

Effectiveness and Challenges of Green Environmental Planning in Apparel Companies of Sri Lanka

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Abstract

Globalization has made people deviate from the natural environment day by day, and it has also increased global warming with consequences for both the living and non-living environment. To address this issue, organizations have undertaken different kinds of environmental planning. Green Environmental Planning (GEP) is one of them. The very first green factories are owned by the massive garment producers in Sri Lanka. However, their success was challenged by many limitations in various ways. This study investigates the effectiveness of GEP and challenges of GEP in Sri Lankan apparel companies. This research was conducted through both qualitative and quantitative research methods. Five main components of GEP were examined in this study as the independent variables while the dependent variable was the effectiveness of GEP. The sample was based on two companies by using stratified random sampling method. One hundred and twenty employees were selected from the total population of each company. The primary data was collected through a questionnaire and face-to-face interviews and the secondary data were also used. All variables of GEP are highly correlated with the dependent variable of Effectiveness of Green Environmental Planning while temperature controlling is the strongest predictor of the dependent variable. The main challenges of improving GEP are technological weaknesses, lack of awareness of employees, conventional mindsets towards traditional buildings, less governmental contribution, less inter-sectorial coordination among related sectors and lack of professionals in the field.

Recommendations were proposed towards a more effective green environmental planning in Sri Lankan apparel companies.

Key Words: Challenges, Effectiveness, Global Warming, Green Environmental Planning, Apparel Companies

Introduction

Globalization has made people deviate from the natural environment day by day, and it has also increased global warming with consequences for both the living and non-living environments. This situation causes many unbalances in physical and human environment (Hansen et al., 2000). Today, it is essential to manage the gap between natural resource consumptions and the human needs with a sustainable approach (Yılmaz & Bakış, 2015). Different organizations are concerned about the implementation of environmental planning to manage the gap between unlimited human needs and limited natural resources under the sustainability concept. Green Environmental Planning (GEP) can be highlighted as one of them. Green Environmental Planning is all about behaving, engaging, and connecting all the building arrangements in an eco-friendly manner to inspire the natural environment and to combine with the sustainable environment (Green Building Council, 2009).

In the Sri Lankan apparel sector, some well-known companies have taken an initiatory step to engage in the manufacturing process in a sustainable way by building Green Factories with the intention of having environmental certifications like Leadership in Energy and Environmental Design (LEED) as a part of ethical trading. The very first green factories are owned by the massive garment producers in Sri Lanka (Thilakarathna & Silva, 2013).

However, the success of green factories is challenged by limitations in various ways. Firstly, green environmental planning is not up to the standard level

compared to the organizations in the similar chain worldwide regarding the usage of Green Environmental Planning due to technological weaknesses. Secondly, the government intervention is less in Sri Lanka for a successive Green Environmental Planning. In this context, this paper tried to answer the following research questions;

1. Is the existing Green Environmental Planning effective?
2. What are the challenges of Green Environmental planning?
3. How to overcome the challenges?

With the sustainable perspective, this study was geared to investigate the effectiveness and challenges of applying GEP and to find the ways and means of overcoming the identified challenges in two selected Sri Lankan apparel companies.

Accordingly, the specific objectives of the study are;

1. To find whether the existing Green Environmental Planning is effective.
2. To identify the challenges of Green Environmental Planning.

Literature Review

Starting from the general concepts of global warming and the sustainability, the latter part of the literature emphasizes the effectiveness of green environmental planning. The theoretical backgrounds of the variables which are included in the conceptual framework are described here to emphasize the interrelationship between independent and the dependent variables.

Global Warming and Its Impact on Earth

Globalization gets people away from natural environmental inspiration day by day and as a result, adverse effects of global warming have increased today.

This situation results in many unbalances in physical and human environment (Hansen et al., 2000). Therefore, it is essential to manage the gap between natural resource consumptions and the human needs with a sustainable approach (Yılmaz & Bakış, 2015).

The Concept of Sustainability

The concept of Sustainability, defined for the first time by Brundtland Report, published in 1989 by the United Nations of the World Commission on Environment and Development has been placed in the center of several studies and practices (Yılmaz & Bakış, 2015). Sustainable development concept has been improved after developing the report of “World Conservation Strategy” and it consists of three main important factors for any development process: maintaining environmental processes, sustainable usage of all resources and maintaining genetic diversifications (Dhanapala, 2010).

Eco- Sustainability through Green Buildings

Today, many industries deal with the eco-sustainable practices with the intention of protecting the natural environment and having sustainable benefits for organizations through renewable energy sources, eco-friendly work arrangements, garbage management, pure natural ventilation etc. (Green Building Council, 2009). Under the Ministry of Environment and Natural Resources National action plan of programme of Haritha Lanka was initiated in Sri Lanka 2009 and its main missions were: getting rid of dumps, having water for all and always, greening the industries, having clean air everywhere, saving the fauna, flora and ecosystems, facing the challenges of climate change, wise use of the coastal belt and the sea around, responsible use of the land resources, and constructing green cities for health and prosperity (Ministry of Environment and Natural Resources, 2009).

Green building is one of the measures that have been put forward to mitigate the significant impacts of the building stock on the environment, society and economy (Zuo & Zhao, 2014). There are several components that can be identified in the Green Building Designing. These components play a vital role when designing a green environment inside an organization. (Bombugala & Atputharajah, 2010).

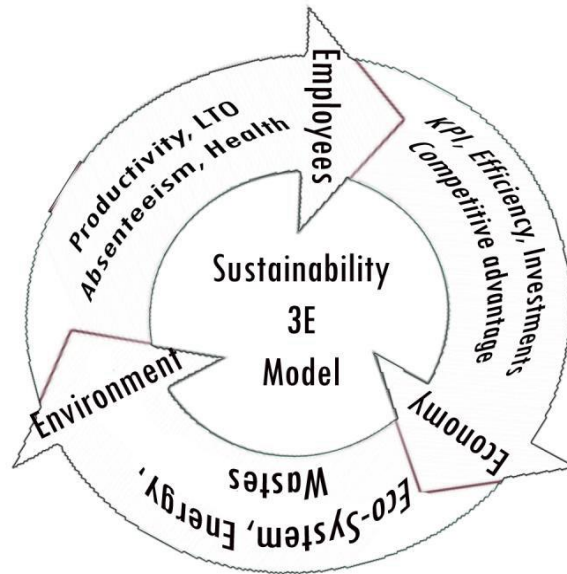
Figure 01: Components of Green Building Designing



Source: Bombugala & Atputharajah, 2010

Benefits of the sustainable design can also be identified in terms of economic, societal and environmental aspects under different principles like sustainable sites, water efficiency, energy efficiency, materials and resources (Waidyasekara & Fernando, 2013). Below figure shows how the real integration can be improved among social, environmental and economic fields through sustainable green factories.

Figure 02: Sustainability Model of Green Factories



Source: Thilakarathna & Silva, 2013

Sri Lankan apparel sector has also been acceded by the ethics and laws of environmental conservation in the recent past. Many apparel companies came to realize the impacts of their various actions on the environment and are trying to make important changes to mitigate their negative environmental impacts. Green arrangement in resource-efficient manner, using ecologically based principles which enables healthy facility for people to work, is one of the measures (Kibert, 2007).

Large organizations now have started using green factories at the basic level of manufacturing as a marketing strategy for their customers to surpass their competitors in order to show the corporate, social and environment responsibility (Thilakarathna & Silva, 2013). In the Sri Lankan apparel sector, some well-known companies have taken the initiatory step to engage manufacturing process in a sustainable way by building Green Factories with the intention of having environmental certifications like LEED as a part of

ethical trading. The very first green factories are owned by the massive garment producers in Sri Lanka namely, MAS holdings Thuruli factory in Thulhiriya, Brandix Casual Wear in Seeduwa, Hirdaramani Mihila factory in Agalawaththa (Thilakarathna & Silva, 2013).

Green Environmental Planning under Green Buildings

The environment can be recognized as the immediate surrounding which man manipulates for his survival (Ajala, 2012). Unjust manipulation causes hazards which make the environments insecure and interfere with the productivity rate of the worker (Ajala, 2012). Therefore, it is essential to create a good environment around employees to have an effective and efficient work place. Ajala (2012) proved that workers are happy with some workspace features such as, lighting, ventilation rates, access to natural light and a relaxed environment which are highly important to the productivity and workspace satisfaction. The physical environmental features like lighting, temperature, existence of windows, free air movement make a big influence on the employee's attitudes, behaviors, satisfaction, performance and productivity (Ajala, 2012).

Green Outdoor Environments (GOE) can be used to reduce employee stress, improve job satisfaction, employees' well-being and performance inside companies and institutions (Shukor et al., 2012). Pati et al. (2016) also noted that natural sceneries through window view was positively affect to control the level of acute stress.

According to Thilakarathna & Silva (2013), under a planned green environment, every employee enjoys fresh air, better light, comfortable surroundings, and beautiful outdoor views of intact nature. This improves employee health, well-being and productivity. The company is benefited

economically through reduced costs, improved employee productivity and quality of work, reduced employee absenteeism rate and turnover and improved brand equity (Thilakarathna & Silva, 2013).

Green Environmental Planning and Its' Effectiveness in Sri Lankan Apparel Companies

Green environmental planning deals with the eco-friendly working methods with the intention of protecting natural environment and having sustainable benefits for organizations through renewable energy sources, eco-friendly work arrangements, garbage management, pure natural ventilation, water management etc. (Green Building Council, 2009). Thus, effectiveness of the Green Environmental Planning is based on the success of energy savings, creating healthy working environment, keeping optimal temperature, arranging pleasant and stress-free working environment and resources utilization. If those variables result in a productive environment with sustainable development and delightful work environment without any stressful situations, it can be identified as the effectiveness of Green Environmental Planning (Green Building Council, 2009).

There are several examples for the effective practices of Green Environmental Planning in Sri Lanka. “The MAS intimates Thuruli factory, Thulhiriya has reduced energy cost by 40% and recycled waste by 95%, Hatton National Bank Nittambuwa has reduced energy cost by 30% and use of portable water by 56%, CKT Apparel, Mihila has reduced energy consumption by 48%, and reduced 60% of total water by harvesting rain water, Brandix Casual Wear Ltd, Seeduwa has reduced energy cost by 50%, reduced water consumption by 60%, recycled waste by 95% and reduced absenteeism with improvement in health standard to 2%” (Bombugala & Atputharajah, 2010).

Brandix Eco-Center, Seeduwa is Sri Lanka's first converted eco-friendly apparel manufacturing plant which has implemented sustainable strategies with the interconnection of environment, people and community and business development (Brandix Eco Center, 2012). According to the Brandix Eco Center (2012), they always prioritize the 'environment' aspect among these three components and try to deal with eco-friendly new products for sustainable development. It is the first apparel factory in the world to receive the platinum rating, the highest standard in eco-friendly manufacture. They further explained that the energy consumption, water conservation, solid waste management, carbon emissions were the main criteria of their eco sustainable practices. During the conversion period they were able to reduce carbon foot print by 77% without any loss in the production output. 70% of the energy consumption of the factory was A/C but they have reduced energy by 43% by using heat-blocking paving that prevents the transfer of heat flow to the factory. The constructed green roofs reduce the indoor temperature and solar panels reduce the energy requirement throughout the year (Brandix Eco Center, 2012).

MAS Thuruli factory, Thulhiriya takes advantages from rain water harvesting for some of their daily usages (MAS Intimates Thuruli, 2008). "Evaporative cooling systems save 75% of the energy used by A/C, Solar panels provide 10% of plant energy and balance power from off-site hydro-electricity, natural light, fresh air, natural views are the main parts of eco-friendly work environment and usage of special eco-bricks for construction is prominent in the factory" (MAS Intimates Thuruli, 2008).

According to Hirdaramani Mihila Walkthrough (2014), Hirdaramani Mihila factory, Agalawaththa is the world's first custom-built green apparel factory. In their factory stores, all empty raw materials are collected and classified for

reusing process. They were able to reduce energy consumption by 48% compared to conventional factories. LED (Light-Emitting Diode) task lights have been replaced in each machine to save energy compared to the conventional lighting systems. Evaporative cooling systems keep building temperature 4-5⁰C lower than the external temperature, use only 25% of the energy for air-conditions and usually circulate fresh air. Skylights significantly reduce the need for electric lighting by saving 158,630 kWh annually and removing harmful UV and IR rays (61% filtered lights). When there is low natural lighting, the factory uses energy saving lights as well. The packaging processes were further explained and the factory is the first carbon neutral apparel manufacturing facility in Asia. They use 70% less water than a conventional factory. Waste water treatment through biological systems in recycling process plays a significant role under 3R process. Preservation of near wetland ensures ground water protection as a part of earth's ecological balance. Reduction of fabric, paper and food wastages via active awareness programs is another ongoing method under 3R process. The solar panels of the factory generate 22000 kWh per annum and supply the national grid on holidays. Hirdaramani Mihila factory has won awards as a certified carbon neutral factory in 2012 and 2013 and as a LEED (Leadership in Energy and Environmental Design) gold-certified factory. They also won national energy award in 2011 and national green award in 2012 (Hirdaramani Mihila Walkthrough, 2014).

In accordance with the reviewed literature, the conceptual model of the study was developed with five independent variables such as energy management, temperature controlling, eco-friendly work environment, eco-friendly color usage, and garbage management. The dependent variable of the study was the

effectiveness of green environmental planning. The conceptual model is shown in figure 03.

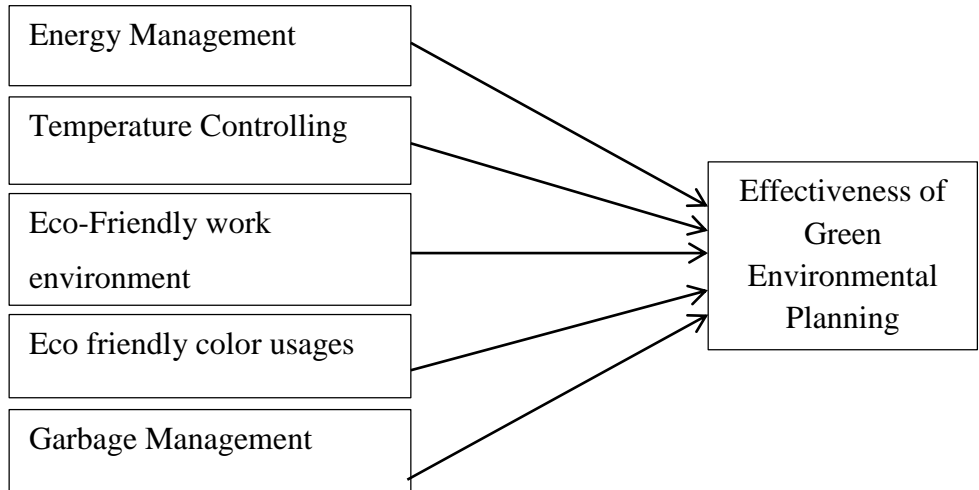
Majority of the literature is about the effectiveness and challenges of green environmental planning in scientific perspective and less attention has been given for expressing it in attitudinal aspect of employees working under apparel companies. This study will come forefront to fill the research gap on effectiveness and challenges of green environmental planning in attitudinal perspective of employees working under two apparel companies in Sri Lanka. Further, it emphasises the need of effective Green Environmental Planning and the required measures to be taken to eliminate related problems in order to overcome challenges.

Methodology

The entire study of the research was conducted by using both quantitative and qualitative research methods. The effectiveness was measured generally in two ways: scientifically and attitudinally. In this study, a questionnaire was distributed to the production floor workers of the selected companies to get their attitudes. The effectiveness of green environmental planning is the dependent variable which is determined by five dimensions, namely, reduced consumptions, reduced wastage, quantity of daily target, employee stress condition, and occupational health condition. Green environmental planning is the independent variable which could also be measured attitudinally by using five sub variables namely, (1) Energy management (2) Temperature controlling (3) Eco-friendly work environment (4) Eco-friendly color usage and (5) Garbage Management.

Figure 03: Conceptual Framework Explaining Effectiveness of Green Environmental Planning

Green Environmental Planning



Source: Based on the Literature Review

Hypotheses

H1 - Energy management positively influence the effectiveness of Green Environmental Planning.

H2 - Temperature controlling positively influence the effectiveness of Green Environmental Planning.

H3 - Eco-friendly work environment positively influence the effectiveness of Green Environmental Planning.

H4 - Eco-friendly color usage positively influence the effectiveness of Green Environmental Planning.

H5 - Garbage management positively influence the effectiveness of Green Environmental Planning.

Data was collected through secondary data sources which consist of related literature on Green Environmental Planning. It was helpful in finding the

empirical gap with a better understanding and conceptualization of the study. After careful consideration of the secondary data, the primary data was collected via a structured questionnaire and face-to-face interviews.

Population for quantitative study comprises all employees who work under the inspiration of Green Environmental Planning within selected companies. The sample identified for this study was 120 employees out of 244 workers. The stratified random sampling method was applied as the respondents were represented in two strata of selected companies. The sample for the qualitative study comprises 20 employees in eco-center maintenance department and the sampling method applied for this was the convenient sampling.

Analysis and Discussion

Demographic Analysis

With regards to the demographic characteristics of the sample, approximately 72% of the production floor workers are female and the male representation is 28%. Majority (40%) of them is in the age category of 31 to 40 years and therefore, the majority of the employees in selected green companies represents the middle-aged workforce. 80% of the employees have been working in selected companies for 3-5 years and more while only 8.3% of employees represent the working category of less than one year of service. The majority of the respondents who have responded regarding the green arrangements are also in the category of 3-5 and more than five years of the service.

Reliability Analysis

In order to ensure the reliability of measures, Cronbach's coefficient alpha was calculated. All Cronbach's Alpha values ranging from 0 to 1 show the

consistency or stability of the collected data for the study. The Cronbach's Alpha values of the questions under each and every variable show significant relationships. The Alpha values for energy management, temperature controlling, eco-friendly work environment, eco-friendly color usage, and garbage management are 0.776, 0.745, 0.832, 0.829, and 0.857 respectively.

Correlation Analysis

In accordance with the rule of thumb of correlation coefficient size, all variables of green environmental planning are highly correlated with the dependent variable and all P values are less than 0.001. It has indicated that there was a significant relationship between Green Environmental Planning and its effectiveness.

Regression Analysis

To find predictors of effectiveness of green environmental planning, the regression analysis was used. The results of regression analysis are shown in Table 1.

According to Hair et al. (2011, cited by Won et al, 2017), there is a multicollinearity issue if the VIF value is higher than 5 and the tolerance value is <0.20. All VIF values were <5 and tolerance values exceeded 0.20. Thus, multicollinearity is not an issue in the present study.

Table 01: Regression Analysis

Model	Unstandardized		Standardized	t	Sig.	Correlations			Collinearity	
	Coefficients		Coefficients			Zero-	Partial	Part	Statistics	
	B	Std. Error	Beta						order	Tolerance
1 (Constant)	2.853	1.669		1.710	.090					
EM	.345	.125	.252	2.750	.007	.597	.249	.178	.497	2.014
TC	.446	.131	.410	3.396	.001	.681	.303	.219	.286	3.498
EFWE	.110	.134	.118	.825	.411	.653	.077	.053	.204	4.906
EFCU	.017	.129	.018	.131	.896	.607	.012	.008	.225	4.443
GM	.010	.109	.011	.091	.928	.553	.009	.006	.295	3.391

*EM Energy Management, TC Temperature Controlling, EFWE Eco-Friendly Work Environment, EFCU Eco-Friendly Color Usage, GM Garbage Management, **Correlation is significant at the 0.01 level (2-tailed)*

The regression standardized residuals of the model were normally distributed and the F-test indicated a good model fit. In accordance with the results of coefficients in Table 1, the standardized coefficients' Beta value is 0.011 for garbage management and it is the lowest representation. The highest value is the temperature controlling and that is 0.410. The second highest and lowest values are for energy management and eco-friendly color usage respectively.

In accordance with the values of Table 1, regression coefficient of energy management and temperature controlling were 0.345, 0.446 respectively. The respective statistical significance levels were less than 0.01. Hence, H1 and H2 were accepted. Therefore, it can be postulated that there was a statistically significant influence of the above mentioned two variables on the effectiveness of green environmental planning in the two selected companies. Also, the other variables such as eco-friendly work environment, eco-friendly color usage, garbage management were excluded from the model due to

statistical insignificance and rejected H3, H4, and H5. With regards to the regression analysis, ultimately, temperature controlling can be highlighted as the strongest predictor of the effectiveness of green environmental planning in Sri Lankan apparel companies. According to the measures of indicators of the variable, attitudes regarding tree plantation in the middle yard, natural ventilation, heat-blocking paving systems, usage of eco-bricks, and creating green roofs have highly affected the effectiveness of Green Environmental Planning. The least influential factor can be recognized as Garbage management and the measures of indicators such as attitudes regarding the recycling process, chemical disposal system, re-use process, ways of collecting garbage, and dust controlling methods show a comparatively less contribution towards the effectiveness of green environmental planning.

As shown in the Table 2 the explanatory power of the model (R^2) was 0.524 indicating the model explained 52.4 percent of the variance in the measure of effectiveness of green environmental planning. The ANOVA was statistically significant at less than 0.001 level. Therefore, the model was powerful enough to predict the linear relationships between independent variables and the effectiveness of green environmental planning.

Table 02: Model Summary

R	R Square	Adjusted R Square	F	Sig. F Change
.724 ^a	.524	.503	25.091	.000

Ajala (2012) identified a positive relationship between temperature controlling and employee's satisfaction, performance and productivity. This study also suggests that the dimensions of temperature controlling have a positive impact on effective green environmental planning. McCunn & Gifford (2012) showed

that while sustainable building arrangements enhance the use of natural and renewable resources in order to minimize the nonrenewable energy and materials consumption, they are also able to reduce the project cost and the maintenance costs. In accordance with the research findings, energy management also positively correlated with effectiveness of green environmental planning. According to Ajala (2012), workers are happy with some workspace features and natural color views (Saito &Tada, 2007), and they are highly important to the productivity and workspace satisfaction. Such features include lighting, ventilation rates, access to natural light, and a relaxed environment (Ajala, 2012). The researcher has also identified that these factors, to a certain extent also influenced an effective green environmental planning while emphasizing the influence of several other factors like earth color interior designing and internal green plantation. Comfortable and ergonomic office plan inspires the employees with good performance (Makhbul, 2007 cited in Hameed & Amjad, 2009). With regards to the research findings of eco-friendly work environment, it shows a positive correlation with green environmental planning while emphasizing the importance of some other factors like rain water harvesting and carbon neutralization for an effective green environment. Leadership in Energy and Environmental Design (LEED) considers a building as an effective one, once it reduces water usage and waste; improves reuse, recycling and using efficient appliances of energy, fixtures and fittings (Green Building Council, 2009). This research also indicates the same criteria for an effective green environment.

Challenges of Green Environmental Planning

This study identified several challenges related to each and every part of green environmental planning through face-to-face interviews with the employees

in eco-center maintenance department and the answers provided to the open-ended questions by production floor employees. A face-to-face interview was conducted as a semi-structured interview method which consisted partially pre-planned questions to obtain real attitudes, feelings and ideas regarding green arrangements. Ability of asking spontaneous questions was sensitive to participants and it was helpful for expressing their real feelings.

Based on different themes of green arrangements, this study identifies several challenges. Firstly, green environmental planning is not up to the standard level compared to the other similar apparel manufacturing companies in the world due to technological weaknesses as mentioned by maintenance departments' employees who have worked in similar chain organizations in different countries. Secondly, the awareness of employees regarding the importance of green environmental planning is not enough for improving the effectiveness and employees do not have a proper knowledge regarding green arrangements according to the answers given to the open ended questions. Thirdly, the preference of some employees towards conventional building is higher than that of green building preference since a few of them expressed negative attitudes regarding green building designing and provided positive attitudes towards conventional building designing. Further, a few professionals to the field can be identified from both the companies even though the eco-factories are governed by a large scientific process. Furthermore, less government intervention for the development of green environmental planning can be recognized as this is one of the newest concepts in Sri Lanka as mentioned by the Sri Lankan green building council. It has also revealed that less inter-sectorial coordination among related institutions like irrigation department, road development authority, geology department, national building research organization, and engineering service department is

another challenge for the development of green environmental planning in Sri Lanka.

Conclusion and Recommendations

Even though the hypothesized five variables of green environmental planning are highly correlated with its effectiveness, only two variables are significantly affecting the dependent variables. The study highlighted temperature controlling as the strongest predictor of the effectiveness of green environmental planning in Sri Lankan apparel companies. Also, this study identified different types of challenges under different circumstances such as technological challenges, attitudinal challenges, investment challenges and expertise challenge. Further, this study would be beneficial for the top management, employees, human resource managers, similar industries, other industries and finally, for the Sri Lankan economic and sustainable development.

Based on the findings, some strategies are suggested for improving green environmental planning and also for overcoming the challengers. The first and foremost important factor is to improve temperature control and energy management by using high quality standards and technologies practiced in other similar chain organizations worldwide. A well-maintained monitoring system under the top management is crucial and inter-departmental coordination must be improved for all the eco-sustainable implementations. Better utilization of physical, geographical, geomorphological, and geological knowledge with the collaboration of professionals who value all components of green building, primary temperature control, ventilation control, lighting control and abundant day lighting and energy efficient methods can also be recommended as essential measures. It is crucial to conduct awareness

programs for the employees regarding the importance of the green environmental planning in order to enhance positive attitudes towards it. Active participation of employees in the decision-making processes is also a good way of improving green arrangements and sustainable practices. Government intervention to provide monetary and non-monetary supports is vital for the development of green environmental planning. Ultimately, the smooth functioning among different sectors related to green building designing should be improved to have efficient and effective green environmental planning.

Limitations and Further Research

Taking the whole population is impracticable and not effective due to the time and man power confinements. Therefore, the sample size selected for the study was limited to 120 employees from 244 employees. While there may be other variables which have an impact on effectiveness of green environmental planning, only five variables have been examined in this study. The unexplained factors like water management, sustainable site designing, superior indoor quality, and carbon neutralization can be assumed as influential factors for the effectiveness of green environmental planning. Hence, the further studies can be exposed towards those directions.

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