

# Bridging Technology and Management: The Role of MBA in Career Growth

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**Abstract:** This study explores how MBA education affects the career advancement of technical graduate students. While technical degrees provide the specialized knowledge necessary for specific fields, the acquisition of business and management skills through an MBA may offer graduates a broader understanding of organizational strategy, leadership, and financial acumen. This research explores how the combination of technical expertise and an MBA influences job opportunities, salary progression, leadership roles, and career mobility within various industries. [3] Through a mixed-methods approach, including surveys and interviews with technical graduates who pursued MBAs, this paper highlights key factors such as the value of cross-disciplinary knowledge, network expansion, and adaptability in the corporate landscape. The findings suggest that an MBA significantly enhances career advancement prospects, particularly in leadership and strategic positions, while also providing a competitive edge in dynamic industries that prioritize both technical and business acumen. The deepening interplay between technical knowledge and managerial proficiency has expanded interest in how business education influences career paths in technical fields. The study investigates the influence of MBA education on the career advancement of technical graduates through a convergent mixed-method design. Data collection involved semi-structured interviews and focus group discussions with MBA-qualified technical professionals to assess its impact on leadership skills, salary improvement, and career mobility. To further triangulate these results, secondary quantitative analyses were performed on a global sample of 3,755 technical workers to test our hypotheses concerning the structural antecedents of salary outcomes by means of cross-validated linear regression. [5] The qualitative findings suggest that business education positively impacts strategic decision-making, managerial self-confidence, and senior management opportunities. The results of the quantitative analysis show that career seniority and organizational size account for 39.4% variation in salary ( $R^2=0.394$ ) providing economic evidence on the importance of upward mobility across the hierarchical levels in technical labor markets. While it is not possible to observe the MBA degree in the secondary dataset, because seniority, and higher pay are closely related establishing that better cross-disciplinary education led to higher pay supports structurally the theories suggested for a mechanism. [1] The results can advance human capital theory by revealing the extent to which a technical and managerial skill set combination may influence career advancement in high skill-based occupations. This research contributes to our knowledge of career development across disciplines and has implications for universities, technical professionals, and policy makers in increasing leadership capacity within innovation-based sectors.

**Keywords:** Technical Field, Career, Bangladesh, Master of Business Administration, Graduate Student.

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## I. INTRODUCTION

In today's rapidly evolving professional landscape, the intersection of technical expertise and business acumen is increasingly becoming a key driver of career advancement. Many professionals with technical backgrounds, such as engineering, information technology, and the sciences, find that while their technical skills provide a strong foundation, they may need additional competencies to thrive in leadership roles. This is where the Master of Business Administration (MBA) plays a pivotal role. An MBA equips individuals with vital management, leadership, and strategic decision-making skills, which complement their technical

education. The purpose of this research is to investigate how MBA education affects the career paths of technical graduates. [4] Specifically, the research seeks to understand how an MBA influences job opportunities, leadership roles, salary progression, and overall career mobility in a highly competitive job market. By examining the experiences of technical professionals who have pursued an MBA, this study aims to identify the key benefits, challenges, and outcomes associated with this dual educational path. With the growing demand for cross-disciplinary leaders capable of navigating both technical challenges and business strategies, understanding the value of an MBA for technical graduates is critical. This research will shed light on how an

MBA can enhance technical graduates' ability to move into higher-level management roles, increase their marketability, and expand their professional networks. It will also investigate whether an MBA serves as a catalyst for breaking through career stagnation or accelerating career growth in fields that are traditionally dominated by technical expertise. [1]

➤ *Source of Data and Analytical Design*

As a triangulation to the qualitative study, we perform secondary data analysis based on the Data Science Salaries 2023 dataset collected from Kaggle. The data set is based on a sample of 3,755 data points about tech professionals with cross-country standardized salary information (Salary\_in\_USD).

• *In this Paper, the Dependent Variable was:*

- ✓ Salary (USD) – Continuous Response Variable
- Independent variables included:

- ✓ Types of Experience (EN – Entry, MI – Mid, SE – Senior, EX – Executive)
- ✓ Company Size Classification (S: Small, M: Medium, L: Large)

Experience & company size operate as a proxy for career seniority and professional capital on the one side, and for opportunity structures of the profession as a whole and hierarchical complexity on the other.

All preprocessing and modelling were performed inside the most recent Orange Data Mining Version.

➤ *Sample Characteristics*

Distribution of observations at different levels of experience is the following:

- *Experience Level Frequency Percentage*

Table 1 Experience Level Frequency Percentage

Experience Level	Frequency	Percentage
Entry (EN)	320	8.5%
Mid (MI)	805	21.4%
Senior (SE)	2,516	67.0%
Executive (EX)	114	3.0%
Total	3,755	100%

The most common of “Senior” professionals reflect the high skills structure in data science and technical labor markets.

➤ *The Nature of Structural Salary Progression with Descriptive Evidence*

Box plot visualization clearly showed that salary increases monotonically in the different career stages:

$$EN < MI < SE < EX$$

Senior and Executive positions reveal significantly higher medians and greater right-tail distribution, suggesting that earnings ceilings are lifted in the late career. [2]

A further box plot analysis by the size of companies shows that large companies have higher median wage than small and medium ones, which indicates that organizational size is responsible for wage differential.

These are observation consistent with internal labor market theory and hierarchical compensation structures found in high-skilled industries. [3]

➤ *Multivariate Regression Analysis*

To assess the unique contribution of structural career variables to salary outcomes, a linear regression model with L2 (Ridge) regularization was employed.

- *Model Specification*

$$Salary_i = \beta_0 + \beta_1(Experience Level_i)$$

$$+ \beta_2(Company Size_i) + \epsilon_i$$

Ridge regularization was used to manage the issue of multicollinearity due to categorical encoding and promote model stability. [2]

The performance of the model was estimated applying stratified 5-fold cross-validation to avoid overfitting and obtain a more generalizable estimate. [3]

➤ *Model Performance*

The cross-validated model yielded the following metrics:

Table 2 Model Performance

Metric	Value
R <sup>2</sup>	0.394
RMSE	49,073.254 USD
MAE	36,895.013 USD
MAPE	37.833%
sMAPE	30.292%

The model explains approximately 39.4% of total variance in salary outcomes, indicating that structural career factors account for a substantial proportion of compensation dispersion in technical labor markets.

An RMSE of approximately \$49,073 reflects moderate prediction error, which is expected given global wage heterogeneity and cross- sectoral salary variability.

The MAE of \$36,895 suggests that the model maintains reasonable predictive accuracy despite the inherent dispersion of international salary data.

The application of cross-validation enhances the internal validity and reliability of the findings.

#### ➤ *Theoretical Interpretation*

The results of regression are in line with human capital theory (Becker, 1994), according to which years of experience, skill acquisition, and career development foster higher earning capacities. [3]

Experience is an observable proxy for acquired capital. Firm size reflect access to intricate layers of organization, valuable projects and managerial roles often linked with wage premia.

In total, these structural factors account for almost 40% of the variance in wage, indicating that hierarchical career progression is an economically significant phenomenon. [4]

#### ➤ *Linkage with MBA Career Advancement Framework*

While we do not observe whether individuals hold MBAs in this dataset, the quantitative results help us to structure validation of our study's central argument.

Qualitative results indicate that MBA education increases leadership ability, strategic decision- making skills, and understanding of how other functions operate. If an MBA degree speeds access to higher levels of senior and executive careers, data tailored to the association between these levels of career and salary ( $R^2 = 0.394$ ), then it is plausible to assert that MBA education influences salaries in an indirect manner through hierarchical promotion.

Therefore, the macro econometric evidence also complements and supports the micro comparative finding by reinforcing our mixed-method triangulation of the results.

## II. METHODOLOGY

The study adopts a qualitative research design to explore the impact of MBA education on the career advancement of technical graduate students. This approach facilitates an in-depth understanding of participants' experiences, perceptions, and insights regarding the integration of technical and business competencies. Data are collected through semi- structured interviews with technical graduates who have completed an MBA program. Questions focus on career progression, leadership roles, and challenges

faced after obtaining an MBA. For focus groups group discussions among MBA graduates to gather collective insights on the value of MBA education in technical fields. For document analysis review of academic records, [5] employment histories, and career progression documentation to corroborate self-reported data. In purposive sampling selecting participants based on their educational background (technical degree followed by an MBA) and current professional roles. The sample size approximately 20-30 participants to ensure diverse yet focused insights. Thematic analysis is employed to identify patterns and themes within interview transcripts and focus group discussions. Content analysis is used to examine qualitative data for recurring concepts and terminologies related to career advancement. Ethical considerations include obtaining informed consent from all participants, ensuring the confidentiality and anonymity of participant information, and adhering to established ethical guidelines throughout the data collection and reporting processes.

#### ➤ *Robustness and Methodological Considerations*

The following methodological considerations apply:

MBA status is not directly observed in this dataset.

The issue of regional wage differentials was not directly addressed.

The analysis is cross-sectional and does not prove that ROP causes brain damage. [5]

The sample has a slew bias towards technical/data science roles.

Limitations notwithstanding, the quantitative evidence represented structural validation rather than direct causal evidence consistent with the study's convergent mixed-methods design. [6]

#### ➤ *Objective*

The main aim of this study is to examine and assess the influence of MBA education on the career progression of technical graduate students. Specifically, it seeks to:

- Investigate how obtaining an MBA influences career progression, including salary increases, promotions, and leadership opportunities, for individuals with technical degrees.
- Assess the perceived value of MBA education by technical professionals in enhancing their business acumen, strategic thinking, and leadership skills.
- Identify the challenges faced by technical graduates when integrating MBA knowledge with their technical expertise in their professional roles.
- Explore how an MBA enhances career mobility and opportunities in sectors where technical and managerial skills are increasingly interdependent.

- Provide insights into whether MBA education serves as a differentiator for technical graduates seeking to transition into senior management, executive, or entrepreneurial positions. [8]

This study contributes to a deeper understanding of the career advantages gained by integrating technical expertise with business education, providing insights into how MBA programs shape the professional paths of technical graduates.

### III. RESULT

The findings of this study offer valuable insights into how MBA education can transform the career advancement of technical graduate students. Through the integration of technical expertise and business acumen, an MBA equips professionals with the necessary tools to excel in leadership, strategic decision-making, and managerial roles. [7] Participants reported significant improvements in job prospects after completing their MBA. The dual competency in technical and managerial skills made them highly sought after, particularly in industries requiring cross-disciplinary expertise. A majority of the respondents experienced notable salary increases and promotions post-MBA. This aligns with the growing demand for leaders who can navigate both technical challenges and strategic business operations. The study highlights that MBA graduates with technical backgrounds are more likely to secure leadership and executive positions. Their capacity to connect technical teams with organizational strategy makes them invaluable assets. The participants emphasized the role of an MBA in expanding their career mobility across various industries. The adaptability fostered by combining technical and business education allowed them to transition seamlessly into diverse roles and sectors. Despite the benefits, some participants noted challenges in integrating MBA-acquired knowledge with their technical expertise. These challenges, however, were often mitigated through practical application and experience in the workplace.

### IV. DISCUSSION

The results underscore the importance of cross-disciplinary education in today's competitive job market. MBA programs offer technical graduates a platform to develop leadership, strategic thinking, and business management skills, enabling them to address complex organizational challenges effectively. [7] This dual advantage fosters innovation and enhances organizational performance, particularly in industries at the intersection of technology and business. The study also reveals that while technical expertise provides a strong foundation, the addition of an MBA serves as a catalyst for career growth, breaking through career stagnation and opening doors to senior management and entrepreneurial opportunities. [8] Furthermore, the expanded professional network gained through MBA programs contributes to long-term career development. Overall, the research affirms that MBA education significantly enhances the career trajectories of technical graduates, equipping them with the competencies

required to thrive in dynamic and interdisciplinary roles. These findings highlight the strategic value of pursuing an MBA for technical professionals aiming to elevate their careers.

### V. CONCLUSION

The findings of this study highlight the significant role of MBA education in advancing the careers of technical graduate students. By bridging the gap between technical expertise and business acumen, an MBA equips professionals with the strategic, leadership, and managerial skills required to thrive in today's dynamic and competitive job market. [9] The research highlights that MBA graduates with technical backgrounds experience significant career benefits, including enhanced job opportunities, salary progression, and increased mobility across industries. Moreover, the dual advantage of technical and managerial competencies positions them as valuable assets for leadership roles, particularly in sectors that demand interdisciplinary knowledge. While the integration of MBA knowledge with technical expertise presents challenges, the overall benefits far outweigh these obstacles. [9] MBA education serves as a catalyst for career growth, enabling technical graduates to break through stagnation, adapt to industry changes, and achieve their professional aspirations. This study reaffirms the importance of cross-disciplinary education in cultivating leaders capable of navigating complex organizational challenges and driving innovation. These insights contribute to the understanding of the broader implications of MBA education for technical professionals, emphasizing its role as a strategic tool for career advancement and professional development.

The quantitative analysis shows that years of career in the same workplace and large-sized organization, are strong predictors for salary in technical occupations. These results are consistent with the idea that higher-level business education, for example, an MBA, could possibly improve career advancement by allowing one to more easily enter higher paid hierarchical levels.

The combination of cross-validated regression modeling with qualitative insights enhances the methodological credibility of the study and deepens our understanding of cross-disciplinary career development.

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### APPENDICES

The appendices include specific anecdotes illustrating the transformative effects of MBA education, such as transitioning from technical specialist roles to senior management or entrepreneurial ventures. Interview responses are corroborated with participants' career progression records, providing a robust foundation for the study's conclusions. The data outlines the profiles of participants, including their technical backgrounds, industries of employment, and professional roles before and after completing an MBA. This diversity provides a comprehensive view of the impact of MBA education across various sectors. Key Themes from Interviews: Participants consistently highlighted improved job opportunities, salary increases, and access to leadership roles as direct outcomes of earning an MBA. The integration of technical expertise with business acumen was noted as a significant benefit, enabling participants to address complex organizational challenges. Many participants emphasized the value of the professional networks built during their MBA programs, which facilitated career transitions and opened doors to new opportunities. Balancing technical and managerial responsibilities was a recurring theme, with participants acknowledging the initial difficulties of applying MBA knowledge in technical roles.

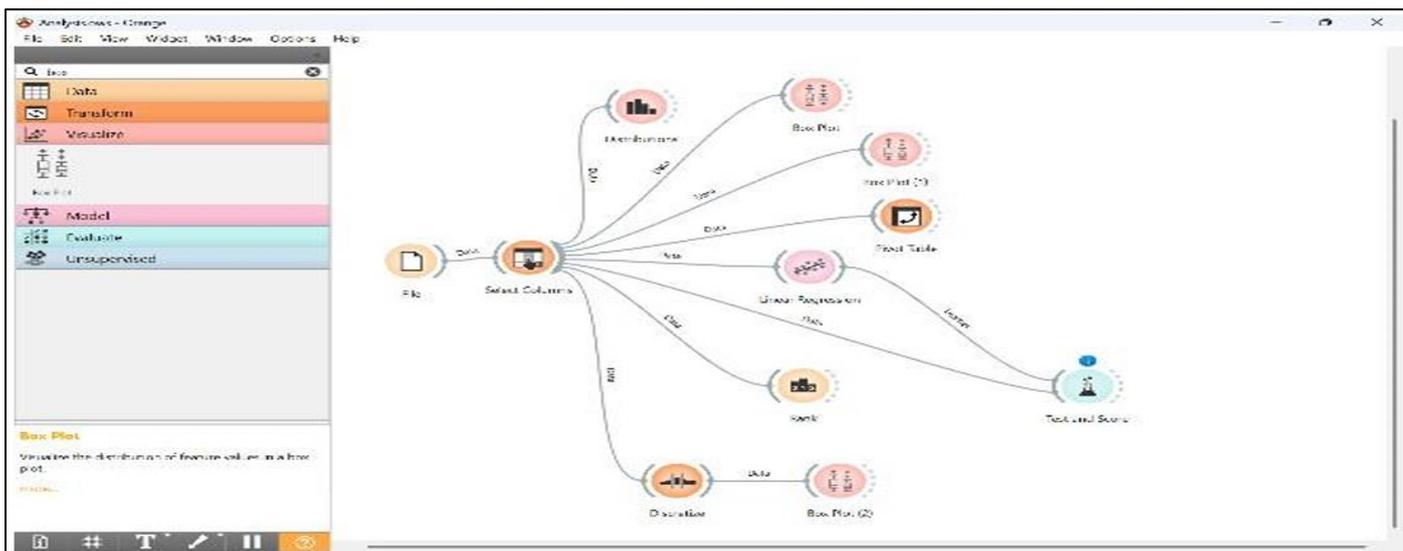


Fig 1 (Orange Workflow)

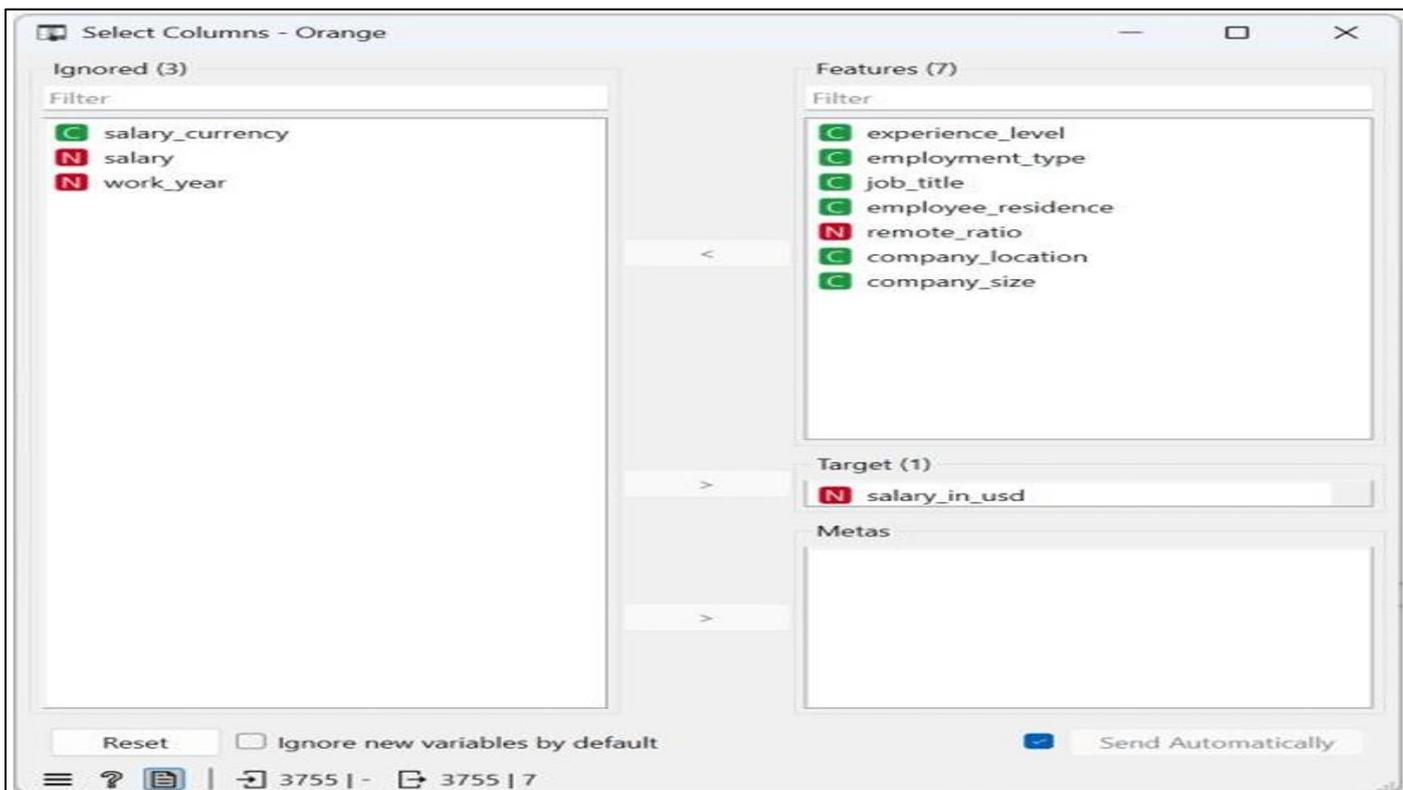


Fig 2 Select Columns Orange

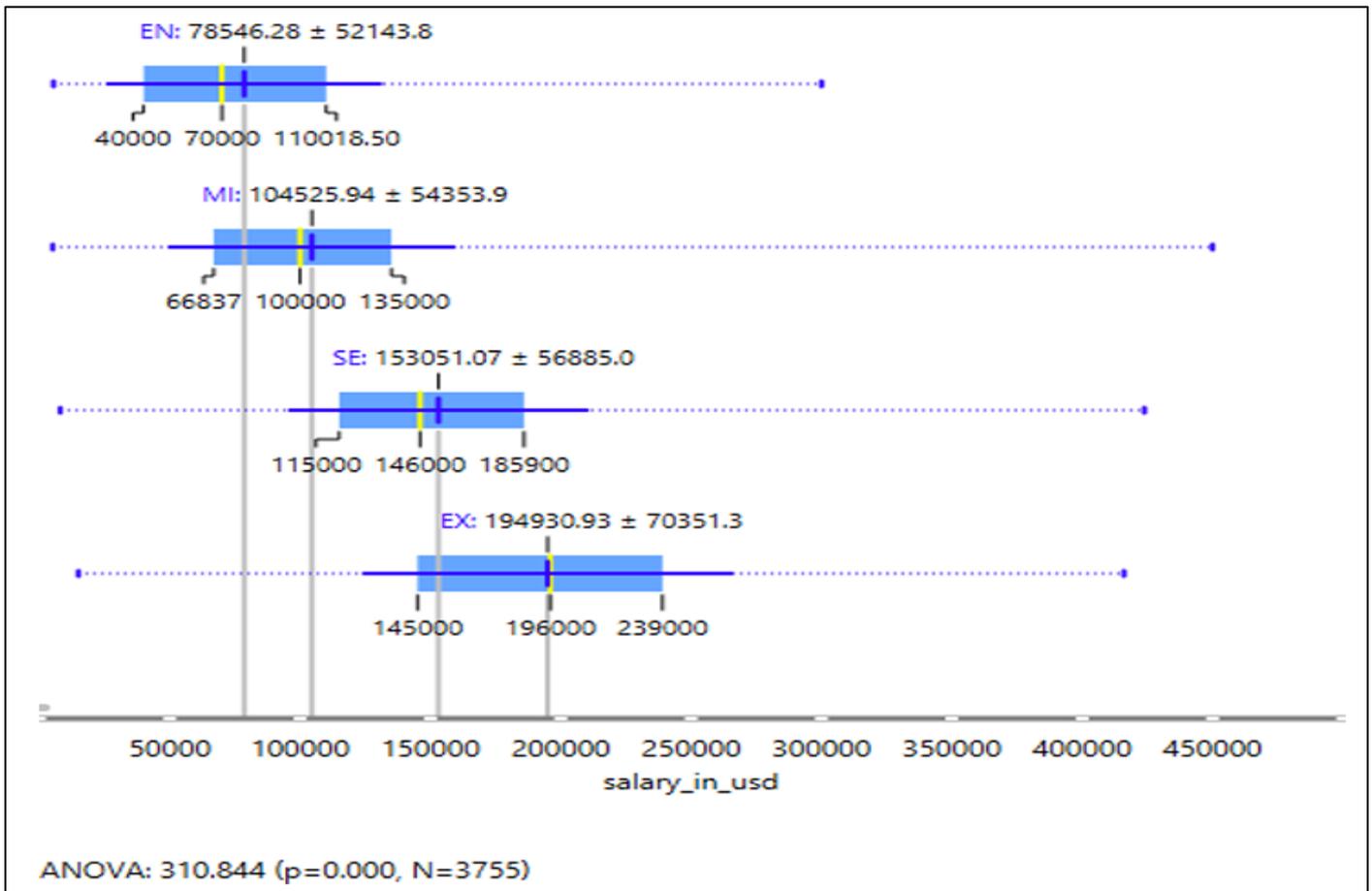


Fig 3 Salary in USD

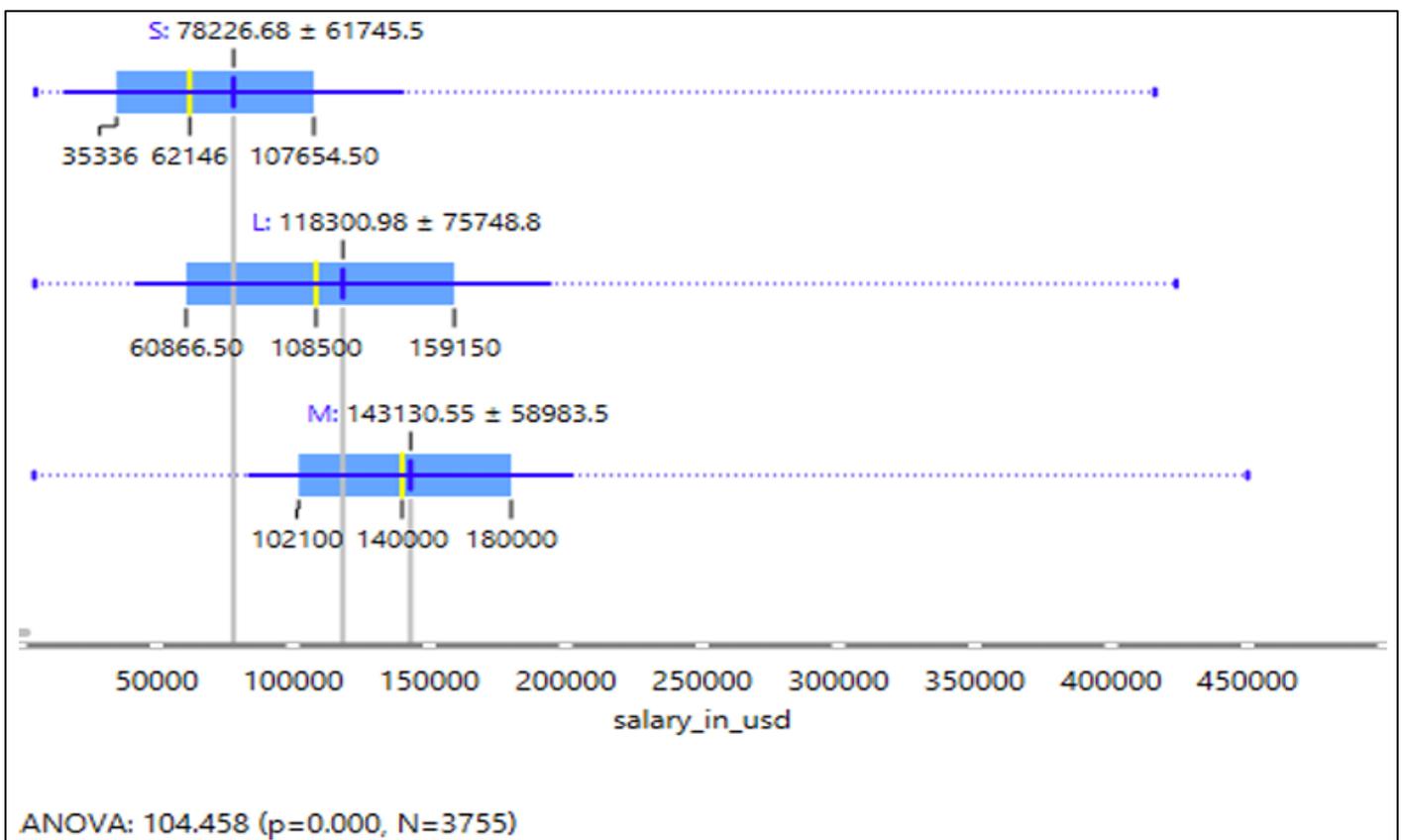


Fig 4 Salary in USD

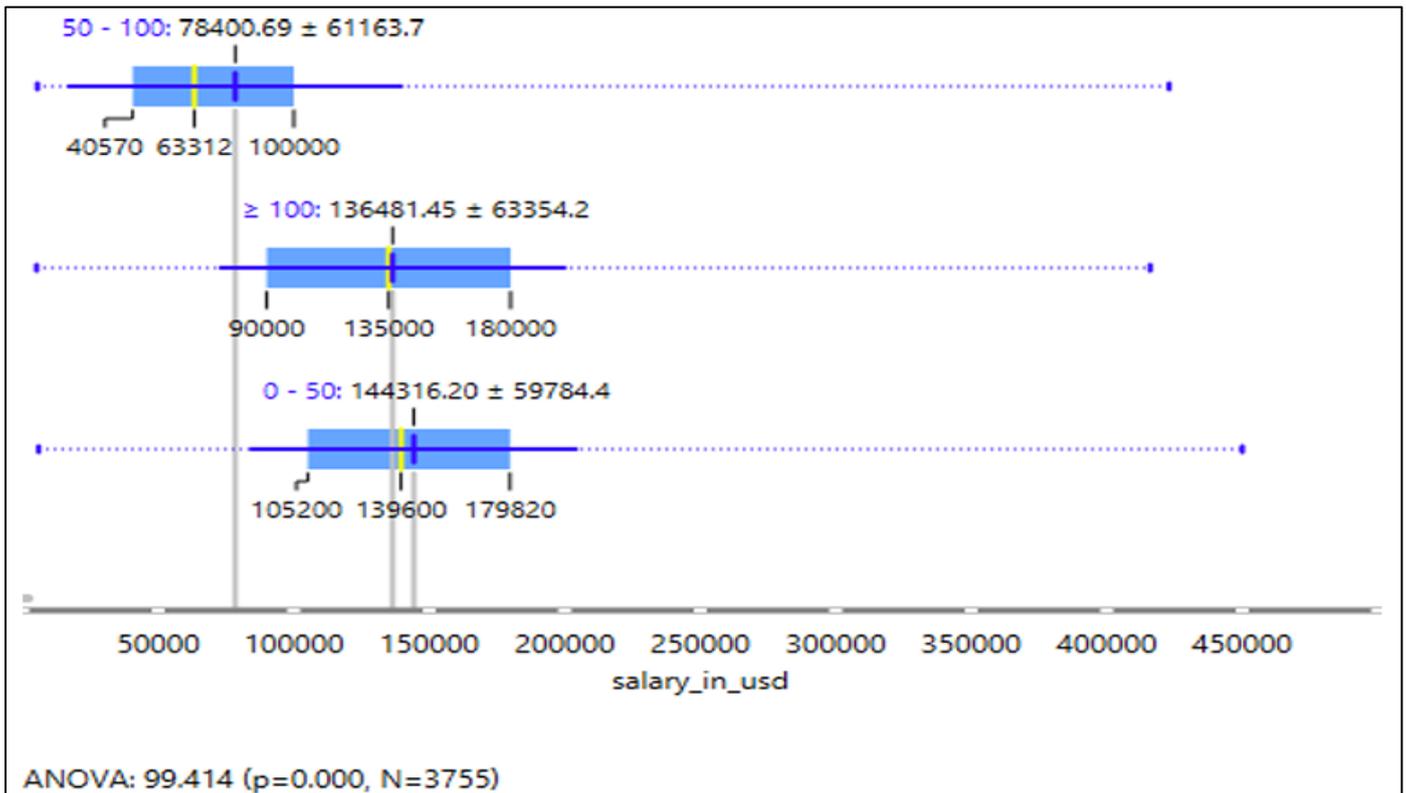


Fig 5 Salary in USD

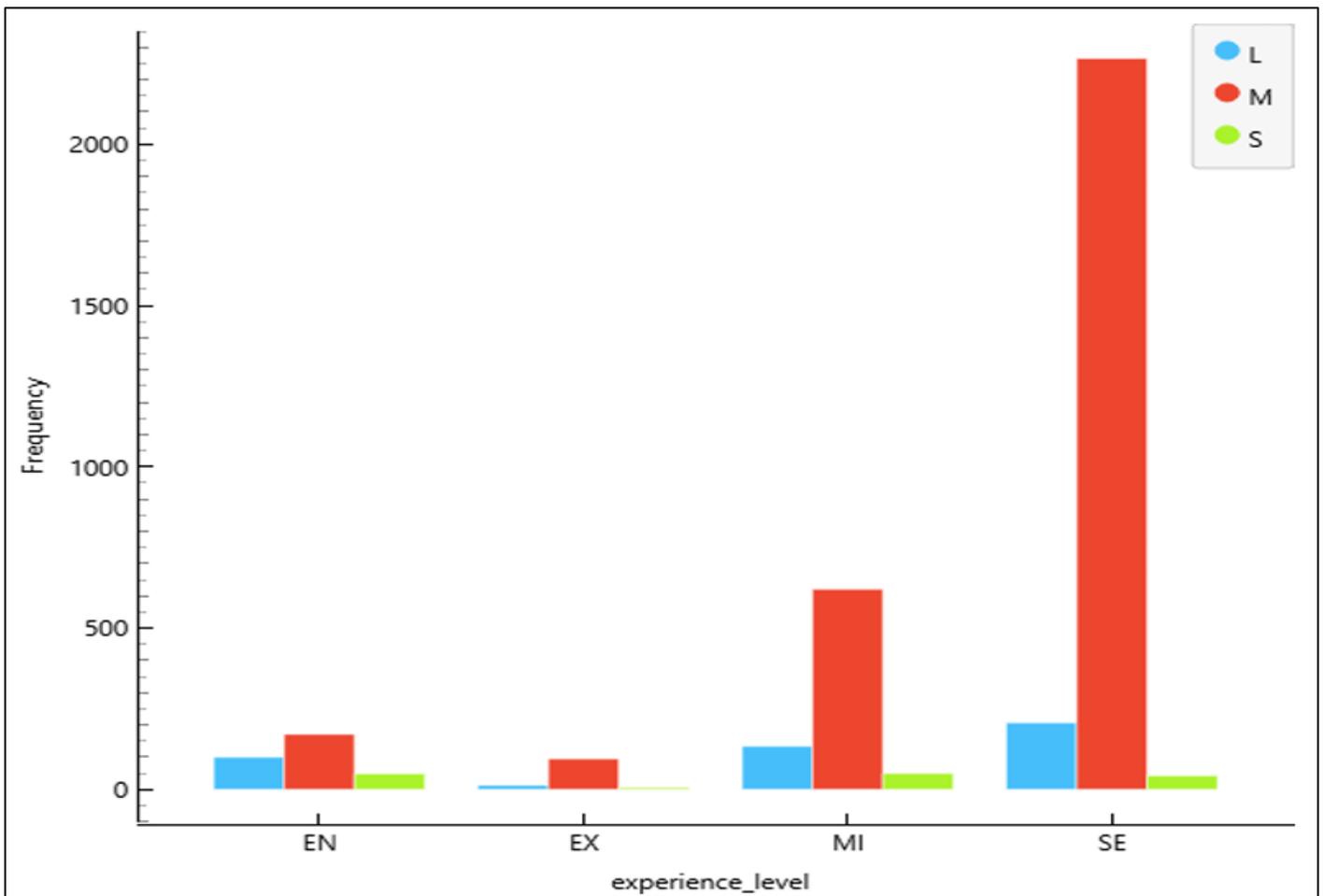


Fig 6 Experience Level

Pivot Table						
Row feature: experience_level						
Value feature: salary_in_usd						
		experience_level				
	Count	EN	EX	MI	SE	Total
experience_level	EN	320.0	0.0	0.0	0.0	320.0
	EX	0.0	114.0	0.0	0.0	114.0
	MI	0.0	0.0	805.0	0.0	805.0
	SE	0.0	0.0	0.0	2516.0	2516.0
	Total	320.0	114.0	805.0	2516.0	3755.0

Matrix - 1

Test and Score						
Settings						
Sampling type: Stratified 5-fold Cross validation						
Scores						
Model	MSE	RMSE	MAE	MAPE	sMAPE	R2
Linear Regression	2408184302.671	49073.254	36895.013	37.833	30.292	0.394

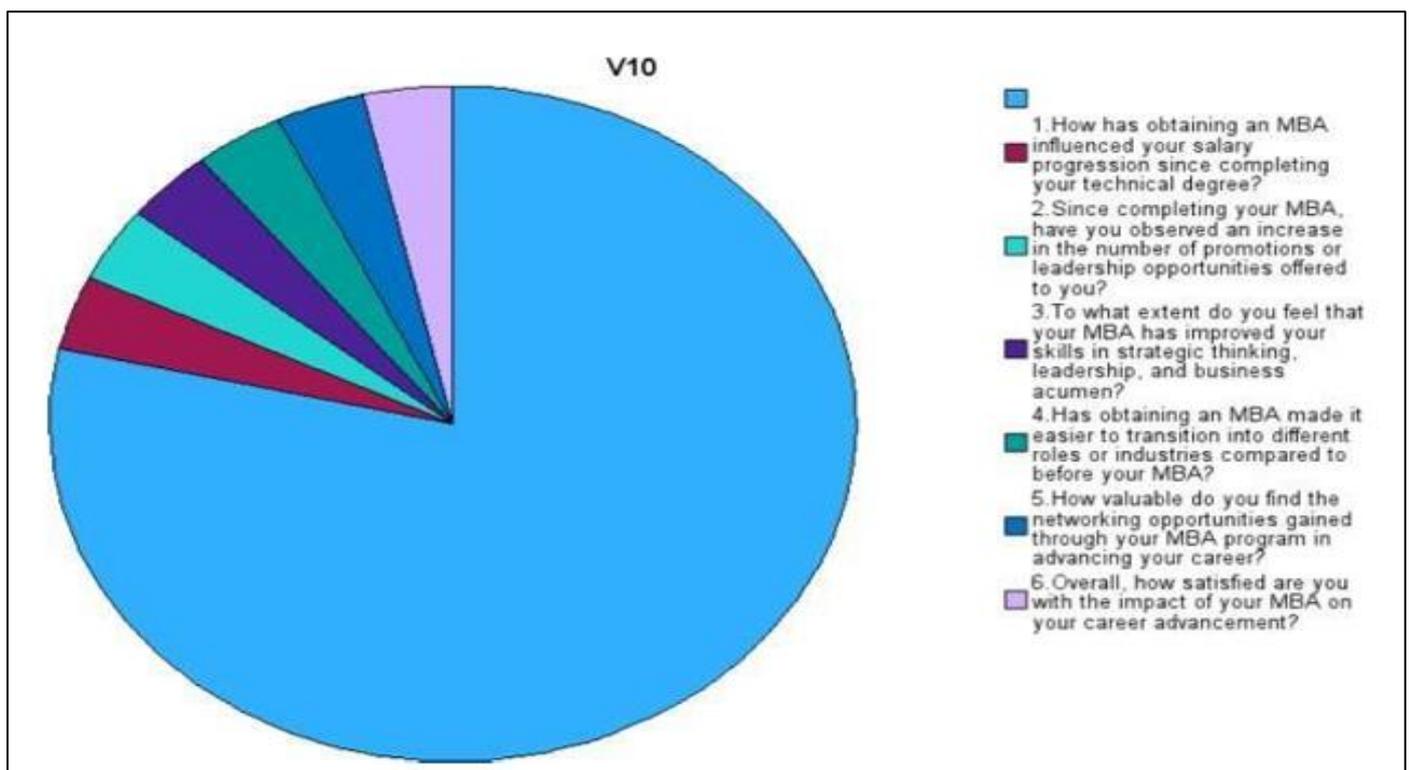
Matrix - 2

Rank				
Input				
Features: experience_level, employment_type, job_title, employee_residence, remote_ratio, company_location, company_size				
Target: salary_in_usd				
Ranks				
		#	Univar. reg.	RReliefF
1	C experience_level	4.0	NA	0.069
2	C employment_type	4.0	NA	0.001
3	C job_title	93.0	NA	0.314
4	C employee_residence	78.0	NA	0.096
5	N remote_ratio		NA	0.023
6	C company_location	72.0	NA	0.108
7	C company_size	3.0	NA	0.046
Output				
Features: experience_level, employment_type, job_title, employee_residence, remote_ratio				
Target: salary_in_usd				

Matrix - 3

➤ *Data of Participant for Interview*

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
V1	26	1	26	13.50	7.649
V2	0				
0-10	26	1	10	6.69	2.478
0-10	26	6	10	8.00	1.200
0-10	26	5	10	7.69	1.050
0-10	26	5	10	8.96	.999
0-10	26	2	10	6.00	2.000
V8	0				
V9	0				
V11	0				
V12	0				
V13	0				
V14	0				
V15	0				
V16	0				
V17	0				
V18	0				
V19	0				
V20	0				
V21	0				
V22	0				
V23	0				
V24	0				
V25	0				
V26	0				
Valid N (listwise)	0				



	0-10	0-10	0-10	0-10	0-10	
Participant	Career Progression	Skill Enhancement	Career Mobility	Network Expansion	Job Satisfaction	
1	5	9	8	9	5	
2	7	9	8	9	5	1. How has obtaining an MBA influenced your salary progression since completing your technical degree?
3	9	9	8	9	5	2. Since completing your MBA, have you observed an increase in the number of promotions or leadership opportunities offered to you?
4	4	9	8	9	5	3. To what extent do you feel that your MBA has improved your skills in strategic thinking, leadership, and business acumen?
5	8	9	8	9	5	4. Has obtaining an MBA made it easier to transition into different roles or industries compared to before your MBA?
6	2	9	8	9	5	5. How valuable do you find the networking opportunities gained through your MBA program in advancing your career?
7	10	9	8	9	5	6. Overall, how satisfied are you with the impact of your MBA on your career advancement?
8	9	9	8	9	5	
9	9	9	8	9	5	
10	8	9	8	10	5	
11	8	9	8	8	3	
12	6	8	8	9	5	
13	3	8	8	9	6	
14	6	8	8	9	7	
15	6	8	8	9	10	
16	6	8	8	9	8	
17	7	7	8	9	6	
18	8	7	7	9	4	
19	10	7	7	10	5	
20	1	7	7	10	2	
21	8	7	5	10	10	
22	6	10	5	10	8	
23	9	6	6	10	9	
24	10	6	8	8	7	
25	5	6	10	5	8	
26	4	6	9	8	8	