



## MALAYSIA SMART TOURISM FRAMEWORK FOR ECOTOURISM (MSTF-ECO) FROM MALAYSIA SMART CITY FRAMEWORK: A REVIEW

Syakir Amir Ab. Rahman<sup>1\*</sup>, Nur'Hidayah Dura<sup>1</sup>

<sup>1</sup>Department of Urban and Regional Planning, Kulliyyah of Architecture and Environmental Design, International Islamic University  
Malaysia, 50728 Kuala Lumpur, Malaysia

\*Corresponding Author: [syakir Amir@iiu.edu.my](mailto:syakir Amir@iiu.edu.my)

Received: 12 August 2021 • Accepted: 27 October 2021 • Published: 31 October 2021

### Abstract

*Smart tourism today is a frontier of studies in the tourism field, and is a promising area from various research perspectives in terms of models, tools and strategies in sustaining the process of intelligent configuration of tourism destinations. The emergence of smart devices is highly favourable as it connects everyday infrastructures via the present networks available. Today's smart tourism has given rise to research efforts that are getting more detailed for future needs. On that count, this study aims to develop Malaysia Smart Tourism Framework for Ecotourism (MSTF-Eco) from Malaysia Smart City Framework. The content analysis is used to identify the characteristics and sub-characteristics for MSTF-Eco by analysing several literature reviews on smart tourism in terms of terminologies and case studies, which will be placed into the characteristics and sub-characteristics for MSTF-Eco.*

**Keywords:** *Malaysia Smart Tourism Framework for Ecotourism (MSTF-Eco), Malaysia Smart City Framework, Smart Tourism, Content Analysis*

**Cite as:** Ab. Rahman, S.A., Nur'Hidayah Dura, N.H (2021). Malaysia Smart Tourism Framework for Ecotourism (Mstf-Eco) From Malaysia Smart City Framework: A Review. *Asian People Journal*, 4(2), 185-200.

### INTRODUCTION

United Nations World Tourism Organization (UNWTO) has defined tourism as “the activities of a person travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure and not less than 24 hours for business and other purposes” (World Tourism Organization, 1995, p. 10). It is significant to

economic contribution (World Tourism Organization, 1980), which has giving an impact towards the economy directly and indirectly (Lee and Chang, 2008) in many regions and even for entire countries around the globe. Moreover, in some sectors of the industry, the applications of networking have been introduced since the mid-1970s in supporting the process of distribution as the industry experimented different stages of evolution in ICT (Nolan, 1979). Previously, ICT has never been integrated with travel experience and tourism management (Ollerenshaw et al., 1999). However, the widespread use of mobile technology has transformed the tourism into advance experiences by bringing together all the related information, social networking and mobility-related functionalities to the fingertips of the tourists (Tussyadiah and Zach, 2012). The technologies surrounding tourism has been developed for providing the basis information and communication as well as infrastructure and capabilities, which serve as strategic tools for industry's development to improve tourism management and governance, facilitate innovation of services and products, enhance tourist experience, as well as achieve competitive advantages for tourism organizations and destinations (Werthner and Ricci, 2004).

Recently, smart tourism has relied on an extensive adoption of emerging technologies, such as social media, mobile technology, smart devices and sensors to collect and exploit the huge amount of data to create new value propositions (e.g. Gretzel et al., 2015; Vecchio et al., 2018). This resulted in significant implications and changes to the ways in which tourism destinations compete. Consequently, smart tourism is the result of the interconnection of tourism activities with multiple community stakeholders through dynamic platforms, knowledge intensive communication flows and enhanced decision support systems. Therefore, smart tourism can be considered as intelligent tourism that encompasses touristic activities that are informed and supported by smart technologies. It utilizes the flexibility (sometimes ad-hoc) of the network connecting everyone, anywhere and anytime, as well as connecting them with travel entities that depend on one another (Busquets et al., 2007).

Caragliu et al. (2011) has defined a city can be smart when there are present investments on human and social capital, as well as transportation and ICT. In generic terms, smart city is an urban environment that utilizes ICT and other related technologies to enhance performance efficiency of regular city operations and quality of services (QoS) provided to urban citizens (Silva et al., 2018). Therefore, this study has chosen Malaysia Smart City Framework as a guidance in outlining the findings and analysis in developing Malaysia Smart Tourism Framework for Ecotourism (MSTF-Eco) as shown in Figure 1.

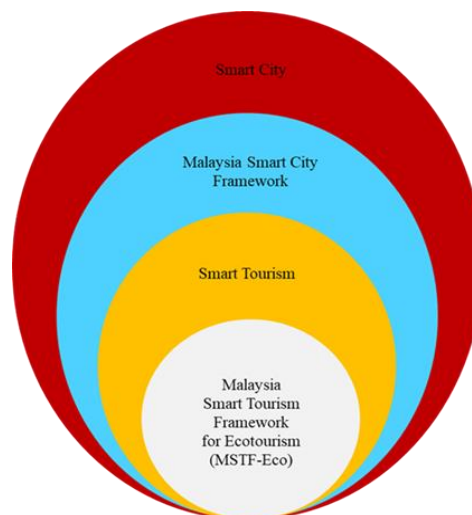


Figure 1: Research Relationship

Kondepudi (2014) found that smart city is an advanced modern city that utilizes ICT and other technologies to improve quality of life (QoL), competitiveness and operational efficacy of urban services, while ensuring the resource availability for present and future generations in terms of social, economic, and environmental aspects. Accordingly, the modern smart cities mainly focused on sustainable and efficient solutions for energy management, transportation, healthcare, governance and many more to accommodate the demands and meet the extreme necessities of urbanization (Ejaz et al., 2007). On that count, several literatures have indicated six major dimensions (also known as characteristics) of a smart city, which are smart governance, smart people, smart environment, smart economy, smart mobility and smart living (e.g. Giffinger et al., 2017; Cohen, 2014). Technically, Malaysia's Smart City Framework also follows the trend as shown in Figure 2.

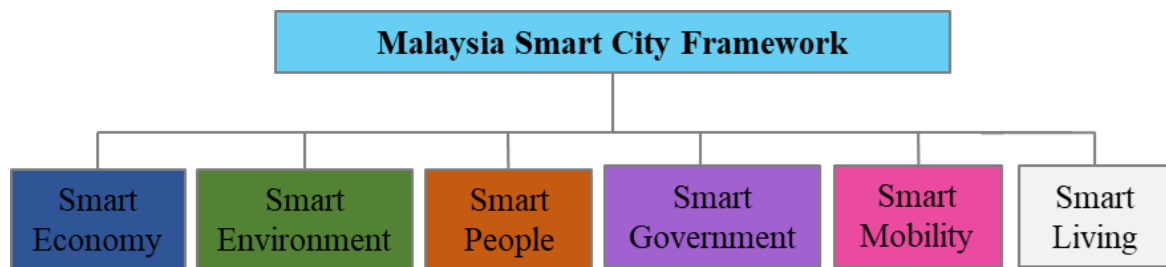


Figure 2: Characteristics of Malaysia Smart City Framework

Firstly, smart cities develop more competitive business environments, where the basic business model of smart economy is the combination of smart approaches between the environment, mobility and people (Appio et al., 2019). Commonly, smart cities create technology hubs in the forms of research centres, start-up incubators and accelerators, as well as innovation parks as to facilitate sharing of knowledge. For instance, the Research Triangle Park (RTP) known as a knowledge economy hub in Raleigh, which is also credited as a main source of territorial economic growth in North Carolina since the 1960s. Meanwhile, environment initiatives become “smart” as they use technology to improve crucial living aspects such as waste disposal, food growth, pollution control, smart electric grids, housing quality and facility management. According to Zhang et al. (2014), the way to manage a smart city environment can be drastically changed through the widespread use of IoT sensors. Additionally, human and social capital development can be fostered through smart cities (Toppeta, 2010). If not sufficient, cities must retain and attract talent by engaging living with fun (Florida, 2014). For instance, Pittsburgh has excellent universities, but it has failed in creating an innovative environment as dynamic as Boston’s or San Francisco’s. This is because Pittsburgh has a less exciting city life which is suitable for young and talented graduates. In addition, social capital is also built through open minded and tolerant communities that can attract a diverse of creative workers to the city (Appio et al., 2019). Other than that, innovative use of ICT infrastructure can be applied to achieve goals, as well as providing simplified and one-stop experience to all stakeholders based on service application integration to become a smart governance (Tokoro, 2015). It involves tools such as data analytics and real time process diagnosis; activity coordination and social orchestration; citizen communication; infrastructure management; service management; and incentives management (Appio et al., 2019).

As time changes, Watson (1992) found that mobility also responded to innovation through smart transportation or Intelligent Transport System (ITS) which includes various types of communication and navigation systems in vehicles, between vehicles (e.g. car-to-car), and between vehicles and fixed locations (e.g. car-to-infrastructure). However, mobility should not only be concerned with vehicles and infrastructure, but also QoL of citizens. For example, RFID toll collection allows drivers to passing through toll booths without blocking the traffic

flow (Watson, 1992). Last but not least, smart living can be defined as wellbeing, a result from local material conditions, QoL and sustainability (Organization for Economic Co-operation and Development, 2014). Based on Organization Economic Co-operation and Development (OECD) Better Life Initiatives Framework 2017, smart living must be included in the initiatives to improve health, education and social services, as well as empower participation of citizens. For example, Apprio et al. (2019) has found that Spain and Rome in Spain (which also popular to become the example of smart living solutions) have adopted a centralized digital solution for beach quality, mobility, touristic infrastructure and public services in delivering real-time information.

## **METHODOLOGY**

### ***Research Design***

There are several types of research approaches, which among others are qualitative and quantitative, as well as mixed-method. This study in particular applies the qualitative research approach. To be added, this approach allows the study to explore the meanings, concepts, definitions, characteristics and descriptions of things. Furthermore, it has made significant contributions to tourism studies (Wilson and Hollinshead, 2015). By implementing the qualitative approach, the tourism sector derives a deeper understanding about connectivity on the social, cultural and political levels.

### ***Data Collection Design***

Boote and Beile (2005) stated that researchers need to understand what had been done previously before conducting a research. It is important to support the scientific process of cumulative research upon building a new research (Turner et al., 2018). In another study, Rocco and Plakhotnik (2009) indicated that a research is developed from the researcher's implicit or explicit theory which depends on the research efforts which are either qualitative or quantitative. This is because literature review has the ability of providing a clear theoretical framework (Rocco and Plakhotnik, 2009). Therefore, others can build upon one's literature review, providing support or going against the existing theoretical framework (Turner et al., 2018). It helps in establishing existing theories, the relationship between them, degree of investigated theories and developing new hypotheses to be tested, as well as explaining new or emerging research problems. In some cases, Turner et al. (2018) stated that theory is a key driver for research efforts and literature reviews which are commonly visualized as a prediction or explanation of a particular phenomenon. However, within the literature, there are numerous terminologies explaining the theory (Turner et al., 2018).

Therefore, this study has made an effort in abstracting the terminologies involved and translating it into practice by developing a framework. Literature review is a very important step for this study as it builds and establishes the characteristics and sub-characteristics of smart tourism. First of all, this study abstracts numerous terminologies on smart tourism and smart city worldwide as well as in Malaysia specifically. In addition, this study also evaluates the positive impacts of smart tourism by looking at numerous smart tourism implementations and case studies (particularly on ecotourism) from various data sources. Gathering all the related data and information through theoretical literature review help identify significant enablers of smart tourism for further analysis later on.

### ***Data Analysis Design***

Data analysis is a process that has been used to a story and its interpretation (LeCompte and Schensul, 1999) by reducing a large amount of collected data and selecting the common data in the study. There are many ways to

analyse qualitative data that typically involves familiarity with data, patterns and theme searching to provide an indication of various relationships between data which helps in understanding it, visualising it and writing it up.

In this study, content analysis is chosen as this study has collecting data from the literature reviews. Specifically, content analysis can be defined as an observational research method that systematically used to evaluate all forms of recorded communications (Kolbe & Burnett, 1991). It is a common research method in social sciences and is commonly used to do research on various forms of human communication, including permutations of written documents, photographs, motion pictures or videotapes, and audiotapes. In recent years, an increasing number of studies in the tourism field have used content analysis (Camprudi & Coromina, 2016). In this context, Hall and Valentin (2005) identified different uses of content analysis in the tourism field, such as the study of advertising and images, the examination of the context of texts written by tourists themselves or the identification of different understandings of conceptual issues in tourism.

## RESULTS AND DISCUSSION

Content analysis benefits the study because it focuses on the research process and its versatility (Camprubi and Coromina, 2016). Therefore, this study has undergone process on collecting and evaluating sub-characteristics for smart tourism gathered from theoretical literature reviews. Thus, the output will be the identification of characteristics and sub-characteristics for MSTF-Eco. The below mentioned steps are illustrated in Figure 3.

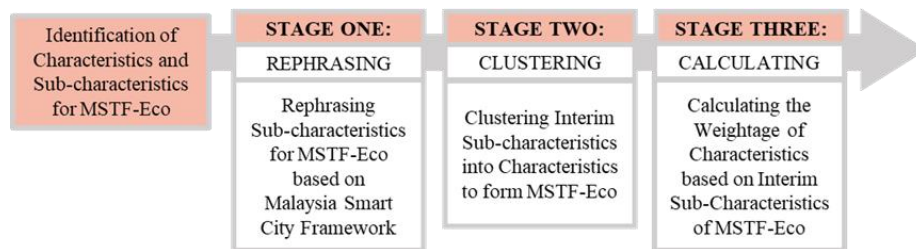


Figure 3: Identification of Characteristics and Sub-characteristics for MSTF-Eco

### *Stage 1: Rephrasing Sub-characteristics for MSTF-Eco based on Malaysia Smart City Framework*

Based on Figure 4, the first stage of identification of characteristics and sub-characteristics for MSTF-Eco is rephrasing sub-characteristics. Rephrasing is important before the data is brought into the next stage which is the summarization or simplification of terminologies into concise statements, referring directly to the concept of smart tourism. Therefore, this study aims to develop MSTF-Eco based on the Malaysia Smart City Framework. Thus, similarities can be drawn between the sub-characteristics of Malaysia Smart City Framework and the proposed sub-characteristics for MSTF-Eco by the end of this analysis as shown in Table 1:

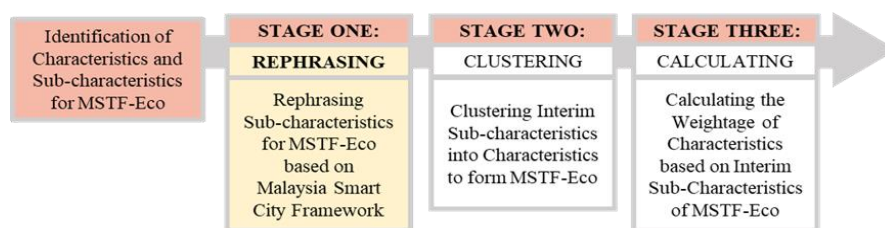


Figure 4: Rephrasing Sub-characteristics for MSTF-Eco

Table 1: Rephrasing Sub-characteristics for MSTF-Eco

Characteristic	Sub-characteristics of Malaysia Smart City Framework	Sub-characteristics for MSTF-Eco
Smart economy	<ul style="list-style-type: none"> <li>High productivity</li> </ul>	SE-1 Productivity performance
	<ul style="list-style-type: none"> <li>Implementation of innovations</li> <li>Utilization of ICT</li> </ul>	SE-2 Innovation creations
	<ul style="list-style-type: none"> <li>Competitive economy &amp; attractive investment</li> </ul>	SE-3 Competitiveness & attractive investment
Smart living	<ul style="list-style-type: none"> <li>Urban safety &amp; security</li> <li>High quality of healthcare services</li> <li>High quality of life in housing area</li> </ul>	SL-1 Destination Safety & Security
Smart environment	<ul style="list-style-type: none"> <li>Clean environment</li> </ul>	SEV-1 Clean Environment
	<ul style="list-style-type: none"> <li>Sustainable resource management</li> </ul>	SEV-2 Sustainable Resource Management
	<ul style="list-style-type: none"> <li>Readiness towards disaster resilient city</li> </ul>	SEV-3 Readiness Towards Resilience
	<ul style="list-style-type: none"> <li>Low carbon city &amp; green lifestyle</li> </ul>	SEV-4 Green Lifestyle
	<ul style="list-style-type: none"> <li>Environmental protection</li> </ul>	SEV-5 Environmental Protection
Smart people	<ul style="list-style-type: none"> <li>Empowered community</li> </ul>	SP-1 Community Empowerment
	<ul style="list-style-type: none"> <li>Talented human capital with high digital skills</li> </ul>	SP-2 Intelligent Human Capital
	<ul style="list-style-type: none"> <li>Community with good moral values</li> <li>Community with first class mentality</li> <li>Gender &amp; vulnerable group friendly</li> </ul>	SP-3 Quality of Life
Smart government	<ul style="list-style-type: none"> <li>Open data &amp; information disclosure</li> </ul>	SG-1 Open Data & Information Disclosure
	<ul style="list-style-type: none"> <li>Quality e-government services</li> <li>Inter-governmental data sharing</li> </ul>	SG-2 Inter-governmental Data Sharing
Smart mobility	<ul style="list-style-type: none"> <li>Seamless &amp; efficient connectivity</li> </ul>	SM-1 Seamless & Efficient Connectivity
	<ul style="list-style-type: none"> <li>Sustainability/green as core principle</li> </ul>	SM-2 Green Transportation



<b>Smart digital infrastructure</b>	<ul style="list-style-type: none"> <li>Integrated, safe &amp; reliable roads &amp; public transports</li> </ul>	<b>SM-3</b> Integrated Transportation System
	<ul style="list-style-type: none"> <li>Offers flexible &amp; affordable modes of transport</li> </ul>	<b>SM-4</b> Flexibility & Affordability
	<ul style="list-style-type: none"> <li>Comprehensive network coverage</li> <li>Widespread adoption of high-speed internet</li> </ul>	<b>SDI-1</b> Technological Innovation
	<ul style="list-style-type: none"> <li>Enhanced personal data protection &amp; cybersecurity measures</li> </ul>	<b>SDI-2</b> Data Protection & Cybersecurity Measures

Source: Secondary Data: Malaysia Smart City Framework (2020)

**Stage 2: Clustering interim sub-characteristics into characteristics to form MSTF-Eco**

Stage two is conducted to gather the interim sub-characteristics into relevant clusters or main characteristics to form the framework of MSTF-Eco. This stage is divided into four levels, as shown in Figure 5. Firstly, level one involves gathering related theoretical literature that can be divided into two categories, terminologies and case studies. This is because the terminologies and case studies provide significant evidence towards theories and practices of smart tourism as a whole. Next, level two simplifies the literature into simple and understandable keywords. Last but not least, level three and four involve the grouping process of the interim sub-characteristics into specific characteristics. The findings for forming MSTF-Eco are shown in Table 2 and Table 3.

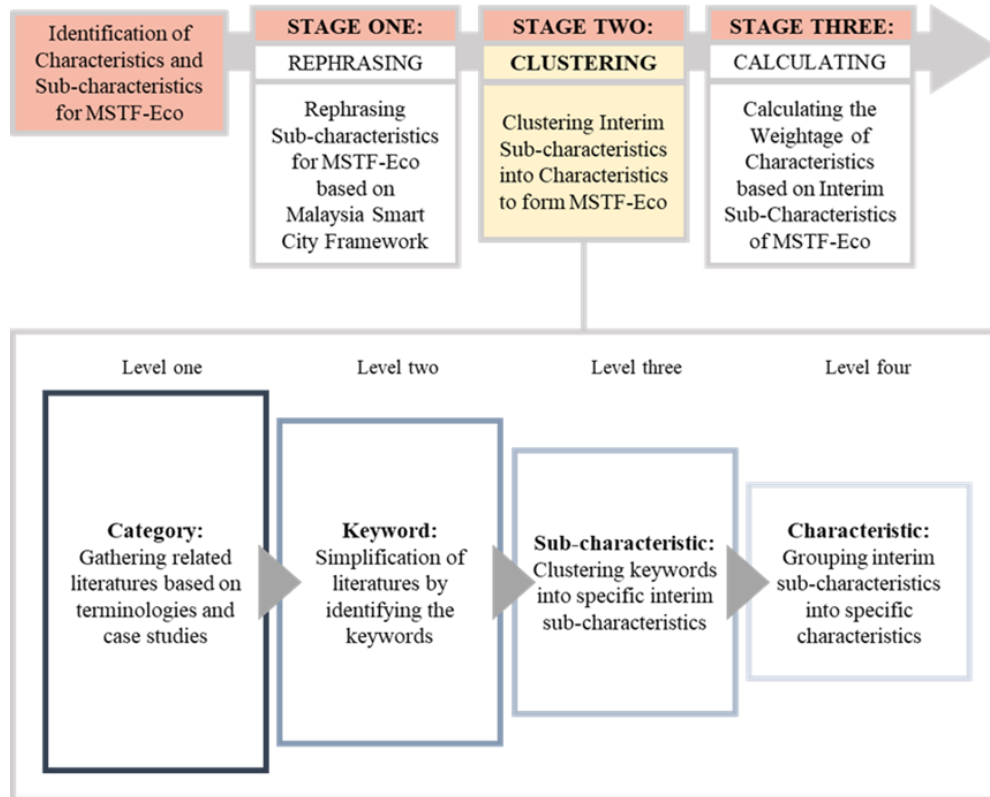


Figure 5: Clustering Interim Sub-characteristics into Characteristics

Table 2: Clustering Interim Sub-characteristics into Characteristics (Terminologies)

<b>STAGE TWO: Clustering Interim Sub-characteristics into Characteristics to Form MSTF-Eco</b>				
<b>CATEGORY: TERMINOLOGIES</b>				
Year	Authors	Keywords	Sub-characteristics	Characteristics
<b>Smart Tourism</b>				
2003	Buhalis	Evolution of ICT	SDI-1	SDI
2004	Werther & Ricci	Technological orientation		
		Foundation of innovation	SE-2	SE
2011	Gretzel	New height of intelligence	SDI-1	SDI
2011	Ma & Liu	Human-oriented	SP-3	SP
		Green	SEV-1	SEV
		Technological innovation	SE-2	SE
		Quality improvement services	SDI-1	SDI
2012	Zhang et al.	Tourist satisfaction services	SM-1	SM
		Integration of social resources	SP-3	SP
		Effective use of resources	SEV-2	SEV
2012	Sheng	Demand of sustainable development	SEV-2	SEV
		Innovation management	SE-1	SE
		Government transformation	SG-1	SG
2012	Yan	Public-private partnership	SG-2	SG
2012	Tang	Information management system	SDI-1	SDI
2012	Zhang et al.	Combination of resources & ICT	SDI-1	SDI
2013	Wang et al.			
2013	Xu et al.	Variation of information	SG-1	SG
2015	Gretzel et al.	Progression of innovation	SE-2	SE
		Extensive adoption of ICT	SDI-1	SDI
2015	Hunter et al.	ICT & tourist experiences	SDI-1	SDI
2015	Gretzel et al.	Physical infrastructure	SDI-1	SDI
		Social relations	SP-1	SP
		Governmental resources	SG-1	SG
2016	Boes et al.	Knowledgeable people	SP-3	SP
		Technology interconnected system	SDI-1	SDI
		Sustainable competitiveness	SE-3	SE
2016	Kaur & Kaur	Model of online business	SE-1	SE
2018	Yalçinkaya et al.	Closed communication & interaction	SG-1	SG
		Web-based technologies	SDI-1	SDI
<b>Smart Tourism Ecosystem</b>				
2015	Gretzel et al.	Knowledge sharing & value creation	SG-1	SG



		Utilization of smart technology	SDI-1	SDI
		Technological development		
2015	Gretzel et al.	Tourism demand	SE-1	SE
		Tourism supply		
		Marketing & information sharing	SG-1	SG
<b>Smart Tourism Destination</b>				
2004	Zhu	Intelligent destination	SEV-3	SEV
2017	Ivars et al.	Utilization of smart technology	SDI-1	SDI
2013	Buhalis & Amaranggana,	Stakeholders' interconnection	SE-3	SE
		Process of exchanging information	SG-1	SG
2014		Tourism experience enhancement	SM-1	SM
		Effective resource management	SEV-2	SEV
2015	Lamsfus et al.	Technological infrastructure	SDI-1	SDI
		Tourism experiences	SM-1	SM
		Management in decision-making	SG-1	SG
2015	Boes et al.	Demand & supply of co-creation	SE-3	SE
		Tourist pleasure & experiences	SM-1	SM
		Technological tools & techniques	SDI-1	SDI
2015	Lopez de Avila	Innovative tourist destination	SE-2	SE
		Sustainability & accessibility	SM-2	SM
		Interaction with environment	SEV-4	SEV
2016	Vasavada & Padhiyar.	Innovation encouragement	SE-2	SE
		Sustainability & quality of life	SP-2	SP
		Enrichment of physical infrastructure	SDI-1	SDI

Source: Secondary Data: Literature Review (2020)

Table 3: Clustering Interim Sub-characteristics into Characteristics (Case Studies)

**STAGE TWO: Clustering Interim Sub-characteristics into Characteristics to Form MSTF-Eco**

**CATEGORY: CASE STUDIES**

Year	Authors	Case Studies	Keywords	Sub-Characteristics	Characteristics
1990	Koo et al.	Seoul, South Korea	Communication connection Social network service Korea Tourism Organization	SDI-1  SG-2	SDI  SG

2007	Lee et al.	Songdo City, South Korea	Intelligent transport system	SM-1	SM
			Crime/ prevention	disaster SP-2	SP
			New city development	SEV-3	SEV
			Urban management		
			Business model for investors	SE-3	SE
			Real-time data and information sharing	SG-1	SG
			Public-private partnership	SG-2	
2009	Lee et al.	Central Taiwan	Advance technology of city system & development	SEV-3	SEV
			Quality of life	SP-2	SP
2010	Wu et al.	Taipei, Taiwan	Internet-of-Things (IoT)	SDI-1	SDI
			Mobile connections		
2013	Wang et al.	Nanjing, China	Location-based services (LBS)	SDI-1	SDI
			Experience-sharing value	SG-1	SG
			Destination marketing organization (DMO)	SG-2	
2015	Zacarias et al.	Puebla City, Mexico	General Packet Radio Service (GPRS)	SM-1	SM
			Transportation Safety Planning (TSP)		
			Google Maps API		
2016	Stephane MOT	Gangnam City, South Korea	Increase economic growth	SE-1	SE
			Sustainable management	SEV-2	SEV
			Extensive tourist information	SG-1	SG
			Cultural diversity communities	SP-1	SP
2016	Oates	Vienna, Austria	Innovation development	SE-2	SE

2018	Amsterdam Smart City Official Website	Amsterdam, Netherlands	Destination facilities and amenities	SDI-1	SDI
			Resilience-based approach	SEV-3	SEV
			App-based information sharing	SG-1	SG
			New city approach	SEV-3	SEV
			Smart productivity	SE-1	SE

Source: Secondary Data: Literature Review (2020)

### Stage 3: Calculating the weightage of characteristics based on interim sub-characteristics of MSTF-Eco

Stage three is the final stage of the content analysis (phase one) in developing characteristics and sub-characteristics for MSTF-Eco as shown in Figure 6. In this stage, all the interim sub-characteristics and characteristics are evaluated based on weightage for both categories, namely terminologies and case studies. This weightage helps the study to prioritize the sub-characteristics that have the most influence and least influence, hence identifying the irrelevant or unrelated sub-characteristics and characteristics for MSTF-Eco as shown in Table 4 and Table 5. These findings help to develop the interim framework for MSTF-Eco for further study.

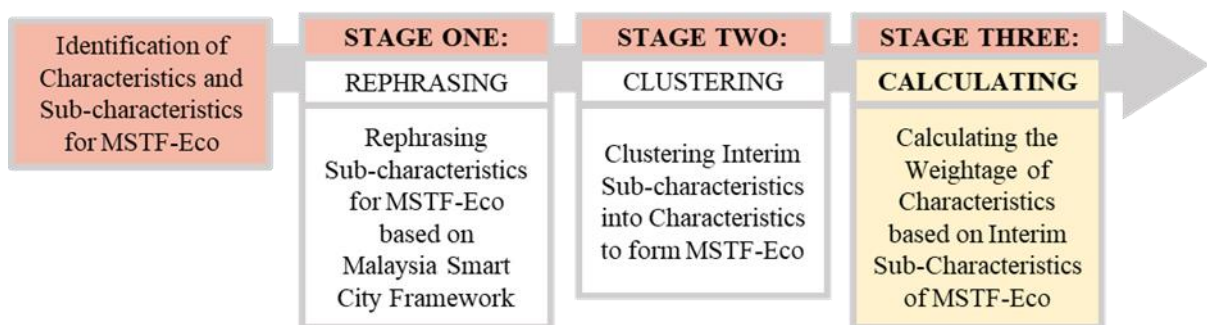


Figure 6: Calculating the Weightage of Characteristics based on Interim Sub-Characteristics of MSTF-Eco

Table 4: Weightage of Characteristics and Sub-characteristics for MSTF-Eco (Terminologies)

STAGE THREE: Calculating the Weightage of Characteristics based on Interim Sub-Characteristics of MSTF-Eco					
CATEGORY: TERMINOLOGIES					
Sub-characteristics		Weightage	Characteristic		Total Weightage
SE-1	Productivity Performance	3	SE	Smart Economy	13
SE-2	Innovation Creations	6			
SE-3	Competitiveness & Attractive Investment	4			
SL-1	Destination Safety & Security	0	SL	Smart Living	0
SEV-1	Clean Environment	1	SEV		8

SEV-2	Sustainable Resource Management	4	Smart Environment	7
SEV-3	Readiness Towards Resilience	2		
SEV-4	Green Lifestyle	1		
SP-1	Community Empowerment	3	SP Smart People	7
SP-2	Intelligent Human Capital	2		
SP-3	Quality of Life	2		
SG-1	Open Data & Information Closure	7	SG Smart Government	9
SG-2	Inter-Governmental Data Sharing	2		
SM-1	Seamless & Efficient Connectivity	5	SM Smart Mobility	6
SM-2	Green Transportation	1		
SDI-1	Technological Innovation	9	SDI Smart Digital Infrastructure	9

Source: Primary data: Content Analysis (2020)

Table 5: Weightage of Characteristics and Sub-characteristics for MSTF-Eco (Case Studies)

**STAGE THREE: Calculating the Weightage of Characteristics based on Interim Sub-Characteristics of MSTF-Eco**

**CATEGORY: CASE STUDIES**

Sub-characteristics		Weightage	Characteristic		Total Weightage
SE-1	Productivity Performance	2	SE	Smart Economy	4
SE-2	Innovation Creations	0			
SE-3	Competitiveness & Attractive Investment	2			
SL-1	Destination Safety & Security	0	SL	Smart Living	0
SEV-1	Clean Environment	0	SEV	Smart Environment	4
SEV-2	Sustainable Resource Management	1			
SEV-3	Readiness towards Resilience	3			
SEV-4	Green Lifestyle	1			
SP-1	Community Empowerment	1	SP	Smart People	2
SP-3	Intelligent Human Capital	0			
SP-3	Quality of Life	1			
SG-1	Open Data & Information Closure	3	SG	Smart Government	6
SG-2	Inter-governmental Data Sharing	3			
SM-1	Seamless & Efficient Connectivity	2	SM	Smart Mobility	2
SM-2	Green Transportation	0			
SDI-1	Technological Innovation	7	SDI	Smart Digital Infrastructure	7

Source: Primary data: Content Analysis (2020)

Content analysis was conducted successfully in four stages. The analysis has combined the characteristics of Malaysia Smart City Framework and theoretical literature review to create interim characteristics and sub-

characteristics for MSTF-Eco. The result of this content analysis for both categories of terminologies and case studies is shown in Table 6 and Table 7.

Table 6: Findings of Characteristics and Sub-characteristics for MSTF-Eco (Terminologies)

Sub-characteristics		Characteristics	
SE-1	Productivity Performance	SE	Smart Economy
SE-2	Innovation Creations		
SE-3	Competitiveness & Attractive Investment		
SEV-1	Clean Environment	SEV	Smart Environment
SEV-2	Sustainable Resource Management		
SEV-3	Readiness Towards Resilience		
SEV-4	Green Lifestyle		
SP-1	Community Empowerment	SP	Smart People
SP-2	Intelligent Human Capital		
SP-3	Quality of Life		
SG-1	Open Data & Information Disclosure	SG	Smart Government
SG-2	Inter-Governmental Data Sharing		
SM-1	Seamless & Efficient Connectivity	SM	Smart Mobility
SM-2	Green Transportation		
SDI-1	Technological Innovation	SDI	Smart Digital Infrastructure

Source: Primary data: Content Analysis (2020)

Based on the literature review on terminologies, the smart tourism sub-characteristics under smart economy, smart people and smart government and all sub-characteristics from Malaysia Smart City Framework were included as part of MSTF-Eco. However, the sub-characteristic of environmental protection was removed from smart environment as it did not match the terminologies in the study. In addition, smart mobility also saw the removal of two sub-characteristics, which are flexibility and affordability and integrated transportation system, while smart digital infrastructure dropped the sub-characteristic of data protection & cybersecurity measures. On top of that, the smart living characteristic was removed altogether from MSTF-Eco as none of its sub-characteristics matched or were included in smart tourism terminologies. As a result, MSTF-Eco identified 6 characteristics and 15 sub-characteristics based on smart tourism terminologies.

Table 7: Findings Characteristics and Sub-characteristics for MSTF-Eco (Case Studies)

Sub-characteristics		Characteristics	
SE-1	Productivity Performance	SE	Smart Economy
SE-2	Innovation Creations		
SE-3	Competitiveness & Attractive Investment		
SEV-2	Sustainable Resource Management	SEV	Smart Environment
SEV-3	Readiness Towards Resilience		
SEV-4	Green Lifestyle		
SP-1	Community Empowerment	SP	Smart People

SP-3	Quality of Life		
SG-1	Open Data & Information Disclosure	SG	Smart Government
SG-2	Inter-Governmental Data Sharing		
SM-1	Seamless & Efficient Connectivity	SM	Smart Mobility
SDI-1	Technological Innovation	SDI	Smart Digital Infrastructure

Source: Primary data: Content Analysis (2020)

Literature review on case studies found that the characteristics of smart economy and smart government can adopt all their sub-characteristics from the Malaysia Smart City Framework in MSTF-Eco. However, for the smart environment characteristic, only sustainable resource management and readiness towards resilience were adopted to become a part of the interim sub-characteristics for MSTF-Eco. Meanwhile, the smart people characteristic only adopted community empowerment and quality of life as interim sub-characteristics. The characteristic of smart mobility also omitted a few sub-characteristics, namely flexibility and affordability and integrated transportation system, while the sub-characteristics of data protection & cybersecurity measures were dropped from the smart digital infrastructure characteristic as they were not found in the case studies of smart tourism practiced in other countries. In addition, the entire characteristic of smart living was deleted from MSTF-Eco as none of its sub-characteristics matched or are included in the case studies. As a result, MSTF-Eco identified 6 characteristics and 12 sub-characteristics based on case studies of smart tourism.

Table 8 shows that content analysis successfully identified 6 characteristics and 15 sub-characteristics after overlaying the content analysis result from literature reviews for both categories, which are terminologies and case studies. However, one of the characteristics from Malaysia Smart City Framework which is smart living was found to have no impact on smart tourism, and thus it was removed automatically from MSTF-Eco. In addition, the characteristics smart environment, smart mobility and smart digital infrastructure removed two sub-characteristics derived from Malaysia Smart City Framework to better suit MSTF-Eco.

Table 8: Overall Findings

<b>CONTENT ANALYSIS:</b>			
<b>Identification of Characteristics and Sub-characteristics for MSTF-Eco</b>			
<b>Sub-characteristics</b>		<b>Characteristics</b>	
SE-1	Productivity Performance		
SE-2	Innovation Creations	SE	Smart Economy
SE-3	Competitiveness & Attractive Investment		
SEV-1	Clean Environment		
SEV-2	Sustainable Resource Management	SEV	Smart Environment
SEV-3	Readiness Towards Resilience		
SEV-4	Green Lifestyle		
SP-1	Community Empowerment		
SP-2	Intelligent Human Capital	SP	Smart People
SP-3	Quality of Life		
SG-1	Open Data & Information Disclosure	SG	Smart Government
SG-2	Inter-Governmental Data Sharing		

SM-1	Seamless & Efficient Connectivity	SM	Smart Mobility
SM-2	Green Transportation		
SDI-1	Technological Innovation	SDI	Smart Digital Infrastructure

Source: Primary data: Content Analysis (2020)

## CONCLUSION

Content analysis has identified significant characteristics and sub-characteristics from Malaysia Smart City Framework and analyzed them based on theoretical literature review on tourism terminologies and global cases studies. In this study, the characteristic and sub-characteristics under smart living was removed from MSTF-Eco. Thus, MSTF-Eco can be introduced to management and planning policymakers to enhance tourism policies and strategies and reduce the current negative impacts affecting most tourism destinations.

## ACKNOWLEDGEMENT

This research has been carried out under the Fundamental Research Grant Scheme (FRGS/1/2019/WAB05/UIAM/02/1) provided by Ministry of Higher Education of Malaysia (MOHE).

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