GREEN SERVICE TECHNOLOGY: OPPORTUNITY AND CHALLENGES

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ABSTRACT
Service industry is expanding rapidly and known as the profitable and contributors to the highest global Gross Domestic Product. Due to the climate change issue is getting more attention due to its increasingly adverse effects on human and nature. None of the research debate about what is the motivation for the service sectors to switch into green service. Thus, this study investigates the opportunity on pursuing into green service, in particular, high technology service industry which is airline industry. A qualitative case study through a semi-structured interview is conducted with thirty managers and executives from AirAsia and Malaysia Airport Holdings Berhad to examine the green service challenges. The results of this study identified five green service challenges that should be acknowledged before proceed into green service management.

Keywords: Green service technology, Opportunity, Challenges, AirAsia, Malaysia Airport Holdings Berhad

1. Introduction

Along the rapid growth of the service industry, climate change issue is getting more attention due to its increasingly adverse effects on human and nature [1]. Every human being has increasingly noticed that the world is getting hotter because of activities by industrial manufacturing that raising the disastrous environmental pollution [2]. Competing and winning in today’s economy requires a strategy that incorporates environment sustainability [3]. Each and everyone need to play a role to our environment and we should not leave the entire problem solving to the experts. Since previous three decades, many industrial companies have involved into the environmental revolution. The industrial companies finally recognized that they could reduce the pollution while maximizing the profit [4]. Today’s life contains many activities that bring about the greenhouse effect. However, we fail to ask ourselves the following question. Would we incur high costs if we embraced a green lifestyle? Customers have the most powerful choices to buy services that promote a healthy lifestyle and harmless to the environment. Consequently, service-oriented business that is committed to focus on environmental sustainability has increased efficiency, where the business can transfer resources into high-quality goods at a lower cost. This study is aimed to understand the opportunity of green service in the high technology service sector that uses the most highly advanced technology which is airline industry. As such, it is often seen as it has the most potential for future growth. The airline industry is a gateway to and between each country as a flagship and opener to foreigners and expatriates. The narrow definition of airline service is also called intangible service which means the effort of airline staffs giving knowledge, information, and energy into their work to satisfy passengers’ needs [5]. The airline industry is the most high technology service provider from gate to the gate which involves all the facilities in the airport and also in the airline and the services are provided along the journey from one destination to another destination.
2. Related Work

Over the last three decades, most of the service companies have switched into the environmental revolution and noticing that they can reduce the pollution and increasing the profits respectively [4]. Likewise in the airline industry, they also shifted toward creating a superior eco-positioning [6-10]. It is compulsory to win in today’s economy for sustaining competitive advantage. Below are the details of the opportunity of green service technology for sustainable development.

2.1. Industry Forces

Service sector contributed the highest global Gross Domestic Product (GDP) with a share of 68.3 percent in the world GDP in 2014 [11]. Service employment had exceeded industrial employment and became the highest contribution GDP from 1900 until today [12]. However, since the climate change issue becomes the major environmental issues, green practices have been nurtured to produce environmentally and ecologically friendly ways [13-16]. According to the International Air Transport Association (IATA), the aviation should achieve 50% reduction in carbon dioxide (CO\textsubscript{2}) emissions by 2050 relatively to 2005 levels and targeted to improve about 1.5% of fuel efficiency in year 2020 [17, 18]. Through this initiative, aviation industry is growing into a healthy environment and encourages the airlines to establish environmental management system [19, 20]. Other than that, the enforcement by Kyoto Protocol in 1997 has listed thirty-seven industrialized countries to reduce greenhouse gas emissions from human activities by 5% over the period 2008 to 2012 [7, 19]. In addition, policy enforcement by EU Emissions Trading System was introduced to mitigate CO\textsubscript{2} emissions to 5% using a cap system [21].

2.2. Market Demand

Air transport is an important transportation for tourism and business. IATA forecasts the total passengers is increasing over four years at 28.5% [20]. However, due to the climate change issue, it has a significantly negative impact on the environment. This is because 68% of the passengers are concern on environmental sustainability [18] and it is become the important factor that positively influences satisfaction in the airline industry [22]. Nowadays, passengers prefer to choose airlines that support the environmental protection activities [19] and they are willing to pay extra for the carbon offset and the green image [21, 23]. Therefore, the number of environmentally oriented airline carriers is increasing globally with the green technology like the usage of new engine option that more environmentally friendly. Finally, the enforcement of green policy makes the airline more effective towards green [17].

<table>
<thead>
<tr>
<th>Author</th>
<th>Findings</th>
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<tbody>
<tr>
<td>Tan &amp; Yap [20]</td>
<td><strong>Industry Forces</strong>&lt;br&gt;The International Air Transport Association (IATA) has announced that the global aviation industry is growing at a healthy rate where the overall demand has grown 5.6% from 2012 for the total market&lt;br&gt;<strong>Market Demand</strong>&lt;br&gt;1. 25% seat capacity growth for the period April 2012 to October 2013.&lt;br&gt;2. IATA forecast the total passengers is increasing over four years at 28.5%</td>
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<td>Chen et al. [18]</td>
<td><strong>Industry Forces</strong>&lt;br&gt;Aviation industry is responsible for 2-3% of global anthropogenic CO\textsubscript{2} emissions, approximately 12% of the global transport industry’s emission of CO\textsubscript{2}&lt;br&gt;<strong>Market Demand</strong>&lt;br&gt;68% of the airline passengers are concern on environmental sustainability</td>
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<td>Niu et al. [19]</td>
<td><strong>Industry Forces</strong>&lt;br&gt;1. 1987 Montreal Protocol to prevent the continued destruction of the ozone layer and the 1997 Kyoto Protocol to reduce the emissions of greenhouse gases (GHG) arising from human activities.&lt;br&gt;2. (IATA) encourages its member airlines to establish environmental management systems</td>
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3. Challenges for Green Service Technology

Although towards into green service technology has allocate the opportunity, there are some challenges need to be considered. Through the semi-structured interview with AirAsia and Malaysia Airport Holdings Berhad, there are five challenges are identified: cultural, management, infrastructure, technology and policy.

### Table 2: Green Service Technology Challenges

<table>
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<tr>
<th>Market Demand</th>
<th>Industry Forces</th>
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<tr>
<td>Passengers prefer to choose airlines that support environmental protection activities</td>
<td>1. Kyoto Protocol 1997, which came into force in February 2005, thirty-seven industrialized countries and the European Community agreed on binding targets to reduce greenhouse gas (GHG) emissions on average by 5% over the period 2008 to 2012 compared to their respective emission levels of 1990. 2. Airline industry should follow EU’s emission trading scheme once entered EU nations</td>
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<td>Lu &amp; Shon [23]</td>
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<td>Arjomandi &amp; Seufert [7]</td>
<td>The number of environmentally oriented airline carriers is increasing globally.</td>
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<td>T e o h &amp; Khoo [9]</td>
<td>1. It is also approximated that the air transport activity would encounter an annual growth rate of 5% in average and the CO\textsubscript{2} emission level in the year 2050 will be 7-8 times of the year 1990 level. 2. Strengthen the environmental policy on Emission Trading Scheme (ETS)</td>
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<tr>
<td>Abdullah et al. [17]</td>
<td>1. Aviation contributes about 2% to global man-made CO\textsubscript{2} emissions. 2. IATA targeted an improvement in fuel efficiency by about 1.5% per year from 2009 to 2020 and reduction in aviation CO\textsubscript{2} emissions of 50% by 2050 relatively to 2005 levels</td>
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<tr>
<td>Market Demand</td>
<td>Corporate policies on improving green airline image</td>
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<tr>
<td>Market Demand</td>
<td>1. Eco-friendly reputation is a factor that generates positive satisfaction in the airline industry. 2. Green image is an important factor that positively influences satisfaction in the airline industry.</td>
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<td>Wu et al. [10]</td>
<td>1. Two of these are the International Standard Organization (ISO) 14001 series and the EU Eco-Management and Audit Scheme (EMAS). These have also prompted airlines to more adequately address environmental issues 2. Policy enforcement by EU ETS to reduce CO\textsubscript{2} emissions to 5% below the level of 2006 by 2020, using a cap system</td>
</tr>
<tr>
<td>Hagmann et al. [21]</td>
<td>Passengers are willing to pay extra for a green image</td>
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3.1. Cultural Challenge

Based on the Table 2, there are six of twenty AA interviewees about 30% stated on cultural challenges.

“Our culture is not like to beat something or to get something out of it. We try to get awareness by our co-operation staffs towards the green. Our first step is to get awareness rather than the recognition. We don’t want to get any achievement if you did it just for a while and never maintain it. There is no point. We want the staffs to maintain the green behaviour” commented by Head People 1.

From the explanation, it is clear that AA has challenges in creating the green behaviour among employees. Human behaviour is the difficult part to change and is resist to a change since they are in their comfort zone and need time and space to ensure it is totally improved, as supported by Head People 2.

As an example given by Legal Manager, our cabin crews must segregate recycle and non-recycle waste on board and this culture will cost more time and work. Consequently, AA has to hire the ramp manpower to cover 200 flights in a day only for segregating and gathering all the waste to the interim cargo (waste recycling area). Furthermore, it may incur additional cost on additional plastic bags and hiring more ramp staffs. Besides that, from all the management level to the operational level must participate in green campaign (#Green24) program, as explained by Improvement Manager, Safety Manager and IT Manager collectively. The participation is based on voluntary to go on the ground and together create awareness on the environmental sustainability.

Different views from MAHB interviewees on this challenge. Two of ten interviewees about 20% expressed on cultural challenges. Even though klia2 is a certified green airport, they have to educate and create the green awareness among the airport users and tenants. “Our Malaysian culture itself is not very familiar with green concept. We received complaints and arguments from the customers regarding the slow water flushing system because of we use the rainwater harvesting system”, frustration commented by Senior Executive 2. Other than that, Executive Engineer 1 highlighted that they also facing trouble from the tenants and commercial outlets to adopt environmental preventive measures. The green concept among the Malaysian culture is still low since they have lackadaisical attitude towards the environment.

The aggressive actions have been done on both industrial practitioners. Unfortunately, the local culture is not familiar with the green concept. Additionally, it also needs to incur additional cost on the green practices that have been implemented.

3.2. Management Challenge

Three of twenty about 15% AA interviewees said that the management have faced the challenges to replace the conventional resources to green resources. However, there are some areas which face difficulties in using the green material because there is no such alternative to suit with the practices. Although they are switching to green purchase:

“We also move forward for green demand. We start to purchase all products in green things. For example, when we buy the television, it must have 5 star rating. We are looking forward on that. We are now looking forward to green purchase rather than operational purchase” explained by Head People 1.
For an example, the aluminium foil is still needed to re-heat the food, said by Head People 2. Other than that, all the employees are not simply using any paper as they are only using certified paper for printing and job purposes in their work as to meet the demand of reducing the carbon emission, said Head Employee. From the example given, it can be concluded the green objectives are not set as a company values to promote eco-friendly practices.

From the MAHB perspective, there are four of ten about 40% interviewees mentioned on the management challenge. The biggest challenge for the management is cost. Even though klia2 is already certified as a Green Building Index but it still needs additional cost for another airport in Malaysia, explained by Senior Manager. Other than that, the selection of the green suppliers is difficult to be found and needs to be identified clearly and carefully. Senior Executive 1 commented that most of the suppliers out there are not equipped with green products, so they need to be identified and examined in order to meet their green procurement policy. The green policy requirement must achieve to reduce the carbon emissions. Executive Engineer 1 added that the procurement department needs to purchase certified and standard material that meets green procurement policy. Different view from Senior Executive 2, she highlighted that the biggest challenge that the management face is the green awareness event is only limited to airport staffs but not airline staffs.

The assessment and evaluation from the management towards the green service is significantly meeting the industrial practitioner perspective. However, it seems like the cohesiveness is the main challenge to pursue green service management once the service is provided in one service process.

3.3. Infrastructure Challenge

From the AA interviews, three of twenty about 15% justified two challenges. First is the short lifespan of the product make higher maintenance costs. “It is challenging to us because we do not know yet the outcome of the green infrastructure installation at our airports within Malaysia. For example, I am changing the LED lighting system at Kota Kinabalu airport. Basically, the warranty of the LED light is 5 to 10 years or 30,000 hours but the problem is the lighting itself can last about 3 months. So we need to change the LED lights for every 3 months. The LED lifetime is short. The receiving volt of LED is about 60 to 80 volts but our power that we received is estimated about 240 volts. So the driver itself cannot last long when we use for 24 hours with 240 volts” explained Head People 1. Second, it may incur high cost to switch to green infrastructure. All the activities in structuring the infrastructure will incur additional cost for establishing new green building called RedQ building beside klia2 soon, said Head Corporate. Furthermore, in order to achieve ICAO requirement, AA has to purchase new aircraft design and it will cost a huge money investment solely to achieve 2% fuel efficiency, said HOD of People.

Different perspective from MAHB, only one interviewee explained on infrastructure challenge. MAHB is not struggling to change to green infrastructure since klia2 was equipped with green technology and green infrastructure. “The challenges are there but of course one good thing is we are already certified environmental company and here we only have to maintain and sustain as long as we comply with the criteria’s of GBI” said Senior Manager. Meanwhile, based on the document analysis, the carbon management plan is organized with the direction to proactively improve in meeting environmental commitments for continuous improvement [24]. Besides that, the engineering division has embarked some initiatives to maintain and improve the group’s airport infrastructure to ensure they offer the most efficient and secure service to airlines as well as to the passengers who use the facilities [25].

In conclusion, it is contrasted with the academic scholar that the poor infrastructure leads to the challenges but the durability of the infrastructure cause to pursue green infrastructure. In addition, the high cost of green infrastructure is the biggest challenge too.

3.4. Technological Challenge

Technology is the key factors in the customer’s experience chain with service and to deliver the service strategy developed by the organization. In the study of Song, Guan [26], technological advance is able to increase energy efficiency and reduced energy consumption while supporting the human activities by reducing the burden of physical work and making social life comfortable. Ireland, Hoskisson [27] have categorized three technology related trends and conditions: technology diffusion and disruptive technology, the information age, and increasing knowledge intensity.

From the AA interviews, five of twenty interviewees about 25% stated that knowledge intensity is the challenges for both companies on pursuing the green service technology. Along with the rapid pace of
technology, knowledge and experience is the critical organizational resource to nominate the technology (explained by HOD of People, Group Head Talent, Group Head Engineering and Improvement Manager collectively). Furthermore, Head People 1 added that they are facing challenges to meet the suitable resources to synchronize with the new technology adoption. The suitable resource means the employee knowledge towards the implementation of the new technology. Similar challenges facing by MAHB, three of ten about 30% interviewees mentioned that they are having new obstacle in developing skill and knowledge of the employees in order to handle the new technology (expressed by Executive Engineer 1, Senior Executive 1 and Senior Executive 4 collectively). Taking into consideration the literature reviews, the lack of knowledge on green technology is the barrier for both industrial practitioners.

3.5. Policy Challenge

Policy can impose a rigid framework of service provision that increases the likelihood of failing to cope with the uncertainties of service provision and sustainable environment as well as maintain the economic growth [15]. It is found that four of twenty about 20% AA interviewees stated the green policy implementation at AA is limited and only implemented in some activities.

“We only follow KeTTHA and DoE environment policy to promote environmental sustainability. KeTTHA refers to the application of our activity to reduce negative effects of human activities and DoE is more to our engineering department to dispose item based on disposal standard” explained by Group Head Talent.

At the meantime, the GBI that focuses on efficiency of resource use – energy, water and materials in building construction and operation practice in their building, as commented by Head Employee. Besides that, another policies need to commit is DCA that related with policy requirement from ICAO and IATA, commented Head People 3. However, the policies changes from the responsible parties will impact on the processes and need to align with new corporate strategies and goals, mentioned by HOD of People.

MAHB has more holistic green policies than AA. There are four of ten about 40% interviewees’ supports the implementation of green policies. Regarding to Senior Manager and Senior Executive 1, Integrated Management System (IMS) is applied to meet the quality, safety and environment standards. The green policies implementation must be complied by the suppliers, tenants and subsidiaries to meet the environmental standard, said Senior Executive 3. Then, all the green policies that have implemented are a mandate from the government to meet Kyoto Protocol and Copenhagen Agreement, as highlighted by Senior Executive 2. In addition, MAHB has its own green policy on Carbon Management Plan 2015-2020, it is called the Environmental Protection Policy to support business objective ‘Zero Harm or Damage to the Environment’ to promote the efficient use of energy in delivering service excellence to airport users and customers [24].

As a conclusion, the industrial practitioners have the same view with the academic scholar to adopt green policies as a guideline and standard towards the environmental sustainability. However, the green practices should be grounded on the green policies in order to standardize to all management levels.

4. Conclusion

In this article, the opportunities towards into green service technology were discussed on industrial forces and market demand. However, the opportunities create the challenges for green service technology. There are five challenges should be considered: Cultural, Management, Infrastructure, Technology and Policy. This discussion should be considered as a guide for academicians and industrial practitioners to understand the situation and provide a motivation for further research on green service technology. Future research could explore the comprehensive strategy on green service technology in order to transform from lean to green service practices.

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