

Please note that this study consists of real analyses on real data but for a fictional client.

CIS 634
Information Retrieval

Case Analysis Project
Mid scale Hotels

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Executive Summary

Current U.S. Hospitality Industry Environment

A report published by PKF Consulting revealed that the average U.S. hotel suffered an 11.9% decline in Income Before Fixed Charges (IBFC) during the first six months of 2003 compared to the same period in 2002. IBFC is defined as income before deductions for management fees, property taxes, insurance, capital reserves, debt service, rent, income taxes, depreciation, and amortization. Contributing factors to this decline are the lackluster economy, catastrophic events such as the Iraqi War, and fear of future terrorist attacks.¹

The hotel industry is focusing on the unmanaged business segment, those business travelers whose expenses are reimbursed by their employer but are not subject to formal travel policies. In 2000 this segment represented 11% of travelers and amounts to a projected \$20.5 billion dollars in spending in 2003.

By 2005 an estimated 1 in 5 hotel bookings will be made online, up from 1 in 12 in 2002.² Most of these online bookings will be made by leisure and unmanaged business customers. These business travelers are turning to the Internet to improve their travel experiences and costs.

Problem

Hotel America is a mid scale hotel chain. It is among the top ten most successful hotel chains in the United States. It has been experiencing a declining occupancy rate since the last quarter of 2001. Although this is a condition of the hotel industry at large, the executive leadership of Hotel America believes it can improve its occupancy rate with the appropriate business strategy in place.

Project Description

PROsav Consulting, Inc. was hired by Hotel America to determine which aspects of midscale hotels customers considered most appealing and to better determine what customers' needs are. PROsav subsequently retrieved from customer opinion web sites (TripAdvisor.com, Epinions.com, and Travelocity.com) customer opinions and ratings of those mid scale hotel chains that present as Hotel America's main competitors.

Analysis

An analysis of the data was performed to determine the most frequently occurring terms in the entire set of customer opinion documents. These terms were then grouped into categories and compared with the overall customer rating scores to determine if any correlations existed. The analysis results are summarized below. For a listing of the terms within each category, please refer to Appendix A.

- BATHROOM is significantly negatively correlated with a low customer rating score.

- KITCHEN, LOCATION, STAFF, and SPECIAL FACILITIES have a significant positive effect with customers' ratings of the hotel. Customers favor the presence of kitchenettes in the suite and SPECIAL FACILITIES such as business center, lounge, nightclub, and restaurant inside the hotel; however, the absence of these features does not have a strong negative effect on the customer's rating (the occurrence rates of these features within the category of Rating 1 and 2 are low).
- For LOCATION customers favor hotels that are located near airports, the downtown area, commercial areas, shopping centers, or tourist attraction sites. There are also positive comments of hotels that are located within walking distance to the subway, Amtrak, bus stations, and train stations.
- For STAFF the occurrence rate of keywords within this category for ratings of 1 and 2 is relatively high (11.30%). Thus, it is very important not to deliver poor quality of service as well as to deliver high quality of service as both poor quality and high quality appear to impact the overall rating score.
- COMMUNICATION FACILITIES, TRANSPORTATION/ PARKING, BED, SPORT FACILITIES, and ENTERTAINMENT have an insignificant effect with customers' ratings of the hotels.
- The content about ENTERTAINMENT and SPORT FACILITIES features found in the hotel reviews are mostly descriptive of the feature rather than positive or negative opinions. This may imply that the more features the hotel provides, the more appealing the hotel is to the customer.

A deeper analysis was performed on FEATURES/SERVICES category that revealed the following:

- Within the LOCATION category, the closeness to mass transit facilities (subway, Amtrak, bus stations, and train stations), downtown, and beach has the highest positive effect.
- Within the SPECIAL FACILITIES category, the presence of restaurants inside the hotel or in the neighborhood has stronger effect than the presence of a business center, lounge, or nightclub.
- Within the COMMUNICATION FACILITIES category, providing a telephone in good working condition has a stronger effect than providing access to the Internet, newspaper, or data port. The reviews also show negative opinions on hotels that carry an extra charge for making phone calls.

Recommendations

Based upon this analysis project PROSav Consulting, Inc. recommends the following actions be taken by Hotel America to better meet the needs of today's customers and to attract new customers who are currently staying at competitive hotels:

- Ensure bathroom facilities are consistently kept clean and in good working condition.
- Re-assess the location of each of your hotels to determine their proximity to mass transportation services, tourist attraction sites, shopping centers, and airports. Customers are looking to do the least amount of traveling (by foot and using public transportation services) as possible at the lowest cost to reach their destinations.
- Assess your current customer service and quality improvement programs to ensure they are effective. Also, institute continuous monitoring of customer service related performance measures.
- Assess the types of facilities you currently offer to customers and possibly add new facilities, such as a restaurant within the hotel, as appropriate and when feasible.

Problem Statement & Approach to the Problem

Hotel America is a mid scale hotel chain. It is among the top ten most successful hotel chains in the United States. It has been experiencing a declining occupancy rate since the last quarter of 2001. Although this is a condition of the hotel industry at large, the executive leadership of Hotel America believes it can improve its occupancy rate with the appropriate business strategy in place.

Mid scale hotels are defined as quality hotels located in major cities or suburban areas, often near major expressways or business areas, convenient to shopping and attractions. The hotel usually features medium-sized restaurants, fitness centers and pools.

The main competitors of Hotel America within the context of mid scale hotels include Sheraton, Best Western, Doubletree, Four Points, Howard Johnson, Quality Inn, Ramada, Homewood Suites, Residence Inn, Country Inn & Suites, and Hampton Inn.

In consideration of the state of the current hotel industry in general and the competitive threat it faces with its primary competitors, the executive leadership of Hotel America has decided to engage in a new customer-focused strategy to remain a market leader within the mid scale hotel market segment. This strategy is expected to dramatically improve its customer value proposition.

Hotel America has contracted with PROsav Consulting, Inc. Their task is to determine customers' needs within the context of mid scale hotels. Given the increasing use of the Internet for online hotel bookings, it is more likely that those individuals who book reservations online also provide valuable opinions on the Internet of those hotels they stayed at. PROsav Consulting, Inc. will perform a search of specific web sites that contain customer opinions of hotels. These opinions will then be analyzed to determine appropriate keywords that describe what matters to customers within the domain of mid scale hotels. Various analyses will then be performed to determine what areas of customer service Hotel America needs to focus on.

Document Sources

The document collection is focused on reviews of Hotel America's main competitors. Reviews on other hotels that were scored significantly worse in the domain, such as Ramada and Howard Johnson, are also considered for negative impacts. Opinions and reviews on mid scale hotels are collected from the following websites.

www.epinions.com

Epinions is one of the most popular website that provides consumer reviews on various products. It basically helps people make informed buying decisions. The website is known to be one of the most reliable source for in-depth product evaluations, unbiased advice, and personalized recommendations. For reviews on hotels, Epinions currently stores information on nearly 50,000 hotels worldwide.

www.tripadvisor.com

TripAdvisor aims to provide a comprehensive travel search engine and directory that helps consumers research their travel plans via the web. The website also indexed popularity of hotels in each city, state-by-state, based on guidebooks, articles, user reviews, and web comments. However, only user reviews are collected into our document collection, as they are our only main interest.

www.travelocity.com

Travelocity.com is one of the most popular online travel services. The website provides reservations for airline tickets, car rentals, vacation packages, as well as hotels. They facilitate a comprehensive search, detailed information, and reviews on hotels within U.S. and Canada. Due to the large number of the website's visitors, we expect to retrieve opinions on hotels from large domain of travelers.

The reviews from all the three websites are free text and each review contains an associated overall rating score (scale of 1 to 5) for the hotel. To view samples of screenshots of each website, please refer to Appendix B.

The entire data collection (360 customer reviews) collected from all the three web sites above, can be viewed online at <http://web.njit.edu/~wa9/CIS634/FinalProject>.

Text Tool Research

Spiders-R-Us

Spiders-R-Us is a free software product developed by Artificial Intelligence Lab. It is a digital library toolkit software that provides modular tools for functions such as spidering, indexing, and searching.

The software was used in this project to perform spidering to facilitate the selection of our customer reviews.

TextAnalyst

TextAnalyst, a product of Megaputer, is text mining software. It enables the user to quickly summarize and cluster text documents. Another feature of the software is its ability to perform natural language queries. A single seat standalone version of TextAnalyst is \$1,290.00

The demo version of TextAnalyst is limited in that it cannot work with documents over 100K. However, it did process 229 out of 360 data files. Once done, it output what the software deemed to be the most significant words in the document. These included HOTEL, RATING, LOCATION, AMENITY, and BUSINESS (see screen print below). It correctly identified HOTEL as the topic of the document collection. However, the other words identified as most significant were not so for our purposes. They were structured words within the documents that provided no meaning for our analysis. We therefore, opted to use Wordstat for the text analysis process rather than TextAnalyst.

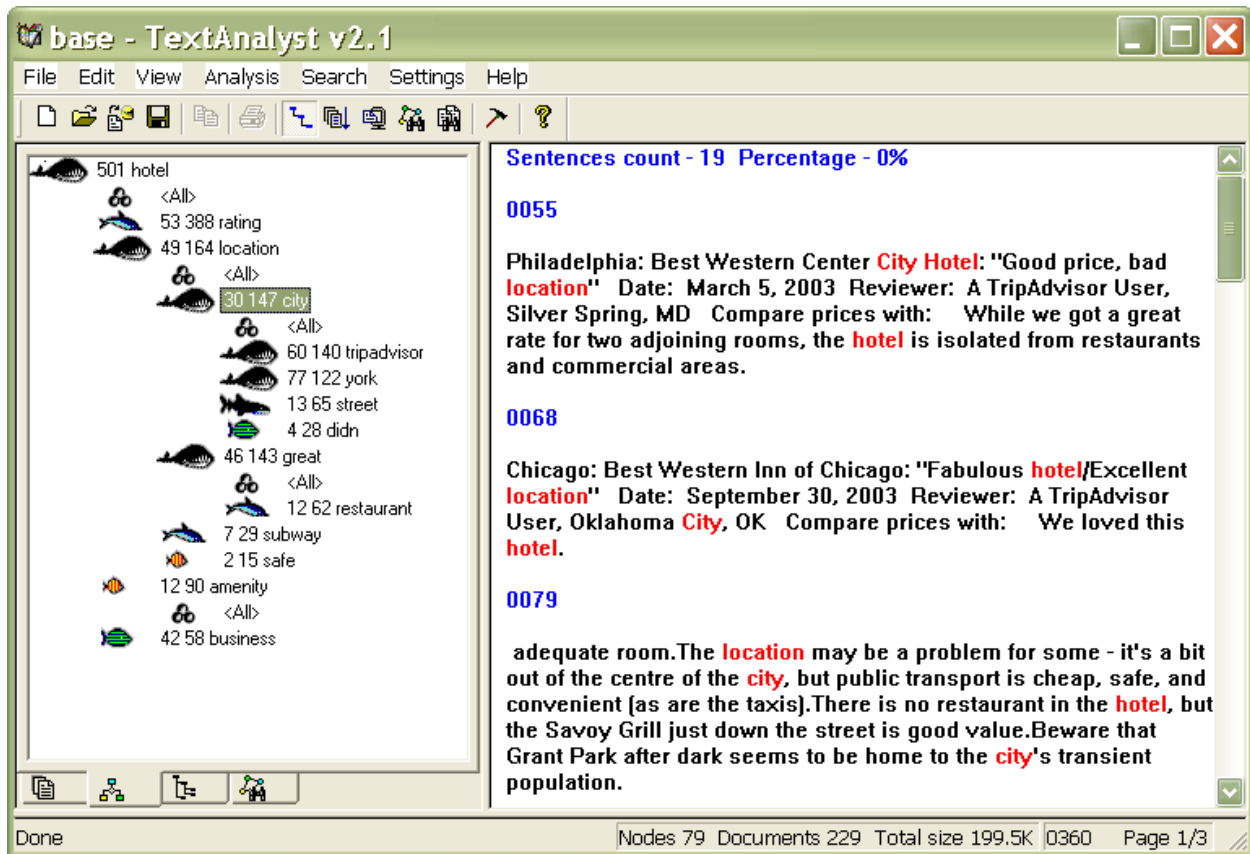


Figure 1: Screen shots of TextAnalyst v2.1

Rainbow

Rainbow is a program that indexes the data collection and performs statistical text classification. We used Rainbow to determine the top 50 words that have highest mutual information within the data collection. Such words that we found are:

Boston	date	reviewer	tripadvisor	user	compare
prices	good	Cons	service	pros	amenities
rooms	recommended	FL	quality	city	dining
visit	favorite	Vacation	entertainment	average	traveler
review	submitted	destination	feature	improvement	rated
scale	lowest	Highest	public	facilities	sports
activities	reviews	Full	USA	families	york
LA	type	Travel	Orlando	Orleans	author
product	bottom				

However, we did not find the results from Rainbow or the index words very useful because of the following reasons:

- o Many words have high mutual information because they are words that are used for structuring the free-text, but are rarely found in the contents of the review. For example, the following text is found in all reviews from www.travelocity.com

*Amenities rated on a 1-5 scale:
(1=Lowest 5=Highest N/A=Not Rated)*

*Rooms = Sports/Activities =
Dining = Entertainment =
Public Facilities = Service =*

Some other words are such as:

*Reviewer: or Submitted by: or Author:
Date of visit:
Pros:
Cons:
The Bottom Line:
Recommended: (Yes / No)*

- o Words that indicate location such as Boston, LA, FL, Orlando, [New] Orleans, [New] York, and USA, are not of our concern. We are more interested in identifying the factors, features, or services that affect customers' opinions, either negatively or positively. We intend to generalize the results for all hotels in the mid scale range, which are not limited to any particular city, or country.

To obtain a better result from Rainbow requires much manual work to separate the parts that are structured from the parts that are purely customers' opinions. However, it is likely that the result will not be adequate as the index words that we are interested in, such as STAFF/ SERVICES, LOCATION, BED, BATHROOM, COMMUNICATION FACILITIES, SPORTS FACILITIES, and TRANSPORTATION/ PARKING, are mostly found in all hotel reviews, which makes it more difficult for textual classification.

In addition, regarding our interest to determine the factors that affect customers' opinions, it is necessary for the analysis to incorporate customers' opinions about each feature or service, and the proximity of positive/negative opinions to each index word within each review. The presence/absence of words from Rainbow was not sufficient in solving the problem.

Nenet and SomPak

Nenet and SomPak do not seem to be appropriate tools for our case because:

- o We do not have a good initialization and training data file. This is a consequence of failing to get a good set of index terms and D-T matrix that represents the problem or concern.
- o The limitation of Nenet's demo version in which it is capable of handling only up to 6 dimensions or 5 index terms.

Wordstat

Wordstat, a product of Provalis Research, is text analysis software that is designed to study textual information such as responses to open-ended questions, interviews, titles, journal articles, etc. It includes exploratory data analysis and graphical tools to enable the user to determine relationships between the document contents and information stored in categories or numeric variables. The retail price of Wordstat with Simstat is \$445.00. It may be purchased online at simstat.com.

Wordstat required a significant amount of manual work to create categories and assign keywords to each category.

Simstat

Simstat, a product of Provalis Research, is a statistical analysis software program. It also contains data management, output management, charting, script and multimedia features. The retail price for a full version of Simstat is \$149.00.

The demo version of the Simstat software program doesn't seem to provide much assistance in parsing the data contents of a semi-structured free-text file in order to create independent and dependent variables for statistical analyses. This needed to be performed manually.

Analysis

In performing the analysis, we retrieved 360 reviews from the document sources, used those reviews to determine keywords, and then analyzed the data to determine what matters to customers of mid scale hotels. The customer-assigned overall hotel satisfaction rating score associated with each review was also incorporated into the analysis.

We determined the correlation between the customers' ratings (evaluations) and the features/services that hotels provide; that is, what features/services that customers favor (result in high ratings), and what features/services, if lacking, result in lower ratings. We selected Pearson's R as the statistical formula to determine the correlation between 2 continuous-value variables. Rating on a scale of 1 to 5 is the independent variable and the features/services category is the dependent variable. The results are displayed in the following table:

Table 1: Percent of Occurrence for each Feature/Service Category at each Level of Customer Rating

Features/Services	Rating					Statistics	
	1	2	3	4	5	Pearson's R	P (1-tail)
OPINIONS-NEGATIVE	26.90	21.30	20.50	13.10	12.50	-0.359	0.000
BATHROOM	10.80	7.70	6.20	4.10	5.50	-0.141	0.004
COMM_FACILITIES	4.20	2.60	1.90	2.80	2.50	-0.035	0.254
TRANSPORTATION/ PARKING	7.50	7.70	4.60	7.60	6.10	0.000	0.500
BED	6.10	7.70	4.60	7.30	5.50	0.014	0.395
SPORT_FACILITIES	6.10	5.20	5.00	7.10	5.80	0.042	0.213
ENTERTAINMENT	2.40	3.90	2.70	3.20	3.60	0.050	0.173
SPECIAL_FACILITIES	2.80	3.90	6.20	7.60	5.80	0.134	0.006
STAFF	11.30	10.30	11.60	12.80	14.70	0.141	0.004
KITCHEN	* 0.00	0.60	1.50	2.30	2.50	0.147	0.003
LOCATION	5.20	7.10	9.70	9.40	10.00	0.153	0.002
OPINIONS-POSITIVE	16.50	21.90	25.50	22.70	25.50	0.443	0.000

Note: The percentage of KITCHEN within the Rating 1 group is zero (0) because there are no reviews rated 1 that contain terms within the KITCHEN category.

The interpretations of the data from Table 1 are as follows:

1. BATHROOM has a significant negative effect with customer's rating of the hotel ($p < 0.025$).

Thus, it is necessary to ensure bathrooms are maintained in good, working condition; however, having bathrooms in good working condition will probably not result in a more positive rating. The negative effect means that there are more negative reviews that resulted in poor ratings than positive reviews that resulted in high ratings in the data collection. Examples of negative reviews about bathrooms include:

"The bathroom was way too small." (Rating: 2)

“The **toilet leaked** from the bottom, slowly, enough to make the floor wet every day.”
(Rating: 1)

“The cold-water faucet in the **bathroom sink didn't work.**” (Rating: 1)

Examples of positive reviews about bathrooms are below:

“This **bathroom** was **immaculate**, down to the white (yes, I said white) ceramic tile. No funky urine **smell** and there was actually **toilet paper** and tissues.” (Rating: 5)

The percent of occurrence of words within the BATHROOM category at each rating level are shown in Figure 2.

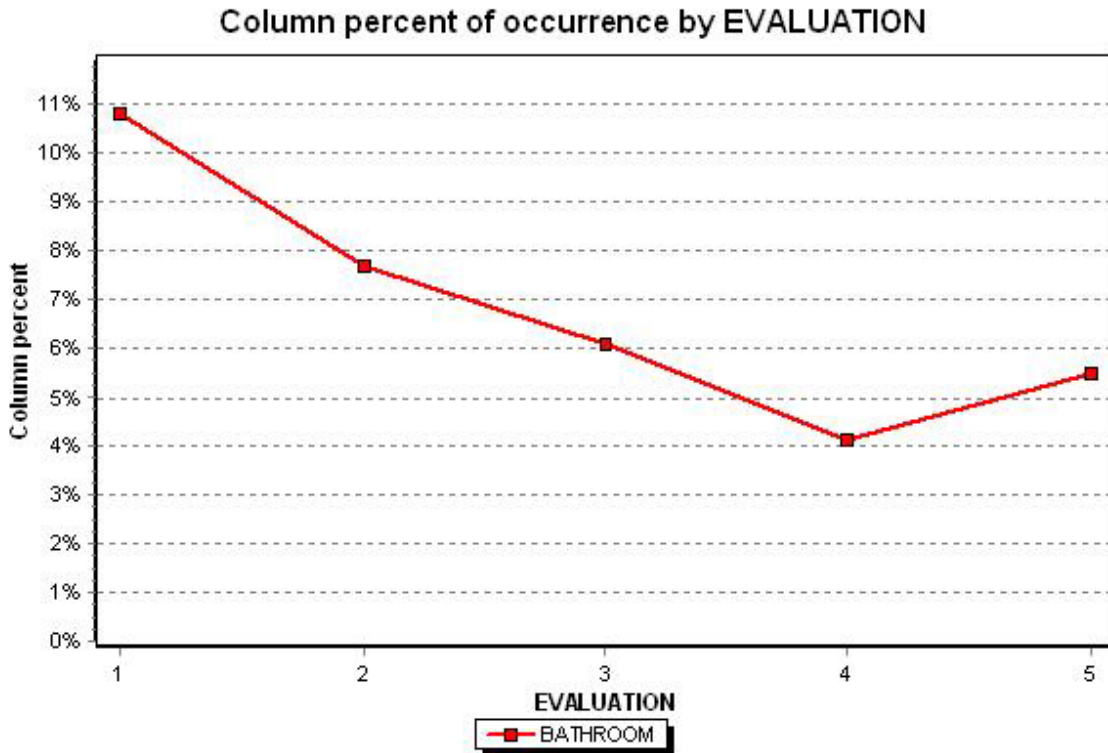


Figure 2: Percent of occurrence of words within BATHROOM category

2. KITCHEN, LOCATION, STAFF, and SPECIAL FACILITIES have a significant positive effect with customers’ ratings of the hotel ($p < 0.025$).

Thus, it is important to leverage the level of quality of these aspects. The positive effect means that there are more positive reviews (which resulted in higher ratings) than negative reviews (which resulted in poor ratings) in the data collection.

Customers favor the presence of kitchenettes in the suite and SPECIAL FACILITIES such as business center, lounge, nightclub, and restaurant inside the hotel; however, the absence of these two features does not have a strong effect on the customer's rating (the occurrence rates of these features within the category of Rating 1 and 2 are low).

Examples of reviews about KITCHEN are:

*"The **kitchenette** (adjacent to the living room) had a full-sized **refrigerator**, a **microwave**, a **dishwasher**, and a built-in table with two chairs. The maid put any dishes we used into the **dishwasher** every morning."* (Rating: 4)

and SPECIAL FACILITIES are below:

*"The room had no kind of menu indicating that there was a **restaurant** or any other services available to the guests."* (Rating: 1)

*"**Good** location, but this hotel is not set up for business travelers. **No high-speed Internet access** and no **business center** in the hotel."* (Rating: 2)

*"There was also a **business center** for the guests to use which offered **Internet access**, and almost anything you would need to use on a computer, such as a printer and word processors."* (Rating: 4)

*"I was most **impressed** with the choices of 3 **restaurants**, one which was a **fine dining** and a **lounge**."* (Rating: 5)

3. For LOCATION customers favor hotels that are located near airports, the downtown area, commercial areas, shopping centers, or tourist attraction sites. There are also positive comments of hotels that are located within walking distance to the subway, Amtrak, bus stations, and train stations.

*"The hotel is just a few blocks south of Grand Central Station and **convenient** to all the **tourist attractions**."* (Rating: 4)

*"The hotel is connected to the Prudential Mall, which has the Cheesecake Factory, Legal Seafood, Boston Duck Tours right within **walking distance**. If its not, the **train stations** are everywhere around the hotel. Very **convenient**."* (Rating: 5)

*"We were in **walking distance** of all the **major attractions**."* (Rating: 4)

*"It is also within **walking distance** to the **subway** and has **free parking**."* (Rating: 5)

*"Close to just about **everything** that's within **walking distance** and **comfortable** with all the amenities one expects from a big city convention hotel."* (Rating: 4)

*“Great location that positions you within **walking distance** for uptown and **downtown** and within ten minutes walk of 34th street and 42nd street for **shopping** and **airport buses**.” (Rating: 4)*

4. The interpretation for STAFFS and SERVICES is quite different since the occurrence rate of keywords within the STAFF category (which also includes SERVICES aspects) for ratings of 1 and 2 is relatively high (11.30%). Thus, it is very important not to deliver poor quality of service as well as to deliver high quality of service. Examples of negative reviews about staff and services are below:

*“The **staffs** always answer “I don't know” or “I can't do anything about it”. The manager took a sleeping pill and could not come in to answer our **complaints**. Never again.” (Rating: 1)*

Examples of positive reviews about STAFF and SERVICES are below:

*“**Staff** was **outstanding** from the **doorman** to the **concierge**. No hidden charges. No **hard sells**. These folks really take pride in their hotel and it shows. Never an attitude. The **concierge staff** knows the city inside and out. Our somewhat unusual request for the location of a magic shop in the city was met with a surprisingly immediate response and directions to an incredible place on West 21st Street which “made” the vacation for my 9 year old. I was very **impresssed**. Our request for a late checkout was granted without hesitation. Housekeeping was **excellent** and never intrusive.” (Rating: 5)*

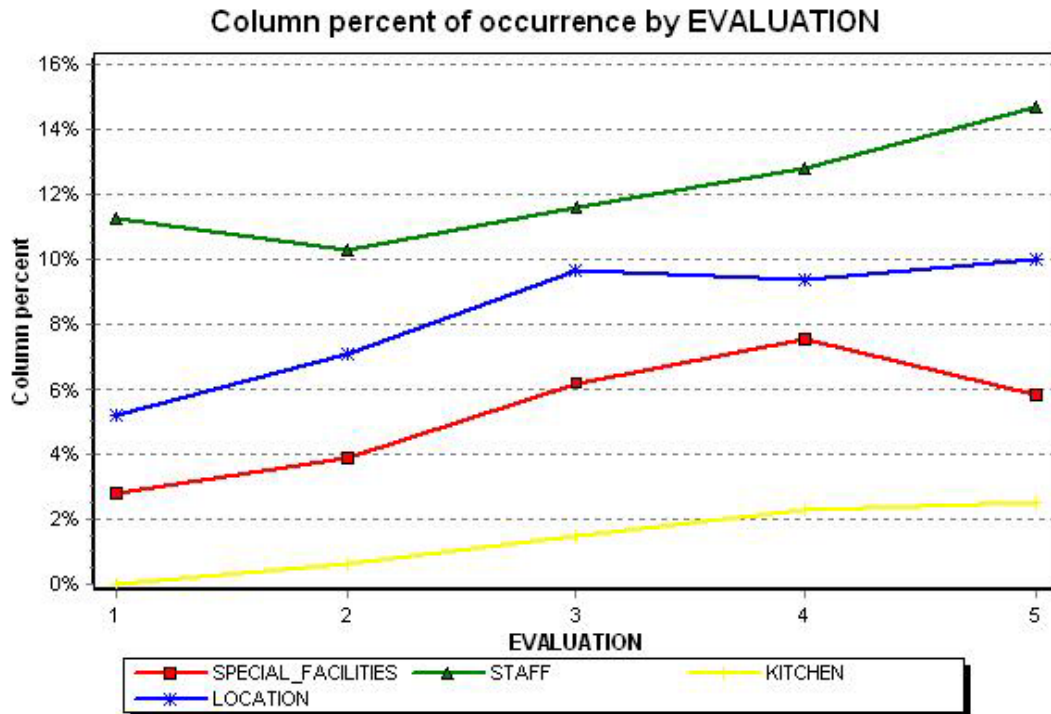


Figure 3: Percent of Occurrence of Keywords within LOCATION, KITCHEN, STAFF, and SPECIAL FACILITIES Categories at each Rating Level

5. COMMUNICATION FACILITIES, TRANSPORTATION/ PARKING, BED, SPORT FACILITIES, and ENTERTAINMENT have an insignificant effect with customers' ratings of the hotels ($p>0.025$).

Based upon these results, we cannot conclude that these are features/services that a hotel should or should not provide, nor that customers will rate a hotel higher if they are provided in a high quality manner. Figure 4 shows that there is no relationship between the occurrence of words in each of these features/services category and how the customers rate a hotel.

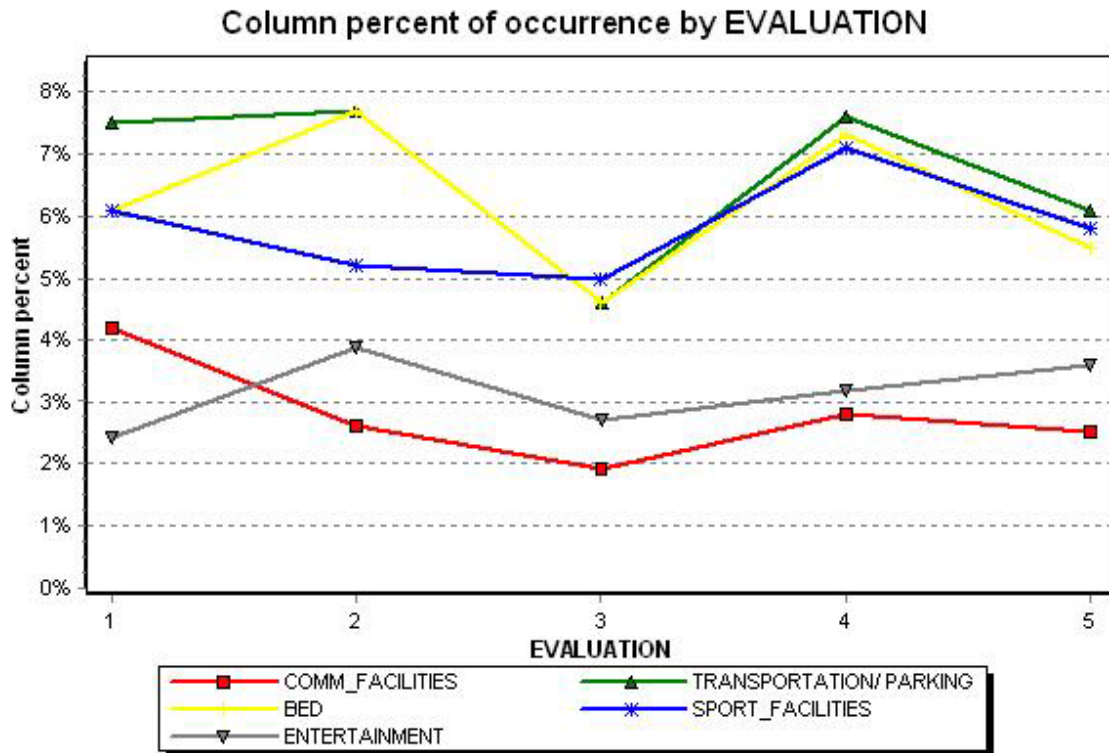


Figure 4: Percent of Occurrence of Keywords within COMMUNICATION FACILITIES, BED, ENTERTAINMENT, TRANSPORTATION/ PARKING and SPORTS FACILITIES Categories at each Rating Level

In order to determine the effects of the FEATURES/SERVICES with a higher level of confidence, we performed a deeper analysis by incorporating the analysis of co-occurrence of words from the OPINION-NEGATIVE or OPINION-POSITIVE with words in each FEATURES/SERVICES category. Wordstat has the capability to perform cluster analysis. The co-occurrence of words was counted based on the co-occurrence within the same sentence. We only considered the occurrence of opinions with the words in each FEATURES/SERVICES category; however, the exclusion of either word (OPINION or FEATURES/SERVICES) was not taken into account because of the following reasons:

- o OPINION words are general words or even stopped words that have very high occurrence within the data collection. Without knowing the context, opinion words have no semantic significance.
- o The occurrence of words in each FEATURES/SERVICES category without OPINION words does not relate to our problem statement to identify the impact of the FEATURE/SERVICES on customers' opinions, thus is not in our interest.

We therefore, selected Inclusion Index as a similarity index for cluster analysis and obtained results shown in Figures 5 and 6.

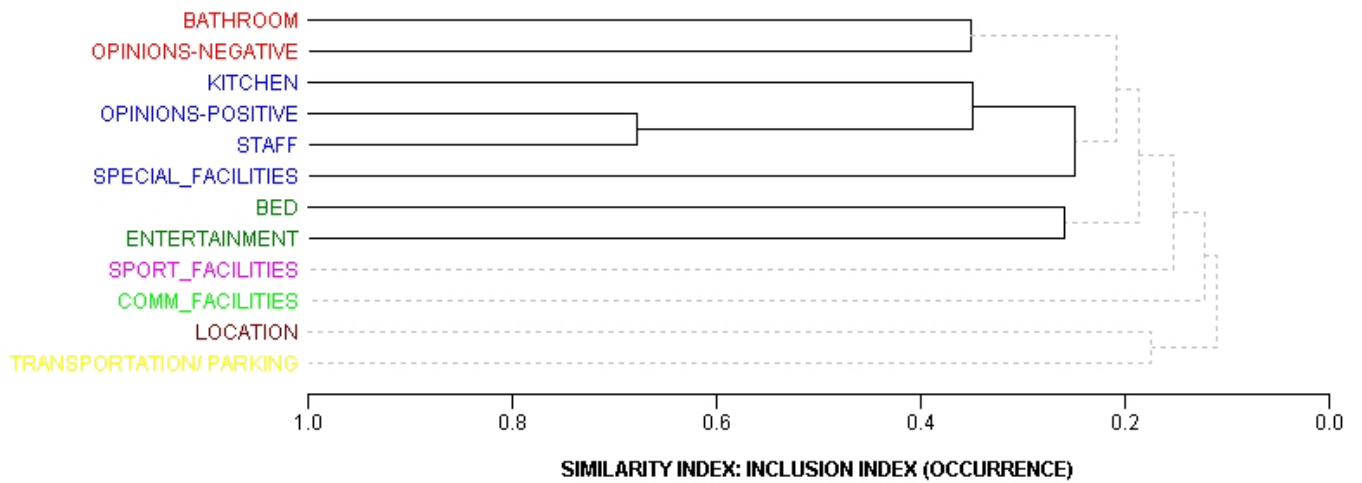


Figure 5: Dendrogram Using Inclusion Index as a Similarity Index

The number of clusters should be high enough to discriminate between OPINIONS-POSITIVE and OPINIONS-NEGATIVE. Figure 5 displays 7 clusters. BATHROOM is clustered with OPINIONS-NEGATIVE. STAFF, KITCHEN, and SPECIAL_FACILITIES are clustered with OPINIONS-POSITIVE. The results indicate that most of the reviews about bathrooms are negative opinions or complaints; and most of the reviews about staff, kitchen, and special facilities (business center, lounge, nightclub, and restaurant) are positive opinions.

The results from the cluster analysis conforms with the results from the correlation analysis, discussed earlier, and again, the features/services in the BED, ENTERTAINMENT, SPORT_FACILITIES, COMM_FACILITIES, and TRANSPORTATION/ PARKING were not found to have close distance to either positive or negative opinions.

CLUSTER ANALYSIS												
Cooccurrence : Same sentence												
Inclusion index												
Cooccurrence matrix												
	BATHROOM	BED	COMM_FACILITIES	ENTERTAINMENT	KITCHEN	LOCATION	OPINIONS-NEGATIVE	OPINIONS-POSITIVE	SPECIAL_FACILITIES	SPORT_FACILITIES	STAFF	TRANSPORTATION/PARKING
BATHROOM	159											
BED	20	150										
COMM_FACILITIES	6	6	53									
ENTERTAINMENT	12	18	6	71								
KITCHEN	4	4	0	3	32							
LOCATION	3	2	3	4	1	191						
OPINIONS-NEGATIVE	55	37	9	16	9	24	546					
OPINIONS-POSITIVE	61	68	20	34	18	105	182	1314				
SPECIAL_FACILITIES	2	3	4	3	3	13	25	66	112			
SPORT_FACILITIES	12	5	2	4	4	9	42	64	6	144		
STAFF	6	12	1	5	4	9	51	162	5	9	238	
TRANSPORTATION/PARKING	0	2	1	0	2	24	31	70	3	7	10	144
Similarity matrix : Inclusion index												
	BATHROOM	BED	COMM_FACILITIES	ENTERTAINMENT	KITCHEN	LOCATION	OPINIONS-NEGATIVE	OPINIONS-POSITIVE	SPECIAL_FACILITIES	SPORT_FACILITIES	STAFF	TRANSPORTATION/PARKING
BATHROOM	1											
BED	0.133	1										
COMM_FACILITIES	0.113	0.113	1									
ENTERTAINMENT	0.169	0.254	0.113	1								
KITCHEN	0.125	0.125	0.000	0.094	1							
LOCATION	0.019	0.013	0.057	0.056	0.031	1						
OPINIONS-NEGATIVE	0.346	0.247	0.170	0.225	0.281	0.126	1					
OPINIONS-POSITIVE	0.384	0.453	0.377	0.479	0.563	0.550	0.333	1				
SPECIAL_FACILITIES	0.018	0.027	0.075	0.042	0.094	0.116	0.223	0.589	1			
SPORT_FACILITIES	0.083	0.036	0.038	0.056	0.125	0.063	0.292	0.444	0.054	1		
STAFF	0.038	0.080	0.019	0.070	0.125	0.047	0.214	0.681	0.045	0.063	1	
TRANSPORTATION/PARKING	0.000	0.014	0.019	0.000	0.063	0.167	0.215	0.486	0.027	0.049	0.069	1

Figure 6: Co-occurrence Matrix and Similarity Matrix

Although there are insignificant effects of BED, ENTERTAINMENT, SPORT_FACILITIES, COMM_FACILITIES, and TRANSPORTATION/ PARKING on customers' ratings or opinions about the hotels, the customers' opinions about each of these FEATURES/SERVICES are still valuable and important to know in order to improve the hotel's level of service. Therefore, we randomly select the opinions about each of these FEATURES/FACILITIES to determine what aspects of them resulted in negative or positive opinions.

BED

Negative opinions:

*"Oh, and the **bed** during this stay was very soft and **uncomfortable** as well."* (Rating: 1)

*"Another Ramada I stayed at had such a foul odor coming from the air conditioning system that I got ill. A few have had **dirty stained bedding**."* (Rating: 1)

Positive opinions:

*"**Bed** was **super comfortable**."* (Rating: 5)

*"The room was **immaculate and pleasant**, the **beds** were quite **comfortable**, the **bedding/floors/bath** were all very fresh and **clean**, and many little extras were included."* (Rating: 5)

ENTERTAINMENT

Negative opinions:

*"Not too many **TV** channels to choose from"* (Rating: 3)

Positive opinions:

*"There are two **TVs**, which vary in model and brand. Most rooms have two completely different **TVs** - different brand, different model, etc. This is only a **problem** if one of the controllers **breaks**. There is also a **Pay-per-view** set **near** each **TV**, you just scan your card (I think your room card), and you get a **great** selection of **movies!**"* (Rating: 4)

*"The living room was very **comfortable** and functional. A couch and a matching **easy** chair were grouped around a highly polished coffee table facing an **entertainment center** with a **reasonably large** (27"?) **TV** and a **VCR**."* (Rating: 5)

*"We got a **great** rate and the kids loved the character theme rooms with four bunk-beds, and their own **TV**, **VCR**, and N64 **game**. The pool, **game** room, and kids' **movie** theater were **great** also."* (Rating: 5)

Note that the content about ENTERTAINMENT features found in hotel reviews are mostly descriptive rather than positive or negative opinions. Customers mostly provide descriptions

in their reviews about what entertainment features the hotel provides. This may imply that the more features the hotel provides, the better.

SPORTS FACILITIES

Negative opinions:

*“Also, the **fitness center** was **poorly maintained** - two **treadmills** that **didn't work** and two **bikes**, one of which had a spring that poked you, the other's seat height couldn't be adjusted.”* (Rating: 2)

Positive opinions:

*“Guests can live the high life here. In the middle of it all is the big recreation area with a **pool**, **sauna**, **hot tub**, kiddie **pool**, game room, and **putting green**. Right next to the **pool** area there is a bar and a walk-up counter where you can order a pizza. There are plenty of tables and chairs to sit down and eat or just to watch the kids. I kind of got the feeling that we were in a Caribbean resort instead of a vacation hotel in the heart of the Midwest.”* (Rating: 4)

*“The **pool** and **workout** room at this Hampton Inn are **well maintained** and **clean**.”*
(Rating: 5)

The results about SPORTS_FACILITIES can be analyzed in the same way as ENTERTAINMENT: that is, customer reviews of SPORTS_FACILITIES consist mostly of descriptions about what sport facilities the hotel provides rather than negative or positive opinions. However, it can be implied that the more facilities the hotel provides, the better.

COMMUNICATION FACILITIES

Negative opinions:

*“The entire **phone** system was completely knocked out in the hotel. You couldn't even call the front desk. I used my cellular **phone** to order room service!”* (Rating: 1)

*“Be careful if you're making a direct dial long distance **phone** call from your room. They don't post the rates on the phone and they charged me \$5.95 for what ended up being an operator assist connection.”* (Rating: 2)

*“The **telephone** charges were **extortionate**. \$120 for three local and one regional call.”*
(Rating: 1)

Positive opinions:

*“You can make unlimited local calls, and can call room to room. You will need a calling card for long distance calls, or you can have them charged to your room. Each **phone** has a separate **phone** line and internet connection line.”* (Rating: 4)

TRANSPORTATION/ PARKING

Negative opinions:

*“On top of all this, they only offer **valet parking** for a fee, on top of the already **overpriced** room rate.”* (Rating 1)

*“**Valet parking** was **awful**, and the pool was closed more than it was open.”* (Rating: 2)

*“**Parking is disaster; valet** doesn't answer when you call and no other choice is available.”* (Rating: 2)

Positive opinions:

*“My wife and I were **pleased** with the **great** room rate and the **free shuttle** to downtown and the airport. It is also within **walking distance** to the subway and has **free parking**.”* (Rating: 5)

*“They have a **free shuttle service**”* (Rating: 5)

*“Your concierge will **gladly** call and a **valet bus** will pick you up and bring you into the heart of Philly.”* (Rating: 4)

*“The **free shuttle** the hotel provides to JFK/UK Mass T and the Airport is **excellent**.”* (Rating: 3)

An interesting point that we found from opinions about TRANSPORTATION/ PARKING is that negative opinions are mostly related to valet parking, and positive opinions, to shuttle service.

The analysis about the effects of the main features/services introduces some interesting aspects that we would like to know, such as:

- Within the group of LOCATION, what are the effects of the distance to each particular place: airports, downtown, commercial areas, shopping centers, tourist attractions, or mass transits (Subway, Amtrak, bus stations, and train stations)?
- What are the different effects of facilities within the group of SPECIAL FACILITIES (business center, lounge, nightclub, and restaurant)?
- What are the different effects of facilities within the group of COMM_FACILITIES (data port, Internet, newspaper, and phone)?

To answer these questions, we assessed the percent of co-occurrence of words in each sub-category with negative and positive opinions.

Table 2: Percent of Co-occurrence for each Features/Services Subcategory with Positive and Negative Opinions

FEATURES/ SERVICES SUB-CATEGORY	PERCENT (%) OF OCCURRENCE	
	OPINIONS-NEGATIVE	OPINIONS-POSITIVE
COMM_FACILITIES/DATA_PORT	0.10	0.10
COMM_FACILITIES/INTERNET	0.90	0.80
COMM_FACILITIES/NEWSPAPER	0.40	0.50
COMM_FACILITIES/PHONE	1.90	1.60
LOCATION/AIRPORT	0.70	1.00
LOCATION/BEACH	1.70	1.60
LOCATION/CENTER	0.80	1.30
LOCATION/COMMERCIAL_AREAS	0.00	0.10
LOCATION/DOWNTOWN	1.00	1.50
LOCATION/MARKETPLACE	0.00	0.10
LOCATION/MASS_TRANSIT	0.80	1.60
LOCATION/MUSEUM	0.20	0.20
LOCATION/TOURIST_ATTRACTIONS	0.50	0.80
SPECIAL_FACILITIES/BUSINESS_CENTER	0.30	0.40
SPECIAL_FACILITIES/LOUNGE	0.30	0.20
SPECIAL_FACILITIES/NIGHTCLUB	0.00	0.10
SPECIAL_FACILITIES/RESTAURANT	4.20	5.10

Table 2 reveals the following:

- Within the group of LOCATION, the closeness to mass transit facilities (subway, Amtrak, bus stations, and train stations), downtown, and beach has the highest positive effect.
- Within the SPECIAL FACILITIES category, the presence of restaurants inside the hotel or in the neighborhood has stronger effect than the presence of a business center, lounge, or nightclub.
- Within the COMM_FACILITIES category, to have a telephone in good working condition has a stronger effect than providing access to the Internet, newspaper, or data port. The reviews also show negative opinions on hotels that carry an extra charge for making phone calls.

Conclusion and Recommendations

In summary, the analysis of customer opinions and ratings of midscale hotels reveals the following:

- BATHROOM is significantly negatively correlated with a low customer rating score.
- KITCHEN, LOCATION, STAFF, and SPECIAL FACILITIES have a significant positive effect with customers' ratings of the hotel
- For LOCATION customers favor hotels that are located near airports, the downtown area, commercial areas, shopping centers, or tourist attraction sites. There are also positive comments of hotels that are located within walking distance to the subway, Amtrak, bus stations, and train stations.
- For STAFF the occurrence rate of keywords within this category for ratings of 1 and 2 is relatively high (11.30%). Thus, it is very important not to deliver poor quality of service as well as to deliver high quality of service.
- The content about ENTERTAINMENT and SPORT FACILITIES features found in the hotel reviews are mostly descriptive of the feature rather than positive or negative opinions. This may imply that the more features the hotel provides, the more appealing the hotel is to the customer.

A deeper analysis was performed on FEATURES/SERVICES category that revealed the following:

- Within the LOCATION category, the closeness to mass transit facilities (subway, Amtrak, bus stations, and train stations), downtown, and beach has the highest positive effect.
- Within the SPECIAL FACILITIES category, the presence of restaurants inside the hotel or in the neighborhood has stronger effect than the presence of a business center, lounge, or nightclub.
- Within the COMMUNICATION FACILITIES category, providing a telephone in good working condition has a stronger effect than providing access to the Internet, newspaper, or data port. The reviews also show negative opinions on hotels that carry an extra charge for making phone calls.

Based upon this analysis project PROSav Consulting, Inc. recommends the following actions be taken by Hotel America to better meet the needs of today's customers and to attract new customers who currently prefer staying at competitive hotels:

- Ensure bathroom facilities are consistently kept clean and in good working condition.
- Re-assess the location of each of your hotels to determine their proximity to public transportation services, tourist attraction sites, shopping centers, and airports. Customers are looking to do the least amount of traveling (by foot and using public transportation services) as possible at the lowest cost to reach their destinations.
- Assess your current customer service and quality improvement programs to ensure they are effective. Also, institute continuous monitoring of customer service related performance measures.
- Assess the types of facilities you currently offer to customers and possibly add new facilities, such as a restaurant within the hotel, as appropriate and when feasible.

References

1. PKF Consulting Report. (2003), 2003 First Half Hotel Profits Plunge - Average U.S. Hotel Suffered 11.9% Decline in IBFC During the First Six months of 2003. Oct. 15, 2003. Retrieved from [http://www.hospitalitynet.org/news/Market_Reports/PKF_Consulting_\(USA\)/4017369.html](http://www.hospitalitynet.org/news/Market_Reports/PKF_Consulting_(USA)/4017369.html) on 10/17/03
2. News Release. (2003), Cornell experts propose strategies for hotels challenged by growing Internet room bookings by customers. Cornell School of Hotel Administration. Retrieved from <http://www.hotelschool.cornell.edu/publications/news/news.html?id=233> on 10/17/03.

Appendix

Appendix A Categorization Dictionary

AMENITIES

BATHROOM

BATH (1)
BATHROOM (1)
FLUSH (1)
HAIR_DRYER (1)
SHOWER (1)
SINK (1)
TOILET (1)
TOWEL (1)
TUB (1)

BED

BED (1)
MATTRESS (1)
PILLOW (1)
SLEEPER_SOFA (1)

COMM_FACILITIES

DATA_PORT (1)
INTERNET (1)
NEWSPAPER (1)
PHONE (1)
TELEPHONE (1)

ENTERTAINMENT

CABLE_TELEVISION (1)
CABLE_TV (1)
ENTERTAINMENT_CENTER (1)
GAME
 GAME_ROOM (1)
 NINTENDO (1)
 VIDEO_GAME (1)
MOVIE (1)
PAY-PER-VIEW (1)
TV (1)
VCR (1)

KITCHEN

COFFEEMAKER (1)
DISHWASHER (1)
FRIDGE (1)
KITCHENETTE (1)
MICROWAVE (1)
REFRIGERATOR (1)
STOVETOP (1)
STOVE (1)

OTHERS

AIR-CONDITION (1)
HALLWAY (1)
IRON (1)
IRONING_BOARD (1)
LOBBY (1)
SAFE (1)
SAFETY_DEPOSIT_BOX (1)
WALLPAPER (1)
WORKING_DESK (1)

LOCATION

AIRPORT (1)
AMTRAK (1)
ATTRACTION (1)
BEACH (1)
CENTER (1)
COMMERCIAL_AREAS (1)
DOWNTOWN (1)
MARKETPLACE (1)
MUSEUM (1)
STATION (1)
SUBWAY (1)
TOURIST_AREAS (1)
TOURIST_ATTRACTIONS (1)
TOURIST_ZONES (1)

OPINIONS-NEGATIVE

ANNOY (1)
AWFUL (1)
BAD (1)
BREAK (1)
COMPLAIN (1)
COMPLAINT (1)
CROWD (1)
DIDN'T_WORK (1)
DIFFICULT (1)
DIRTY (1)
DISAPPOINT (1)
DISASTER (1)
DOWNFALL (1)
DOWNSIDE (1)
EXPENSIVE (1)
FILTHY (1)
FLAKY (1)
FUZZY (1)
HADN'T_BEEN_CLEANED (1)
HARD (1)
HORRIBLE (1)
LACK (1)
LEAK (1)
LENGTHY (1)
LOUD (1)
NASTY (1)
NEGATIVE (1)
NIGHTMARE (1)
NO_*_NEAR (1)
NO_*_WORTH (1)
NOISY (1)
NON-RESPONSIVE (1)
NOT_*_CHEAP (1)
NOT_*_CLEAN (1)
NOT_*_CLOSE_TO (1)
NOT_*_CONVENIENT (1)
NOT_*_FREE (1)

NOT_*_FRIENDLY (1)
NOT_*_GOOD (1)
NOT_*_GREAT (1)
NOT_*_IMPRESSED (1)
NOT_*_LARGE (1)
NOT_*_NICE (1)
NOT_*_PLEASANT (1)
NOT_*_QUIET (1)
NOT_*_SECURE (1)
NOT_*_WORTH (1)
NOT_ACCOMODATE (1)
NOT_AT_ALL_CONVENIENT (1)
NOT_AVAILABLE (1)
NOT_BEEN_CLEANED (1)
NOT_CHEAP (1)
NOT_CLEAN (1)
NOT_CLEANED (1)
NOT_CLOSE_TO (1)
NOT_COMFORTABLE (1)
NOT_CONVENIENT (1)
NOT_FEEL_*_SAFE (1)
NOT_FEEL_SAFE (1)
NOT_FREE (1)
NOT_FRIENDLY (1)
NOT_GOOD (1)
NOT_GREAT (1)
NOT_HELPFUL (1)
NOT_IMPRESSED (1)
NOT_LARGE (1)
NOT_NICE (1)
NOT_PLEASANT (1)
NOT_QUIET (1)
NOT_SECURE (1)
NOT_WELCOMING (1)
NOT_WORK (1)
NOT_WORKING (1)
NOT_WORTH (1)
OVERPRICE (1)
PAIN (1)
POOR (1)
POORLY (1)
PRICEY (1)
PROBLEM (1)
QUIBBLE (1)
RUDE (1)
SLOW (1)
SMALL (1)
SMELL (1)
STAIN (1)
STINK (1)
TERRIBLE (1)
TOUGH (1)
TROUBLE (1)
UGLY (1)
UNACCEPTABLE (1)
UNCOMFORTABLE (1)
UNFRIENDLY (1)

UNHAPPY (1)
UNHELPFUL (1)
UNSAFE (1)
WASN'T_GOOD (1)
WORSE (1)
WORST (1)

OPINIONS-POSITIVE

ACCOMODATING (1)
AFFORDABLE (1)
AMAZING (1)
AROUND_THE_BLOCK (1)
ATTRACTIVE (1)
AWESOME (1)
BE_SAFE (1)
CHEAP (1)
CLEAN (1)
CLOSE_BY (1)
CLOSE_TO (1)
COMFORTABLE (1)
COMPETITIVE (1)
CONVENIENT (1)
DECENT (1)
DECORATIVE (1)
EASY (1)
ECONOMICAL (1)
ENJOY (1)
EXCELLENT (1)
FEEL_*_SAFE (1)
FEEL_AT_HOME (1)
FEEL_SAFE (1)
FINE (1)
FREE (1)
FRIENDLY (1)
GOOD (1)
GREAT (1)
HEAVEN (1)
HELPFUL (1)
HIGH-QUALITY (1)
HUGE (1)
IMMACULATE (1)
IMPRESS (1)
INEXPENSIVE (1)
LARGE (1)
MEMORABLE (1)
NEAR (1)
NEVER_*_DISAPPOINTED (1)
NEVER_HAD_A_PROBLEM (1)
NEXT_TO (1)
NICE (1)
NICELY (1)
NICER (1)
NO_PROBLEM (1)
NO_PROBLEMS (1)
NO_TROUBLE (1)
NOT_*_BAD (1)
NOT_*_PROBLEM (1)
NOT_BAD (1)

OK (1)
OKAY (1)
OUTSTANDING (1)
PERFECT (1)
PLEASANT (1)
PLEASURE (1)
POSITIVE (1)
PROBLEM-FREE (1)
PROFESSION (1)
QUICK (1)
QUIET (1)
REASONABLE (1)
SAFE_PLACE (1)
SATISFY (1)
SECURE (1)
SHORT_WALK (1)
SPACIOUS (1)
SUPER (1)
TERRIFIC (1)
THE_BEST (1)
TROUBLE-FREE (1)
WALK_DISTANCE (1)
WONDERFUL (1)
WORTH (1)

SERVICE

STAFF

CONCIERGE (1)
DESK_HELP (1)
DOORMAN (1)
FRONT_DESK (1)
HOUSEKEEP (1)
MAID (1)
STAFF (1)

SPECIAL FACILITIES

BUSINESS_CENTER (1)
LOUNGE (1)
NIGHTCLUB (1)
RESTAURANT (1)

SPECIAL SERVICE

AIRPORT_SHUTTLE (1)
CAR_RENTAL (1)
PARK (1)
SHUTTLE (1)
VALET (1)

SPORT FACILITIES

BICYCLE (1)
BIKE (1)
EXERCISE (1)
FITNESS (1)
GOLF (1)
GYM (1)
HEALTH_CLUB (1)
HOT_TUB (1)
JACUZZI (1)
POOL (1)
RECREATION (1)
SAUNA (1)
SPA (1)
SUN_BATH (1)
SWIM (1)
TENNIS (1)
TREADMILL (1)
VOLLEYBALL (1)
WHIRLPOOL (1)
WORKOUT (1)

Appendix B Sample Screenshots of Document Sources

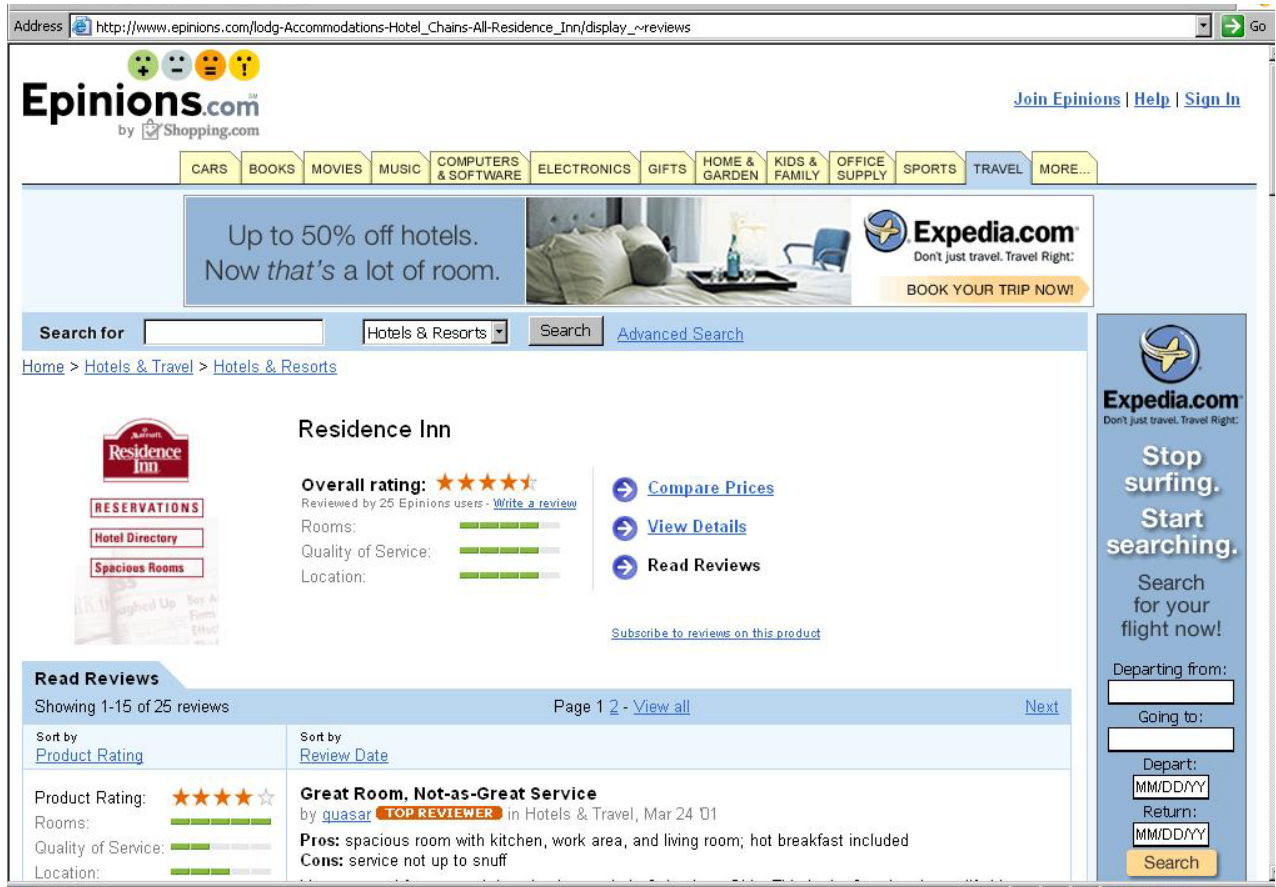


Figure B1: Actual screen of Epinions.com

Great Room, Not-as-Great Service

Mar 24 '01

Author's Product Rating



Pros

spacious room with kitchen, work area, and living room; hot breakfast included

Cons

service not up to snuff

The Bottom Line

Although the service was fair at best, large suites at reasonable prices make Residence Inn Easton a good choice for accommodations in Columbus.

Full Review

I just returned from a week long business trip in Columbus, Ohio. This is the first time in my life I have gotten to travel for work, and they chose to house me at the Residence Inn in Easton, a trendy suburb of Columbus.

The Room

Although there were no walls so you could call it a room, my accommodations included a kitchen, work area, living room, bedroom area, dressing area, and bathroom so it was really a suite.

The work area consists of a desk with phone, lamps, and several electrical outlets right at the entrance. The phone has a side jack for a data line which is a separate phone line - you can use the phone and internet at the same time. One of the lamps has two electrical outlets on its base so you do not have to fool around under the desk to plug in a laptop. Very nice.

To the right was the kitchen included a two-burner electric stove, a refrigerator, a microwave, a dishwasher, many cupboards, and a breakfast bar. Four full place settings as well as numerous cooking implements and accessories were also provided.

Figure B2: Sample Full Review from Epinions.com

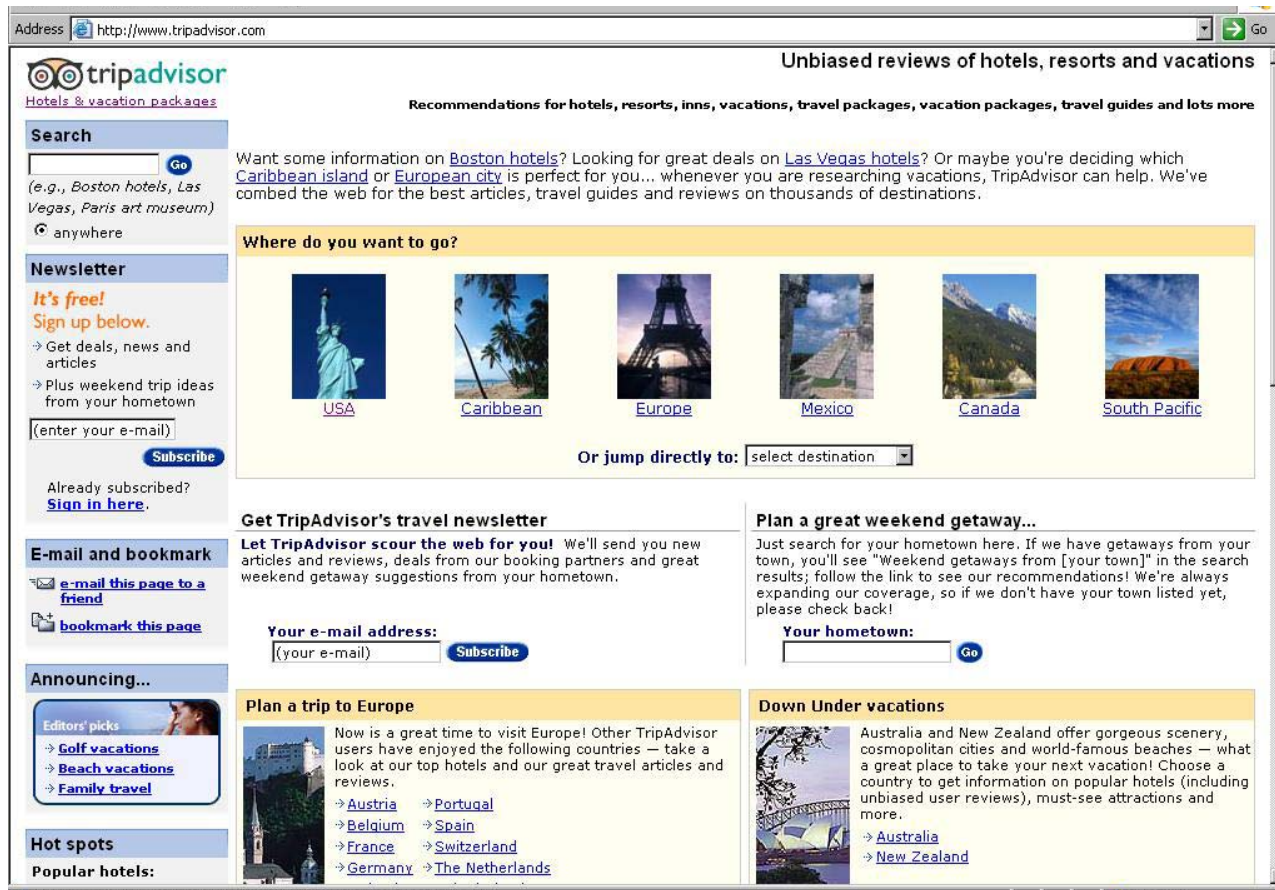


Figure B3: Actual Screen of TripAdvisor.com

User reviews (4-8 of 19)

○○○○○ **New York City: Doubletree Guest Suites New York City: "Great place to stay!"**
Compare prices with:

Date: October 28, 2003
 Reviewer: A TripAdvisor User, Chesapeake, VA

Our first trip to NYC, my husband and I stayed at Doubletree. The staff was excellent, the rooms spacious with separate living room/bedroom. Bathroom enormous. VERY convenient to shows. Our view was excellent and the maid service is very friendly and helpful. Tidied our rooms and checked on us to make certain we had adequate supply of everything for our little "kitchen". Great place to stay in NYC.

This review is the opinion of a TripAdvisor user and not of TripAdvisor, Inc.

This review was: <least helpful 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ most helpful> **Submit rating**

Agree? Disagree? [Read more about Doubletree Guest Suites New York City>>](#)
[Write your own review of Doubletree Guest Suites New York City>>](#)

Figure B4: Sample Full Review from TripAdvisor.com

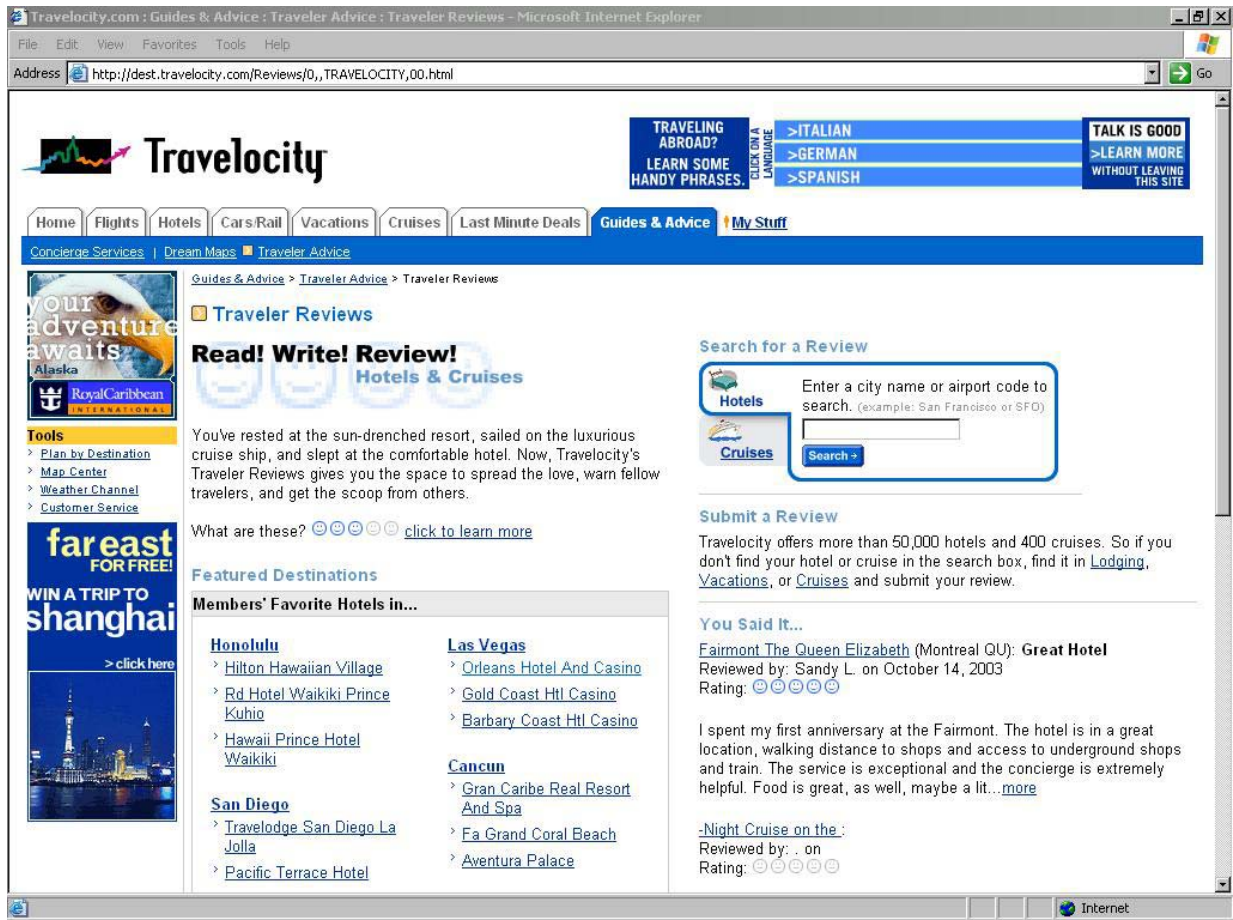


Figure B5: Actual Screen of Travelocity.com

A Nightmare

Submitted by: Karen M. of Hyannis, MA USA ; September 28, 2003
Date of visit: 09/03
Traveler's Favorite Vacation Destination: Florida
Traveler's Rating: ⓄⓄⓄⓄⓄ

Lobby is very deceiving. It's beautiful, but wait until you get to your room. Bed is lumpy, smells like mildew, concrete walls, and ocean view is two small windows. TV gets two channels and tub doesn't drain. We complained and were upgraded to suite, which was two rooms of same, so we checked out early and stayed elsewhere. Only redeeming quality is the pool area. Too bad you can't stay in lobby or pool. Don't ever stay here--even though it is on cheaper side it's not even worth that.

Best Feature: Lobby and pool area
Needs Improvement: Rooms

Amenities rated on a 1-5 scale:
 (1=Lowest 5=Highest N/A=Not Rated)

Rooms = 1	Sports/Activities = N/A
Dining = N/A	Entertainment = N/A
Public Facilities = N/A	Service = 3

0 out of 0 people found this review helpful.

Was this review helpful to you?

Figure B6: Sample Full Review from Travelocity.com