



Sameer Pingle

 <https://orcid.org/0000-0002-0323-4561>

Symbiosis Centre for Management Studies
Nagpur, Symbiosis International
(Deemed University), Pune, India
sameerpingle22@gmail.com

Shubhangi Jore

 <https://orcid.org/0000-0002-8387-3151>

School of Business Management NMIMS
Indore campus
shubhangi.jore@nmims.edu

Rajwinder Kaur

 <https://orcid.org/0000-0001-8946-6496>

Symbiosis Institute of Business
Management, Noida
Symbiosis International
(Deemed University), Pune, India
drrajwinderkaur19@gmail.com

Employer attractiveness, socio-demographic variables, and personality traits: A cluster analysis of potential employees

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Abstract

Aim/purpose – This study explores the dimensions of employer attractiveness and its impact on segmenting potential employees based on their preferences. The research focuses on socio-demographic variables, personality traits, and critical aspects of employer attractiveness to elucidate the factors influencing individuals' inclination to align themselves with their employers.

Design/methodology/approach – The research employs a non-probability sampling technique to collect data from undergraduate and postgraduate management and engineering students in Indore City, India. Data was collected through a structured questionnaire covering socio-demographic details, perceptions of employer attractiveness, and personality traits. Factor analysis and cluster analysis were used to analyze the data.

Findings – The study provides insights into understanding employer attractiveness and its components. Segmenting employees based on their preferences reveals how individuals perceive different aspects of employers. By analyzing socio-demographic factors and

personality traits in combination with employer attractiveness, the research offers a nuanced perspective on the determinants of individuals' preferences for employers.

Research implications/limitations – This study's findings are limited by the non-probability sampling technique and its focus on students in a specific geographic area, which may affect the generalizability of the results. Future research could include diverse demographic and geographic samples to validate the identified clusters. Despite these limitations, the study's findings have practical implications for developing targeted employer branding strategies to enhance employer attractiveness and employee retention.

Originality/value/contribution – This research contributes to the growing body of knowledge on employer attractiveness. It highlights the significance of effective employer branding strategies for organizations striving to attract and retain top talent in a competitive labor market.

Keywords: employer attractiveness, talent acquisition, retention, personality traits, employer branding, segmentation.

JEL Classification: L2, M1.

1. Introduction

In today's competitive labor market, attracting and retaining top talent has become a critical priority for organizations across industries (Dauth et al., 2023). Employer attractiveness, which refers to attributes that make an organization desirable to potential employees, is pivotal in shaping job seekers' perceptions and influencing their employment decisions (Ritz et al., 2023). However, despite its significance, there is still a notable gap in understanding the multifaceted factors that contribute to employer attractiveness, particularly from the perspective of potential employees (Dassler et al., 2022; Pernkopf et al., 2021). Most existing research has either focused on industry-specific studies or broad conceptual frameworks, often overlooking the influence of socio-demographic factors and personality traits on individuals' preferences (Li et al., 2024; Satzger & Vogel, 2023; Vogel & Satzger, 2024).

Employer attractiveness is a dynamic construct encompassing several dimensions, such as economic value, development opportunities, social benefits, and organizational culture (Berthon et al., 2005). While previous studies have explored individual dimensions in isolation, there is limited research on how these factors interact with socio-demographic characteristics (e.g., age, gender, education level) and personality traits to shape individuals' overall perceptions of employer attractiveness. Additionally, a lack of research systematically segmenting potential employees based on these interacting factors leaves a gap in understanding how diverse candidate pools prioritize different employer attributes.

This study aims to address this gap by examining the role of socio-demographic variables and personality traits in shaping perceptions of employer attractiveness among potential employees. Specifically, the research investigates how these factors influence the preferences of undergraduate and postgraduate students in India. Using factor and cluster analysis, the study segments respondents into distinct groups based on their perceptions of employer attractiveness. By focusing on dimensions such as Application Value (AV), Interest Value (IV), Social Value (SV), Economic Value (EV), Development Value (DV), and Opportunity Value (OV) (Berthon et al., 2005), the study seeks to provide a nuanced understanding of the diverse preferences that drive individuals' inclinations to align with specific employers.

The theoretical framework of this study is grounded in Social Exchange Theory (SET) (Blau, 1964), which theorizes that individuals make decisions based on perceived benefits and costs. In the context of employer attractiveness, this theory helps explain how potential employees assess the value of an organization in terms of the opportunities and rewards it offers in exchange for their time, skills, and effort. Furthermore, by exploring the interaction between personality traits and perceptions of employer attributes, this study offers practical insights into how organizations can tailor their recruitment strategies to attract and retain top talent from diverse socio-demographic backgrounds.

The remainder of the paper is structured as follows: Section 2 reviews the relevant literature on employer attractiveness, socio-demographic characteristics, and personality traits. Section 3 outlines the research objectives, methodology, and data collection process. Section 4 presents the results of the cluster analysis and key findings. Section 5 concludes by discussing the implications of the findings about existing literature, limitations, and suggestions for future research.

2. Literature review and theoretical underpinning

Organizations face significant challenges in attracting and retaining talented employees in today's competitive landscape (Tanwar & Prasad, 2017). While attracting top candidates remains crucial, retaining employees and fostering long-term commitment have become equally important objectives for organizations. Employer attractiveness, defined as the perceived benefits of working for a specific organization, is pivotal in shaping individuals' employment decisions (Berthon et al., 2005). Khapova et al. (2022) outline the literature on employer attractiveness into two distinct phases: the foundational period (1990-2009) and the subsequent focus on employee-centric approaches (from 2010 onwards).

Ambler and Barrow (1996) highlighted the significance of employer attractiveness for potential and existing employees. Lievens et al. (2007) further categorized the attributes of employer branding into symbolic and instrumental dimensions.

Research has long emphasized the importance of person-organization fit, signifying that individuals succeed in organizations that align with their personalities (Tom, 1971). Ryan and Kristof-Brown (2003) highlight the stability and visibility of personality traits, suggesting that personality-based person-organization fit may strongly influence individuals' attitudes and behaviors. However, potential employees lacking first-hand experience with the organization may need more accurate perceptions of the employment experience (Cable & Turban, 2003). This discrepancy underlines differences in how potential and existing employees perceive organizational actions and anticipate outcomes. While potential employees' perceptions often translate into application intentions or job pursuits, existing employees' experiences influence retention, engagement, and word-of-mouth behavior (Cable & Turban, 2003).

Existing literature offers extensive insights into employer attractiveness antecedents and consequences (Lievens & Slaughter, 2016; Moser et al., 2017; Schlager et al., 2011). Antecedents encompass transactional attributes (e.g., compensation, training), relational attributes (e.g., leadership style, work culture), and ideological attributes (e.g., company brand, social responsibility) (Dassler et al., 2022). Consequences include individual and organizational performance, positive work attitudes, compensation expectations, retention, and word-of-mouth behavior (Dassler et al., 2022).

The theoretical foundation of this study is anchored in the SET, which provides a lens to understand the dynamics of relationships between individuals and organizations (Blau, 1964). SET suggests that social interactions are based on reciprocity and mutual benefit, where individuals exchange with others to maximize rewards while minimizing costs (Blau, 1964). In the context of employer attractiveness, SET suggests that individuals evaluate potential employers based on the perceived benefits they gain from the employment relationship (Nguyen & Nguyen, 2023). These benefits may include tangible rewards such as compensation and career advancement opportunities and intangible rewards such as organizational support, recognition, and a positive work environment (Lievens et al., 2007). Conversely, individuals also assess the costs associated with employment, such as workload, job stress, and perceived incongruence with personal values and goals (Lievens et al., 2007).

According to SET, individuals are more likely to be attracted to organizations that offer favorable exchange terms where the benefits outweigh the costs (Tkalac Verčič et al., 2023). This implies that organizations must effectively

communicate their value proposition to potential employees, highlighting the rewards and opportunities available while mitigating perceived costs (Sengupta et al., 2015). Applying SET in the context of employer attractiveness highlights the importance of understanding the psychological processes underlying individuals' decision-making when evaluating potential employers (Luan & Ha, 2023). By recognizing the reciprocal nature of the employment relationship and the factors that influence individuals' perceptions of organizational exchange, organizations can effectively tailor their recruitment strategies to attract and retain top talent (Chernyak-Hai & Rabenu, 2018). Therefore, by applying SET principles to recruitment and retention strategies, organizations can cultivate positive exchange relationships that benefit employees and the organization.

Based on the above literature review, this study's research objectives are outlined below.

RO1: To identify the factors affecting employer attractiveness.

The literature identifies instrumental (e.g., salary, benefits, job security) and symbolic attributes (e.g., prestige, innovation, ethics) as significant factors influencing this perception (Lievens & Highhouse, 2003). Additional aspects such as development opportunities, work-life balance, and organizational culture have also emerged as critical determinants, especially among younger job seekers (Dabirian et al., 2019; Wilden et al., 2010). Furthermore, employer branding literature emphasizes that attractiveness is not static but shaped by contextual variables like labor market conditions, industry reputation, and generational preferences (Theurer et al., 2018). As the workforce becomes increasingly diverse, identifying the factors influencing employer attractiveness becomes essential for strategic talent acquisition and retention.

RO2: To segment the respondents into clusters based on factors of employer attractiveness that emerged.

Segmenting job seekers based on their preferences allows organizations to develop tailored employer branding strategies that resonate with different audience groups (Lievens & Slaughter, 2016). Cluster analysis frequently identifies homogeneous subgroups within a heterogeneous sample, revealing distinct profiles (Collins & Stevens, 2002; Sivertzen et al., 2013). Prior studies have uncovered segments such as "security seekers," "development-oriented," or "value-driven" groups, each prioritizing different organizational attributes (Schlager et al., 2011). This reflects broader career orientations and expectations, often shaped by life stage, personality, and socio-economic context. However, existing literature has predominantly focused on single-dimensional segmentation (e.g., only based on values or benefits), underlining the need for multidimensional and demographically grounded approaches to better understand the complexity of talent expectations.

RO3: To find the association between the socio-demographic variables and the segmentation of respondents possessing different characteristics of employer attractiveness.

Socio-demographic variables such as gender, age, educational background, and family income have significantly influenced job preference and perceptions of employer attractiveness (Jiang & Iles, 2011; Uggerslev et al., 2012). For example, women often prioritize work-life balance and job security, while men may emphasize advancement opportunities and compensation (Cable & Judge, 1994). Additionally, students from different academic disciplines may demonstrate divergent value orientations; for example, engineering students may prioritize innovation and technical advancement, while management students may seek leadership and growth opportunities (Lievens, 2007). These demographic differentials affect how individuals are grouped in segmentation models and must be accounted for in cluster-based employer branding research. Despite this, limited studies have systematically examined the interplay between socio-demographic variables and respondent clustering, suggesting a crucial gap in understanding nuanced candidate preferences.

RO 4: To determine how socio-demographic variables, personality traits, and essential aspects of employer attractiveness affected the chance of belonging to each identified respondent group.

Personality traits, particularly those based on the Big Five model (openness, conscientiousness, extraversion, agreeableness, neuroticism), have shown strong predictive power in shaping individuals' preferences for different work environments and employer attributes (Uggerslev et al., 2012). For example, individuals high in openness may prefer innovative and dynamic organizations, while those high in conscientiousness may prioritize structured environments and clear career paths (Judge & Cable, 1997). Coupled with socio-demographic characteristics, these traits contribute to a complex interplay influencing cluster membership in employer attractiveness studies (Dabirian et al., 2019; Lievens, 2007). This multidimensional approach could enhance employer branding strategies' predictive accuracy and relevance.

3. Research methodology

3.1. Data collection

The target population for this study consists of undergraduate and postgraduate students from management and engineering. These two disciplines were chosen due to their high employability, industry relevance, and distinct career expecta-

tions, making them ideal subjects for examining employer attractiveness. Prior research (e.g., Berthon et al., 2005; Dabirian et al., 2019) has frequently used student populations in similar studies, as they represent potential employees actively making career decisions. Students from other fields (e.g., humanities, arts) were not included to maintain disciplinary control while ensuring diversity in perspectives. The exclusion of these groups was intentional, as their career structures and employer expectations may differ significantly, potentially introducing additional complexity to the clustering process. However, this is acknowledged as a limitation for future research.

The data collection was conducted between September 2023 and December 2023 using a non-probability convenience sampling method. A structured questionnaire was designed and administered via Google Forms for easy distribution and response tracking. The survey was distributed to students enrolled in engineering and management programs at a university with an off-campus location in Indore City, India. Additionally, faculty members facilitated the distribution by sharing the survey within their student networks. Indore City was selected due to its status as a prominent education hub in India, housing students from diverse socio-demographic backgrounds. This choice enhances the generalizability of findings by ensuring that the sample reflects a varied and representative population of young professionals and job seekers. Participation in the study was voluntary, and strict anonymity and confidentiality measures were maintained throughout the research process.

A total of 214 responses were collected, of which 176 valid responses were retained after data cleaning, yielding a response rate of 82%. The study comprises 176 respondents, of whom 59% are undergraduate and 41% postgraduate. The proportion of engineering students is 37.3%, and the management stream is 64.7%. While the study was based on a relatively small sample size of 176 respondents obtained through convenience sampling, potentially limiting the generalizability of the findings, it is important to note the strength of the data's internal consistency. The Employer Attractiveness Scale yielded a Cronbach's alpha value of 0.905, indicating excellent reliability. This suggests that the data is robust despite the limited sample size, and the findings are meaningful within similar demographic and contextual settings.

3.2. Instrument development

The questionnaire comprised three sections accessible via an online link, with an estimated 5-10 minute completion time. The first section collected socio-demographic information, including age, gender, student category (undergradu-

ate or postgraduate), parents' highest qualification, monthly family income, and academic performance. The second section focused on measuring respondents' perceptions of employer attractiveness using a modified version of the EmpAt Scale developed by Berthon et al. (2005). Respondents rated the importance of various job aspects on a seven-point Likert scale. This section's key question was: "How important are the following factors to you when considering a potential employer?" The third section assessed personality traits using the Big Five model Ten-item personality inventory – TIPI (Gosling et al., 2003), which has been widely used in previous research to predict work-related attitudes and behaviors. This model categorizes personality into five essential traits: conscientiousness, extraversion, agreeableness, emotional stability, and openness to experience. Appendix 1 details the variables and items used for the study.

4. Results

4.1. Demographics

The demographic profile of the respondents is presented in Table A.1. Respondents' ages ranged from 16 to 29 years. The gender distribution was nearly equal, with 53% male and 47% female students, comprising 59% undergraduate and 41% postgraduate students. Notably, postgraduate enrolment tends to be lower than undergraduate (Ali, 2019).

4.2. Perception of employer attractiveness

The perception of employer attractiveness was assessed by constructing a factor structure using exploratory factor analysis. The significance of the correlation matrix was confirmed through the Bartlett test of sphericity ($\chi^2 = 1580.423$; $df = 276$; $p < .001$), indicating the suitability of the data for factor analysis. The sampling adequacy (MSA) measure was determined to be 0.876, indicating sufficient interdependency among the variables and a suitable sample size for factor analysis. Following Yong and Pearce (2013), factors were interpreted based on rotated factor loadings, Eigenvalues, and the Scree test. Table A.2 summarizes the results of multiple criteria used to extract the number of factors. Six factors were extracted: 1. AV, 2. IV, 3. SV, 4. EV, 5. DV, and 6. OV. Factor one, AV, comprised six items and accounted for 31.36% of the variance. The factor assessed the extent to which an employee feels compelled to join an employer based on factors such as producing innovative products and services, customer orientation, and societal contributions.

The second factor, IV, explained 7.92% of the variance and consisted of five items. Notably, item IV1 received the highest loading, followed by items IV2 and IV3. Next, the third component, SV, explained 6.39% of the variance and encompassed three items. Good relationships with colleagues and superiors significantly contributed to this dimension. EV, the fourth component, explained 5.97% of the variance and included four items related to salary, compensation package, promotion opportunities, and job security.

The fifth component, DV, described 4.88% of the variance and included items related to personal growth and recognition within the organization. Finally, OV, the sixth component, accounted for 4.46% of the variance and comprised items related to future career prospects and gaining career-enhancing experience. These findings provide insights into the multifaceted nature of perceived employer attractiveness and highlight the factors that influence individuals' perceptions when considering potential employers.

4.3. Cluster analysis approach: Clustering respondents based on the employer attractiveness dimensions

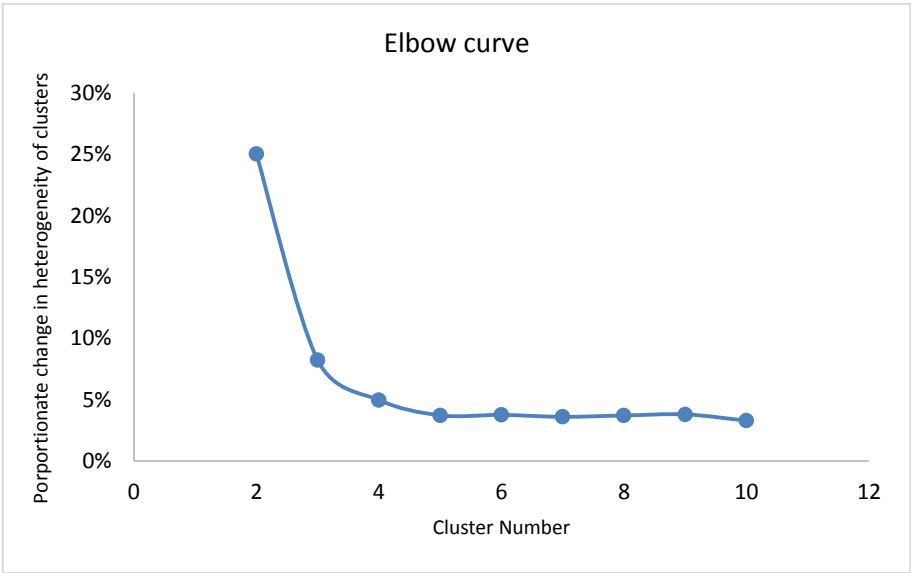
In order to achieve the objective of segmenting respondents based on employer attractiveness dimensions, factor scores obtained from the exploratory factor analysis were treated as clustering variables. The factor scores, already extracted by the exploratory factor analysis, inherently addressed the issue of multicollinearity, as the factors were orthogonal to each other, thus minimizing the likelihood of collinearity among factors significantly (Hair et al., 2019). A two-stage cluster analysis was employed to classify the respondents, which differs from estimation techniques used in other multivariate analyses, as it directly utilizes the specified variables for the analysis (Hair et al., 2019).

Before conducting the cluster analysis, efforts were made to identify multivariate outliers, as cluster analysis is sensitive to extraneous variables and outliers. A graphical approach, a profile diagram, was utilized to detect outliers visually. Upon examination, a low response on the OV factor score was identified as a potential outlier, corresponding to respondent ID 83. Further confirmation of this outlier was obtained through empirical analysis and an agglomeration schedule, as it remained unmerged until stage 161 of the agglomeration schedule. Consequently, the outlier was excluded from the analysis, resulting in a reduced sample size of 175.

The stress value was evaluated to determine the optimal cluster solution, with the highest stress, ignoring two clusters, observed at 8.24%, corresponding

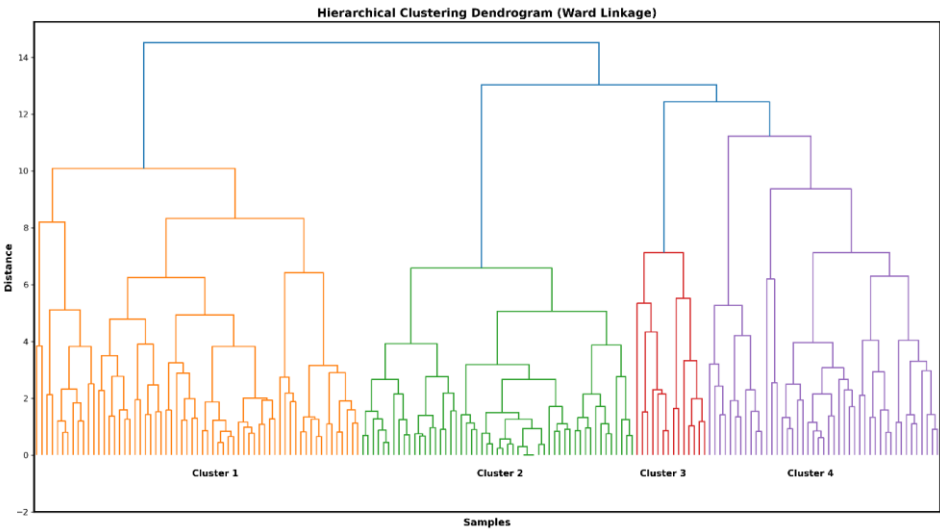
to Cluster 4 (Figure 1). Additionally, the hierarchical structure of respondent IDs was visualized through a dendrogram (Figure 2), which indicated a clear stopping point at the four-cluster solution.

Figure 1. The plot of proportionate change in heterogeneity of clusters



Source: Authors' own elaboration.

Figure 2. Dendrogram



Source: Authors' own elaboration.

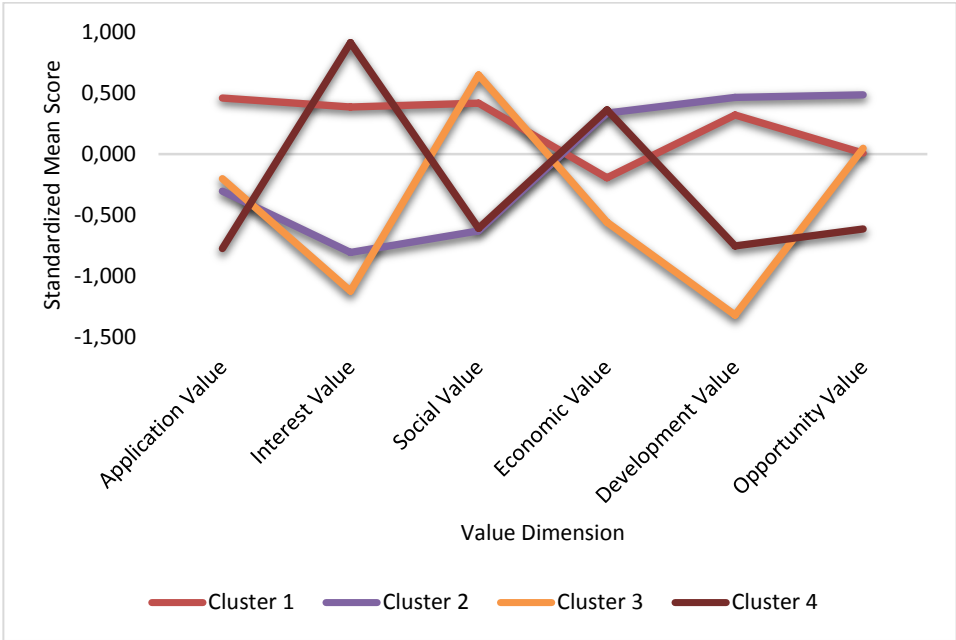
The individuality and significance of the cluster association were assessed using one-way ANOVA to elucidate the differences between clusters, aligning with the research question and illustrating the distinct traits of each cluster. The initial assessment yielded satisfactory results, as each cluster comprised more than ten percent of observations, indicating robust representation across all clusters and warranting further exploration through non-hierarchical clustering methods. In the subsequent non-hierarchical analysis, the final implications of the four clusters were delineated, considering the potential adjustments in cluster size and rearrangement of cases. A refined depiction of the cluster solution, post-k-means clustering, is presented in Table A.3, showcasing the profile of each cluster. The validity of the cluster solution was confirmed through ANOVA (Bohorquez et al., 2019) and Kruskal–Wallis’ test (Muresan et al., 2021), with all factors yielding significant statistics ($p < 0.01$). Further insight into the differences between the four clusters was gained through mean-centered values.

The cluster analysis segmented respondents into four clusters based on perceived employer attractiveness, utilizing six factors derived from principal component analysis. These clusters were labeled as follows: Cluster 1 – *practitioners*, Cluster 2 – *learners*, Cluster 3 – *relationists*, and Cluster 4 – *fun lovers*. The final cluster means and multivariate statistics demonstrated significant differences among all six clusters ($p < 0.001$). Additionally, the Kruskal–Wallis test highlighted high homogeneity within segments based on the considered factors ($p < 0.001$) (Figure 3). Predictive validity was assessed by profiling the four clusters against additional variables not included as clustering variables, as presented in Table 1. These variables encompassed socio-demographic characteristics such as gender, age, monthly family income, education level, marks scored, and parents’ highest qualification, akin to the approach taken by Muresan et al. (2021). Crosstabulation and chi-square statistics facilitated the identification of the socio-demographic profile of each respondent’s cluster based on these variables. Notably, all variables exhibited a significant association with cluster membership, except for the parents’ highest qualification and marks scored to date by the respondents.

Cluster 1, *practitioners*, represented the most significant proportion of the sample at 47%. Members of this cluster exhibited moderate values across the Application, Interest, Social, Development, and Opportunity dimensions. Predominantly male (56%), aged between 16 and 21 (55%), and pursuing undergraduate courses, this cluster was characterized by individuals from families earning above 2,00,000 (46%). Cluster 2, *learners*, constituted the second largest group, comprising 26% of the sample. Members of this cluster displayed lower values on the Application and Social dimensions, contrasted with higher values

on the economic, Development, and Opportunity dimensions compared to other clusters. Equally represented by both genders, predominantly in the 16 to 21 age bracket (58%) and studying across undergraduate and postgraduate programs, this cluster showcased a higher proportion (58%) in the monthly salary group of 75,000 to 2,00,000. Cluster 3, *relationists*, represented a smaller fraction, accounting for only 11% of the sample. Dominated by males (79%) in the 16 to 21 age bracket (84%) and pursuing undergraduate programs, this cluster exhibited a higher mean on SV but lower on IV, EV, and DV. Notably, many individuals in this cluster hailed from families earning less than 75,000 monthly. Cluster 4, *fun lovers*, constituted 17% of the sample, predominantly comprising females (66%) aged between 16 and 21 (76%) pursuing undergraduate programs. This cluster exhibited a mix of family incomes and showcased the highest proportion of individuals scoring above 80%, primarily females, and a lower proportion of males aged above 22 years.

Figure 3. Cluster profile with centered mean



Source: Authors' own elaboration.

Table 1. Cluster socio-demographic profile

Characteristics	Cluster 1 (n = 82, 47%)	Cluster 2 (n = 45, 26%)	Cluster 3 (n = 19, 11%)	Cluster 4 (n = 29, 17%)	Chi-Square DF	p-value
Gender						
Female	36 (44%)	23 (51%)	4 (21%)	19 (66%)	9.75 (df = 3)	0.02*
Male	46 (56%)	22 (49%)	15 (79%)	10 (34%)		
Age						
Between 16 and 21 years old	45 (55%)	26 (58%)	16 (84%)	22 (76%)	8.47 (df = 3)	0.04*
Above 22 years old	37 (45%)	19 (42%)	3 (16%)	7 (24%)		
Category						
Student UG	45 (55%)	23 (51%)	16 (84%)	20 (69%)	7.96 (df = 3)	0.04*
Student PG	37 (45%)	22 (49%)	3 (16%)	9 (31%)		
Parents' highest qualification						
Both non-graduate	4 (5%)	2 (4%)	3 (16%)	4 (10%)	4.52 (df = 6)	0.61
At least one is a graduate	36 (44%)	19 (42%)	8 (42%)	14 (48%)		
At least one is PG	42 (51%)	24 (53%)	8 (42%)	12 (41%)		
Monthly family income (Rs.)						
Less than Rs. 75,000	17 (21%)	2 (4%)	6 (32%)	4 (14%)	13.63 (df = 6)	0.03*
Between Rs. 75,000 and 2,00,000	27 (33%)	26 (58%)	5 (26%)	13 (45%)		
Above Rs. 2,00,000	38 (46%)	17 (38%)	8 (42%)	12 (41%)		
Marks scored to date (SSC, HSSC, Graduation, PG combined average % marks)						
Less than 60%	1 (1%)	0 (0%)	2 (11%)	0 (0%)	10.925 (df = 9)	0.28
Between 60% and 70%	6 (7%)	2 (4%)	1 (5%)	2 (7%)		
Between 70% and 80%	37 (45%)	21 (47%)	7 (37%)	12 (41%)		
Above 80%	38 (46%)	22 (49%)	9 (47%)	15 (52%)		

Note: P value less then .05.

Source: Authors' own elaboration.

Next, binary logistic regression was conducted to assess the validity of cluster analysis and gauge the influence of socio-demographic variables and dimensions of employer attractiveness on the likelihood of belonging to each of the four identified clusters of respondents. Additionally, personality traits such as extraversion, agreeableness, conscientiousness, emotional stability, and openness to new experiences were included as independent variables to determine their impact on cluster membership. The dependent variable was binary, taking a value of one if the respondent belonged to a particular cluster and zero otherwise. The model containing predictors significantly improved fit over the intercept-only model, as evidenced by a significant likelihood ratio χ^2 test (De Noble et al., 2007; Pituch & Stevens, 2016; De La Viña & Ford, 2001). The inclusion of predictors significantly improved fit, indicated by the likelihood ratio chi-square test, with $LR \chi^2(4) = 179.661$, $p = .000$ for Cluster 1 (Table 2). Similarly,

for Clusters 2, 3, and 4, LR $\chi^2(7) = 171.061$, LR $\chi^2(7) = 120.231$, and LR $\chi^2(6) = 157.159$, respectively, with $p = 0.000$, the whole model demonstrated a significant enhancement in fit compared to the null model.

In logistic regression, the coefficient of determination R^2 is akin to R^2 in linear regression, which evaluates the contribution of regressors to the variability of the target variable. For Cluster 1, *practitioners*, EV and OV dimensions of employer attractiveness and overall employer attractiveness and agreeableness explained 84.7% of the variance. For Cluster 2, *learners*, conscientiousness, AV, IV, SV, EV, DV, and OV explained 91.7% of the variance. Cluster 3, *relationists*, exhibited 99.9% explained variance, primarily driven by conscientiousness, IV, SV, EV, DV, and dummy_income_75th_2_Lacs. For Cluster 4, *fun lovers*, the explained variance was again 99.9%, with overall employer attractiveness score, emotional stability, IV, EV, and OV as predictors.

Tests of significance (χ^2) for the overall model fit, assessed using Hosmer and Lemeshow, yielded non-significant results (Tabachnick & Fidell, 2013), suggesting good model fit for all clusters. Referring to Table 2, an increase in the overall employer attractiveness essential score by one was associated with a 76% increase in the chances of belonging to Cluster 1 (odds ratio = 1.762, $p < 0.01$). Similarly, a one-unit increase in the essential agreeableness score was linked to a 35% increase in the likelihood of belonging to Cluster 1 (odds ratio = 1.349, $p < 0.10$). Conversely, increases in EV and OV dimensions were associated with a decreased likelihood of being classified in Cluster 1 by 99% and 85%, respectively (odds ratio = 0.008 and 0.152, $p < 0.05$).

Table 2. Binary logistic regression results

Variables	Coefficient Estimate	S.E.	Wald	df	Sig.	Odds Ratio	The ratio of probability changes
1	2	3	4	5	6	7	8
Cluster 1							
Overall Employer attractiveness score	0.57	0.11	25.40	1.00	0.000***	1.76	0.76
Agreeableness	0.30	0.17	3.18	1.00	0.075*	1.35	0.35
Economic Value	-4.81	0.97	24.66	1.00	0.000***	0.01	-0.99
Opportunity Value	-1.88	0.49	14.93	1.00	0.000***	0.15	-0.85
Diagnosis							
LR (Chi-square)	179.66			4.00	0***		
Hosmer–Lemeshow Test	1.46			8.00	0.99		
Model Summary							
Cox & Snell R^2	0.64						
Nagelkerke R^2	0.86						

Table 2 cont.

1	2	3	4	5	6	7	8
Cluster 2							
Conscientiousness	-0.63	0.36	3.03	1.00	0.082*	0.53	-47%
Application Value	-1.91	0.71	7.30	1.00	0.007***	0.15	-85%
Interest Value	-5.86	1.67	12.32	1.00	0.000***	0.00	-100%
Social Value	-4.00	1.30	9.50	1.00	0.002***	0.02	-98%
Economic Value	3.71	1.20	9.52	1.00	0.002***	40.75	3975%
Development Value	5.15	1.46	12.46	1.00	0.000***	173.10	17210%
Opportunity Value	5.36	1.64	10.65	1.00	0.001***	213.57	21257%
Diagnosis							
LR (Chi-square)	171.06			7.00	0***		
Hosmer–Lemeshow Test	0.72			8.00	1.00		
Model Summary							
Cox & Snell R ²	0.62						
Nagelkerke R ²	0.92						
Cluster 3							
Conscientiousness	0.79	0.44	3.17	1.00	0.075*	2.20	1.20
Interest Value	-5.83	2.08	7.83	1.00	0.005***	0.00	-1.00
Social Value	2.73	1.45	3.58	1.00	0.059*	15.37	14.37
Economic Value	-3.74	1.44	6.78	1.00	0.009***	0.02	-0.98
Development Value	-6.15	2.17	8.07	1.00	0.005***	0.00	-1.00
dummy_income_75th_2_Lacs(1)	3.86	2.08	3.46	1.00	0.063*	47.64	46.64
Diagnosis							
LR (Chi-square)	120.23			7.00	0.00		
Hosmer–Lemeshow Test	0.24			8.00	1.00		
Model Summary							
Cox & Snell R ²	0.50						
Nagelkerke R ²	1.00						
Cluster 4							
Overall Employer attractiveness score	-1.14	0.55	4.35	1.00	0.037**	0.32	-0.68
Emotional Stability	-1.54	0.86	3.25	1.00	0.071*	0.21	-0.79
Interest Value	15.70	6.97	5.07	1.00	0.024**	6554464.17 40237.51	6554463.17
Economic Value	10.60	4.86	4.76	1.00	0.029**	6554464.17 40237.51	40236.51
Opportunity Value	-7.87	3.98	3.90	1.00	0.048**	0.00	-1.00
Diagnosis							
LR (Chi-square)	157.16			6.00	0***		
Hosmer–Lemeshow Test	0.91			8.00	0.99		
Model Summary							
Cox & Snell R ²	0.59						
Nagelkerke R ²	1.00						

Note: * significant at 10%, ** significant at 5%, *** significant at 1% significance level.

Source: Authors' own elaboration.

In the context of Cluster 2, individuals who exhibited conscientiousness as a personality trait, along with those who emphasized the importance of AV, IV, and SV dimensions of employer attractiveness, were less likely to belong to this group (odds ratio = 0.533, $p < 0.10$; odds ratio = 0.148, 0.003, and 0.018, $p < 0.01$, respectively). Conversely, respondents prioritizing economic development and OV values were more likely to be classified in this cluster (odds ratio = 40.746, 173.101, and 213.568, $p < 0.01$).

For Cluster 3, individuals demonstrating conscientiousness as a personality trait were likelier to belong and were more likely to belong to this group (odds ratio = 2.203, $p < 0.10$). Those who considered SV a vital factor also exhibited a higher probability of belonging to this cluster (odds ratio = 15.374, $p < 0.10$). Additionally, respondents with family incomes between 75,000 and 200,000 had a greater chance of belonging to this cluster than those below 75,000 (odds ratio = 47.643, $p < 0.10$). Conversely, individuals prioritizing EV and DV were less likely to belong to Cluster 3 (odds ratio = 0.003, 0.024, 0.002, $p < 0.01$).

In the scenario of Cluster 4, individuals who considered overall employer attractiveness, emotional stability, and OV as important factors had reduced chances of being classified in this group (odds ratio = 0.193, $p < 0.05$; 0.213, $p < 0.10$; 0.000, $p < 0.05$). Conversely, higher scores in IV and EV significantly increased the likelihood of being classified in this cluster (odds ratio = 6554464.172, 40237.511, $p < 0.05$), highlighting the significance of these factors for this group. It is worth noting that apart from monthly income, none of the other socio-demographic attributes, gender, age, student category, parents' educational qualification, and marks scored, showed statistical significance in influencing the classification of respondents into different clusters.

The confusion matrices for the fitted logistic regression models of Cluster 1, Cluster 2, Cluster 3, and Cluster 4 are represented in Table A.4. The model performs exceptionally well across all clusters in predicting the majority class (0.00), with accuracy above 93% for all clusters. The accuracy for predicting the minority class (1.00) is slightly lower (89.5%-95.6%), reflecting a common challenge in imbalanced datasets. The overall accuracy ranges from 92.6% to 98.3%, indicating strong model performance across clusters.

The Nagelkerke R^2 values of 1.00 for Clusters 3 and 4 indicate excellent model performance regarding explained variance. However, this is to acknowledge that these results could reflect a potential sensitivity to data-specific patterns. The Cox & Snell R^2 values for Clusters 3 and 4 are 0.50 and 0.59, respectively. These moderate values provide a more tempered view of the variance explained, suggesting that the perfect Nagelkerke R^2 may overstate the model's predictive ability. The Hosmer–Lemeshow test p -values of 1.00 for both clusters support

the hypothesis that the model fits the data well, with no significant differences between observed and predicted values. The Odds Ratios for some predictors, such as IV and EV in Cluster 4, are exceptionally high (6,554,464.17). While these coefficients underline the importance of these predictors, they may also indicate multicollinearity or sensitivity to extreme values. Conversely, predictors like OV have an Odds Ratio of 0.00, suggesting limited influence. This diversity in variable impact underscores the need for further robustness checks.

The overfitting and class imbalance concerns in Clusters 3 and 4 were addressed by modeling logistic regression in Python. The process involved standard scaling the numeric variables and then combining the numeric and dummy variables (for categorical data). After this, an 80-20 train-test split was performed. The logistic regression model for Cluster 3 resulted in an accuracy of 0.914 (Tables A.4 and A.5), with acceptable precision, recall, and F1-score values for class 0. However, recall and F1-score for class 1 were lower. The confusion matrix for Cluster 3 showed that class 0 was correctly classified for the training and test data, while there was some misclassification for class 1. Similarly, the logistic regression results for Cluster 4 are shown in Table A.6. The confusion matrix for Cluster 4 indicates that class 0 was classified correctly for nearly all instances in the training and test data, with some misclassification occurring for class 1.

Referring to Table A.7, Clusters 3 and 4 exhibited class imbalances, which were addressed through SMOTE. After applying SMOTE, the results showed significant improvements in the ROC curve, AUC, and accuracy measures for logistic regression in Clusters 3 (Figure A.1) and 4 (Figure A.2). These improvements were further validated using cross-validation. Cross-validation provides a robust estimate of the model's performance on unseen data by splitting the dataset into multiple train-test folds (Table A.8). Even with SMOTE addressing the class imbalance, cross-validation ensures the model generalization, especially when handling imbalanced classes. While SMOTE might introduce synthetic patterns into the training data, cross-validation helps verify that the model does not overfit these synthetic samples. It was ensured that SMOTE was applied only to the training folds in each cross-validation iteration. In contrast, the test fold remained untouched, preserving the original class imbalance for unbiased evaluation.

These scores reflect the model's ability to distinguish between the positive and negative classes, with higher AUC scores indicating better performance (1.0 being perfect). The mean AUC score was 0.9723, which is excellent and suggests that the model is highly effective at distinguishing between classes across all folds. The consistently high scores across folds (ranging from 0.9355 to 1.0)

demonstrate that the model performs robustly on different subsets of the data. The AUC score, which exceeded 0.9 and is generally considered outstanding, confirms that the logistic regression model for Cluster 3, trained with SMOTE, is highly effective in predicting the target variable, as shown in Tables A.9 and A.10. The high AUC scores validate that SMOTE successfully addressed the class imbalance, allowing the model to perform well across minority and majority classes.

Additionally, the consistency of these scores indicates that the model generalizes to unseen data, suggesting it is not overfitting. While the results for Clusters 3 and 4 are indeed optimistic, the diagnostics, cross-validation, and hold-out testing suggest that the model is not overfitting. The high variance reflects the model's ability to capture meaningful relationships within these clusters.

5. Discussion

The present study identifies four clusters of potential employees based on their perceptions of employer attractiveness. The segmentation provides valuable theoretical and practical insights into employer branding and workforce attraction strategies.

Cluster 1, *practitioners* (47%). The most significant cluster in the study includes those who mainly emphasize DV and OV, suggesting their preference for career advancement, skill enhancement, and structured learning opportunities. The findings align with the Person-Organization Fit Theory by Kristof (1996). The theory suggests that individuals seek employment with organizations that match their career objectives and developmental needs. Similar results were reported by Moser et al. (2017), who reported in their results that access to professional development programs significantly increases employer attractiveness.

Additionally, a study by Berthon et al. (2005) stressed that employees with a strong focus on career progression are more inclined to decide on organizations that invest in continuous learning and leadership training. The segmentation of respondents also supports the research by Tanwar and Prasad (2017). This study shows that structured career development frameworks positively affect employer brand perception. The study by Vogel and Satzger (2024) highlighted that private-sector firms attract talent by emphasizing employee mobility and growth opportunities. Such organizations should focus on leadership training, mentorship programs, and clear career advancement pathways. Employer branding should highlight structured career progression models, continuous learning initiatives, and internal mobility programs.

Cluster 2, *learners* (26%). This segment values EV and DV, exhibiting opportunities for financial compensation and career-building. Their employment decisions are associated with the SET (Blau, 1964). The SET theory suggests that people evaluate job offers based on perceived benefits versus costs. This is also in line with the study by Tanwar and Prasad (2017), who found that economic incentives, such as salary, bonuses, and financial support for professional certification, significantly influence employer attractiveness. Likewise, a study by Dabirian et al. (2019) uncovered that companies that offer desirable compensation packages experience higher recruitment success rates. Vogel and Satzger (2024) further supported that monetary emoluments remain a substantial contributing factor to employer attractiveness, predominantly in the private sector, where competitive pay and performance-based rewards enhance attractiveness. Given these insights, companies aiming to appeal to this segment of employees should emphasize competitive salary structures, performance-based incentives, and reimbursement programs for professional development. Recruitment campaigns should feature financial rewards alongside long-term career opportunities.

Cluster 3, *relationists* (11%). Relationist employees rank SV and emphasize the importance of workplace relations, a collaborative culture, and supportive environments. The Signaling Theory (Spence, 1973) supports such employees, suggesting that job seekers have confidence in organizations that align their culture and social cohesion. Dassler et al. (2022) conducted a systematic review and highlighted that positive workplace relations and social linking substantially shape perceptions of employer attractiveness from the employee's point of view. Their findings underscore organizations' need to cultivate inclusive, team-oriented environments to enhance their appeal as employers. Similarly, Inalhan, and Finch's (2004) research suggests that job seekers strongly value a sense of belonging and teamwork when evaluating potential employers.

Additionally, employer branding research highlights that organizations that foster workplace inclusivity and strong team dynamics experience higher employee engagement and retention (Confetto et al., 2023). To attract *relationists*, organizations should emphasize their team-building initiatives, mentorship structures, and diversity and inclusion programs. Employer branding strategies should showcase employee testimonials, social events, and initiatives promoting a strong sense of community.

Cluster 4, *fun lovers* (17%). This segment values both interest and EV, suggesting they prefer engaging in work environments alongside financial security. Their preferences align with the Self-Determination Theory (Deci & Ryan, 1985), which states that individuals are intrinsically motivated by workplace enjoyment, autonomy, and engagement. Research by Mikołajczyk (2022) high-

lights that job satisfaction, engaging projects, and workplace culture significantly influence job seekers in this category. Similarly, studies indicate that employees drawn to creative work settings exhibit higher levels of organizational commitment (Hou et al., 2011). Research reinforces the importance of intrinsic rewards, showing that employees who value engaging work environments demonstrate higher productivity and long-term loyalty (Manzoor et al., 2021). Organizations should focus on emphasizing workplace culture, innovation, and job enrichment. Employer branding campaigns should highlight creative projects, flexible work arrangements, and social workplace events that attract these candidates.

Further, this study aimed to uncover the determinants of employer attractiveness while also exploring the socio-economic profiles of the respondents through cluster analysis. Employing the modified EmpAt scale (Berthon et al., 2005), we assessed potential employees' perceptions of employer attractiveness, complemented by using the Big Five to assess their personality traits. Through exploratory factor analysis, six key factors emerged: AV, IV, SV, EV, DV, and OV. One particularly noteworthy finding is the significance of DV. Organizations that emphasize employee growth and development through clear communication of training programs, career paths, and mentorship opportunities are poised to foster employee development effectively. This aligns with findings from Mikołajczyk (2022), advocating tailored developmental offerings amidst evolving post-pandemic dynamics to meet employee needs effectively.

EV emerged as another crucial dimension, highlighting the importance of competitive compensation packages in attracting candidates who prioritize economic factors. Shtembari et al. (2022) highlight the pivotal role of compensation and benefits packages in effective employment decisions, engagement, and retention strategies, cautioning against potential costs incurred by organizations seeking to offer competitive packages. Further, considering personality traits in team formation can enhance team dynamics and organizational collaboration. Research by Kozlowski and Ilgen (2006) highlights the global imperative for organizations to cultivate teams characterized by promptness, adaptability, and resilience. Aranzabal et al. (2022) discuss forming balanced teams based on Belbin's roles to promote positive interdependence and individual responsibility, ultimately bolstering teamwork and performance.

Continuous feedback from candidates undergoing the recruitment process can inform the ongoing refinement of organizational strategies. Retention planning for attracted talent may involve implementing long-term strategies aligned with the preferences of different clusters, such as mentorship programs and career progression plans. Cluster analysis revealed four distinct segments of respondents based on the six identified factors for employer attractiveness: *practi-*

tioners, learners, relationists, and fun lovers. Notably, agreeableness emerged as a significant personality trait for Cluster 1 (*practitioners*), while conscientiousness was deemed essential for Clusters 2 (*learners*) and 3 (*relationists*). Furthermore, employees demonstrating emotional stability were less likely to belong to Cluster 4 (*fun lovers*).

6. Conclusions

This study examined the multidimensional nature of employer attractiveness through the lens of socio-demographic variables and personality traits among potential employees. Using cluster analysis, the research identified distinct groups with differing preferences for various dimensions of employer attractiveness, offering new insights into how organizations can tailor employer branding strategies. The findings have several practical implications for HR professionals and employer branding consultants. The findings of this study offer valuable implications for human resource professionals, employer branding strategists, and talent acquisition managers, particularly in designing more personalized and effective recruitment strategies.

First, identifying distinct clusters highlights the need for organizations to move beyond generic branding messages. Instead, employers should tailor their value propositions to appeal to the unique motivations of different applicant segments. For instance, candidates in the development-oriented cluster may respond well to messaging around career growth, learning opportunities, and leadership development. At the same time, the Economically Motivated group may prioritize competitive salaries and financial incentives.

Second, the study reveals that personality traits such as agreeableness, extraversion, and conscientiousness influence how individuals perceive employer attractiveness. Organizations can leverage psychometric assessments or digital footprint analysis during early recruitment stages to customize communication and highlight aspects of the employer brand that are most likely to resonate with individual candidates.

Third, the organizations must create inclusive and targeted talent Attraction. Socio-demographic characteristics such as gender, education level, and prior work experience influence preferences for specific employer attributes. Acknowledging these variations allows firms to build more inclusive and appealing recruitment campaigns that speak directly to the values and needs of diverse candidate pools, including women professionals, early-career talent, and those from varied academic backgrounds.

Fourth, managers must look to enhance the employer-employee fit. Aligning employer brand messages with candidates' personality traits and values increases the likelihood of achieving better person-organizational outcomes. This, in turn, improves job satisfaction, reduces turnover, and strengthens the organization. This strategic alignment benefits both employers and employees in the long term. Lastly, HR leaders can use the clustering framework proposed in this study as a blueprint for developing Employee Value Propositions (EVPs) that are grounded in evidence and tailored to workforce expectations. This approach promotes a more strategic, data-driven workforce planning and talent engagement method.

While this study offers significant theoretical and practical insights, several limitations should be acknowledged, which open avenues for future research.

First, the study sample is limited to a specific population of potential employees within the management and engineering. Future research could replicate this study across domains like humanities, social sciences, etc., to enhance external validity and capture cultural nuances in employer attractiveness perceptions.

Second, the research employs a cross-sectional design, capturing preferences and traits at a single point in time. This approach does not account for how employer preferences or personality traits might evolve with changes in life stage, career progression, or labor market dynamics. Longitudinal studies could provide a deeper understanding of how perceptions of employer attractiveness change over time.

Third, the study relies on self-reported data, which may be subject to social desirability bias or inaccurate self-assessment, particularly concerning personality traits. Future research may incorporate multi-source data, such as behavioral assessments or recruiter evaluations, to validate and triangulate findings.

Fourth, while the study focuses on individual-level factors influencing employer attractiveness, it does not account for organizational-level characteristics such as industry reputation, HR practices, or leadership styles. Incorporating these variables in future studies could offer a more holistic view of the employer-employee attraction process.

Fifth, although the Big Five personality traits provide a robust foundation, future research could explore other psychological constructs, such as values, motivation types, or cognitive styles, to enrich the understanding of how individual differences influence employer preferences.

Lastly, while the cluster analysis revealed meaningful groupings, the stability and reproducibility of these clusters across datasets and periods were not tested. Future research could use latent class analysis or machine learning algorithms for deeper segmentation and cluster validation.

Author contributions

Sameer Pingle – 33,3% (research concept and design; collection and/or assembly of data; data analysis and interpretation; writing the article).

Shubhangi Jore – 33,3% (research concept and design; collection and/or assembly of data; data analysis and interpretation; writing the article).

Rajwinder Kaur – 33,3% (research concept and design; collection and/or assembly of data; data analysis and interpretation; writing the article).

Disclosure statement

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Declaration

The authors used ChatGPT (<https://chat.openai.com/>) and Grammarly (<https://www.grammarly.com/>) to assist in revising the manuscript's content, improving language, and ensuring grammatical accuracy. Following these tools, the authors carefully reviewed and made necessary edits to the content. The authors undertake full responsibility for the final version of this publication.

Appendices

Appendix 1. Details of the factors and items used

Employer Attractiveness Scale by Berthon et al. (2005)	
Factor 1. Application Value (AV)	
AV1	The organization produces innovative products and services.
AV2	The organization is customer-oriented.
AV3	The organization produces high-quality products and services.
AV4	The humanitarian organization gives back to society.
AV5	Opportunity to apply what was learned at a tertiary institution.
AV6	Opportunity to teach others what you have learned.
AV7	Hands-on inter-departmental experience.
Factor 2. Interest Value (IV)	
IV1	The organization both values and makes use of your creativity.
IV2	A fun working environment.
IV3	Working in an exciting environment.
IV4	Innovative employer, novel work practices/forward-thinking.
IV5	Happy work environment.
Factor 3. Social Value (SV)	
SV1	Having a good relationship with your colleagues.
SV2	Supportive and encouraging colleagues.
SV3	Having a good relationship with your superiors.
Factor 4. Economic Value (EV)	
EV1	An above-average basic salary.
EV2	An attractive overall compensation package.
EV3	Good promotion opportunities within the organization.
EV4	Job security within the organization.
Factor 5. Development Value (DV)	
DV1	Feeling more self-confident as a result of working for a particular organization.
DV3	Feeling good about yourself as a result of working for a particular organization.
DV3	Recognition/appreciation from management.
Factor 6. Opportunity Value (OV)	
OV1	A springboard for future employment.
OV2	Gaining career-enhancing experience.
Ten-item personality inventory -TIPI (Gosling et al., 2003)	
1	____ Extraverted, enthusiastic.
2	____ Critical, quarrelsome.
3	____ Dependable, self-disciplined.
4	____ Anxious, easily upset.
5	____ Open to new experiences, complex.
6	____ Reserved, quiet.
7	____ Sympathetic, warm.
8	____ Disorganized, careless.
9	____ Calm, emotionally stable.
10	____ Conventional, uncreative.

Appendix 2

Table A.1. Socio-demographic characteristics of respondents

Demographic factor	Count	%
Gender		
Male	93	53%
Female	83	47%
Age		
Between 16 and 21 years old	109	62%
Between 22 and 27 years old	63	36%
Above 27 years old	4	2%
Category		
Student UG	104	59%
Student PG	72	41%
Parents' highest qualification		
Both non-graduate	12	7%
One of them graduated	18	10%
Both graduate	60	34%
One of them, PG	47	27%
Both are PG and above	39	22%
Monthly family income (Rs.)		
Less than Rs. 75,000	29	16%
Between Rs. 75,000 and 1,50,000	42	24%
Between Rs. 1,50,000 and 2,00,000	30	17%
Above Rs. 2,00,000	75	43%
Marks scored to date (SSC, HSSC, Graduation, Post-Graduation combined average % marks)		
Less than 60%	3	2%
Between 60% and 69%	11	6%
Between 70% and 80%	78	44%
Above 80%	84	48%

Table A.2. Exploratory factor analysis results

		Cronbach α	Mean	SD	Eigenvalue	% variance explained	Factor loading	Mean	SD
Factor 1. Application Value (AV)									
1	AV1	0.84	5.70	.089	7.53	31.36	0.771	5.8	1.2
2	AV2						0.727	5.7	1.1
3	AV3						0.711	5.6	1.2
4	AV4						0.620	5.7	1.2
5	AV5						0.613	5.7	1.0
6	AV6						0.607	5.5	1.2
7	AV7						0.563	5.8	1.1
Factor 2. Interest Value (IV)									
8	IV1	0.77	6.21	.176	2.24	7.92	0.702	6.2	0.9
9	IV2						0.688	6.1	0.9
10	IV3						0.661	6.1	0.9
11	IV4						0.493	6.0	0.9
12	IV5						0.480	6.5	0.7
Factor 3. Social Value (SV)									
13	SV1	0.77	6.20	.044	1.81	6.39	0.790	6.2	1.0
14	SV2						0.746	6.2	1.0
15	SV3						0.695	6.2	0.8
Factor 4. Economic Value (EV)									
16	EV1	0.77	6.30	.084	1.46	5.97	0.811	6.2	0.9
17	EV2						0.745	6.3	0.9
18	EV3						0.636	6.2	0.8
19	EV4						0.571	6.4	0.8
Factor 5. Development Value (DV)									
20	DV1	0.61	6.17	.045	1.44	4.88	0.748	6.2	0.9
21	DV2						0.741	6.2	0.9
22	DV3						0.459	6.1	0.9
Factor 6. Opportunity Value (OV)									
23	OV1	0.52	6.12	.512	1.12	4.46	0.829	5.8	1.1
24	OV2						0.513	6.5	0.9

Note: KMO = 0.876, Bartlett's Test of Sphericity $\chi^2=1580.423$, df = 276, $p < 0.001$.

Table A.3. Profile of four clusters from non-hierarchical cluster analysis

Factors	Centered mean for				F Statistic	Kruskal–Wallis Test	p-value
	Cluster 1	Cluster 2	Cluster 3	Cluster 4			
AV	0.459	−0.303	−0.203	−0.774	17.333	67.07	0.00
IV	0.385	−0.806	−1.124	0.913	59.877	47.28	0.00
SV	0.416	−0.630	0.648	−0.608	23.320	93.12	0.00
EV	−0.194	0.336	−0.559	0.363	6.534	51.93	0.00
DV	0.321	0.465	−1.319	−0.752	35.942	16.07	0.00
OV	0.007	0.484	0.046	−0.614	9.845	29.17	0.00

Table A.4. Confusion Matrix Results of Logistic Regression separately for Cluster 1, Cluster 2, Cluster 3, and Cluster 4

Classification Table Cluster 1					
Observed			Predicted		percentage correct
			dummy_dep1_logistic		
			0	1	
Step 4	dummy_dep1_logistic	0	87	6	93.5
		1	7	75	91.5
	overall percentage				92.6
a. The cut value is .500					
Classification Table Cluster 2					
Observed			Predicted		percentage correct
			dummy_dep2_logistic		
			0	1	
Step 7	dummy_dep2_logistic	0	126	4	96.9
		1	2	43	95.6
	overall percentage				96.6
a. The cut value is .500					
Classification Table Cluster 3					
Observed			Predicted		percentage correct
			dummy_dep3_logistic		
			0	1	
Step 6	dummy_dep3_logistic	0	155	1	99.4
		1	2	17	89.5
	overall percentage				98.3
a. The cut value is .500					
Classification Table Cluster 4					
Observed			Predicted		percentage correct
			dummy_dep4_logistic		
			0	1	
Step 5	dummy_dep4_logistic	0	145	1	99.3
		1	3	26	89.7
	overall percentage				97.7
a. The cut value is .500					

Table A.5. Cluster 3 Logistic Regression results

Cluster 3				
Accuracy =		0.914		
Classification Report				
Class	Precision	Recall	f1-score	support
(Not a Cluster 3 member) 0	0.91	1	0.95	30
(Cluster 3 member) 1	1	0.4	0.57	5
Cluster 3 Confusion Matrix of Training (80%) data				
Actual / Predicted	Predicted (Not a Cluster 3 member) 0		Predicted (Cluster 3 member) 1	
Actual (Not a Cluster 3 member) 0	127		0	
Actual (Cluster 3 member) 1	3		10	
Cluster 3 Confusion Matrix of Testing (20%) data				
Actual / Predicted	Predicted (Not a Cluster 3 member) 0		Predicted (Cluster 3 member) 1	
Actual (Not a Cluster 3 member) 0	30		0	
Actual (Cluster 3 member) 1	3		2	

Table A.6. Cluster 4 Logistic Regression results

Cluster 4				
Accuracy =		0.914		
Classification Report				
Class	Precision	Recall	fi-score	support
(Not a Cluster 4 member) 0	0.93	0.96	0.95	27
(Cluster 4 member) 1	0.86	0.75	0.8	8
Cluster 4 Confusion Matrix of Training (80%) data				
Actual / Predicted	Predicted (Not a Cluster 4 member) 0		Predicted (Cluster 4 member) 1	
Actual (Not a Cluster 4 member) 0	118		1	
Actual (Cluster 4 member) 1	3		18	
Cluster 4 Confusion Matrix of Testing (20%) data				
Actual / Predicted	Predicted (Not a Cluster 4 member) 0		Predicted (Cluster 4 member) 1	
Actual (Not a Cluster 4 member) 0	26		1	
Actual (Cluster 4 member) 1	2		6	

Table A.7. Cluster 3 Confusion Matrix and Accuracy Measures for SMOTE Train (80%) and Test (20%) data

Cluster 3 with SMOTE Train Data (80%)				
Classification Report:				
Class	Precision	Recall	fi-score	support
(Not a Cluster 3 member) 0	0.99	0.99	0.99	127
(Cluster 3 member) 1	0.86	0.89	0.89	13

Cluster 3 Confusion Matrix (Train Data with SMOTE)		
Actual / Predicted	Predicted (Not a Cluster 3 member) 0	Predicted (Cluster 3 member) 1
Actual (Not a Cluster 3 member) 0	125	2
Actual (Cluster 3 member) 1	1	12

Table A.7. cont.

Cluster 3 with SMOTE Test Data (20%)				
Classification Report:				
Class	Precision	Recall	fi-score	support
(Not a Cluster 3 member) 0	0.97	0.97	0.97	30
(Cluster 3 member) 1	0.8	0.8	0.8	5

Cluster 3 Confusion Matrix (Test Data with SMOTE)		
Actual / Predicted	Predicted (Not a Cluster 3 member) 0	Predicted (Cluster 3 member) 1
Actual (Not a Cluster 3 member) 0	29	1
Actual (Cluster 3 member) 1	1	4

Table A.8. Cluster 3 Cross-Validation results for SMOTE data

Fold 1	Fold 2	Fold 3	Fold 4	Fold 5	Mean AUC Score
0.9583	1	0.93548	0.9919	0.9758	0.972296

Table A.9. Cluster 4 Confusion Matrix and Accuracy Measures for SMOTE Train (80%) and Test (20%) data

Cluster 4 with SMOTE Train Data (80%)				
Classification Report:				
Class	Precision	Recall	fi-score	support
(Not a Cluster 4 member) 0	1	0.98	0.99	119
(Cluster 4 member) 1	0.91	1	0.95	21

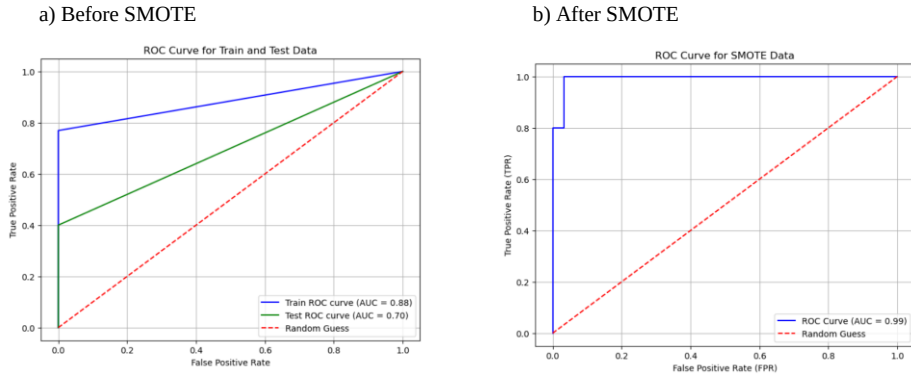
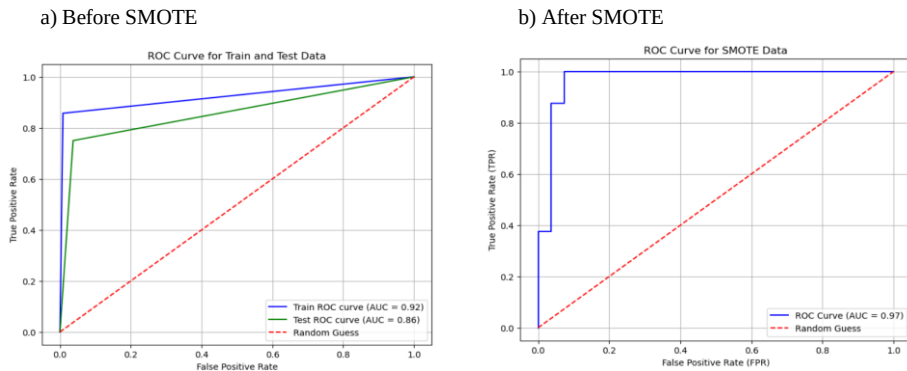
Cluster 4 Confusion Matrix (Train Data with SMOTE)		
Actual / Predicted	Predicted (Not a Cluster 4 member) 0	Predicted (Cluster 4 member) 1
Actual (Not a Cluster 4 member) 0	117	2
Actual (Cluster 4 member) 1	0	21

Cluster 4 with SMOTE Test Data (20%)				
Classification Report:				
Class	Precision	Recall	fi-score	support
(Not a Cluster 4 member) 0	0.96	0.96	0.96	27
(Cluster 4 member) 1	0.88	0.88	0.88	8

Cluster 4 Confusion Matrix (Test Data with SMOTE)		
Actual / Predicted	Predicted (Not a Cluster 4 member) 0	Predicted (Cluster 4 member) 1
Actual (Not a Cluster 4 member) 0	26	1
Actual (Cluster 4 member) 1	1	7

Table A.10. Cluster 4 Cross-Validation results for SMOTE data

Cross-Validation AUC Score					
Fold 1	Fold 2	Fold 3	Fold 4	Fold 5	Mean AUC Score
0.98	0.977	0.97126	0.982759	0.977	0.977604

Figure A.1. ROC Curve for Cluster 3 before SMOTE a) and b) after SMOTE**Figure A.2.** ROC Curve for Cluster 4 before SMOTE a) and b) after SMOTE

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