Ranking Influential Factors on Job Satisfaction Based on University Students' Perspective

Thao Bich Doan, Huyen Thu Tran*, Huyen Thi Nguyen, Thang Xuan Tran, Anh Viet Pham, Ngoc Thi Hong Nguyen, Yen Thi Hong Pham
Department of Business English, Foreign Trade University, Hanoi, Vietnam.

ABSTRACT
This study utilizes Herzberg's Two-Factor Theory to quantitatively analyze university students' perspectives on future work motivation. Addressing the challenges in securing and sustaining meaningful employment, the research focuses on the impact of motivators on job attraction. A structured survey collects data from a representative sample of university students to quantify relationships between specific motivators and overall job attraction. Anticipated findings contribute empirical insights into the unique dynamics of youth employment, refining Herzberg's theory in this context. Implications extend to informing organizational practices, policies, and interventions for enhancing the job satisfaction and well-being of young workers.

Keywords: University students Work motivation Herzberg's Two-Factor Theory Youth employment Job attraction

INTRODUCTION
Advancements in science and technology have created an extremely fierce business environment. To improve competitiveness in the context of integration, businesses constantly invest in technology and production, especially in human resources. Nowadays, university students make up a significant portion of the workforce and are highly valued by employers because of their formal education. In terms of employment prospects, graduates typically experience lower unemployment rates than workers without a bachelor's degree. As of January 2023, the unemployment rate for graduates stood at 4.0%, whereas young workers without bachelor's degrees faced a higher unemployment rate of 6.9% (The Labor Market for Recent College Graduates, n.d.).

However, job hopping among university students is becoming increasingly prevalent. Young individuals often switch between six or seven jobs within just two years of work experience. In December 2021, Pham (2021) warned that this situation would spread to Vietnam, where the percentage of working people looking for new jobs in the previous six months was 58%. By April 2022, up to 260,000 out of nearly...
4 million laborers in Vietnam have updated their "Open To Work" status. Additionally, in 2022, the legal, human resources, and marketing industries had the highest turnover rate of more than 40%, the younger the worker - the higher the turnover rate, the number is up to 36%. The reason for job hopping is dissatisfaction with various workplace factors. Zahari and Puteh (2023) conducted a study and identified four key motivational factors that have the most significant impact on turnover rate, including achievement, salary and benefits, recognition, and working conditions. In contrast, the impact of interpersonal relations and career advancement on employee motivation was non-significant. Additionally, Muslim et al. (2017) showed that achievement was the dominant group affecting students’ perspectives toward job hopping and how long they anticipated the same company before leaving.

Considering the high turnover rate, employers are clearly aware of the motivators that significantly contribute to the prevalent job-hopping trend among young individuals. However, employers still lack a complete understanding of the importance of each contributing factor, which hinders the identification of the most feasible and effective solutions to address this problem. Consequently, strategies to attract new talent and retain current employees may not be effective.

Furthermore, undergraduate students are about to join the workforce on a more permanent basis. In their second or third year, they start working to accumulate valuable experience and knowledge in their respective fields. According to Hora et al. (2021), a significant proportion of students (67.9%) pursue internships to gain practical experience in a specific field. In addition, a recent survey has shown that more than three-quarters (78.6%) of students participate in experiential learning opportunities throughout their college career. However, this includes not only internships but also opportunities such as co-ops and externships (2022 NACE Student Survey, n.d.). Therefore, enterprises seek to attract and retain these students, minimizing the need to invest a lot of time and financial resources in training new employees.

Consequently, many companies have chosen to invest in student training programs as a strategic approach to address specific skill gaps in the industry and attract high-potential individuals who may be willing to join their company. This approach ensures that the candidates they hire have the relevant skills and knowledge required, which is important in industries that require specialized skills. Rodriguez and Walters (2017) stated that providing core proficiencies and structure throughout the employee training and development process increases the probability for individuals to effectively deliver the mission while supporting others in creating a learning culture as part of the organization’s strategic goals. Additionally, training programs allow companies to instill their values, culture, and work methods at the start of new employees, leading to integration and alignment between employees and businesses (Bauer et al., 2007). However, according to Babelová et al. (2020), if employees feel that an enterprise is unable to attract and retain important employees, it may negatively affect their perception and commitment to the organization and its performance. The retention challenge poses a significant concern for businesses, requiring a multifaceted approach encompassing various facets of employee experience. This includes providing benefits and incentives that promote a positive work environment and opportunities for career growth. Recognizing and appreciating employee contributions are also important components in building a workplace culture that promotes commitment to the company (Ali & Anwar, 2021). However, the importance of factors that contribute to employee retention may vary depending on the organization and its specific context. Therefore, enterprises must comprehend the most important factors, thereby improving them to develop specific strategies to effectively retain workers.

This study aims to explore the significance of motivators in employee recruitment and retention. In addition, college students demonstrate a profound awareness of the multitude of factors that impact their choices when selecting a workplace. As a result, companies can develop effective strategies to attract and retain highly skilled and talented university students.

2. LITERATURAL REVIEW

2.1. Workforce

Workforce is defined as the total number of people engaged in or available for work in a particular industry, country, or community. In the contemporary era, the role of the workforce, especially undergraduates, has gained paramount significance for any institution. The new workforce is characterized by a commitment to social responsibility, environmental sustainability, and inclusivity, aligning with the values that are increasingly becoming central to successful and responsible business practices. Recognizing and harnessing the talents of undergraduates not only addresses the immediate needs of the workforce but also ensures a robust and forward-looking foundation for the future of the professional world.

Newer generations have shown a significant change in their job decision-making process compared to previous generations, which is especially true for undergraduate students. They are about to join the workforce on a more permanent basis. Many of them start working to accumulate valuable experience and
knowledge since the second or third year of college. At the same time, companies seek to attract and retain these students, minimizing the need to invest a lot of time and financial resources in training new employees. They represent a crucial segment of the workforce, embodying a talented generation with immense potential for innovation and growth. Their significance lies not only in their skills and knowledge but also in the need for considerate care and support. As they transition from academic settings to professional environments, they greatly benefit from mentorship, guidance, and opportunities for skill development. Nurturing their talents through continuous learning and providing a supportive work culture ensures their successful integration into the workforce. Recognizing the importance of fostering a conducive environment for their growth and well-being is pivotal, as it not only maximizes their potential but also contributes to the overall productivity and dynamism of the workforce. In essence, undergraduates are an invaluable asset, and their potential can be fully realized through thoughtful consideration and support. Therefore, it is necessary for businesses to gain a deeper insight into new graduates’ motivation, thereby leading to newly graduated workers’ increased satisfaction and reduced turnover rates and job hopping in the workplace.

2.2. Job satisfaction

When it comes to employees, job satisfaction has been an important concept in the study of Human Resources. A large number of research studies about job satisfaction have provided various definitions of it. The concept of job satisfaction is so diverse because employees have unique feelings and reactions to their organization. Nagy and Tomm (2023) defined the concept of job satisfaction as referring to an individual's overall contentment with their work, leading to increased productivity, specifically when their expectations are fulfilled. Meanwhile, Meier and Spector (2015) described in more detail the term ‘job satisfaction’ as the overall assessment of positive or negative feelings experienced in relation to one's job. Job satisfaction is a subject of extensive research and holds a significant position in various theories concerning organizational factors. Moreover, it is closely linked to essential elements of human resource management such as performance, counterproductive work behavior, turnover, and employee well-being. On the other hand, Paais and Pattiruhu (2020) explained job satisfaction in a way that is more related to employee's emotion, that it is a nexus connecting the rewards associated with work engagement. Although scholars have different definitions, they generally say that job satisfaction can lead to the engagement of employees within the work environment.

Thus, the term ‘job satisfaction' refers to the level of satisfaction and happiness employees feel toward their jobs and work environments. In short, employee job satisfaction can be understood as the degree of positive feelings or attitudes they have toward their work and it plays an important role for a company in retaining employees.

Job satisfaction is influenced by several factors. Studies have shown that there are three different perspectives when it comes to understanding what factors may contribute to job satisfaction: The dispositional approach (individual characteristics), the situational approach (work environment), and the interactionist approach (how the person and the environment interact and fit together) (Meier & Spector, 2015).

Employee satisfaction directly affects productivity, morale and retention of talented employees. Satisfied employees are more likely to be motivated, engaged, and committed to their work, leading to better performance, higher job satisfaction, and lower turnover. On the other hand, dissatisfied employees may experience burnout, decreased productivity, and may even seek opportunities elsewhere, costing companies valuable time and resources in recruiting and training new employees. Meier and Spector (2015) have examined not only how job satisfaction can influence desired behaviors such as task performance, but also how it may contribute to counterproductive behavior. It is noteworthy that low job satisfaction is significantly associated with behavior that goes against the organization, as reported by individuals themselves. Moreover, job satisfaction is considered to be a component of overall well-being. Consequently, numerous studies have identified a connection between job satisfaction and various measures of well-being. Meanwhile, Jalagat (2016) argues that the relationship between job satisfaction and motivation forms a circular process, as they mutually influence each other. For instance, when 10 employees experience job satisfaction, they tend to become more motivated, leading to improved performance in the workplace. This creates a cycle where increased job satisfaction boosts motivation, which in turn enhances job performance.

According to Herzberg’s theory, employees’ satisfaction at work is affected by motivators. Motivators include six sub-factors which are (1) achievement, (2) recognition, (3) responsibility, (4) possibility of growth, (5) work itself and (6) advancement.

2.3. Herzberg - The Two-Factor Theory

Herzberg’s Two-Factor Theory suggests that satisfaction and dissatisfaction at work are influenced by two factors which are hygiene factors and motivators. Herzberg emphasized the Motivators are considered more important to employees’ job satisfaction than Hygiene Factors. Motivators include 6 sub-factors which are (1) achievement, (2) recognition, (3) responsibility, (4) possibility of growth, (5) work itself and (6) advancement (Figure 1). When undergraduate students start entering the workforce, motivators play a crucial role.
role in their job satisfaction in the workplace because “the satisfier factors are known as motivators because if they are present in appropriate amounts in any organization, they bring about work motivation as a corollary to their creating positive attitudes of job satisfaction” (Herzberg, 1974, p18).

![Figure 1. Motivators in Herzberg’s Two-Factor Theory](Source: Herzberg (1974))

It was emphasized that motivation theories aim to assist in the development of tools managing to achieve profitable employee behaviors that are more aligned with the goals of the organization (Shultz, 2014). With the help of motivation theories, many studies on job choices and employee motivation have been done to help firms find the right person suited to the right job.

3. RESEARCH METHOD
3.1. Fuzzy preference relations
This approach has been adopted for varied research purposes, and the relevant formulas are devised below.

**Definition 1.** Expert preferences over a set of alternatives where X is denoted by a positive preference relation matrix $P \in X^+X$ with membership function: $a : X^+X \times [0,1]$, where $p_{ij} = a(x_i,x_j)$ expresses the ratio of the preference intensity of alternative $x_i$ to that of $x_j$. Additionally, if $p_{ij} = \frac{\hat{a}}{\sum_{i=1}^n p_{ij}}$ implies indifference between $x_i$ and $x_j (x_i \sim x_j)$. $p_{ij} = 1$ denotes that $x_i$ is absolutely preferred to $x_j$. $p_{ij} = 0$, indicates $x_j$ is absolutely preferred to $x_i$, and $p_{ij} > \frac{1}{2}$ indicates that $x_i$ is preferred to $x_j$, $x_i > x_j$. Meanwhile, $P$ is assumed to be an additive reciprocal, that is:

$$p_{ij} + p_{ji} = 1 \quad i,j \in \{1,...,n\} \quad (1)$$

**Proposition 1.** Assume a set of alternatives, $X = (x_1,...,x_n)$ related to a reciprocal multiplicative preference relation $A = (a_{ij})$ for $a_{ij} \in [1/9,9]$. Then, the corresponding reciprocal fuzzy preference relation, $P = (p_{ij})$ with $p_{ij} \in [0,1]$ as related with $A$ (Chiclana, Herrera, & Herrera-Viedma, 2001; Herrera & Herrera-Viedma, 2000; Wang & Chang, 2007; Wang & Chen, 2007; Wang & Nguyen, 2016) is defined as follows:
5 Frontier Management Science (FMS)

\[ P_{ij} = g(a_{ij}) = \frac{1}{2} (1 + \log_{9} a_{ij}) \] (2)

The log base is denoted by the maximum value in the scale range used for the linguistic assessment variables. For example, when \( a_{ij} \) is between 1/9 and 9, \( \log_{9} a_{ij} \) is utilized.

With this type of transformation function \( g \), it can be related to the research issues obtained for both kinds of preference relations.

**Proposition 2.** Let \( A = (a_{ij}) \) be a consistent multiplicative preference relations, then the corresponding reciprocal fuzzy preference relations, \( P = g(A) \), verifies the additive transitivity property.

**Proof.** For \( A = (a_{ij}) \) being consistent it has that \( a_{ij}a_{jk}a_{ki} = 1 \), or equivalently \( a_{ij}a_{jk}a_{ki} = 1 \). Taking logarithms on both sides, it has

\[ \log_{9} a_{ij} + \log_{9} a_{jk} + \log_{9} a_{ki} = 0 \] (3)

Adding Equation (3) and dividing by Equation (2) on both sides then

\[ \frac{1}{2} (1 + \log_{9} a_{ij}) + \frac{1}{2} (1 + \log_{9} a_{jk}) + \frac{1}{2} (1 + \log_{9} a_{ki}) = \frac{3}{2} \] (4)

The fuzzy preference relations \( P = g(A) \), being \( p_{ij} = \frac{1}{2} (1 + \log_{9} a_{ij}) \), verifies

\[ p_{ij} + p_{jk} + p_{li} = \frac{3}{2} \] (5)

It follows that \( P = g(A) \) verifies the additive transitivity property.

By so doing, in this study, it considers the following definition of the consistent fuzzy preference relations:

**Definition 2.** A reciprocal fuzzy preference relation \( P = (p_{ij}) \) is consistent if

\[ p_{ij} + p_{jk} + p_{li} = \frac{3}{2} \] (6)

In what follows, it will be using the term additive consistency to refer to consistency for fuzzy preference relations based on the additive transitivity property.

**Proposition 3.** For a reciprocal fuzzy preference relation \( P = (p_{ij}) \), the following statements are equivalent:

\[ p_{ij} + p_{jk} + p_{li} = \frac{3}{2} \] (7)

\[ p_{ij} + p_{jk} + p_{li} = \frac{3}{2} \] (8)

**Proposition 4.** A fuzzy preference relation \( P = (p_{ij}) \) is consistent if and only if

\[ p_{ij} + p_{jk} + p_{lk} = \frac{3}{2} \] (9)

**Proposition 5.** For a reciprocal additive fuzzy preference relation \( P = (p_{ij}) \), the following statements are equivalent:

\[ p_{ij} + p_{jk} + p_{li} = \frac{3}{2} \] (10)

\[ p_{ij} + p_{jk} + p_{li} = \frac{3}{2} \] (11)

### 3.2. Student demographics

The condition to choose students participants in this research is that (1) they are Vietnamese undergraduate students; (2) they are doing bachelor degrees in three kinds of majors which are economics, linguistics and engineering. In our survey, 200 students were selected.
As in the table 3.1 below, male students make up 43.5% while female ones constitute 56.5%. Our study has two main age groups which are from 18 to 20 (78.5%) and from 21 to 23 (21.5%). First-year students make up 1.5%; second-year students account for 11.5%; third-year students constitute 73.5% while seniors represent 13.5%. They are from Hanoi (90%), Ho Chi Minh city (3%) and other cities (7%). Their majors are economics (40%), linguistics (30%) and engineering (30%). Students who have never had any work experience make up 38%, students who have less than six-month experience accounts for 28%; 20.5% students have from 7 months to 12 months of experience; 13.5% students have more than 12 months of experience.

<table>
<thead>
<tr>
<th>Table 3.1. The students’ profile sketch</th>
</tr>
</thead>
<tbody>
<tr>
<td>F (frequency)</td>
</tr>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>Age</td>
</tr>
<tr>
<td>Current location</td>
</tr>
<tr>
<td>Academic year</td>
</tr>
<tr>
<td>Major</td>
</tr>
<tr>
<td>Part-time job</td>
</tr>
</tbody>
</table>

Source: the present authors

3.3. Hierarchical analytical process to evaluate the influence of factors

3.3.1. Linguistic variables

The present research compares factors in pairs using expressions such as “Equally important (EQ)”, “Moderately important (MO)”, “Strongly important (ST)”, “Very strongly important (VS)”, and “Absolutely important (AB)”, using a five-level scale with values indicated by actual numbers (Table 3.2). These linguistic terms are converted into a numerical value using a scale of 1 - 9 to each side respectively (Appendix), where 1 denotes equal importance, and 9 denotes the highest level of favoritism. Even numbers (2, 4, 6 and 8) can be adopted to present compromises among the preferences below (Table 3.2).

<table>
<thead>
<tr>
<th>Table 3.2. Linguistic terms for priority weights of influential factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition</td>
</tr>
<tr>
<td>Equally important (EQ)</td>
</tr>
<tr>
<td>Moderately important (MO)</td>
</tr>
<tr>
<td>Strongly important (ST)</td>
</tr>
<tr>
<td>Very strongly important (VS)</td>
</tr>
</tbody>
</table>
3.3.2. Consistent fuzzy preference relations for weighting the influential factors

The research adopted the analytic efficiency with the reciprocal additive fuzzy preference relations’ constructed computational simplicity of just requiring \((n - 1)\) comparisons for a set of \(n\) factors. The processes for constructing the reciprocal additive consistent fuzzy preference relations, which was designed by Herrera-Viedma et al. in 2007, for prioritizing the influential factors are presented below:

1. This study established pairwise comparison matrices for \(n\) criteria \((C_i, i = 1, 2, \ldots, n)\) in the dimension of a hierarchical system. Evaluators \((E_k, k = 1, 2, \ldots, m)\) provided the more importance of each of the considered pairwise factor for a set of \((n - 1)\) preference values \((a_{ij}, a_{23}, \ldots, a_{(n-1)n})\) as shown below:

\[
A^k = \begin{bmatrix}
C_1 & C_2 & \cdots & C_{n-1} & C_n \\
C_1 & 1 & a_{12}^k & \times & \times & \times \\
C_2 & \times & 1 & a_{23}^k & \times & \times \\
\vdots & \vdots & \vdots & \ddots & \ddots & \ddots \\
C_{n-1} & \times & \times & \cdots & 1 & a_{(n-1)n}^k \\
C_n & \times & \times & \cdots & \times & 1
\end{bmatrix}
\]

where \(a_{ij}^k\) denotes the preference intensity toward considered criteria \(i\) and \(j\) are assessed by evaluator \(k\), \(a_{ij} = 1\) indicates no difference between considered criteria \(i\) and \(j\), \(a_{ij} = 3, 5, 7, 9\) reveals that criteria \(i\) relatively important to criteria \(j\), and \(a_{ij} = \frac{1}{3}, \frac{1}{5}, \frac{1}{7}, \frac{1}{9}\) indicates that considered factor \(i\) is less important than factor \(j\). The sign unknown “-” indicates the remaining \(a_{ij}^k\), which can be done via inverse comparison.

2. Transform the preference value \(a_{ij}^k\) into \(p_{ij}^k\) using an interval scale \([0,1]\), then generate the remaining \(P_{ij}^k\) based on the reciprocal transitivity property, as follows:

\[
p^k = \frac{1}{2} \left( 1 + \log_2 A^k \right) = \begin{bmatrix}
C_1 & C_2 & \cdots & C_{n-2} & C_n \\
C_1 & 0.5 & p_{12}^k & \times & \times & \times \\
C_2 & \times & 0.5 & p_{23}^k & \times & \times \\
\vdots & \vdots & \vdots & \ddots & \ddots & \ddots \\
C_{n-1} & \times & \times & \cdots & 0.5 & p_{(n-1)n}^k \\
C_n & \times & \times & \cdots & \times & 0.5
\end{bmatrix}
\]

where \(p_{ij} = 0.5\) indicates no difference between criteria \(i\) and \(j\), \(p_{ij} = 1\) illustrates that criteria \(i\) is absolutely important to criteria \(j\), and \(p_{ij} = 0\) illustrates that the criteria is absolutely less important than criteria \(j\). The rest of \(P_{ij}^k\) can be calculated using Equations (1) and (11), but within an interval \([-a, 1+a]\) as, and a transforming function is essential to keep the reciprocity and additive transitivity (Herrera et al., 2004). The transformation function is, as follows:
where \( a \) denotes the absolute value of the minimum negative value or maximum positive value minus one in this preference matrix.

(3) Based on the opinions of individual evaluators, the weights of the criteria of each evaluator will be obtained, generating ranking. Normalizing the aggregated fuzzy preference relation matrices \( Q_{ij} \) is used to indicate the normalized fuzzy preference values of each considered criteria, such as

\[
q_{ij} = p_{ij} / \sum_{i=1}^{n} p_{ij}
\]

(15)

(4) Using the \( V_{ij} \) representing the priority weight of considered criteria, the priority of each criteria can be obtained, that is

\[
\omega_i = \frac{1}{n} \sum_{j=1}^{n} q_{ij}
\]

(16)

(5) The aggregated weights of all evaluators are calculated using Equation (17). In addition, let \( V_{ij}^k \) denote transforming the fuzzy preference value of evaluator \( k \) for assessing the factor \( i \) and \( j \). This paper uses the average value to integrate the judgment values of \( m \) evaluators for prioritizing weight.

\[
\omega_{ij} = \left( \omega_{ij}^1 + \omega_{ij}^2 + \cdots + \omega_{ij}^m \right) / m
\]

(17)

4. RESULTS AND DISCUSSION

This study employed fuzzy preference relations to evaluate factors affecting students in deciding on a company to work for. A total of 200 samples were collected from survey candidates in three major groups of universities in Vietnam. Pairwise comparisons of the six Motivators were obtained via an online survey.

To determine the preference values, the following steps clarify the computational procedures used to obtain the priority weights via a reciprocal additive consistent with the fuzzy preference relation approach. The six Motivators are named as F1 - Achievement, F2 - Recognition, F3 - Responsibility, F4 - Possibility of Growth, F5 - Work Itself, F6 - Advancement.

4.1. Establishing pairwise comparison matrices

Based on the interviews regarding the importance of six Motivators, Table 4.1.1 lists the pairwise comparison matrices for a set of \((n-1)\) neighboring additive consistent with the fuzzy preference relations approach.

| Table 4.1.1. Pairwise comparison results of Motivators from 200 students |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F1 | S2 | S3 | S4 | S5 | S6 | … | S194 | S195 | S196 | S197 | S198 | S199 | S200 |
| F1 | 8  | 1/6| 8  | 8  | 1  | 5  | 1/3| 1/3| 5  | 1/8| 8  | 1/6| 1/8  | 3  |
| F2 | 1  | 6  | 8  | 9  | 3  | 3  | 4  | 1  | 1  | 1/8| 9  | 8  | 1/9  | 1/5|
| F3 | 1  | 5  | 1  | 1/9| 1/7| 1/2| 1/6| … | 1/3| 1/9| 1/3| 1/7| 1/8  | 1/9|
| F4 | 8  | 5  | 1/9| 9  | 9  | 7  | 5  | 1/2| 9  | 7  | 7  | 8  | 1/6  | 3  |
| F5 | 1  | 1/6| 1  | 1/9| 1/9| 3  | 1  | 1  | 1/4| 1/9| 1/9| 1/7| 1/7  | 1/6|
| F6 | 1  | 1/6| 1/8| 1/9| 1/9| 1/8| 1/8| … | 3  | 1/5| 1/8| 1/8| 1/9  | 8  |

Source: calculated by the present authors

The assessment of Student 1 (S1) is presented as an example and listed in Table 4.1.2. They include the linguistic terms, which are transferred into corresponding numbers while values of “x” can be computed with Equations (1) and (11). In the table, the Sample 1 shows the preference levels for 6 pairwise comparisons. For example, in the table \( a_{12} = 8 \) showing the score of Factor 1 (F1) compared with Factor 2 (F2) equals 8. It means S1’s preference to F1 falls between strongly important and very strongly important. Furthermore, after constructing this assessment, the matrix can generate the reciprocal values based on the
original preference, for instance, from the values $a_{12} = 8$ and $a_{45} = 1/8$, it can formulate respective values as $a_{21} = 1/8$ and $a_{45} = 8$.

### Table 4.1.2. Original Motivators pairwise comparison matrix of S1

<table>
<thead>
<tr>
<th></th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>F4</th>
<th>F5</th>
<th>F6</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>1.0000</td>
<td>8</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>F2</td>
<td>1/8</td>
<td>1.0000</td>
<td>1</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>F3</td>
<td>×</td>
<td>1</td>
<td>1.0000</td>
<td>1</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>F4</td>
<td>×</td>
<td>×</td>
<td>1</td>
<td>1.0000</td>
<td>8</td>
<td>×</td>
</tr>
<tr>
<td>F5</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>1/8</td>
<td>1.0000</td>
<td>1</td>
</tr>
<tr>
<td>F6</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>1</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

× denotes unknown values

Source: calculated by the present authors

### 4.2. Transforming preference values in the original matrix

Equation (2) was utilized to convert the elements in Table 4.2.1, resulting in the following values:

- **Log transformation matrix of Motivators**
  
  $p_{12} = (1 + \log_9 8.0000)/2 = 0.9732$

  $p_{23} = (1 + \log_9 1.0000)/2 = 0.5000$

  $p_{34} = (1 + \log_9 1.0000)/2 = 0.5000$

  $p_{45} = (1 + \log_9 8.0000)/2 = 0.9732$

  $p_{56} = (1 + \log_9 1.0000)/2 = 0.5000$

Likewise, the log transformation of the test of the assessment score in Table 4.1.1 can be obtained and all transformed values are expressed in Table 4.2.1.

### Table 4.2.1. Log transformation matrix of Motivators

<table>
<thead>
<tr>
<th></th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>F4</th>
<th>F5</th>
<th>F6</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>0.5000</td>
<td>0.9732</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>F2</td>
<td>0.0268</td>
<td>0.5000</td>
<td>0.5000</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>F3</td>
<td>×</td>
<td>0.5000</td>
<td>0.5000</td>
<td>0.5000</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>F4</td>
<td>×</td>
<td>×</td>
<td>0.5000</td>
<td>0.5000</td>
<td>0.9732</td>
<td>×</td>
</tr>
<tr>
<td>F5</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>0.0268</td>
<td>0.5000</td>
<td>0.5000</td>
</tr>
<tr>
<td>F6</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>0.5000</td>
<td>0.5000</td>
<td>0.5000</td>
</tr>
</tbody>
</table>

× denotes unknown values

Source: calculated by the present authors

---

Ranking Influential Factors on Job Satisfaction Based on University Students’ Perspective (Huyen Thu Tran)
*Calculating the unknown values

Equation (10) \( p_{ij} + p_{jk} + p_{ki} = \frac{3}{2} \) to calculate the “×” value in the upper triangle of Table 4.2.2, then, using Equation (1) \( p_{ij} + p_{ji} = 1 \) to calculate the “×” value in the lower triangle of Table 4.2.2.

Following is the calculation example.

- **Matrix of Motivators**
  
  a) \( p_{13} = 1.5 - p_{23} - p_{21} = 1.5 - 0.5000 - 0.0268 = 0.9732 \)
  
  \( p_{31} = 1 - p_{13} = 1 - 0.9732 = 0.0268 \)
  
  b) \( p_{24} = 1.5 - p_{43} - p_{32} = 1.5 - 0.5000 - 0.5000 = 0.5000 \)
  
  \( p_{42} = 1 - p_{24} = 1 - 0.5000 = 0.5000 \)
  
  c) \( p_{35} = 1.5 - p_{52} - p_{23} = 1.5 - 0.0268 - 0.5000 = 0.9732 \)
  
  \( p_{53} = 1 - p_{35} = 1 - 0.9732 = 0.0268 \)
  
  d) \( p_{46} = 1.5 - p_{65} - p_{54} = 1.5 - 0.5000 - 0.0268 = 0.9732 \)
  
  \( p_{64} = 1 - p_{46} = 1 - 0.9732 = 0.0268 \)

Similarly, the calculation patterns should be done with the rest of the matrix value in the following order:

- **Matrix of Motivators**
  
  \( (p_{14}; p_{41}); (p_{25}; p_{52}); (p_{36}; p_{63}) \)
  
  \( (p_{15}; p_{51}); (p_{26}; p_{62}) \)
  
  \( (p_{16}; p_{61}) \)

Consequently, all of the obtained values are expressed in Table 4.2.2.

<table>
<thead>
<tr>
<th>S1</th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>F4</th>
<th>F5</th>
<th>F6</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>0.5000</td>
<td>0.9732</td>
<td>0.9732</td>
<td>0.9732</td>
<td>1.4464</td>
<td>1.4464</td>
</tr>
<tr>
<td>F2</td>
<td>0.0268</td>
<td>0.5000</td>
<td>0.5000</td>
<td>0.5000</td>
<td>0.9732</td>
<td>0.9732</td>
</tr>
<tr>
<td>F3</td>
<td>0.0268</td>
<td>0.5000</td>
<td>0.5000</td>
<td>0.5000</td>
<td>0.9732</td>
<td>0.9732</td>
</tr>
<tr>
<td>F4</td>
<td>0.0268</td>
<td>0.5000</td>
<td>0.5000</td>
<td>0.5000</td>
<td>0.9732</td>
<td>0.9732</td>
</tr>
<tr>
<td>F5</td>
<td>-0.4464</td>
<td>0.0268</td>
<td>0.0268</td>
<td>0.0268</td>
<td>0.5000</td>
<td>0.5000</td>
</tr>
<tr>
<td>F6</td>
<td>-0.4464</td>
<td>0.0268</td>
<td>0.0268</td>
<td>0.0268</td>
<td>0.5000</td>
<td>0.5000</td>
</tr>
</tbody>
</table>

Source: calculated by the present authors

4.3. Transforming the preference values to fit the scale

Table 4.2.2 shows values outside the interval [0;1], which are \( p_{15}, p_{16}, p_{35}, p_{61} \). In order to guarantee that the matrix satisfies both reciprocity and additive transitivity, a linear transformation referred to as Equation (14) is used. Hence, the transformation matrix of Motivators is described in Table 4.3.1 below.
Table 4.3.1. The S1 transformation matrix of Motivators by linear solution

<table>
<thead>
<tr>
<th></th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>F4</th>
<th>F5</th>
<th>F6</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>0.5000</td>
<td>0.7500</td>
<td>0.7500</td>
<td>0.7500</td>
<td>1.0000</td>
<td>1.0000</td>
</tr>
<tr>
<td>F2</td>
<td>0.2500</td>
<td>0.5000</td>
<td>0.5000</td>
<td>0.5000</td>
<td>0.7500</td>
<td>0.7500</td>
</tr>
<tr>
<td>F3</td>
<td>0.2500</td>
<td>0.5000</td>
<td>0.5000</td>
<td>0.5000</td>
<td>0.7500</td>
<td>0.7500</td>
</tr>
<tr>
<td>F4</td>
<td>0.2500</td>
<td>0.5000</td>
<td>0.5000</td>
<td>0.5000</td>
<td>0.7500</td>
<td>0.7500</td>
</tr>
<tr>
<td>F5</td>
<td>0.0000</td>
<td>0.2500</td>
<td>0.2500</td>
<td>0.2500</td>
<td>0.5000</td>
<td>0.5000</td>
</tr>
<tr>
<td>F6</td>
<td>0.0000</td>
<td>0.2500</td>
<td>0.2500</td>
<td>0.2500</td>
<td>0.5000</td>
<td>0.5000</td>
</tr>
</tbody>
</table>

Source: calculated by the present authors

4.4. Prioritizing weights

As per the pairwise comparison preference relation matrix of S1, Equation (16) is utilized to normalize the matrix. Subsequently, Equation (17) is used to derive the priority weight of individual factors, which is presented in Table 4.4.1.

Table 4.4.1. Priority weight of influential Motivators of S1

<table>
<thead>
<tr>
<th></th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>F4</th>
<th>F5</th>
<th>F6</th>
<th>Average</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>0.5000</td>
<td>0.7500</td>
<td>0.7500</td>
<td>0.7500</td>
<td>1.0000</td>
<td>1.0000</td>
<td>0.7917</td>
<td>0.2639</td>
</tr>
<tr>
<td>F2</td>
<td>0.2500</td>
<td>0.5000</td>
<td>0.5000</td>
<td>0.5000</td>
<td>0.7500</td>
<td>0.7500</td>
<td>0.5417</td>
<td>0.1806</td>
</tr>
<tr>
<td>F3</td>
<td>0.2500</td>
<td>0.5000</td>
<td>0.5000</td>
<td>0.5000</td>
<td>0.7500</td>
<td>0.7500</td>
<td>0.5417</td>
<td>0.1806</td>
</tr>
<tr>
<td>F4</td>
<td>0.2500</td>
<td>0.5000</td>
<td>0.5000</td>
<td>0.5000</td>
<td>0.7500</td>
<td>0.7500</td>
<td>0.5417</td>
<td>0.1806</td>
</tr>
<tr>
<td>F5</td>
<td>0.0000</td>
<td>0.2500</td>
<td>0.2500</td>
<td>0.2500</td>
<td>0.5000</td>
<td>0.5000</td>
<td>0.2917</td>
<td>0.0972</td>
</tr>
<tr>
<td>F6</td>
<td>0.0000</td>
<td>0.2500</td>
<td>0.2500</td>
<td>0.2500</td>
<td>0.5000</td>
<td>0.5000</td>
<td>0.2917</td>
<td>0.0972</td>
</tr>
</tbody>
</table>

Source: calculated by the present authors

4.5. Aggregating opinions weights

Similarly, the above computational procedures are applied to calculated the fuzzy preference relations matrices of the other 199 students. The 199 matrices result in discovering respective priority weights and ranks. From 200 sets of weight by 200 college students, Equation (15) is used to aggregate weights of 200 students.

As presented in Table 4.5.1 and Figure 4.5.2, F4 - Possibility of Growth (0.2044)> F6 - Advancement (0.1959) > F1 - Achievement (0.1654) > F5 - Work Itself (0.1587) > F3 - Responsibility (0.1410) > F2 - Recognition (0.1346).

Possibility of Growth stands out as the most critical factor within the Motivators category, registering a numerical value of approximately 0.2044 based on fuzzy preference relations. Students are obtaining knowledge at their school. They are inexperienced so they are hungry for opportunities of working and progressing. Therefore, what an employer offers them should be possibility of growth. Further, since Advancement factor is placed 2nd. This result suggests an employer should consider offering of advancement to them as an attractive chance. Achievement is ranked 3th, which show the third possibility to persuade a student, a potential candidate. Similarly, the sequential rankings of Work Itself, Responsibility and Recognition should be the last choice for students when the employer want to offer them a job or retain them.

The application of the fuzzy preference relations method to evaluate the influence of factors in order to understand what motivate students to work or keep them satisfied with their job is obviously suited to the evaluation process. Apart from proposing evaluation, the study reveals concerns and preferences of student engagement. The findings of the study offer an appropriate reference for employers favoring student employment to decide appropriate offers to them when they want to hire them or keep them work in the company.

Ranking Influential Factors on Job Satisfaction Based on University Students' Perspective (Huyen Thu Tran)
Table 4.5.1. Priority weight and rank of Motivators

<table>
<thead>
<tr>
<th>Weight</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>0.1654</td>
</tr>
<tr>
<td>F2</td>
<td>0.1346</td>
</tr>
<tr>
<td>F3</td>
<td>0.1410</td>
</tr>
<tr>
<td>F4</td>
<td>0.2044</td>
</tr>
<tr>
<td>F5</td>
<td>0.1587</td>
</tr>
<tr>
<td>F6</td>
<td>0.1959</td>
</tr>
</tbody>
</table>

1.0000

Source: calculated by the present authors

Figure 4.5.2. Influential ranking of Motivators

Source: calculated by the present authors

5. CONCLUSION

Herzberg's Two-Factor theory distinguishes between motivators and hygiene factors, both influencing employee satisfaction and dissatisfaction. Our research emphasizes the importance of motivators like growth opportunities, advancement, and achievement. To attract and retain talent, companies should prioritize these factors, offering clear career paths, mentorship programs, and targeted skill development for student employees. Leveraging digital training platforms, mentorships, and international exposure can further optimize their growth potential.

Studies underscore the significance of intrinsic job characteristics in employee motivation, highlighting enjoyment derived from the work itself as a primary factor, especially among college students. While recruitment methods may vary in impact across experience levels, job specifics remain crucial. Companies can add more offers relating to these rankings of the six motivators in job advertisement as attracting items to student candidates.

Lastly, while positive feedback reinforces value, it must be constructive. Enterprises should balance recognition with actionable, honest feedback, following the principle: "Praise publicly, correct privately." Clear, timely recognition, complemented by tangible rewards, fosters a motivational work environment.
REFERENCES


[8] Da Silva Michele Daiane, D. A. (2022, May 1). Generation Z – A quantitative study into their motivation in the workplace in Ireland. https://esource.dbx.is/items/8a51b763-856b-478b-81ab-6a153b1f1597?fbclid=IwAR34XdnLHYa46RK1E-qcicdwmYg9hTsYkJxZZh4gi1Hy9nxohmFkpVVL2M


