Does Online Rating Affect Companies' Financial Performance? Evidence from Hotels in Singapore

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Consumer rating websites provide a source of open and big data to generate insights on customer perceptions of companies' service quality. In this study, we gathered online consumer ratings on 9 listed hotel groups in Singapore over an 8-year period (2008-2015) to measure consumers' online feedback on hotel services. We also explore the relationship between a firm's online rating and its financial performance. Using pair-wise Granger causality tests, we find that online rating is very closely related to the financial performance of the hotels, especially in terms of profitability, and the causality is in both directions.

INTRODUCTION

Consumer rating websites provide a source of open and big data to generate insights on customer perceptions of companies' service quality, especially in the hotel industry, where online reviews have been found to heavily affect consumers' service perception and purchase intention. Such information is not only useful for identifying consumer service preferences, it may also be useful to predict companies' financial performance.

According to Nielsen and NM Incite's Social Media Report in 2012, consumers continue to spend more time with social media sites than any other types of sites —roughly 20 percent of their total time online via personal computer (PC), and 30 percent of total time online via mobile (Nielsen, 2012). At the same time, the total time spent on social media in the U.S. across PC and mobile devices increased by 37% in 2012 compared to 2011. In Singapore, consumers are also heavy users of social media, both at home and on mobile devices. As of 2012, 4,032,919 people or 77.8% of the total population in Singapore surf the Internet at least three times per week. Also, 74% of the total population is forecasted to use social media at least once per week by 2013 (Rock Publicity, 2012). Social media is fundamentally changing the

way consumers communicate, collaborate, consume, and create. Increasingly, consumers are becoming more vocal online, and the emergence of various online review forums has fostered a rapid rise in consumer-generated ratings. Prior research has supported that these ratings correlate with the opinions of the population at large, notably in the domain of service quality (Gao et al., 2012). Furthermore, about half of the Singapore online population use social media to uncover reviews by other consumers as a form of research prior to making a purchase decision (Rock Publicity, 2012). Therefore, online rating from consumers can be used as a relevant source to measure service quality.

The prevalence of social media has revolutionized the ways organizations relate to the marketplace and society, including consumer preferences (Trusov et al., 2010), peer-to-peer and targeted marketing techniques (Aral and Walker 2012), and demand prediction (Bollen et al., 2011). Research has shown that when compared to the traditional customer survey, online consumer review may not be an inferior information source for market research. In fact, reviews from consumer websites may even be more accurate than traditional surveys since their contributors are mainly expert consumers (Chen, Fay, & Wang, 2003). Traditionally, firms collect this data through personal interviews or customer survey. However, as Griffin and Hauser (1993) showed, there are large monetary and time delay costs inherent to this data collection process. Using online consumer review to provide reliable information on consumer feedback on service quality, companies could realize large savings and timely information.

While consumers are increasingly vocal in posting their reviews online, companies in Singapore have yet to take advantage of the information available, usually due to a lack of resources within their own companies and/or an appropriate tool to manage the information available on online social media. In this study, online consumer ratings on 9 listed companies in the hotel sector in Singapore over an 8-year period (2008-2015) are gathered from major online review websites such as TripAdvisor.com. By leveraging on consumer review ratings across major online user-generated review platforms, we aim to explore the relationship between a firm's online rating and its financial performance. This will help companies make informed and timely decisions and bring about a virtuous feedback loop between companies' stake holders and the consumers.

We study the relationship between a firm's online rating and its financial performance by conducting Granger causality tests for various financial ratios in relation to the online rating. We find that there are two particular pairs of variables that have significant causality relations: online rating Granger causes return on assets and net income growth Granger causes online rating. The Granger causality results indicate that online rating is very closely related to the financial performance of the hotels, especially in terms of profitability, and the causality is in both directions. Furthermore, we also investigate the effect of online rating on the companies' stock prices over time. This will help companies make informed and timely decisions and bring about a virtuous feedback loop between companies/businesses and their consumers so as to improve the consumers' service perception and purchase intention, and eventually the companies' financial performance.

In sum, the research project aims to achieve the following objectives: Firstly, to provide a consolidated average online rating for hotels on their service performance by integrating consumer online reviews across difference platforms; secondly, to explore the relationship between service performance based on the online rating scores and the financial performance at the firm level.

LITERATURE REVIEW

Globally, the impact of online product reviews on consumers and marketers have attracted the attention of both researchers and practitioners (Bickart and Schindler 2001; Trusov, Bucklin, and Pauwels 2009; Xia and Bechwati 2008). A summary of major market level research investigating the impact of online reviews is shown in Table 1. Most of the market-level studies use aggregated panel data on the collective characteristics of the reviews (e.g., the average ratings, volumes and the valence of consumer reviews) extracted from the websites to examine the impact of review messages on product sales. However, findings on the impact of the reviews are inconsistent to some extent. Some found product reviews (e.g., volume, overall product ratings) to influence product sales, while others did not (Chevalier

and Mayzlin 2006; Godes and Mayzlin 2004; Liu 2006; Trusov et al. 2009). This implies that the overall ratings alone may not be a sufficient predictor of sales that will translate into financial performance. Ratings by attribute may also be important predictors of a firm' financial performance. Besides, sales reflect only one aspect of a firm's financial performance. Other financial data such as expense, profit, the accounting value of the company's assets, liabilities and shareholder's equity and financial ratios do impact overall financial performance.

In addition, most prior studies focused on IT products such as MP3 players, cell phones, digital cameras etc. and/or experience products such as books, CDs, DVDs, video games and TV programmes. Little effort has been made to examine the impact of online ratings of service performance in the service industry, such as hotels and/or food & beverage.

TABLE 1
PRIOR RESEARCH ON ONLINE CONSUMER RATINGS AND COMPANY PERFORMANCE

Factors Influencing Online Review Effectiveness	**Online Review Effectiveness Measurements**	**Findings**	**Author and Year**
Overall rating	Sales (Chatterjee 2001; Chevalier and Mayzlin 2006; Duan et al. 2008; Godes and Mayzlin 2004; Liu 2006; Zhu and Zhang 2010)	The overall rating affects sales positively (Chatterjee 2001; Chevalier and Mayzlin 2006; Duan et al. 2008; Godes and Mayzlin 2004). Ratings contribute to the product attitude and review credibility (Cheung et al. 2009). An increase in overall rating results in higher incremental sales for products (Zhu and Zhang 2010). Online ratings have no impact on sales (Duan et al. 2008; Liu 2006).	Chatterjee (2001), Cheung et al. (2009), Chevalier and Mayzlin (2006), Duan et al. (2008), Godes and Mayzlin (2004), Liu(2006), Zhu and Zhang (2010)
Volume (Total number of reviews)	Sales (Davis and Khazanchi 2008) Percentage of households that watched the show (Godes and Mayzlin 2004) Revenue (Liu 2006; Trusov et al. 2009)	The volume of reviews does not affect sales (Chevalier and Mayzlin 2006), customer loyalty (Gauri et al. 2008), and percentage of households that watched the show (Godes and Mayzlin 2004). Pure increase in review volume has no effect on sales (Davis and Khazanchi 2008). The volume of reviews has a positive impact on revenue (Duan et al. 2008; Liu 2006; Trusov et al. 2009), and purchasing intention (Park et al. 2007). The early volume of online reviews can be used as a proxy of early sales (Dellarocas et al. 2007). The proportion of negative reviews in the total number of reviews results in a change in product attitude (Lee et al. 2008). Consumers with low skepticism tend to form attitude peripherally and are more persuaded by review quantity (Sher and Lee 2009).	Chevalier and Mayzlin (2006), Davis and Khazanchi (2008), Dellarocas et al. (2007), Duan et al. (2008), Gauri et al. (2008), Godes and Mayzlin (2004), Lee et al. (2008), Liu (2006), Park et al. (2007), Sher and Lee (2009), Trusov et al. (2009)

Consistency (the extent to which a review is congruent with others' opinions)		Consistency of reviews has a positive effect on review adoption (Cheung et al. 2009) and sales (Clemons et al. 2006).	Cheung et al.(2009), Clemons et al. (2006)
Dispersion (the extent that the conversations take place across many communities)		The dispersion of reviews has a positive influence on future sales (Dellarocas et al. 2007). Dispersion influences the percentage of households that watch the show more than volume (Godes and Mayzlin 2004).	Dellarocas et al., (2007), Godes and Mayzlin (2004)

DATA AND METHODOLOGY

The data comprises of online consumer ratings and financial reports. All listed companies in Singapore under the hotel sector are captured under the group name, instead of individual brand of hotels. For the purpose of this project, the data consists of online consumer ratings and financial data between the years 2008 – 2014.

Online Rating Data

Online consumer ratings on all listed companies in the hotel sector in Singapore are gathered from major online review websites such as TripAdvisor.com. These websites are chosen based on its volume of ratings (the number of unique reviews). The reviews and related information are extracted from the review websites using import.io, an open-source web crawling programme. import.io was selected in this research as it is a web-based platform for extracting data from websites without writing any code. The tool allows users to create an application programming interface (API) using a point-and-click interface.
For each company, the average rating (overall rating) are collected as a quantitative measurement for service performance, as both factors have been found to be heavily affecting a company's sales (Duan, Gu, & Whinston, 2008; Liu, 2006; Trusov, Bucklin, & Pauwels, 2009). The overall rating scores will be used as a proxy to measure the overall service performance for this company. When a hotel chain consists of multiple sub-brands or branches (such as Hilton Honours), the data is collected at the sub-brand or branch level. Then, a house brand level score is derived by aggregating the ratings from all the sub-brands/branches.

Company Financial Data

The financial reports of the identified hotels listed on the SGX are obtained from a major database, S&P Capital IQ. Currently there are 14 companies listed in the hotel industry on SGX and each of them operates multiple hotels in different brands targeted at different groups of customers. Some hotel groups like Banyan Tree Holding and Stanford Land Corp. Ltd. only run subsidiary hotels overseas. Hence, they are excluded from the sample. See Appendix A for a list of hotel groups and subsidiary hotels included in the study.

The financial data from these listed companies are collected at the consolidated level. At the group level, we would look at the overall financial health of the group. Hence, the financial figures collected consist of income statements, balance sheets and cash flow statements and relevant financial ratios to understand the relationship between online rating and the financial performance in the hotel industry.

As the hotel industry is heavy in fixed and tangible assets, it requires a very specific set of financial ratios to accurately analyze the industry's financial performance. The following are key financial ratios we selected from four categories to analyze the SGX listed companies within the hotel industry.

Liquidity Ratios

Liquidity ratios provide information regarding a company's ability to meet its short-term financial obligations. The hospitality industry needs a high amount of working capital and has a lot of short-term financial obligations to cover, making liquidity ratios an integral part of the industry's analysis. Therefore, we choose current ratio and quick ratio to measure hotels liquidity status.

The current ratio is a liquidity measure that shows how a company is able to meet all its short-term liabilities with the short-term assets on hand. These assets are anything considered short-term such as inventory, and do not include long-term assets such as property, plant and equipment. For the hotel industry, companies usually have a large amount of current liabilities in the form of salaries and wages, short-term equipment leasing and other short-term liabilities. Additionally, it is a cyclical industry, making it imperative that companies have enough current assets to cover current liabilities, even in an economic downturn.

Financial Leverage Ratios

Financial leverage ratios, such as the debt ratio, measure the long-term solvency of a firm and a company's ability to meet its long-term debt obligations. Companies within the hotel industry tend to have large long-term liabilities in the form of debt, along with current liabilities. A lot of long-term assets are needed to successfully run a hospitality business, and therefore long-term debt financing is also normally needed. We use long-term debt ratio and total debt over equity to measure the level of financial leverage of hotels.

Profitability Ratios

Profitability ratios measure a company's level of profitability, at the gross profit, operating profit and net profit levels. In general, there are three most commonly used measures of firm profitability: net profit margin (NPM), return on assets (ROA), and return on equity (ROE). NPM is essentially net income over net sales; ROA is calculated by dividing net income by total assets; and ROE is defined as the ratio of a firm's net income to its common equity. Earlier studies have shown that unlike other profitability ratios, ROA compares bottom-line profits to the total assets, thus measuring the return to total investment. ROA incorporates both net income and firms' assets into its computation and is therefore the premier metric in evaluating the performance of management.

For companies in the hospitality industry, most of the costs come from operations instead of cost of goods sold, and the gross profit margin usually is quite high for those businesses that operate within the hotel industry.

The net profit margin is similar to the gross profit margin except it measures the amount of net profit earned on the revenue a company generates. For the companies in the hospitality industry, net profits are actually not very high, as there are high associated operating costs to run a company in this industry.

The return on assets (ROA) shows the percentage of how profitable a company's assets are in generating revenue. It indicates the amount of return earned on each dollar of assets. Return on Assets helps to measure the efficiency of hotels; how these hotels efficiently used their assets to generate net income.

Asset Management Ratios

Asset Management ratios measure how well or how poorly a company is operating and how efficient it is in using its assets, a set of ratios can be calculated. The average collection period of accounts receivable can enable to measure the probability of collecting a company's credit sales. The result of this ratio represents an average number of days it takes the company to collect its credit sales. Inventory turnover indicates the number of days inventory is on hand before it is sold. The higher the turnover rate, the more efficient the company is in managing its inventory. Moreover, to demonstrate how well the company's assets are being used to generate sales, the ratio of sales to total assets, or total asset turnover as it is sometimes called, is often calculated. Fixed Asset Turnover Ratio measures how the studied hotels use their fixed assets to generate revenues. Fixed assets are important because they usually represent the

largest component of total assets for hotel industry. Therefore, the use of fixed assets in generating of revenues must be effective and efficient.

Granger Causality Tests

Granger causality is a popular method for causality analysis, especially in time series (Granger, 1969). It implements a statistical and predictive notion of causality whereby causes precede, and help predict, their effects. A time series $\{X_t\}$ is said to Granger-cause another time series $\{Y_t\}$ if the prediction error of current Y decreases by using past values of X in addition to past values of Y, or the past observations of X_t can improve the prediction of Y_t. More specifically, $\{X_t\}$ Granger causes $\{Y_t\}$ if for some $k \geq 1$, $(Y_{t+1}, \dots, Y_{t+k}) | (F_{X,t}, F_{Y,t}) \nsim (Y_{t+1}, \dots, Y_{t+k}) | (F_{Y,t})$, where $F_{.,t}$ denotes the distribution of the variable.

To test for Granger causality, assume a stationary bivariate system. The vector auto-regression (VAR) model can be expressed as follows:

$$X_t = \mu_1 + \sum_{s=1}^{p} \beta_{1,s} X_{t-s} + \sum_{s=1}^{p} \gamma_{1,s} Y_{t-s} + \epsilon_{1,t} \qquad [\text{Eq. } 1]$$

$$Y_t = \mu_2 + \sum_{s=1}^{p} \beta_{2,s} X_{t-s} + \sum_{s=1}^{p} \gamma_{2,s} Y_{t-s} + \epsilon_{2,t} \qquad [\text{Eq. } 2]$$

where p denotes the optimal lag length determined by the information criteria. If $\gamma_{1,s}(s = 1,2 \dots p-1) \neq 0$, it implies that there exists a short-run Granger causal relationship running from variable Y to variable X; similarly, if $\beta_{2,s}(s = 1,2 \dots p-1) \neq 0$, it suggests variable X Granger causing variable Y in the short-run.

When the variables in the system are not stationary but integrated of the same order, say I(1), the vector error correction (VEC) model is proposed (Engle and Granger, 1987). When the data expand from time series for one unit to cross-section units, the VAR and VEC models can be extended to fit the panel data. In this paper, pairwise Granger causality tests are performed using EViews version 9.

It is worthy to note, however, that the conventional Granger causality test has some limitations. First, Granger causality does not necessarily imply real causality that advises how the causes affect the outcome of interest; it only suggests the direction of predictive power, if any. Second, the Granger causality test is based on a linear relationship among variables, and therefore it does not capture any non-linear causal relationships.

RESULTS AND DISCUSSION

Table 2 presents the summary statistics for three selected variables: overall rating, return on assets and net income growth for a period of 2008-2015 for the nine hotel groups. The mean average rating is 3.7 (out of 5) for our sample, ranging from 1.9 to 4.6 (out of 5). The return on assets has a mean of 2.12%, varying from -0.3% to 4.5% and the net income growth is 25.9% on average with the minimum growth of -85% and the maximum growth of almost five folds. The distribution of the total number of 44474 specific rating is shown in Figure 1. As can be seen, about 76% of the total ratings are positive with a score of 4 and above, only about 8% are negative review with a score below 3.

TABLE 2
SUMMARY STATISTICS OF THE HOTELS' OVERALL RATING, RETURN ON ASSETS AND NET INCOME GROWTH

Test	Average rating	Return on assets	Net income growth
Mean	3.760	2.12%	25.9%
SD	0.745	0.009	0.964
Min	1.875	-0.27%	-84.9%
Max	4.717	4.50%	482.2%
No. of observations	72	56	52

FIGURE 1
RATING DISTRIBUTION (BASED ON 44474 RATINGS)

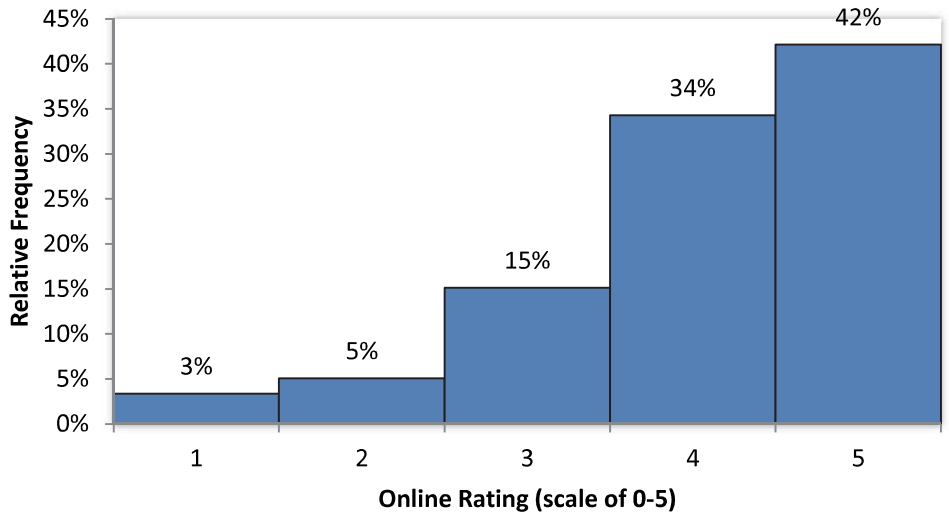


Figure 2 and Figure 3 provide summary information on the total number of online review and average return on assets by hotel groups respectively. OUE Hotel Group has the largest number of online reviews because it operates three of the most popular hotels in Singapore, namely the Marina Mandarin Singapore, Crowne Plaza Changi Airport Hotel, and Mandarin Orchard Singapore. Hotel Grand Central Limited only operates and manages one hotel in Singapore, and therefore has only 120 effective online-reviews.

FIGURE 2
TOTAL NUMBER OF ONLINE REVIEWS BY HOTEL GROUPS DURING 2009-2015

FIGURE 3
AVERAGE RETURN ON ASSETS BY HOTEL GROUPS DURING 2009-2015

We conducted preliminary analysis of the relationship between overall online ratings with the various financial ratios. The scatter plots of overall online ratings versus key financial ratios representing the four categories are shown in Figure 4 to Figure 9 respectively. Based on these graphs, we can clearly observe some interesting patterns in the pair-wise relationships. For example, hotels with high online ratings tend to have higher asset turnover ratios, and higher returns on asset. This is intuitively understandable because high online rating will attract more booking, and thus increase the occupancy rate of the hotels room, and it will eventually result in higher asset utilisation efficiency and return on these asset. On the other hand, overall online rating seems to have no clear relationship with other financial performance indicators such as liquidity ratios, debt ratios, and profit ratios. In general, these financial ratios are largely affected by the managerial style and preference in choosing financial policies such as the use of financial leverage or level of inventory to maintain. The overall online rating may not directly affect the ratios in a short time frame.

FIGURE 4
CURRENT RATIO VS. AVERAGE RATINGS

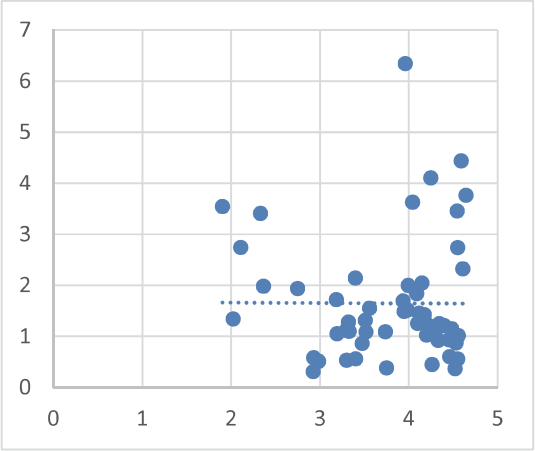


FIGURE 5
TOTAL DEBT OVER EQUITY VS. AVERAGE RATINGS

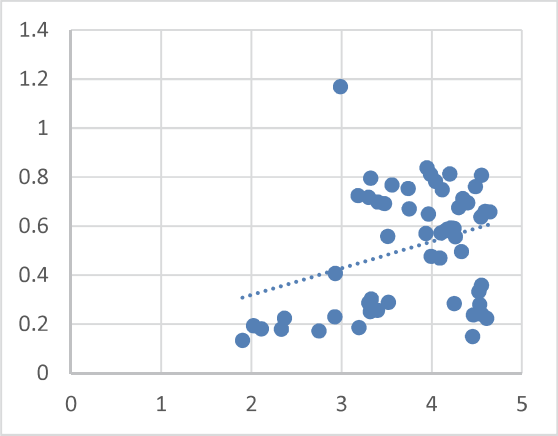


FIGURE 6
TOTAL ASSET TURNOVER VS. AVERAGE RATINGS

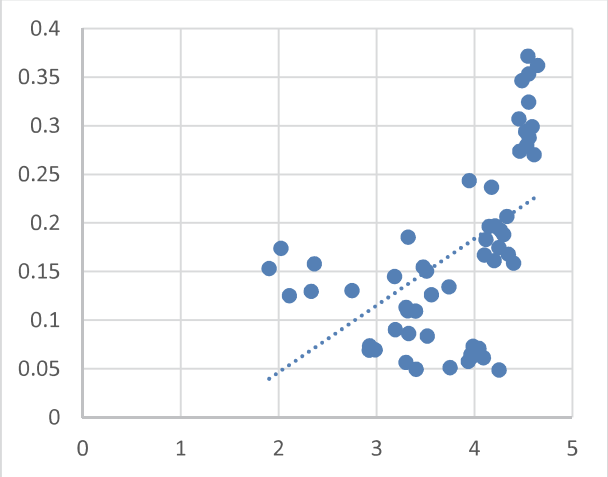


FIGURE 7
NET INCOME GROWTH VS. AVERAGE RATINGS

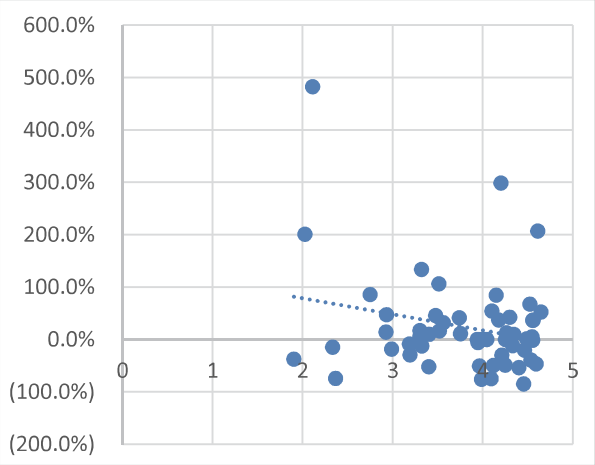


FIGURE 8
RETURN ON ASSET VS. AVERAGE RATINGS

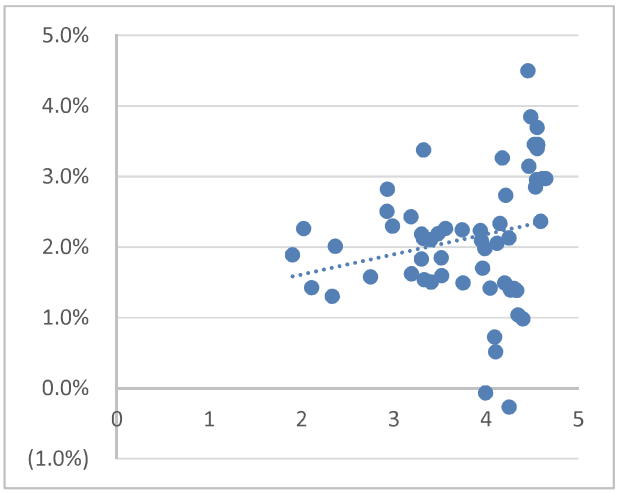
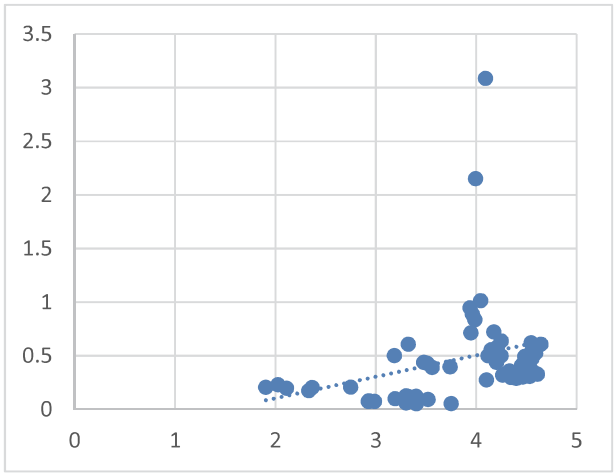


FIGURE 9
FIXED ASSET TURNOVER VS. AVERAGE RATINGS



To better understand these relationships, using overall rating as a proxy for hotel service performance, we conducted Granger causality test to determine whether the online rating time series is useful in forecasting Return on assets and Net income growth or vice versa. In a Granger causality test, $\{X_t\}$ Granger cause $\{Y_t\}$ if for some $k \geq 1$, $(Y_{t+1}, \ldots, Y_{t+k})|(F_{X,t}, F_{Y,t}) \nsim (Y_{t+1}, \ldots, Y_{t+k})|(F_{Y,t})$, where $F_{\cdot,t}$ denotes the distribution of the variable. In other words, if the past observations of X_t can improve the prediction of Y_t, we say there is a Granger causality running from $\{X_t\}$ to $\{Y_t\}$.
We conducted Granger causality tests for all the financial ratios in relation to online rating, and the result of selected tests are presented in Appendix B. From all the pair-wise causality tests, we found that there are two particular pairs of variables that have clear causality relations: online ratings Granger cause return on assets and net income growth Granger cause online rating. Table 3 shows the panel Granger causality test results for the pair (return on assets, average rating). Table 4 presents the pair (net income growth, average rating).

TABLE 3
GRANGER CAUSALITY TESTS BETWEEN OVERALL RATING AND RETURN ON ASSETS

Test	F-Statistics	p-values
Return on assets->Rating	0.112	0.739
Rating->Return on assets	4.458	0.040

TABLE 4
GRANGER CAUSALITY TESTS BETWEEN OVERALL RATING AND NET INCOME GROWTH

Test	F-Statistics	p-values
Net income growth->Rating	3.256	0.079
Rating->Net income growth	1.861	0.180

The Granger causality results seem to indicate that online rating is very closely related to the financial performance of the hotels, especially in the terms of profitability, and the causality is in both directions. This can be very well interpreted intuitively: when there is a net income growth, which means the

company is financially healthy, more resources will be invested in the hotel which in turn improves the average online rating. On the other hand, when a hotel receives higher rating, it will attract more customers which will in turn increase the revenue and utilization of the hotel's assets, and therefore generate higher income. Thus, higher rating leads to higher return on assets.

By conducting DuPont analysis, it is shown that ROA, as a performance indicator of a company, can be broken down into two components: profitability and efficiency.

ROA = Net Income / Total assets = (Net Income / Sales) x (Sales / Total Assets)

The major advantage of using ROA as a performance measure is that it allows its users to analyze a firm's profitability and efficiency at the same time. We can also apply this breakdown in our analysis of hotel's financial performance. The Granger causality results indicate that higher online rating leads to higher ROA, which can be further explained by higher profit margin or more efficient use of assets. As hotels are usually assets heavy, a hotel with good rating will naturally reach out to more customers, which will result in good utilization rate of assets, and eventually turn into high returns on assets.

CONCLUSION

Review sites are widespread on the Internet and rapidly gaining popularity. Previous research has established that online product ratings can have an influence on revenue (Duan, Gu, & Whinston, 2008; Liu, 2006; Trusov, Bucklin, & Pauwels, 2009). This paper shows that these platforms can serve as a valuable source of information for firms' profitability as well. This paper contributes to the understanding about how a firm's online rating relates to its financial performance, particularly in the areas of return on assets, net income growth and ROA, which is a performance measure capturing a firm's profitability and efficiency at the same time. The study shows that a hotel's online rating is a useful indicator in in forecasting its profitability and vice versa. That is, online ratings are very closely related to the financial performance of the hotels. Firms can use statistics of online ratings as a reliable proxy of consumer evaluation on service excellence to forecast profitability for new experience goods. We apply this idea to the context of hotels and propose hotel financial performance-forecasting methods using statistics of online reviews posted by users on Tripadvisor. Although our theoretical reasoning is not limited to specific products, our research findings are particularly relevant to the tourism and hospitality industry because our empirical investigation was carried out in the context of this industry.

The ability to derive profitability forecasts of a firm's performance has traditionally been of value to investors. We argue that the ability to generate reliable forecasts can have important implications for tourism marketing. Such knowledge will allow hotel owners to fine-tune a hotel's campaign or, perhaps, to develop entirely new marketing strategies that can respond to an audience's initial reception.

Our research has implications for dealing with customer dissatisfaction and customers' posting of reviews. When customers are dissatisfied with the products sold by marketers, they may post negative reviews about the products in online forums. Our findings suggest that the posting of negative reviews reduces the average rating, which is closely related to undesirable consequences on its financial performance. Thus, it is imperative for marketers to pre-empt the posting by addressing customer dissatisfaction or complaints early.

We conclude by pointing out a number of limitations of the current study and associated opportunities for future research. We gathered online consumer ratings on 9 listed hotel groups in Singapore over 8-year period (2008-2015) to measure consumers' online feedback on hotel services. The sample size and the context of this data set limits the generalisability of our study. Given the increasing popularity of online review sites, an investigation of cross-country sample would be an exciting next step of this line of research.

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APPENDIX A

TABLE 1
HOTEL GROUPS AND SUBSIDIARY HOTELS

Hotel Groups	Subsidiary Hotels	No. Of Reviews
Amara Holdings Limited	Amara Hotel	681
	Amara Sanctuary Resort Sentosa	730
Hotel Properties Limited (HPL)	Concorde Hotel Singapore	1032
	Four Seasons Hotel Singapore	1039
	Hilton Hotels Singapore	1458
Overseas Union Enterprise Limited (OUE)	Marina Mandarin Singapore	3219
	Crowne Plaza Changi Airport Hotel	2595
	Mandarin Orchard Singapore	5686

Global Premium Hotels Limited	Fragrance Hotel - Riverside	315
	Fragrance Hotel - Bugis	203
	Fragrance Hotel - Selegie	370
	Fragrance Hotel - Lavender	42
	Fragrance Hotel - Crystal	199
	Fragrance Hotel - Viva	21
	Fragrance Hotel - Royal	60
	Fragrance Hotel - Rose	51
	Fragrance Hotel - Balestier	72
	Fragrance Hotel - Classic	45
	The Fragrance Hotel(Joo Chiat)	207
	Fragrance Hotel - Pearl	95
	Fragrance Hotel - Sapphire	164
	Fragrance Hotel- Sunflower	99
	Fragrance Hotel - Imperial	201
	Fragrance Hotel - Oasis	143
	Fragrance Hotel - Emerald	323
	Fragrance Hotel - Ruby	364
	Parc Sovereign – Albert St	447
	Parc Sovereign Hotel - Tyrwhitt	217
Mandarin Oriental International Limited	Mandarin Oriental Singapore	3058
Hotel Grand Central Limited	Hotel Grand Central	186
Hotel Royal Limited	Hotel Royal	257
	Hotel Royal @ Queens	478
Shangri-La Asia Limited	Shangri-La Apartment, Singapore	90
	Shangri-La Hotel, Singapore	2880
	Shangri-La's Rasa Sentosa Resort & Spa	1216
	Hotel Jen Orchard Gateway Singapore	210
	Hotel Jen Tanglin Singapore	1789
Pan Pacific Hotels Group Limited	Pan Pacific Singapore	4092
	Pan Pacific Orchard, Singapore	1182
	Pan Pacific Serviced Suites Beach Road Singapore	261
	Pan Pacific Serviced Suites Orchard, Singapore	108

APPENDIX B

Pairwise Granger Causality Tests
Date: 10/19/16 Time: 09:22
Sample: 2008 2015
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
RETURN_ON_ASSETS does not Granger Cause AVE_RATING	47	0.11216	0.7393
AVE_RATING does not Granger Cause RETURN_ON_ASSETS		4.45840	0.0404

Null Hypothesis:	Obs	F-Statistic	Prob.
GROSS_MARGIN does not Granger Cause AVE_RATING	51	1.24718	0.2697
AVE_RATING does not Granger Cause GROSS_MARGIN		0.22393	0.6382

Null Hypothesis:	Obs	F-Statistic	Prob.
EBIT_MARGIN does not Granger Cause AVE_RATING	52	1.46464	0.2320
AVE_RATING does not Granger Cause EBIT_MARGIN		0.33258	0.5668

Null Hypothesis:	Obs	F-Statistic	Prob.
NET_INCOME_MARGIN does not Granger Cause AVE_RATING	52	0.27270	0.6039
AVE_RATING does not Granger Cause NET_INCOME_MARGIN		0.21924	0.6417

Null Hypothesis:	Obs	F-Statistic	Prob.
TOTAL_ASSET_TURNOVER does not Granger Cause AVE_RATING	47	0.19997	0.6569
AVE_RATING does not Granger Cause TOTAL_ASSET_TURNOVER		2.27004	0.1390

Null Hypothesis:	Obs	F-Statistic	Prob.
FIXED_ASSET_TURNOVER does not Granger Cause AVE_RATING	47	0.09176	0.7634
AVE_RATING does not Granger Cause FIXED_ASSET_TURNOVER		1.43750	0.2370

Null Hypothesis:	Obs	F-Statistic	Prob.
CURRENT_RATIO does not Granger Cause AVE_RATING	47	0.08247	0.7753
AVE_RATING does not Granger Cause CURRENT_RATIO		0.34312	0.5610

Null Hypothesis:	Obs	F-Statistic	Prob.
QUICK_RATIO does not Granger Cause AVE_RATING	47	0.85664	0.3597
AVE_RATING does not Granger Cause QUICK_RATIO		0.67678	0.4151

Null Hypothesis:	Obs	F-Statistic	Prob.
ALTMAN_Z_SCORE does not Granger Cause AVE_RATING	46	0.20600	0.6522
AVE_RATING does not Granger Cause ALTMAN_Z_SCORE		0.22793	0.6355

Null Hypothesis:	Obs	F-Statistic	Prob.
TOTAL_REVENUE_GROWTH does not Granger Cause AVE_RATING	52	2.44522	0.1243
AVE_RATING does not Granger Cause TOTAL_REVENUE_GROWTH		0.34810	0.5579

Null Hypothesis:	Obs	F-Statistic	Prob.
GROSS_PROFIT_GROWTH does not Granger Cause AVE_RATING	46	0.01847	0.8925
AVE_RATING does not Granger Cause GROSS_PROFIT_GROWTH		0.37610	0.5429

Null Hypothesis:	Obs	F-Statistic	Prob.
NET_INCOME_GROWTH does not Granger Cause AVE_RATING	42	3.25632	0.0789
AVE_RATING does not Granger Cause NET_INCOME_GROWTH		1.86123	0.1803