Title: Listening to Your Employees: Analyzing Opinions from Online Reviews of Hotel Companies

Purpose: This study examines the factors influencing hotel employee satisfaction and explores the different sentiments expressed in these factors in online reviews by hotel type (premium versus economy) and employment status (current versus former).

Design/Methodology/Approach: A total of 78,535 online reviews by employees of 29 hotel companies for the period of 2011–2019 were scraped from Indeed.com. Structural topic modeling (STM) and sentiment analysis were used to extract topics influencing employee satisfaction and examine differences in sentiments in each topic.

Findings: Results showed that employees of premium hotels expressed more positive sentiments in their reviews than employees of economy hotels. The STM results demonstrated that 20 topics influenced employee satisfaction, the top three of which were workplace bullying and dirty work (18.01%), organizational support (16.29%), and career advancement (8.88%). The results indicated that the sentiments in each topic differed by employment status and hotel type.

Originality/Value: This study is one of only a few to use online reviews from an employment search engine to explore hotel employee satisfaction. This study found that workplace bullying and dirty work heavily influenced employee satisfaction. Moreover, analysis of the comments from previous employees identified antecedents of employees' actual turnover behavior but not their turnover intention.

Practical implications: Rather than relying on survey data to explore employee satisfaction, hotel industry practitioners can analyze employees' online reviews to design action plans.

Keywords: hotel employee satisfaction, sentiment analysis, structural topic modeling, hotel type, hotel company online review

Paper type: Research paper

1. Introduction

The Internet's development has fostered the rise of user-generated content (UGC) and provided an online medium for posting and obtaining information, such as reviews of restaurants, products, and various tourist attractions (Krumm *et al.*, 2008). Online reviews are among the most important types of UGC, as they provide rich information that allows industry practitioners to better understand their customers and employees (Jung and Suh, 2019). Specifically, big data provide a data-rich and technologically innovative approach for examining and exploring hospitality phenomena (Rivera, 2020; Ying *et al.*, 2020). The traditional deductive approach in customer satisfaction research relies on existing theories to develop hypotheses and data collection to test these hypotheses (McAbee *et al.*, 2017). However, the rise of big data techniques, such as topic modeling and sentiment analysis, in text mining aimed at analyzing unstructured text data scraped from online platforms provides extensive opportunities for researchers to employ an inductive approach to expand and rethink existing theories with new data (McAbee *et al.*, 2017; Oswald *et al.*, 2020). A growing number of studies in the field of tourist and consumer behavior use online review data to explore customer emotions to better understand sociological and business implications (e.g., Akhtar *et al.*, 2020; Hu *et al.*, 2019; Li *et al.*, 2020; Moro *et al.*, 2019; Padma and Ahn, 2020; Ying *et al.*, 2020; Zhu *et al.*, 2020).

Similar to trends in which consumers post comments about products or experience online, employees post online reviews about their work experiences in their companies (Könsgen *et al.*, 2018). Negative reviews written by employees is detrimental to the organizations' corporate reputation (Opitz *et al.*, 2017). Hence, exploring employees' satisfaction by reading online reviews is crucial for the companies being reviewed and business owners.

Prior studies on employee satisfaction often use traditional quantitative and qualitative approaches, such as interviews, focus group discussions, and surveys, to measure satisfaction. However, these traditional approaches may no longer be sufficient to capture the multiple factors potentially influencing employee satisfaction, as the measurement tools are predetermined and limited by generalizability. Compared with analyzing survey data, examining employees' online reviews has more advantages, as employees post such reviews voluntarily without their company's involvement. Hence, the information employees post on third-party review websites is considered trustworthy (Stamolampros *et al*., 2019). The above features also enhance ecological validity (Landers *et al.*, 2016). As indicated by Moro *et al.* (2019) and Guo *et al.* (2017), online reviews may simultaneously reflect the influences of multiple dimensions to visitors' satisfaction, which is different from studies that pre-determine the factors that could potentially influence satisfaction and then perform the tests afterwards. Another distinct advantage of using online reviews is that the generated topics can be ranked by the topic percentage (Hu *et al.*, 2019). Such information could be used by researchers and practitioners to prioritize the topics related to employee satisfaction with the highest percentage ranking when making decisions.

However, thus far, only a few studies have explored employee satisfaction through company review platforms. There are two streams of research on employees' online reviews. One stream focuses on analyzing companies' numerical ratings given by employees or the relationship between the ratings and the companies' performance (Könsgen *et al.*, 2018; Luo *et al.*, 2016; Moniz and Jong, 2014). The other stream focuses on revealing employee satisfaction by exploring the textual meaning of the employees' written language (Moniz and Jong, 2014; Stamolampros *et al.*, 2019). Many such studies either call for further research or highlight the

importance of treating industry sections individually and considering "within-sector differences" in each industry (Jung and Suh, 2019; Luo *et al.*, 2016, Stamolampros *et al.*, 2019). Considering hotel type as a within-sector difference is especially crucial, as employee satisfaction varies depending on the hotel type (Mount and Frye, 2006; Sherman, 2007). Mount and Frye (2006) found that employee satisfaction in full-service hotels is lower than that in limited-service hotels. This may be attributed to hotel size, as the workload of full-service hotel employees may be higher than that of limited-service hotel employees.

In addition to making comparisons based on hotel type, we also aim to examine employee turnover issues by comparing employee satisfaction based on employment status (current versus former employees). High turnover rate is a critical problem for human resource management (HRM) in the hospitality industry (Tracey and Hinkin, 2008). One issue in employee turnover research is that most studies rely on investigating current employees' turnover intention, which may not reflect their actual reasons for leaving a company. Turnover intention and actual turnover behavior are distinct and should not be treated as the same construct (Hom *et al.*, 2017). By using online employee review data, we explore the potential reasons causing former employees' actual turnover behavior.

Specifically, we develop four research questions wherein we also outline the specific sub-questions to be explored:

(1) What is the sentiment expressed in the hotel employees' online reviews?

We use sentiment analysis to examine the sentiments expressed in employee reviews for premium and economy hotels. The relationship between employees' sentiments and the star ratings they give is likewise examined. Terms that contribute to employees' positive or negative sentiments are investigated across hotel types.

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(2) What topics are related to hotel employee overall satisfaction?

Structural topic modeling (STM) is used to identify the topics that are frequently discussed by hotel employees. Topic prevalence is calculated to identify the topics with the highest percentage.

(3) How do topic prevalence and topic sentiment vary depending on hotel type, namely, economy or premium?

(4) What are the differences in topic prevalence and topic sentiment between current and former employees?

To examine research questions 3 and 4, topic prevalence and topic sentiment are utilized to determine the frequency and positivity of the topics across hotel types and employment status.

2. Literature review

2.1 Employee job satisfaction and its antecedents

Online reviews are valuable resources for examining the antecedents of employee satisfaction, as reviews can reflect employee attitudes and other specific job-related information (Stamolampros *et al.*, 2019). Similar to the classification used by Kong *et al.* (2018), we classified the antecedents of employee job satisfaction in the hospitality industry into four categories, namely, individual factors, organizational factors, work domain factors, and non-work domain factors.

Examples of individual factors are employees' personality traits, such as perceived psychological capital (e.g., self-efficacy and resilience; Jung and Yoon, 2015), creative personality (Viseu *et al.*, 2020), career management (Kong *et al.*, 2015), and demographics (Sarker *et al.*, 2003). For example, Jung and Yoon (2015) found that employees with high

psychological capital (e.g., confidence and optimism) are likely to have high job satisfaction. Sarker *et al.* (2003) argued that hotel employee job satisfaction increases with age and job tenure.

Additionally, most studies identified organizational factors as perceived organizational support (Cheng and O-Yang, 2018), organizational functioning (Viseu *et al.*, 2020), organizational justice (López-Cabarcos *et al*., 2015), organizational climate of diversity (Madera *et al*., 2013), compensation (Ashton, 2018; Lee *et al*., 2015), and advancement opportunities (Ann and Blum, 2020; Ashton, 2018). For example, López-Cabarcos *et al*. (2015) found that procedural justice, such as how organizations make decisions about employee promotions and job resource allocations, has a positive relationship with job satisfaction.

Meanwhile, work domain factors include job demands, job resources, supervisors' leadership style, and job characteristics. When employees experience high job demands, such as role ambiguity and guest incivility, they tend to have low job satisfaction (Kim *et al*., 2014; Yang, 2010). By contrast, when employees receive job resources of job autonomy, social support, and freedom to accomplish their work on their own time, they are likely to have high job satisfaction (Kim and Jogaratnam, 2010; Yang, 2010). Transformational leadership style promotes employees' job satisfaction (Ohunakin *et al.*, 2019). Job characteristics (e.g., job skills, work intensity, seasonality, etc.) and the physical working environment also influence hospitality employee job satisfaction (Ann and Blum, 2020).

Finally, non-work domain factors are those related to employees' families and personal lives. Examples of such factors include supervisors' family-supportive behaviors, work-family conflicts, and private issues (Ann and Blum, 2020; Kong, 2013; Lee *et al*., 2015; Pan and Yeh, 2018). When supervisors are supportive when it comes to employees' family issues, this

increases employees' career competencies, which in turn, increases their job satisfaction (Kong, 2013).

The above examples illustrate that previous studies have mainly tested the relationship between a single factor or multiple factors and job satisfaction. An issue with this approach, however, is that the selection of the antecedents influencing employee satisfaction is based on previous literature. Additionally, many studies used the existing job satisfaction scale, which may not capture all the facets of job satisfaction. Hence, the mainstream approach may not present a holistic picture of all factors influencing hotel employee satisfaction. Given the importance of online reviews, a few studies employed big data and natural language processing (NLP) to examine employee satisfaction (Jung and Suh, 2019; Luo *et al*., 2016; Lee and Kang, 2017; Stamolapros *et al*., 2019). Luo *et al*. (2016) assessed the job satisfaction of 274,061 employees using the criteria provided by Glassdoor, such as "work and life balance" and "career opportunities." Instead of using predetermined criteria from a company review website, Jung and Suh (2019) and Stamolapros *et al*. (2019) applied topic modeling to extract employee satisfaction dimensions from the text data. In the above examples, Stamolapros *et al*. (2019) were the first to focus on employees in the hospitality industry. The authors determined that the top three topics affecting employee job satisfaction are "working environment," "career opportunities," and "task variety," respectively.

2.2 Differences between premium hotels and economy hotels

Previous studies on customer satisfaction have shown that exploring topics that influence customer satisfaction based on hotel type is meaningful (Geetha *et al*., 2017). Given that customers' expectations of the services of different hotel types vary, employees' job demands may also differ depending on hotel type. Work requirements may be higher in premium hotels

compared with those in economy hotels, as premium hotels (e.g., luxury hotels) focus on service quality and work efficiency, whereas economy hotels focus primarily on service efficiency (Li *et al*., 2012). Hotels can be classified in different ways, such as by type, star rating representing classifications, and number of rooms; yet, no universal classification system exists for all hotel types (Padma and Ahn, 2020). The Smith Travel Research (STR) report (Smith Travel Research, 2018) classified hotels as "luxury," "upper upscale," "upper midscale," "midscale," and "economy." Xu and Li (2016) categorized hotels as "full-service hotels," "limited-service hotels," "suite hotels with dining options," and "suite hotels without dining options." Meanwhile, Bi *et al*. (2020) categorized hotels as "economy hotels," "midscale hotels," and "luxury hotels." Most previous studies determined that the broad hotel types (full-service hotels with a full range of amenities versus economy hotels with basic facilities) could potentially influence customer and employee satisfaction (e.g., Bi *et al*., 2020; Geetha *et al*., 2017). Differences in satisfaction among hotel types (e.g., from one star to five stars or from the lowest level of a budget hotel to the highest level of a luxury hotel) have yet to be observed, probably because no confirmed hotel classification rules exist, and certain types of hotels show little difference. Although various rating systems may name each category in distinct ways, some categories with different names from various systems can be treated as the same types. Yu and Timmerman (2014) posited that, although hotels can be categorized as luxury, upper upscale, upper midscale, midscale, and economy, the factors influencing customer satisfaction and experience are evident only between luxury and economy hotels. To capture a broad perspective, we summarized the STR classification into two general categories. We defined premium hotels, including luxury, upper-upscale, and upper-midscale hotels, as a single type and economy hotels, including economy and midscale hotels, as another single type.

2.3 Turnover issues in the hotel industry

Many hospitality turnover studies in the past decade focused on current employees' turnover intentions using either qualitative research methods, such as interviews (e.g., Yang *et al*., 2012), or self-reported surveys (e.g., Chen *et al*., 2019; Li *et al*., 2019). Although previous studies provided crucial insights into the reasons that may trigger employees' intention to leave their respective companies, traditional data collection methods, such as self-reported surveys, may have social desirability bias issues. In summary, studies on employee turnover intention mainly examined current employees in the hospitality industry; thus, little is known about the actual reasons behind former employees' turnover behaviors (Park and Min, 2020). The antecedents of employees' turnover intention should not be treated exactly the same as those of employees' actual turnover behavior (Park and Min, 2020). Employee online review platforms provide employees a space wherein they can post anonymous comments, which in turn, can serve to better understand employees' actual reasons for leaving their company. In contrast to most previous approaches analyzing current employees' turnover intention, in the current study, we analyzed reviews from former hotel employees.

2.4 NLP in hotel industry research

The phenomenon of people using online websites to post reviews and comments provides researchers a high volume of real-time textual data containing users' thoughts, opinions, emotions, and sentiments (Sun *et al*., 2017). NLP is a computational technique for analyzing people's natural language, such as users' real-time thoughts and sentiments, in online text data (Sun *et al.*, 2017).

Sentiment is defined as "an acquired and relatively permanent major neuropsychic disposition to react emotionally, cognitively, and conatively toward a certain object (or situation)

in a certain stable fashion" (Cattell, 1940, p.16). Although sentiment and satisfaction are two different constructs, sentiment analysis is widely used in the customer satisfaction domain to assess online reviews (e.g., Ma *et al.*, 2018; Zhu *et al.*, 2020). Geetha *et al.* (2017) applied lexicon-based sentiment analysis to study customer satisfaction in premium and economy hotels by analyzing customers' online reviews. Young and Gavade (2018) showed that hotel management can use sentiment analysis to manage diversity issues. Prior studies commonly computed general sentiment polarity, which is a score indicating whether customers' comments are positive or negative, to represent overall satisfaction (e.g., Geetha *et al.*, 2017; Salehan and Kim, 2016). Job satisfaction is defined as individuals' evaluative judgement on workplace objects and situations (Weiss, 2002). This indicates that satisfaction has a cognitive component, which partly overlaps with the definition of sentiment. Hence, the current research also employed sentiment analysis to analyze employee satisfaction.

Topic modeling is widely used to summarize dominant topics in unstructured texts (Robert *et al.*, 2014). Some popular topic models, such as latent Dirichlet allocation (LDA) and STM, have been recently adopted in the hospitality literature to explore topics related to consumer satisfaction in hotels and tourist attractions (e.g., Guo *et al.*, 2017; Hu *et al.*, 2019). This new research stream provided a holistic picture of the prevalent topics in customers' written reviews and offered hotel management teams with new approaches for tracking and improving customer satisfaction through popular online platforms. In comparison, studies on employee sentiments in the hotel industry remain lacking. Beyond the findings of current studies on employee satisfaction, results from online reviews can enhance understanding on what determines hotel employee satisfaction in different hotel types.

3. Method

3.1 Data collection

This study's target population included hotel employees in the United States, and the empirical setting was the employee job search website Indeed.com (hereafter referred to as "Indeed"). Indeed is one of the largest employment-related search engines. Established in 2004, Indeed is currently one of the top 10 best websites for job searching (Doyle, 2020). Indeed includes a company review section, which allows current and former employees to post comments about their employment experiences in certain companies. We collected online reviews of hotels in the United States for the period of January 2011 (the year of the first displayed review) to October 2019 using the "rvest" package (Wickham and Wickham, 2019) in R. The scraped data included review content, review title, date of review, employment status (i.e., current or former employee), and the numerical rating of the reviewed company from 1 (not satisfied) to 5 (highly satisfied). When employees write a review for their hotel company, they are asked to rate a couple of items describing their employment experience, such as "Overall, I am completely satisfied with my job" and "I feel happy at work most of the time," on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The numerical rating of the reviewed company represents employees' overall employment experience satisfaction with their hotel company, which is calculated by averaging the rating results of the all items employees need to rate.

3.2. Dataset description

As the target population comprised hotel employees in the United States, all the reviews came from hotel companies in the country. The sample included 78,583 comments from employees of 29 hotels, including 32,634 comments from employees of 14 economy hotels and

45,949 comments from employees of 15 premium hotels. The average number of reviews for premium-type hotels was 3,063 per hotel, and that for economy-type hotels was 2,331. For the economy hotels, 8,402 (26.62%) comments were written by current employees, and 24,232 (73.38%) comments were written by former employees. The average star rating, which represented employee overall satisfaction, was 3.55. For the premium hotels, 14,385 (31.31%) reviews were written by current employees, and 31,562 (68.69%) were written by former employees. The mean star rating of employee satisfaction was 3.99.

3.3 Data preparation

The next step was the data preparation and term reduction. First, given that the review titles were summative and conveyed highlighted information and emotions (Geetha *et al*., 2017), we combined the review titles and review body texts in documents for the topic modeling and sentiment analysis. Next, the scraped raw texts were processed using steps conventionally employed in prior studies (e.g., Geetha *et al*., 2017, Guo *et al*., 2017), including changing all letters to lowercase letters; removing non-meaningful numbers, punctuations, URLs, emojis, extra spaces, and English stop words (e.g., words with no semantic meaning, such as "the," "me," "myself," "and," and so on); and grouping the different grammatical forms of a word into a single word through lemmatization. For example, the words "worked" and "working" were returned to their original word form, "work." Employment status (1 = current and 0 = former) and hotel type (1 = premium and 0 = economy) were coded as dummy variables, and calendar year was coded as a continuous variable.

3.4 Sentiment analysis

Sentiment analysis was employed to answer the first research question regarding exploring employees' sentiment. We applied the lexicon-based sentiment analysis, which

matched words from a text to several existing dictionaries to label sentiments (Liu, 2010).

Sentiment extraction can be performed at different levels, such as single words, sentences, or

long passages (Sun *et al.*, 2017). A term that matches the lexicon is called a "polarity term,"

which is labeled as either positive or negative. Specifically, a word is tagged as either positive or

negative by comparing it with each word in the National Research Council Canada Emotion

Lexicon (Mohammad and Turney, 2013). Furthermore, we followed Zhu *et al.*'s (2014)

suggestion that a comment's sentiment should be weighted by the surrounding polarity terms in

the same sentence. Zhu *et al.*'s (2014) process involves keeping negations, such as "not" and

"no," because they can completely alter a comment's sentiment. For example, if an employee

writes, "I don't like the culture in this hotel," the word "not" (from the contraction "don't") is a

negation that reverses the sentence's positive sentiment to a negative one. This procedure differs

from the typical text processing used in other studies, which deletes all negative words.

Additionally, we considered such words as "very" and "few," which may influence the

magnitude of sentiments. Sentiment analysis is conducted using the "sentimentr" package in R

(Rinker, 2019).

3.5 Topic modeling

The overall objective of the second to the fourth research questions was to identify topics

regarding the hotel employees' satisfaction and to compare topic sentiments by hotel type and

employment status. Similar to the basic topic modeling (i.e., LDA), which defines each topic as a

distribution of words and each document as a mixture of *k* topics, STM incorporates covariates

that may influence topic prevalence and content. Considering document-level covariates in topic

modeling allow researchers to identify whether certain topics have different representative words

or varying prevalence across covariate levels (Robert *et al.*, 2014). We considered three

covariates: hotel type, employment status, and star rating of employees' satisfaction. STM was conducted using the "stm" package (Robert *et al.*, 2014) in R. Following Robert *et al.* (2014), we selected topic numbers using the following criteria: (1) held-out likelihood, (2) residuals, (3) topic word exclusivity, and (4) semantic coherence. First, we computed models with topic numbers 5, 10, 15, 20, 25, and 30 and then selected the 20-topic model based on the above criteria. As seen from the "Held-Out Likelihood" chart from Appendix A, topics numbers from 20 to 30 showed a high held-out likelihood. The "Residuals" chart showed that residuals were the lowest between 20 and 30 topics. After further considering semantic coherence and topic exclusivity, we determined that the 20-topic model performed best (see Appendix B). The 20-topic model and the 30-topic model both showed high levels of topic exclusivity. However, the 20-topic model had a higher semantic coherence than the 30-topic model. Considering all the above criteria, the model with 20 topics can be considered the best option.

4. Results

4.1 Sentiment analysis

The sentiment polarity of the online employee comments was positive regardless of hotel type. However, the comments about premium hotels had a higher positive sentiment polarity than those about economy hotels. Specifically, the average sentiment polarity of the comments about premium hotels was .80, with a range of [–2.83, 4.65]. For economy hotels, the average sentiment polarity of the comments was .66, with a range of [–2.25, 4.67]. Furthermore, the percentage of the negative employee comments about economy hotels was higher than that about premium hotels. Based on hotel types, we further calculated the percentage of comments from 2011 to 2019 showing the negative sentiment. Results indicated that approximately 14.23% of

the comments from employees of economy hotels conveyed negative sentiments, and 9.78% of the comments from employees of premium hotels were negative. Economy hotels had approximately 5% more negative comments across the years than premium hotels. The two sample t-test result showed that the mean of the negative sentiment percentages differed significantly between economy hotels and premium hotels [$t(156) = 8.04$, $p < .001$].

Furthermore, statistically significant correlations were observed in the sentiment polarities of star ratings and employment status. In particular, employees' average sentiment was moderately and positively correlated with the star ratings of premium ($r = .33$, $p < .05$) and economy hotels ($r = .39$, $p < .05$), thereby indicating a positive relationship between employees' ratings and their sentiment polarities. Current and former employees had positive sentiments, on average, whereas current employees had significantly high positive sentiments ($p < .5$).

Figures 1 and 2 list the 20 most frequently mentioned words in the comments that contributed to hotel employees' positive and negative sentiments toward economy hotels and premium hotels, respectively. For economy hotels (see Figure 1), the top terms contributing to positive sentiments included "job," "good," "management," "customer," "fun," "love," and so on. Meanwhile, the words contributing to negative sentiments were "bad," "dirty," "challenge," "payment," "complaint," "terrible," and so on. These terms indicated that employees from economy hotels expressed more positive views on management teams, customers, and their overall work. For premium hotels (see Figure 2), the top positive terms were "fun," "enjoy," "customer," "opportunity," "advancement," and "productive," whereas examples of negative terms were "leave," "bad," "challenge," "diverse," and "pressure." These terms may indicate that employees from premium hotels viewed their work generally as enjoyable and with development

opportunities. Next, we conducted topic modeling to reveal the specific topics that can potentially influence employees' satisfaction.

4.2 Topic summary and validation

Appendix C shows the topics computed from the 20-topic STM model, the prevalence of each topic, the broader topic category, and the ten keywords used to identify the label of each topic. The topics were analyzed using topic label interpretation and topic reliability examination. First, we extracted the most distinguishable words and the most representative comments from each topic in order to assign a meaningful label to each topic. Two graduate students with expertise in organizational behavior management and HRM were tasked to label the topics using this information. Matching distinguishable words with corresponding representative comments can serve as a topic labeling quality assurance step (Hu *et al*., 2019). To ensure the reliability of the topics derived from STM, we followed the procedures used by Jung and Suh (2019) and calculated the interrater reliability using Cohen's kappa coefficient (Cohen *et al*., 1960). After confirming the topics, we asked 30 individuals with HRM experience in the hotel industry whether they agreed or disagreed with the label of each topic. Cohen's kappa was .80, thereby indicating substantial agreement among the raters. Finally, 18 out of the 20 topics achieved consistent and meaningful interpretations. The first column in Appendix C shows the label for each topic. The two non-interpretable topics were labeled as "comments in Spanish" (#9) and "others/miscellaneous" (#20).

We further classified the topics into broad categories to provide an overview of the 20 topics (see Appendix C). The topics were summarized as follows: (1) hotel job content (topics # 2, 4, 14, 16, 17, and 18), (2) general work characteristics (topics # 1, 8, and 15), (3) job resources

(topics # 5, 6, 10, 11, 12, 13, and 19), and (4) hotel and work environment (topics # 3 and 7). The first category, hotel job content, mainly included topics about job descriptions of food and beverage, front offices, housekeeping, sales, and the engineering department. The key words under each topic were related to the daily job responsibilities in each department. The second category, general work characteristics, included topics reflecting the nature of hotel jobs, such as low compensation, high turnover rate, and dirty work. The third category, job resources, was defined as those factors related to resources and support, which employees receive from their supervisors and organization. The last category, hotel and work environment, was defined as factors related to the working environment and hotel facilities, such as workplace facilities (e.g., software and computers) and hotel locations.

4.3 Topic prevalence

Topic prevalence is defined as a topic's presence in a given text dataset (Robert *et al*., 2014). Controlling for star rating, employment status, and hotel type, we identified the top five topics with the highest percentage as workplace bullying and dirty work (#15, 18.01%), organizational support (#13, 16.29%), career advancement (#12, 8.88%), compensation and turnover (#1, 8.77%), and workplace support (#10, 7.32%; see Appendix C).

Furthermore, topic prevalence varied across employment status (Figure 3) and hotel types (Figure 4). The bar chart in Figure 3 shows the topic proportion for current employees and former employees in each of the 20 topics. The overall percentage of each topic from former employees was higher than the percentage of each topic from current employees. For example, 80% of the comments mentioning workplace bullying (#15), 70% mentioning workplace support, 66% mentioning compensation and turnover, and 63% mentioning career advancement (#12) were from former employees (see Figure 3).

The bar chart in Figure 4 shows the topic proportion for economy hotels and premium

hotels in each of the 20 topics. The top five topics mentioned by employees of premium and

economy hotels were workplace bullying (#15, e.g., workplace harassment and

supervisor/customer bullying behaviors) and dirty work (e.g., taking out the trash and cleaning

the toilet), organizational support (#13), career advancement (#12), compensation and turnover

(#1), and workplace support (#10). Descriptively, some topics showed percentage variations

between premium and economy hotels. For example, in the topic about organizational support

(#13), 29% of the comments came from employees of economy hotels, while 71% of the

comments came from employees of premium hotels. In the topic about career advancement

(#12), 61% of the comments came from the employees of premium hotels, and the rest were

from employees of economy hotels.

[insert figure 3 about here]

[insert figure 4 about here]

4.4 Sentiments across topics

Next, we conducted two-way ANOVA to examine sentiment differences in the topics and

hotel types. We found that sentiments differed by topic ($F = 918.68$, $p < .001$) and hotel type (F

$= 233.20$, $p < .001$). Furthermore, we observed a statistically significant interaction effect

between hotel type and topics on sentiment polarity [$F(1, 19) = 4.19$, $p < .001$]. We examined the

effects of employment status and topics on sentiment differences. The ANOVA showed that

sentiments differed by topic ($F = 915.44$, $p < .001$) and employment status ($F = 3.20$, $p < .05$).

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The results indicated a significant interaction between employment status and topics [$F(1, 19)$ = 1.74, $p < .05$]. Overall, the two-way ANOVA results demonstrated that topic sentiments differed depending on hotel type and employment status.

To further answer the third and fourth research questions, we calculated the negative sentiment percentage of each topic based on hotel type and employment status. Figure 5 displays the percentage of negative sentiment in each topic for economy hotels and premium hotels, respectively. The negative sentiment polarity percentage of each topic was mostly higher for economy hotels than for premium hotels, except for the topics about job content related to basic front office work (#4) and work–life conflict (#8). The top five topics with the highest negative sentiment polarity percentage for premium hotels were workplace bullying and dirty work (#15), compensation and turnover (#1), working environment (#3), job content related to the engineering department (#18), and non-work domain support and benefits (#19). For economy hotels, the top five topics were topics 15, 1, 14, 19, and 18. The topic that differed from the list for premium hotels was job content related to housekeeping work (#14).

[insert figure 5 about here]

Next, we compared the percentage of negative sentiment polarity between current employees and former employees. As seen from Figure 6, for both current and previous employees, topics about workplace bullying (#15), compensation and turnover (#1), and working environment (#3) had the highest negative sentiment percentages. Previous employees' negative sentiment polarity percentage was higher than that of current employees in topics related to compensation and turnover (#1), job content of food and beverage work (#2), working

environment (#3), job content of basic front office work (#4), teamwork (#5), job content of advanced front office work (#16), job content of sales (#17), and non-work support (#19).

[insert figure 6 about here]

5. Discussion and Conclusions

5.1 Conclusions

Using online employment review data from the company review section of Indeed, this study explored the overall sentiments expressed in employee-written reviews and provided suggestions for how hotel companies can utilize these to improve employees' satisfaction. Quantitative and qualitative information was revealed from the textual information, and the four research questions were well-addressed based on the results. To address the first research question on the overall sentiment expressed by hotel employees in their online reviews, multiple steps were taken to examine the sentiment score for each type of hotel. The aims were to explore the relationship between employees' sentiment polarity and satisfaction and to identify the terms influencing positive and negative sentiments for each hotel type. To answer the second research question, we used STM to compute topics about antecedents of employee satisfaction. Most of the topics are consistent with those discussed in previous studies (Jung and Suh, 2019; Kong *et al.*, 2018; Stamolampros *et al.*, 2019; Yang, 2010), but we also identified unique topics, including hotel job content in each department in the hotel industry (topics #2, 4, 14, 16, 17, and 18); workplace harassment, discrimination, and dirty work (#15); and employee recognition (#11). To address the last two research questions, we computed topic prevalence and topic sentiment across hotel types and employment status. The commonly discussed topics and those

with a high negative sentiment percentage differed considerably across hotel types and employment status. For example, the topic prevalence and negative sentiment percentage of workplace bullying were higher among former employees than among current employees, thereby indicating that this topic could be a potential reason for employees to resign from their hotels. For economy hotels, the negative sentiment percentages of the topics related to workplace bullying, compensation, and housekeeping work were higher than that for premium hotels.

5.2 Theoretical implications

Although hotel employee satisfaction is not a new topic, exploring the antecedents of satisfaction based on the linguistic characteristics of employees' online reviews is underexplored. In contrast to previous studies that predetermined and tested the antecedents of employee satisfaction, the current study identified 20 semantically meaningful topics by summarizing the key terms mentioned in employee online reviews, thereby revealing the degree of positivity or negativity of each topic by using sentiment analysis. Additionally, this study contributed to the employee satisfaction literature by demonstrating that satisfaction is a multidimensional construct. McAbee *et al*. (2017) suggested integrating inductive and deductive approaches to explore new research questions. The current research was not a purely inductive study, as the naming of the topics based on the most frequent terms and the grouping of the identified topics were based on previous studies. The four broad categories of factors that influence employee satisfaction can be used further to guide future studies in selecting terms for variables that could potentially influence workplace satisfaction.

Though previous studies have identified factors that could influence employee satisfaction by examining statistical relationships between one or several variables and satisfaction, such an approach is fragmented and cannot reveal the weight of each factor.

Capturing employees' global satisfaction is important, as it shows their overall attitude toward their employment experiences. However, previous research determined that the measure of global job satisfaction is not equivalent to the various facets of job satisfaction (Highhouse and Becker, 1993; Judge and Kinger, 2007). Studying the facets of job satisfaction is crucial, as it enhances our understanding of the terminologies related to job satisfaction. The current study also identified a variety of factors that could influence employee satisfaction, namely, (1) hotel job content, (2) general work characteristics, (3) job resources, and (4) working environment. Some of the specific topics, such as organizational factors (e.g., compensation and working environment) and family factors (e.g., non-work domain support), are consistent with those presented by Yang (2010) and Kong *et al.* (2018). Moreover, this study revealed that the topic of workplace bullying and dirty work, though ignored in previous studies, actually played a crucial role in influencing hotel employee satisfaction.

Hotel types are important in studying employee satisfaction. Organizational context, such as job demands (determined by hotel type), is essential in exploring employee satisfaction in different settings. This study responded to the call for future research examining within-sector differences (e.g., gender, location, hotel type) from Stamolampros *et al*. (2019). In particular, we investigated differences in topic prevalence and topic sentiment by hotel type. Overall, the results revealed that reviews written by employees of economy hotels were more negative than those of employees of premium hotels. The topics with the highest negative sentiment percentage were not completely the same for premium and economy hotels. Thus, hotel type should be considered when exploring employee satisfaction, as the topics influencing satisfaction in premium and economy hotels differ.

Finally, by assessing employees who left their company, this study revealed reasons that may have triggered former employees' resignation. The three topics mentioned by former employees with the highest negative sentiment percentages were workplace bullying and dirty work, compensation, and working environment. Although previous studies identified the antecedents of turnover intention (e.g., Park and Min, 2020; Rubenstein *et al*., 2018), dirty work and workplace bullying seemed to be neglected in previous studies on hospitality employees' turnover intention.

5.3 Practical implications

This study can provide managers in the hotel industry with a new approach for examining employee satisfaction. Most hotel companies still rely on traditional surveys to investigate employee satisfaction. Employees may be concerned about reporting their perceptions in surveys implemented by their company, as they may believe that the management team has access to the data. Online review platforms have become common spaces for employees to share their employment experiences without disclosing their personal information. The results of the current study have important implications for premium and economy hotels. Below, we outline the actions that hotel management teams can take based on the results of this research.

The answers to the first research question provided basic information to hotel companies on the overall picture of employee satisfaction based on different hotel types. Aside from using annual surveys to manage employee satisfaction, management teams could regularly check the star ratings given by employees and develop action plans. Hotel chain companies and management teams could use sentiment scores as primary information for determining whether or not the employees of certain hotel groups are happy with their work environments. In addition, using terms that contribute to either positive or negative sentiments can help hotel

companies determine the directions (e.g., focus on issues related to stress, pressure, payment, or turnover) they should consider in order to improve employee satisfaction. After obtaining an overall idea of their employees' satisfaction levels, hotels can further use employees' comments to explore the specific factors influencing employee satisfaction.

The results of the second research question demonstrated that, when examining employee satisfaction, 20 prevalent topics indicating a range of issues should be included. This study showed that questions related to general work characteristics, job resources, and working environment could be included in surveys. For example, questions related to work–life conflict, supervisor support, coworker support, organizational support, and career advancement opportunities can be incorporated into the design of annual employee surveys.

This study found that topics related to discrimination, racism, workplace harassment, and dirty work were widely discussed by current and former employees from all hotel types. Moreover, the topic percentage and negative sentiment percentage of topic #15 (workplace bullying and dirty work) were higher among former employees than among current employees. Although most hotels have diversity and inclusion programs, successful ways to examine the effectiveness of such programs remain lacking. Thus, questions related to fair treatment and equality should be included in employee satisfaction surveys. The term "dirty work" originated from Ashforth and Kreiner (1999) and is defined as work with "physical," "social," and "moral" taints (Ashforth and Kreiner, 1999). The results of this study further highlighted the importance of ensuring the well-being of employees in positions that require performing dirty work, such as kitchen staff, room attendants, and food and beverage staff.

Finally, this study showed that the topics influencing employee satisfaction varied depending on hotel type. For premium hotels, topics related to workplace bullying and dirty

work, compensation and turnover, working environment, and non-work domain support should be prioritized to improve employee satisfaction. For economy hotels, aside from addressing the same topics as those for premium hotels, management teams should pay special attention to the workload and well-being of employees in the housekeeping department.

5.4 Limitations and future research

This study has a few limitations, which also provide opportunities for future studies. First, the study data are limited to one employment search engine, and the sample is limited to reviews from employees in the United States. Thus, selection bias may exist in the sample of this study as the main language used for the writing comments was English. Although we found a topic concerning reviews written in Spanish, we did not analyze it, as it was less than 1% of the total number of topics. Hence, future studies can use different online platforms and examine how cultural elements influence employees' sentiments expressed online.

Second, the dataset scraped from the third-party website may have several limitations, as it does not contain employees' demographic information, such as job tenure in the hotel industry, employment history in previous companies, age, gender, and educational background, among others. To better utilize this big data technique, researchers could work with hotel companies to create their own review website that could collect demographic information as well as allow employees to post about their employment experiences and provide suggestions anonymously. From a practical perspective, hotel companies could use this new research approach to determine their employees' satisfaction levels for their reference. From an academic perspective, such a dataset can help researchers study different employee segments (e.g., different generations) and enable hotel companies to develop strategies for improving employee satisfaction effectively.

Third, using sentiment analysis to study employee satisfaction may cause confusion in the definitions of "sentiment" and "satisfaction" in the texts. Although we justified previous studies' use of such an approach for examining satisfaction, the differences between sentiments and other relevant terms (e.g., satisfaction, emotion, and affect) in the NLP community are challenging issues; hence, such a topic should be explored further.

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