Economy-led sustainable touristic city: the case of Surakarta, Indonesia

Valid Hasyimi and Hossny Azizalrahman

Abstract

Purpose – *This paper attempts to examine drivers of tourism development by affording a framework that sustains economic growth and protects the local environment. It develops evaluative and predictive models to measure city performance. Further, a strategy-based model of low carbon cities (SMLC) is used to demonstrate possible tourism development scenarios. The model was applied to the city of Surakarta to operationalize city's transformation towards sustainability.*

Design/methodology/approach – *The research methodology is constructed on three interrelated components: theoretical framework, analytical methods and SWOT. First, the authors have initiated this study by an understanding of linkages between planning and tourism. Second, the SMLC has been used to test sustainable tourism in the city of Surakarta. Third, Strength-Weakness-Opportunity-Threat (SWOT) analysis was applied to formulize the recommendations.*

Findings – *When evaluated by the static SMLC model, the city of Surakarta was categorized as an unsustainable touristic city. However, when the dynamic SMLC was applied, the city of Surakarta was categorized as a sustainable touristic city under a high economy scenario. By reason of the methodological and analytical frameworks and the dynamic SMLC, the city of Surakarta could be promoted to a sustainable touristic city after applying opportunity-seeking strategy and policies.*

Practical implications – *The paper concludes with policy implications to realign city plan and support sustainable tourism development in the city of Surakarta.*

Originality/value – *This paper attempts to develop a framework for sustainable tourism as it operates in the city of Surakarta by (1) introducing the sustainable touristic city concept, (2) definition and characters, (3) evaluative and predictive models using the SMLC to measure city performance of the city of Surakarta and (4) rigorous and relevant insight into the magnitude of the benefits of tourism.*

Keywords *Sustainable tourism, Heritage city, Surakarta, Indonesia, Scenario-based model, Economy development*

Paper type *Research paper*

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Received 13 July 2020
Revised 16 November 2020
21 February 2021
Accepted 20 April 2021

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1. Introduction

As one of the fastest-growing industry in the world, tourism promotes local economic development, especially in developing countries. Regarding to the role as a driving force of economic development in developing countries, tourism promotes three important goals, following income generation, employment increase and foreign-exchange earnings. Tourism contributes to income distribution for local population due to tourist direct spending to local business, which is dominated by the bazaar economy or informal sector (Alam and Reddy, 2016).

At an individual level, this growth brings a negative effect to the socio-environment if the stakeholders do not have a proper policy measurement. A holistic planning and strong commitment from stakeholders has to be affirmed to reduce socio-environment pressure and increase resource efficiency (Pan *et al.*, 2018). The United Nations responded to this situation by adjoining the concept of sustainability to tourism development to reduce the negative impact of excessive tourism activities and promote green growth and social equitability (UNWTO, 2007).

Tourism inside a city can be promoted by the development of MICE (meeting, incentives, conference and exhibition), which could become a competitive advantage for a city provided that attractive tourist destinations offer new original cultural experience (Croes *et al.*, 2021). However, the impact on the vulnerable heritage area should be addressed by the government from the beginning (Lepp and Gibson, 2008). Urban development pressure like office and commercial buildings development and land-use change become a massive threat to heritage preservation.

Unfortunately, rapid growth in Surakarta's tourism sector has resulted in negative impacts on the environment (Bujdosó *et al.*, 2015). The development of hotels, restaurants and retails without proper land use control has threatened the habitat, residential areas and the city centre. Heritage dwellings that form one of the main attractions in the city centre are under enormous development pressure (City of Surakarta, 2015).

The environment as the major source of attraction can be endangered due to tourism growth if it is not supported with a proper plan. It should be protected to maintain its sustainability for further growth of tourism, hence economic development. Similarly with historical-cultural heritage, this is definitely important to preserve every element of heritage area to keep its originality and local value (Maksin, 2010). Regarding to sustainable tourism concept, the plan should address all aspects to minimize impact of tourism growth to cultural and social impacts, at the same time maximize the economic benefit for conservation and local communities (Su *et al.*, 2018). Supported by itself, economy growth will enable the municipality to develop better infrastructure and increase participation of local community in tourism development.

Most tourism development studies address planning, implementation and evaluation. However, there appears to be a gap in the mechanism to formulate a proper strategy to achieve sustainable tourism goal (Butowski, 2012). Performance measurement has become fundamental for policymakers and planners to make evidence-based decisions. The use of data allows cities to not only measure their performance but compare and benchmark themselves empirically against other international cities (Freeman, 2017). The theory and practice continue to evolve towards new global challenges and urban development paradigms. From time to time, city plans are reviewed, city targets revisited, policies reconsidered and procedures amended.

This research gives rigorous and relevant insight into the magnitude of the benefits of tourism, hence helping decision-makers to implement investment policies at the same time protect local interest. It evaluates and predicts future trajectories of current policies to realign city plans and proposes recommendations for the improvement of Surakarta's tourism. The scenario-based approach offers a systematic scenario building strategy using customization of value setting in each parameter, which overcomes a traditional scenario planning approach. It provides a flexible and open approach that considers multiple-strategy possibilities (Wulf *et al.*, 2010).

This paper attempts to develop a framework for sustainable tourism as it operates in the city of Surakarta by (1) introducing the sustainable touristic city concept (STC), (2) definition and characters, (3) evaluative and predictive models using SMLC (strategy-based model for low carbon cities) to measure city performance of the city of Surakarta and (4) rigorous and relevant insight into the magnitude of the benefits of tourism. This endeavour could help decision-makers to realign city plans and improve Surakarta's tourism.

2. Literature review

2.1 Tourism

Berno and Bricker (2001) divided tourism into three kinds of business: *Primary trades* (attractions, travel agencies, transportation, accommodation and restaurants); *secondary trades* (entertainment and leisure activities), *tertiary trades* (public sector services, fuel and manufacturing). It benefits in jobs, especially local businesses through a multiplier effect, restructuring local economies and stimulating infrastructure development. However, tourisms' cost is manifested in low paid seasonal jobs, congestion and expensive infrastructure that is

dependent on tourism's intensity. Moreover, the local economy becomes vulnerable to tourism's market changes (e.g. global crisis, natural disaster and pandemic). Therefore, the municipality must determine the tourism capacity and set a maximum number of visitors to avoid environmental degradation.

There is a conflict between the preservation of the environment and economic growth, primarily the result of extensive infrastructure to support mass tourism, for example, the construction of airports, roads, bridges and harbours, which requires many materials through natural resource exploitation (Bjork, 2001). Moreover, the economic growth that is caused by tourism will attract more people to live adjacent to tourism sites to get the advantage of employment creation, leading eventually to rapid urbanization. Building development should be regulated strictly to preserve the authenticity of the heritage site and its visual aesthetic, thus keep the environment at an adequate level of sustainability (Bowitz and Ibenholt, 2009). The spatial analysis of attraction is based on tourism resources and accessibility (Sousa and Martín, 2015).

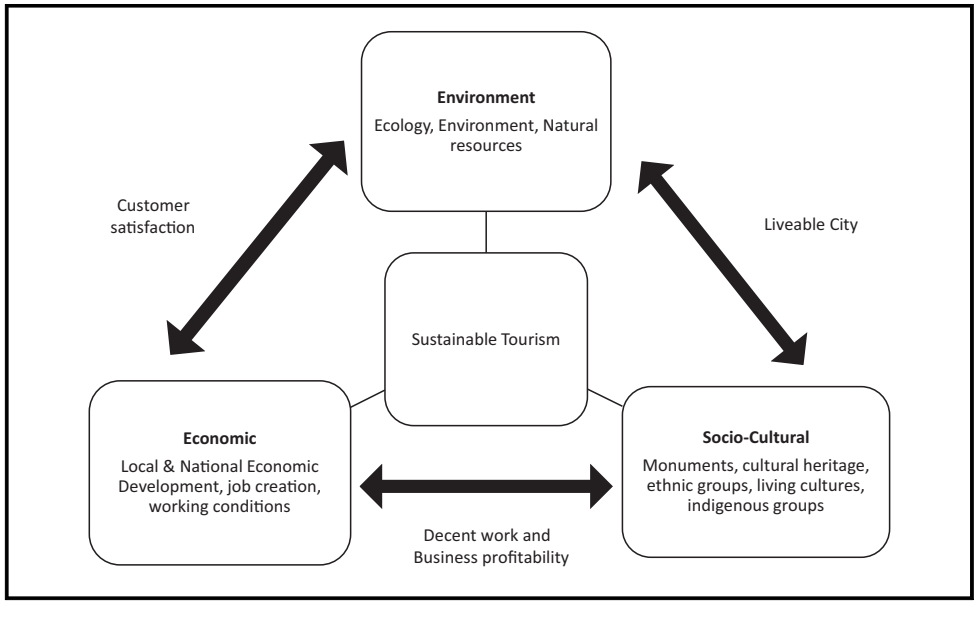
2.2 Sustainable tourism development

The definition of sustainable tourism is plausible and multi-faceted (Bramwell and Lane, 1993; Butler, 1993; Payne, 1993; Tosun, 2001). The United Nations World Tourism Organization (UNWTO) defines sustainable tourism as *tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of the visitors, industry, environment and host communities* (UNEP-WTO, 2005). Further, the UNEP-WTO (2005) established three dimensions of STD (economy, social and environmental) that must be affirmed in suitable balance to guarantee long-term sustainability (Figure 1).

The economic viability of tourism is contingent intensely on conserving the quality of the local environment. It is crucial to achieving a visitor's need and providing opportunities without sacrificing economic sustainability purpose.

The social sustainability has a strong correlation with the cultural richness of host communities, and it has a strong bearing on environmental aspects in terms of the built environment and cultural dimensions of society's interaction with nature. Preserving the cultural heritage-built environment,

Figure 1 Sustainable tourism development framework



respect the socio-cultural authenticity of host communities and contribute to inter-cultural understanding and tolerance.

Environmental resource management should be the primary goal for host communities. By conserving access to freshwater and preventing environmental degradation, some countries, such as Malaysia, were able to preserve natural resources and establish Tourism National Key Economic Areas that are designated to restrict touristic impacts.

2.3 Sustainable touristic city

The researchers view the sustainable touristic city as a city that has existing and potential tourism resources, city plan and development proposals, a strategy which accounts for economic, social and environmental impacts and meets the needs of present and future generations. The sustainable touristic city is part of sustainable tourism within the city area. It addresses five essential interacting factors: economy, social, environmental, infrastructure and municipal support (Figure 2).

Infrastructure construction for tourism might impact on vulnerable heritage area due to modernity. Municipal support in establishing an integrated approach to policy, regulation and tourism management and secure positive benefits is essential. Effective governance, policies, frameworks and tools need to be in place to plan to guide the development of sustainable tourism (Bramwell, 2015).

A limited set of indicators has been selected from UNWTO (2017a, b) to measure the performance of sustainable touristic cities (Table 1). The chosen indicators ought to correlate with urban development indicators, otherwise would be excluded. From this set of sustainable touristic city indicators, a selection of key indicators will be made in Section 4 to measure the city's performance.

The primary function of the government in a sustainable touristic city framework is to deal with city planning and regulation of development, land use planning, environmental protection, employment, provision of infrastructure and socio-economic services. A total of four elements appear to be operational in touristic cities: tourism development theme, stakeholders, municipal authorities and infrastructure. Development theme is usually translated into a city

Figure 2 Sustainable touristic city framework

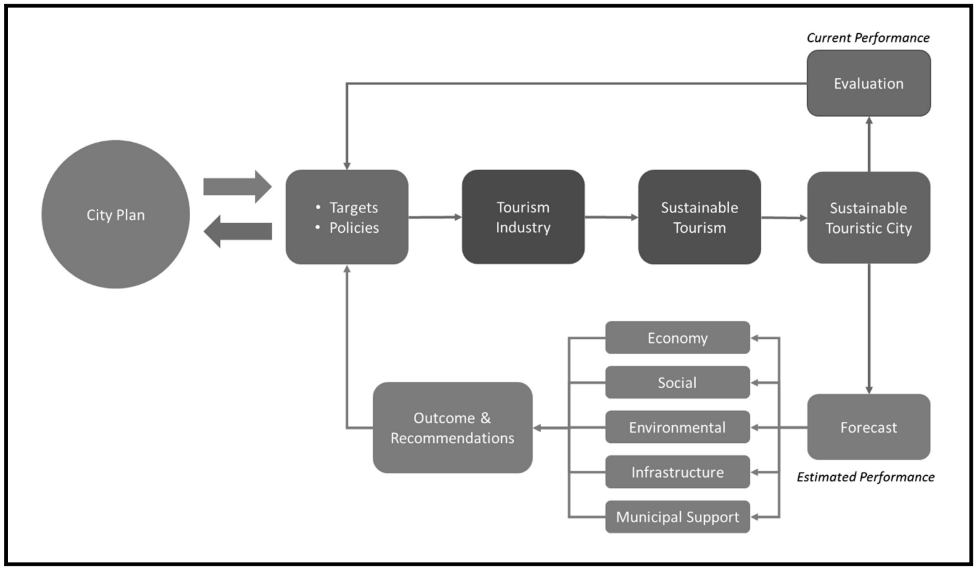


Table 1 Selected indicators of sustainable touristic city

Aspects	*Indicators*
Economic	Contribution of tourism to GDP
	Contribution of tourism employment to total employment in the city
	Hotel occupancy
	Duration of stay
Environmental	Land-use planning, including tourism
	The intensity of tourist usage
	Pollutant emissions
	Waste treatment
Social	Education
	A campaign about local identity
	Stakeholders involvement
	Sustaining population level
	Social-carrying capacity
Infrastructure	Access to the destination
	Public transportation
	IT support for operational and promotion
	Security, health and financial services
Municipal support	Financial allocation
	Tourism adoption in master plan
	Promotion and branding

branding to provide a clear planning direction and nurture a sense of belonging to society. With a multitude of actions, the municipality undertakes city plan formulation and policy implementation.

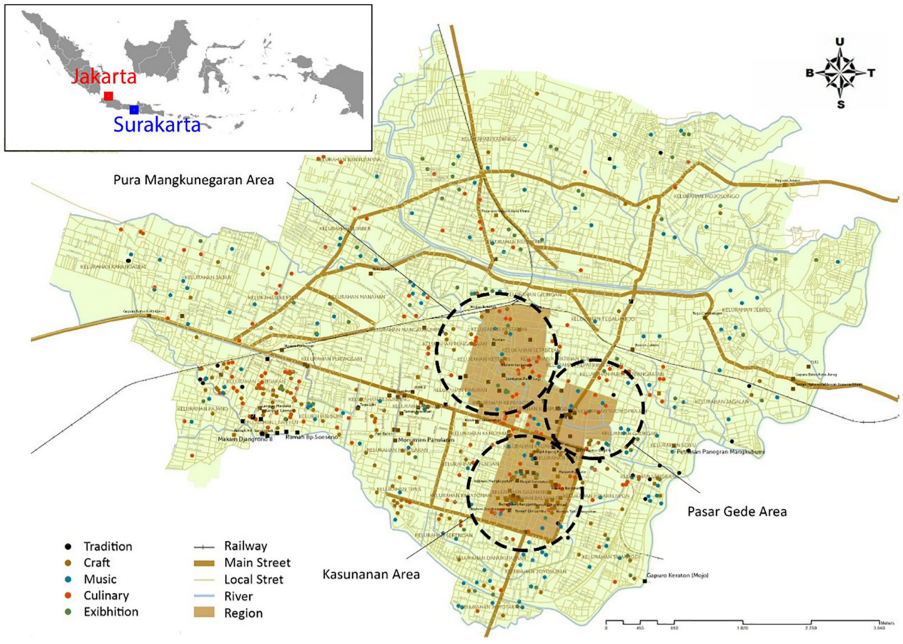
Implementation strategies for sustainable tourism development require cross-sectoral linkages, institutional and structural challenges faced by tourism sectors. The effective operations of the tourism economy largely depend on the institutional arrangements and structural frameworks within the entire socio-economic system (Demarco, 2016). To ensure broad participation and consensus building, the development of sustainable tourism requires strong political leadership, as well as the informed participation of all relevant stakeholders (UNEP-WTO, 2005). Synergies should be developed (among institutional networks, along with public–private–people participation). Collaboration among stakeholders can lead to an improvement in the tourism sector's performance (Pan *et al.*, 2018).

2.4 Tourism action plan in Surakarta

Tourism contributed 5.93% to the total gross domestic product (GDP) of Surakarta city in 2013. This proportion is estimated to grow to 6.6% by the year 2028 (Statistics of Surakarta Municipality, 2018). Moreover, the strategic location of Surakarta in the centre of interchange route between Central Java, Yogyakarta and East Java reinforces the competitive advantage of the city featured in good accessibility and transferability. Unfortunately, rapid growth in Surakarta's tourism sector has resulted in negative impacts on the heritage area. Heritage dwellings that form one of the main attractions in the city centre are under development pressure (City of Surakarta, 2015).

Based on the Decree of the Mayor of Surakarta No. 646/1–2/1/2013 and Municipality Law No. 5/1992, there are 69 buildings of cultural heritage (City of Surakarta, 2013). In addition to the area that has been established by the government of Surakarta, there are several other cultural areas mentioned in the book heritage Surakarta "Physical Traces of Solo City". The most attractive tourism destinations of Surakarta city are Kasunanan, Pura Mangkunegaran and Pasar Gede area (Figure 3). This area is the centre of Javanese culture, which requires majority concern to be conserved and restored. These areas contain museums, heritage buildings, indigenous villages and exhibition buildings.

Figure 3 Tourism priority areas in Surakarta city



Source(s): Action Plan Towards the Heritage City of Surakarta (2015)

The city of Surakarta is currently carrying out the vision of developing a town as the "Eco-cultural city". It is a guide for Surakarta city to develop strong cultural roots, economic independence, quality public space with a clean environment and adequate infrastructure. To realize the vision of the city, the development strategy of Surakarta city focuses on four components, namely ecology, inheritance, the economy and the structure for growth.

3. Methodology

The research methodology is constructed on three interrelated components, namely theoretical framework, analytical methods and SWOT. First, the authors have initiated this investigation by an understanding of sustainable tourism, urban planning and the linkages between planning and tourism to establish a definition and criteria of the sustainable touristic city, together with key performance indicators.

Second, the SMLC model of Hasyimi and Azizalrahman (2018) has been used to test sustainable tourism in the city of Surakarta. This model is twofold: a static model featuring direct input–output evaluation and a dynamic model exhibiting an input with multiple outputs, calculated according to particular strategies. The authors have applied the SMLC on tourism because of its contributory impact on carbon emissions. While the static model attempts to extrapolate current conditions, the dynamic model forecasts future trajectories.

Third, SWOT analysis was applied to frame the recommendations to inform Surakarta's city plan and tourism policies.

3.1 Static SMLC model

This assessment begins with data normalization which consists of two stages: (1) calculation of sustainable touristic city (STC) index and (2) calculation of score of each key performance indicator

(Azizalrahman and Hasyimi, 2018). The STC index ranges from −1 for the worst to 1 for the best performance. The calculation of data normalization can be seen in Eqs (1) and (2).

$$y_i = \frac{x_i - x_b}{max\ \{x_i\} - x_b} \tag{1}$$

$$y_i = \frac{x_b - x_i}{x_b - 0} \tag{2}$$

where y_i is normalized data of assessed object on i indicator, x_i is the original value of the object on ith indicator, $max\ \{x_i\}$ is the highest value in ith indicator and x_b is benchmark value of ith indicator. Whereas Eq. (1) is used for indicators with positive impacts on carbon emissions, Eq. (2) is used for indicators with negative effects on carbon emissions.
The calculation of the cumulative score of the proposed STC evaluation model is shown in Eq. (3).

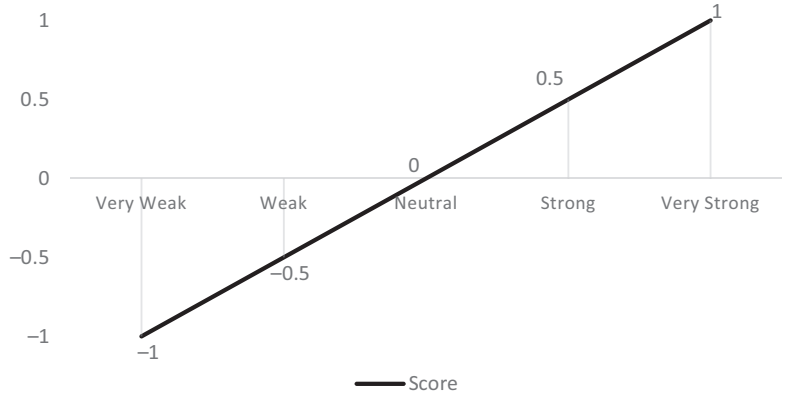
$$S_t = \sum_{c=1} \frac{(S_c \times w_c)}{6} \tag{3}$$

where S_t is the total score of the assessed city, w_c is the weight factor of c category and S_c is a total score of y_{ic} in cth that category. To calculate a cumulative STC index score, first, equal weight is applied to all key performance indicators (KPIs) by dividing it uniformly to six to ensure that they have equal importance. Moreover, this study has advanced the results of STC model by formulating a contrastive analysis of the position of tourism and defining the relation between tourism function and sustainable development in four categories: very weak, weak, strong and very strong (Figure 4).

3.2 Dynamic SMLC model

Based on the analysis of KPIs, the scenario building process is conducted. A model is proposed to assess the performance of a certain city, whether its scores over or under the benchmark. A total of four strategies are proposed consisting of different sets of scenarios for forecasting purpose: passive intervention, problem-solving, trend modifying and opportunity seeking. By using the calculation in Eqs (1)–(3), the cumulative score in each strategy is calculated to show under which method the score starts to be neutral (exceed 0), see Figure 5.

Figure 4 Classification of sustainable touristic cities



Source(s): Hasyimi and Azizalrahman (2018)

Figure 5 Strategies of sustainable touristic city model

First, the passive intervention strategy forecasts future output without any intervention whatsoever. Second, the problem-solving recognizes the indicator(s) which is still under 0 then chooses this as the development priority. Third, the trend modifying strategy seeks to induce changes based on the global trend. In this study, according to WTTC (2017b), the authors assume that the direction of tourism will grow approximately 3% annually. Fourth, the opportunity-seeking strategy addresses current tourism problems and put forth policies to try and tackle the issues. A case in point is economic development that tends to decline environment sustainability.

Built on scenarios of the economy, social and environmental, the strategies are divided into two different growth rates: low and high for each sector. The growth rate is built according to the studies of Fong (2009), Vaz *et al.* (2012) and Fang *et al.* (2018). When three sectors and two growth rates are combined, six scenarios will be formed (Table 2).

Before formulating a generic sustainable touristic city model, the KPIs were derived from UNEP-WTO (2005) and published research. First, a set of simple and available sustainability indicators were selected. Second, quantifiable indicators were used. This study uses the technique of Azizalrahman and Hasyimi (2018a) to normalize calculation of KPIs. In this research, the authors are considering two benchmarks to measure the performance of sustainable tourism city: first, international targets from research studies and credible international organization and second, a benchmark for each indicator according to the mean value of selected cities (GEF–World Bank, 2018).

The proposed method has calculated the current score of each target sector, economic, environmental and social to show which sector is under or over performing. Annual growth of 3% is assumed, the percentage which is similar to the projection of World Travel and Tourism Council (WTTC). In total, six KPIs were selected, and benchmarks were calculated (Table 3). A set of simple quantifiable indicators from the above were used to build a generic sustainable touristic city model. Two types of benchmarks were considered: Targets set out by credible international organizations, such as UNWTO and UNEP, and a benchmark for each indicator calculated from the mean values of pilot cities.

4. Results

4.1 Static SMLC model

The result of the application of static STC model to the city of Surakarta can be seen in Table 3. Based on the evaluation score (−0.197), which, according to the sustainability scale of this study,

Table 2 Scenarios of sustainable touristic city development

KPI	*Symbol*	*Effect*	*Economy*		*Social*		*Environmental*	
			Low	*High*	*Low*	*High*	*Low*	*High*
Intensity of tourist use	I_1	+	+10%	+20%	−25%	−50%	−10%	−20%
Pollutant emissions	I_2	−	−5%	−10%	+5%	+10%	+25%	+50%
Contribution of tourism to GDP	I_3	+	+5%	+10%	−5%	−10%	+5%	+10%
Employment contribution	I_4	+	+5%	+10%	−5%	−10%	+5%	+10%
Hotel occupancy	I_5	+	+5%	+10%	−5%	−10%	−5%	−10%
Social-carrying capacity	I_6	−	−10%	−20%	+10%	+20%	+10%	+20%

Source(s): Hasyimi and Azizalrahman (2018)

Table 3 Result of the application of static STC model to Surakarta city

Indicators	*Code*	*Parameter*	*Benchmark*	*Data*	*Score*
Daily intensity of tourist uses	I_1	Total tourists per unit area	89.41 tourist/km/day	4.76 tourist/km/day	−0.366
Pollutant emissions	I_2	Level of CO_2	2.19 ton/capita	2.03 ton/capita	0.073
Contribution of tourism to GDP	I_3	Percentage of GDP attributable to the activities of Hotels and Restaurants	10.4%	5.93%	−0.269
Employment contribution	I_4	Percentage of the employee in the tourism sector to the total volume of employment in the city	9.9%	1.3%	−0.585
Hotel occupancy	I_5	% average room used	71.23%	49.02%	−1.000
Social-carrying capacity	I_6	Ratio of tourist to locals	4.5%	14.87%	0.968
Total score					−0.197

suggested that the city is not sustainable. From the list of six KPIs, four indicators have underperformed: the daily intensity of tourist use, contribution to GDP, employment contribution and hotel occupancy due to the following scores (−0.366), (−0.269), (−0.585) and (−1.000). On the other hand, social carrying capacity has scored (0.968), a figure that falls beyond the benchmark of 0.5 on the scale of sustainability. Likewise, the pollutant emissions level has scored (0.0731) because Surakarta is a small town with limited traffic demand and industrial activities.

4.2 Dynamic SMLC model

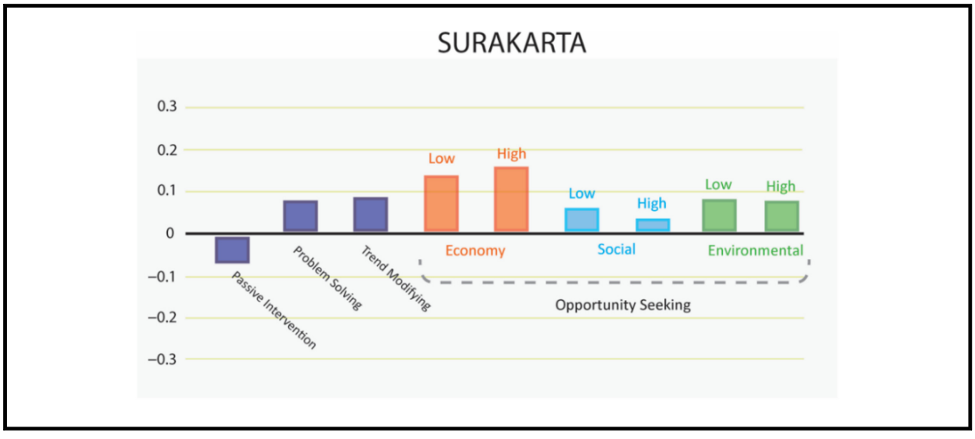
The result of the application of dynamic STC model to the city of Surakarta can be seen in Table 4. Under a passive strategy, Surakarta has underperformed and therefore cannot be considered a sustainable city. It must be recalled, however, that the passive intervention strategy does not adopt any measures to tackle the current problems of tourism. However, under the strategy of (1) problem-solving, (2) trend modifying and (3) opportunity seeking, the city performs well and can be considered sustainable due to the achievement of the corresponding scores: (0.080), (0.084) and (0.157). Future tourism policy should focus on the economic scenario, the predictive score of which is (0.157). Based on this scenario, an increase of 5% of GDP contribution to tourism in the city of Surakarta would lead to a 5% rise in employment and 21% in hotel occupancy. Accordingly, municipal authorities can focus their efforts on the economy and employment. Figure 6 presents the graphical illustration of Table 4.

To visualize sectors and indicators, the investigators have proposed metrics for touristic cities. This was obtained by rotating the sustainable touristic city performance scale around its *x*-axis.

Table 4 Result of the application of dynamic STC model to Surakarta city

				Opportunity seeking		
KPI	*Passive intervention Result 1*	*Problem- solving Result 2*	*Trend modifying Result 3*	*Economy*	*Social*	*Environment*
					Result 4	
I_1	−0.354	−0.336	−0.313	−0.298	−0.349	−0.327
I_2	0.342	0.342	0.342	0.276	0.408	0.671
I_3	−0.259	−0.050	−0.050	0.007	−0.108	0.007
I_4	−0.553	−0.401	−0.401	−0.374	−0.429	−0.374
I_5	−0.570	0.000	0.000	0.412	−0.412	−0.412
I_6	0.929	0.928	0.928	0.921	0.942	0.935
Total	−0.078	0.080	0.084	0.157	0.009	0.083

Figure 6 Graphical result of the application of dynamic STC model in the city of Surakarta



In total, four zones are constructed: very weak, weak, neutral, strong and very strong. Zones were then divided into six sectors (intensity of tourist use, pollutant emissions, contribution to GDP, employment contribution, hotel occupancy and social capacity) representing key performance indicators. By plotting and connecting scores, the STC metrics could be had. The authors have applied sustainability metrics, the graph of which confirms that tourism development that is centred on the economy improves the performance of all indicators (Figure 7).

Figure 7 STC metrics for the city of Surakarta

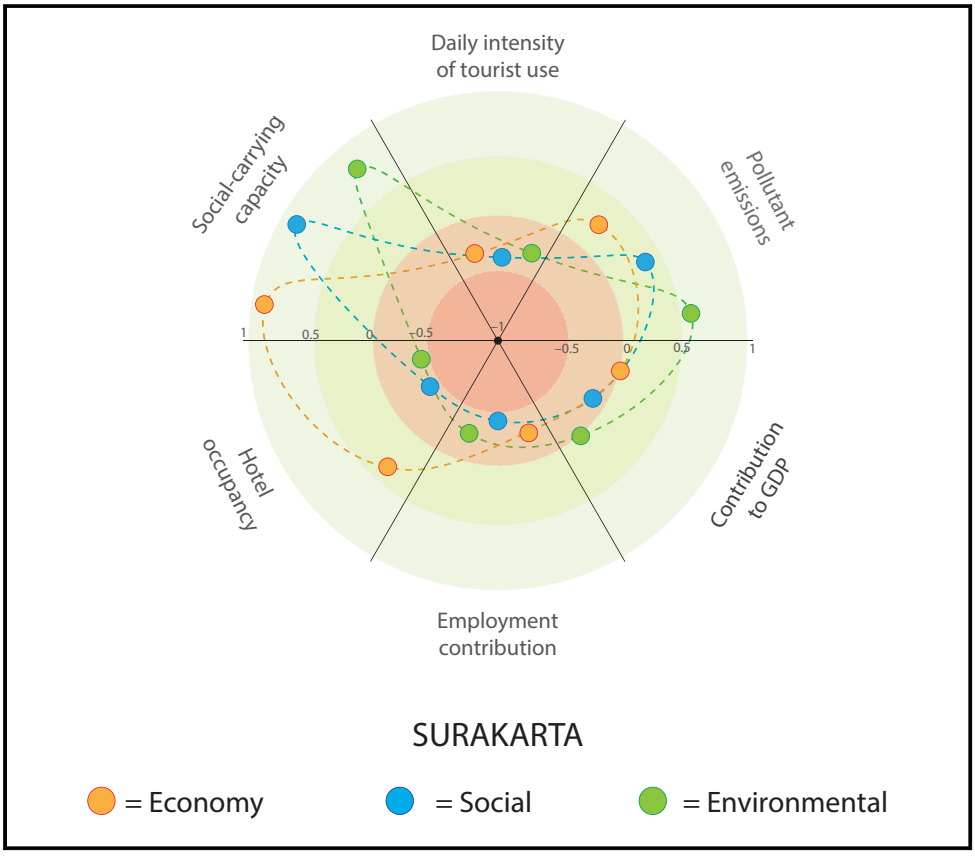


Figure 7 shows key indicators, the daily intensity of tourist use, pollutant emissions, contribution to GDP, employment contribution and social carrying capacity are relatively similar to low social and high environmental scenarios. However, when indicators are measured under a high economy scenario, the performance in the hotel occupancy goes far beyond the social and environmental scenarios and eventually, sustainable tourism.

4.3 SWOT analysis

This section seeks to discuss policy implications that could direct the development of Surakarta to a sustainable touristic city. Implications are greatly influenced by KPIs, namely the daily intensity of tourist uses, pollutant emissions, the contribution of tourism to GDP, employment contribution, hotel occupancy and social carrying capacity. SWOT analysis was used to identify and then formalize the strategies and directions to realize sustainable tourism (Figure 8). It must be noted, however, that this vision is in line with the city's master plan with emphasis on tourism as a driver for vision realization.

The components of SWOT were examined to frame recommendations that relate to tourism strategies (Falcone, 2019). According to *Strength-Opportunity*, it suggests that the municipality should push Surakarta's inherent strength, especially cultural assets and its strategic location for investment. It also recommends that cooperation within Surakarta and its surrounding areas would enhance connectivity through the integration of public transportation system. By recognizing *Threat-Opportunity*, it suggests increasing the quality of local human resources through intensive training in communication and hospitality.

Under *Threat-Strength*, the municipality should increase the support by formulating relevant regulations and operationalizing action plan to strengthen education, local character, tour packaging, Internet marketing and social media. *Threat-Weakness* would initially establish Surakarta city branding as a touristic city and nurture a sense of belonging in the heritage area. It also provides the municipality with a clear strategy and action plan to differentiate between built-up

Figure 8 SWOT analysis of Surakarta

INTERNAL / EXTERNAL	**Strength** - Strategic location. - Center of Java culture. - Numerous cultural events. - Professional local artists. - Local participatory program. - Good infrastructure and accessibility.	**Weakness** - Lack of awareness of the local people. - Insufficient commitment from Surakarta municipality. - Lack of promotion strategy. - Human vandalism. - Rapid urban development.
Opportunity - Regional Infrastructure development. - Business Investment. - Support from Province and National Government.	**Strength-Opportunity Strategy:** - It is pushing its inherent strength, especially cultural assets and strategic location for investment. - Increasing integration of public transportation. - Establish regional cooperation.	**Weakness-Opportunity Strategy:** - Increase the quality of local human resources.
Threat - Travel warning. - Competition with other tourism destinations.	**Strength-Threat Strategy:** - Spread messages to international communities. - Synergy between business and heritage conservation. - Clear strategy and action plan. - Support from all stakeholders - Cooperation between travel agencies. - Increase brand image.	**Weakness-Threat Strategy:** - Strengthen education in local culture and tradition. - Increase municipal support through regulation and action plan. - Tour package promotion within a regional tourism destination.

Source(s): Adapted from Suprapto, 2005 and Dewi *et al*., 2010

and heritage area. An increase in the economic benefit of tourism development requires robust marketing strategy to spread messages to the international community that Indonesia is safe and friendly to tourists.

5. Discussion

Sustainable tourism affects long-term profitability by reforming policy, institutional and regulatory conditions that govern business activity (UNWTO, 2017b), as well as through well-tempered price policies and diverse products. Practice guidelines and regulations should be proposed in accordance with national visions and legislation. For instance, promoting the foreign direct investment (FDI) could effectively improve market awareness, economic stability, quality control, skill/knowledge levels and technology transfer. Moreover, the provision of adequate economic instruments from the government can enhance public investment and finance of sustainable tourism. Financial mechanisms, such as incentives, eco-taxes and charges from tourists, can motivate the private sector to change their operations towards sustainability (World Tourism Organization, 2017). Strategies should seek the economy-led strategy to promote the city of Surakarta's to a sustainable touristic destination.

5.1 The daily intensity of tourist uses

Information, education and promotion are viewed as essential elements to sustain heritage sites in the city of Surakarta. This effort can be carried out as a campaign to increase local participation in preservation. When the current performance of the city of Surakarta is measured with static STC model, the result is weak (−0.366), with a daily intensity of tourist use (4.76 tourists/km/day), compared to the benchmark (89.41 tourists/km/day). However, the city's performance using the dynamic STC model is higher (−0.298) with the daily intensity of tourist use (20.39 tourists/km/day). The score is still undesirable due to a larger gap between the current condition and target. Pedersen (2002) believes that by advancing the campaign strategy, the quality of its content and implementation plan would become more effective and efficient towards the sustainable touristic city goals. Surakarta 2011–2031 master plan calls for the execution of the following strategy (City of Surakarta, 2012):

1. Identification of potential and distance of each tourism spot together with its mobilization network and facilities;
2. Strengthening the branding strategy, rejuvenating heritage assets and increasing cultural event and festival programs;
3. Improving integration of city infrastructure to support tourism activities;
4. If possible, considering densification inside the zone within the land-use mix development framework by adding supporting facilities that are still needed;
5. Giving priority for local people to develop their business inside the tourism zone by giving specific incentive like lower tax or more straightforward process to get a business permit.

5.2 Contribution of tourism to GDP

Based on the static STC model, the current performance of tourism contribution to GDP scored (−0.269), which resulted in a contribution of 5.93%. Then by applying the dynamic STC model, the score reached (0.007) thereby contributing (10.52%) to the economy. Minimizing income leakages should increase the proportion of the economic contribution to local GDP and ensure tourism's integration and linkages with other sectors. This mechanism can be developed by addressing the type of business that is usually run by the local community (tour operators, food produces, transport services, guides, etc.).

To increase the proportion of the economic contribution of tourism to local GDP, the local government should consider minimizing income leakages and ensuring well-integration alongside

other sectors. There are two types of leakages. First, the leakage which occurs due to profit return by external investors or business owners through the purchase made by tourists outside the destination and by the purchase of imported goods. Second, the leakage may occur if the income earned within the local community is spent outside the city.

5.3 Pollutant emissions

Surakarta has a strong carbon emissions performance (0.073), which is supported by a good public transportation network. The entire city has been serviced with bus routes and is planned to start railway service. According to the static STC model, the current performance is categorized as a strong performance with a score of (0.073) and carbon emissions (2.03 ton/capita), compared to the benchmark of (2.19 ton/capita). By applying the dynamic STC model under the high economy scenario, the score is predicted to reach (0.276) and carbon emissions level at (1.59 ton/capita), which in turn go in line with the carbon reduction target of Indonesia.

A general policy line is to improve accessibility to and within destinations using less-polluting transport modes and to manage tourist traffic in ways that will minimize congestion and adverse impacts on local communities and environments. However, the actual provision of transport infrastructure and public transport services is clearly an important area of action on its own right. Examples of physical infrastructure measures are included as follows:

Regarding infrastructure for visitors in protected areas, particular precaution is necessary for vulnerable natural attributes. Within these protected areas, various types of green infrastructures and practices, such as green street (tree planting on streets), bioswales, permeable vegetated surfaces, detention basins and green corridors, can logically be incorporated under a national program (Plummer *et al.*, 2013). The key concept of implementing green infrastructure for sustainable tourism is the strategic use of both the existing natural elements and newly constructed elements to provide benefits of open space and visual aesthetic.

5.4 Employment contribution

Based on the static STC model, the current performance of employment contribution stands at (−0.535), resulting in a contribution of 1.3% to employment. By focusing on the economic scenario in the dynamic STC model, the score can be raised to −0.374 by increasing the employment rate on tourism to 4.4%. The author realizes that an increase in employment rate is challenging to achieve because of the large gap between current performance and the benchmark (9.9%).

Labour absorption rate in the accommodation sector showed a promising performance. In 2016, there were 3,432 workers in hotel business consisting of 2,017 permanent workers (1,548 men and 469 women) and 1,396 seasonal workers (1,030 men and 366 women). Based on these data, men workers still dominate the employment sector, and there is room to empower women workers by opening more job opportunities (ILO, 2017). The action plan of the Heritage City of Surakarta (2015) addresses economic development of Surakarta as a driver to sustainability.

It is imperative to increase the quality of workers through education and workshops to nurture local labour in hotel service and management. Giving more opportunity for the local community to get a job in this sector means reducing externalities. The local economy will grow positively because the income will be spent on family living inside the city area. The action plan of the Heritage City of Surakarta (2015) calls for realizing maximum economic development by the following measures:

1. Conducting a study of the distribution of tourism employment that potentially runs by the local community (e.g. hotel, restaurant, tourist guide, driver, etc.);
2. Organizing more training for the local community, English skills and tourism services and
3. Improving the local creative industry's quality and innovation.

5.5 Hotel occupancy

In 2016, Surakarta city had 44 registered hotels of different stars and 112 inns, concentrated in the city centre and surrounding golden triangle area. These hotels and inns can accommodate approximately 12,929 visitors. Four years later, there were 1,382,166 visitors in which 15,072 were foreigners (Statistics of Surakarta Municipality, 2016).

According to the static STC model, Surakarta hotel occupancy scored (−1.000) compared with a benchmark of (71.23%) and an occupancy rate of (49%). By applying the dynamic STC model in a high economy scenario, the score could be promoted to (0.419), with the proviso that the hotel occupancy rate reaches (78.35%).

A strategy to increase the number of hotel occupancy could be obtained by a set of building and operation standards. Employers should facilitate training for their employees to improve hospitality services. Increase variance of price, by giving tourists more choices could increase the number of tourists from different levels of income. Internet marketing could boost the number of tourist by providing information about accommodation and promotion/discount for their member. To increase hotel occupancy, efforts that can be made are as follows:

1. Establishing the standard of services and building in each type of hotel;
2. Enhancing the front-man skill through training in service manner and language;
3. Encouraging hotel owners to join a website that offers online booking and travelling blog and
4. Managing hotel distribution to the location that is adjacent to a tourism spot or accessible tourism spot or transportation hub.

5.6 Social carrying capacity

Based on the static STC model, the current performance of social-carrying capacity is solid (0.968) compared to the benchmark (4.6%). By applying high economy scenario in the dynamic STC model, the performance will decrease to (0.921), but still higher than the benchmark.

The Golden Triangle, as a conservation area, should be able to sustain themselves and provide room for local communities to participate through synergistic interactions. City of Surakarta (2015) encourages local participation in every phase of tourism development. Communities which are not involved directly in tourism activities still have an essential role in supervising the implementation of a city plan. Likewise, the roles of stakeholders to promote social-carrying capacity, according to City of Surakarta (2013), are

1. Maintaining a focus on the community as the center of the tourism development strategy to ensure local ownership of projects and retention of profits;
2. Encouraging widespread community participation in tourism planning processes;
3. Raising awareness among tourists to encourage them to appreciate and respect the sites they visit and
4. Facilitating voluntary contributions from tourists and tourism enterprises for responsible initiatives.

6. Conclusion and recommendation

The STC model was applied to the city of Surakarta to evaluate and predict current and future trajectories. When evaluated by the static SMLC model, the city of Surakarta was categorized as an unsustainable touristic city. However, when the dynamic SMLC was applied, the city of Surakarta was categorized as a sustainable touristic city under the high economy scenario. Contribution of tourism in economy development will enable the municipality to develop better infrastructure and

motivate local community to involve in the tourism service and heritage preservation because they find it increases the number of jobs and promotes local business growth.

STC results together with SWOT analysis and Surakarta's city plan have informed policies that could give development to sustainability status. The guidelines regarding this scenario call municipal authorities to increase the number of tourists by spreading information through city branding and online campaigns. Thus, local income, hotel occupancy rate and employment rate could increase.

To maintain sustainability in local economic development, the municipality should consider proving communication platform to develop value co-creation with related stakeholders and engage participation. The municipality is also required to protect the revenue from leakages which are twofold. First, proportion of the profit return by external investors and business owners who purchase imported goods. Second, the income earned within the local community as much as it can does not spent outside the city. The local government could formalize some policies to minimize it by (1) supporting local business owner with business coaching and financial support; (2) ensuring that a fair proportion of total tourist expenditure is distributed locally; (3) prioritizing employment of local labour, also by holding workforce building capacity and (4) strengthening the local supply chain.

In the future, it might be found that the best scenario shift from the high economy scenario to high social scenario or high environmental scenario due to tourism growth will reach the peak tolerance of sustainability in which if the high economy scenario is being applied, it would worsen the social and environmental aspect. At this point, the municipality should continuously re-evaluate the condition and formulize a new strategy to respond future uncertainty.

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