FACTORS AFFECTING TECHNOLOGICAL COMPETITIVENESS IN THE GREEN PRACTICES IN THE HOTEL INDUSTRY OF SRI LANKA

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Abstract— Tourism is recognized as one of the world's largest industries and continues to expand at a rapid rate. However, negative environmental impacts and social impacts are results of this rapid growth. The Sri Lankan hotel industry is operated in a lagging characteristic in greening compared with the global tourism even if some of the best green hotels are operating locally. Hence, a clear gap in greening is visible between the local hotel industry and the best local green hotels. Therefore, this research focused on observing the relevant technological factors behind the existence of such a gap in green implementation of the 58 hotels which are located within the Western Province of Sri Lanka. Further it was conducted as a hybrid approached based on the details collected from the literature review, interviews and a questionnaire based survey. The questionnaire sample included 120 respondents. Data analysing was done using the SPSS through the descriptive and inferential statistics techniques. Findings showed that green expertise knowledge and the technological capabilities are critical factors on green. However, technology transfer and technological infrastructure are not critical factors as of now. Therefore, key issues were analysed and the recommendations were made to meet the sustainable development in the hotel industry of Sri Lanka.

*Keywords— **Technological Competitiveness, Green Practice, Hotel Industry***

I. INTRODUCTION

Natural environment is a core feature of tourism products (Mathieson, 1982) hence tourism and natural environment have very strong relationship. On the other hand, tourism industry are causing degradation of the natural environment due to several reasons such as the excessive use of natural resources, high numbers of tourist arrivals and over development of tourism facilities (Robinot & Giannelloni, 2010). Therefore, hospitality industry is seriously taking part of green concept because of few driving factors. The driving factors are financial benefits (Molina-Azorín et al., 2009), ecological responsibility, competitiveness, legitimation (Bansal & Dahlquist, 2000) and the emergence of green consumers (Vikneswaran Nair & Anantharajah, 2012). Studies had confirmed that financial benefits and legitimation is the main driving factors that causing hotelier to become green operators (Rahman et al., 2012).

Sri Lanka has witnessed unprecedented economic growth since the end of its three-decade long civil conflict in May 2009. The tourism sector has emerged as a frontrunner in Sri Lanka's economic activities. According to Central Bank of Sri Lanka (CBSL) (2011) the hotel industry contributed around two percent to the country's gross domestic product (GDP) which lead the a major tourism destination in South Asia. As the hotel industry continues to grow rapidly, authorities need to encourage sustainability practices by recognizing and promoting hotels that implement energy saving and recycling measures in their operations. Best practices are often subsequently rewarded. With this growth, it becomes important that Sri Lanka's pristine environment does not suffer. Through joint efforts from the government and industry, this growth can be planned and systematic to achieve sustainability. This will result in a reduction in the emissions of millions of tons of greenhouse gases into the atmosphere, which can have irreversible effects on Sri Lanka's fragile ecology (International Finance Corporation, 2013).

Green' is no longer just a fad for the hospitality sector around the world. Numerous hotels are looking to leverage their choices for solar energy, LED lighting, water recycling and others as corporate social responsibility initiatives and showcase them to both industry and guests (www.idsnext.com). However, the hotel industry of Sri Lanka is operating in a lagging characteristic of green implementation comparing with the global trends. Therefore, this research is conducting to overview the relevant technological issues behind the existence of a gap in greening the local hotel industry of Sri Lanka.

A. Research Objectives

- To describe technological factors related to implementing green practices in local hotel industry.
- To explain the relationship between the technological factors and the technological competitiveness in implementing green practices in the local hotel industry.

II. LITERATURE

Tourism is an industry which consumes significant quantities of water and energy resources and generates waste. In the case of Sri Lanka, the hospitality sector ranks as the most energy intensive and therefore incurs high energy costs. Also, the electricity demand of the hotel sector constitutes 4-5 per cent of the national electricity demand. The energy costs constitute 18 per cent of the total operational costs of the hotels (Miththapala, 2011).

Moreover, the water consumption, per guest, in a hotel can be around three times that of the average consumption of a person staying at home (Barberán et al. 2013). With the increasing number of tourist arrivals, there is a tendency to use enormous amounts of energy and water and generate high amounts of waste. The industry person and the expertise ideas on green implementation issues are discussed on several angles through the overall operation of a hotel. Some of those are discussed below.

The most commonly observed barrier for the large hotel category is the perception that the cost of adopting good practices exceeds the benefits. Under the small hotel category, the most observed barrier was that environmental management was not a major priority. Lack of financial resources and constraints due to the structure of hotels and limitations in space were also significant barriers. Policy-wise it is important that more attention has to be given to small hotels to improve environmental management activities. Space and structural constraints are common barriers for adopting good environmental management practices. This indicates that environmental management should be considered at the initial stage of designing hotels or when considering refurbishments. These findings call for greater awareness, training and capacity building support to improve environmental management practices in the hotel industry (Wickramasinghe, 2014).

The main point which is explained under operating environment is that the green implementation difficulties due to adopting issues with existing traditional building which were constructed in an era where the green concept was not influenced significantly and the operating environment and relevant technologies were not much complex like present global situation. Therefore, lots of old hotels which constructed traditional design have been facing serious issues with the decision making in selecting the right choice which required expertise knowledge. Therefore, the industry is operating lagging characteristics in greening as the lots of hotels have an issue with finding right information and direction even if they have skillful well educated employees who are trained for several other fields. Further, they have no relevant green experience even if they have a considerable experience in the hotel field. However, several chain hotels are on the process of adapting to green initiatives to have the involving benefits.

The uncertainty in output of the green initiatives compared with required capital investment is also a serious issue highlighted by the industry person. This is mainly due to the lack of know -how which is necessary to implement the suitable green initiatives, various myths on misleading green benefits, and unavailability of required resource, lack of supportive factors and lack of management concern on short team benefits.

Unavailability of required resources is also a highlighted issue especially on old machineries usage, unskilled employees and high turnover rate and low-tech infrastructure. Several chief Engineers of five star hotels have emphasized that "the required suitable green products are not available in the market and instead a lot of low quality cheaper products can be seen.

Paddy Withana, Former chairman, Tourist Development Authority has emphasized that the impotency of the sustainable tourism development is affecting the labor turnover rate, inadequate infrastructure facilities, less education level of existing employees in the hotel sector and less utilization of unique features available with the destination opportunities and diversified bio diversity. Lots of government officer who are involved in various decision making processes on environmental regularization work has noted that the investment difficulties is the main issue behind the less development of green implementation. However, senior project evaluation officer on environmental aspect has emphasized that the entire decision making officers involved in environmental feasibility studies has no background in green implementation. Sri Lanka Sustainable

Energy Authority (SLSEA) and Green building council have been doing a respectable role in making a greening Sri Lanka. Specially, almost all the hotels observed are involved in a lot of energy serving related activities through the direct and indirect guidance of the SLSEA.

One of the senior Engineers of a green hotel has highlighted the issue in unavailability of relevant technologies to improve existing waste in to energy plants within their premises. They have to contact foreign specialists' ideas on implementing the systems while obtaining the financial supports as well. However, lack of technological knowledge base issues in such an important effort must be considered seriously in order to improve the local green implementation work. However, Janaka Wijesekara, Manger Environmental Management, Cleantech (Pvt) Ltd has noted that the failure of an attempt to address similar concept implementation due to lack of issues coming from the civilians. Therefore, the green initiatives are needed to be done having the proper understanding and equipped with the relevant technologies properly in order to make it successful.

Building technologies are mostly involved with the energy management perspectives. Most of the useful greening stories were developed through the effective and efficient architectural design which developed based on the greening concept. Most of such designs showed the best use of natural lights and ventilation effect giving the lifelong benefits to the nation. Other technologies are manly involved with AC, heat energy, kitchen, laundry operation and guest room facilities.

III. METHODOLOGY

The hotel industry is a highly diversified business which is operated on registered hotels while an unregistered hotel also operates which may be the majority. Therefore, considering the scope of the hotel industry, the research focused on clusters dividing into four main categories. This study focused only on 60 numbers of registered hotels (250 numbers as per the registered name list, published by the Sri Lanka Tourism Development Authority) and 10 selected unregistered hotels which are operating based on the green incentives within the western province except selected limited green hotels out of the western province. Cluster 01: 5 stars and 4 stars class hotels - 15 numbers, Cluster 02: 1 star, 2 stars and 3 stars class hotels - 15 numbers, Cluster 03: Unclassified and selected unregistered hotels - 30 numbers, Cluster 04: Selected unregistered hotels - 10 numbers. This

study used both primary and secondary data. Self-administered semi structured questionnaires was used to collect primary data. Descriptive and inferior analysis was used to analysis the data.

IV. CONCEPTUAL FRAMEWORK

Technology being regarded as the skills, knowledge and methods for achieving plans in a changing environment, and thus encompasses management systems and techniques as well as the physical artefacts of technology, such as equipment and machines (Gilmore and Pine, 1997). However, in comparison with many other industries, it can be argued that the use of technology in the hospitality

industry is not widespread, and its assimilation is expected to be slow. Hence, not only is technology itself an important factor, but the way technology is introduced into and used by organizations (technology transfer) is crucial to its successful utilization.

There is a resistance by managers to undertake formal environmental management programs. This is due to lack of
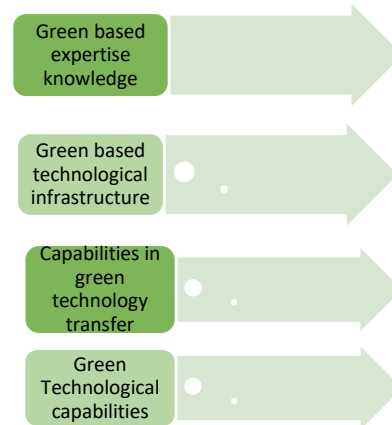
knowledge and training and also the investment in time, money and resources that is required in order to comply with standards and procedures leading to additional barriers to implementation (Doody et. al. 2009). Based on the literature conceptual framework was developed and explained in figure 1.

Figure 1: Conceptual framework of the study
Sources: Author derive through literature review

A. Hypotheses of the Study

Based on the conceptual model, the key objectives of the research hypothesis are developed as below.

H1: There is a significant positive relationship between availability of green expertise knowledge and technological competitiveness in local hotel industry.
H2: There is a significant positive relationship between strength of green technological infrastructure and technological competitiveness in local hotel industry.
H3: There is a significant positive relationship between competent in green Technology transfer and technological competitiveness in local hotel industry.
H4: There is a significant positive relationship between green technological capabilities and technological competitiveness in local hotel industry.

B.   Operationalization
Technology base competitiveness mainly depended on green based expertise knowledge, competent in technology transfer, technology capabilities and strength of technological infrastructure. Expertise knowledge can be measures through knowledge on green and organizational background (Yusof & Jamalumdin, 2014). Organizational factors and human factors are measured the competent in technology transfer (Salehudine, Prasad and Osmond, 2012). Technological capabilities can be measured through available technologies and competencies (Decelle, 2004). Lastly, strengths of technological infrastructure can be measured through using external factors and operational factors (Salehudine, Prasad and Osmond, 2012). The dependent variable, technological competitiveness can be measured through technology and innovation, human capital development (Juhasz-Dora, 2015, Tasi, Song and wong 2009).

V. RESULTS
1: Reliability & Validity Test
At the beginning of this analysis, Cronbach's Alpha was used and factor analysis was done to test the validity and reliability of collected data. The variables which were less than 0.7 has removed and all the other variables are valid and reliable as values are greater than 0.7.

2: Descriptive Statistics
The descriptive statistics of knowledge based average values listed in Table 1 and the mean value (3.2) implies positive side of the testing values. However, this is a relatively less on a five point likert scale. Standard deviation is 0.95 which indicates comparatively less deviation from mean value and

implies the positive side of the data series. Therefore, average knowledge level could be a positive factor.

Descriptive		Statistic	Std. Error
AVG knowledge	Mean	3.1967	.08674
	Std. Deviation	.95018	

Table 1: *Descriptive statistics of average knowledge level*

Descriptive		Statistic	Std. Error
Average Technology Transfer	Mean	3.3400	.06428
	Std. Deviation	.70418	

Table 2: Descriptive statistics of average capability to technology transfer

The descriptive statistics of technology transfer based average values is listed in Table 2. The mean value (3.3) is tending to positive side of the testing values. However, this is a relatively less on a five point likert scale. Standard deviation is 0.7 which indicates comparatively less deviation from mean value and implies the positive side of the data series. Therefore, average capability of technology transfer is also tends to could be a positive factor.

The descriptive statistics of infrastructure based average values is listed in Table 3. The mean value (3.5) is tending to positive side of the testing values. However, this is a relatively less on a five point likert scale. Standard deviation is 0.8 which indicates comparatively less deviation from mean value and tends to positive side of the data series. Therefore, average level of infrastructure also tends to could be a positive factor.

Descriptive		Statistic	Std. Error
AVG infrastructure	Mean	3.4933	.07447
	Std. Deviation	.81578	

Table 3: Descriptive statistics of average level of infrastructure

The descriptive statistics of capabilities base criteria's average values is listed in Table 4. The mean value (3.5) tends to present a positive side of the testing values. However, this is a relatively less on a five point likert scale. Standard deviation is 0.83 which indicates comparatively

less deviation from mean value and negative skewness which tends to positive side of the data series. Therefore, average capability level also tends to could be a positive factor which is positively influence on green implementation.

Descriptive

		Statistic	Std. Error
capability	Mean	3.4972	.07614
	Std. Deviation	.83403	

Table 4: Descriptive statistics of Capabilities

The descriptive statistics of technological competitiveness based average values is listed Table 5. The mean value (3.1) is tending to positive side of the testing values. However, this is a relatively less on a five point likert scale. Standard deviation is 1.05 which indicates comparatively less deviation from mean value.

Descriptive

		Statistic	Std. Error
Average competitiveness	Mean	3.1431	.09643
	Std. Deviation	1.05637	

Table 5 : Descriptive statistics of technological competitiveness

3: Correlation Analysis
Results of correlation analysis are shown in Table11.

Correlations

		knowledge	technology transfer	capability	Infrastructure .	Competition.
Average knowledge	Pearson Correlation	1	.711	.772	.627	.907
			.000	.000	.000	.000
			120	120	120	120
Average technology transfer	Pearson Correlation			.665	.487	.658
				.000	.000	.000
				120	120	120
Average capability	Pearson Correlation				.527	.863
					.000	.000
					120	120
Average infrastructure	Pearson Correlation					.548
						.000
						120
Average competition.	Pearson Correlation					1

Table 6: Correlation analysis

The Table 6 describes the association between dependent variables and independent variables. Pearson correlation Descriptive Statistic Std. Error AVG knowledge Mean 3.1967 .08674 Std. Deviation .95018coefficients for all the variables are positive and independent variables are correlated with dependent variables at 0.01 significant levels. Highest correlation exists between green based knowledge and hotel competitiveness (0.907) at 0.01 significant levels.

According to the results, there is an association between green expertise Knowledge, technology transfer, technological capabilities and technological infrastructure with technological competitiveness in local hotel industry.

4: The relationship between all four factors and technological competitiveness

Model Summary

M	R	R^2	Adj. R^2	Std. Error of the Esti.	R^2Chan.	F Chan.	df1	df2	Sig. F Chan.
1	.945	.893	.889	.351	.893	240.191	4	115	.000

Table 7: Regression analysis Tables –all factors

The Table 7 shows the summary of the regression model between independent variables, and dependent variable. R-value indicates the correlation of the two variables that is 0.893 and R2explains the variance, which is 0.889. These results mean that 88.9% of the variance is affected the technological competitiveness by a set of independent variables. Therefore, the model is explaining the relationship more accurately.

ANOVAᵃ

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	118.598	4	29.650	240.191	.000[b]
Residual	14.196	115	.123		
Total	132.794	119			

Table 8: ANOVA -all factors

The Significant value 0.000 is less than 0.05. Therefore, Overall model is significant and adequate for the research.

Coefficients

	Unstan. Coef.		Stan. Coef.			95.0% Confidence Interval for B	
Model	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1 (Con.)	-.496	.183		-2.713	.008	-.859	-.134
infrastructure	-.078	.051	-.060	-1.535	.127	-.179	.023
tech.transfer.	-.102	.067	-.068	-1.515	.132	-.236	.031
capabilities	.543	.063	.429	8.614	.000	.418	.668
knowledge	.737	.063	.663	11.745	.000	.612	.861

Table 9 coefficient Table – all factors

Table 9 results show strong relationship among technological competitiveness with the knowledge level and capability level. It is highlighted that there is no significance relationship among technological competitiveness with infrastructure and technology transfer.

5: Results of hypothesis Testing

Hypothesis 1:
This is a direct effect of green expertise knowledge on hotel competitiveness. According to ANOVA Table 8, significant value is 0.000, which is less than 0.05. Therefore, it can reject the null hypothesis and accept the alternative hypothesis with 95% level of confidence. Hence, it can be concluded that there is a significant positive relationship between availability of green expertise knowledge and technological competitiveness in local hotel industry.

Hypothesis 4:
According to ANOVA Table 8, significant value is 0.127, which is greater than 0.05. Therefore, null hypothesis is not rejected. Hence it can be concluded that there is no significant positive relationship between strength of green technological infrastructure and technological competitiveness in local hotel industry.

Hypothesis 2:
According to ANOVA Table 8, significant value of above relationship is 0.132, which is greater than 0.05. Therefore, null hypothesis is not rejected. Hence it can be concluded that there is no significant positive relationship between competent in green technology transfer and technological competitiveness in local hotel industry.

Hypothesis 3:
According to ANOVA Table 8, significant value is 0.000, which is less than 0.05. Therefore, it can reject the null hypothesis and accept the alternative hypothesis with 95% level of confidence. Further, according to correlation Table 6, correlation coefficient for the relationship is 0.863. Hence it can be concluded that there is a significant positive relationship between green technological capabilities and technological competitiveness in local hotel industry.

VI. DISCUSSION AND CONCLUSION

Identification of the relationship between the technological factors and the technological competitiveness in the local hotel industry was one objective of the study. Confirming the results of Yusof and Jamaludin, (2014) this study also found that the green based expertise knowledge and green technologicalcapabilities are critical factors for the hotel competitiveness in local hotel industry. However, the results of the research showed that the technology transfer is not a critical factor in enhancing the hotel competitiveness in Sri Lankan hotel sector comparing with green based knowledge level. Okumus and Hemmington (1998) has highlighted that the technology transfer is difficult due to the lack of resistance to change issues. Salehudine, Prasad and Osmond (2012) have urged that the technological infrastructure is a critical issue in green implementation in Malaysian hotel industry. Contrast, infrastructure is not a significant issue in green implementation in Sri Lanka. Mr.Paddy withana, former chairperson of Tourism Development Authority, has emphasized that the importance of the destination competiveness which is a key measure to develop the industry drastically competing with other Asian countries while emphasizing the requirement of the infrastructure facilities requirements for the nation. Green implementation in hotel industry of Sri Lanka is strongly affected by technological factors on expertise knowledge and required

technological capabilities. The technological infrastructure facilities and capability to technology transfer are not a seriously affecting issue in which sustainable development was not influenced significantly in Sri Lankan context.

Considering the above facts following recommendation can be made in order to strengthen the local hotel industry.

1: Implications to industry

Recruitment, carrier management, reward systems are to be done effectively targeting the technological aspect as well including the greening concept in Sri Lankan hotel industry. Greening concept may be improved through the green consultation bodies, energy audits, certification or responsible government bodies in order to assure the triple line benefits rather than considering the financial benefits. On the other hand, capability enhancement of the hotel is to be done based on the green technological aspect as well.

2: Implications to Policymakers

New projects approval and environmental assessment are to be improved using the greening concept as well depending on the feasibility. The assistance of Green building council, Sustainable Energy Authority and respective efficient bodies should be taken involving in such assessments regulating in the necessary terms. The hotel industry, State and the Academia should be working together to enhance the environmental friendly initiatives by strengthening the capabilities such as bio gas generating process, waste water treatment methods, and recycling. Research and Development facilities are to be provided for the industry including the green consultation in order to uplift the industries' requirements while encouraging the innovative thinking. Education sector is needed to be improved having the sustainable concept as well in order to protect the natural environmental.

3: Recommendations to Academia

More researches are to be carried out to enhance the local technological capability on sustainable development in hotel industry. Short courses and information flow mechanism are to be enhanced to develop the exiting employees in the industry.

Therefore, it can be concluded that green expertise knowledge and the relevant technological capabilities on green are the most critical factors affecting technological competitiveness in the hotel Industry of Sri Lanka.

A. Limitations &Future research

However, this study was limited to western province in Sri Lanka and considered technological aspects only. The sample was not homogenous as percentage of males included in the sample was considerably higher than the percentage of females. By considering above limitations future researches are encouraged to conduct considering the other factors which may affect the implementation issues such as the financial, attitudinal factors etc. Future research also further expands to its sample size, geographic area, etc. to have a better conclusion.

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