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Green Implementation Water Theme Park in Malaysia

Aimi Ashikin Hanib*
Faculty of Architectural, Planning & Surveying, Universiti Teknologi Mara, Shah Alam, Selangor, Malaysia

Fadilah Abu Bakar Sidek
Faculty of Architectural, Planning & Surveying, Universiti Teknologi Mara, Shah Alam, Selangor, Malaysia

Shaza Rina Sahamir
Faculty of Architectural, Planning & Surveying, Universiti Teknologi Mara, Shah Alam, Selangor, Malaysia

Abstract

There is growing concern on environmental impacts resulted from building operation system and concern for the environment in people lifestyle. Among questions that has been arose was related to sustainable theme parks destinations-are they even exist? It is evident in few studies indicate that major theme parks are starting to give their inherently unsustainable operations a fresh, green implementation. Environmental footprint matters for theme park as it operations contribute to the increasing of waste generation, water and power used. Thus, this paper aims to study on the green implementation for theme park in Malaysia. Reassuring to achieve the aim, two objectives were established: 1) to identify ways in conserving energy through technical and operational enhancement, 2) to discover the important criteria for green theme park implementation. Literature review and in-depth interviews have been conducted. Experts opinion were employed in getting rich data for the study. The result shows that there was initiative for implementing green concept in Malaysian theme park. Technical aspects that associated with green implementation for Malaysian theme park were consumption of energy, consumption of water, construction, maintenance, management of waste, materials and the design of theme park. Expanding lifespan of theme park, decreasing the use of chemical elements and rate to run the equipment can save a lot of energy contribute to the operational aspects of green theme park. Materials, energy efficiency, water efficiency were among important criteria needed to implement green theme park. Many efforts to discover green implementation have been conferred into green theme park in project management cycle.

Keywords: Sustainable theme park; Conserve energy; Operation; Water efficiency.

1. Introduction

Motivating towards green concept for theme park in Malaysia has been familiarized. Government has contended the expert organizations and developers to taking the initiative actions to advance the green concept in domain and responsive to the basic in improvise the environmental system and social shield. By assuming rise concerns over the deterioration in the environment, all stakeholders, governments and developers start thinking the responsibly and return to the advancement approach that have been used (Abidin, 2010). In 2009, Malaysia has launched its form of green evaluation naming Green Building Index (GBI) to handle all related green issues. The segments are driven by to an advance sustainability in the constructed environment and bring issues to light between the industries players about environment matters. This study concentrates to identify ways to conserve energy through a mix of technical and operational enhancements which is includes facilities, management and design stage. Besides, it is also to identify the challenges in implementing green water theme park.

Lack of expertise and capability, coinciding of roles between the government agencies and sluggish industry follow through on government platforms are the challenges in developing green water theme park in Malaysia. Most of the expertise during the design concept related to sustainability water theme park development are less capability in operation system of water theme park. In addition, the challenges in enhancement of technical and operation have been verified as lack of technical experts, problems in case of technological failure, inadequate energy supply and lack of training facilities is a part of implementation of green theme park (Afroj, 2012). Theme parks have been identified as a reason of concern for conservationists such wide-ranging operations involve massive swaths of land as well as big supplies of energy and water. Interestingly, the applications of environmental measures are restricted. (Liyin et al., 2006) proved that the normal reasons adding to the impediment incorporate the conflicts are among cost and environment, environmentally passive culture within construction industry, lack of assistance between project parties and conflict among deal time and implementing environmental management approaches. The challenges in implementing are to plan of the improvement to be well-organized and effective.

2. Literature Review

The reception of sustainable development and green structures has turn into a vital issue in Malaysia as of late and has be present rightfully emphasized in the Malaysian Construction Industry Master Plan (2005 – 2015).

*Corresponding Author

Currently, Malaysian construction industry was being enhanced. These days, In Malaysia, there have a few theme parks that have a couple of trademark headed for the green. This demonstrates the green construction technology particularly towards theme park was dispersal and being advance in this nation. In this present day, by utilizing the innovation material and technology in concept and operational, it contributes to the changes of building performance. This lead to the improvement for the whole development where environment protection and preservation was likewise from headway.

2.1. Conserve Energy through Technical and Operational Enhancements

In Malaysia, projects with green assessment and operating are to streamline and promote the practicality of green management with decreasing the negative impact on environment and to increase preservation of our mother earth. (Francescato, 2012) defined sustainability often refers to green industries, such as companies that promote renewable energy or electric vehicles which is all the equipment for the theme park. Green theme park could be referred as its lifetime of operation and construction guarantee in the healthiest possible environment while representing the most effective and slightest troublesome in utilization of land, water, energy and resources (Zeigler, 2012). It will be redefining and changing of theme park practice and emerging as a response to growing concern over pollution and environmental damage, increasing awareness and acceptance of climate change, decreasing natural resources, increasing energy cost, and increasing demand for sustainability in building design and development.

Sustainable or green is as a result of a design which concentrates on increasing the efficiency source use of energy, water, and materials while less in the impacts on human health and the environment during the building's lifecycle operation, through better space, design, construction, operation, maintenance and removal (Kamana and Escultura, 2011). A green building and construction is a result of operational and sustainability of energy effectiveness use in the whole building cycle and seen the impact to environment. Operating and maintaining energy efficient features of a building to minimize the energy used will further ensure that cost savings are realized in long-term. Implementing sustainable building construction practices is away forward in fostering economic advancement in the building industry. Moreover, minimizing impacts of construction on the environment, three principles emerge: resource efficiency, cost efficiency and design for human adaptation in achieving sustainability in the industry (Akadiri *et al.*, 2012).

In addition to reducing the effect of day-to-day operations on biodiversity (e.g. energy, waste, transport), the communication with visitors is an excellent opportunity to contribute to the conservation of biological diversity. Conflicts with local residents and conservation organization on site are inevitable due to a high volume of traffic, noise, energy consumption and waste generation. There are lots of national building environmental assessment methods have been introduced in energizing the advancement of green theme park. Thus, the implementation by conserving energy in day-to-day operation system are achieved by latest and economical technology of maintenance operational system in theme park.

2.2. Discover Implementation Green Theme Park in Malaysia

Green is an idea started in United States on early 1990s and characterized as an interconnected system of green spaces of conserves natural ecosystem values and functions in giving advantages to human population. Green Management has embarked in the Malaysian construction industry to stakeholders who are environmentally concerned towards sustainability quality and product (Liang *et al.*, 2014). There are monetary advantages in operating green theme park, for example reduced operating cost, enhanced asset value, improved employee productivity and fulfillment, and the enhancing of theme park (Leaman and Bordass, 2007). Green consumerism concentrates on balance and the harmony between addressing human needs and keeping up the environments capacity to supply raw materials and recover.

In Malaysia, there is not yet strategies specify only for theme parks. However, the implementation of Green Building Index (GBI) as a rating tools for buildings in promoting the sustainability development in assembled of environment and awareness about environmental issues and responsibility towards sustainability. GBI rating tool provides an opportunity for developers and building owners to design and develop green, sustainable buildings by providing energy and water efficiency, a healthier indoor environment, better connectivity to public transport and the adoption of recycling and greenery in projects and reduce impact on the environment.

The Walt Disney World Resort has implemented a state of the art energy management program (EMP) that served as a good example to owners and administrators of public and private facilities to maximize energy conservation and efficiency while minimizing costs and environmental concerns. Many efforts have been conferred for project management aspect related to green theme park. Since the appropriation of ISO 14001, which exists to help associations minimize how the operations affect nature and agree to relevant laws, the subject of sustainability through project management had stayed undefined at best as there had been a lack of continuity among organizations who desire to use project management as the component to impart change (Maltzman and Shirley, 2012).

In order to Malaysia to achieve sustainable objectives, green building must be executed. Malaysian government gives emphasize on sustainable tourism development in the country. The government adopts and implements various laws and regulations to ensure sustainable tourism development (Bhuiyan *et al.*, 2013). In addition, eco-labelled construction materials will help with the selection and verifiability of material, including easing the process of selection and provide a single open platform to facilitate further certification (e.g., LEED, BREEAM) (Kamar and Hamid, 2011). There are many types of green technology products available in the market that produces low level of waste and contamination such as solar photovoltaic panel, wind turbine and rain harvesting. Actions are being taken to meet all the requirements needed to pursue sustainability in the theme park. For example, by implementing

strategic planning, as well as, considering the allocation of resources. The construction of green theme park is taking into considerable of green development by sustainability in longer operation to conserve energy and renewable sources like water consumption.

3. Methodology

The qualitative methods are approaches of gathering data which are explorative and concerned through defining meaning, explanation otherwise elaboration instead of with diagram statistical inferences. In additional, it concentrations on targeted group or individual hence; it offers a further in penetration and explanation. The in-depth interview sessions are used to achieve the aim and objectives of the research study. In additions, the questionnaires also were used to develop approximately data in the direction of the topic. The interview session has been conducted by choosing specific respondents that relate to theme park projects such as developer, building maintenance or project engineer was significant appropriate to develop the accurate information for the objective deprived of any lack and to avoid any repetitive of interview to achieve the objective. The interview sessions were conducted to gather different opinions from the selected respondents who have experienced in constructions, engineering and architecture pertaining to green building development. Since in Malaysia has nine (9) water theme park, there were 3 experts involved in this session which is 1 respondent from Sunway Lagoon Theme Park and 2 respondents from Lost World of Tambun as shows in Table 1.

Table-1. Background of respondents

Respondent	Designation	Background	Company	Experience
A	Assistant General Manager	Project Manager	SUNWAY (Lost World of Tambun)	11 years
B	Operation Manager	Civil Engineer	SUNWAY (Lost World of Tambun)	7 years
C	Senior Executive	Marketing/Engineering	SUNWAY (Sunway Lagoon Theme Park)	4 years

This interview session permits experts to response the questions in detail with explanations. The preparation of semi structure interview questions was set closely linked to the objective of this study. A clearer idea of interpretation of the data is presented in the arrangement of tables. It analyses and demonstrates a connection among the arrangements of the results.

4. Results and Findings

The content analysis has been done related to the objective of this paper. Green theme park concept exhibits a high level of environmental, economic and engineering performance. These include energy efficiency and conservation, improved indoor air quality, resource and material efficiency and occupant's health and productivity. The interview about understanding the concept of the green theme park shows only 3 elements score 3/3 which is energy efficiency, water efficiency and transportation. The green concept for theme park is about efficiency in using of energy consumption in building, water consumption, material and reducing impact on human health and environment. In decreasing energy consumption, materials and technologies, concept and design in theme park are implementing in this theme park.

4.1. Concept of Green Theme Park

Green building designs and standards are developed to improve theme park operation energy and embodied energy efficiencies and minimize energy and wastes (Kwok *et al*., 2012). Therefore, green concept of theme park, whose core is integrated building technology systems, are about construction and operational efficiencies and enhanced management and occupant functions. Green theme park exhibits a high level of environmental, economic, and engineering performance. These include energy efficiency and conservation, improved indoor air quality, resource and material efficiency, and occupant's health and productivity. Table 2 shows the understanding from respondents regarding green theme parkconcept.

Table-2. Respondents Green theme park Concept

Respondent	Description
A	Concept of green theme park is related material that we used. The use correct materials in terms of green criteria and the limitation the energy used. Green also related with waste water.
B	Green is functioning to reduce the materials used that nowadays are costly like energy, waste water, building, transportation and manufacturing. To decrease the energy consumption in a building, the materials, technologies, concept and design of theme park should be implementing.
C	The green concept of theme park is an action that reduce impacts to the environments, climate change and offer lives better and most important is living more sustainably.

So, concept of green theme parks practice is a process of to create buildings and surroundings in efficiency of resources, materials and integrated operational system technology for sustainability of theme parks.

4.2. Technical Operational and Maintenance

The technical operation in green theme park must create decent surroundings for occupants and decrease risky impacts happening to biology. The way to conserve through technical in green theme park which is consist of consumption of energy, consumption of water, design construction, management of waste and materials for theme park. Besides that, the management of waste water and materials has been used and replaced are helps to reduce from pollution in recycle concept. This will give the positive impacts to theme parks also environment to stay green. The operational system used in this case study of theme park is to ensure the theme parks energy must related and enough to support the systems and continue to perform. In example, the water consumption in theme park, encouraging in water recycling system will lead in potable water consumption and encourage the design of systems to monitor and manages the water consumption that creates less in water supply consumption. Provided alternative design in material like flexible lightings controls, is to optimize and conserve energy savings based on automation sensor in controlling lighting in conjunction with daylight strategy for all parameters.

Energy conservation is about reducing energy consumption through using less of an energy service. For the best building operation system, automated monitors and controls for energy, water, waste, temperature, moisture, and ventilation are applied. The proper operational system is reducing waste through source reduction and recycling to eliminate disposal off-site and minimize travel by supporting telecommuting programs and enabling teleconferencing. In addition, to reducing the effects on day-to-day operations on biodiversity (e.g. energy, water, transport), the communication with visitors is an excellent opportunity to contribute to the conservation of biological diversity. The conserve through technical green theme park system is reducing the usage of resources, create well surroundings for occupants and decrease risky impacts happening to the biology.

Table-3. Maintenance operation in Sunway Lagoon and Sunway Lost World of Tambun

Respondent	Description
A	Maintenance is to ensure the theme park energy related systems will continue to perform.
B	Maintenance must operate with responsibly and maintained properly to ensure operation and maintenance personnel are part of the project planning and development process, including the establishing of commissioning criteria at the onset of a project.
C	Maintenance is to ensure the building operating smoothly without any problem by using EMS connected to water sub-meters and flexible lighting controls.

Based on one of Sunway mission is ‘embracing sustainability in our business processes and decisions’, the maintenance operations operated with responsibly and maintained properly to ensure operation and maintenance personnel are part of project planning and development process, including the establishing of commissioning criteria at the onset of project. As stated by all respondent, the maintenance operating in green concept theme park the system is continues to perform and maintained properly to guarantee the building and system is operating efficiently as shown in Table 3. The operation and maintenance come with security, safety, health, comfort and productivity of occupants in mind and with understanding of the next generation’s need to reuse and recycling building components. The system maintenance selected are easy and friendly to maintain and training to the maintenance team on sustainable design principles and method is introduced. For example, both in Sunway theme park is using metering and leak detection system, use of sub-meters to monitor and manage major water usage for cooling towers, irrigation, kitchens and tenancy use. The systems are link all water sub-meters to (Energy Management System) EMS to facilitate in early detection of water leakage. Besides that, the maintenance products used resources-efficient, bio-gradable and safer for staff and occupants.

The concept of green in the Malaysia construction industry has practices to theme park. It related to materials, energy efficiency, water efficiency, transportation, manufacturing and others. Technical in green consist of consumption of energy, consumption of water, design construction, maintenance, management of waste and materials also the design of theme park. For operational in this theme park it can be conclude, through operational it is expanding lifespan of theme park, decreasing the using of chemical elements and decreasing the rate to operate equipment that can save a lot of energy.

4.2. Discover the Implementation in Water Theme Park

The implementation in water theme park for this case study area started before the Green Building Index introduce in Malaysia yet. The developer take initiative in sustainable development of water theme park by managing from the design stage, implement proper construction waste management for examples, storage collection and reuse of recyclables and construction formwork. In addition, reducing the strain on existing infrastructure by implementing proper construction management and storm water management, beside use of environmental-friendly materials source from sustainable sources and recycling. Various of environmentally best materials are used in Sunway amusement parks, for example the low VOC paints to decrease toxic emission.

The major implementation green features in water theme park of course the water conservation by ensuring maximum in efficiency and reducing in utility bills. Table 4 shows, green implementation from the expert’s view is

use environmentally materials, conserve resources and the implementation from the design stage is to reflect at early stage. Therefore, employing integrated design principles which is new in construction or employ integrated of assessment, operation and management principles in existing buildings are beneficial in optimize performance, protect and conserve water and enhance indoor air quality.

Table-4. Concept of green implementation in theme park

Respondent	Description
A	Implementing green can utilizes various environmentally best materials or items in our amusement parks.
B	Green acquiring is consequently an essential preparation to significantly reserve our valuable resources also reduce the waste.
C	Employ integrated design principles which is new construction or employ integrated assessment, operation, and management principles.

With use less of operating energy, embodied energy has assumed much greater importance. Water efficiency can be reducing water consumption and protecting water quality are key objectives in this sustainable building. The facilities increase their dependence on water that is collected, used, purified, and reused on-site. For indoor environment quality, it created to provide comfort, well-being, and productivity of occupants. It also creates a good impact to environment, economy as well technology in creating sustainable theme park.

In Malaysia, there are lot of projects are getting green assessment and are operating to apprise and boost the practicality of green management to decrease negative impact on environment and to increase preservation of our mother earth. The significance implementing accorded to green theme park is identified with social values, which additionally influence the social creation of ecosystem services. As shown in Table 5, it can be summarized that the implementation of green theme park in Malaysia is constructive for sustainable development, create a healthy environment and decrease impacts in biological cycle towards effective operation for new construction of theme park.

Table-5. The future of implementing green theme park in Malaysia

Respondent	Description
A	Applying new method for green of course it good for theme park in the future and slow down the process that impacted to ecosystem.
B	The implementation of green creates theme park more better in future by reducing the cost and the better environment to theme park area by using of green mechanical equipment to generate the theme park. Theme park will become more grid-responsive, resilient, efficient, energy-positive and networked.
C	Consideration the various environmental impacts that buildings generate and consideration in negative impacts, it can be reduced or eliminated through more effective planning, design and construction. It will improve marketing and developers incorporate green elements into the theme park in future.

The utmost important benefits can be achieved if the design and construction lineup takings an incorporated method since the earliest stage of proposed project. The important criteria to implement green water theme parks are identified during design stage that must suite theme elements, friendly and sustainably technology. operational and management team adapting in green theme park. Furthermore, materials being utilized itself would affects to green achievements. The green building developments appeared to check these effects besides to bring up-to-date the building development process. In addition, green technology products generate low level of waste, contamination and reflected through environmentally friendly and create as meager waste and pollution by way of conceivable and apply the recycling and reuse of materials when potential. Table 6 shows the green technology has applied in Sunway Lagoon and Lost World of Tambun states that the green technology chosen from the feasibility study and design stage. The technologies use necessity valuable to environment and sustain in operation. Natural energy utilization such as the water that has been used and recycled for environment, the management of waste material for recycled product like plastics is enhance the execution of green theme parks.

Table-6. Green technology in implementation in green theme park

Respondent	Description
A	Green technology products accessible in the sector that generate low level of waste and contamination, for example, solar photovoltaic panel, wind turbine and rain harvesting. Green management, in four project stages that are feasibility study, design, implementation and close-out.
B	Green technology mention technologies that plan to influence the environments. This technology is a comprehension expose to be exceptionally useful to the environment in place of it can reduce greenhouses gases discharge to the atmosphere which in turn reasons heating of the earth.
C	Green technology of land development in landscapes is designed to allow irrigation and storm water to soak into the soil recharges groundwater systems and filters out pollutants. Besides, EMS is one of green technology in green theme park implementation for energy efficiency.

Currently, green technology plays important rolls in the construction industry in developing the sustainable development. Green technology for example solar panels and energy efficient appliances get to be fundamental highlights as building components. In addition, renewable and sustainable materials are incorporated with these components to build the building sustain and less in maintenance cycle. Green technology is utilized synonymously with terms 'environmental technology' or 'clean technology' and referred to technologies that plan to have little effect on the environment. This technology is a thought and comprehension discovered to be exceptionally helpful to the environment as it is reducing greenhouses gases release to the atmosphere which in turn causes of global warming. Besides that, knowledges and skills in building operation team are required to maintain and manage high-performance of green theme park. Enhancement of implementing green to theme park is the way to create better theme park via technology through all the construction management process. Furthermore, the use of eco-labelling promotes voluntary tools and guidelines, which recognizes the production of sustainable materials as well as stimulates the demand for products and services with lower environmental burden. It can be concluded, the important criteria in implementation of green water theme park are as shown in Table 7;

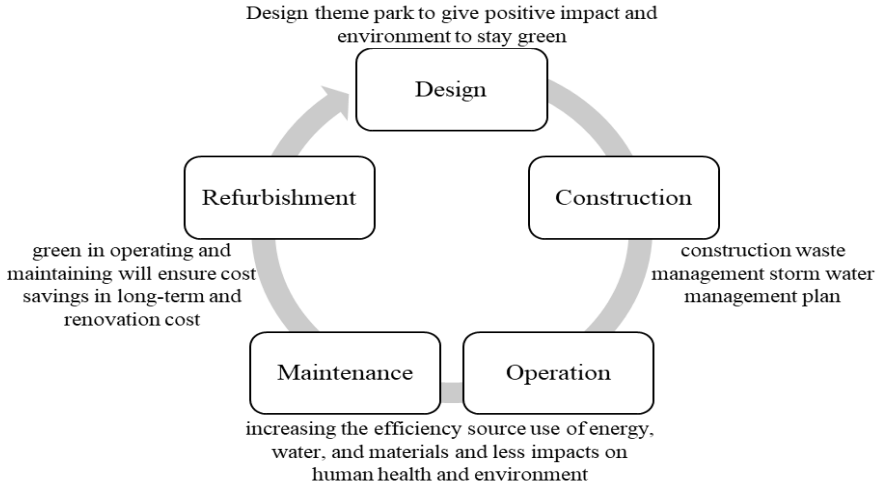
Table-7. Criteria implementation of green theme park

Criteria	Description
Design	Identify the theme of water park, recognizes the elements of green to be used, identified with social values and impact to the surrounding environment and sustainability of the theme park to develop.
Construction Management	Manage the construction waste, waste water and storm water management. Proper in project planning and management in environment impacts during the construction stage. Low impacts to enclosed habitants and residents during construction.
Material	Select an environmental-friendly materials source from sustainable sources, recycling and eco-labeled products and materials has low impacts to environment.
Operational And Maintenance	Select the maintenance system are easy and friendly to maintain, training to the maintenance team on sustainable method and ensure the system is continues to perform and maintained properly. Facilities management is part of project development. Operational system expanding lifespan of theme park, decreasing of chemical elements and rate to operate equipment.
Green Technology	Selection and execution of green technology should be reliable to the development of theme parks. Sustainable and high-performance green technology involved team with wide range of knowledge and skills in practicing and operating the system.

5. Conclusion

The significance implementing accorded to green theme park is identified with social values, which additionally influence the social creation of ecosystem services. The following is changing ideas and qualities which is people to truly change the dominant model for development from high energy use, high consumption of raw materials and high discharges to low consumption, low emissions yet in high efficiency and sustainability. Technical and operational in green building design concentrates on increasing the efficiency source use of energy, water, and materials while less in impacts on human health and environment throughout the building's lifecycle, through better area, design, construction, operation, maintenance, and removal as shown in Figure 1.

Figure-1. Green Buildings Cycle in Water Theme Park



All of respondent retort on technical and operational in green building consist of consumption of energy, consumption of water, design construction, maintenance, management of waste and materials for theme park also the design of theme park give positive impact to theme park and environment to stay green. It can adapt to theme park which is to become green in operating and maintaining energy efficient features will further ensure cost savings are realized long-term. Methods of green construction with using of modular configuration for deconstruction, long life building and using recoverable materials could be introduced. As conclusion for this paper are construction of green building, green technology, green management, strategic performance human resource development and eco labels in construction industry as a new method to implement green theme park. The management of green theme park projects differs from that of conventional projects on several issues namely feasibility study, design, implementation, and close-out.

In addition, many countries start to implement green for their theme parks such as Hong Kong Disneyland and Universal of Orlando. However, construction industry in Malaysia nowadays especially in, Green Building Index (GBI) is one of the famous building assessment that have been used in Malaysia because all the criteria of GBI fulfil all the requirement as a green theme park, but the implementation of green theme park is still depends on stakeholders. The practice of green in theme park will be important in future and maybe one of the requirements to implement complex or massive project. Many of theme parks can be use as case study which is in Malaysia or overseas. Different theme park will use different method and technology for green. In addition, the government infrastructure readiness in terms of internet connectivity and others infrastructure developing towards green theme park technology could be discussed in the future.

However, in implementing green theme parks there is always challenges. Amongst the challenges of implementing green theme park becomes the barrier are identified with law and regulation. Many of these issues can't be tended by conventional project management practices. There is a requirement for quality management system that is convenience, versatile, adaptable and most vitally towards green idea environment. Currently, the administration of Malaysia neglects to manage and authorize because of the lack of an authoritative structure. The expensive cost for green project regarding economic climate heading down, which means this difficulty is very significant and it's very difficult to be able to bring to the investors while others who would like to combine within the green theme park. The challenges are in planning of the improvement to be efficient and effective. Despite the fact, cost is an issue, designers should to change their mentalities. The developers should not search for least expensive answer but rather go for the best long-term arrangement. Hence, it recommends for further research to identify challenges of implementing green theme park in Malaysia construction industry based on lack on continuity, lack of authoritative cost, culture and environment.

Since implementation of green theme park is at its novice stage in Malaysia, the understanding and exposure of green theme park still limited to a small number of stakeholders in this industry. So, the limitation of data collection regarding seek projects that implemented green theme park as the tools in design stage or could able to construction stage. In addition, lack of the data and reference of those Malaysia success stories in green theme park not obtained yet.

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