etc. elements. (Fuchs and Weiermair, 2003).

Destinations are places that would attract visitors for a short-term stay. In brief, a destination can be explained as the local government boundary that needs essential for communities (Pike, S., & Page, 2014). Furthermore, Destinations are placed with some form of actual or perceived limitations, such as the physical boundary of an island, political boundaries, or even market-created boundaries, are included (Kotler, et al, 2017).

As per Ajzen, I. Driver (1991), tourist destination selection behavior is an important subject that is widely studied by researchers. Literature suggests that destination selection behavior is largely influenced by rules, psychological decision-making processes, and choice criteria have all been related in these behavioral investigations of destination choice.

This study is mainly based on cycling tourists, and their choice of destination should be the place where they can do cycling, and promote that particular place as a tourist destination. Accordingly, the study has chosen Ella as the main location.

Because, previous tourists also proved that Ella is one of the best destinations to get the cycling experience (*Trip Advisor - Ella Cycline*, 2020)

Destination Promotion

Mainly, a tourist destination is a geographical area that attracts tourists and it may have attractions including natural, cultural, man-made, or events. Accordingly, to determine the tourist destination's popularity, counting the number of visitors in a specific period to the destination site is the best answer (O. Kim and Shin, 2004). Nevertheless, there could be opposite ideas, that this can be an option of 'quantity' over 'quality' which smaller destinations do not appear to be essentially inferior because they have a less number of visitors. It is recognizable that little-known or remote destinations have less- popularity and a less number of visitor arrivals. Hence, it is important to take an effort to promote a destination while analyzing its scope the strategic vision. Finally, in the future, it may lead to a wide array of individual businesses and makes it a major destination among travelers one day (Lingxu Zhou, 2014).

Promotion of destination mainly considers promoting a town, an area, or a country to increase visitor numbers. In other words, destination marketing is the promotion of a particular region as a tourist destination. In contrast, sustainable destination promotion in Ella needs to draw significant attention from the product development stage to distribution and marketing (Promodo, 2018).

Methodology

Due to the multidisciplinary nature of the transportation and tourism industry, this study used both primary and secondary data. To in-depth analyze the scenario this study adopts the qualitative approach. It consists of various methods such as document analysis, participant observations, and semi-structured interview sessions with purposive sampling techniques. The study also used secondary data from different sources including data from the reports published by the Sri Lanka Tourism Development Authority (SLTDA) and Senses and Statistics of Sri Lanka, and the Ella Tourist Information Center (TIC). Gathering information from different sources allows the data triangulation process to get a rich outcome and to ensure the credibility of the findings (Bowen, 2009; Denzin, 2006).

Due to the qualitative nature of the study data were collected from twenty participants. The qualitative nature of the study the data 'saturation criterion' determined the sample size of the current study (Patton, 1990). Further, the study employed a semi-structured interview method for data collection, and data were collected during the period of October 2019. The unit of analysis of the current research was at the individual level, and the Thematic analysis technique was used to analyze the collected data.

Ella, Sri Lanka- The Study Location

Ella, Sri Lanka was selected as the study location since it is one of the most famous tourism hotspots among tourists in the hill country rural area and lots of cycling tourists visit Ella, to take some different touristic experiences including cycling, local cuisines, nature, and climate differences.

Ella is a small town situated between Badulla and Bandarawela and it is governed by the Uva provincial council of Sri Lanka. This scenic little town is one of the most famous attractions among tourists due to its unique geographical positioning. It is located in a misty hill countryside approximately 210 km away from Colombo. It is situated nearly 1100 m above sea level and has a high biodiversity with unique flora and fauna. Ella receives more international than local tourists. Because of this, it is changing into a foreign-dominated resort; hence Ella is considering a different destination from the other ecotourism destinations in Sri Lanka (Ekanayake, 2021). Previous studies have indicated that most tourists admire Ella as an eco-friendly, nature based-adventure destination (Fernando, 2010). Because of its central location, tourists stay in Ella to relax and enjoy nature, while admiring a clean environment, fresh air, and the soft and hard adventure activities in the region around Ella. Further, Ella has a rich historical background that dates back to the famous Rama, and Ravana-Ramayana trails. The surrounding attractions such as the Ella loop, Demodara Bridge, Ravana Cave, and so attraction also add more historical and cultural value to the destination (*Lost in Sri Lanka*, 2019). Since Ella has a high tourist influx lot of traditional and pop culture events also have become a significant attractions. Particularly the food festivals, cultural festivals, and other important day celebrations, etc. The unique taste of local cuisines, textures, simple, attractive garnishing, and eco-friendly packing methods are some key reasons that travelers are attracted to Sri Lankan food in the Ella area. According to Ella Tourist Information Center (TIC), there are so many remote tourist destinations that tourists can observe in Ella and the suburbs. As Fernando, 2010 stated most tourists visiting Ella are interested in visiting less popularized places with adventure experiences.

According to the secondary sources, information, and the Ella TIC information five remote tourism destinations were identified in Ella and the suburb area for the current study. They are Demodra loop, Nine arches, Ella spice garden, little Ravana falls, and Kithal Ella.

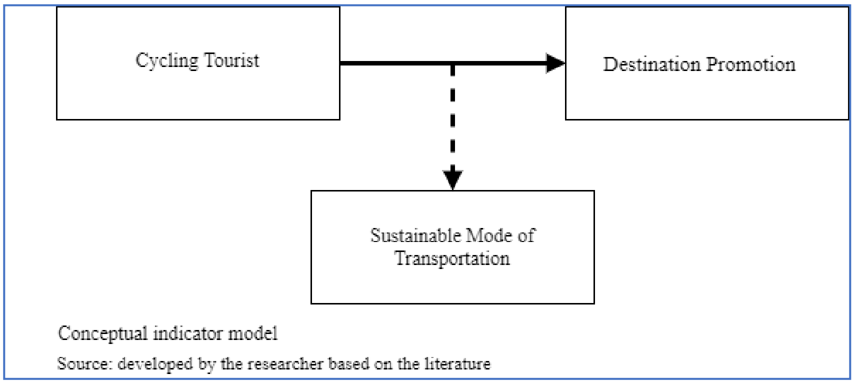

Figure: 3.1 *Conceptual Indicator Model*

The literature has demonstrated the various, economical, social, environmental, etc benefits as well as issues about cycling and destination promotion. Particularly, the European Cyclists' Federation (ECF) also highlights the significance of cycling tourism as a sustainable transportation mode. Based on the literature, the study developed the above conceptual model to examine the potential and challenges of cycling tourism as a sustainable mode of transportation for destination promotion.

Results and Discussion

No.	Respondent ID No.	Gender (F/M)	Age Group	Monthly Income $	Marital Status (M/S/L)	Occupation	Educational Background	Country/Region	Length of Stay in Ella
1	**A1**	**M**	**21-30**	**>2500**	**S**	**Private Sector**	**Degree**	**EU**	**<5**
2	**B1**	**M**	**21-30**	**<2000**	**M**	**Private Sector**	**Diploma**	**A**	**>3**
3	**C1**	**F**	**31-40**	**>3500**	**L**	**Bank**	**Degree**	**EU**	**>5**
4	**D1**	**M**	**31-40**	**<2000**	**M**	**Private Sector**	**High School**	**EU**	**>5**
5	**E1**	**M**	**31-40**	**>3500**	**M**	**Private Sector**	**PG.Dip**	**A**	**>5**
6	**F1**	**M**	**21-30**	**<2000**	**L**	**Private Sector**	**High School**	**A**	**<5**
7	**G1**	**M**	**31-40**	**>3500**	**M**	**College**	**Degree**	**EU**	**>7**
8	**H1**	**F**	**31-40**	**>4500**	**M**	**Mariner**	**Degree**	**EU**	**>7**
9	**I1**	**M**	**31-40**	**>3500**	**L**	**Private Sector**	**Degree**	**EU**	**>3**
10	**J1**	**F**	**31-40**	**>3500**	**L**	**Private Sector**	**PG.Dip**	**USA**	**>5**
11	**K1**	**F**	**31-40**	**>2500**	**M**	**Private Sector**	**High school**	**A**	**<5**
12	**L1**	**M**	**21-30**	**>2500**	**S**	**Private Sector**	**High School**	**EU**	**<5**

13	**M1**	**M**	**31-40**	**>3500**	**M**	**Public Sector**	**Degree**	**EU**	**>5**
14	**N1**	**F**	**41-50**	**>3500**	**L**	**Public Sector**	**Matser**	**EU**	**>7**
15	**O1**	**F**	**41-50**	**>3500**	**M**	**Entrepreneur**	**High School**	**USA**	**>5**
16	**P1**	**M**	**21-30**	**<2000**	**S**	**Private Sector**	**High School**	**EU**	**>5**
17	**Q1**	**M**	**41-50**	**>3500**	**M**	**Public Sector**	**PG.Dip**	**A**	**>5**
18	**R1**	**F**	**21-30**	**>2500**	**M**	**Naturalist**	**Matser**	**EU**	**>7**
19	**S1**	**F**	**31-40**	**>4500**	**M**	**Entrepreneur**	**M**	**USA**	**>5**
20	**T1**	**M**	**31-40**	**>3500**	**L**	**Private Sector**		**EU**	**>7**

Table 4.1 *Interview Participants' Profile*

According to the profile of the respondents, males have dominated the cycling tourist category. Further, most of the respondents were in the age group of 31-40 years and most of them were having in-between USD 2500-3500 monthly income and the majority were married. Moreover, the majority of the respondents were private sector employees and they were mainly from the European region. Another important factor is that majority of the respondents were having a minimum of 05 nights' stay at Ella. Based on the above facts it can conclude that Ella is getting good demand from European tourists and mainly it is famous among young and middle-aged adventure-seeking tourists. According to the income patterns and the occupation of the respondents promoting local food, handicraft items, and reasonable tourist services would be ideal to promote the destination.

The success of destination promotion by Cycling as a sustainable mode of transportation

According to the objectives, the current study revealed four main themes regarding the sustainable mode of transportation.

Economic Gains

Generally, any visitor may conduct a Cost and Benefits Analysis (CBA) before making a travel decision. According to the field survey, it was discovered that traveling by cycle is a low-cost transport method. Further, findings revealed that Ella cycling tourists are a bit price-conscious and the majority are seeking budgetary facilities and services. Further, the majority mentioned that since Ella is one of the most beautiful places on earth with a very pleasing climate cycling is the best method to discover the beauty of nature. Further, it was identified that long-staying cycling tourists spend a considerable amount of money on modifying and repairing their cycles. It will help to generate new business opportunities for the local communities.

"*A great trip. Yes! Ella is very beautiful and we love the climate and the environment here. Very Cool. And with YouTube and other social media, we came to know that this is a budget destination for most tourists. Especially the local foods, accommodation, transport, etc. And our friends recommend getting a cycle and do discover nature and the beauty of the hills. Before coming here, we search a lot of information about the destination, and, since this is an Asian country with low cost, we selected this destination. And cycling is nothing new for us. Usually, we are taking the annual foreign tour. So, we used to be environmentally friendly and this cycling concept is very famous in Europe too. Since we planned to stay at Ella for a week because of my travel colleagues' advice. They said the cycle is an ideal vehicle to access some destinations in Ella and also, and they advised me to get regular check-ups of the cycle and to put attention to its performance before cycling because cycle repair shops are not widely available beside destination routes. So, I think tourism people may think of putting some cycle repair shops for the* *convenience of cycling tourists. It will also increase your income too. Hahahhahaaa… So, I feel you can promote cycle tourism as an eco-friendly method…………"*

Another intriguing aspect of cycling is that it is largely encouraging tourists to spend more on the local economy than other modes of transportation. Because, cyclists frequently visiting for local shops, restaurants, cafés, and other businesses. Therefore, there is a big opportunity to promote a local destination through cycling tourism activities.

Health and Other Benefits

During the study, some respondents highlight the health benefits and the safety side of cycling. Especially, it was mentioned that cycling is an active, energy-efficient physical activity. Hence, there is no doubt that cycling can be identified as a significant potential means to promote health and wellness among all (Bassett et al., 2008; Bauman & Rissel, 2009)

"Mmmmm………. perhaps I think cycling is good because it improves our cardiovascular fitness and muscle flexibility. And it is good exercise for the entire body. Isn't it? So, my wife and I used to go on a cycle, especially during vacations. You know; because we are working a lot of time with a huge pressure during our work life there. So, vacationing and cycling is a way to reduce our stress and relax. Because we both are working and have no time to rest during the work life. Therefore, I believe cycling is good for anyone regardless of age or wealth. Not only that, I guess cycling is a safe kind of transport mode. Because most of the time only the rider is there and the mind is not disturbed by another person. So, I believe cycling is all about having fun while riding. Usually, in our country (Scotland) they encouraged us to use cycles and highlight their benefits to society. In our countries, we have separate lanes (sections) to ride cycles. It reduces traffic and it is also good for our safety. Automobiles usually have separate lanes with speed limits. Since cycles don't have speed limits the rider can manage the speed and it helps to control the traffic in lanes. It is quite a peaceful way and ideal for short trips…. As I

observed Siri Lanka roads have mainly two lanes. Thus, it would be great to have separate lanes for cycle riders, especially in city areas as it reduces traffic…………"

Many respondents highlighted the fact that cycling is one good way to reduce traffic congestion and negative environmental impacts. Further, they mentioned having their cycle allows them to manage time without depending on taxi services that are unknown to them. Apart from that, they said especially in the rocky, hilly, mountainous areas better to have cycling as an alternative transport method as it helps people to get to their destination. The next factor is accessibility. Respondents emphasize that a cycle is one of the best ways to access the roads, paths that are not accessible by other motor vehicles. Hence, they said sometimes they can go closer to the attraction with the cycle.

"Well, I guess the cycle is very important to access some difficult roads because sometimes we can't get them accessed by a motor car or van. And we both find it a very friendly mode of transportation as it helps us to manage our travel time because we don't want to waste our time while waiting for taxi services. We can go for the time we need and we can enjoy ourselves and come back. It is an interesting kind of journey. And we get chances to try local foods. We went to 'wade kade' is selling something prepared from dhal. We sometimes get opportunities to talk to locals and we found it is an interesting method to learn the basics of a language. A lot of people in Sri Lanka used to say 'Ayubowan' to us as it is the traditional way of greeting in Sri Lanka…… Finally, to answer your question, I think cycling is admired by a lot of tourists as you can see here now because of the different benefits…."

Environmental Benefits

Traveling by bicycle is a different sort of experience for Travelers. Further, cycling tourists mentioned this is one of the best methods to engage with nature. Because while riding they said they can enjoy the beauty and they can stop anywhere they wish to enjoy. Further, they emphasize the overall tourism product is all about the experience it is just not limited to a place or a product but it also incorporates the roads, rivers, waterfalls, the beauty of nature, and the local community. And they are also a part of the tourism product that we consume during our stay as stated by School, (2016). Most of the respondents respect the idea of being environmentally friendly and ensuring the long-term sustainability of the destination. Hence, they mentioned especially the virgin destinations should promote cycling, walking, and other possible modes of sustainable transport methods to conserve mother nature. Especially, respondents mentioned that cycling allows them to have a close look at flora and fauna. Another important factor is that cycling is a way to explore the destination without abusing the local resources. Hence, it is an ideal way to promote these types of unspoiled tourism destinations in the hill country. Respondents further elaborate on the importance of promoting cycling in rocky, mountain destinations and suburbs due to the smokeless nature. Promoting automobiles will increase environmental pollution including, air, water, and visual pollution, etc. Further, data revealed that road traffic and loud noise of vehicles are negatively impacting the quality of life of the people and the animals around the Ella area. However, using environmentally friendly accessible modes including cycling will be one of the best solutions to overcome traffic congestion and environmental pollution-related issues.

"I think we have a lot of environmental challenges, as you may know, climate change is one of the biggest challenges before us. Most countries cut down trees and destroy the environment, and nature for construction works. But we should look after nature. Because it is our blood. I am a zoologist. We need to maintain the balance of the environment, it not only human beings, anialsion, and trees everything is having an equal right to live………………. In my country, people mostly use public transport. But in Sri Lanka, I saw many personal automobiles on the roads. If people were encouraged to travel by public transport or environmentally friendly type of vehicles, including, cycles, and battery-driven vehicles I think it is good for the environment. Because it reduces the consumption of oil, and gases and saves the environment whit out polluting air, noise, animal habitats, and the total environment. Young people like you can impress governments

with new tourism projects like in our countries. Cycling is a good option, as it minimizes negative environmental impacts……………………….."

Social and Cultural Benefits

Presently, people are living in concrete jungles and have very busy work life people tend to get a vacation at least every 12 months to escape from their busy lifestyles and pressure. As a result, they go in search of unspoiled destinations. Frochot (2005), pointed out that rural areas gain considerable attention and more visitation at present and have become an important element in the tourism industry. Respondents highlight the fact cycling offers plenty of opportunities to get closure with the community. Especially, during tea or repair work they said they will get the chance to engage with locals. Further, they highlight the fact, cycling offers great opportunities for the socialization process while allowing them to learn the key elements of the culture of the village subcultures, and to know about tangible and intangible cultural assets, etc. Therefore, almost all the participants emphasize that cycling is having a positive relationship with Community Based Tourism also.

"……I am a naturalist. So, I know the real value of promoting cycling and so-called smoke-less alternative transport methods in a destination. I believe there should be a top-to-bottom approach in policymaking and everything to conserve nature and culture. I always take great care of the environment and I learn from the places I visit. Travelling allows us to learn and develop self-discipline. Cycling on the other hand provides us with an opportunity to closely work with locals and get to know the unknown culture and societies. So, I believe promoting cycling in these unspoiled destinations would contribute to the sustainable development of the destination."

Challenges to promote cycling tourism at Ella- Exploring the Tourists' Perception

Based on the respondent's feedback tourist perception towards challenges to promoting cycling tourism at the destination was discovered and d finally the data were clustered into five main categories as bellows. Safety & security, infrastructure facilities, process-related issues, product-related issues, and environment and sustainability.

Safety and Security

Participants highlighted that they had to face difficulties because of their luggage. In Particularly, the respondents mentioned they had different kinds of unpleasant experiences with the traffic police. Further, tourists stated that these types of cases are not very frequent in their countries. Additionally, many cycling tourists have mentioned that the congestion of other vehicles makes cycling feel less safe of their unethical driving behaviors. Especially, the smog, Carbon Monoxide, and other toxins emitted by motor vehicles are life-threatening to human health. Thus, breathing polluted air and frequent road accidents are some of the major concerns that cycling tourists were having in terms of their safety and security. Additionally, respondents mentioned that unethical behaviors of the people will also damage the image of the destination. Thus, it is important to maintain a healthy relationship with the host and the guest community.

"Sometimes police stopping us and asking a lot of questions. It might be their duty. But it takes a lot of time and in our country, there is no such system. Other than that, smokes by motor vehicles are a big problem for us. Sometimes even you may have seen that lorries and long vehicles heavily discharged gases, oil, toxins, etc., which are not good for human health. At least there should be time limitations for such types of vehicles….."

Infrastructure facilities

Participants mentioned that they have met challenges due to poor different infrastructural facilities. They further emphasize especially the lack of safe parking stations, repair stations, and comfort centers in the destination area. All most all the respondents have mentioned guiding services, including proper road maps, etc., and lack of internet signal are mainly negatively impacting their tour as they are depending on web-based information most of the time. Cycling travelers are often independent, and they are discovering new destinations by themselves. Therefore, they use up Google Maps and other road maps for that, and they have to have a strong internet supply. According to cycling tourists' perception, since Ella is located in the hill country, there is a lack of telecommunication and internet facilities. Cyclists rely on signs for crucial information. This is especially true for women, who exhibit a higher level of navigation anxiety and a preference for the route wayfinding technique when visiting new places.

Additionally, participants highlight the fact of inadequate facilities in the washrooms and sanitary facilities. Europe and North America are still considered some of the developed destinations in terms of cycling infrastructure, including mountain riding, day trip trail cycling, and city cycling, etc. because infrastructure facilities and tourist services are playing a vital role in promoting cycling tourism at destinations. (Lamont, 2009; Probstl-Haider et al., 2018).

"Oh! I think the destination needs a lot of infrastructure developments in the future including roads and tourist facilities. Sanitary facilities and repair centers are not at a satisfactory level for me. One day I had a bad experience. Because during the middle of one of my cycle tours I had a tired punch. So, I searched for a repair center. But there was no single repair center close to me. Then some locals helped me to get rid of the problem. Of course, people in Sri Lanka are very hospitable and they care for and they helped everyone... Thanks to God I saved my life finally because of them…And I think good route maps and Apps for destination sites should be developed. It makes our journey very comfortable and easy….."

Product and Process related issues

Most cycling tourists tend to rent a bicycle in Ella. However, obtaining a cycle that process is not very convenient for the tourist. Because they have to keep their passport with the cycle renters until they return the cycle and they said a lot of documentation work. Further, respondents mentioned that lack of technical assistance is the biggest problem they encounter. According to the respondent's view, this is a manual system and it is time-consuming with lots of documentation work. If they can make it faster with the technology, they said it would great for both parties. Some of the respondents suggested creating an App with relevant details including a list of cycle rental centers, fees, and other rules, etc., so it will be easy for people to search for information and get the purpose done.

Participants suggested that it is always better to provide a general guideline booklet of road traffic rules etc., and a kind of educational awareness program to the cycle of hiring people as international tourists are unknown to this society, culture, nature, and the environment. And participants mentioned it is better to keep a picture of the vehicle all the time. Because if something went wrong that picture is also an evidence kind of a document.

"You Know! The cycle renting process is a bit difficult sometimes. Because they ask for a lot of details and photocopies documents etc. This is very difficult during a Poya Day or holiday because a lot of shops/ communication centers are closed. So, I would recommend you to have a new system incorporate with the technology. Then it is easy for all…..!"

Conclusion and Recommendations

Findings revealed that Ella is one of the well-famous tourism hot spots in the hill country despite of age gender and nationality. Further, findings elaborate that environmental factors are the most dominant aspect of sustainable destination promotion. Especially, at present, themes like 'going green, ecofriendly' 'save the planet' etc., have become buzzwords in society and many scholars have also shown a huge interest in researching the field of sustainability, eco-tourism, environmental conservation, etc. With the rapid boom in the above areas, sustainable transportation and sustainable accessibility methods have also gained significant attention in society. Thus, cycling is having lots of opportunities to promote itself as one of the best sustainable modes of transportation due to its zero-emission, smoke-less nature, and low-cost and environmentally friendly accessibility in the mobility industry. As a result, in the future cycling tours are expected to become a significant element in destination promotion, conservation, and minimizing social, cultural, and environmental issues. (Bielinski et al., 2019; Han et al., 2019; Verbeek et al., 2011).

Accordingly, findings are evident that cycling is an alternative and effective way to maintain the health and well-being of people as it provides mental and physical exercise with fun and enjoyment. Not only that results elaborate that cycling opens doors for sustainable and green destination promotion with available resources. Thus, targeting green cycling practices for individual and small-group tourists would be ideal for sustainable destination promotion (Han and Yoon, 2015; Gazzola et al., 2018; Bielinski et al., 2019). Further, a lot of tourists admire the fact, cycling is a great opportunity to network with local communities and socialization process during a very short stay. In summary, the findings of the study conclude that environmental, social-cultural, economic, health, and other benefits are very significant and unique for cycle tourists compared to mass and other travelers who frequently use automobile services during their vacations.

In reviewing the perception of cycling tourists towards the challenges their main concern was safety and security issues. Specially they mentioned carrying luggage. Hence, designing or importing special cycles with luggage racks, and lockers and ensuring the safety of the rider with some additional functions would be great terms for ensuring rider safety. Further, these types of applications would be helpful for the long-term sustainability of the destination. Moreover, establishing a visitor-friendly environment with visitor comfort centers, and other basic infrastructure facilities such as sanitary and water, electricity for destination sites, medical centers, parking areas, repair centers, observation points, road maps, and enabling free WIFI zones, and telecommunication services without interruption, and developing Apps for destinations, enabling location finding services via google maps and enabling language translation services and establishing guiding services and Information Centers and other supportive services, etc., would be highly essential in promoting these types of lesser-known semi-urban locations which are located far-away from the main capital city of a country. To make such a visitor-friendly environment for cycle tourists it is highly essential to network with local authorities, government policymakers, tourism industry-related stakeholder groups, and academia in the area to bring the required level of change and development.

In addition to that, government involvement in minimizing illegal activities and misbehaviors, etc., area tourist Police, and other local authorities should involve. Moreover, fair trade policies, rules, and regulations should encourage every business to retain local and international tourists. Because having huge differences between prices, processes, etc., for locals and Internationals will not be an appropriate way to address the long-term sustainability of a destination.

Apart from that, educating the tourists and the residents in the area is also very important in the sustainable planning and development process. Thus, the tourist service providers, as well as the customers, should make aware of the local rules and regulations that are important for them in their short stay and educate them about the local cultural values, products, available resources, attractions, and providing them a small guide booklet would also very useful for them to familiarize with the unknown destination. The best way to initiate such programs is to have collaborative awareness / educational programs with Sri Lanka Tourism and the tourism accommodation providers, area Hotel Association, area Tourist Guide Association, tourism SMEs and other stakeholder groups in the area. Because in a way it provides an opportunity to promote local businesses and also contributes to the social and cultural well-being of society. Further, employing well-trained tourist guides and establishing digital road maps with proper directions, ensuring visitor capacity management systems and marketing destination uniqueness in the international arena are some of the crucial points in promoting Ella as a sustainable tourism destination.

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Subject Index

Appendix 01

TRIVALENT

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Journal of Archaeology, Tourism & Anthropology

Department of Archaeology

University of Kelaniya

Sri Lanka

Volume II *Issue II* *2021*

About

The Journal of Archaeology, Tourism & Anthropology is to provide a platform for researchers and professionals to publish their research findings, theoretical overviews, models, and concepts related to Archaeology, Anthropology & Tourism & Cultural Resource Management with a multidisciplinary research approach. This is an interdisciplinary, open-access journal that is exclusively devoted to the publication of high-quality research in the fields of Archaeology, Anthropology & Tourism & Cultural Resource Management. The Journal focuses on new trends in each field.

Intentions & Scopes

The academic journal of Archaeology, Tourism & Anthropology is the official journal of the Department of Archaeology, University of Kelaniya, Sri Lanka. The journal provides a platform for researchers and professionals to publish their research findings, theoretical overviews, models, and concepts related to relevant fields of Archaeology, Anthropology & Tourism & Cultural Resource Management. Further, the journal encourages collaboration by

teams of researchers to create special issues on the latest developments in related topics of national and international importance.
The peer-reviewed journal publishes one issue annually & invites original research articles from diverse disciplines. In addition to original research articles, the journal invites review articles, book reviews, and short communications.

Overview of the Department of Archaeology

Archaeology has become a subject field of studying human culture through human activities beyond a mere appraisal of past cultures & societies. The application of new knowledge & secrets of human history uncovered through that scientific study is the main aim of archaeology. Based on the multidisciplinary & multivocal concept of archaeology, it is an internationally connected subject via likes Tourism & Cultural Resource Management. The department offers a student-centered learning system by instilling in lectures a series of practical skills in fieldwork & research.

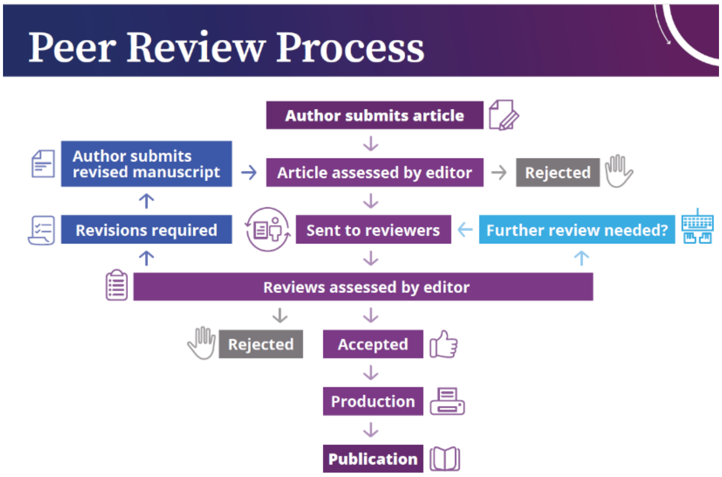
Themes

1. Pre & Protohistoric Archaeology
2. Mortuary Archaeology & Social Archaeology
3. Environmental Archaeology, Geoarchaeology, Zooarchaeology.
4. Ancient Art & Architecture, Ancient Technology, Epigraphy & Numismatics.
5. Recent trends in computer applications in Archaeology
6. Field Archaeology & Settlement Archaeology.
7. Archaeological Research, Education, Training & Public Archaeology
8. Underwater and Maritime Archaeology
9. Physical & Cultural Anthropology, Ethnology & Ethno Archaeology & Indigenous Studies.
10. Recent trends, Research & Education in Anthropology
11. Cultural, Archaeological, Paleo & Spiritual Tourism.
12. Eco, Nature, Adventure, Agro Tourism & CBT.
13. Sustainable Tourism Development, Tourism Entrepreneurship, Innovation & Creativity
14. Tourism Research, Education and Training and Tourism Crisis Management

15. Destination Marketing, Hospitality Management and Recent Trends in Tourism
16. Role of Technology and Multidisciplinary Approach in the Tourism Industry.
17. Archaeological Conservations, Museums & Heritage Management

Policies

Peer Review Process



1. Submission of Paper

The corresponding or submitting author submits the paper to the journal. This is usually via an online system such as Scholar-One Manuscripts. Occasionally, journals may accept submissions by email.

2. Editorial Office Assessment

The journal checks the paper's composition and arrangement against the journal's Author Guidelines to make sure it includes the required sections and stylizations.

3. Appraisal by the Editor-in-Chief (EIC)

The EIC checks that the paper is appropriate for the journal and is sufficiently original and interesting. If not, the paper may be rejected without being reviewed any further.

4. Invitation to Reviewers

The handling editor sends invitations to individuals he or she believes would be an appropriate board of review.

5. Response to Invitations

Potential reviewers consider the invitation against their expertise, conflicts of interest, and availability. They then accept or decline. If possible, when declining, they might also suggest alternative reviewers.

6. Review is Conducted

The reviewer sets time aside to read the paper several times. The first read is used to form an initial impression of the work. If major problems are found at this stage, the reviewer may feel comfortable rejecting the paper without further work. The reviewers will evaluate the paper based on the following criteria;

I. Statement of Problem or Purpose
II. Relevance of the Topic
III. Importance of the Topic
IV. Contribution to the Literature
V. The proper research methodology adopted
VI. Organization of the contents
VII. Discussion
VIII. Conclusion
IX. Quality of writing & Mechanics
X. Any other comments from the reviewers

Otherwise, they will read the paper several more times, taking notes to build a detailed point-by-point review. The review is then submitted to the journal, with a recommendation to accept or reject it – or else with a request for revision (usually flagged as either major or minor) before it is reconsidered.

7. Journal Evaluates the Reviews

The handling editor considers all the returned reviews before making an overall decision. If the reviews differ widely, the editor may invite an additional reviewer to get an extra opinion before making a decision.

8. The Decision is Communicated

The editor sends a decision email to the author including any relevant reviewer comments. Whether the comments are anonymous or not will depend on the type of peer review that the journal operates.

9. Next Steps

If ***accepted***, the paper is sent to production.

If the article is ***rejected*** or sent back for either major or minor ***revision***, the handling editor should include constructive comments from the reviewers to help the author improve the article. At this point, reviewers should also be sent an email or letter letting them know the outcome of their review.

If the paper was sent back for ***revision***, the reviewers should expect to receive a new version, unless they have opted out of further participation.

However, where only minor changes were requested this follow-up review might be done by the handling editor.

Author Guidelines

Final Submission:

Authors should note that proofs are not supplied before publication. The manuscript will be considered to be the definitive version of the article. The author must ensure that it is complete, grammatically correct, and without spelling or typographical errors. Before submitting, authors should check their submission completeness using the given Article Submission Checklist. The manuscript will be considered to be the definitive version of the article.

Manuscript requirements

Authors are advised to prepare their manuscripts before submission, using the following guidelines

Format	• All files should be submitted as MS Word-compatible documents. • Times New Roman font, 12-sized, and 1.5 line-spaced. Single-columned layout and in B5-sized paper.
Article Length	• Articles can contain a maximum of 10 pages including references.
Article Title	• A title of not more than 20 words should be provided. • Times New Roman font, 14-sized, and 1.5 line-spaced
Author Details	• Name of each author with initials ex: Bandara, A.W.M. • Affiliation of each author, at the time research, was completed. If more than one author has contributed to the article, details of who should be contacted for correspondence. • E-mail address of the corresponding author
Abstract	• A single paragraphed abstract containing maximum of 300 words. • The abstract should include the purpose of the study, research problem, objectives, design/methodology/approach, and findings, and also could mention the originality/value of the work with the conclusion. • Times New Roman font, 12-sized, and 1.5 line-spaced. Single-columned layout justified Italic.
Keywords	• Provide up to 05 keywords encapsulating the principal topics of the paper.
Article Format	• The article submission should be compiled in the following order: (I) abstract, keywords • main text including (II) introduction (including relevant literature and research objectives) (III) materials and methods (IV) results and discussion

	(V) conclusion and recommendations, acknowledgments (VI) references
The text	• Line spacing should be 1.5; with 12-point font Times New Roman Should employ italics • For scientific names, use the SI system/ metric system for units of measurement. • All illustrations, figures, and tables should be placed within the text at the appropriate points, rather than at the end.
References	• Please use the APA (American Psychological Association) reference style. • For detailed information, please see the Publication Manual of the American Psychological Association, Sixth Edition (2010); http://www.apastyle.org/ and http://blog.apastyle.org/ • References should be 1.5 spaced, 1.5 cm 2nd line right indent, and listed alphabetically at the end of the paper

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