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EFFICIENCY OF HOTEL RECYCLING PROGRAMS

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Abstract

In 2008, the Bureau of Labor Statistics reported that 64,300 hotels were operating in the United States. These hotels are contributing to the growing environmental crisis in the United States. The United States faces environmental issues that range from energy efficiency to waste management. Legislation has been passed at the state level in order to reduce the Lodging Industry's contribution to these environmental problems. In Pennsylvania, the state government passed Pennsylvania's ACT 101 (Municipal Waste Planning, Recycling and Waste Reduction Act) which requires "Commercial, municipal and institutional establishments within a mandated municipality recycle aluminum, high-grade office paper and corrugated paper in addition to other materials chosen by the municipality." The act also mandates that these establishments recycle at least 25% of the waste generated at their property. This study investigated 8 hotels and the relationship between the size of each property and the amount of waste and recyclables produced. The study also analyzed the efficiency of each recycling program and the financial impact of a recycling program for the hotel. Our results showed that there was a relationship between size of the hotel and the amount of waste produced and that the hotels were falling considerably short of the 25% benchmark set by Pennsylvania law makers.

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Chapter 1

Introduction

Definition of the Problem

According to the U.S. Environmental Protection Agency (EPA), the United States produced 243 million tons of trash and 82 million tons of recyclables and compost (U.S. Environmental Protection Agency, 2010). This ratio comes out to a 33.8 percent recycling rate. The average American generates 4.34 pounds of waste per day and recycles and composts 1.46 pounds per day. This amount of waste created by Americans each year is enough to fill the Saint Louis Cardinal's baseball stadium top to bottom twice a day. The number of landfills in the United States has also declined from 7,924 in 1988 to 1,654 in 2005. Even though the number of landfills in America has significantly declined, the average size of each landfill has grown enormously. These figures provided by the EPA continue to show an already identified issue in the United States; America needs to find a way to decrease the amount of waste that is going into landfills.

Background Information

The tourism industry is a major contributor to the ever growing solid waste dilemma in the United States (DeBare, 2008). Conventions and meetings generate \$107 billion in annual revenue and serve 136.5 million people each year (DeBare, 2008). Nancy Wilson, a meeting planner in Portland, Oregon, provides insight into the amount of waste produced by conventions and meetings. She estimated that a five day conference with 2,500 attendees can use up to 62,500 plates, 87,500 napkins, 75,000 cups or glasses and 90,000 cans or bottles (DeBare, 2008). The EPA estimated that 730,000 tons of trash is generated at conventions each year (U.S. Environmental Protection Agency, 2008). This amount of trash is enough to fill eight Transamerica Pyramids. These figures don't even include the amount of waste produced by the rooms in the 64,300 hotel properties in the United States reported by The Bureau of Labor Statics (2010) in 2008.

The response to these environmental issues by managers in the hospitality industry is concerning. A recent survey conducted by Meeting Planners International revealed that only 16 percent of U.S. meeting planners cited environmental concerns as being one of the top three external factors affecting their work. This survey shows an alarming reality in that the majority of meeting planners are not concerned with the grave environmental impact they are having on the planet. In a 2008 interview, Ray Burger, president of Pineapple Hospitality stated that, on a scale of one to 10, the hotel industry, in terms of sustainability, is about a three, with most of the sustainability or environmental initiatives initiated thus far have been implemented for economic reasons (Fleming, 2008). Not only do Mr. Burger's thoughts reveal the hospitality industry's slow response to the sustainability movement but also that hotels are only becoming more environmentally friendly for economic reasons. In order to decrease the lodging industry's carbon footprint, hotels will need to change their business strategies to include more sustainable practice in their daily operations.

Contributions of this Study

Previous research such as Enz and Siguaw (1999) have only analyzed full service hotels and the impact of implementing recycling programs and their effect on the hotel. Studies like these have given great insight into positive effects of recycling programs. However, there has been little research on recycling programs in mid-scale and smaller hotels. Adding mid-sized and smaller hotels to the research sample will give a better picture of recycling throughout the whole lodging industry rather than a single part. The results from this study give good insight into why some hotels of this size are not being efficient in their recycling practices. Furthermore, the results from this study suggest that the hotels in this sample may have no financial reason for improving the efficiency of their recycling programs. Through identification of these problems; hotel owners can now formulate possible solutions to

correcting these inefficiencies in their recycling programs. These solutions can help to reduce the lodging industry's carbon footprint by increase the recycling rate in mid-size and smaller hotels.

Chapter 2

Literature Review

Effective Recycling Methods

As environmental issues become the forefront concern in the United States, Americans are looking for ways to reduce their carbon footprint. One simple and effective method is to recycle. According to Campaign for Recycling, recycling reduces more pollution, saves more energy and decreases Green House Gases (GHG) emissions more than any other method besides source reduction (Vida, 2010). Recycling allows people and business to have a tremendous impact on the environment without a major investment. The obvious impact recycling has on the environment is reducing the amount of waste that is hauled to landfills. There are also many other impacts that are overlooked when it comes to recycling. One in particular is that recycling reduces the amount of GHG emitted from landfills. When waste is dumped into landfills, methane is produced as a byproduct due to the fact that landfills are anaerobic. Anaerobic environments have little air which causes the digestion of organic materials by organisms that thrive in this type of condition. Paper, food waste, organic materials and grass are willingly digested and turned into landfill gas that accounts for 50 percent of the methane generated in our atmosphere. Recycling would contribute to limiting the amount of methane admitted into the atmosphere by decreasing the amount of waste going into landfills. Another cause of GHG is the trucks that transport both mined materials and solid waste. Materials such as aluminum for soda cans are extracted from the earth and transported far distances in order to be processed in factories. Then after the products are used by consumers they are most likely discarded in waste bins and then hauled to landfills. This whole process emits a tremendous amount of GHG into the atmosphere (Vida, 2010). The California Department of Conservation conducted a study and found that using recycled aluminum from soda cans requires only 5 to 8 percent of the energy required to produce the primary aluminum to make the cans (Vida, 2010). This results in a 95 percent reduction of GHG emission when

compared to the primary production. Using recycled plastic has a 70 percent reduction while recycled glass has a 30 percent reduction. These figures show conclusive evidence of the tremendous impact recycling can have on the environment.

Corporate Recycling

Over the last decade, corporations in all industries have made a concerted effort to become more sustainable. This choice to become more sustainable was cited in an article by Marcus and Fremeth (2009) as a shift in view towards environmental business practices. The article states, “At one time many practicing managers regarded a preoccupation with green management almost exclusively as a threat. Today it is more widely accepted that green management can be profitable.” This statement shows that businesses are incorporating more environmentally friendly practices due to the financial benefits. The authors use 3M as an example of a corporation that is adopting more sustainable practices through innovations in pollution prevention. 3M was the first company to develop a successful industrial program committed to source reduction through process modification, product reformulation, recycling, equipment redesign, and reuse. The program is called 3P (Pollution Prevention Pays). This source reduction program created by 3M is not completely transferrable to all industries due to the different resources and capabilities of companies. However, business can pick and choose what sustainable practices created by 3M could be applied and used in their business model.

With companies implementing more sustainable practices, many businesses are looking for ways to incorporate sustainable practices in their business models. Sustainability is a broadly defined term that means many different things to many different people as well as different industries. Unruh and Ettenson (2010) discuss this ambiguity and how businesses can find their place in this environmental movement. One main theme throughout the article is that businesses need to analyze their capabilities, the competition, and the standards of sustainability within their respective industry.

After the company analyzes these factors they can then determine where to implement more sustainable practices in their business model. Neil Sainsbury-Carter, director of climate policy for Ecos Consulting, sheds some insight into how companies can find their niche and be profitable in the green movement (Business Wire, 2010). According to Sainsbury-Carter, “Organizations should prioritize sustainability strategies and investments with any eye towards both meeting environmental regulations and delivering measurable results. Organizations that are accountable for their sustainable programs will enjoy a competitive advantage” (Business Wire, 2010). This quote from Sainsbury-Carter reveals to companies in all industries that they can have a competitive advantage through making a genuine effort to be sustainable and by having measurable results to show to clients. Companies need to plan out their environmental programs just as much as executing them in order to be successful.

Waste Haulers

In addition to corporations focusing on environmental business practices, waste hauling companies are also investing a significant amount of capital into recycling plants. Waste Management, America’s largest trash hauling company is an example of this shift in focus from solid waste to recycling. The chief executive of Waste Management, David Steiner, knows recycling is a part of his company’s future. According to Steiner, “Picking up and disposing of people’s waste is not going to be the way this company survives long term. Our opportunities all arise from the sustainability movement” (Gunther, 2010). These words from Steiner indicate that the company will be changing its business model by incorporating more sustainable practices. The waste hauling company has already begun to shift its capital investments away from landfills and towards recycling plants. These plants would be designed for single-sourced recycling. Single-source recycling, also known as commingle recycling, allows consumers to place all recyclable materials in one bin. This type of recycling would eliminate the task of sorting recyclables that most Americans, businesses and recycling companies need to do

before recycling collection. The new recycling plants will make the process of recycling easier and more efficient which will help decrease the amount of waste that goes into landfills. Even with this shift in capital investments, the company has still outperformed its top competitor, Republic Services, over the past three years (Gunther, 2010). Waste Management's new focus on recycling will have a major impact on the environment and businesses in the United States.

Previous Research

The majority of research studies on waste management in hotels, restaurants and institutional foodservice operations have been conducted since the 1990's. The studies performed analyzed different types of waste management programs and their effect on the operations of a hotel (Enz and Siguaw, 1999), restaurant and institutional foodservice (Ghiselli, 1995). These studies have also analyzed the financial impact of recycling programs on hotels (Enz and Siguaw, 1999). One study in particular (Stipanuk, 1996), analyzed the historic environmental issues in the hospitality industry. Throughout the paper the researcher analyzes issues regarding water and energy conservation. There was no mention of recycling or composting in the paper which could reveal that these are more modern day issues. The lack of emphasis on recycling programs in this paper also shows that recycling was not a major concern for hotels in the past. This lack of concern will be a major obstacle in changing the recycling practices in hotels.

Another study analyzed the influencing factors for a hotel's decision to implement a recycling program (Shanklin, 1991). These major influences include the location of the hotel property, waste management fees, public image, corporate emphasis on recycling and waste management programs, and the infrastructure of the organization. All of these issues will need to be considered in an owner's decision to implement a recycling program in their hotel. Ignoring any of these important factors could jeopardize the long term success of a recycling program.

Financial Implications

A major issue addressed in previous research studies was the financial ability of the hotel to cover all of the necessary costs needed to start a recycling and waste management program. One research project examined new recycling programs created in the full service and luxury hotels (Enz and Siguaw, 1999). The researchers picked four full service hotels, the Hyatt Regency Chicago, The Colony Hotel, The Hotel Bel Air, and The Hyatt Regency Scottsdale. These hotels had been recognized for their recycling, composting, and waste management programs. The research also analyzed the amount of money the hotels saved from cutting down on cost through these recycling and waste management programs. One hotel in particular that benefited financially from a recycling program was The Hyatt Regency Chicago. The hotel initiated “A comprehensive waste – reduction and recycling program.” From this program the hotel was able to recover 70 percent of recyclable materials and cut waste hauling fees in half (Enz and Siguaw, 1999). Also, the hotel was able to recover \$120,000 in hotel items (e.g. silverware) as a direct result from the recycling program. The study notes that this was an unforeseen benefit by stating “an unexpected benefit of sorting the trash has been the recovery of silverware, towels, dishes, coffee servers, and other equipment” (Enz and Siguaw, 1999). The Hyatt Regency’s recycling program shows that hotels can save money from an efficient recycling program in more ways than just reduced hauling fees. Another important aspect to note of these recycling programs is that some require new positions to be created such as an “environmental-program manager” and “recycling chief.” The Hyatt Regency Chicago has 10 full – time staff members working in their recycling department (Enz and Siguaw, 1999). This study shows that these hotels made a significant investment into their recycling programs. The result of the recycling programs also showed significant financial savings.

Hotels can also generate more revenue in addition to saving money as a result of improving their recycling practices. An example of generating revenue from a recycling program comes from a study

done at the Doubletree Hotel and Executive Meeting Center in Portland (McPhee, 2006). The Director of Operations and Director of Communication, Michael Luehrs and Doug Brecht respectively, gave insight into their money making recycling practices. Luehrs said “We understand the additional costs we experience today will equate to solid, quantifiable business returns as well as less tangible benefits of the goodwill created with our clients and guests.” These words from Luehrs reveal that hotels can gain a tangible return from investing in a recycling program. Brecht went on to add that the hotel can track \$500,000 in convention business in just 6 months after receiving a Green Seal certification. Green Seal is a nonprofit organization that gives out certifications to various businesses that meet sustainable business practices. This example goes to show that the hotels sampled in this study can still see a financial return on their investment in a recycling program even if recycling does not help cut back on costs.

Recycling’s Effects on Consumer and Employee Behavior

The recycling programs’ effect on consumer and employee behavior was another important issue identified Enz and Siguaw’s (1999) research paper. The Colony Hotel saw a direct relationship between guest satisfaction and the addition of a recycling program. In the report the researchers state, “Customers are actively using the guest – friendly environmental practices of the Colony Hotel, and the guest – comment cards indicate a high level of satisfaction” This quotation shows the positive effect the recycling program has on the guest. In addition, the resort’s corporate business has increased in part because of its environmental programs. Property managers believe they gained marketing leverage from the numerous awards the hotel’s programs have won (Enz and Siguaw, 1999). The Colony Hotel also saw an increase in employee morale and pride as a direct effect of the recycling the program. These types of results demonstrate that there is a consumer and employee benefit in addition to the cost savings benefits of the recycling program.

Relationship between Recycling and Operation Size

In addition to the research on various sustainability programs and their influencing factors; a study was performed in the Indiana school foodservice operations (Ghiselli, 1995). The study examined the relationship between the amount of waste produced by the foodservice operation, the size of the operation and the money allocated to its waste management program. The results of the study showed that a larger institutional foodservice operation will produce more waste but with more money allocated to the program it can keep the cost down by removing more food waste. With this knowledge, larger hotels could benefit the most from a recycling program since they are producing more waste than other properties. The benefit would come from diverting a lot of their waste to recycling which would significantly decrease their hauling and tipping fees.

Chapter 3

Methods

Description of the Research Design

This study was an observational study designed to analyze the amount of trash that is produced by various hotel properties, the efficiency of their recycling programs, and cost implications of their recycling programs. This type of design was useful since the main objective of the study was to gather new data on mid size and small hotel recycling programs.

In this study 8 hotels were randomly selected from an area located in central Pennsylvania. The sample was ample enough to give an idea of waste generation and recycling practices for this range of hotel size. As mentioned previously, many hotels that are included in previous best practice recycling studies are upscale or luxury properties. This study gives a good insight into mid-size and smaller scale properties that may not have the financial resources for a recycling program that a luxury property may have. These properties revealed certain information that could allow other hotels of similar size and nature to improve their recycling programs. The more hotels that join into these beneficial environmental practices the more the hospitality industry reduces its carbon footprint.

Research Objectives

This study was broken down into three distinct stages. Below are the objectives listed for each stage of the research process:

Stage 1: Gather information about the amount of waste produced at the hotel property.

The first stage consisted of finding out how much trash these hotels generated in 2009 by contacting the local municipality and using their billing information to find out the specific amount of trash being produced at the individual properties. The characteristics of the hotel (number of rooms, square footage of meeting space, restaurant seats) and the total waste were compiled in order to identify any relationships between the type of hotel and the amount of waste produced. Gathering this

information revealed the amount of waste being produced at each property. The recyclable materials were also added to these figures since a complete overview of the total waste stream was sought.

Stage 2: Gather information about the amount of recycling done on the property.

The second stage in this study examined the amount and efficiency of recycling done by each hotel in 2009. This information was obtained from the local solid waste authority. The type of recyclable materials that were analyzed in this stage were plastic, metal cans, mixed paper, clear glass, green glass and brown glass. In this stage I was able to analyze the efficiency of the hotel's recycling program by calculating the recycling rate for each hotel.

The purpose of this stage was not to criticize any hotel for a poor recycling program but to show that there is a need to increase the amount of recycling on the property.

Stage 3: The financial impact of implementing and improving the hotel's recycling program.

Stage three was designed to show the financial impact of improving and implementing recycling within the hotels. In this stage I visited each property and spoke with the manager on duty to gain more insight into their recycling practices. A best practices model was formulated in order to identify any problems in the hotel's recycling programs. The model for this stage of the research process was simple and had four distinct aspects. The first consisted of whether or not the hotel has a recycling program. The second part of the model was finding out if the hotel had recycling bins on property and where the bins were located on the property. Aspect three investigated whether or not there were recyclable materials in the room. The final part of the model was finding out if there was any publication about the recycling program in the hotel. Each manager was asked about these different aspects of the best practice model and whether or not their hotel had these effective practices. After the information was obtained on the logistics of the recycling program in the hotel, I organized the data into a table and was

able to compare the information from stage one, two and three. From this analysis I was able to find a relationship between the data.

Relationship between the Independent and Dependent Variables

Stage 1

Based on previous research (Shanklin, 1991; Enz and Siguaw, 1999) I used three independent variables for this study; the number of rooms, the size of the function space (square feet), and the number of seats at the bar or restaurant (if present at the hotel). The dependent variable was the amount of trash produced by the hotel.

Analysis of Variance (ANOVA) was used to show any significant relationships between each variable; number of rooms, meeting/functional space, and number of seats in the restaurant and or bar, with the total amount of waste generated. Regression was used to find how much each variable contributes to total waste generated

Stage 2

The purpose of Stage 2 was to determine if the type of waste generated by the hotels was affected by the number of rooms, the size of the function space (square feet), and the number of seats at the bar or restaurant. The type of trash produced by the hotel was used as the dependent variable in a regression analysis.

The dependent variable was measured by contacting the local municipality and obtaining the billings regarding the amount of trash that was picked up from hotel properties. The information from the billings revealed the amount of trash that is being produced by the hotel property. The amount of recycling done by the hotel was also taken into consideration since a portion of the waste may or may not be recycled. For hotels that do recycle, that amount was added back to the total amount of waste in

order to gauge an accurate measurement. The local solid waste authority was the source of the recycling data.

A problem became apparent when collecting this data. The amount of recycled materials was so small (less than 5-percent) we felt it could not give an accurate representation of the true make-up of the waste being generated. Although this situation became a very important factor in stage three for the potential it would seem to indicate for possible cost savings with an improved recycling program, it limited our ability to show the relationship of service provided to type of waste produced. We therefore requested and were granted permission to perform a waste audit for the hotels. This involved taking trash out of each hotels dumpster, opening the bags and analyzing the contents. Results showed that 40 to 60-percent of the hotels waste was actually recyclable in some form. Those that had restaurants had close to 60-percent recyclable material due to compostable/food items. Food or compostable material was not considered in this study, but obviously affects total waste. The materials there were considered in this study were only recyclable materials which included plastics, metal cans, clear glass, brown glass, clear glass and mixed office paper. Consistently we found that approximately 40-percent of each hotels waste was recyclable material. However the make-up of that material varied from hotel to hotel.

Chapter 4 **Results**

Stage 1

Table 1 below shows the results from the different areas in the hotel and the amount of recyclables and waste they produced. The totals for both recycling and waste are measured in pounds.

Property	Restaurant	Conference Center	Seats in Restaurant	Rooms on Property	Square Ft. in Conference Center	Total Recycling	Total Waste	Total Waste Stream
A	No	No	N/A	37	N/A	-	187,200	187,200
B	No	No	N/A	35	N/A	18,623	351,000	369,623
C	Yes	No	120	81	N/A	14,944	514,800	529,744
D	No	Yes	N/A	138	2,300	-	561,600	561,600
E	No	No	N/A	75	720	2,183	327,600	329,783
F	Yes	Yes	376	184	6,000	41,748	1,778,400	1,820,148
G	Yes	Yes	284	286	18,000	8,102	1,544,400	1,552,502
H	Yes	Yes	66	150	9,000	10,372	1,263,600	1,273,972

Table 1: Waste generating areas within hotels

For each independent variable, ANOVA was run with the dependent variable. All three independent variables; number of rooms, meeting/functional space, and number of seats in the restaurant and or bar were found to have a significant positive relationship (all p-values < .01) to total waste generated. The regression analysis revealed that all three independent variables were significantly positively related to total waste both as a whole (equation p-value < .03) and as individual but simultaneous contributors (all p-values < .05). The equation had an r-squared value of .87.

Stage 2

The regression analysis revealed that for plastic recyclable materials, meeting space was significantly and positively related (p-value < .05). Number of rooms was marginally significant and positively related to plastic materials (p-value < .09). The number of restaurant seats was not significantly related to plastic materials. The results were similar for the independent variables and their relationship to metal materials. Meeting space was significant and positive (p-value < .05). And the

number of rooms was marginally significant and positively related to metal materials (p-value <.08).

Once again, the number of restaurant seats was not significantly related to metal materials. For recyclable paper, only meeting space was found to be significant and positive (p-value < .03). Next, we found that all three independent variables were both significant and positively related to glass recyclable material (p-value < .09), although marginally. Lastly, for mixed paper materials, meeting space and number of restaurant seats were significant and positively related (p-value < .04). Below Table 2 shows the amount of each recyclable material that was recycled. The unit of measure for the weight of these recyclable materials is in pounds.

Property	Restaurant	Conference Center	Seats in Restaurant	Rooms on Property	Square Ft. in Conference Center	PLASTIC	METAL CANS	MIXED PAPER	CLEAR GLASS	GREEN GLASS	BROWN GLASS	Total Recycling
A	No	No	N/A	37	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-
B	No	No	N/A	35	N/A	27	2464	380	2865.5	6937.5	5949	18,623
C	Yes	No	120	81	N/A	522	968	304	4365.5	4051.5	4733	14,944
D	No	Yes	N/A	138	2,300	N/A	N/A	N/A	N/A	N/A	N/A	-
E	No	No	N/A	75	720	63	66	1444	97	222	291	2,183
F	Yes	Yes	376	184	6,000	1917	6299	380	28337	2053.5	2762	41,748
G	Yes	Yes	284	286	18,000	76.5	44	2394	2363	2775	449	8,102
H	Yes	Yes	66	150	9,000	688.5	715	646	2477.5	2941.5	2903	10,372

Table 2: Recycling breakdown of each property

Stage 3

Below is table 3 that shows the amount of recyclables and waste generated by the hotels as well as what they were charged for the pickup.

Property	Total Recycling (Pounds)	Borough waste pickup (Pounds)	Total Waste Stream (Pounds)	Recycling Percentage of Waste	Billed
A	-	187,200	187,200	0%	\$2,104
B	18,623	351,000	369,623	5%	\$3,945
C	14,944	514,800	529,744	3%	\$7,250
D	-	561,600	561,600	0%	\$6,312
E	2,183	327,600	329,783	1%	\$3,682
F	41,748	1,778,400	1,820,148	2%	\$20,514
G	8,102	1,544,400	1,552,502	1%	\$17,358
H	10,372	1,263,600	1,273,972	1%	\$14,202

Table 3: Total recycling and waste produced at each property

After contacting the municipality, they indicated that they charge the same fee for picking up both recyclable materials and waste. This identical fee for hauling both recyclables and waste create no cost savings incentive for the hotels to invest in a recycling program. Since the hotels would be paying the same fee for both waste removal and recycling, hotel owners would not save any money by investing money into a recycling program. In contrast to previous research studies such as Enz and Siguaw (1999), these hotels would not have long term savings from enhancing their current recycling program.

In addition to the billings, data was gathered on the recycling practices of the hotel. Below is Table 4 that shows that shows whether or not the hotels in the sample have a recycling program, recyclable amenities, publication of recycling programs and the type of recycling containers. Table 4 also shows where the recycling bins are located on the property as well as what the hotel was billed for their waste and recycling pickup.

Property	Recycling Program	Recycling Bins on Property	Bins on the Property	Recyclable Amenities	Publication of Recycling Program	Recycling Containers	Types of Recycling Containers	Billings
A	No	No	N/A	N/A	N/A	N/A	N/A	\$2,104
B	Yes	Yes	- Restaurant and Back of Office	Yes	No	Yes	All	\$3,945
C	Yes	Yes	- Located in back of house	No	No	Yes	All	\$7,250
D	Yes	Yes	- Kitchen	Yes	No	Yes	Paper	\$6,312
E	Yes	Yes	- Rooms (Season), Back Office	Yes	Sometimes	Yes	All	\$3,682
F	Yes	Yes	- Just in Back offices	No	No	Yes	All	\$20,514
G	Yes	Yes	- Back Offices	No	No	Yes	All	\$17,358
H	Yes	Yes	- Back Offices and Break Rooms	Yes	No	Yes	All	\$14,202

Table 4: Recycling practices at each property

Table 4 shows that only one of the properties does not have a recycling program. The data also shows that most of the properties that have recycling programs only keep their recycling bins in the back office and out of guest areas. Furthermore, the results show that the guests are not informed of the hotel's recycling program due to the fact that there is no publication (signs and pamphlets) of the hotel's recycling program on the property.

Chapter 5

Discussion

Stage 1

As expected, the number of rooms, meeting/functional space, and the number of seats in the restaurant and/or bar were found to have a significant positive relationship to total waste generated. It would stand to reason that as the hotel becomes larger and more complex it would generate more waste. What would seem to be intuitive now has some data to confirm it. More interestingly, the coefficients show that restaurant seats contribute the most to total waste.

On an individual level, the three independent variables showed to have a positive relationship with the total waste stream. These results show that by recycling in just one area of the hotel, (restaurant, rooms, or meeting space); the total waste stream can be impacted by just that one area. This is a positive takeaway for mid scale and smaller hotels that cannot afford to have recycling in every part of the hotel.

Also, the results revealed that together, all three independent variables can potentially reduce the total waste stream. This is another important aspect of the results to note since a hotel that recycles in all three of these areas can have a significant impact on its waste stream. Whether the hotel decides to recycle in one area or all areas of its hotel, the hotel will see a positive impact on its waste stream.

Stage 2

The results of stage two were mixed. For plastic materials, meeting space and number of rooms were found to be significant and marginally significant, respectively. Possibly, recycled water bottles might have a major role in this category. We would expect to find considerably more water bottle use in rooms and meeting space with more tap water use in the restaurant, but further analysis would be required to show this.

For recycled mixed paper material, only meeting space was significant. This significance seems logical, especially after talking to the events coordinator at one hotel. As noted earlier by DeBare (2008), Nancy Wilson pointed out that most meetings, conferences and trade shows generate large volumes of waste paper. For rooms, you would be looking at the occasional newspaper that is recycled, and restaurants with paper napkins. Neither of these items apparently comes close to the volume generated by meeting space.

This information is valuable for hotel owners who are trying to figure out what departments in the hotel generate certain types of recyclables. This information can also help to improve the recycling efficiency in each hotel by placing the correct recycling container in the right location. For example, our results show that it would be unwise to place all mixed paper recycling containers in only guest rooms since meeting space was the only area that had a significant relationship with mixed paper.

Stage 3

During the third stage of the research process we discovered that the municipality in this sample area charges the hotels the same disposal fee for both waste and recycling. This discovery reveals a possible explanation into why the recycling levels are so low at each property. Hotel owners have no real financial incentive to divert more of their waste stream into recycling. However, there is still a positive to take away from this information. A simple reduction in the recycling disposal fee could possibly lead to more recycling by the hotels since they would be able to save money. Independent recycling disposal companies could benefit from these results due to the fact that they could pick up hotel's recycling at a lower cost than the municipality. This could be beneficial to the local economy since more jobs would be created by the need for more independent contractors to pick up the recyclable materials.

As noted earlier in the Enz and Siguaw (1999) paper, some of the hotels in the study hired additional staff to manage the recycling program. These additions will be tough to make for many hotels due to the current financial condition of the hospitality industry. Many hotels are struggling to stay open and operating which would prevent them from incorporating a new recycling program that would require a financial investment. The location of the hotel property could allow the hotels the option of acquiring a recycling program without hiring new staff. For example, if the hotel was located in an area that practices single-stream recycling as opposed to single-source recycling. As defined previously, single-stream recycling allows consumers to place different recycled materials in one bin. Single-source recycling requires the consumer to sort recycled materials in different bins before collection. Single-stream recycling would not require a need for new staff to sort through the waste because this type of program would allow the workforce to put various recyclable materials into one bin. Single-source recycling would require the addition of new staff in order to sort through the waste stream to separate and put the proper recycling materials into the proper bin. Recycling programs that require a significant initial cost will need to have significant long term savings in order for a hotel to start recycling.

Another potential benefit from a hotel's location lies in the fact that hauling fees for waste and recycling vary from municipality to municipality. Even with the hotels in the sample being charged the same rate for hauling recycling and waste; this is not the case for all municipalities. Certain municipalities charge a lower rate for hauling recycling than waste. Therefore the impact of this municipality's hauling fees only effects the hotels in this sample area. However, these hotels need to find away to recycle more of their waste stream. One possible way to obtain lower fees for recycling is to contact the local municipality and find out why they are being charged the same rate for recycling and waste pickup. With companies such as Waste Management investing more capital in recycling

programs; hotels can use this to their advantage to contract the waste hauler to pick up their recyclables at a cheaper rate than the municipality.

In addition to the similar hauling fees, another major finding in our data was the simple changes hotels can make to significantly improve a recycling program. The properties sampled in this study have already implemented a recycling program to a certain degree. Through our best practices survey we found that hotels were missing out on a lot of opportunities to recycle more materials. Table 4 shows that most of the recycling done on property is in back of the house which is a small part of the hotel. With the exception of one hotel on certain weekends, none of the hotels had recycling bins in the guest rooms or in public areas (lobby, lounge and bars). Also, none of the hotels had publication (posters or cards) notifying the guest of any recycling program on property. The results from stage 1 and 2 revealed that the guest rooms and public areas are larger parts of a hotel property where guest generate the most waste and recyclable materials (plastics, metal cans, mixed paper, various types of glass). Placing recycling bins in these areas as well as notifying the guest of the recycling program can significantly improve the amount of recyclable materials diverted from the waste stream.

The most important thing to note about the aspects of the best practices is that they are not that expensive to incorporate in the design of a hotel. Hotels that do not have these aspects and have a lot of recyclable materials on property have the opportunity to implement these simple practices and drastically increase the recycling at their hotel. There are some road blocks that can hinder a recycling program for a hotel or motel. The hotel's staff, guests, budget and location are all obstacles to increasing the recycling levels in hotels. However, by adding cost-effective recycling solutions (e.g., recycling bins, recyclable amenities), and providing guests with information on the property's recycling program, a hotel has the potential to make great inroads towards improving the level of recycling achieved in the hotel industry.

Chapter 6

Limitations and Further Research

The purpose of this study was to examine recycling programs in smaller and mid-sized hotels in terms of size, efficiency and financial feasibility. Future studies should have larger samples and include hotels in a wider geographic area. The hotels included in the study sample had relatively poor recycling programs, thus limiting the amount of recycling material data available for analysis. This study should be used as a starting point for other studies that are looking to expand on the issue of sustainability in smaller to midsize hotels. Studies in the future can further analyze the cost saving impact of recycling programs as well as the revenue created from good recycling practices. Also, future work can analyze the reasons for the different prices set for recycling and waste hauling fees since they played a major role in this study.

Another research topic that could be further researched is the effect recycling programs have on customer and employee perception. Enz and Siguaw (1999) reported the positive impact of a hotel's recycling programs on both consumer and employee perception. This is a topic worth researching since the hospitality industry is an industry that depends on positive guest experiences and interactions with employees. A hotel could benefit from a staff with a high sense of pride and morale.

References

- (2010). Doubletree hotel San Jose and Ecos Consulting join HydroPoint to discuss green multiplier effect on July 24 webcast. *Business Wire*.
- United States Environmental Protection Agency, (2010). *Municipal solid waste generation, recycling and disposal in the United States: facts and figures for 2009*.
- Enz, C. & Siguaw, J. (1999). Best hotel environmental practices. *Cornell Hospitality Quarterly*. 40 (5). 72-77.
- Ghiselli, R. (1993). Reusing, reducing, and recycling solid waste in Indiana school food service: A cost effective approach. Purdue University, Indiana. Dissertations and Theses.
- Keene-Osborn, S. (1999). Turning trash into dollars is becoming big business. *The Denver Business Journal*. Oct2. P.19
- Stipanuk, D. (1996). The U.S. lodging industry and the environment: A historical view. *Cornell Hospitality Quarterly*. 37 (5). 39.
- McPhee, M. (2006). Sustainable resource management in the hospitality industry. *BioCycle*, 47 (10). 40 -43.
- Gunther, M. (2010). Waste management's new direction. *Fortune*, 162 (9). 103-108.
- Unruh, G & Ettenson, R. (2010). Winning in the green frenzy. *Harvard Business Review*.
- Marcus, A. & Fremeth, A. (2009). Green management matters regardless. *Academy of Management Perspective*. 17 -24.
- Fleming, S. (2008). Q & A: Ray Burger: hotel sector joins rush to raise green standards. *National Real Estate Investor*, 50 (8). 13.
- DeBare, I. (2008). Where does convention trash go? Meeting planners are starting to focus on recycling, reusing, reducing waste. *San Francisco Chronicle*. G.1
- Vida, R. (2010). How does recycling decrease greenhouse gas emission? Retrieved from <http://www.campaignforrecycling.org/faq/ghg>.

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Education

The Pennsylvania State University, University Park

- *Bachelor of Science in Hotel, Restaurant, and Institutional Management*
 - Emphasis in Accounting, Taking Intermediate Accounting classes in Smeal College of Business
 - Enrolled in the Schreyer Honors College, Expected Graduation in Summer 2011
 - Thesis: "Efficiency of hotel recycling programs"
 - Thesis Supervisor: Dr. Dave Cranage
 - Honors Advisor: Dr. Breffni Noone
-

Professional Experience

Inn on the Biltmore Estate

House Keeping Internship

*Asheville, NC
May 17th, 2010 to August 13th, 2010*

- Cleaned rooms at 4 Star and 4 Diamond standards
- Managed inventory at the Cottage on property
- Assisted with preparing a weekly payroll report
- Inspected rooms at 4 Star and 4 Diamond standards
- Examined the daily internal cash audit and deposit
- Learned accounting practices for daily accounts receivable
- Put in charge of daily chores for the Cottage on property

Sheraton at Station Square

Accounting Externship

*Pittsburgh, PA
January 2nd, 2010 to January 10th, 2010*

- Assisted with the daily internal audit
- Attended both Sales Strategy and Labor Review meetings
- Observed the month end procedures for the financial statements
- Computed the daily bank deposits
- Participated in setting up banquet functions

Osaka Restaurant

Runner

*Chestnut Hill, PA
December 2008 to August 2009*

- Bused tables
- Served meals to tables
- Cleaned and set up restaurant
- Resolved problems with customers

Springfield Township Public Works Department

Municipal Service Employee

*Springfield Township, PA
Summer 2008*

- Audited the streetlights throughout the township for efficiency
 - Cut the grass at various public areas around the township
 - Picked up municipal waste in the township
-

Clubs and Organizations

Pennsylvania Tourism and Lodging Association, Penn State Student Chapter

American Hotel and Lodging Association, Penn State Student Chapter

- Chairman of the Events Planning Committee *Fall 2009*

Penn State Hotel and Restaurant Society, Penn State Student Chapter

- Serving as Treasurer Officer on PSHRS student council board *Fall 2009 to Fall 2010*
- Planning budget a 20,000 budget 2010 New York Hotel Show
- Manage the monthly finances of the club and cash deposits
- Assist with planning Pig Roast fundraiser