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Model for Developing Five Key Pillars of Sustainable Tourism: A Literature Review

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Abstract. Tourism is one of the most important sectors that drive the national economic growth. There is a lot of research conducted on sustainable tourism. Furthermore, previous studies on tourism have been done by many researchers, yet there is no research that reviews the literature about the five key pillars of sustainable tourism development with three aspects of sustainable tourism, namely social-culture, economy, and environment. This research was conducted with the aim to review and map previous studies related to sustainable tourism and the key pillars of its development. With the mapping in descriptive statistical analysis, it is expected that the findings will provide information and fill the unfilled research gap as well as to suggest academic contribution to identifying the key pillars in developing sustainable tourism. Considering the large number of studies on sustainable tourism, this study focused on the five key pillars of sustainable tourism development, namely tourism attraction, accessibility, amenity, ancillary, and community involvement as well as the three sustainability aspects. Research mapping was done by classifying previous studies based on the five key pillars. The finding shows that there is a need to develop the model of all key pillars to support sustainable tourism. The model which is going to be developed can be based on simulation approach, such system dynamics model.

INTRODUCTION

Tourism is one of the fastest growing sectors and one of the driving forces of the economy of many countries in the world. Currently, tourism is not just a conventional concept in providing tourism activities, but also associated with sustainable development. Sustainable development has long been highlighted by many experts and the issue reappears in the World Commission on Environment and Development (WCED) or Brundtland Commission in 1987—which formulated the concept of economic development and its interconnection with the environment in the context of sustainable development. Sustainable development itself is a process of change in which the institutional changes, exploitation of resources, the orientation of technological development, and the direction of investments are made consistent with the future as well as the current needs [1]. The latest tourism realm developed today is more precisely leading to the concept of sustainable tourism. Sustainable tourism is developed to create added value in all aspects of tourism. In addition, sustainable tourism is a system of tourism development that can ensure sustainability or availability of natural resources, socio-cultural life, and the economy until the next generation. In essence, sustainable tourism can provide long-term benefits (both current and future benefits) to the local economy and social-culture without damaging the environment as well as to address the needs of visitors, the industry, and the community [2]. Based on the definition, it can be perceived that sustainable tourism involves three main aspects of social-culture, economy, and environment, which should be aligned each other. A lot of research has been conducted in sustainable tourism. However, not all of them discussed the aspects of sustainable tourism. Some studies involved one until two aspects in the discussion, but only few of the involved three aspects at once. In the social-cultural aspect, Dominguez-Gomez and Gonzalez-Gomez [3] analyzed stakeholder perceptions for developing sustainable projects, Campon-Cerro et al. [4] identified factors that contribute to the tourist loyalty for sustainable improvement competitiveness, Waligo et al. [5] built a framework for stakeholder involvement, and Amir et al. [6] discussed the resiliency of the rural communities in Malaysia with the help of the sustainability planning in rural tourism. In the economic aspect, Marais et al. [7] reviewed critical success in tourism related to finance, Cao et al. [8] modeled the

interdependence of tourism demand with the analysis of tourism import & export, Gross Domestic Product (GDP), Consumer Price Index (CPI), and other economy indicators, and Khan et al. [9] examined the impact of air transportation, travel on inbound and outbound tourism related to trading and economy indicators. In the environmental aspect, Tang et al. [10] proposed a factor decomposition model for analyzing carbon emission of tourism industry.

Moreover, two aspects of sustainable tourism were also combined in some studies, such as social-culture & economy, social-culture & environment, as well as economy & environment. In social-cultural and economic aspect, Balbi et al. [11] examined the strategies of adaptation to tourism demand changes, Merinero-Rodriguez et al. [12] reviewed the main contributions of relationships in tourism to guide future research agenda with explanatory analysis, Buonincontri et al. [13] managed the experience co-creation process in tourism destinations, and Khazai et al. [14] developed a framework for benchmarking and monitoring progress on disaster recovery. In social-cultural and environmental aspect, Lee and Hsieh [15] analyzed indicators of sustainable tourism, especially in the relationship between stakeholders and the environment. For economic and environmental aspect, Fu et al. [16] analyzed sustainable tourism industry, specifically in the economic and environmental indicators by using the system dynamics approach. Furthermore, Meng et al. [17] provided a comprehensive framework of carbon dioxide account for tourism and measured the total carbon emission of the tourism industry with the economic impact. Meanwhile, a lot of research has been conducted with three aspects of sustainable tourism, such as Polat and Hermans [18] proposed a model for sustainable tourism and involved three aspects of sustainability, Jovanovic and Ilic [19] analyzed three aspects of sustainability in term of an infrastructure component, Mai and O.J.H. [20], Zhang et al. [21], Janusz and Bajdor [22], as well as Lola et al. [23] provided an overview of system thinking approach and system dynamics model for sustainable tourism. However, although a lot of research focused on the three aspects of sustainable tourism and most of them used descriptive explanatory analysis, there has been little research proposing a model for sustainable tourism, such as system dynamics model built by Zhang et al. [21] and Lola et al. [23]. It can be concluded that there are still many chances to research and develop more detail models that include the three aspects of sustainable tourism.

To support and develop the sustainability of tourism, the five key pillars of sustainable tourism are required. According to Cooper et al. [24], there are four pillars to develop tourism sustainability, i.e., a) Attraction, b) Accessibility, c) Amenity, and d) Ancillary. However, UNWTO & UNEP [2] emphasized that sustainable tourism development needs the informed participation of all relevant stakeholders and communities to ensure wide participation and consensus building. It means that there is one additional key pillar in developing sustainable tourism, which is community involvement. Therefore, there are five key pillars based on Cooper et al. [24] and UNWTO & UNEP (2), i.e., a) Attraction, b) Accessibility, c) Amenity, d) Ancillary, and e) Community Involvement. Regarding those key pillars of sustainable tourism development, some studies have been conducted. Most of them focused on either one or some pillars. The amenity has been discussed in Mirabueno and Yujuico [25], while Amir et al. [6] analyzed community involvement in sustainable development. In addition, discussions of two until four pillars were conducted numerously, such as Rivera [26], Balbi et al. [11], Khadaroo and Seetanah [27], Marais et al. [7], Ukpabi and Karjaluoto [28], Meng et al. [17], Sedarati [29], and so on. Nevertheless, none of them discussed the five key pillars at once. Moreover, some studies in literature review did not discuss the sustainable tourism aspect with five tourism pillars simultaneously. Based on the research gap explained previously, there is a need to review researches according to their topics in sustainable tourism aspects, tourism pillars, and research methodology. Therefore, to fill the research gap, research on literature review about five key pillars to support sustainable tourism development simultaneously with three aspects of sustainable tourism (social-culture, economy, and environment). This research was conducted with the aim to review and map previous research related to sustainable tourism and the key pillar of its development by using descriptive statistical analysis. With the mapping, it is expected to provide research findings and position as well as to suggest an academic contribution for identifying the key pillars of sustainable tourism.

RESEARCH METHODOLOGY

The methodology used in this research, such as data collection, justification for framework classification, and identification of interest variables in the terms of sustainable tourism and its key pillars can be seen as follows:

a) Data Collection

Because this is a review of papers, a literature search was conducted to find publications on five pillars of tourism development and three aspects of sustainability separately. The keywords included in the search were

‘sustainable tourism’, ‘sustainable tourism development’, ‘tourism model’, and ‘tourism pillars’, which were usually appeared in the research title or abstract and within the text of the publication. The searches identified a total of 40 relevant publications published in 2008 to 2017, which were then selected and used for the purpose of analysis. However, for the year of the research, the data were centrally distributed over the years of 2014-2017.

b) Justification for Framework Classification

Based on the research objectives, all previous studies were classified according to relevancy, contexts, and similarity to the topic. This research classified them based on three classifications of framework, i.e., 1) Sustainability aspects, including social-culture, economy, and environment, 2) Five key pillars of sustainable tourism development, including attraction, accessibility, amenity, ancillary, and community involvement, and 3) Methodology based on qualitative and quantitative analysis and the model/framework of the research. By using this classification, the research mapping and position can be determined.

c) Identification of Interest Variables

This research mapping also presents the identification of interest variables which were related to the topics. The identified variables contain the key indicators from each previous research. This will be useful for developing models of sustainable tourism by using identified key variables from previous studies. The identified variables are presented in Table 2.

RESEARCH FINDINGS

The main interest of this research was to draw a map of research position as the review of previous studies in terms of the model used to develop the five key pillars of sustainable development. Thus, based on the research methodology, previous studies were analyzed using statistic descriptive. The result of statistical distribution can be seen in the following analysis. Figure 1(a) represents the distribution of previous studies according to the year of research. From 40 publications between the years of 2008 and 2017, over 30 publications were published in 2014-2017. It means that the recent sustainable tourism becomes more popular to be investigated referring publications in the last three years. In this research, the methodology was classified into two groups, i.e., qualitative and quantitative approach. In addition, based on research methodology which can be seen in Fig. 1(b), over 55% publications are distributed using quantitative approach instead of qualitative approach. However, this proportion is not significantly different. Qualitative approach is still used as research methodology. Yet, Figure 1(b) does not show the relationship between the research methodology and the year of research. It does not represent which approach has been more popular currently to be used as an approach in sustainable tourism. This relationship will be explained in Figure 2.

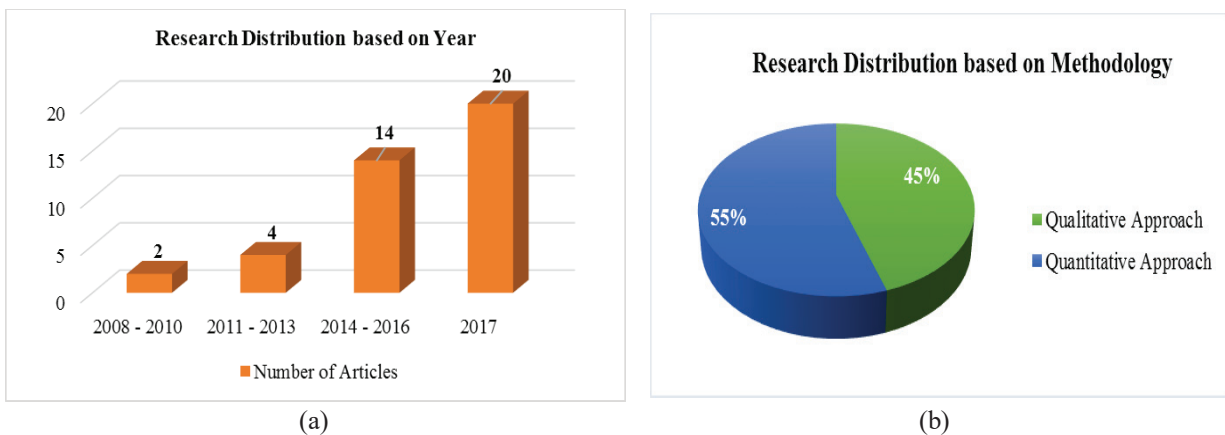


FIGURE 1. Distribution of Publication based on: (a) Year and (b) Research Methodology.

Meanwhile, Fig. 2 represents which approach has been more popular currently to be used as an approach in sustainable tourism. It explains the distribution of research methodology by year. In the last five years, it can be seen that quantitative approach has been increasing significantly. Otherwise, qualitative approach significantly increased since 2008 until 2016, but in 2017, the number of research using qualitative approach slightly reduced. This figure also shows that recently (in the last three years), quantitative approach is more preferable than qualitative approach. Nowadays, research methodology has shifted from qualitative into quantitative approach. Nevertheless, it does not

mean that qualitative approaches are no longer used for solving problems, especially in sustainable tourism. Both quantitative and qualitative approaches are still needed for solving general problem.

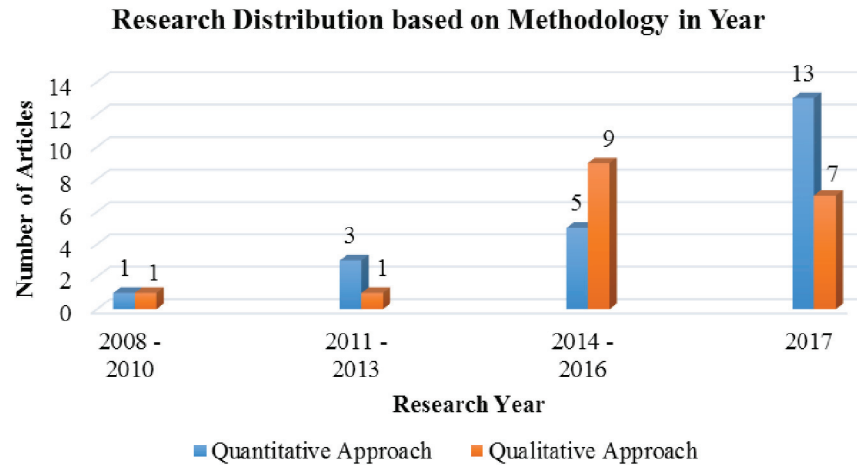


FIGURE 2. Distribution of Publication based on Methodology in Year.

As explained in the previous paragraph, the research methodology has been classified into two approaches, quantitative and qualitative. The quantitative approaches include mathematical, statistical, and simulation model. Meanwhile, the qualitative approaches include explanatory/theoretical framework, such as descriptive/explanatory analysis, analytic model, and explanatory model framework. The distribution of publications by methodology in specific and detail classification and analysis can be seen in Table 1.

Based on Table 1, the proportion of researchers using mathematical, statistical, and simulation model is, respectively, 20%, 20%, and 15%. Thus, the total proportion of researchers using quantitative model is 55%. Meanwhile, the researchers using qualitative method have 45% of proportion.

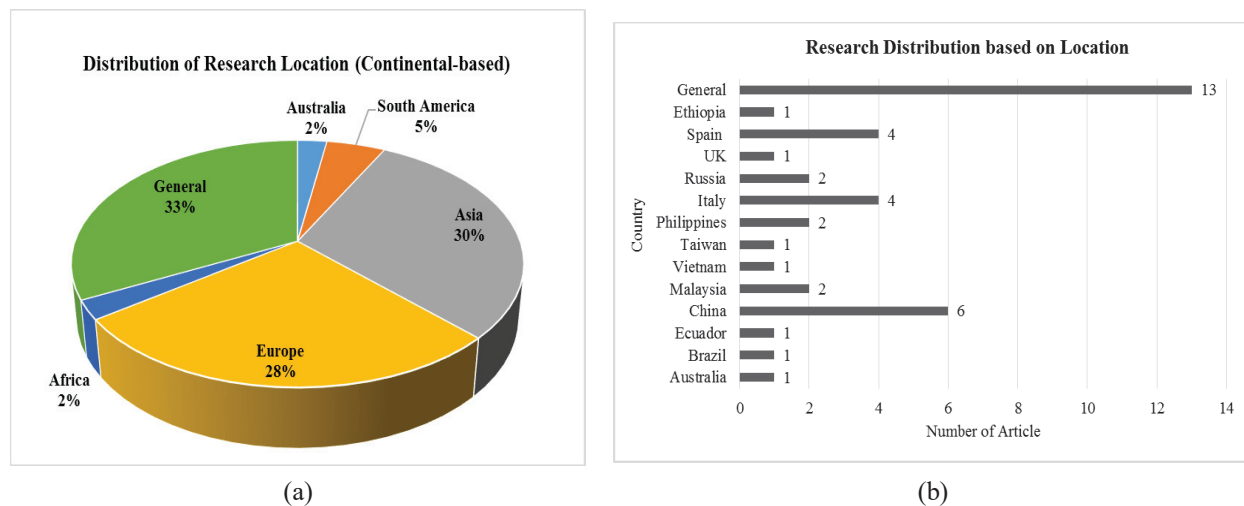


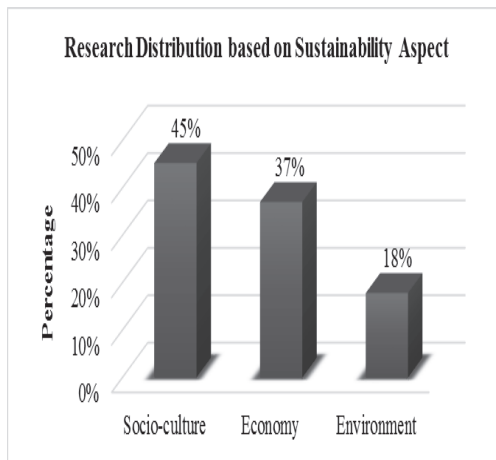
FIGURE 3. Distribution of Publication based on Location: (a) Continent and (b) Country.

The analysis of previous research is also reviewed based on location. The authors classified the research location into two categories, i.e., continental and country-based research. Figure 3(a) presents the distribution of publication in several continents, i.e., Australia, Asia, Europe, Africa, South America, and General. The classification ‘General’ means that some studies were conducted in several countries in some continents. Thus, the authors classified those researches in ‘General’. It is also the same for the Fig. 3(b) in which country informed as ‘General’. Based on Fig. 3(a), it can be seen that the top three of the continental-based research location is sequentially occupied by General

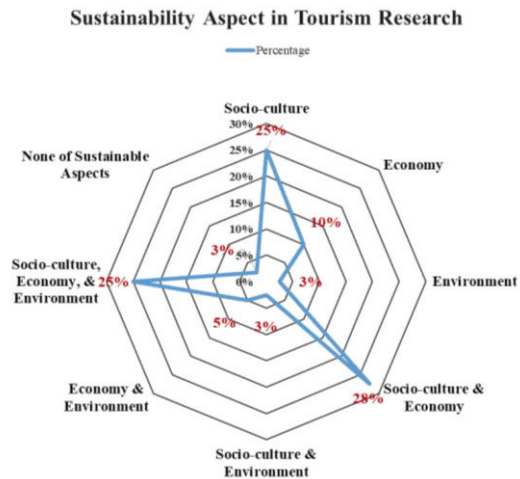
continent, Asia, and Europe. Meanwhile, in Figure 3(b), the top three of country-based research location is sequentially occupied by General country, China, Spain, and Italy in which Spain and Italy have the same number of research/publications.

TABLE 1. Classification of Research Methodology

Methodology		Classification	Number of Articles	Percentage
Quantitative Approach	Simulation Model	- Agent-Based Modeling	6	15%
		- System Dynamics & BP-Neural Network		
		- Co-integration Analysis (Error-Correction Model)		
		- Global Vector Autoregressive (GVAR)		
		- Partial Least Squares (PLS)		
	Statistical Model	- Principal Component Analysis (PCA)	8	20%
		- Q-Methodology (Pictorial-Statistical Analysis)		
		- Statistical Correlation Analysis		
		- Structural Equation Model (SEM)		
		- The Fuzzy Delphi Method		
	Mathematical Model	- Factor Decomposition Model	8	20%
		- Gravity Model Approach		
		- Horizontal Visibility Graph Algorithm (HVG)		
		- ISOST Index (Index of Tourist Sustainability)		
		- Weighted Sum Model		
Qualitative Approach	Explanatory/Theoretical Framework	- Overlapping Generations Approach (OLG)	18	45%
		- Mathematical Framework (Tourism Recovery Scorecard - TOURS)		
		- Tourism Satellite Account (TSA)		
		- Actor-Network Theory (ANT)		
		- Analytical Model		
		- Descriptive/Explanatory Analysis		
		- Explanatory Model Framework		
		- Qualitative System Dynamics Approach		
		- The Traffic Light Routes Framework		
		Total		



(a)



(b)

FIGURE 4. Distribution of Publication based on Sustainability Aspects in Tourism: (a) Proportion of Every Sustainable Aspects and (b) Detail Proportion of Combined Sustainable Aspects.

All selected previous publications were also reviewed based on one of the main interests of this research, which are the sustainability aspects of tourism. As explained in the background, the sustainability aspects are classified into three aspects of social-culture, economy, and environment. Figure 4(a) shows that sustainability aspects were generated by all previous publications without considering the aspects involved in the publication. Meanwhile, Fig.

4(b) explained more detail than Fig. 4(a). It presents the distribution of publications which were discussing only one, two or all aspects at once. From 40 publications, the highest rank of sustainability aspects is 28% of research discussing social-culture and economy simultaneously. Then, the second rank is 25% of research discussing only social-culture and similarly the 25% of research discussed three aspects of sustainability at once. In the third rank, 10% of research only discussed economic aspect. In addition, 5% of research discussed only economic and environmental aspects at once, 3% of research discussed only environmental aspect as well as 3% of research discussed social-cultural and environmental aspects at once. However, 3% of research discussed no sustainable aspects at all. Although some studies did not discuss all sustainable aspects, they discussed some key pillars of sustainable tourism development instead.

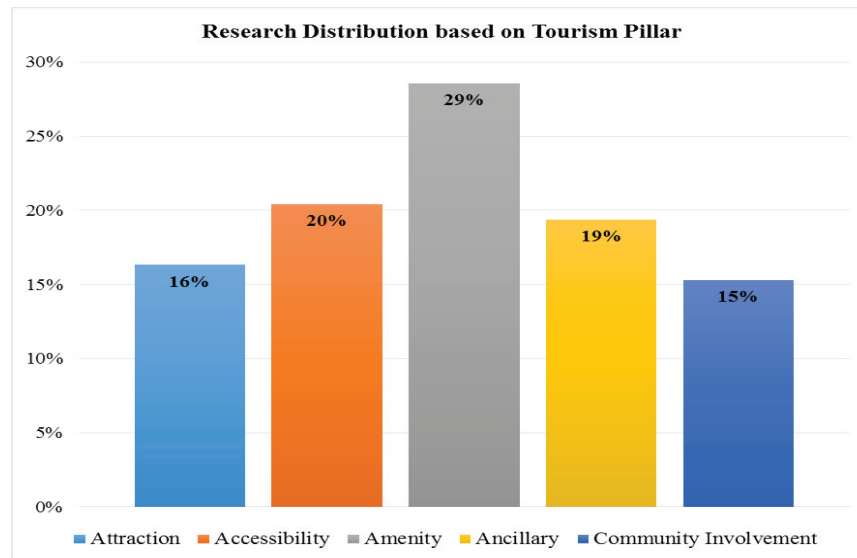


FIGURE 5. Distribution of Publication based on Five Key Pillars of Sustainable Tourism Development.

Figure 5 explains the distribution of publication based on the other main interests of this research, which is the five key pillars of sustainable tourism development. Based on the explanation in the background, the five key pillars of sustainable tourism development are tourism attraction, accessibility, amenity, ancillary, and community involvement. Tourism pillar which has the highest rank (shown by the number of publications which discussed the tourism pillars) is tourism amenity (29% of publications), then the next rank is consecutively followed by accessibility, ancillary, attraction, and community involvement. It means that a lot of research discussed the amenity as the key pillars of sustainable tourism. However, this figure does not show the proportion of combined tourism pillars in every research.

DISCUSSION AND CONCLUSION

Contributions of the Study

This study has reviewed 40 publications in the field of sustainable tourism related to the five key pillars of sustainable tourism development. The main interests of this research are the aspect of sustainability, five key tourism pillars, and the methodologies/models used in the literature. According to the purpose, this research aimed at providing research position and findings, which have been explained in the previous research findings as well as to suggest an academic contribution for identifying the key pillars in developing sustainable tourism. The detail review of literature in this research which can contribute to identifying the key pillars of sustainable tourism is presented in Table 2.

TABLE 2. Detail Review of Previous Research

No.	Author	Year	Research Objective	Research Location	Critical Variables/ Indicators/ Criteria	Methodology		Model/ Framework/ Theory	Sustainability Aspect			Tourism Pillar					Future Research
						Q u a l i t y	Q u a n t i t y		S o c i a l	E c o n o m i c	E n v i r o n m e n t a l	A c c e s s i b i l i t y	A c c e s s i b i l i t y	A m n e s i s	C o m m u n i t y	Com. Inv.	
1	Dominguez-Gomez, and Gonzalez-Gomez (3)	2017	To examine a range of stakeholders perceptions of the impacts of a golf-based tourism development in the south-west of Spain	Spain	Influential & non-influential stakeholder (Regional administration, council, hotels, developers, farmers, Resort association)	✓		Conceptual Model (Descriptive Explanatory Analysis)	✓					✓		✓	Future research can suggest to develop a diversity of point of view on the territory & its development as a 'smarter' methodological starting point for tourism projects which will be more sustainable than hitherto
2	Campón-Cerro et al. (4)	2017	To develop a better understanding of how destination loyalty is generated in rural tourism by identifying factors that contribute to this loyalty	Spain	Tourism satisfaction, destination loyalty, tourism marketing & management, tourism quality & image		✓	Partial Least Squares (PLS) and Structural Equation Model (SEM)	✓			✓		✓	✓		Future research needs to continue the understanding of loyalty to rural tourism destinations and sustainable ways to take advantage of tourism's socio economic benefits in rural environments
3	Waligo et al. (5)	2015	To build a framework which shows how stakeholders can be better involved in sustainable tourism	United Kingdom	Stakeholder involvement process	✓		The Traffic Light Routes Framework	✓							✓	The findings and applicability of the Traffic Light Routes Framework can be extended to different ST scenarios or non-UK cultural contexts
4	Amir et al. (6)	2015	To discuss the resiliency of the rural communities in Malaysia with the help of the sustainability planning in rural tourism	Malaysia	Culture of the community, the relationship with the authorities, the flexibility of the community and the environmental condition	✓		Descriptive Explanatory Analysis	✓							✓	Future research shall work into comprehensive model for sustainable development in rural tourism that comprises of local community resiliency elements & traditional sustainability concepts
5	Marais et al. (7)	2017	To identify the critical success factors of tourism industry by reviewing many literatures	General	Human resources, finance, customer relationship, marketing, maintenance, hygiene, information, policies	✓		Descriptive Explanatory Analysis	✓				✓	✓	✓		The future research is needed to develop better understanding about critical success factors and to fill the gap within this research topic
6	Cao et al. (8)	2017	To develop a global vector autoregressive (global VAR/GVAR) model to quantify the cross-country co-movements of tourism demand and simulate the impulse responses of shocks to the economy	China & 24 major countries	Tourism demand, tourism import & export, GDP, Consumer Price Index (CPI), exchange rates, Oil prices, Bilateral trade volume		✓	Global Vector Autoregressive (GVAR)	✓						✓		Future studies can continue to investigate from perspective of tourism supply & to explore the interdependent nature of the global tourism sector by applying time-varying parameter techniques to capture the changes in contemporaneous impact elasticity over time

TABLE 2. Detail Review of Previous Research (Continued)

No.	Author	Year	Research Objective	Research Location	Critical Variables/ Indicators/ Criteria	Methodology		Model/ Framework/ Theory	Sustainability Aspect			Tourism Pillar					Future Research
						Qualitative	Quantitative		Social	Environmental	Economic	Attractiveness	Accessibility	Amenity	Anticipation	Com. Inv.	
7	Khan et al. (9)	2017	To examine the impact of air transportation, railways transportation, travel and transport services on international inbound and outbound tourism	19 Countries	Inbound & outbound tourism; air transportation (freight, passengers); railway transportation (goods); passengers; trade, travel, & transport services		√	Principal Component Analysis (PCA) & panel Fully Modified OLS (FMOLS)			√			√	√		Future work is needed to develop appropriate policy tools for strengthening the international tourism infrastructure for the betterment of the peoples and for their livelihoods
8	Tang et al. (10)	2017	To propose a factor decomposition model for analyzing carbon emissions in energy consumption of the tourism industry from the perspective of tourism area life cycle	China	Carbon Emissions, Energy Consumption, tourism industry (transportation, accommodation, activity, catering, Architecture, road, commodity, and equipment), tourism area life cycle		√	Factor Decomposition Model (Mathematical Assessment)						√	√		Future studies are needed to explore other tourism destinations with special unique features in different types of tourism destinations, wider scope in indirect energy consumption and carbon emissions for the tourism industry, as well as long time span of study, and the use of input-output analysis on measuring total carbon emissions
9	Balbi et al. (11)	2013	To assess three hypothetical and contrasted infrastructure-oriented adaptation strategies for the winter tourism industry	Italy	Tourist arrivals, overnight stays, seasonality, expense, distance, revenue, cost of labor, cost of energy		√	Agent-Based Model	√	√		√			√	√	Further research can include the possibility of making supply endogenous to the model that would change the scope of this work from testing hard-coded strategies to observe the evolution of the destination supply structure
10	Meriner o-Rodriguez et al. (12)	2016	To identify the main lines of research developed in the field and to analyze the main contributions and make a series of proposals to guide the future research agenda	General	Social sciences, community approach, tourism system, stakeholder approach, tourism cluster, tourism networks		√	Descriptive Explanatory Analysis	√	√		√				√	Further work is also needed to provide greater clarification regarding the effect of relationships on the tourism phenomenon or event analyzed & the relational effect on the reality of tourism in clear terms of improvement or deterioration
11	Buoninconti et al. (13)	2017	To investigate the main antecedents and consequences of experience co-creation in tourism.	Italy	Experience co-creation in tourism, tourist interaction & participation, tourist satisfaction, expenditure level, happiness, experience sharing		√	Structural Equation Model (SEM)	√	√		√	√		√		Future studies may identify and consider other stakeholders, focus on the role of smart technology in experience co-creation, investigate if there are different levels of prior knowledge of the destination
12	Khazai et al. (14)	2017	To develop a methodological framework for the Tourism Recovery Scorecard (TOURS)	Philippines	Tourist safety, physical recovery, business recovery		√	Methodological Framework (Tourism Recovery Scorecard - TOURS)	√	√		√	√	√			Further work can be conducted to establish the best way of communicating recovery to tourists contemplating a holiday in a resort recovering from a disaster

TABLE 2. Detail Review of Previous Research (Continued)

No.	Author	Year	Research Objective	Research Location	Critical Variables/ Indicators/ Criteria	Methodology		Model/ Framework/ Theory	Sustainability Aspect			Tourism Pillar					Future Research	
						Qual.	Quant.		Social.	Economic.	Env.	Att.	Acc.	Man.	Env.	Com. Inv.		
13	Lee and Hsieh (15)	2016	To identify and assess indicators for sustainable wetland tourism	Taiwan	Stakeholders (tourist, resident, for-profit organization, government, and NGO) & environment (loss of renewable resources, rate of ecosystem degradation, environmental impact of tourism activity)		√	The fuzzy Delphi method & the analytic hierarchy process (AHP)	√		√					√	√	Future studies shall conduct similar surveys on the sustainable development of various nature-based tourism destinations in various countries to capture international and multicultural perspectives, as well as should develop a practical procedure (a long-term monitoring system)
14	Fu et al. (16)	2011	To study the sustainability for the development of tourism industry	China	Tourists, tourism facility, environment impact, government income		√	System Dynamics		√	√	√			√	√		Further research is to develop the created model into deeper and wider scope of sustainable tourism and required the validation & verification
15	Meng et al. (17)	2017	To provide a comprehensive framework for a national tourism carbon dioxide account using the top-down method to measure total carbon emission of tourism industry	China	Carbon Emissions (direct-indirect carbon), Energy Consumption, tourism industry (transportation, sightseeing, accommodation, food, shopping, entertainment, post & telecommunication)		√	Tourism Satellite Account (TSA), Recommended Methodological Framework (RMF)		√	√	√	√	√	√			Reliability, validity and regular inspection of the measurement method are needed in future
16	Polat and Hermans (18)	2016	To build a model of SAT that will help to understand how disabled people can intensively join in tourism activities and have the highest level of experience	General	a) At macro-level: the relationship between governments, intergovernmental organizations and NGOs. b) At micro-level: sustainable accessibility factors at the destination and travel restrictions/advantages per mode	√		Explanatory Model Framework	√	√	√			√	√		√	There is a need to have more studies about accessible tourism. This research needs to create broader and detailed sustainable accessible tourism criteria
17	Jovanovic and Ilic (19)	2016	To analyze the correlation between tourism competitiveness and the level of tourism infrastructure	Southeast Europe (SEE)	Tourism competitiveness, environmental infrastructure, social infrastructure, transport infrastructure		√	Statistical Analysis (Correlation Analysis)	√	√	√			√	√			This research only focuses on tourism infrastructure, no further explanation about other tourism pillars. It needs develop research in wider tourism pillar.

TABLE 2. Detail Review of Previous Research (Continued)

No.	Author	Year	Research Objective	Research Location	Critical Variables/ Indicators/ Criteria	Methodology		Model/ Framework/ Theory	Sustainability Aspect			Tourism Pillar					Future Research
						Qualitative	Quantitative		Social	Economic	Environmental	Attractiveness	Accessibility	Management	Finance	Com. Inv.	
18	Mai and O.J.H. (20)	2010	To provide an overview of the systems thinking approach and its application	Vietnam	Infrastructure, pollution, natural resources, social demography (educational quality, skilled labor, welfare), tourism satisfaction, tourism attractiveness	√		Qualitative System Dynamics Approach	√	√	√	√		√		√	This research requires further explanatory research, empirical examination of the author's model, and should consider applying qualitative approaches in systems dynamics modeling for testing and validation
19	Zhang et al. (21)	2015	To employ a non-linear dynamic evaluation method to assess the tourism sustainability of Tibet Autonomous Region (TAR)	China	Tourism resources stock, pollution stock, resident's tourism cognition, tourism innovation ability, accessibility, public service investment		√	System Dynamics & BP Neural Network	√	√	√		√		√	√	Future research shall pay serious attention to the issue of climate change and tourism
20	Janusz and Bajdor (22)	2013	To completely describe the term of "sustainable tourism"	General	Resource efficiency, Environmental purity, economic viability, employment quality, social equity, cultural richness, community wellbeing	√		Descriptive Explanatory Analysis	√	√	√						The future work is needed to explore the managerial implication of the framework in this research and to develop real strategy to achieve sustainable tourism
21	Lola et al. (23)	2017	To analyze the dimensions of the socio-economic and environmental impacts of ecotourism	Malaysia	Infrastructure, job opportunity, tourist activity, environmental pressure, sustainable management strategies, conservation, socio-economics		√	System Dynamics	√	√	√			√	√		Further research shall develop the created model into deeper and wider scope of sustainable tourism and to perform validation & verification the model itself
22	Mirabueno and Yujico (25)	2014	To analyze how to surmount obstacles to beneficial collaboration linking tourism with road infrastructure (road network)	Philippines	Government agencies, tourism infrastructure, tourism roads, public innovation	√		Analytical model	√					√			Further works is needed to explore the relationship between road network for tourism and other aspects which have key role in supporting tourism development
23	Rivera (26)	2017	To assess the dynamic relationship between human development, economic growth, and tourism in Ecuador	Ecuador	Quality of life, Tourism arrivals, Human development, Economic growth		√	Co-integration Analysis (an error-correction model)	√	√					√	√	Future studies shall consider to evaluate the impacts of tourism by considering the different market segments or assessing tourism's impact on poverty in rural and urban areas

TABLE 2. Detail Review of Previous Research (Continued)

No.	Author	Year	Research Objective	Research Location	Critical Variables/ Indicators/ Criteria	Methodology		Model/ Framework/ Theory	Sustainability Aspect			Tourism Pillar					Future Research
						Q	Q		S	E	E	A	A	A	A	Com.	
						u	u		o	c	n	t	c	m	n	Inv.	
						a	a		-	-	v	-	-	-	-		
24	Khadaro o and Seetana h (27)	2008	To evaluate the importance of transport infrastructure in determining the tourism attractiveness of destinations	28 Countries	Transport infrastructure, tourism arrival, income of origin, relative prices, distance, proximity		√	Gravity Model Approach	√	√		√	√	√			Independent analysis should be undertaken at each country's level to investigate the relationship between transport capital & tourism further
25	Ukpabi and Karjaluto (28)	2017	To review studies on consumers' acceptance or adoption of e-tourism in order to synthesize models and frameworks used and identify the antecedents influencing consumers' e-tourism acceptance and usage	General	Consumer Adoption of Web-Based Services in Tourism (CAWST), Consumer Adoption of Social Media in Tourism (CASMT), Consumer Adoption of Mobile Information Services in Tourism (CAMIST)	√		Descriptive Explanatory Analysis	√				√	√			The next research shall be focused on the factors influencing the adoption of these mobile technologies and shall incorporate YouTube, Delicious, Digg, and Lonely Planet into the literature on social media in tourism as well as wider area scope in the emerging markets
26	Sedarati (29)	2015	To assess the implementation of the System Dynamics method in the tourism industry	General	Accommodation, Food & beverage, transportation, cultural activities, sport & recreation, Retail Trade in tourism	√		Descriptive Explanatory Analysis	√			√	√	√	√		Further research is to develop the system dynamic model based on the criteria which are classified in this research
27	Andrade s et al. [30]	2017	To discuss issues that have affected and that will continue to affect tourism in Russia	Russia	Human resources & labor market, tourist service infrastructure, travel & tourism, business environment, price competitiveness, ICT readiness, safety & security, environmental sustainability, natural resources, cultural resources & business travel, port infrastructure	√		Descriptive Explanatory Analysis	√	√	√	√	√	√			Future work is needed to bridge gaps and find opportunities to collaborate with Russian partners to investigate tourism in Russia
28	Truonga and Shimizu [31]	2017	To review the application of computable general equilibrium (CGE) models in empirical studies assessing the impact of transportation factors on tourism	General	Economic element, tourism, and transportation	√		Descriptive Explanatory Analysis		√			√		√		Next research is needed to consider methodologies and techniques that consider previously unincorporated variables, such as transportation accessibility factors

TABLE 2. Detail Review of Previous Research (Continued)

No.	Author	Year	Research Objective	Research Location	Critical Variables/ Indicators/ Criteria	Methodology		Model/ Framework/ Theory	Sustainability Aspect			Tourism Pillar					Future Research
						Q	Q		S	E	E	A	A	A	A	Com.	
						u	u		o	c	n	t	c	m	n	Inv.	
29	Amelung et al. [32]	2016	To argue that a full exploration requires the study of tourism as a complex socio-ecological system	General	Governance, Commerce, natural resources, transportation, cultural amenities, biodiversity, renewable energy, water, infrastructure, investment funds	√		Descriptive Explanatory Analysis	√	√	√			√	√	√	Future study is needed to synthesize ideas from many perspectives to develop an epistemological basis for tourism & to consider the adoption of the tools in problem identification & analysis across scales, industries & ecosystems
30	Garcia-Magariño [33]	2015	To provide a system that simulates how many tourists sign up for each tourist route considering some routes & tourists	Spain	Tourist route, tourism destination, type of tourist (group/individual)		√	Agent-Based Model	√			√	√		√		Next research suggests that ABSTUR could be extended in sets of routes of several cities and town in particular region and to predict the behavior of tourist & to be provided in more automated way
31	Yan et al. [34]	2017	To develop an operable, quantitative approach to measure the potential of heritage sites	China	Resource values and tourism development state (e.g.: awareness level, traditional style)		√	Mathematical model (Weighted Sum Model)	√				√	√	√		The model needs to be developed by considering some approaches to involve various respondents (local tourism scholars, travel agency professionals, and tourism officials)
32	Tegegne et al. [35]	2016	To investigate the destination image of Ethiopia in Japan	Japan - Ethiopia	Cultural distance, product competitiveness, infrastructure, economic stability, poverty, security, accessibility, political stability	√		Qualitative System Dynamics Approach	√	√		√	√	√			This research requires further explanatory research, empirical examination of the author's model, & shall consider applying qualitative approaches in systems dynamics modeling for testing and validation
33	Dedeke [36]	2017	To analyze and investigate a principal actor created a sustainable tourism business in Amazon forest	Brazil	Business/venture creation	√		An actor-network theory (ANT)	√	√					√	√	Future work can analyze more cases about other kinds of sustainable ventures to explore if the same phases of translation could be verified and explore different sectors & industries
34	Hardy and Pearson [37]	2017	To assess the alignment of individual stakeholders' attitudes against their traditionally with respect to sustainable tourism development	Australia	Stakeholder's attitude, Access, Accommodation, Infrastructure & Facilities, Visitor Experiences		√	Q-Methodology (Pictorial-Statistical Factor Analysis)	√				√	√		√	This next research shall assess the application of the Q methodology in tourism related stakeholder research in different cultures, & compare the opinions of tourists with stakeholders

TABLE 2. Detail Review of Previous Research (Continued)

No.	Author	Year	Research Objective	Research Location	Critical Variables/ Indicators/ Criteria	Methodology		Model/ Framework/ Theory	Sustainability Aspect			Tourism Pillar					Future Research
						Qualitative	Quantitative		Social	Economic	Environmental	Attitude	Aesthetic	Amenity	Access	Com. Inv.	
35	Aggreywah et al. [38]	2017	To evaluate a number of studies that have proposed a variety of indicator themes to identify commonality to move towards a more sustainable path	General	Job creation, business viability, life quality, water management & quality, waste management, energy conservation, maintenance of comm. Integrity	√		Descriptive Explanatory Analysis	√	√	√		√			√	The future work is needed to explore the managerial implication of the key indicators measured in this research and to develop real strategy based on core indicators to support sustainable tourism
36	Baggio and Sainaghi [39]	2016	To develop linear models in demand analysis focused on tourism demand turning points, disregarding the complex structure of tourism destinations	Italy	The number of nights spent in a destination by tourists (overnight stays)		√	Horizontal Visibility Graph Algorithm (HVG)				√		√			The future research can analyze new and different tourism systems in order to verify this research whether both phases and turning points remain the same or whether different outcomes can be found, as well as to deepen this type of analysis using more sophisticated techniques
37	Claveria [40]	2016	To analyze the interactions between tourism and economic variables in twenty emerging markets	20 Countries	Overnight visitors, Total expenditure, GDP, Occupancy rates, Expenditure per tourist, GDP, Human Development Index (HDI)	√		Descriptive Explanatory Analysis	√	√				√	√		Further insight can be focused on the contribution of tourism development to economic growth & also to compare the results with other new dimensionality reduction techniques such as self organizing maps
38	Stauvermann et al. [41]	2017	To propose a model for the demand for tourism in the context of a developing country	Developing Country	Human capital investment, agricultural sector, productivity growth, tourism sector (demand elasticity)		√	Overlapping Generations Approach (OLG)	√	√				√		√	Future research needs to explore the type of tourists who can expose a price elastic demand and the kind of tourism activities to optimize the revenue generated for broader economic development
39	Torres-Delgado and Palomeque [42]	2017	To tackle the primary problems facing sustainable tourism: the absence of any defined limits on sustainability in this sector and the difficulty of measuring sustainability	Spain	Tourist population, tourism product accessible to disabled, seasonality of tourism offer, public investment, energy & water consumption, waste generation		√	ISOST Index (Index of Tourist Sustainability)	√	√	√	√	√	√			The future work can implement the ISOST Index for the decision-making, management and planning of municipal tourism, not only because it is designed specifically for local managers, but also because it has been constructed on the basis of data available from official agencies
40	Soufivand [43]	2012	To build a model aiming at developing a tourism engagement based value co-creation mechanism and targeting to improve cultural heritage sector performance in terms of service delivery system	Italy	Co-creation (personalization, co-production), Tourist satisfaction, expected & perceived quality, tourist needs, investment, finance, human resources, investment policies, infrastructure & public service		√	System Dynamics	√	√		√		√	√	√	The future research can take into account to involving all the actors in cultural heritage sector in the model

Remarks: Qual. (Qualitative Analysis), Quan. (Quantitative Analysis), Soc. (Socio-Culture), Eco (Economic), Env. (Environment), Att. (Attraction), Acc. (Accessibility), Amn. (Amenity), Anci. (Ancillary), and Com. Inv. (Community Involvement).

Based on Table 2, the critical variables/indicators in previous studies can be identified as input variables for modeling the five key pillars of sustainable tourism development. The identification of critical variables is very helpful for modelers to build their conceptual or simulation model in their research. Moreover, based on the table, the research position by concluding that none of those studies has discussed all five key pillars of sustainable tourism at once is revealed. It can be evidenced by the absence of 'check' sign in each research which covers all tourism pillars simultaneously. Meanwhile, although some publications have discussed all aspects of sustainability, none of them is conducted on all aspects of sustainability with all five key pillars of sustainable tourism development. It also can be evidenced by the absence of 'check' sign in each research which covers all aspects of sustainability with five tourism pillars at once. Based on this analysis, it can be concluded that there are some research gaps which are needed to be filled by conducting further research.

In research methodology, only few studies have developed models in sustainable tourism. Moreover, there is no model is developed in previous studies that involved all aspects of sustainability and the five key pillars at once, especially using simulation models, such as system dynamics. In addition, for the research location, since the authors are from Indonesia, it can be seen from Table 2 that there is no research which has been conducted about all aspects of sustainability and five key pillars of sustainable tourism development using modeling approach, especially in Indonesia. It means that the Table 2 already presents the research gap and position in the field of sustainable tourism development by considering the five key tourism pillars.

Limitations and Future Research

We know that this research must have its drawbacks, such as the number of previous research can still be added in larger number in order to provide more in-depth analysis as well as the distribution of combined tourism pillars in every research is not graphically presented in the analysis. In addition, this research is only a literature review. Thus, this study only discusses about the review of previous research to look for the research gaps and its drawbacks which will become beneficial for further research. Hence, we do not discuss about the model that can be developed by using critical variables from previous studies.

Despite of the drawback of this research, it has contributed in providing the research gap and position in order to conduct research in the future. There are some topics that can be conducted by using this literature review. Based on Table 2, we can see the future research for every previous research. The future research can be conducted based on the analysis explained in the table. For example, future research can take into account the development of sustainable tourism model considering all aspects of sustainability and the five key pillars of sustainable tourism simultaneously. The modeling approach of sustainable tourism can use simulation model, e.g., system dynamics, by using some critical variables that have been identified in this study. Furthermore, research can also be conducted with the same topic by considering a case study in one of cities in Indonesia.

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