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# Dynamics in the asymmetric effects of job attributes on employee satisfaction: A mixed-method approach using big data

**Abstract**: Given its direct influence on customer satisfaction and firm profitability, employee satisfaction has attracted much attention from scholars in the hospitality industry. However, the moderating variables that shape the asymmetric relationship between job attributes and employee satisfaction remain largely unexplored. We aim to fill this gap by considering the influence of employee position and organizational tenure on the relationship. We reveal the asymmetric relationships between employee satisfaction and various job attributes by performing an impact-asymmetry analysis and using a hybrid approach that integrates the big textual data from online reviews written by employees. Our results highlight some differences between managers and non-managers, with the former giving priority to organizational culture and work environment and the latter setting high expectations on employee benefits. These results also underscore the dynamic effect of organizational tenure on the aforementioned asymmetric relationships. Our empirical findings can guide managers in the hospitality industry in designing targeted strategies that can effectively maximize the satisfaction of their employees.

**Keywords**: employee satisfaction, three-factor theory, employee online reviews, employee position, organizational tenure, impact-asymmetry analysis

## 1. Introduction

The COVID-19 pandemic and its economic repercussions (Chen & Chen, 2021; Liu-Lastres et al., 2023) have not only introduced challenges related to the health, work–life balance, and personal finances of hotel employees but have also forced them to reassess their career decisions. Many employees have even quit the industry due to work pressures, health risks, and uncertainties associated with hotel work (Liu-Lastres et al., 2022), thus triggering a labor shortage in the hospitality industry and subsequently affecting service quality and workforce stability in hotels (Dogru et al., 2023). The pandemic has also ushered in a “quiet quitting” phenomenon, where employees do not express any intention to quit their jobs yet gradually reduce their engagement at work (Hamouche et al., 2023). Such behavior may be attributed to several reasons, including the growing dissatisfaction of employees with their work environment, their poor communication with

managers and colleagues, and their uncertainty about the available prospects at work, which directly influence their job satisfaction and productivity and ultimately impact the performance of their companies. Therefore, to ensure their survival, hospitality firms should understand those factors that influence the satisfaction and dissatisfaction of their employees.

While tourism and hospitality studies have explored the relationship between job attributes and employee satisfaction, most of them have only focused on linear and symmetric relationships and ignored the possible asymmetric links (e.g., Back et al., 2010; Kara et al., 2012; Kong et al., 2018; Yang, 2010), thereby limiting the present understanding of which job attributes lead to higher employee satisfaction or dissatisfaction. It is believed that employee satisfaction and dissatisfaction are not two extremes of a spectrum but are influenced by different factors (e.g., Ann & Blum, 2020; Lundberg et al., 2009). Specifically, some job attributes could lead to satisfaction while others could prevent dissatisfaction (Herzberg et al., 1959). Building on this idea, Kano (1984) categorized attributes into satisfiers (delighters), hybrids, or dissatisfiers (frustrators).

A limited prior tourism and hospitality research (Lee et al., 2015; Matzler & Renzl, 2007) has examined the asymmetric relationship between job attributes and employee satisfaction. However, a critical gap in these studies is that they ignore variations when investigating such asymmetries. Employee satisfaction and dissatisfaction with different job attributes are generated by the degree of deviation of employees' actual experiences from their prior expectations and perceptions (Oliver, 1980). Given that each employee holds a different set of expectations and that these expectations may change over time, the asymmetric effect of job attributes on employee satisfaction may also vary (Bi et al., 2020). Therefore, we explore how the asymmetric relationship between job attributes and employee satisfaction is moderated by employee position and organizational tenure.

The differences among the positions of employees (Liu & Cho, 2018; O'Neill & Davis, 2011), especially between managers and non-managers (Bellou & Andronikidis, 2009), have received much attention in the hospitality literature. Non-managerial employees communicate directly with customers and provide service, while managerial employees respond to and correct deficiencies in service delivery (Lu et al., 2016). Given that these two employee groups show differences in their skillsets, job specifications, and work values, they also hold different perceptions and expectations of their jobs (Liu & Cho, 2018). Previous studies also show that the job satisfaction of employees changes along with their organizational tenure (Dobrow et al., 2018) because employees accumulate

more job skills, experience, and familiarity as they stay longer with their organizations (Park & Min, 2020), thus driving them to adjust their job expectations over time (Chen et al., 2011; Zacher, 2014). After this adjustment, satisfiers may be transformed into either hybrids or dissatisfiers, and vice versa (Kim et al., 2023; Matzler et al., 2004).

Building on and extending prior work (Lee et al., 2015; Matzler & Renzl, 2007), the purpose of this study is to empirically investigate how the asymmetric relationship between job attributes and employee satisfaction differs across work roles in hotels and how such relationship changes along with organizational tenure. We propose the following questions to guide this investigation:

**RQ1:** *Is there an asymmetric relationship between job attributes and overall employee satisfaction?*

**RQ2:** *Does this asymmetric relationship differ between employees serving managerial and non-managerial roles?*

**RQ3:** *Does this asymmetric relationship change along with organizational tenure?*

To answer these questions, we analyze a sample of 114,250 employee online reviews for 1,721 US hotel companies posted on Glassdoor by using a hybrid approach that integrates big data and asymmetric analysis techniques. Our work offers several contributions to the literature. First, by considering the boundary conditions of employee position and organizational tenure, our findings offer novel insights into the asymmetric effects of job attributes on employee satisfaction. Second, our exploration of the dynamics of employee satisfaction expands the scope of three-factor theory, which is traditionally used in examining customer satisfaction (e.g., Lai & Hitchcock, 2017; Mikulić & Prebežac, 2011; Park et al., 2020). Finally, by relying on large-scale employee-generated data, our work complements the findings of previous employee satisfaction studies that are mainly based on questionnaire surveys (Yang, 2010; Zhao et al., 2020).

# 2. Literature review

## *2.1. Three-factor theory and asymmetric effects*

Herzberg's (1959) two-factor theory of job satisfaction posits that the satisfaction and dissatisfaction of employees hinge upon two independent factors, namely, satisfiers (motivators) and dissatisfiers (hygiene). These factors are not placed at the opposite ends of a spectrum but should instead be viewed from two different spectra. Specifically, while high levels of motivators can

enhance employee satisfaction, high levels of hygiene do not necessarily reduce dissatisfaction but merely prevent it. Kano (1984) later extended this model by proposing three-factor theory of customer satisfaction, which aims to highlight the asymmetric effect of quality attributes on customer satisfaction. In this theory, the determinants of customer (dis)satisfaction are categorized into satisfiers, hybrids, and dissatisfiers (Kano, 1984).

The two aforementioned theories differ in their conceptual applications and number of factors (Matzler et al., 2004). First, two-factor theory strictly divides these factors into hygiene (e.g., company policy and administration, supervision, relationship with supervisors, and working conditions) and motivator factors (e.g., achievement, recognition, work, and responsibility), while three-factor theory defines satisfiers, hybrids, and dissatisfiers based on the expectations of customers. Such classification may differ across industries and market segments and thereby require a consideration of individual and situational differences (Davras & Caber, 2019). Second, three-factor theory of customer satisfaction can be viewed as a dynamic model (Bi et al., 2020) where those factors that have been initially categorized as satisfiers may be later recategorized as hybrids and dissatisfiers, and vice versa (Kim et al., 2023).

While three-factor theory offers a suitable framework for understanding the asymmetric effects of service or product attributes on customer satisfaction across various contexts (e.g., Davras & Caber, 2019; Füller & Matzler, 2008; Park et al., 2020; Shin & Nicolau, 2022), its application in understanding the formation of employee satisfaction lacks empirical justification. Matzler and Renzl (2007) compared the applicability of prospect theory and three-factor theory in explaining the asymmetric relationship between various job attributes and satisfaction. Their findings empirically rejected the claims of prospect theory that having a low satisfaction with specific factors has a greater impact on overall employee satisfaction than having a high satisfaction, thereby suggesting that three-factor theory offers a better explanation for such asymmetric relationship. Lee et al. (2015) applied three-factor and self-determination theories in their examination of the relationship between intrinsic (satisfiers) and extrinsic needs (dissatisfiers) and found that these two factors have a strong positive association with employee satisfaction and dissatisfaction, respectively.

However, the above studies regard three-factor theory as a static model. As previously mentioned, three-factor theory is dynamic, unlike the static two-factor theory. In other words, while each attribute in two-factor theory is predetermined, the attributes in three-factor theory dynamically

evolve over time and may vary among individuals.

The asymmetric relationship between job attributes and employee satisfaction is shaped by the differences in the job attribute expectations set by employees. According to the expectation disconfirmation paradigm (Oliver, 1980), employee satisfaction and dissatisfaction with job attributes are determined through the comparison of employees' expectations with the perceived actual performance. Specifically, employees only experience satisfaction when the actual levels of these job attributes exceed their expectations; otherwise, they experience dissatisfaction. However, as noted above, each employee type may set unique expectations, and these expectations change over time (Kandasamy & Ancheri, 2009; Wanous et al., 1992).

### *2.2. Employee satisfaction and its determinants in hospitality*

Employee satisfaction can be defined as the positive emotional state or sense of pleasure derived by an employee from evaluating his/her job or job experience (Locke, 1976). The retention and recruitment of employees in the hospitality industry are largely influenced by employee satisfaction (Kusluvan et al., 2010). Service profit chain theory suggests that employee satisfaction benefits customer satisfaction because satisfied employees tend to deliver high-quality services (Heskett et al., 1994). Satisfied employees also tend to stay longer with their organizations and share positive word-of-mouth (Lee & Kim, 2020). In this case, employee satisfaction positively contributes to employee retention in hotel companies (Back et al., 2011; Oh et al., 2023; Yang, 2010).

Employee satisfaction is typically viewed as a multi-factor construct, with the hospitality literature largely focusing on its organizational, social, family, and work-related factors. For instance, Kong et al. (2018) underscored in their meta-analysis the predominant role of organizational factors, including compensation (Chiang et al., 2013), work environment (Bangwal & Tiwari, 2018), co-worker relationships (Ineson et al., 2013), and promotion opportunities (Back et al., 2011), in understanding employee satisfaction. An increasing number of studies have also explored the effects of managerial style (García-Rodríguez et al., 2020), work support (Zhang et al., 2023), leadership (Moin et al., 2021), and company culture (Farmaki et al., 2022) on employee satisfaction, while other scholars have explored the effects of social and family factors, especially work–life balance and work–family conflict (Zhao et al., 2020). These factors are particularly relevant to hotel employees, who usually have long working hours and shifting schedules that force them to reconcile

148 their work demands with their personal lives (Zhao et al., 2016). Other studies have investigated the
149 effects of job characteristics, such as role stress (Shi et al., 2022), emotional exhaustion (Pu et al.,
150 2024), emotional labor (Chu et al., 2012), and role conflict (Yang, 2010). Given its significant
151 influence on work environments and employee morale, the effects of the COVID-19 pandemic on
152 employee satisfaction have also attracted much scholarly attention (Benítez-Núñez et al., 2024;
153 Dorta-Afonso et al., 2023; Stamolampros & Dousios, 2023; Xia et al., 2023).

154 Previous studies reveal the direct and indirect effects of employee characteristics on their
155 satisfaction (García-Rodríguez et al., 2020; Glaveli et al., 2019; Karatepe et al., 2006). Prominent
156 is the effect of demographics such as age, gender, ethnicity, personal skills, personal-organizational
157 fit, and values (Kong et al., 2018). Individual characteristics such as employee positions and
158 organizational tenure may cause variations in employee satisfaction. For instance, managers have
159 been demonstrated to have higher engagement levels compared with non-managers (Liu & Cho,
160 2018), and the higher engagement levels among non-managers have been positively correlated with
161 their satisfaction (Lu et al., 2016). Role distinction has a moderating effect on the relationship
162 between job stress and employee satisfaction (Kim et al., 2009; O'Neill & Davis, 2011), while
163 organizational tenure has a positive effect on the organizational commitment of employees (Gu et
164 al., 2017) and a moderating effect on the relationship between employee satisfaction and turnover
165 (Boğan & Dedeoğlu, 2017).

166 Despite the large amount of research on employee satisfaction in the hospitality industry, these
167 studies have mostly focused on linear and symmetric relationships and assume that the positive or
168 negative performance of an attribute exerts a quantitatively similar effect on satisfaction (Matzler
169 & Renzl, 2007). Various attributes influence employee satisfaction, but improving performance on
170 each attribute does not necessarily result in a proportional increase in satisfaction (Matzler et al.,
171 2004). In other words, employee satisfaction is shaped by these attributes in distinct ways. To the
172 best of our knowledge, only two studies have investigated the asymmetric relationship between job
173 attributes and satisfaction among hotel employees (Lee et al., 2015; Matzler & Renzl, 2007), and
174 both have ignored the dynamic evolution of this relationship. Nevertheless, Matzler and Renzl (2007)
175 highlighted the contextual differences in such relationship by comparing seasonal with non-seasonal
176 workers.

177 Previous studies have predominantly measured employee satisfaction by using questionnaire

surveys and established scales, such as the Job Descriptive Index (JDI). However, these approaches involve a limited number of samples, thus failing to offer a complete picture of the dynamic nature of complex constructs, such as employee satisfaction (Matzler & Renzl, 2007; Stamolampros et al., 2019a). To address these shortcomings, recent studies (e.g., Jung & Suh, 2019; Symitsi et al., 2021) have examined the determinants of employee satisfaction through online reviews written by employees (see Table A in Appendix).

### *2.3. Influence of employee position on the asymmetric relationship between job attributes and employee satisfaction*

In the context of the skills shortage confronting the hospitality industry, managers and non-managers play pivotal roles in ensuring the operational success of their firms (Bellou & Andronikidis, 2009). These two roles differ not only in terms of hierarchy but also in their job responsibilities and skill prerequisites. Workplaces foster a positive "person–position" alignment as employees try to balance their identities, goals, attitudes, and the demands imposed by their work roles (Klehe et al., 2011). Therefore, the perceptions of managers and non-managers on their job attributes may be shaped by their role disparities and ultimately contribute to variations in the asymmetric relationship between job attributes and employee satisfaction.

Due to their high job demands and stringent educational qualifications, managers tend to earn a higher salary than their non-manager counterparts. Such hierarchical discrepancy is particularly evident in the hospitality industry, where non-managerial employees earn relatively low wages, which is a primary contributor to employee turnover in this industry (Park & Min, 2020). These low wages may also explain why non-managers, relative to managers, hold higher expectations related to their salary and benefits (Chiang & Birtch, 2008). Given that such expectations often fail to match their reality, non-managers tend to show greater dissatisfaction than managers. By contrast, managers prioritize their company culture, which they expect to align with their personal values, and the failure to meet such expectations may negatively impact their leadership role and position (Liu & Cho, 2018).

The above hierarchical difference between managers and non-managers also highlights variations in their career progression. Non-managers are placed at the lower levels of the organizational chart and thus actively seek out promotion opportunities to advance their careers and

fulfill their personal goals. Therefore, non-managers tend to set higher expectations for this attribute compared with managers (Creed et al., 2009), who, in turn, have limited opportunities for career advancement. Consequently, the availability of such opportunities tends to delight managers (Gordon & Shi, 2021).

Managers and non-managers also differ in their duties and work assignments. Non-managers in the hospitality industry directly provide services to customers, while managers check and address any deficiencies they spot in the service delivery process (Lu et al., 2016). These two employee groups also differ in the complexity of their tasks and responsibilities. While non-managers are mainly engaged in singular, highly repetitive tasks, managers are given more job responsibilities and are thus exposed to more challenges at work. As a result, managers are more likely to focus on job-related factors than non-managers and are more likely to experience dissatisfaction when their job requirements are not met. The pressure emanating from these responsibilities also explains why managers place much emphasis on maintaining their work–life balance (Zhao et al., 2011).

Based on these arguments, managers and non-managers are assumed to have different expectations regarding job attributes that may influence how these attributes influence their levels of satisfaction and dissatisfaction. In other words, variations in the asymmetric relationship between job attributes and employee satisfaction are likely to be caused by employee position.

### *2.4. Influence of organizational tenure on the asymmetric relationship between job attributes and employee satisfaction*

The hotel industry faces an important challenge in the form of a considerable employee turnover rate (Dogru et al., 2023). The influx and outflow of employees significantly impact the distribution of organizational tenure within a firm. Organizational tenure refers to the length of an employee's service or employment within an organization (McEnrue, 1988). Previous studies show that employees typically accumulate more skills and experience as their organizational tenure increases, which positively contributes to their job performance (Yang et al., 2015). Meanwhile, employees with short organizational tenure are relatively unfamiliar with their jobs and typically undergo a “honeymoon period” where they exhibit great enthusiasm and curiosity in their new work environment (Yang et al., 2015). Given the discrepancies in their work experience and organizational familiarity, employees with different organizational tenures tend to show variations

in their perceptions and expectations of job attributes (Chen et al., 2011). In this case, the asymmetric relationship between job attributes and employee satisfaction may vary along with organizational tenure.

The work experiences and skills accumulated by employees with increasing organizational tenure also increase their expectations regarding salary, work tasks, and work–life balance (Dobrow et al., 2018). While employees with long tenure may take these factors for granted, the failure to satisfy their expectations may still lead to greater dissatisfaction. By contrast, employees with shorter tenure tend to view their work environment with a positive attitude due to their organizational unfamiliarity (Wright & Bonett, 2002). Given their stronger reliance on workplace resources, employees with longer organizational tenure are placed at a greater risk of showing dissatisfaction when facing challenges in managing co-worker relationships. Their high familiarity with the organization also makes these employees deeply knowledgeable about their organizational culture (Tang et al., 2023), thus leading to their high expectations for this attribute. In essence, the job attributes that are initially perceived as satisfiers may change into hybrids or dissatisfiers when they become more familiar to employees (Matzler & Renzl, 2007).

Given that they are still at the beginning of their careers, employees with shorter organizational tenure generally exhibit a higher motivation to further their careers by actively seeking out career opportunities (Kong et al., 2012). Meanwhile, employees with longer tenure are given limited promotional paths, hence diminishing their expectations for a career advancement. As a result, the sense of accomplishment and satisfaction of these longer-tenure employees may be more pronounced when opportunities for promotion are present.

Based on the above arguments, the expectations held by employees for certain job attributes may be adjusted as they stay longer with their organizations. The changes in their expectations as a result of organizational tenure may also shape those factors that influence their satisfaction and dissatisfaction. In other words, organizational tenure moderates the asymmetric relationship between job attributes and employee satisfaction.

# 3. Methodology

## *3.1. Data collection*

We retrieved employee reviews from Glassdoor.com, a popular job listing website with a strong

presence in US markets that allows users to describe and rate their working experience with their current or former employers. These reviews, which can be viewed as a form of electronic word-of-mouth, can have a significant effect on the decisions of job seekers and the reputation of companies (Stockman et al., 2020). Given their several advantages over questionnaire data (Symitsi et al., 2021), employee reviews have been widely used in previous research to forecast the stock returns and performance of companies (e.g., Barnes & Cheng, 2023; Fang et al., 2021; Huang et al., 2020; Stamolampros & Symitsi, 2022; Symitsi et al., 2018) to generate insights into employee attitudes and job-related information that can aid in identifying the determinants of employee satisfaction (e.g., Jung & Suh, 2019; Sainju et al., 2021; Stamolampros et al., 2019a).

Our study focuses on the hospitality industry as our target, as employee satisfaction plays a critical role in shaping the customer experience, affecting firm profitability (Chi & Gursoy, 2009). We systematically searched for employee reviews on Glassdoor by utilizing a Python crawler. First, we selected all US companies classified under the Hotels & Resorts category and obtained 4,232 companies with available employee reviews. Second, to ensure the reliability of our collected data, we removed those companies that only had less than 10 employee reviews. Third, we removed those reviews with missing employee information. We eventually retained 114,250 reviews for 1,721 companies that were published between May 2008 and June 2023.

Our collected reviews included information about the reviewer, such as his/her job title, employment status, and years of work experience. Besides providing an overall rating, each reviewer also highlighted the favorable (pros) and unfavorable aspects (cons) of working for his/her company. Fig. 1 presents a sample review extracted from Glassdoor, and Table B in the Appendix presents the job distribution statistics for the collected reviews.

We used employee position and organizational tenure as situational variables to understand the asymmetric influence of job attributes on the satisfaction of employees with various characteristics and to explore how such influence changes over time. Following the literature (Karatepe et al., 2006; Ng & Feldman, 2011; Ozturk et al., 2021; Storer & Reich, 2021), we divided the employees in our sample into short-tenured (worked/working for the company for less than a year), medium-tenured (worked/working for the company for more than a year but less than five years), and long-tenured employees (worked/working for the company for more than five years). We also used the job titles of the reviewers to determine whether they held managerial or non-managerial positions. Following

Huang et al. (2020), we assumed that an employee held a managerial position in his/her company if his/her job title includes the keywords "manager," "director," "executive," "leader," "president," "officer," "chief," or "management." Table 1 shows that those reviewers with a longer organizational tenure tend to assign a higher rating for employee satisfaction, thereby suggesting a link between these variables. This result is not surprising given that dissatisfied employees often do not last long with their companies. Moreover, in line with the findings of previous studies (Lu et al., 2016; Yang, 2010), managers tend to provide higher ratings in their reviews than non-managers.

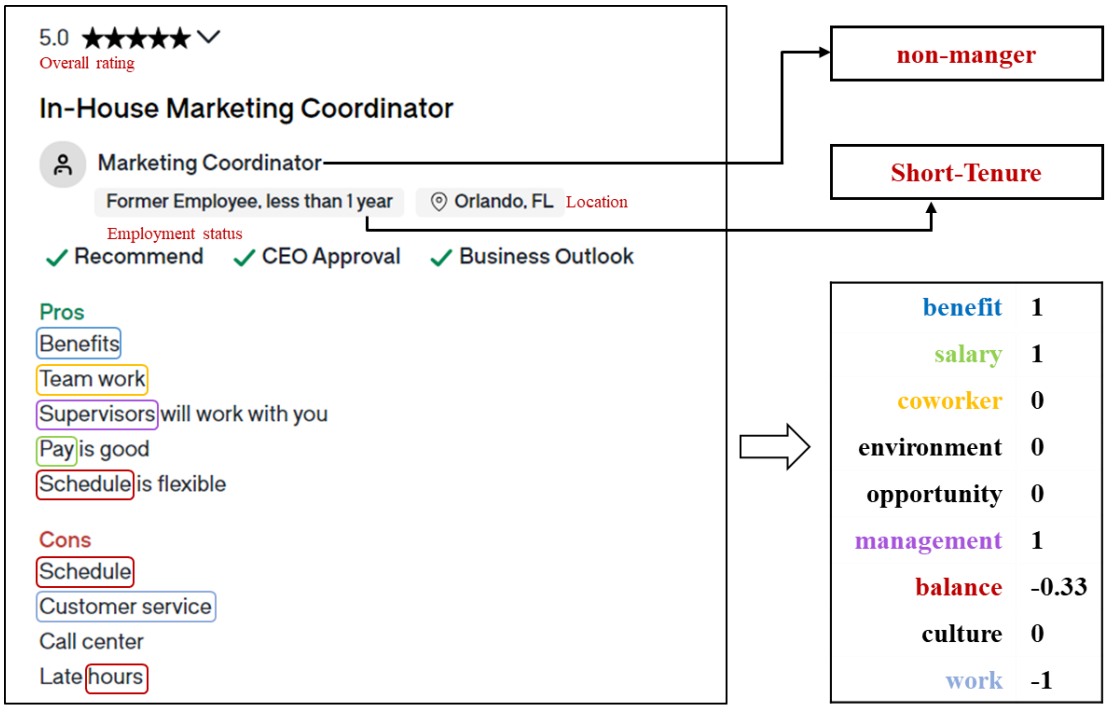


Fig. 1. Example of an online review from Glassdoor.

Table 1. Descriptive statistics.

| Organizational Tenure | Working year | Non-managers | | Managers | |
|---|---|---|---|---|---|
| | | Amount of reviews | Average rating of overall satisfaction | Amount of reviews | Average rating of overall satisfaction |
| Short | <1 | 27,877 | 3.36 | 5,134 | 3.36 |
| Medium | [1–3) | 30,340 | 3.47 | 8,272 | 3.53 |
| | [3–5) | 15,560 | 3.56 | 6,025 | 3.74 |
| Long | [5–8) | 7,285 | 3.63 | 3,815 | 3.90 |
| | [8–10) | 2,842 | 3.69 | 1,915 | 4.03 |
| | >=10 | 3,001 | 3.83 | 2,184 | 4.15 |

## *3.2. Research methods*

### 3.2.1 Topic modeling and keyword extraction

Given that various job attributes affect the satisfaction of employees (Lee et al., 2015), the online reviews retrieved from Glassdoor often highlighted these attributes in their texts. We identified those attributes that influence employee satisfaction by performing latent Dirichlet allocation (LDA) (Blei et al., 2003), which has been widely used in the literature to extract attributes from online reviews and to highlight the distribution of topics within each review and the distribution of words within each topic (Liu et al., 2021; Zhang et al., 2021).

Glassdoor asks users to provide separate feedback for the positives ("Pros") and negatives ("Cons") of a company. Therefore, we performed topic modeling using the information from both sections (Jung & Suh, 2019). We standardized these reviews by changing their text to lowercase, reducing the words to their base forms via lemmatization, and removing those words that were deemed irrelevant based on their meanings. Given its capability to tag parts of speech, we used Spacy's natural language processing tool (https://spacy.io/) to extract job attributes (nouns or noun phrases) from the review text. Specifically, we regarded those nouns or noun phrases that were present in more than 0.1% of the collected reviews as the most significant attribute words and retained them for the analysis (Shin & Nicolau, 2022).

Based on topic coherence score calculations (Joshi et al., 2023), the optimal number of topics for our analysis is 20 (see Fig. A in the Appendix). Given that some overlapping topics or noisy words may be present in our results, we fine-tuned our analysis by manually adjusting our final topics (Bi et al., 2019; Zhang et al., 2021). In this study, we employed two main principles to merge similar topics. The first principle involves merging topics based on the similarity of related keywords or reviews. The second principle focuses on merging more specific topics into broader categories based on the categorization of satisfaction factors documented in previous literature (Lee et al., 2015; Matzler & Renzl, 2007; Stamolampros et al., 2019a).

### 3.2.2 Attribute performance calculation

Previous studies (Mirtalaie et al., 2018; Y. K. Oh & Yi, 2021) ensured the accuracy of their evaluation by calculating the sentiment value of each attribute in descriptive reviews published on online platforms, such as Yelp and TripAdvisor, where users often write about positive and negative

attributes together in their reviews. Previous studies (e.g., Chatterjee, 2019; Li et al., 2023) have mostly classified these reviews into sentence-level categories and calculated the sentiment scores for each attribute based on this categorization.

However, in the specific context of our study, we focus on analyzing reviews from Glassdoor, where reviewers express their opinions on positives and negatives separately. This structure poses a challenge as reviewers may not include explicit opinion words, leading to a potential difficulty in extracting sentiment associated with the mentioned attributes (Mirtalaie et al., 2018). For instance, when writing about the pros of working for a company, a reviewer may only write "Benefits" instead of "Great benefits." Therefore, we assumed that the pros and cons highlighted in each Glassdoor review correspond to positive and negative polarities, and we no longer extracted opinion words related to the mentioned attributes (Ganapathibhotla & Liu, 2008). We instead calculated the sentiment of these attributes based on how frequent they appear in the review texts. Specifically, we considered an attribute to be skewed toward the positive sentiment if it has been mentioned more frequently under pros than under cons, and vice versa. We regarded an attribute as neutral if it is mentioned to the same extent under both categories or if it has not been mentioned at all in the entire review. We then evaluated the performance of each attribute by using the following equation:

$$Performance_{ij} = \frac{N\_Pros_{ij} - N\_Cons_{ij}}{N\_Pros_{ij} + N\_Cons_{ij}} \quad (1)$$

where $Performance_{ij}$ refers to the performance of attribute $i$ in review $j$, and $N\_Pros_{ij}$ and $N\_Cons_{ij}$ represent the number of times that a keyword related to attribute $i$ appears in the pros and cons sections of review $j$, respectively. The performance score is scaled between –1 and 1, representing a range of sentiments. A value of –1 indicates a very negative sentiment associated with the attribute, while a value of +1 indicates a very positive sentiment. A score of 0 signifies a neutral sentiment toward the attribute (see Fig. 1).

### 3.2.3 Asymmetric relationships test using impact-asymmetry analysis (IAA)

We investigated the asymmetric effects of employee satisfaction by performing IAA (Mikulić & Prebežac, 2008), which has been widely used in hospitality and tourism research (Lai & Hitchcock, 2017; Lee et al., 2020; Lee & Choi, 2019) to evaluate the asymmetric relationship between satisfaction and various attributes. IAA involves three steps, namely, (1) estimating the attribute coefficients via regression analysis with dummy variables, (2) using the obtained

regression coefficients to measure the magnitude of impact of each attribute on satisfaction, and (3) using three-factor theory to categorize attributes into different groups.

**Step 1: Penalty–Reward Contrast Analysis**

We initially generated inputs for IAA by conducting a penalty–reward contrast analysis (Brandt, 1987), where we generated a set of dummy variables for each attribute. We used the first dummy variable to investigate the effects of low-performance attributes on satisfaction. Referring to previous studies (Lai & Hitchcock, 2015; Park et al., 2022), we assigned a value of "1" to those attributes whose performance fell within the lowest 20% range and assigned a value of "0" to the other attributes. We used the second variable to investigate the effects of high-performance attributes on satisfaction. We assigned a value of "1" to those attributes whose performance was within the highest 20% range and assigned a value of "0" to all other attributes. We then used these two sets of variables to conduct a regression analysis, which yielded two sets of regression coefficients for each variable, namely, the penalty index (PI) corresponding to the low-performance attributes and the reward index (RI) corresponding to the high-performance attributes. These indices suggest negative and positive relationships between each attribute and employee satisfaction, respectively.

To account for the potential influence of review length on attribute identification accuracy, we included the length of pros and cons narratives in the reviews as control variables, respectively. We also distinguished those reviews written by former employees from those written by current employees to control for their employment status, and we included year fixed effects in our analysis to address temporal heterogeneity. Mikulić and Prebežac (2012) recommended the use of unstandardized coefficients when examining asymmetric effects based on dummy regressions. Specifically, if the dummy variables do not follow the same distribution and standard deviation, then using standardized coefficients may yield misleading results. Considering that such recommendation has been widely accepted in the literature (e.g., Bi et al., 2019; Lai & Hitchcock, 2017), our study followed this approach. The regression equation is formulated as follows:

$$OES_i = \beta_0 + \sum_j^n (\beta_{1j} dummy_{1ij} + \beta_{2j} dummy_{2ij}) + \beta_k Controls + Year_t + \varepsilon \quad (2)$$

where $OES_i$ represents the overall employee satisfaction for review $i$, $\beta_{1j}$, and $\beta_{2j}$ represent unstandardized regression coefficients of low- (PI) and high-performance (RI) attribute $j$, respectively, $dummy_{1ij}$ and $dummy_{2ij}$ refer to dummy variables of attribute $j$ with lowest and highest performance levels for review $i$, respectively, $n$ represents the number of attributes ($n$=9),

and $Controls$ represents the control variables, including the length of pros and cons and employment status.

**Step 2: Calculating Impact-Asymmetry (IA)**

We then used PI and RI to calculate the IA scores. First, we took the sum of the absolute values of PI and RI of each attribute to calculate the strength of impact of an attribute on satisfaction (RIS). Second, we used PI, RI, and RIS to determine the satisfaction-generating (SGP) and dissatisfaction-generating potentials (DGP) of an attribute, that is, the ratio of its RI and PI to RIS, respectively. Third, we computed for IA by subtracting DGP from SGP. This approach is more straightforward than that used in previous studies (Füller & Matzler, 2008; Matzler & Renzl, 2007), which often employed impact ratios (IR) as an index value by calculating the ratio of PI to RI. Using the IR index can result in a wide range of potential values, spanning from positive infinity to negative infinity, making the comparison of calculated indexes complex. In contrast, the IA index employed in this study is constrained within the range of –1 to +1, providing a more concise measurement. The calculation of IA is as follows:

$$RIS_i = |p_i| + r_i \tag{3}$$

$$SGP_i = r_i / RIS_i \tag{4}$$

$$DGP_i = |p_i| / RIS_i \tag{5}$$

$$IA_i = SGP_i - DGP_i \tag{6}$$

where $r_i =$ reward index for attribute $i$; $p_i =$ penalty index for attribute $i$; $RIS_i =$ range of impact on satisfaction; and $SGP_i + DGP_i = 1$.

**Step 3: IAA**

We then classified the attributes into dissatisfiers, hybrids, or satisfiers by using the calculated IA scores as thresholds. Specifically, if an attribute's SGP is greater than the DGP, the attribute is considered a satisfier because it elicits more satisfaction than dissatisfaction. Conversely, if the SGP of an attribute is less than the DGP, the attribute is considered a dissatisfier because it generates more dissatisfaction than satisfaction. If the arithmetic difference between an attribute's SGP and DGP is small, it is considered as a hybrid because it produces the same effect on satisfaction and dissatisfaction. We then used the thresholds proposed by Mikulić and Prebežac (2008) to classify these attributes into frustrators (extreme dissatisfiers, IA < –0.4), dissatisfiers (–0.4 ≤ IA < –0.1), hybrids (–0.1 ≤ IA ≤ 0.1), satisfiers (0.1 < IA ≤ 0.4), and delighters (extreme satisfiers, IA > 0.4).

The same classification has also been widely adopted in previous studies (e.g., Lee et al., 2017; Lee & Choi, 2019; Ye et al., 2016). We also followed the literature (Mikulić & Prebežac, 2011; Park et al., 2022) and split the attributes into low (RIS ≤ 0.4), moderate (0.4 < RIS ≤ 1.2), and high (RIS > 1.2) impact to determine their RIS. We plotted the IA and RIS values on the y- and x-axes of the IAA grid to clearly understand the strength of each attribute. Fig. 2 illustrates the IAA procedure.

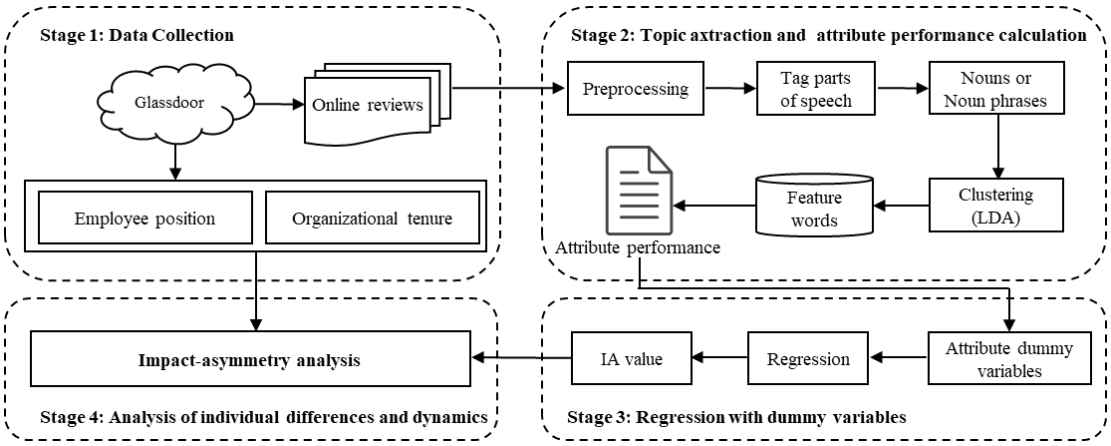


Fig. 2. Data analytics procedure.

# 4. Results

## *4.1 Job attributes mined from employee online reviews*

Table 2 shows the nine job attributes extracted from the reviews using LDA, namely, "benefit," "salary," "co-worker," "environment," "opportunity," "management," "balance," "culture," and "work," all of which show good agreement with the attributes mentioned in related studies (Chuang et al., 2009; Kong et al., 2018; Lam et al., 2001; Lee et al., 2015; Matzler & Renzl, 2007; Stamolampros et al., 2019a), thus providing a first reliability control for our results.

Table 2. List of identified attributes with the associated keywords.

| Attributes | Description | Keywords |
|---|---|---|
| Benefit | Non-monetary reward | benefit, discount, perk, food, meal, lunch, health, insurance, party, breakfast, cafeteria, coffee, drink, dining, 401k, gym, vacation, travel, free ticket, pension, retirement, snack, PTO |
| Salary | Monetary reward | pay, salary, money, compensation, wage, cash, paycheck, dollar, revenue, payment, income, bonus, tip, commission |
| Coworker | Relationship with coworkers | team, teamwork, teammate, staff, worker, colleague, friend, friendship, coworker, peer, co worker, colleague, partner, competition, competitor, associate |
| Environment | Physical conditions and work atmosphere | environment, location, workplace, condition, park, situation, corporate office, racism, bully, harassment, discrimination, atmosphere, property, facility, favoritism, community |
| Opportunity | Promotion and advancement opportunities | opportunity, training, growth, career, position, learning, promotion, advancement, improvement, upward mobility, development |
| Management | Senior Management and communication | management, manager, leadership, leader, boss, supervisor, communication, director, treatment, support, CEO, HR, micromanagement, GM, human resource, feedback |
| Balance | Work life balance | hour, life, schedule, balance, flexibility, vacation, freedom, stress, weekend, pressure, 24/7, busy season, late night, work/life balance, workload, overtime, pressure, evening, long time, full time, shift, break, holiday |
| Culture | Company culture | culture, value, policy, innovation, innovative company, solid company, young company, family oriented company, family owned company, company goal, diverse company, ethical company, growing company, accountability, nepotism, loyalty, vision, integrity, politics, passion, mission, respect |
| Work | Work itself | customer, easy job, hard work, service, operation, standard, client, job security, stable job, job stability, job duty, uniform, server, equipment, guidance, task, guest, system |

We performed a frequency analysis to illustrate the distribution of these attributes in the collected reviews. In this process, we used keyword matching to check whether these attributes were referenced in these reviews, and we calculated the percentage of attribute mentions in different categories of pros and cons comments. Table 3 shows significant differences in the level of attention paid by managers and non-managers to certain attributes. For instance, while managers emphasized "opportunity" and "culture" in their narratives, non-managers focused on "benefit" and "salary." Such level of attention also varied among employees with different organizational tenures. Specifically, those employees who stayed or were staying longer with their companies emphasized "culture" in their reviews but did not pay much attention to "environment" and "co-worker."

Table 3. Percentage distribution of different attributes across various categories.

| Working Year | Benefit | Salary | Coworker | Environment | Opportunity | Management | Balance | Culture | Work |
|---|---|---|---|---|---|---|---|---|---|
| Non-Manager-Pros | | | | | | | | | |
| <1 | 0.2448 | 0.1611 | 0.2515 | 0.1995 | 0.1304 | 0.1662 | 0.1635 | 0.0555 | 0.1134 |
| [1-3) | 0.2750 | 0.1589 | 0.2488 | 0.2013 | 0.1568 | 0.1662 | 0.1712 | 0.0714 | 0.1114 |
| [3-5) | 0.3139 | 0.1582 | 0.2427 | 0.2010 | 0.1767 | 0.1540 | 0.1616 | 0.0822 | 0.1084 |
| [5-8) | 0.3359 | 0.1470 | 0.2307 | 0.1911 | 0.1859 | 0.1462 | 0.1569 | 0.0951 | 0.1108 |
| [8-10) | 0.3392 | 0.1407 | 0.2189 | 0.1742 | 0.1795 | 0.1457 | 0.1411 | 0.1045 | 0.1115 |
| >=10 | 0.3149 | 0.1270 | 0.2136 | 0.1743 | 0.1929 | 0.1516 | 0.1320 | 0.1133 | 0.1200 |
| Non-Manager-Cons | | | | | | | | | |
| <1 | 0.0913 | 0.1915 | 0.1273 | 0.1064 | 0.1129 | 0.2791 | 0.2569 | 0.0467 | 0.1384 |
| [1-3) | 0.0969 | 0.2042 | 0.1261 | 0.1119 | 0.1337 | 0.2958 | 0.2487 | 0.0585 | 0.1359 |
| [3-5) | 0.0989 | 0.2020 | 0.1194 | 0.1118 | 0.1521 | 0.2959 | 0.2300 | 0.0647 | 0.1250 |
| [5-8) | 0.0909 | 0.2066 | 0.1182 | 0.1098 | 0.1524 | 0.2896 | 0.2133 | 0.0719 | 0.1160 |
| [8-10) | 0.0964 | 0.1703 | 0.1038 | 0.1049 | 0.1429 | 0.2646 | 0.1999 | 0.0693 | 0.1049 |
| >=10 | 0.0873 | 0.1396 | 0.1096 | 0.0973 | 0.1360 | 0.2249 | 0.1653 | 0.0706 | 0.1043 |
| Manager-Pros | | | | | | | | | |
| <1 | 0.2008 | 0.1492 | 0.2460 | 0.2069 | 0.2028 | 0.2032 | 0.1270 | 0.1239 | 0.0939 |
| [1-3) | 0.2308 | 0.1343 | 0.2250 | 0.2038 | 0.2291 | 0.1941 | 0.1151 | 0.1275 | 0.0916 |
| [3-5) | 0.2403 | 0.1100 | 0.2438 | 0.1930 | 0.2573 | 0.2020 | 0.1285 | 0.1474 | 0.1029 |
| [5-8) | 0.2823 | 0.1187 | 0.2294 | 0.2066 | 0.2802 | 0.1927 | 0.1185 | 0.1617 | 0.1090 |
| [8-10) | 0.2648 | 0.0982 | 0.2350 | 0.1708 | 0.2924 | 0.1802 | 0.1112 | 0.1640 | 0.1128 |
| >=10 | 0.2427 | 0.1016 | 0.2294 | 0.1781 | 0.3082 | 0.1946 | 0.0994 | 0.1891 | 0.1351 |
| Manager-Cons | | | | | | | | | |
| <1 | 0.0832 | 0.1434 | 0.1360 | 0.1256 | 0.1274 | 0.2780 | 0.2086 | 0.0806 | 0.1151 |
| [1-3) | 0.0806 | 0.1695 | 0.1243 | 0.1234 | 0.1303 | 0.2764 | 0.2188 | 0.0895 | 0.1125 |
| [3-5) | 0.0866 | 0.1892 | 0.1162 | 0.1099 | 0.1426 | 0.2619 | 0.2206 | 0.0815 | 0.0934 |
| [5-8) | 0.0781 | 0.1911 | 0.1156 | 0.1119 | 0.1465 | 0.2548 | 0.2244 | 0.0779 | 0.0865 |
| [8-10) | 0.0674 | 0.1666 | 0.1023 | 0.0794 | 0.1540 | 0.2240 | 0.2078 | 0.0710 | 0.0799 |
| >=10 | 0.0664 | 0.1190 | 0.1062 | 0.0980 | 0.1305 | 0.1973 | 0.1955 | 0.0829 | 0.1016 |

Note: Each cell value represents the frequency of a specific attribute mentioned in employee reviews within a given category, with values ranging from 0 to 1.

## *4.2. Asymmetric effects*

We conducted an asymmetry analysis after identifying the job attributes and calculating their performance for each review. First, regression analyses were performed in all samples and the results are shown in Table 4. We computed the variable inflation factor (VIF) of each attribute to check for multicollinearity. The VIF values ranged from 1.04 to 1.57, which were far below the threshold of 3, indicating no multicollinearity issue (Xu, 2021). In this case, overall employee satisfaction was significantly affected by the high and low performance levels of each attribute, excluding salary. We

calculated the IA values of each attribute by using the regression coefficients and then used these values to divide the attributes into several categories. Based on the IA and RIS values of the attributes, the IAA grid diagram was created (Fig. 3). To illustrate the reliability of the results, we conducted a dominance analysis incorporating the LMG metric (Lindeman et al., 1980) to assess the relative significance of the explanatory variables. The dominance analysis evaluates all possible combinations of variables and their sequence of inclusion in the model to measure their average importance in explaining the variations in overall satisfaction. Fig. C in the Appendix ranks these attributes in terms of their importance, and these rankings are well aligned with the results of the baseline model in Table 4.

Table 4 shows that each job attribute has a unique effect on employee satisfaction. The frustrators ("benefit," "salary," and "management") and dissatisfiers ("co-worker" and "work") have negative asymmetric effects on satisfaction, the hybrids ("environment," "balance," and "culture") exert symmetric and linear effects, and the satisfier ("opportunity") exerts a positive asymmetric effect. Fig. 3 shows that among all attributes, "management" obtains the highest RIS value, thereby suggesting that this attribute exerts the greatest influence on employee satisfaction. This finding agrees with that of Stamolampros et al. (2020), who found that employee treatment, or the attitude of management toward employees, is most often highlighted by employees when providing feedback to their managers. Conversely, "work," "balance," and "benefit" exert the weakest effects on employee satisfaction.

Table 4. Asymmetric relationships between job attributes and overall employee satisfaction.

| | Penalty index | Reward index | RIS | SGP | DGP | IA | Factor |
|---|---|---|---|---|---|---|---|
| Benefit | -0.270*** | 0.073*** | 0.343 | 0.213 | 0.787 | -0.574 | Frustrator |
| Salary | -0.407*** | 0.026 | 0.433 | 0.060 | 0.940 | -0.880 | Frustrator |
| Coworker | -0.283*** | 0.183*** | 0.466 | 0.393 | 0.607 | -0.215 | Dissatisfier |
| Environment | -0.283*** | 0.243*** | 0.526 | 0.462 | 0.538 | -0.076 | Hybrid |
| Opportunity | -0.186*** | 0.373*** | 0.559 | 0.667 | 0.333 | 0.335 | Satisfier |
| Management | -0.922*** | 0.308*** | 1.230 | 0.250 | 0.750 | -0.499 | Frustrator |
| Balance | -0.092*** | 0.106*** | 0.198 | 0.535 | 0.465 | 0.071 | Hybrid |
| Culture | -0.494*** | 0.414*** | 0.908 | 0.456 | 0.544 | -0.088 | Hybrid |
| Work | -0.159*** | 0.109*** | 0.268 | 0.407 | 0.593 | -0.187 | Dissatisfier |

Notes. *** $p < .01$; $R^2=0.35$; VIF ranges from 1.04 to 1.57; Unstandardized coefficients are reported here.

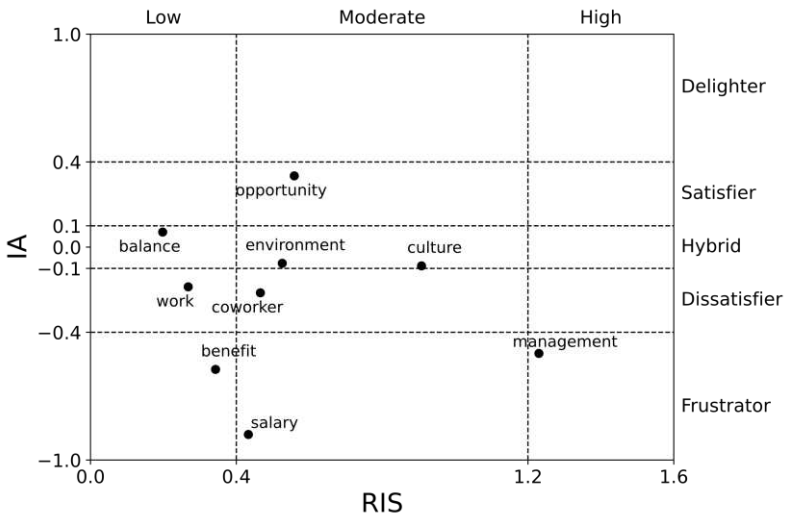


Fig. 3. Impact-asymmetry analysis for all employees.

### *4.3. Dynamic effects*

We analyzed our manager and non-manager samples separately to understand how the impact of job attributes on employee satisfaction differs between these groups (Table 5 and Fig. 4). We also divided organizational tenure into three intervals and performed regression analyses on each of these intervals (Table 6 and Fig. 5).

Table 5 shows some differences in the asymmetric relationship between job attributes and the satisfaction of employees serving managerial and non-managerial roles. Specifically, managers and non-managers classified “benefit” as a dissatisfier and frustrator, respectively, “environment” and “culture” as dissatisfiers and hybrids, and “opportunity” as a delighter and satisfier. Although both groups classified “work” and “co-worker” as dissatisfiers, “work” obtained a smaller IA value among managers, while “co-worker” obtained a smaller IA value among non-managers. Fig. 4 shows that “management,” “balance,” and “environment” obtained higher RIS values among non-managers, thereby suggesting that these attributes had a stronger impact on non-managers than on managers.

Table 5. Asymmetric relationships between job attributes and overall employee satisfaction for managers and non-managers.

| | | Penalty index | Reward index | RIS | SGP | DGP | IA | Factor |
|---|---|---|---|---|---|---|---|---|
| Benefit | NM | -0.299*** | 0.071*** | 0.370 | 0.192 | 0.808 | -0.616 | Frustrator |
| | M | -0.167*** | 0.089*** | 0.256 | 0.348 | 0.652 | -0.305 | Dissatisfier |
| Salary | NM | -0.416*** | 0.047*** | 0.463 | 0.102 | 0.898 | -0.797 | Frustrator |
| | M | -0.371*** | -0.050 | 0.421 | 0.119 | 0.881 | -0.762 | Frustrator |
| Coworker | NM | -0.296*** | 0.185*** | 0.481 | 0.385 | 0.615 | -0.231 | Dissatisfier |
| | M | -0.229*** | 0.171*** | 0.400 | 0.428 | 0.573 | -0.145 | Dissatisfier |
| Environment | NM | -0.289*** | 0.259*** | 0.548 | 0.473 | 0.527 | -0.055 | Hybrid |
| | M | -0.244*** | 0.193*** | 0.437 | 0.442 | 0.558 | -0.117 | Dissatisfier |
| Opportunity | NM | -0.206*** | 0.373*** | 0.579 | 0.644 | 0.356 | 0.288 | Satisfier |
| | M | -0.111*** | 0.368*** | 0.479 | 0.768 | 0.232 | 0.537 | Delighter |
| Management | NM | -0.931*** | 0.318*** | 1.249 | 0.255 | 0.745 | -0.491 | Frustrator |
| | M | -0.876*** | 0.277*** | 1.153 | 0.240 | 0.760 | -0.520 | Frustrator |
| Balance | NM | -0.089*** | 0.104*** | 0.193 | 0.539 | 0.461 | 0.078 | Hybrid |
| | M | -0.110*** | 0.114*** | 0.224 | 0.509 | 0.491 | 0.018 | Hybrid |
| Culture | NM | -0.477*** | 0.421*** | 0.898 | 0.469 | 0.531 | -0.062 | Hybrid |
| | M | -0.508*** | 0.399*** | 0.907 | 0.440 | 0.560 | -0.120 | Dissatisfier |
| Work | NM | -0.154*** | 0.115*** | 0.269 | 0.428 | 0.572 | -0.145 | Dissatisfier |
| | M | -0.174*** | 0.083*** | 0.257 | 0.323 | 0.677 | -0.354 | Dissatisfier |

Notes. NM=Non-managers; M=Managers; *** p< .01; $R^2$=0.34 (non-managers) and 0.39 (managers); VIF ranges from 1.02 to 1.64; Unstandardized coefficients are reported here.

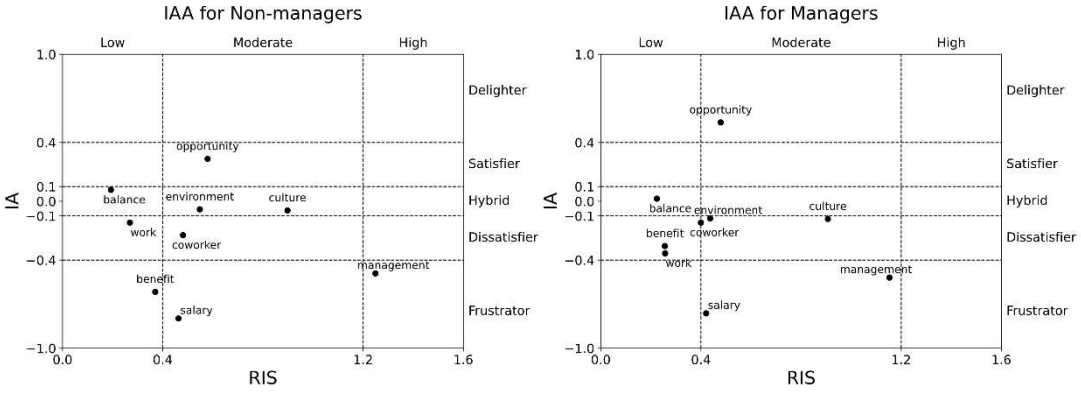


Fig. 4. Impact-asymmetry analysis for managers and non-managers.

Table 6 highlights the dynamic changes in the asymmetric relationship between job attributes and satisfaction of employees with different organizational tenures. Short-tenure managers classified "benefit" as a satisfier, while medium- and long-tenure managers classified this attribute as a dissatisfier and frustrator, respectively. Similar shifts were observed for "co-worker," "environment," "culture," and "work," which transformed from a satisfier to a dissatisfier, a hybrid

to a frustrator, a hybrid to a dissatisfier, and a dissatisfier to a frustrator, respectively, along with increasing organizational tenure.

Short-tenure non-managers classified "environment" and "culture" as hybrids, while medium- and long-tenure non-managers classified these attributes as dissatisfiers. Although the perceptions of employees toward job attributes tend to become negative as their organizational tenure increases, some attributes showed the opposite trend. For example, "opportunity" shifted from a satisfier to a delighter, while "work" shifted from a dissatisfier to a hybrid. Fig. 5 shows that an increasing organizational tenure corresponds to a decreasing RIS value, thereby explaining the declining impact of these attributes on satisfaction.

Table 6. Asymmetric relationship between job attributes and overall employee satisfaction for different organizational tenures

| | | Short-tenured employees | | | Medium-tenured employees | | | Long-tenured employees | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | RIS | IA | Factor | RIS | IA | Factor | RIS | IA | Factor |
| Benefit | NM | 0.355 | -0.623 | Frustrator | 0.367 | -0.597 | Frustrator | 0.349 | -0.650 | Frustrator |
| | M | 0.283 | 0.053 | Hybrid | 0.285 | -0.382 | Dissatisfier | 0.161 | -0.453 | Frustrator |
| Salary | NM | 0.508 | -0.819 | Frustrator | 0.440 | -0.714 | Frustrator | 0.446 | -0.955 | Frustrator |
| | M | 0.489 | -0.542 | Frustrator | 0.365 | -0.973 | Frustrator | 0.490 | -0.653 | Frustrator |
| Coworker | NM | 0.560 | -0.186 | Dissatisfier | 0.441 | -0.215 | Dissatisfier | 0.340 | -0.359 | Dissatisfier |
| | M | 0.456 | 0.145 | Satisfier | 0.414 | -0.217 | Dissatisfier | 0.310 | -0.239 | Dissatisfier |
| Environment | NM | 0.648 | -0.040 | Hybrid | 0.510 | -0.020 | Hybrid | 0.397 | -0.219 | Dissatisfier |
| | M | 0.478 | 0.025 | Hybrid | 0.509 | -0.073 | Hybrid | 0.246 | -0.610 | Frustrator |
| Opportunity | NM | 0.628 | 0.178 | Satisfier | 0.541 | 0.331 | Satisfier | 0.551 | 0.441 | Delighter |
| | M | 0.744 | 0.239 | Satisfier | 0.453 | 0.634 | Delighter | 0.363 | 0.769 | Delighter |
| Management | NM | 1.402 | -0.468 | Frustrator | 1.173 | -0.483 | Frustrator | 1.107 | -0.617 | Frustrator |
| | M | 1.285 | -0.451 | Frustrator | 1.155 | -0.489 | Frustrator | 1.027 | -0.659 | Frustrator |
| Balance | NM | 0.258 | 0.039 | Hybrid | 0.172 | 0.163 | Satisfier | 0.064 | 0.094 | Hybrid |
| | M | 0.268 | 0.037 | Hybrid | 0.218 | 0.100 | Hybrid | 0.165 | -0.273 | Dissatisfier |
| Culture | NM | 0.866 | -0.002 | Hybrid | 0.906 | -0.057 | Hybrid | 0.877 | -0.131 | Dissatisfier |
| | M | 0.912 | 0.086 | Hybrid | 0.931 | -0.177 | Dissatisfier | 0.859 | -0.115 | Dissatisfier |
| Work | NM | 0.285 | -0.158 | Dissatisfier | 0.237 | -0.181 | Dissatisfier | 0.298 | 0.100 | Hybrid |
| | M | 0.274 | -0.226 | Dissatisfier | 0.239 | -0.305 | Dissatisfier | 0.273 | -0.429 | Frustrator |

Notes. NM=Non-managers; M=Managers.

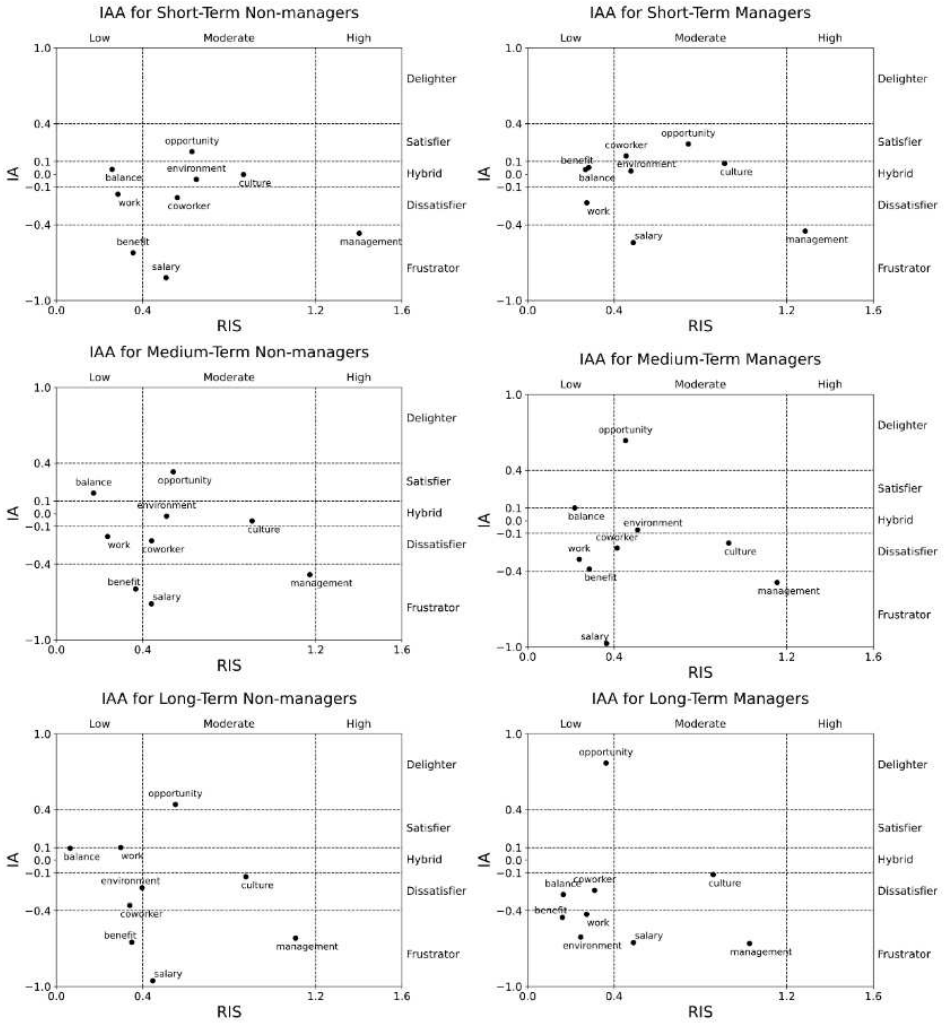


Fig. 5. Impact-asymmetry analysis for employees with different organizational tenures.

# 5. Discussion and implications

## *5.1. Theoretical contributions*

The effects of the COVID-19 pandemic on the hospitality industry have underscored the importance of exploring the satisfaction and dissatisfaction of employees working in this sector (Hamouche et al., 2023). With this knowledge at hand, firms can effectively develop strategies for improving the satisfaction of their employees and consequently reduce their turnover. We investigate the asymmetric relationship of employee satisfaction with various job attributes by using big data, namely, employee-generated reviews posted on Glassdoor, and contribute to the employee satisfaction literature in the following ways.

First, our findings complement those of previous studies exploring the effects of job attributes on satisfaction (e.g., Kong et al., 2018; Lam et al., 2001; Yang, 2010). While the asymmetric effects

of various attributes on customer satisfaction have attracted much scholarly attention (e.g., Davras & Caber, 2019; Park et al., 2020; Shin & Nicolau, 2022), researchers have often described the corresponding effects on employee satisfaction as linear and symmetric. Our findings confirm that there is an asymmetric relationship between different job attributes and employee satisfaction.

Among the factors investigated in this study, employees usually take "benefit," "salary," "management," "co-worker," and "work" for granted and classify them as either frustrators or dissatisfiers, thereby suggesting that the low performance of these attributes increases the dissatisfaction of employees. However, they classify "opportunity" as a satisfier, which suggests that these employees become more satisfied when more opportunities for advancement are available at their work. This finding supports the division of motivational and hygiene factors in Herzberg's (1959) two-factor theory and highlights the difference between the intrinsic and extrinsic needs of employees (Chuang et al., 2009). Specifically, career opportunities positively affect the satisfaction and motivation of employees given their association with these employees' intrinsic needs, including their self-actualization (Back et al., 2011). By contrast, despite their essential roles in achieving certain outcomes, the economic, regulatory, and socially relevant extrinsic needs of employees do not have any association with their inherent satisfaction (Lee et al., 2015). This finding is particularly relevant in the hospitality industry, where employees usually earn low wages and face significant managerial challenges (Marchante et al., 2006). The employees also classified "environment," "balance," and "culture" as hybrids, thereby highlighting the feasibility of using three-factor theory to understand employee satisfaction and alluding to a possible symmetric relationship between satisfaction and certain factors (Matzler & Renzl, 2007). While the attribute categories in our study are aligned with those in Matzler and Renzl (2007), they categorized "opportunity" as a dissatisfier, while we categorized this attribute as a satisfier based on the definition of employees' intrinsic needs (Lee et al., 2015).

Second, we respond to the call of Lee et al. (2015) for further research on how the asymmetric relationship between job attributes and employee satisfaction differs across individuals. We complement their findings by highlighting differences in the effects of job attributes on the satisfaction of employees serving managerial and non-managerial roles. For example, managers expect a greater performance on "environment" and "culture," while non-managers expect a greater performance on "benefits," and the failure to satisfy these expectations would lead to their

dissatisfaction. Our findings also support those of Chiang and Birtch (2008), who argued that while managers in the hospitality industry focus on non-financial rewards (e.g., culture), non-managers focus on financial rewards (e.g., benefits). We also find that "opportunity" tends to satisfy managers given the strong congruence between their self- and environmental exploration. These characteristics reinforce their professional competence, thereby alleviating their career-related concerns and increasing their job satisfaction (Creed et al., 2009; Gordon & Shi, 2021). Meanwhile, managers and non-managers tend to be dissatisfied with "work" and "co-worker," respectively. Such discrepancy may be explained by the fact that non-managers strongly rely on their co-workers to finish their tasks and thus set higher expectations for their co-worker relationships (Lee, 2016), while managers set higher expectations for their own jobs given their increasing responsibilities (Gordon & Shi, 2021).

Third, we extend the findings from the literature (Lee et al., 2015; Matzler & Renzl, 2007) by highlighting how the asymmetric relationship between job attributes and employee satisfaction changes along with the organizational tenure of employees. Several of these attributes, including "co-worker," "environment," and "culture," change from satisfiers or hybrids to dissatisfiers and frustrators as an employee stays longer with the company. In other words, an increasing organizational tenure gradually increases the demands and expectations of employees for these attributes, thus exposing them to greater dissatisfaction (Dobrow et al., 2018; Matzler & Renzl, 2007). However, we observe the opposite trend for "opportunity," which changes from a satisfier to a delighter. This result may be ascribed to the fact that relatively new employees are motivated to work in anticipation of career growth, while employees with longer tenures tend to be placed higher up on the organizational ladder and thus seek pleasure from promotions (Kong et al., 2012).

Those factors that influence employee satisfaction and dissatisfaction tend to be stable for non-managers yet unstable for managers, thus further reinforcing the dynamic characteristic of employee satisfaction (Dobrow et al., 2018). For instance, while non-managers recategorized the attributes "environment," "opportunity," "culture," and "work" at some point in their careers, managers recategorized all attributes, except for "salary" and "management," which remained as frustrators. This finding may be explained by the fact that non-managers tend to concentrate on daily operational tasks and have relatively more stable roles in the workplace, thus making their expectations less susceptible to change (Liu & Cho, 2018). By contrast, managers handle diverse and complex

responsibilities and are expected to face more challenges and adapt to new work environments throughout their careers, thus significantly changing their expectations for many job attributes (Chi et al., 2013).

Finally, we make a methodological contribution by using IAA in combination with big data to investigate the effects of job attributes. Specifically, we identified these attributes through a combination of topic clustering and text mining from employee online reviews, and most of these attributes were in line with those identified in questionnaire surveys (e.g., Kong et al., 2018; Lee et al., 2015; Matzler & Renzl, 2007; Pan, 2015), thus validating the effectiveness of our approach. Our work may serve as a reference for future human resource studies that aim to use big data and text mining, which not only save time and cost but also improve the generalizability of their results by providing a larger sample (Symitsi et al., 2021). We also extend the literature by using the online reviews posted by employees as our primary source of data (Shi & Chen, 2021; Stamolampros et al., 2020; Xia et al., 2023). We conducted regression analysis on our identified job attributes to further clarify their asymmetric relationship with employee satisfaction, and we used three-factor theory to provide a theoretical justification for our results.

### *5.2. Managerial implications*

Managers in the hospitality industry may derive some useful insights from our work. First, we highlight employee-generated reviews as a potential source of insights for human resource (HR) specialists. Managers may use these reviews to measure the satisfaction of employees and to understand their thoughts about the current HR practices. They may also utilize these reviews to complement or replace internal company surveys, especially in cases where employees are particularly concerned about having their identities exposed. These reviews not only help HR managers in modifying and implementing their company policies but also provide them some relevant insights from other companies operating in the same industry. HR managers may also encourage employees to actively write feedback about the company and use their comments to identify any problems and implement the necessary solutions.

Companies should consider ranking those attributes that affect employee satisfaction based on their importance and the degree of their asymmetric effects (Fig. 6 and 7) in order to allocate their resources effectively for enhancing employee satisfaction. Must-have (frustrators and dissatisfiers)

and hybrid attributes are particularly important given that their improper handling can easily result in dissatisfaction. The must-haves identified in this study include salary, management, benefits, co-worker relations, and job content. Moreover, given that employees in the hospitality industry usually receive low pay, managers should design a competitive compensation system to attract high-quality talent and discourage their employees from leaving. Given that management exerts the strongest impact on employee satisfaction, companies in the hospitality industry should provide their employees with transparent communication channels through which they can freely share their ideas and opinions. They may also organize regular one-on-one meetings and introduce innovative employee feedback mechanisms to promote manager–employee interactions. The hybrid attributes, such as work environment, work–life balance, and company culture, also warrant consideration as potential drivers of employee satisfaction and dissatisfaction. When these attributes satisfy the expectations of employees, managers may start focusing on value-added attributes (satisfiers and delighters), such as by providing opportunities for promotion.

The individual differences among employees should be taken into account when formulating strategies for enhancing employee satisfaction. We underscored some differences between employees serving managerial and non-managerial roles. For instance, non-managers set high expectations for benefits, while managers set high expectations for culture-related needs. Furthermore, non-managers show a relatively stable satisfaction throughout their tenure in an organization, while managers demonstrate unstable satisfaction levels given their increasing expectations for many job attributes. These findings provide valuable insights that can aid HR managers in designing targeted interventions for improving the satisfaction of different employee groups in their organizations.

Companies in the hospitality industry should also acknowledge the dynamic nature of those attributes that shape employee satisfaction. Given that the asymmetric relationship between job attributes and employee satisfaction changes along with organizational tenure, when selecting which attributes to prioritize, companies should give consideration to their employees' years of service, particularly those of their long-tenured employees. They should also modify their strategies while considering the changes in the needs and circumstances of their employees. To monitor the expectations and concerns of their employees, companies may utilize a variety of feedback mechanisms, including surveys or regular catch ups.

Those employees in the early or middle stages of their careers treat the availability of advancement opportunities as a satisfier, while those in their later stages regard this attribute as a delighter. Companies should facilitate the career advancement of their new employees by organizing training programs and career planning initiatives. By accommodating the dynamic expectations of their employees, companies in the hospitality industry can create a growth-oriented and supportive work environment that fosters employee satisfaction, engagement, and commitment.

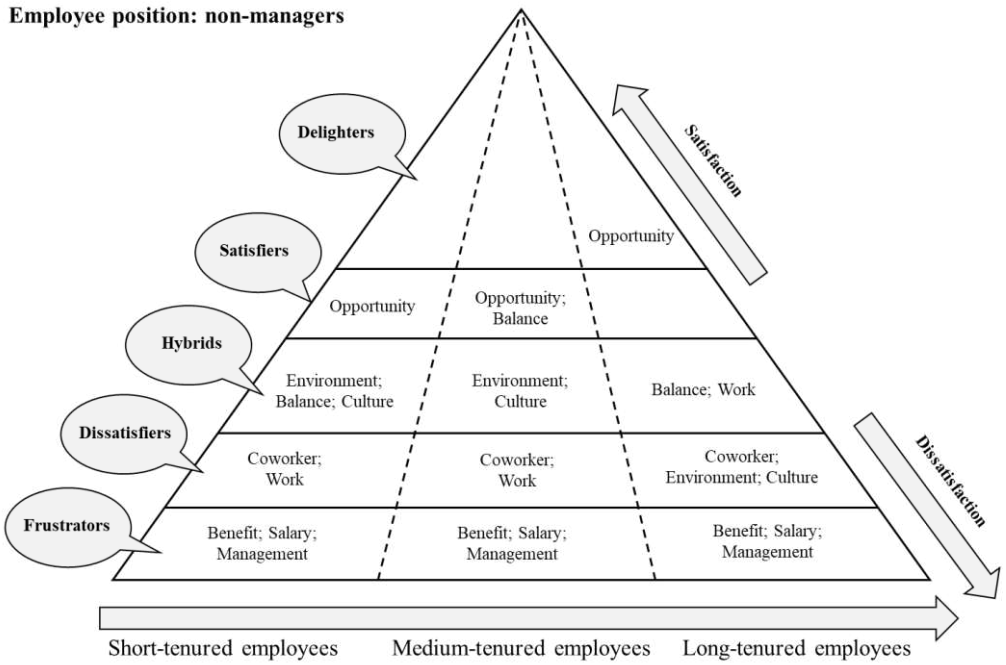


Fig. 6. Strategic prioritization of job attributes for non-managerial satisfaction enhancement.

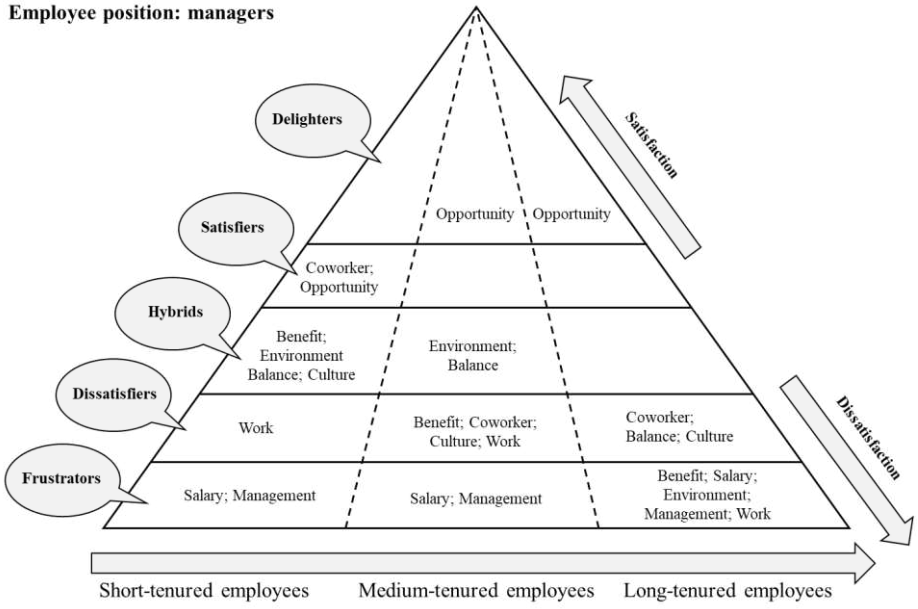


Fig. 7. Strategic prioritization of job attributes for managerial satisfaction enhancement.

### *5.3. Limitations and future research*

Our study has several limitations. First, we primarily focused on US companies when collecting reviews from Glassdoor. However, cultural variances can shape electronic word-of-mouth (Jia, 2020; Stamolampros et al., 2019b), including employee online reviews. Future research may consider exploring the asymmetric relationship between employee satisfaction and job attributes across different cultures by including data from other countries and extracting reviews from other platforms. Second, although we controlled for year fixed effects in our analysis, our results may still be influenced by our collected data, which covered the pre- and post-COVID-19 pandemic periods. Future research may explore the effects of the pandemic on the asymmetric relationship. Third, although we investigated how the determinants of employee satisfaction differ between managers and non-managers with varying organizational tenures, we ignored the potential differences among employees holding various positions in the company. Future research should explore how these determinants differ across departments and positions, such as between front-end and back-end employees. Fourth, due to the anonymity of the reviews, employee demographic characteristics (e.g., gender, age, and education) are not considered in this study. Although the asymmetric relationship between employee satisfaction and job attributes may also be influenced by other individual or situational characteristics, we only consider the effects of employee position and organizational tenure due to the limited availability of data. Finally, although the average rating distribution for the chosen firms closely approximates normality, prioritizing firm-level randomness and representativeness (see Fig. C in the Appendix), it is essential to acknowledge that our analysis exclusively involves data from employees engaged in review posting. This self-selection bias in online reviews can affect the results (Li & Hitt, 2008), although it has been shown to be reduced by the Glassdoor's give-to-get policy incentives (Marinescu et al., 2021).

# Appendix

**Table A.** Literature related to exploring employee experiences using employee online reviews.

| Article | Data Source | Method | Situation Variable | Context | Key findings |
|---|---|---|---|---|---|
| Jung and Suh (2019) | Jobplanet | Topic modeling (LDA); Regression | Industry; Employment status | 10 Industries | The study measured the sentiment and importance of each job satisfaction factor at the industry, company, employee status, and chronological levels. |
| Stamolampros et al. (2019a) | Glassdoor | Topic modeling (STM); Regression | Employment status | Tourism and hospitality | This study utilized ratings and text to identify factors influencing employee satisfaction. |
| Shi and Chen (2021) | Indeed | Topic modeling (STM); Sentiment analysis | Employment status; Hotel type | Hospitality | Employees at premium hotels expressed more positive sentiments in their comments than those at economy hotels, and employees with different employment statuses and hotel types rated each topic differently. |
| Sainju et al. (2021) | Indeed | Topic modeling (STM) | Employment status; Industry | Fortune 50 companies | This study compared differences in identified topics across employment statuses and industry sectors |
| Chang et al. (2022) | Glassdoor | Regression | Not specific | Internet | Emphasizing work-life balance, compensation, career opportunities, and fitness of culture and management style will increase job satisfaction. |
| Joshi et al.(2023) | Ambitionbox | Topic modeling (LDA) | COVID-19 | Top 50 Indian business organizations | Employees identified salary and development as the most important experience factors and expressed negative feelings during the pandemic. |
| Xia et al. (2023) | Glassdoor | Text mining | COVID-19 | Hospitality | This study identified the factors that lead to hospitality employees' negative experiences and changes in these factors caused by COVID-19. |
| This study | Glassdoor | Topic modeling (LDA); Regression (IAA) | Employee position; Organizational tenure | Hospitality | The asymmetric relationship between job attributes and employee satisfaction differs between managers and non-managers and changes dynamically with organizational tenure. |

Note: LDA = Latent Dirichlet Allocation; STM = structural topic model; IAA = impact-asymmetry analysis.

688 **Table B.** Distribution statistics of the top 30 positions

| Position | Count | Rating | Position | Count | Rating |
|---|---|---|---|---|---|
| Front Desk Agent | 4393 | 3.36 | Sales | 653 | 3.22 |
| Manager | 2094 | 3.08 | Banquet Server | 647 | 3.65 |
| Housekeeper | 2071 | 3.26 | Director | 634 | 3.78 |
| General Manager | 2046 | 3.83 | Front Office Manager | 576 | 3.64 |
| Front Desk Receptionist | 1652 | 3.42 | Sales Representative | 566 | 3.17 |
| Server | 1597 | 3.49 | Supervisor | 561 | 3.46 |
| Sales Manager | 1347 | 3.53 | Sales Associate | 537 | 3.43 |
| Bartender | 1230 | 3.53 | Housekeeping | 534 | 3.35 |
| Night Auditor | 946 | 3.36 | Night Auditor/Front Desk Agent | 521 | 3.29 |
| Server/Waiter | 836 | 3.61 | Assistant General Manager | 492 | 3.55 |
| Guest Service Representative | 833 | 3.46 | Front Desk Associate | 469 | 3.41 |
| Guest Service Agent | 831 | 3.49 | Reservations Agent | 450 | 3.31 |
| Assistant Manager | 713 | 3.58 | Business Development Manager | 437 | 2.73 |
| Front Desk | 701 | 3.08 | Customer Service Representative | 435 | 3.37 |
| Receptionist | 699 | 3.43 | Concierge | 430 | 3.76 |

689 Note: Since reviewers have autonomy in writing job titles in Glassdoor, there may be variations in
690 the naming of the same position. Therefore, only the most common positions are shown in this table.
691

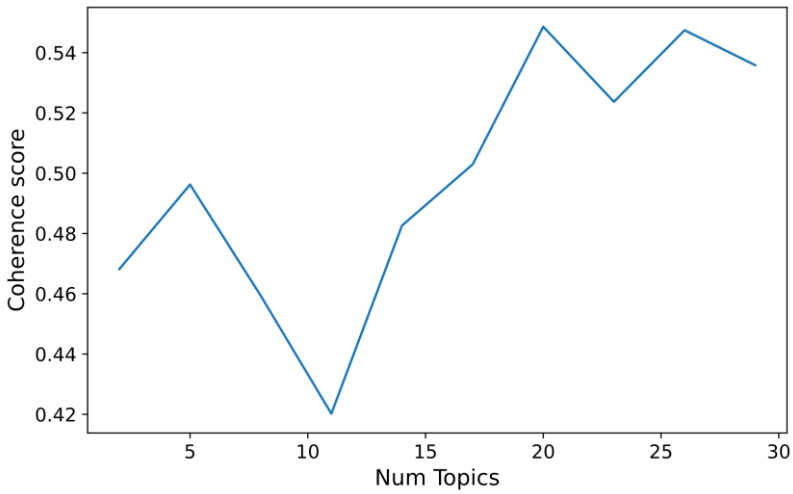


Fig. A. Coherence score for various number of topics using LDA model.

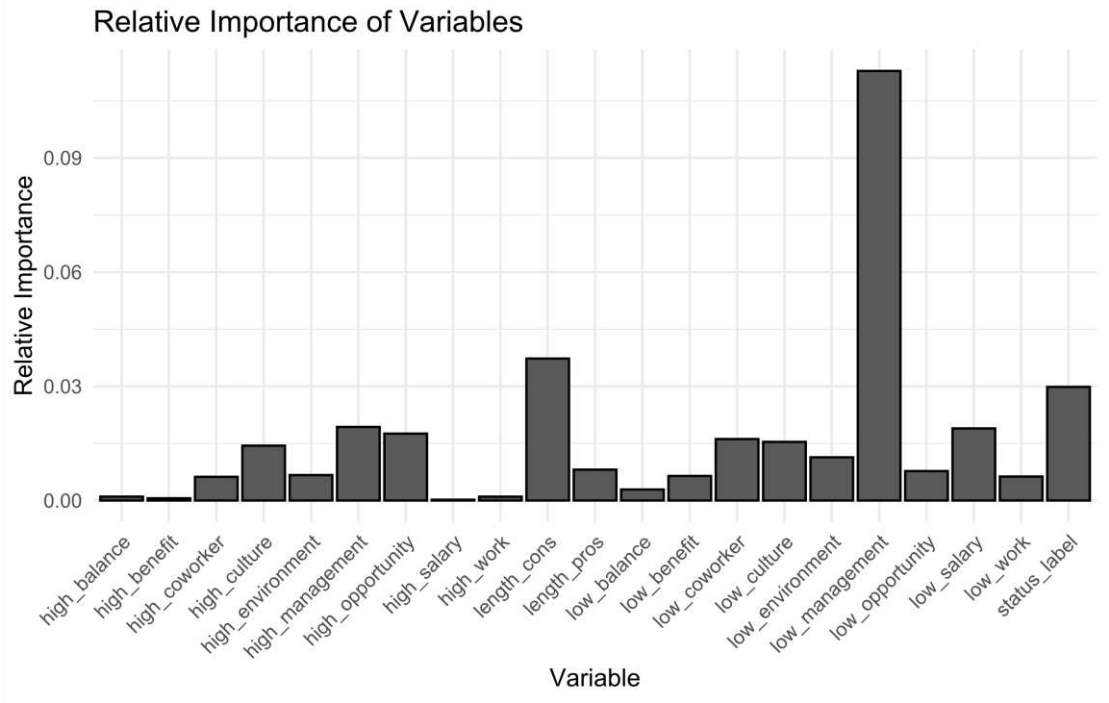


Fig. B. Relative importance of explanatory variables using LMG

Note: The plot describes the relative importance of the all attributes measurements scales to the overall satisfaction. The computation is based on partial R2 partitioned by averaging over orders also known as the LMG metric (Lindeman et al., 1980).

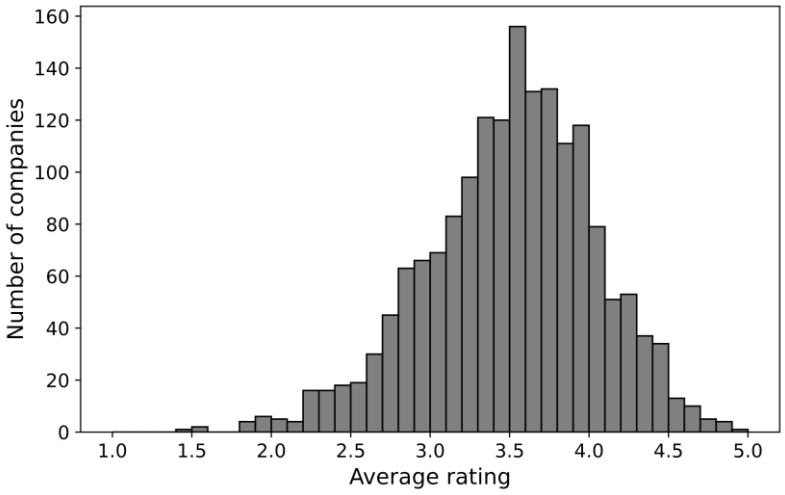


Fig. C. Distribution of average company rating.

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