Determinants of Graduates' Starting Salary Using CHAID Analysis

(Penentu Gaji Permulaan Graduan Menggunakan Analisis CHAID)

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ABSTRACT

This study aims to identify the factors contributing to graduates' starting salaries. We used the data of 1,485 employed graduates from a Malaysian public university retrieved from a comprehensive 2018 Graduate Tracer Study by the Ministry of Higher Education Malaysia. We employed the CHAID predictive model to establish a relationship between starting salary and categorical predictor variables. We further used Chi-square statistics to determine the optimal splits. The study found that graduates' starting salaries are influenced by job sector, English proficiency, job group, academic performance, and field of study. The findings further revealed that only 40 per cent of the graduates received a monthly starting salary of at least RM2,500. This simple model successfully captures the essential patterns and relationships in the data without being overly influenced by irrelevant details. These findings provide valuable knowledge and insights for future graduates to secure a promising career.

Keywords: CHAID analysis; graduate employability; Malaysia; salary; English proficiency; academic performance

ABSTRAK

Kajian ini bertujuan untuk mengenalpasti factor-faktor yang menyumbang kepada gaji permulaan para graduan. Kajian ini menggunakan data 1,485 graduan bekerja daripada sebuah universiti awam di Malaysia melalui Kajian Pemantauan Graduan 2018 yang dikumpulkan oleh Kementerian Pengajian Tinggi Malaysia. Model peramal CHAID digunakan untuk mencari hubungan antara gaji permulaan dan pemboleh ubah kategorikal. Selanjutnya, kajian ini menggunakan statistik Chi-square untuk menentukan pembahagian optimal. Kajian ini mendapati gaji permulaan graduan dipengaruhi oleh sektor pekerjaan, kemahiran Bahasa Inggeris, kumpulan pekerjaan, pencapaian akademik, dan bidang pengajian. Kajian ini seterusnya menunjukkan hanya 40.4% graduan menerima gaji permulaan sekurang-kurangnya RM2,500 sebulan. Model ringkas ini berjaya mengambarkan corak dan hubungan penting dalam data tanpa dipengaruhi oleh perkara yang tidak berkaitan. Dapatan ini memberikan maklumat dan pencerahan kepada bakal graduan dalam memastikan keterjaminan pekerjaan mereka pada masa hadapan.

Kata kunci: Analisis CHAID; kebolehpasaran graduan; Malaysia; gaji; kemahiran Bahasa Inggeris; pencapaian akademik

INTRODUCTION

Graduate employability is a primary concern for the nation and institutions of higher learning because they need to ensure that the graduates produced meet the industry demands. The move from university to the workforce can be challenging since graduates frequently run against obstacles that make it difficult for them to find fulfilling employment. Degree programmes may only sometimes be aligned perfectly with the specific skills and expertise that employers seek in the current workplace. The gap between academic curricula and job market demands has been more evident in this era of rapid technology innovation and industry change. The increased prevalence of automation and artificial intelligence may have impacted job opportunities for entry-level positions.

Some roles that once required human labour are now being automated, leading to a decrease in demand for specific skill sets and consequently driving down salaries for those positions. As Vitale et al. (2020) stated, the development of technology has also affected academic and pedagogical standards. Thus, curriculum designers must be vigilant to give students skills that align with market demands.

Within an increasingly interconnected and highly dynamic world, the economy's shifting structure has caused a continuous rearrangement of labour among economic sectors, ultimately changing the nature of the labour market. The scenario affects both current employees and recent graduates trying to enter the workforce. The challenge would be more significant for the graduates as they have a short experience in the labour market. It might be more difficult for graduates to find well-paying jobs in uncertain times due to employment shortages, wage freezes, or even pay cuts that can result from economic downturns or recessions, especially after COVID-19. Hence, the role of policymakers has a significant impact on how the economy develops as a whole and how the country's workforce will fare in the future. Policymakers can create more potent initiatives to close the gap by thoroughly understanding the factors causing salary differences to promote an equitable and inclusive employment market for all graduates. They can also promote economic growth and social stability by fostering a culture that values equality and rewards abilities. Lysenko and Wang (2023) suggest that relations between students, universities, and the regional background continue throughout students' time in college, impacting their career prospects and salary ranges. As a result, higher education institutions have the task of bridging this gap by equipping their students with transferrable skills, critical thinking ability, and real-world experience they need to succeed in an ever-changing job market.

Nevertheless, there is no clear evidence that a well-established company will provide a higher starting salary than a lesser-known company. Thus, it becomes crucial for employers to understand the factors contributing to pay gaps between comparable graduates. A deep understanding of these elements enables them to design more competitive and equitable compensation plans and facilitates the establishment of a varied and engaged workforce. Any organisation's long-term success depends on attracting and keeping top people, and resolving the issue of pay inequality is essential to achieving this goal.

Ensuring the employability of graduates is a key focus for higher education institutions. Numerous initiatives have been implemented to facilitate the integration of graduates into the labour market. However, a lack of attention has been given to a crucial aspect: whether graduates' starting salaries align with their qualifications. It is widely understood that starting salaries vary depending on the field of study and other significant factors. Thus, studying the determinants of graduates'

starting salaries helps promote fairness, efficiency, and informed decision-making in the labour market and educational systems. It contributes to a more equitable society, a well-prepared workforce, and informed policy decisions that benefit individuals and the economy as a whole.

Hence, this study aims to identify significant variables contributing to a graduate's starting salary. The CHAID prediction model was used to discover the relationship between starting salaries and predictive factors. In addition, Chi-square statistics were employed to choose the best splits for this model. This study is based on the concept by Bartual-Figueras et al. (2019), which used a threshold value to analyse wage differences based on Malaysian data. The current study discovered that factors such as work sector, English proficiency, job group, academic performance, and field of study greatly impact graduates' starting salary.

The contributions of the study are to the literature on graduate employability and their salary differentials. In terms of factors influencing the graduate starting salary. Although Wahab et al. (2020) earlier research on Malaysian graduates used the same dataset, their main concern was the impact of migration on graduate salaries. Chia and Miller's (2008) focused on similar issue using Australian graduates data. This study has the potential to significantly impact graduates' chances of achieving salaries that are ideal for their educational backgrounds and career goals.

BACKGROUND OF THE STUDY

The number of unemployed individuals in Malaysia decreased by 7,000 during the second quarter of 2021 to a total of 764.9 thousand, maintaining a three-quarter streak of 4.8% unemployment The Department of Statistics Malaysia (2020). Meanwhile, the number of people employed in the second quarter of 2021 decreased by 0.2% (292,000 people), totalling at 15.21 million people (Department of Statistics Malaysia Official Portal 2021a).

Focusing on graduate employability with tertiary education level, The Department of Statistics Malaysia (DOSM) in the Graduate Statistics 2021 reported that Malaysia had 5.61 million graduates in 2021, a rise of 4.7% from the previous year (2020: 5.36 million graduates). The number of graduates in the labour force, which includes both employed and unemployed, increased by 4.7% to 4.77 million (2020: 4.56 million graduates). Out of 4.77 million graduates in the labour force, 4.57 million were employed and the remaining were unemployed. Despite the high number of employed graduates, only 64.8% were employed in graduate-level (skilled) jobs, while 35.2% were employed in non-graduate (semi-skilled and low-skilled) jobs that did not require university qualification. For the sake of life survival, some graduates will accept any job while others are willing to remain unemployed

rather than taking positions that require lower skills and less pay. This implies a massive waste of human capital that is not adequately capitalised by the nation, ultimately making graduate unemployment one of policymakers' top worries regarding economic stability.

Consequent to the situation, one of the essential factors considered by graduates upon entering the labour market is the salary offered. It is generally believed that bigger and multinational firms routinely pay higher wages (Gibson & Stillman 2009; Brown et al. 2004). Although such matter is only confirmed by limited studies, most graduates presume that they will earn higher starting salaries by working in multinational companies. According to the Department of Statistics Malaysia Official Portal (2021b), salaries and wages are defined as gross emoluments paid to employees during the reference year, which includes salaries, wages, bonuses, commissions, overtime pay, dismissal pay, and allowances, excluding the payments made to Employees' Provident Fund (EPF), Social Security Schemes, and other types of deductions. In other words, a salary is a fixed payment paid periodically to a person engaged in work or service. Nevertheless, the rate of such payment differs across fresh graduates, even though they possess similar educational background. This disparity presents a significant challenge to the expectations of graduates who devote a lot of time, energy, and money to their education and expect to be rewarded fairly and equitably when they enter the workforce.

When it comes to the starting salaries for graduates in Malaysia, the Fresh Graduate Survey by Jobstreet.com found that 63% of employers offered fresh graduate salaries between RM2,100 to RM2,900. Only 9% of employers were willing to pay more than RM3,000, even though 32% of fresh graduates asked for the same (JobStreet.com 2018). Based on the Jobstore.com Salary Report 2018/2019 (JobStreet.com 2018), the average salary for fresh graduates with an honours degree in 2018 was RM2,482 per month. However, reflecting the effects of COVID-19, the JobStreet Salary Report 2022 (JobStreet.com 2022) found that out of the 31 employment sectors in Malaysia, 40% have raised their salary offerings in an effort to attract job seekers and compete for in-demand skills. For entry-level positions, the average salary for recent graduates is RM2,500 across most industries, ranging between RM 1,500 and RM3,600 (JobStreet.com 2022). This is similar to the report by Glassdoor (2023) where the average monthly compensation for a fresh graduate in Malaysia is approximately RM 2,500.

LITERATURE REVIEW

Recent graduates struggle to find well-paying positions that match their academic qualifications in the current economic climate, especially in the aftermath of the COVID-19 pandemic. To enable graduates to fulfil their career goals, it is necessary to identify the significant factors that may influence their starting salary.

A study conducted by Chia and Miller (2008) utilized a standard earning equation as a model and found that the most significant determinant of a graduates' starting salary is their weighted average university grade. However, it is essential to note that there is a lack of specific research on this topic, particularly in Malaysia. Even though Wahab et al. (2020) used the same Malaysia dataset, the focus is not on determining the graduate starting salaries, but on estimating the wage equation using the ordinal logit model to identify the effects of migration of graduates on their earnings. Therefore, we evaluate previous studies on the expected factor to investigate the factors that may potentially influence graduates' starting salaries.The labour market generally comprises several job sectors, including the government or public sector, private sector, local companies, multinational companies, and government-linked companies (GLCs). Fresh graduates often enter the labour market as entry-level workers, with their respective job choices impacting their salary. This raises a question about which sector that is most preferred by fresh graduates. Findings by Baral (2018) showed that 85.4% of graduates were employed in the private sector, mainly owing to the larger salaries offered than the public sector (Karl & Sutton 1998; Makridis 2021). In contrast, Lewis and Frank (2002) found that graduates are attracted to work in the government sector due to the high pay rate for entry-level jobs. This is in line with Shahril et al. (2023) who reported that guaranteed employment and reasonable salary are the main attractions for graduates to enter the public sector. Even though the work conditions differ, most studies agree that the government or public sector offers a more secure position than the private sector (Blank 1985; Karl & Sutton 1998; Lewis & Frank 2002; Makridis 2021).

Another important employment category is self-employed, which refers to working in a family-owned business, owning a business, or freelancing. This category requires graduates to have high entrepreneurial skills. It is worthwhile to note that entrepreneurial skills are one of the learning outcomes to be fulfilled by Malaysian university programmes based on the Ministry of Higher Education (MoHE) and the Malaysian Qualification Framework (MQF) requirement. Exploring the gig economy[1] is one option for fresh graduates to start their careers. As reported by The Edge Malaysia on 13 November 2017, 68% of participants chose freelancing as their first job. Kassim (2020) also suggested that "educational entities must expose and encourage the gig economy adoption in their teaching and learning process. This does not only prepare the graduates to enter the labour market as an employee but also as an employer, or more specifically to venture into business or entrepreneurship."

Furthermore, job classification stands as an important factor in graduates' employment and salary. The International Standard Classification of Occupation

(ISCO-88) published by ILO in 1989 proposed ten major occupation groups that are used worldwide. This classification acts as a guideline "to help countries improve their labour administration as well as the quality and reliability of their labour statistics and improve international comparability of statistical data" (Hoffmann & Scott 1993). The Destination Leavers survey by Pollard et al. (2015) found the three most common types of jobs that are enrolled by graduates within six months of graduating, namely (1) health professionals and associate professionals; (2) commercial, industrial, and public sector managers; and (3) business and financial professionals.

Another critical factor is the field of study. Albrecht and Sack (2000) reported that accounting graduates in Malaysia were offered a starting salary of RM1,001 to RM2,000, which was significantly lower than undergraduates in the United States who received a starting salary of USD2,900. Moreover, Zhao et al. (2017) found that engineering graduates earned the most compared to graduates from other STEM[2] fields, while nursing graduates earned the most salary for BHASE[3] fields. It contradicts the findings by Hojda et al. (2022) in which natural science graduates had a higher chance for higher earning. From the industry point of view, Ahmad et al. (2014) suggested that turnover among graduates in the hotel industry was higher than in other sectors due to lower salary packages and lack of employment benefits. In addition, the saturation of specific job markets due to the oversupply of graduates can lead to lower starting salaries and reduced bargaining power for graduates since it creates a surplus of qualified candidates competing for limited job openings. Moreover, Cumulative Grade Point Average (CGPA) is the general benchmark in selecting candidates for a job, particularly for the education, health, and legal sectors (Luenendonk 2019).

Notably, graduates' employment and salary are also influenced by the critical factor of English proficiency. English has undoubtedly emerged as a prominent lingua franca that facilitates the communication between enterprises and business entities around the globe. Zainuddin et al. (2019) found that both employers and students agreed that English is essential for employability, with good grammar and a broad vocabulary range being significant qualities for landing a job. Additionally, Ting et al. (2017) revealed that most employers will appoint employees with high communication skills despite having moderate English proficiency. This demonstrates that both English proficiency and good communication skills can increase employment opportunities and career advancement, particularly among graduates. For this study, the Malaysian University English Test (MUET) score was used to measure the level of English proficiency among fresh graduates.

Past scholars have also discussed the influence of gender inequality in the employment sector. Such an issue

can worsen the compensation disparity, with women often facing additional obstacles in receiving equitable pay for their qualifications and skills. A study by Francesconi and Parey (2018) showed that male employees commonly earn more than their female counterparts. This is aligned with Zainol Abidin et al. (2016), who emphasised that wage differential mainly contributes to employer discrimination starting from the hiring stage. Furthermore, Zhao et al. (2017) and Bartual-Figueras et al. (2019) revealed that males earn more than females in engineering courses, while a contradicting scenario was reported in nursing courses. Female graduates were also found to be more informed about highly demanded skills in the industry than male graduates (Ang 2015). Additionally, having women in management reduced the gender earning gap for jobs with low qualifications but not for jobs with high qualifications (Adendroth et al. 2017).

It is also worth highlighting that earlier studies on graduates' income involved inconsistent methodology, and the interpretation of data was done through a wide range of techniques. For instance, the studies by Bartual-Figueras et al. (2019) and Zhao et al. (2017) used quantitative analysis to examine the frequency of specific events and the relationships between various parameters (contingency table). Sharil et al. (2023) employed regression analysis in a different study, whereas Abendroth et al. (2017) used a multilevel model because their data violated the independence assumption of traditional ordinary least square (OLS) estimators by having many levels. Meanwhile, Kadir et al. (2020) employed the partial least squares approach to comprehend the data better, which is similar to Soon et al. (2019), who used quantile estimation to examine various portions of the income range. It can be seen that each of these studies employed a different methodology to better understand the issue of graduate salaries. Examining how factors vary at various income levels involves splitting the data into different parts. Therefore, the present study applied the CHAID analysis to identify the determinants for graduates' starting salary as this graphical method can facilitate easier understanding and interpretation.

The argument thus far has established the importance of analysing the relationship between graduate salary and several characteristics, namely gender, academic performance (CGPA), field of study, English proficiency, employment category, and job classification. Such investigation is crucial to equip graduates with the knowledge necessary in making wise career selections. The findings will also offer invaluable guidance for employers in devising salary structures that can foster a sense of fairness and equity, thereby cultivating a more engaged and motivated workforce. Additionally, policymakers can draw upon this research to implement targeted interventions that promote merit-based rewards and cultivate a thriving job market that benefits all stakeholders.

METHODOLOGY

SOURCE OF DATA

The data used in this study were gathered from the online 2018 Graduate Tracer Study survey database developed by the Ministry of Higher Education (MoHE) Malaysia. It specifically focused on a Malaysian public university which offers various academic programmes ranging from traditional liberal arts to highly specialised technical and other STEM fields. A total of 1,485 respondents who were employed upon graduation were recruited for this study.

TABLE 1. Variable classification for the study

Variable	Classification
Gender	(1) Male, (2) Female
English proficiency / MUET	(1) Band 2, (2) Band 3, (3) Band 4, (4) Band 5
Field of study	(1) Literature & Social Sciences, (2) Sciences, (3) Technical, (4) Information Technology & Communication, (5) Education, (6) Business, Economics & Law
CGPA	(1) 2.00 – 2.69, (2) 2.70 – 3.19, (3) 3.20 – 3.69, (4) 3.70 – 4.00
Job sector	(1) Government, (2) GLCs, (3) Multinational Companies, (4) Local Companies, (5) Business, (6) Others
Job group	(1) Managers, (2) Professionals, (3) Technicians and Associate Professionals, (4) Clerical Support Workers, (5) Service and Sales Workers, (6) Skilled Agricultural, Forestry and Fishery Workers, (7) Craft and Related Trades Workers, (8) Plant and Machine Operators and Assemblers, (9) Elementary Occupation, (10) Armed Forces
Salary status	(1) Graduate Salary, (2) Non-graduate Salary

The independent variable of this study was salary status since it aimed to identify the significant variables contributing to graduates' starting salaries. This study categorised salary into two groups: graduate salary (RM2,500 and above) and non-graduate salary (below RM2,500). Table 1 shows the classification of variables used in the analysis.

CHAID ANALYSIS

Identifying the most significant variables that determine graduates' starting salary can be achieved by assessing thousands of potential subgroups depending on the number of predictors. This study used a decision tree with a specific Chi-square Automatic Interaction Detector (CHAID) analysis. It has the capability to visually display the relationship between variables by generating tree diagrams to determine the best variables that can explain the dependent variable. Generally, the decision tree is a binary split with no probabilistic model built and there is no assumption for the decision tree. This method is easier to understand and interpret as it can analyse all types of data without fulfilling the normality assumption. CHAID analysis is also suitable for splitting the variables in multiway splits while simultaneously preventing overfitting problems.

The CHAID analysis produced a series of subgroup merges and splits of nodes. Subgroups with the most similar salary status merged, while the most distinct subgroups were split into separate nodes. The process of producing the subgroups, merges, and splits was achieved through several steps. It began with a cyclical interrelation through each of the independent variables (predictor) using the Chi-square statistic to determine the pair of (predictor) categories with the least significant difference to the salary status (dependent variable). If the test for a given pair of predictor categories was not statistically significant (p-value $> \alpha$), the respective predictor categories were merged, followed by a repetition of the first step. However, if the test for a given pair of predictor categories was significant (p-value $\leq \alpha$), the Bonferroni adjusted p-value was computed for the predictor's set of categories if the setting was enabled. Next, the predictor variable with the smallest adjusted p-value was considered for the subsequent variable split. If the smallest (Bonferroni) adjusted p-value for any predictor was greater than alpha (adjusted p-value $> \alpha$), no further splits were performed, and the respective node would become a terminal node. This process continued iteratively until no further splits could be performed. Finally, measuring the goodness of fit in the model building was crucial. The model's ability to predict the target variables (classification accuracy) was determined using a confusion matrix, which was performed based on correct/incorrect test record counts.

RESULTS AND DISCUSSION

Table 2 presents the salary status of graduates involved in this study. It can be seen that 59.6% of graduates had a non-graduate salary ($\leq$ RM2,500) as their starting salary,

and only 40.4% of them managed to gain a graduate salary (> RM2,500). This relatively low percentage requires significant attention not only from the graduates themselves but also from stakeholders like employers and policymakers.

TABLE 2. Percentage of graduates' salary status

Salary Status	%
Graduate salary	40.4
Non-graduate salary	59.6
Total	100.0

Table 3 shows the descriptive statistics of the data obtained from the Graduate Tracer Study. The result indicated that 65.9% of the graduates were female, while the remaining 34.1% were male graduates. Nearly half of the graduates (49.8%) studied Literature and Social Science, followed by Sciences (24.6%) and Technical (13.9%). As for English proficiency, a majority of the graduates had MUET Band 3 (49.8%), while the least number of graduates (3.8%) had MUET Band 5. Regarding academic performance, 55.5% of the graduates had CGPA between 3.20 and 3.69, while 19.7% of them recorded excellent CGPA between 3.70 and 4.00. The job sector distribution showed that 37.8% and 25.2% of graduates worked in local and multinational companies, respectively. Further analysis of their job group showed that 55% of graduates worked in the professional job group, which was not surprising as they were bachelor's degree graduates. Meanwhile, 14.1% and 11.9% of them were in the Service and Sales as well as Clerical Support groups, respectively.

The CHAID analysis was used to identify the contributing variables to graduates' salary status. The complete decision tree analysis produced six branches and 15 nodes where the job sector, MUET, job group, CGPA, and field of study were important determinants in explaining the salary status. Figure 1 displays the complete decision tree for graduates' salary status (see APPENDIX A). A more precise explanation was also provided since the diagram performed unclear details of the node's display.

TABLE 3. Descriptive statistics – Graduate tracer study

Variable	%	Variable	%
Gender		Job Sector	
Male	34.1	Government	9.4
Female	65.9	GLCs	4.4
Field of study		Multinational Companies	25.2
Literature & Social Sciences	49.8	Local Companies	37.8
Sciences	24.6	Business	12.2
Technical	13.9	Others	11.0
Information Technology & Communication	6.0	Job Group	
Education	5.7	Managers	7.5
MUET		Professionals	55.0
Band 2	24.0	Technicians and Associate Professionals	5.9
Band 3	49.8	Clerical Support Workers	11.9
Band 4	22.4	Service and Sales Workers	14.1
Band 5	3.8	Skilled Agricultural, Forestry and Fishery	0.2
CGPA		Craft and Related Trades Workers	1.0
2.0 – 2.69	2.4	Plant and Machine Operators	0.3
2.7 – 3.19	22.5	Elementary Occupations	4.0
3.2 – 3.69	55.5	Armed Forces Occupations	0.1
≥ 3.7	19.7		
Total	100.0	Total	100.0

Job sector was the most important parental variable for salary status (Chi-square = 209.406, p-value = 0.000, df = 2). Figure 2 shows that this variable generated three nodes: Node 1 was for Business and Others, Node 2 was for Multinational Companies, and Node 3 contained Local Companies, Government, and Government-Linked Companies (GLCs). Graduate salary rate was mainly offered to graduates working in the Multinational

Companies job sector (70.6%), followed by those in the Local Companies, Government, and GLCs job sectors (34.7%) and the Business and Others job sectors (20.3%). The findings demonstrate that multinational corporations tend to offer more opportunities and greater salaries than the public or government sector, which is consistent with past research by Karl and Sutton (1998), Brown et al. (2004) and Makridis (2021).
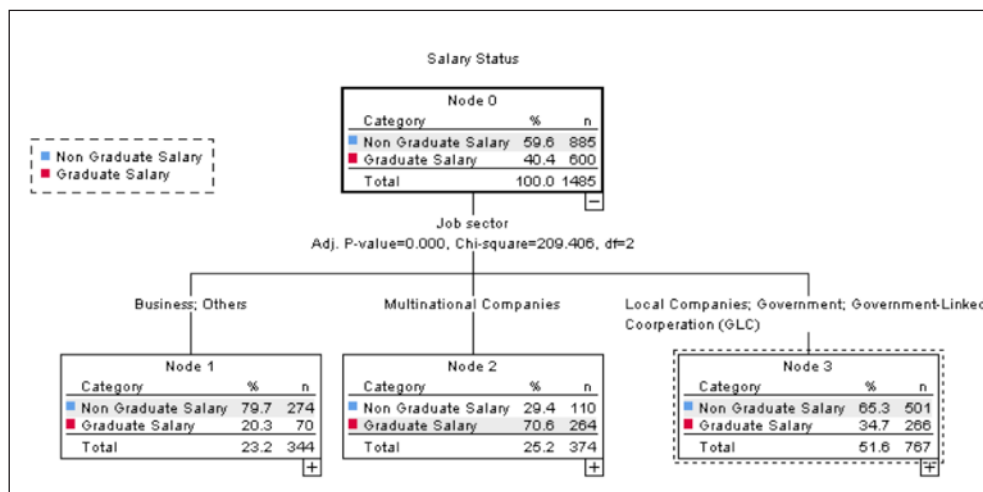

FIGURE 2. Parental Variable for Graduate Salary Status

Meanwhile, the results in Figure 3 showed that the determining variable of graduates' salary status for those in the Business and Others job sectors was MUET (Chi-square = 13.996, *p*-value = 0.001, df = 1). The variable was split into two: (1) Band 2 or less, and (2) higher than Band 2. Only 9.6% of graduates who obtained MUET Band 2 or less received a graduate salary rate, and such

rate increased to 26.5% for graduates who obtained MUET Band 3 and above. This suggests that having a high level of English proficiency not only increases graduates' employment opportunities (Ting et al. 2017; Zainuddin et al. 2019) but also expands the likelihood for them to receive commensurate payments based on their educational backgrounds.
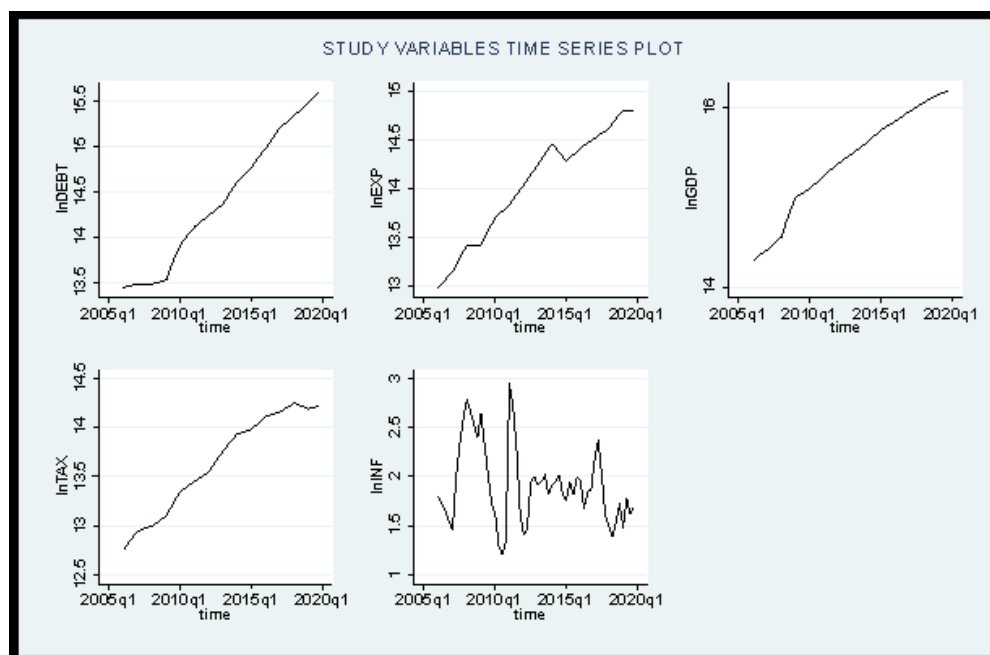

FIGURE 3. Classification variable for business and others job sector (Node 1)

Moreover, Figure 4 demonstrates that job group is an important determinant for Multinational Companies (Chi-square = 58.816, *p*-value = 0.000, df = 1). The graduates from Multinational Companies were further split into two groups, namely Node 6 (Professionals; Technicians and Associate Professionals; Craft and Related Trades Workers; Armed Forces Occupations) and Node 7 (Service and Sales Workers; Managers; Clerical Support Workers; Plant and Machine Operators and Assemblers; and Elementary Occupations).
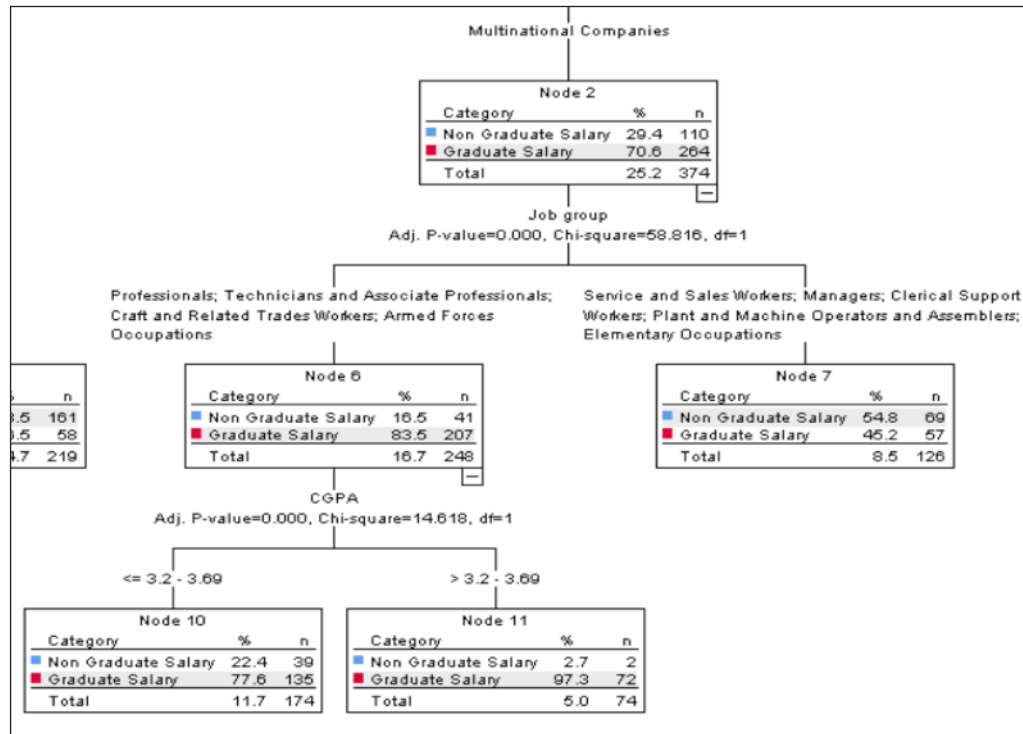

FIGURE 4. Classification Variable for Multinational Companies (Node 2)

The number of graduates in Node 6 graduates was almost double that of Node 7, with 83.5% and 45.2%, respectively. As expected, the professional job group showed parallel results between the level of education and the salary earned. This suggests that job group is an important determinant to graduates' starting salary. It is crucial for graduates to develop soft skills that are highly demanded by the industry to secure employment opportunities in excellent job groups for them to obtain a good starting salary.

CGPA also contributed to graduates' salaries (Chi-square = 14.618, *p*-value = 0.000, df = 1). Graduates from Node 6 were split further into two groups based on CGPA: (1) 3.69 or less, and (2) higher than 3.7. Those with the CGPA of 3.69 or less had a 77.6% chance of earning graduate salary rate. Whereas, graduates who attained CGPA higher than 3.7 and secured employment opportunities within the same job sector and job group would have a 97.3% chance to earn graduate salary rate. This demonstrates that higher CGPA will increase the likelihood of earning income at the graduate salary rate. Therefore, graduates must determine which companies to apply and strive to obtain the highest academic performance before entering the job market. The finding is also in line with Luenedonk (2019) who reported that the employment process for employees in the professional job groups of education, health, and legal sectors highly depends on CGPA.

MUET was also found to be a significant variable in attaining graduate salary for graduates in the Local Companies, Government, and GLCs job sectors (Chi-square = 65.996, *p*-value = 0.000, df = 1). This variable significantly split the branch into two categories: (1) Band 2, and (2) higher than Band 2. Graduates with Band 2 in this job sector had a 10.8% chance of gaining a graduate salary rate, but the opportunity increased almost four times (42.8%) if they achieved at least MUET Band 3. It indicates that graduates with higher MUET scores are more likely to be offered a graduate salary for any position. This highlights the prominence of having good communication skills, especially the English language, for better employability in the private and public sectors (Ting et al. 2017; Zainuddin et al. 2019).
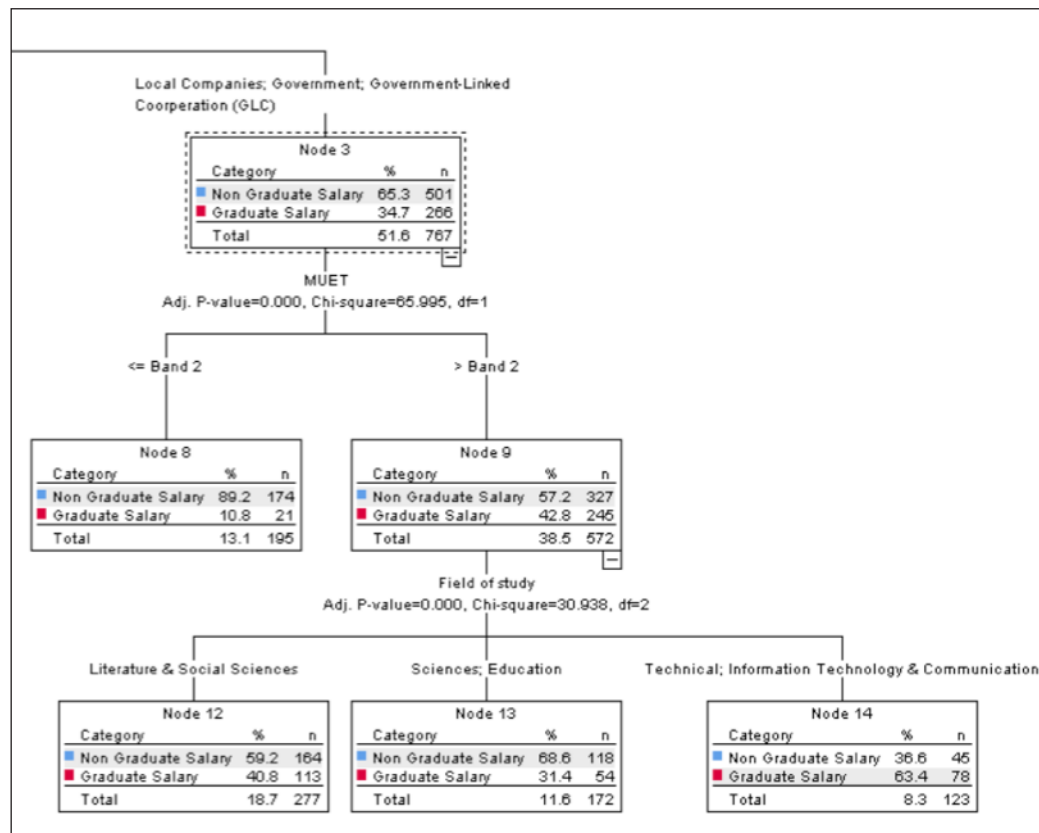
FIGURE 5. Classification variable for local companies, government, and GLCs Job Sectors (Node 3)

Another significant variable was field of study (Chi-square = 30.938, *p*-value = 0.000, df = 2). Figure 5 shows that graduates from Node 9 were split into three groups, namely: (1) Literature & Social Sciences, (2) Science and Education, and (3) Technical and Information Technology & Communication. Graduates from the Technical and Information Technology & Communication fields had the highest chance (63.4%) of gaining a graduate salary than other fields of study, such as Literature & Social Sciences (40.8%) as well as Science and Education (31.4%). This indicates that technical graduates have the highest probability of earning a graduate salary, which is in line with Zhao et al. (2017) who stated that engineering graduates have the most earning within the STEM field. As expected, field of study was a significant variable in determining graduates' starting salary.

Table 4 displays the measure of goodness of fit for this model using a confusion matrix. The results showed that the CHAID analysis accurately predicted 73% of the observations. Moreover, the model's sensitivity of 71.7% correctly predicted the "non-graduate salary" data, which was similar to the actual observation. In terms of predicting power (specificity rate), this model showed that 76.9% of the total overall graduate salary was correctly predicted.

TABLE 4. Confusion matrix for graduate salary status

Observed	Predicted		Per cent Correct
	Non-graduate salary	Graduate salary	
Non-graduate salary	799	86	90.3%
Graduate salary	315	286	47.6%
Per cent Correct	71.7%	76.9%	73.0%

As the data fit the model, it demonstrated that the five variables are indeed significant for predicting graduates' starting salary using the CHAID analysis. Each variable suggests different implications based on the importance of the variable to a model. The implications of these variables must be critically understood to plan the best strategies and programmes to increase future graduates' potential of earning a more reasonable salary based on their education level. This model is useful for forecasting graduates' starting salary as it is naturally simple to interpret and visualise the performance and has a good potential to provide accurate information on the matter.

In summary, the analysis revealed valuable insights into the factors influencing graduates' initial earnings and provided a deeper understanding of the dynamics at play in the job market. The findings of this study highlight the multifaceted nature of graduates' starting salaries. Only 40.4% of the graduates surveyed received a monthly starting salary of at least RM2,500. This suggests that a significant proportion of graduates face challenges in securing remunerative employment upon entering the job market. Among the significant contributors to salary discrepancies include job sector, English proficiency, job group, CGPA, and field of study – such information sheds light on the complex interplay of variables that influence initial earnings. The identified factors are aligned with a number of previous research. The influence of job sector on salaries is consistent with past studies that emphasise wage variation across different industries and sectors. Similarly, the role of English proficiency corroborates with existing literature that highlights the importance of language and communication skills in the globalised job market. The significance of CGPA echoes prior findings that highlight the relationship between academic performance and earning potential. Moreover, the influence of field of study and job group on salaries resonates with past research that underscores the impact of specialisation and job categorisation on remuneration.

CONCLUSION

In human capital development, it is imperative for graduates to develop the necessary skill sets to meet the expectations of future employers. This research found that nearly 60% of graduates had non-graduate salary as their starting salary. With 73% classification accuracy, the CHAID analysis revealed that the variables contributing to graduates' starting salary are job sector, MUET, job group, CGPA, and field of study. Job sector stands as an essential parental characteristic for graduate salary status. Meanwhile, Multinational Companies offer the highest graduate salary rate compared to other job sectors. Another contributing factor is English proficiency level as measured using MUET results. Graduates with higher MUET results have a better chance of getting a graduate salary rate across all job sectors except for Multinational Companies. Conversely, CGPA is also a significant variable for the Multinational Companies job sector.

This demonstrates that better academic performance will result in a better graduate salary probability. Although it may not be the most significant factor in predicting graduates' salary status, field of study carries a weight in certain situations, especially for the Local Companies and GLCs job sectors.

In conclusion, this study provides a comprehensive analysis of the factors concerning graduates' starting salaries. It has the potential to change the graduate employment landscape, attempting to bring in a time when qualifications are appropriately valued and opportunities are presented to recent graduates to commensurate their commitment and knowledge. A more balanced, prosperous, and inclusive working world will certainly be shaped as a result of our enlightening journey for future generations. To ensure that graduates are paid based on their skills and performance rather than their demographic characteristics, a triad collaboration between policymakers, higher education institutions, and employers is imperative to bridge the gap between academic curricula and industry needs. Addressing salary disparities and promoting an equitable employment market is important to connect the full potential of the nation's human capital. By understanding the factors influencing starting salaries, policymakers and employers can create more competitive and inclusive compensation plans, ultimately encouraging a diverse and engaged workforce for sustained economic growth and stability.

SUGGESTIONS FOR FUTURE RESEARCH

For future works, more predictive variables such as employment status, occupation group, and economic sector could be explored to determine their contribution to graduates' starting salary. The study may be expanded to involve other higher education institutions in Malaysia as more inputs and various situations can be captured through the analysis by looking at the nature of the institutions.

NOTES

[1] Gig economy is simply a big group of part-timers and freelancers working on a contractual or ad-hoc basis (Source: https://www.jobstreet.com.my/en/cms/employer/gig-economy-rise-freelancers-impact-hr/)

[2] STEM – science, technology, engineering, and mathematics

[3] BHASE – business, humanities, health, arts, social science, and education

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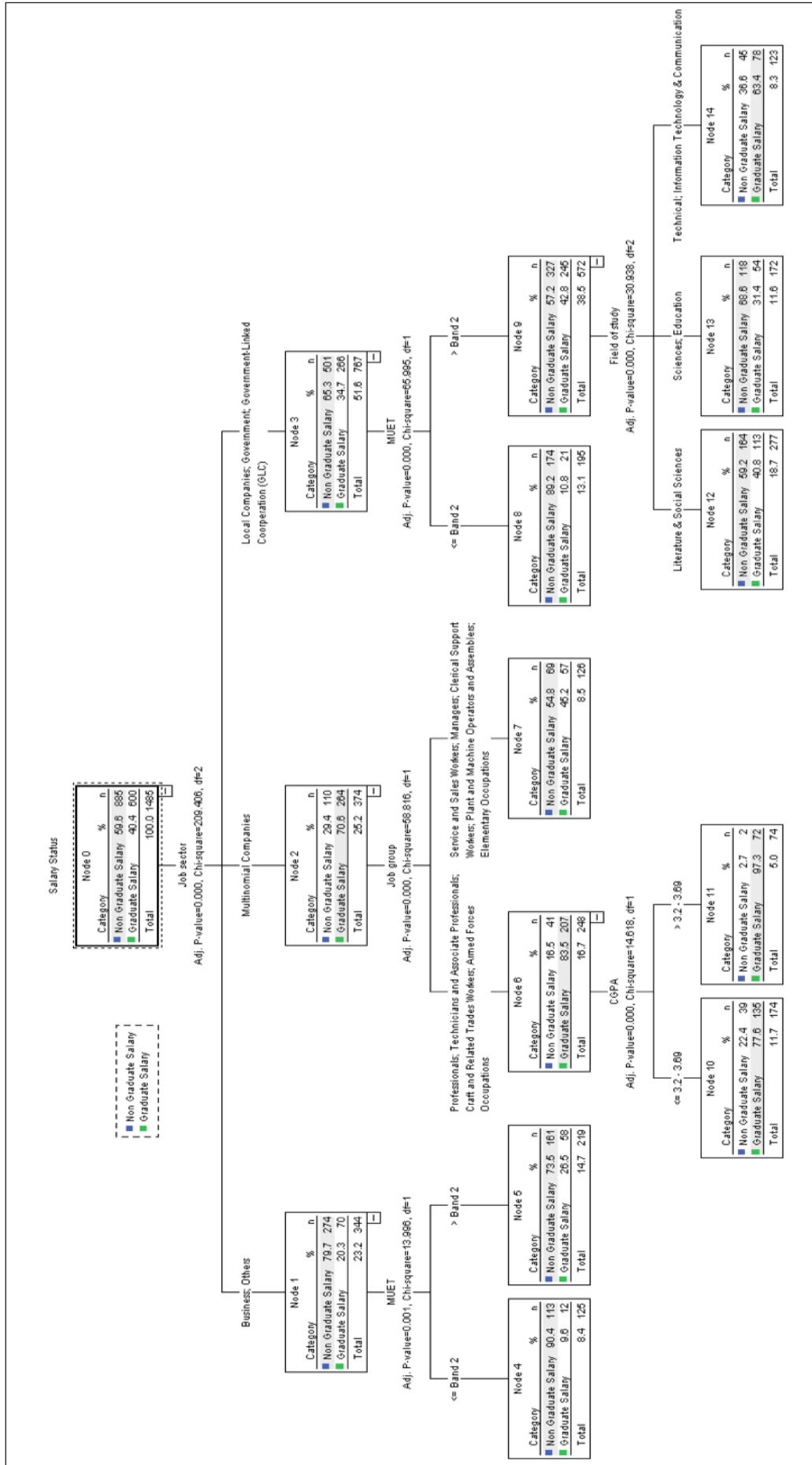Email: rohanaj@um.edu.my

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APPENDIX A

FIGURE 1. Decision tree for graduate salary status