

Stimulating the Adaption of Social Media Application for the Implementation of Green Library Technology for Environmental Sustainability: Aspects and Factors

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Abstract--- This paper is conducted to analyze the factors and aspects of green library technology for environmental sustainability. In this paper, we focus the implementation of green library for environment sustainability by looking at the factors and aspects to implement green technology in library. In order to achieve this aim, we identify the attribute from the previous literature that will lead the future development of framework, which can be applied in library. The significant of this research will ensure the implementation of green library to improve environmental sustainability whether it is explicitly stated or not to improve the condition of community.

Keywords--- Aspects, Factors, Green Technology, Library, Sustainability.

I. Introduction

Green library refers to library that contributes towards maintaining the natural ecological balance in the environment, and preserving the planet and its natural systems and resources. Green Library has many meanings, including preserving natural resources for the future, living in a carbon-neutral way, and meeting the needs of the community. For the purpose of this task is as living and working in a practical and environmentally responsible manner, to ensure the protection of the world's resources for future generations. It also improved day to day operations and procedures of the library, as well as educating the community about responsible environmental practices. Libraries are in a unique high profile position which enables them to be community role models by implementing sustainable strategies.

Libraries are not far behind in green environment movement. The libraries have specific challenges to overall green building movement. Books need special care from extreme temperature, moisture, sunlight, termites, fungus, and rodent's and of course few dishonest readers too. Weight of books and stacks and movement of many readers on the floor make it more complicated. Expandability for future growth in terms of books and readers and technology further complicate building structure and design. According to Binks (2014), from the factors itself, we can see the objectives to implement the library as a green library can be achieved or not.

It is because the factors are very importance thing to move forward. Kurbongnulu & Boustany, (2016) as well discuss that, by provide information literacy and give some instructions can have transformed an ordinary library to the green library movement. This implementation of green library gives and at the same time helped the natural environment retained sustainable in various aspects environmental quality of resources and responsible waste disposal. In addition, Malode (2014) also had mentioned in his previous studied that green library or in other terms known as a sustainable library gives a good quality services affect towards the environment world. By that, the introduction and exposure about the library programming in order to help educate the community about sustainability, libraries can plan and execute programme featuring guest speakers on topics such as water-wise gardening practices, composting and worm farming, recycling in the home, energy efficiency and green cleaning.

Green libraries are related to the overall green building movement, libraries have specific needs that raise some extra challenges for their preservation books must be kept away from sunlight as well as moisture and temperature change. Sunlight plays major role in green design, because it can be used to reduce the reliance on artificial lighting. Another challenge the library presents the weight of the books. A common strategy in green is to raise the floors to increase circulation, but the weight of the stacks can be an impediment to this strategy. To deal with this challenge, many designers have resorted to zooming the library into designated area. Libraries need to be built flexibly, in

order to make room for expansions in size and in wiring capabilities. Library building is long term investments made to benefit the community so when designing them architects need to be looking so or 100 years into the future. Therefore, this research will focus on the factors to implement the green library and aspects towards the environment world.

According to Bayley (2014), the benefits of this implementation of green library gives and at the same time helped the natural environment retained sustainable in various aspects environmental quality of resources and responsible waste disposal. In addition, Malode (2014) mentioned in his previous studied that green library or in other terms known as a sustainable library gives a good quality services affect towards the environment world.

This paper aims to review the implementation of green library towards environment sustainability. The paper is expected to analyse the services affect in implementation of green library also its factors. For the services affect, we focus on five main aspects; resources, environmental, materials, educational and management which are believed to be the leading affect that will influence the implementation of green library towards environment world, while the factors in implementation of green library are focused in terms of energy factor, educational factor and management factors.

The remainder of this paper is organized as follows. Section 2 is literature review. Section 3 is proposed framework. The final section contains the concluding remarks

II. Literature Review

2.1 Green Library for Environmental Sustainability

According to Sonkkanen (2013), had mentioned that green library or either green room was about the availability of environmental aspects and information that offers accessibility of environment basic issues. Besides, it helped keeps updated environmental issues regarding to the development actions information for the community awareness

2.1.1 Resources

According to Malode (2014), environmental concerned was built for retained the natural environment quality. The use of natural and reuse resources were another way to achieved the implementation of green library. In comparison, Meher & Parabhoi (2017) finding out that in 1990s, the information professionals start to give supported towards the implementation of green library. In addition, the green worldwide aspects were already saved a lots of natural reuse resources (Shah, Kumar & Shah, 2015).

2.1.2 Environmental

Shah, Kumar & Shah (2015) discussed either the external aspects resources, internal environmental aspects in green library also must be important to take a good cared of it. A good quality surrounding in the green library will gave a positive effect especially in the services ongoing and the collection materials too. Moreover, in contrast finding, Sotak & Karpinski (2014) studied stated that usually human being attitudes very discouraged when it comes to the environment cared aspects.

2.1.3 Materials

Materials are the main aspects in order to produce and contributed a good quality of the green library. The suitable and right choose of materials such as building materials have helped to achieve the target in implementation of green library (Malode, 2014).

Furthermore, according to Meher & Parabhoi (2017), had mentioned that an efficient resources manner was based on the library's structure designed. Besides that, the standards and requirement aspects also important to follow in order to reduce damaged towards environment surrounding in implementation of green library (Leena, Audhir & Mukesh, 2015). While in contrast, another studied article by Sotak & Karpinski (2014) finding that a high quality condition in green library was always happened when using a low energy building and systems.

2.1.4 Educational

Cardoso & Machado (2015) discussed environmental education in green library must always suitable, comfortable and comes along with updated materials collection. Therefore, a friendly environment surrounding in green library must always in flexible condition. In addition, it is also helped to educate the users about the environmental awareness. Furthermore, above statements have been supported by Bayley (2014) in his studied and added that the relevant life skills of education in green library will always effective and efficient.

2.1.5 Management

Hauke & Werner (2013) mentioned library management also played a very important role in implementation of green library. Therefore, a systematic library management will be a part of a green profile background. Other than that, the library administration must focus on projects management in order to approach a good greening library management (Bink et al., 2014).

Table 1 below shows there are five variables was obtained from the reviewing of eight articles. In general, the most variable found is assigned by the materials construction in implementation of green library. The table clearly stated a various types of variables that can be used by green library services based on external and internal environmental issues and awareness. Recommendations range aspects in implementation of green library towards environment world was to implement a large expectation building development practices and procedures.

Table 1: Implementation Aspects of Green Library for Environment Sustainability

| Author | Resources | Environmental | Material | Educational | Management |
|---------------------------|-----------|---------------|----------|-------------|------------|
| Malode (2014) | / | | / | | |
| Meher & Parabhoi (2017) | / | | / | | |
| Shah, Kumar & Shah (2015) | | / | | | |
| Hauke & Werner (2013) | | | | | / |
| Cardoso & Machado (2015) | / | | | / | |
| Sotak & Karpinski (2014) | | / | / | | |
| Bayley (2014) | | | / | / | |
| Binks et al. (2014) | | | | | / |

2.2 Implementation Factors of Green Library for Environmental Sustainability

Most of the previous study mentions the factor to implement the green library. There have a few factors that they discuss on the articles. According to Binks (2014), from the factor itself, we can see the objectives to implement the library as a green library can be achieved or not. It is because the factor is very importance thing to move forward. Kurbongnulu & Boustany, (2016) as well discuss that, by provide information literacy and give some instructions can have transformed an ordinary library to the green library movement.

2.2.1 Energy Factor

Energy is the importance factor by produced a good of green library. It is because by controlled energy it can protect air quality. Energy is the most importance factor that we have to control it. Based on the LEED (Leadership in Energy and Environmental Design) rating, energy is the heaviest factor should be focused on. We can use the other alternatives way to save the energy. The energy that we used should be independent. For example, wind, solar or geothermal. All this kind independent energy comes from the nature. (Kumar, 2012). So as person, are very important to know what condition or recognize the locations before decide to build a new green library. This purposes to make it sure that the objective to build a green library can be achieved. Based on previous articles, those have a few recommendations to enhance the use of independent energy. It is because not only can protect the environment but also can save the cost and provides a good healthy environment such as air quality.

The libraries itself must use a suitable material the libraries. For example, use an adequate window, glass windows and window palate as initiative to allow natural light squally in to the library. From these initiatives, we don't need to use electricity during the day, only use electricity energy at night or during summer. (Meher & Parabhoi, 2017).

From the previous study shows that Indian Library is constantly use the natural energy because of their culture and the compactness of people. We as an individual should agree with energy give a big impact to the environment and society. According to Binks et al. (2014), renewable energy is the first step to move forward as a new era. Renewable energy gives a positive impact on both environment and human. For example, by using natural energy, the greenhouse spout can be decrease, lessen demand in contacts of maintenance and resources. Most of developed country uses their natural excess as the initiatives to save the energy. For example, Austria use a solar to replace an electricity on their green library. We can say that, all the ideas or creativity to implement a green library should be starting from the heart of the institutions like library because something important usually started from important places.

2.2.2 Educational Factor

Education is an input that we grab from many resources such as learning process or experiences. To make others aware about the green environment, the libraries especially public library should provide collections regarding green educations because probability to others get the knowledge and information from public library. Whereby, in this green education speakers can be invited to give talks related to the green environment. Aside from that, the activities such as reuse and recycle can be added on the library programs. Besides, workshops also are the best way to increase the awareness among people. Provide a workshop such as gardening technique. With these small efforts, people can implement what they have done on their own. Indirectly people can learn something new. (Kurbanoglu & Boustany, 2016).

Other than that, some information literacy and its instructions can be transformed into green library movement. Besides, the outdated collections such as CD, books and etc. are preferred to reuse if all these things are in a good condition. For example, book can make a rough paper or make an origami to garnish a library or special rooms as well as non-printed collections also can be as an exhibition for next generations. Based on (Kumer, 2012), the librarians also must have extra knowledge and have to attend the seminar to enhance their teaching skills. Also know how to transform all the printed collections into computerized systems. From the previous study, focus on public libraries given because mostly people going there for spent time there. So on going to educate people about the green, they should steer with the example. Educate not only focus on designing or renovations but we should live in the green environment and share an experience to others. From that we can see the extent of our efforts. (Binks et al. 2014).

2.2.3 Management Factor

The role of management gives a big impact for the library's objectives. Therefore, if the management is committed with their role, the aims to be green library can be achieved. The role of management is focus on how to market the library itself by focusing on green library. The management should provide a few activities. For example, make collaboration with other organization that are provided a green information such as exhibition or gardening activities. Aside from that, the management of library also can make a conference that topic related with green environment. This effort can give some knowledge to community. Besides that, the management also can find a strategic location to build a library or provide some space to do activities for green networking (Hauke & Werner, 2013).

According Kumar (2012), the management also should be very effective and efficient to choose the materials. Management can discuss with the supplier to supply all the collections and materials that are friendly environment. Other than that, all the things such as computers or books can be recycle or reuse. Such as computer, the management can donate the computer to others that needed. Indirectly, we can help the people out there. Same goes the books, we can give to people that interested to keep the book collections. So that we can see how importance of the management to the library to make it sure that objective to implement a green library was achieved it.

Table 2 shows the study that discuss about the factor to implement the green library. There have three factors to implement of green library. Under the factor of energy there have three authors argue about the energy. Each of them has different view related to energy. Whereby there have three authors argue about the factor of education. For the last factor is management, there have only two author discuss about an education from the previous study.

Table 2: Factors to Implement of the Green Library

| Authors | Energy | Education | Management |
|------------------------------|--------|-----------|------------|
| Kurbanoglu & Boustany (2016) | | / | |
| Kumar (2012) | | / | / |
| Meher & Parabhoi (2017) | / | | |
| Hauke & Werner (2013) | | | / |
| Binks et al. (2014) | / | / | |

III. Framework

The implementation of green library to empower environmental sustainability needs to be focused on two aspect such as factors of implementing and aspects of implementing. In Fig. 1, we propose research framework based on two variable; factors and aspects. At this stage of this research, we consider the two variables are important in order for library to implement green technology.



Figure 1: The Relationship Elements for Green Library Technology Implementation

However, the awareness of implementing green library technology can be applied using social media platform. Social media is one of the most effective tools to share awareness regarding the important of green technology in library. Social media has the potential to facilitate much closer relationship between libraries and their users. Current usage of social media by the library community generally remains ad hoc and somewhat experimental but they likely play an important role in library service provision and outreach the future. Social media presents a good number of opportunities for libraries, but also many challenges. The main opportunities associated green initiative of libraries using social media are seen to be related to its low cost. At the same time, its ability to take the library service to users in their preferred spaces, the opportunity to build a sense of green community between the library and its users, to support co-development of collections and help keep librarians updated on industry news and initiatives.

In Fig. 2, we suggest that the application of social media can assist the process to identify the factors and values toward the implementation of green technology for environmental sustainability.

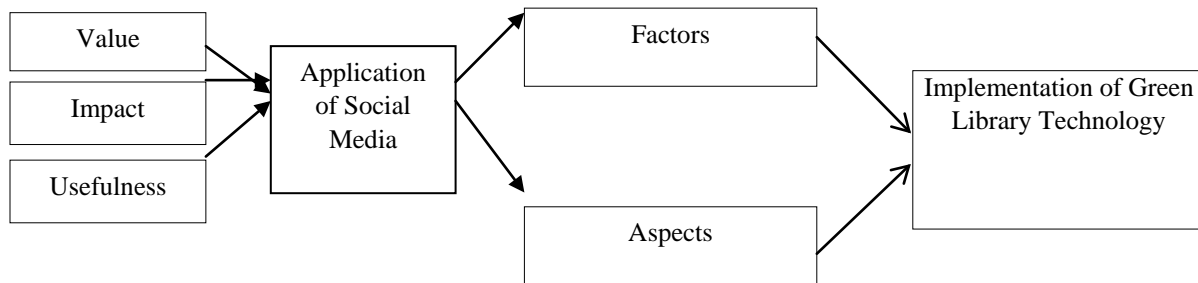


Figure 2: Using Social Media Application to Support the Element Toward the Implementation of Green Library Technology

In Fig. 2, social media is important as an achievement target to promote green technology. Social media becomes a guideline for library toward the implementation of green technology. Library need to understand the impact of social media to support the effort of green technology awareness in the library. Social media plays an important role for library to understand the value and usage of social media to improve the awareness of library community.

In the proposed framework, we denote V_{alue} of social media is important because V_{alue} relies user understanding of social media in sharing the information of green technology using social media platform. We denote I_{mpact} of social media relies the effective of using social media to promote green technology in library. Library need to understand the implementation of social media that could impact the effectiveness of promoting green library. The $U_{\text{sefulness}}$ of social media indicates the implementation of social media that benefit the usage of social media platform to promote green library. The three aspects of social media are proposed to empower the usage of social media as a main platform to promote green library initiative for library sustainability community. The proposed framework implies the propositional logic as,

$$SM = V_{\text{alue}} + I_{\text{mpact}} + U_{\text{sefulness}} \quad (1)$$

where social media (SM) implies the aspect of V_{value} , I_{impact} and $U_{\text{usefulness}}$. Therefore, we denote the implication as,

$$SM(V_{\text{value}}(I_{\text{impact}}(U_{\text{usefulness}}))) \quad (2)$$

In Fig.2, we understand that each social media consists of $V_{\text{value}} + I_{\text{impact}} + U_{\text{usefulness}}$. This implies each relationship as

$$SM(V_{\text{value}}) \quad (3)$$

which indicate social media has value toward green library endowment

$$SM(V_{\text{value}}^1, \dots, V_{\text{value}}^n) \quad (4)$$

where $SM \rightarrow (\neg V_{\text{value}})$ is implies if it has value on green library initiative. We indicate social media has impact toward green library endowment

$$SM(I_{\text{impact}}) \quad (5)$$

$$SM(I_{\text{impact}}^1, \dots, I_{\text{impact}}^n). \quad (6)$$

where $SM \rightarrow (\neg I_{\text{impact}})$ is implies if it has impact on green library initiative. Lastly we indicate social media is useful toward green library endowment

$$SM(U_{\text{usefulness}}) \quad (7)$$

$$SM(U_{\text{usefulness}}^1, \dots, U_{\text{usefulness}}^n). \quad (8)$$

where $SM \rightarrow (\neg U_{\text{usefulness}})$ is implies if it is useful on green library initiative. The framework indicates the relationship between social media platform and green technology (GT) initiative as

$$SM(V_{\text{value}}(I_{\text{impact}}(U_{\text{usefulness}}))) = GT(L_{\text{library}}(S_{\text{sustainability}})) \quad (9)$$

The relationship implies on the implementation of social media to empower green technology initiative for library sustainability community. The three variable; value, impact and usefulness indicate on important of social media as a main platform to promote green technology initiative.

3.1 Library in Social Media Perspective

Most libraries think they do not have any role in social networking (Rosa et al., 2007). However, study by Chu & Nalani-Meulemans (2008) and Charnigo & Barnett-Ellis (2007) showed that social media help librarians to stay connected with the users. Recently, Kai-Wah & Du (2012) showed how the use of social media by library has now become mainstream. Study by Ayu & Abrizah (2011) showed the employs content analysis to examine current uses of the library Facebook page. A checkpoint was developed to analyze the libraries' usage and application of Facebook page. The authors explores the use and application of Facebook among Malaysian academic libraries in order to provide academic libraries with ideas for best practices in using social networking sites to better profile themselves and communicate effectively with their users. Tyler (2012) discussed the increasing interest in social media, the marketing project officers were keen to explore how they could be used by librarians and library services. But they did not wish to embark on campaigns which use social media if library staff and users are unable to access them. Based on this study, evidence suggested that many librarians were prevented from accessing social media tools in a work setting, and that access varied across the different library sectors.

Study by Zhoorian-Fooladi (2014) showed that the librarians use social media to promote library services, manage organizational knowledge and receiving instant feedback from users. Workflow obstacles, technology obstacles, organizational obstacles and personal obstacles deter librarians from participating in social media. Many libraries are already experimenting with different social media services like Twitter or Facebook to interact and connect with their patrons, yet there are still a number of questions that come up as this is still fairly new territory (Burkhardt, 2010).

IV. Conclusion

The findings of this research will ensure the implementation of green library towards the environment world whether it is explicitly stated or not to improve the condition of mankind. The fact that humans are causing harm to the environment is no longer seriously questioned. Since libraries are public buildings meant for the betterment of all, they have the responsibility to not contribute to the destruction of the environment. This research also can give a contribution to educate the community regarding our current situation, and empower them to make a difference. Libraries are discovering that their green building gives them a great opportunity to educate the citizenry. As libraries continue to take a more progressive stance on improving the human condition, sustainability will have to be a central theme. Green libraries often offer various programs about environmental education by explaining how they are reflected in their architectural design and mechanism.

Moreover, this research can build the awareness toward the community across the globe on the important and benefit of the implementation of green library towards the environment world. A few years ago, the implementation of green library started being known by the community. Nevertheless, through this research, the development of the green library towards the environment world will be outstanding and it becomes the focus to the next generation.

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