

Transition to first employment: A survival analysis of university graduates from five cohorts

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Abstract: Graduate employability research often evaluates whether graduates obtain jobs, but the duration required to secure the first job is an equally important indicator of labor market transition. This study applies survival analysis to examine time-to-employment among graduates of a public university in languages, social sciences, and humanities in Vietnam. Using graduate tracer survey data from five cohorts, Kaplan–Meier estimation and Cox proportional hazards regression were employed to analyze the timing of first employment and factors associated with faster labor market entry. The outcome variable was time from graduation to first employment, measured in ordered intervals, with unemployed graduates treated as right-censored observations. Among 657 graduates, 607 (92.4%) had obtained first employment by the time of the survey. Most graduates entered the labor market rapidly: 526 (80.1%) obtained their first job within less than three months after graduation, and the median time-to-employment category was the earliest interval. Kaplan–Meier comparisons showed no statistically significant subgroup differences by sex, supplementary training, job–major alignment, or cohort. However, the adjusted Cox model identified a significant cohort effect: compared with the 2020 cohort, the 2022 cohort had a lower hazard of first employment, indicating a slower transition into the labor market (HR = 0.695, 95% CI: 0.532–0.908, $p = 0.0076$). Other factors, including sex, job–major alignment, supplementary training, knowledge suitability, and skills suitability, were not statistically significant. This study advances Vietnamese graduate employability research by shifting the focus from static employment status to the timing of first employment and by demonstrating the value of survival analysis for examining cohort-sensitive school-to-work transitions when overall employment rates are high.

Keywords: graduate employability; higher education; non-technical graduates; survival analysis; time to employment

1. Introduction

The transition from higher education to the labor market is a critical stage for graduates and an important indicator of the effectiveness of higher education systems. Attention has been paid not only to whether graduates obtain employment but also to how quickly they are able to enter the labor market. The duration between graduation and first employment reflects both individual preparedness and the responsiveness of the labor market, making it a useful measure of graduate employability [1, 2]. International research has shown that the school-to-work transition is influenced by

multiple factors, including academic performance, field of study, work experience, and labor market conditions. Graduates with stronger academic records or more practical experience tend to obtain employment more quickly, while economic downturns and labor market competition may delay entry into the workforce [3]. Institutional characteristics also play an important role, as employment outcomes differ across universities, disciplines, and national education systems [4]. However, a limitation in much employability research is that employment is often treated as a static outcome. Graduates are commonly classified as employed or unemployed at a given point in time, or compared in terms of income, job satisfaction, or job–major alignment. Although these indicators are valuable, they do not fully capture the process. The delayed entry into the labor market may reflect weaker career preparation, limited access to employment networks, skill mismatch, or unfavorable labor market conditions. Therefore, the timing of first employment should be examined as a distinct dimension of graduate employability rather than treated as a secondary detail. Duration-based approaches, such as survival analysis, allow researchers to examine how long graduates remain without employment and how different factors influence the speed of labor market entry [5]. Survival analysis has been widely used in labor economics and sociology to study unemployment duration, job search behavior, and career mobility because it can incorporate both completed and censored observations [6]. Recent graduate tracer studies have similarly applied Kaplan–Meier estimation, Cox proportional hazards regression, and accelerated failure-time models to identify factors associated with the duration of graduates’ transition into employment [7]. Studies using duration and survival models have shown that the transition to first employment varies according to graduates’ characteristics, prior work experience, field of study, and labor market conditions [8]. Graduates in Europe typically experience a rapid transition into employment, although the speed of transition varies across disciplines and economic contexts [3]. Moreover, cohort differences and macroeconomic conditions significantly influence the duration of unemployment after leaving education [9]. Examining the timing of employment provides additional insight beyond simple employment rates.

In recent years, graduate employability has become an important topic in Asian higher education systems due to the rapid expansion of university enrollment and increasing competition in the labor market. Studies in China, Korea, Japan, and Southeast Asia have shown that employment outcomes are influenced not only by academic performance but also by perceived competence, career preparation, and labor market demand. In China, the massification of higher education has intensified competition among graduates and increased the importance of skills and practical experience for successful labor market entry [10]. Studies in Korea and Japan have similarly emphasized that institutional prestige, field of study, and career preparation activities affect employment opportunities and transition speed after graduation [11,12]. Research in Southeast Asia has further highlighted the mismatch between university training and labor market needs, suggesting that graduates in social sciences and humanities may experience longer job search periods when their skills do not directly correspond to employer expectations [13,14]. These findings indicate that the duration of the transition from university to employment is shaped by both individual preparation

and structural conditions in the labor market.

In Vietnam, research on graduate outcomes has mainly focused on employment status, satisfaction, or income, while fewer studies have examined the duration of job search after graduation. Although employment rates among graduates are high, many graduates experience difficulties finding suitable jobs, particularly in fields related to social sciences and humanities, where career pathways are less clearly defined and more dependent on labor market conditions [15]. Recent Vietnamese evidence further suggests that graduate employability is highly context-dependent, with employers valuing not only formal knowledge but also adaptability, continuous self-learning, resilience, and context-specific attributes. This indicates that employability should be understood as a multidimensional construct rather than a simple employment outcome [16]. The rapid expansion of higher education in Vietnam has increased the number of graduates entering the labor market, leading to stronger competition and a growing concern about skill mismatch between university training and employer expectations [17, 18]. Previous research has also shown that graduates often need additional training or work experience before obtaining stable employment, suggesting that the transition from university to work may take longer for some groups of students [19]. As a result, the time required to obtain first employment may vary considerably across cohorts and individual characteristics, but this aspect has not been sufficiently analyzed in the Vietnamese context. This creates an analytical gap. A high employment rate may suggest favorable graduate outcomes, but it may conceal unequal transition experiences across cohorts or groups of graduates. Similarly, job–major alignment and supplementary training may be important for employment quality, but they may not necessarily explain the speed of obtaining the first job. As a result, the Vietnamese literature still lacks sufficient evidence on time-to-employment as a dynamic indicator of graduate employability. Understanding the timing of employment is important for graduates specializing in languages, social sciences and humanities, where employment outcomes are less directly linked to specific professional qualifications. Graduates from non-technical fields tend to follow more diverse and less predictable career paths, which may require longer periods of job search or additional skill development before entering the labor market [15, 17]. Evidence from graduate tracer research also indicates that waiting time to first employment can vary substantially by academic field, academic performance, and other graduate characteristics [20]. In such contexts, graduates may need additional time to explore job opportunities, acquire supplementary skills, or adapt to market demands. Analyzing time-to-employment can therefore provide a more nuanced understanding and can help identify differences that are not visible in cross-sectional indicators.

The novelty of the present study lies in its duration-based approach to graduate employability in the Vietnamese context. Previous research on graduate outcomes in Vietnam has provided important evidence on employment status, skills mismatch, job–major alignment, job satisfaction, and the relationship between higher education and labor market needs. However, less attention has been paid to the timing of the transition from graduation to first employment. By applying survival analysis, the present study examines not only whether graduates obtain employment but also

when the employment transition occurs, while also accounting for right-censored cases among graduates who had not yet obtained employment at the time of the survey.

This approach advances previous studies in Vietnam by introducing a dynamic perspective on graduate employability. It is particularly relevant for non-technical graduates, whose employment pathways are often diverse and less directly linked to a single qualification. In such fields, time-to-employment may reveal differences in labor market transition that are not visible when employability is measured only through employment rates. The study therefore contributes both methodologically, by demonstrating the usefulness of survival analysis for graduate tracer data, and contextually, by providing evidence on cohort-based differences in the speed of labor market entry among Vietnamese university graduates.

The present study addresses this gap by applying survival analysis to examine time-to-first-employment among graduates of a major public university specializing in languages, social sciences, and humanities. The analytical contribution of the study lies in shifting the focus from employment as a binary or cross-sectional outcome to employment as an event that occurs over time. This approach is useful because it allows the study to distinguish rapid from delayed labor market entry among graduates who may eventually become employed. It also incorporates right-censored cases, namely graduates who had not yet obtained employment at the time of the survey. It allows cohort differences to be examined, which is important in a labor market affected by changing economic conditions and post-pandemic uncertainty.

The study aims to answer the following questions:

- (1) How long does it take graduates to obtain their first job after graduation?
- (2) Do individual characteristics such as sex, perceived suitability of knowledge and skills, job–major alignment, and supplementary training influence the duration of the job search?
- (3) Are there differences across graduation cohorts in the speed of transition from university to employment?

By focusing on time-to-employment, this study contributes to the literature on graduate employability by providing a dynamic perspective on the school-to-work transition in the Vietnamese context and by demonstrating the usefulness of survival analysis for evaluating higher education outcomes.

2. Materials and methods

2.1. Research design

This study used a quantitative survival analysis to examine the duration from graduation to the first job. The outcome variable was the number of months between graduation and the first job. Graduates who had not obtained a job at the time of the survey were treated as right-censored cases.

2.2. Data source

Data were obtained from a graduate tracer survey conducted at a public university in languages, social sciences, and humanities in Vietnam. The survey collected

information on demographic characteristics, academic performance, employment history, and training experiences. Only respondents with valid information on time to first job were included in the survival analysis.

2.3. Variables

The outcome variable was time to first employment, measured in ordered intervals, with an event indicator coded as 1 for graduates who had obtained employment and 0 for right-censored cases. The predictors included in the final survival analysis were sex, graduation cohort, job–major alignment, pre-employment supplementary training, perceived knowledge suitability, and perceived skills suitability. Grade point average (GPA) was not included in the final Cox proportional hazards model because academic performance information was incomplete in the survival dataset, and its inclusion would have substantially reduced the analytic sample.

2.4. Statistical analysis

Descriptive statistics were used to summarize the distribution of time to employment. Kaplan–Meier survival curves were estimated to compare employment probabilities across groups. Survival analysis was conducted to examine the duration from graduation to first employment. The time from graduation to first employment was measured using four ordered categories (<3 months, 3–6 months, 6–12 months, >12 months) rather than exact dates. This operationalization was determined by the structure of the original graduate tracer survey, which collected time-to-first-employment using predefined response categories. Therefore, the survival analysis was based on ordered time intervals. In this context, the estimated survival probabilities and hazard ratios should be interpreted as reflecting relative differences in transition timing across broad intervals, rather than exact month-by-month changes in employment probability. This approach allows the analysis to distinguish between early and delayed labor market entry while acknowledging that variation within each interval cannot be observed. In survival analysis, these categories were treated as discrete time intervals. Kaplan–Meier estimation was used to describe the distribution of time to employment, and Cox proportional hazards regression was applied to assess the association between explanatory variables and the speed of labor market entry. Because the time variable is ordinal, the survival estimates should be interpreted as relative differences in transition timing rather than exact durations. Cox proportional hazards regression was used to identify predictors of faster employment. All statistical analyses were performed using IBM SPSS Statistics 28.

3. Results

3.1. Sample characteristics

The survival analysis included 657 graduates. Of these, 607 graduates (92.4%) obtained a first job by the time of the survey and were treated as observed events, while

50 (7.6%) remained unemployed and were treated as right-censored cases. The sample was predominantly female (93.8%), and the largest cohort was the 2022 graduating class (32.7%), followed by 2020 (20.1%), 2024 (19.6%), 2023 (18.3%), and 2021 (9.3%). In terms of job–major alignment, 40.5% reported an exact match, 40.3% reported a related job, and 11.6% reported an unrelated job; 7.6% were missing on this variable, corresponding largely to the unemployed group. Pre-employment supplementary training was reported by 39.7% of respondents, while 52.4% reported no such training (**Table 1**).

Table 1. Sample characteristics for the survival analysis ($N = 657$).

Variable	Category	<i>n</i>	%
Sex	Female	616	93.8
	Male	41	6.2
Cohort	2020	132	20.1
	2021	61	9.3
	2022	215	32.7
	2023	120	18.3
	2024	129	19.6
Employment outcome	Employed (event observed)	607	92.4
	Censored/unemployed	50	7.6
Job–major alignment	Not related	76	11.6
	Related	265	40.3
	Exact match	266	40.5
	Missing	50	7.6
Supplementary training before employment	No	344	52.4
	Yes	261	39.7
	Missing	52	7.9

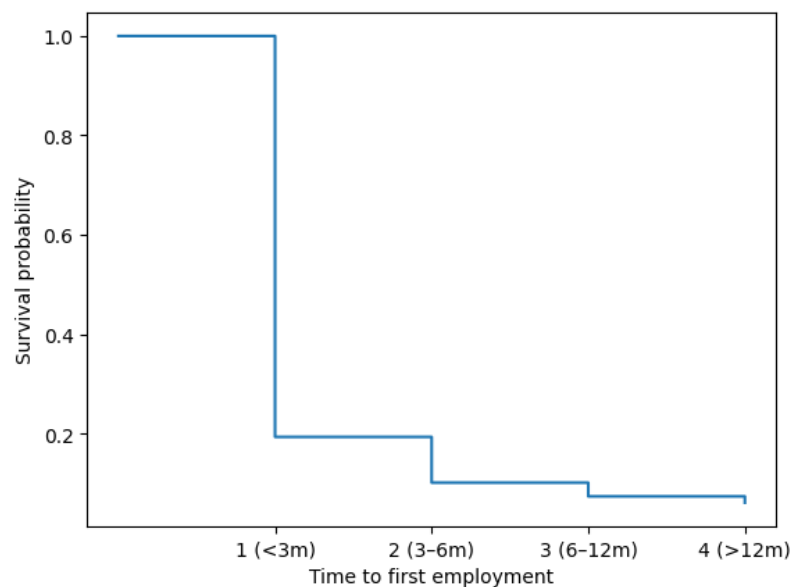
3.2. Descriptive results for time to first employment

The distribution of time to first employment indicated a rapid transition into the labor market. The mean duration category was 1.39, and the median duration category was 1.00, showing that the typical graduate obtained a first job within the earliest interval after graduation. Most graduates, 526 cases (80.1%), secured employment within the first-time category, corresponding to less than three months after graduation. A further 60 graduates (9.1%) obtained employment in the second category, 18 (2.7%) in the third category, and 53 cases (8.1%) were classified in the final category, which included both those taking longer than twelve months and censored late cases (**Table 2**).

The Kaplan–Meier survival function showed a steep decline during the earliest interval. The probability of remaining without first employment was 0.199 at the end of the first interval, 0.108 at the end of the second, 0.081 at the end of the third, and 0.076 at the end of the final interval. This pattern indicates that the largest reduction in unemployment occurred very early in the post-graduation period, with only modest decreases thereafter (**Figure 1**).

Table 2. Descriptive statistics for time to first employment ($N = 657$).

Indicator	Value	
N	657	
Mean duration category	1.39	
Median duration category	1.00	
Minimum	1	
Maximum	4	
Time to first employment	n	%
<3 months	526	80.1
3–<6 months	60	9.1
6–12 months	18	2.7
>12 months/censored late cases	53	8.1
Kaplan–Meier survival estimates	Survival probability	
Time point 1	0.199	
Time point 2	0.108	
Time point 3	0.081	
Time point 4	0.076	

**Figure 1.** Kaplan–Meier survival curve for time to first employment after graduation.

Note: The horizontal axis represents ordered categories of time to first employment (1 = <3 months, 2 = 3–6 months, 3 = 6–12 months, 4 = >12 months). The vertical axis shows the probability of remaining unemployed.

3.3. Kaplan–Meier estimates by subgroup

Kaplan–Meier estimates were compared across key subgroups to explore differences in the timing of first employment after graduation. To examine whether the transition from graduation to employment varied across graduation cohorts, Kaplan–Meier survival curves were estimated separately for each cohort (**Figure 2**). The survival curves indicate that most graduates in all cohorts entered the labor market relatively quickly, as shown by the steep decline in survival probability during the earliest interval. However, some differences between cohorts were observed. Graduates from the 2021 cohort showed the fastest transition into employment, with

the survival probability decreasing more rapidly than in other cohorts during the first interval. In contrast, the 2023 cohort maintained a higher survival probability for a longer period, suggesting that graduates from this cohort required more time to obtain their first job. The 2020, 2022, and 2024 cohorts followed similar intermediate patterns, with survival curves declining at comparable rates. Although these differences were not large, the curves suggest that the timing of labor market entry may vary across graduation years, possibly reflecting differences in external conditions affecting particular cohorts.

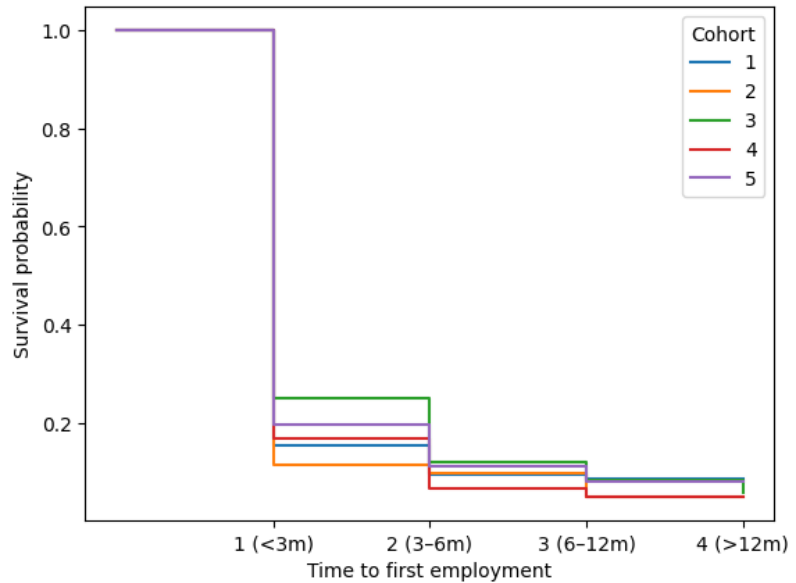


Figure 2. Kaplan–Meier survival curves for time to first employment by graduation cohort.
Note: The horizontal axis represents ordered categories of time to first employment (1 = <3 months, 2 = 3–6 months, 3 = 6–12 months, 4 = >12 months). The vertical axis shows the probability of remaining unemployed.

The Kaplan–Meier survival estimates for each subgroup are presented in **Table 3**. The table shows the survival probabilities and median duration categories for the main groups included in the analysis. Across all subgroups, the median duration of time to first employment fell within the earliest interval, indicating that the typical graduate obtained employment within the first few months after graduation. Differences between groups were generally modest, although some variation was observed across cohorts, sex, and training status. These results suggest that while most graduates entered the labor market quickly, the speed of transition was not identical for all groups.

Table 3. Kaplan–Meier estimates of time to first employment by key subgroups.

Grouping variable	Group	<i>n</i>	Median survival time	Survival at time 1	Survival at time 2	Survival at time 3	Survival at time 4	Log-rank <i>p</i>
Sex	Female	616	1.0	0.193	0.102	0.080	0.075	0.268
	Male	41	1.0	0.293	0.195	0.098	0.098	
Pre-employment training	No	344	1.0	0.131	0.032	0.009	0.000	0.950
	Yes	261	1.0	0.138	0.038	0.000	0.000	
Job–major alignment	Unrelated	76	1.0	0.211	0.026	0.013	0.000	0.171
	Related/Exact	531	1.0	0.122	0.036	0.004	0.000	

Note: Subgroup Kaplan–Meier estimates for pre-employment training and job–major alignment were calculated using cases with valid responses for each grouping variable.

In **Table 3**, missing cases were excluded from these subgroup comparisons.

Because missing values largely corresponded to unemployed or censored graduates, the exclusion of missing cases reduced the number of censored observations in some subgroup estimates. Therefore, survival probabilities of 0.000 at later time points should be interpreted cautiously and do not necessarily indicate that all graduates in the full sample had obtained employment.

3.4. Log-rank tests

Log-rank tests were used to assess whether the observed subgroup differences in survival distributions were statistically significant. No significant differences were found for sex ($p = 0.268$), pre-employment training ($p = 0.950$), or job–major alignment ($p = 0.171$). The overall comparison across cohorts was also not statistically significant ($p = 0.404$). These results suggest that, in unadjusted survival comparisons, the timing of first employment did not differ significantly across these groups in the uploaded dataset (Table 4).

Table 4. Log-rank tests for equality of survival functions.

Comparison	Test statistic	<i>p</i> -value
Sex (female vs. male)	1.225	0.268
Pre-employment training (no vs. yes)	0.004	0.950
Job–major alignment (unrelated vs. related/exact)	1.877	0.171
Cohort (2020–2024, overall)	4.015	0.404

3.5. Cox proportional hazards model

A multivariable Cox proportional hazards model was estimated using the complete-case sample ($n = 605$) to examine the net effects of the predictors on the hazard of obtaining first employment. In this model, a hazard ratio (HR) above 1 indicates a faster transition into employment, whereas a hazard ratio below 1 indicates a slower transition. The only statistically significant predictor was cohort. Compared with the 2020 cohort, graduates from the 2022 cohort had a significantly lower hazard of obtaining first employment (HR = 0.695, 95% CI: 0.532–0.908, $p = 0.0076$), indicating a slower transition into the labor market. No significant differences were found for the 2021, 2023, or 2024 cohorts relative to the 2020 cohort. Sex showed a marginal association with the employment hazard. Male graduates had a lower hazard of first employment than female graduates (HR = 0.746, 95% CI: 0.531–1.047, $p = 0.090$), although this did not reach conventional statistical significance. Knowledge suitability also approached significance, with higher perceived knowledge suitability associated with a somewhat faster transition into employment (HR = 1.172, 95% CI: 0.973–1.411, $p = 0.094$). In contrast, job–major alignment, pre-employment training, and skills suitability were not significant predictors in the adjusted model. The model diagnostics indicated acceptable predictive performance. The concordance index was 0.671, suggesting moderate discrimination. The concordance index measures the model’s ability to correctly rank individuals according to their predicted timing of first employment. A value of 0.5 indicates discrimination no better than chance, while higher values indicate better predictive ordering. The overall likelihood ratio test was

statistically significant ($p = 0.042$), indicating that the model provided a better fit than the null model (Table 5).

Table 5. Cox proportional hazards model for time to first employment (complete-case sample $n = 605$).

Covariate	β	SE	HR	95% CI for HR	p -value
Sex (male vs. female)	-0.2933	0.1732	0.7458	0.5311–1.0473	0.0904
Job–major alignment	0.0479	0.0705	1.0490	0.9137–1.2044	0.4971
Pre-employment training	0.0029	0.0852	1.0029	0.8486–1.1852	0.9730
Knowledge suitability	0.1587	0.0948	1.1720	0.9732–1.4114	0.0941
Skills suitability	-0.0452	0.0895	0.9559	0.8020–1.1392	0.6140
Cohort 2021 vs. 2020	-0.1098	0.1659	0.8960	0.6472–1.2404	0.5082
Cohort 2022 vs. 2020	-0.3640	0.1363	0.6949	0.5320–0.9077	0.0076
Cohort 2023 vs. 2020	-0.0863	0.1453	0.9173	0.6899–1.2196	0.5527
Cohort 2024 vs. 2020	-0.1409	0.1504	0.8686	0.6468–1.1663	0.3487

The survival results show the median transition occurring within the first three months. Although Kaplan–Meier comparisons did not reveal statistically significant subgroup differences, the multivariable Cox model indicated that cohort effects mattered, particularly for the 2022 cohort, which experienced a significantly slower transition than the 2020 cohort. Other factors showed non-significant patterns.

4. Discussion

This study applied survival analysis to examine the duration from graduation to first employment among non-technical graduates of a public university. Unlike studies that evaluate employability using only employment status, the present analysis focused on the timing of the transition into the labor market. The results show that most graduates obtained their first job quickly, but meaningful variation existed across cohorts and, to a lesser extent, across individual characteristics. These findings support previous research suggesting that the school-to-work transition should be viewed as a dynamic process rather than a single outcome measured at one point in time [5,6].

The rapid transition observed in this study may be explained by several contextual and behavioral factors. First, many graduates may have begun job searching before formal graduation, which would shorten the observed interval between graduation and first employment. This is particularly common in fields such as languages, social sciences and humanities, where students may enter a wide range of service, education, administrative, translation, communication, and business-related roles. Second, graduates may be willing to accept initial employment opportunities quickly in order to gain work experience, even when the first job is not fully aligned with their major or long-term career expectations. Therefore, the short time-to-employment observed in this study should be interpreted as evidence of rapid labor market entry, but not necessarily as evidence of high job quality, stable employment, or optimal job–major matching. This distinction is important because employability includes not only whether and how quickly graduates obtain work but also the suitability, sustainability, and developmental value of that employment.

The Kaplan–Meier estimates indicated that the transition to employment was

generally rapid, with the median survival time falling within the earliest interval after graduation. This pattern is consistent with international studies showing that the probability of obtaining employment is highest immediately after leaving education and declines over time [3, 8, 9]. Similar results have been reported in European surveys, where most graduates find employment within a short period, while a smaller group experiences prolonged job searches due to skill mismatch or unfavorable labor market conditions [3]. Subgroup comparisons suggested modest differences across sex, supplementary training, and job–major alignment, but these differences were not statistically significant in the log-rank tests. The absence of strong effects for individual characteristics in the unadjusted survival curves may indicate that the speed of labor market entry is influenced by multiple interacting factors rather than by any single variable. Previous research has also shown that employability outcomes are shaped by a combination of personal, institutional, and economic factors, making it difficult to isolate the effect of individual characteristics alone [2,4].

The absence of statistically significant differences in the Kaplan–Meier comparisons may also reflect the relatively compressed timing of first employment in the sample. Because a large majority of graduates obtained employment within the earliest interval, there was limited variation in the outcome for subgroup differences to emerge clearly. In this situation, traditional group comparisons may underestimate more subtle differences in transition pathways. Graduates may enter employment at similar speeds but differ in job quality, income, occupational stability, or the degree of alignment between their university training and job responsibilities. This supports the argument in previous graduate employability research that employment status and transition speed should be interpreted together with qualitative dimensions of employment, rather than as complete indicators on their own.

The Cox proportional hazards model provided additional insight by examining the joint effects of several predictors. In the multivariable analysis, graduation cohort was the only statistically significant factor, with the 2022 cohort showing a slower transition into employment than the 2020 cohort. This result suggests that external conditions, such as labor market demand or economic uncertainty, may play a substantial role in determining how quickly graduates obtain their first job. Cohort effects have been reported in previous studies of graduate employment, where macroeconomic fluctuations and changes in labor market structure influenced the duration of unemployment after graduation [1,9]. This cohort effect may reflect broader labor market disruption during and after the COVID-19 pandemic. Recent studies have shown that the pandemic affected the university-to-work transition by disrupting recruitment processes, weakening employer demand, and requiring universities and organizations to adapt their career preparation systems [21,22].

The rapid transition into employment may reflect early job search behavior and the broad range of occupational pathways available to non-technical graduates. However, rapid entry into employment should not necessarily be interpreted as evidence of high job quality or strong job–major fit, as some graduates may accept transitional or partially related jobs in order to enter the labor market quickly. This distinction may also explain why supplementary training and job–major alignment were not significant

predictors of transition speed. These factors may influence the quality, stability, or suitability of employment more than the timing of first employment itself. By contrast, the significant cohort effect suggests that graduation-year conditions, including labor market uncertainty and post-pandemic recruitment patterns, may have shaped the speed of employment transition. This finding is consistent with prior research showing that school-to-work transitions are influenced not only by individual characteristics but also by broader economic and institutional contexts.

The slower transition observed among the 2022 cohort may reflect cohort-specific labor market conditions rather than individual characteristics alone. Graduates from this cohort entered the labor market during a period still affected by the consequences of the COVID-19 pandemic, including delayed recruitment, uncertainty in service-sector employment, and changing employer demand. These conditions may have been particularly relevant for graduates in languages, social sciences, and humanities, whose employment pathways are often distributed across sectors such as education, tourism, services, administration, communication, and international business. Some of these sectors were strongly affected by pandemic-related disruption and uneven recovery. Although the present dataset does not directly measure macroeconomic indicators or employer-side hiring demand, the significant cohort effect suggests that the timing of labor market entry should be interpreted in relation to the broader economic and institutional context of each graduation year.

Other variables, including sex, perceived suitability of knowledge, and perceived suitability of skills, showed suggestive but non-significant associations with the hazard of employment. These findings are consistent with studies conducted in Asian higher education contexts, where self-perceived competence and academic preparation are related to employability but do not always predict immediate employment outcomes [13,15]. Graduates from social science and humanities programs often enter diverse occupational fields, which may reduce the direct relationship between academic preparation and the speed of obtaining the first job. Previous survival-based tracer studies have likewise found substantial differences in waiting time according to field of study and academic performance [20]. The lack of significant effects for job-major alignment and supplementary training in the adjusted model should also be interpreted cautiously. Previous research has shown that alignment and additional training are often more strongly associated with job quality or long-term career development than with the speed of obtaining the first job [2,4]. This interpretation is also supported by recent evidence that employability challenges involve not only whether they obtain work but also the adequacy of internships, professional and technical skills, access to job information, language competence, soft skills, and curriculum relevance [23]. It is also consistent with the literature, which views employability-related attributes and training as resources that may shape career quality, adaptability, and longer-term development rather than only the speed of first employment [16,24]. Graduates may accept temporary or unrelated jobs in order to enter the labor market quickly, while those seeking positions closely related to their field of study may experience a longer search period. Therefore, time-to-employment and job quality should be considered complementary rather than identical indicators of employability.

The non-significant effects of supplementary training and job–major alignment require careful interpretation. Although these variables did not significantly predict the speed of transition into first employment in the adjusted model, they remain conceptually important for understanding graduate employability. Supplementary training may indicate that graduates are attempting to strengthen their skills, improve their labor market readiness, or compensate for perceived gaps between university training and employer expectations. However, such training may not immediately shorten the time needed to obtain the first job. In some cases, graduates who undertake additional training may delay labor market entry in order to improve their qualifications before applying for employment. In other cases, supplementary training may influence later outcomes, such as job quality, income, promotion opportunities, or career stability, rather than the timing of first employment itself. Similarly, job–major alignment should not be interpreted only as a factor that accelerates employment. Graduates may obtain work quickly by accepting jobs that are only partly related or unrelated to their field of study, especially when immediate income or work experience is prioritized. By contrast, graduates who seek jobs closely aligned with their major may require a longer search period. Therefore, the absence of a significant association between job–major alignment and time-to-first-employment does not mean that alignment is unimportant. Rather, it suggests that employment speed and employment quality represent different dimensions of graduate employability. Future studies should examine whether supplementary training and job–major alignment are more strongly associated with job satisfaction, income, career progression, and long-term occupational stability than with the timing of first employment alone.

The findings demonstrate that survival analysis provides a useful methodological approach for evaluating graduate outcomes because it captures the timing of labor market entry and allows comparison across cohorts and individual characteristics [7]. In contexts where overall employment rates are high, analyzing the duration of job search can reveal differences that are not visible in cross-sectional indicators. Traditional cross-sectional approaches cannot capture differences in the timing of employment, especially when most graduates eventually find jobs. Event history and survival models allow researchers to analyze the dynamic process of transition from education to work and to identify factors associated with faster or slower entry into the labor market [5, 6]. Applying this approach in the Vietnamese context contributes to the growing literature on graduate employability in developing economies, where rapid expansion of higher education has increased competition in the labor market and made the transition from university to work more complex [1, 15]. The current findings provide implications for universities, policymakers, and students by highlighting the importance of how quickly they are able to enter the labor market. The differences across cohorts indicate that the transition from university to employment is not uniform. Monitoring time-to-employment can therefore serve as a useful indicator of how effectively higher education prepares students for the labor market, complementing traditional measures such as employment rates and income levels [1, 2]. For universities, the results suggest that career preparation should begin before graduation. The steep decline in the survival curve during the earliest interval indicates that many employment

opportunities occur soon after graduation, and graduates who are not ready to enter the labor market at that stage may experience longer periods of unemployment. Previous studies have emphasized that universities should integrate career guidance, internships, and practical training into the curriculum in order to improve graduates' readiness for employment [3, 4]. In particular, programs in languages, social sciences, and humanities often lead to diverse career paths, which makes early career orientation especially important. The significant cohort effect observed in the Cox model also has important implications for institutional and national policy. Differences between graduation years indicate that external conditions, such as economic fluctuations or changes in demand, can influence how quickly graduates obtain employment. Similar cohort effects have been reported in studies of youth employment and school-to-work transition, where economic downturns or structural changes in the labor market resulted in longer unemployment durations for particular groups of graduates [6,9]. Universities should therefore adjust career support strategies according to labor market conditions, and policymakers should consider graduate transition indicators when evaluating the performance of higher education systems.

Another possible explanation for the cohort differences observed is the impact of the COVID-19 pandemic. The pandemic reduced job opportunities for young people worldwide and increased the difficulty of obtaining first employment [25,26]. In Asian countries, the pandemic led to hiring freezes and delayed recruitment processes [22,27]. The significant cohort effect should be interpreted cautiously. Although the COVID-19 pandemic provides an important background for understanding graduate employment during this period, the observed pattern does not support a simple direct-pandemic explanation. Vietnam's most acute labor market disruption occurred mainly in 2021, whereas the Cox model showed a significantly slower transition for the 2022 cohort compared with the 2020 cohort, while the 2021 cohort did not differ significantly from the reference group. This suggests that the 2022 cohort effect may reflect delayed or indirect post-pandemic labor market adjustments rather than the immediate impact of lockdowns. Possible explanations include changes in recruitment cycles, sector-specific hiring recovery, restructuring of service and education-related employment, or increased competition for entry-level positions after the reopening period.

In the Vietnamese context, although overall graduate employment rates remained relatively stable, the pandemic created short-term uncertainty in the labor market, especially in the service, education, and tourism sectors, which are common employment fields for graduates of universities specializing in languages, social sciences, and humanities [28,29]. Such conditions may explain why some cohorts in the present study showed slower transitions into employment. These findings suggest that cohort effects in time-to-employment may reflect broader macroeconomic conditions rather than individual characteristics alone. For policymakers, the results highlight the value of using duration-based indicators when assessing graduate outcomes. Employment rates alone may give the impression that graduates are successfully entering the labor market, but survival analysis shows that some graduates require longer periods to find their first job. Research has suggested that the length of the transition to work is an important dimension of employability and should

be included in national monitoring systems [1]. Incorporating time-to-employment into graduate surveys may help identify structural problems such as skill mismatch, insufficient career guidance, or an imbalance between university enrollment and labor market demand [13]. The findings also have implications for students themselves. The rapid transition observed among many graduates suggests that preparation during the final stage of university is crucial. Students who delay career planning until after graduation may miss early employment opportunities and face longer job search periods. Studies on graduate employability have shown that students who actively develop transferable skills, gain work experience, and seek career advice during their studies tend to adapt more quickly to the labor market [13,15]. Even when individual characteristics are not statistically significant predictors in a specific model, overall readiness at the time of graduation remains an important factor in reducing the duration of unemployment.

This study extends previous Vietnamese graduate employability research. It moves beyond the common cross-sectional focus on employment status by examining time-to-first-employment as an outcome. This is important because high employment rates may conceal differences in the duration of job search and the speed with which graduates enter the labor market. Next, by using survival analysis, the study incorporates both observed employment events and censored cases, providing a more appropriate framework for analyzing graduate transition data than models that exclude unemployed graduates or treat employment only as a binary outcome. Moreover, the study identifies cohort differences in transition speed, suggesting that graduate employability should be understood not only as an individual-level outcome but also as a process shaped by graduation-year conditions and the broader labor market context. These contributions are especially relevant in Vietnam, where rapid higher education expansion, skill mismatch, and changing labor market demand have made the transition from university to work increasingly complex.

Together, these findings contribute to the graduate employability literature in two ways. They show that in contexts where overall employment rates are high, time-to-employment can provide a more sensitive indicator of graduate transition. A high employment rate may conceal differences in how quickly graduates enter the labor market and which cohorts experience delayed transitions. Second, the findings support the value of survival analysis for higher education outcome research. By treating first employment as an event that occurs over time, survival analysis allows researchers to examine both completed transitions and censored cases, thereby offering a more dynamic view of employability than conventional cross-sectional approaches. This is particularly useful for universities and policymakers seeking to monitor the effectiveness of career preparation, internship systems, and graduate support services. These findings both confirm and extend previous research on graduate employability. The present findings also indicate that transition speed should not be equated with employment quality. In this study, variables such as job–major alignment and supplementary training did not significantly predict time-to-first-employment, suggesting that graduates may obtain work quickly even when the first job is not fully aligned with their field of study or long-term career expectations. This partly differs

from studies that emphasize alignment and additional training as key employability factors and suggests that these factors may be more relevant to job quality, income, or career stability than to the timing of first employment. The significant cohort effect further supports the view that the school-to-work transition is shaped not only by individual preparedness but also by broader labor market conditions affecting each graduation year.

Several limitations should be mentioned. First, the measurement of time to first employment was based on ordered categories rather than exact dates or months, which reduced the precision of the survival analysis. For this reason, the hazard ratios should be interpreted as relative differences in the speed of transition across ordered time intervals, rather than precise estimates of month-by-month employment hazards. Second, the survival analysis assumes non-informative censoring. In this study, graduates who had not obtained employment at the time of the survey were treated as right-censored cases. However, this assumption may not fully hold if unemployed graduates remain censored because they face specific barriers to employment, such as weaker job search networks, limited employability skills, personal constraints, or unfavorable local labor market conditions. Next, some variables contained missing values, which reduced the number of cases available for multivariable analysis. The sample was highly imbalanced by sex; therefore sex-based comparisons should be interpreted cautiously. GPA could not be included in the final Cox proportional hazards model because academic performance information was incomplete in the survival dataset. Data collected at a single major public university specializing in languages, social sciences, and humanities may not fully represent other types of institutions. The present analysis focused on the timing but did not evaluate job quality, income level, or long-term career development of the first employment. Finally, the study did not include detailed information about macroeconomic conditions or labor market demand during each cohort year. The significant cohort effect observed in the Cox model suggests that external factors may play an important role in determining how quickly graduates find employment.

5. Conclusion

This study examined time-to-first-employment among graduates of a Vietnamese public university using Kaplan–Meier estimation and Cox proportional hazards regression. Among 657 graduates, 607, or 92.4%, had obtained first employment by the time of the survey, and 526, or 80.1%, found their first job within less than three months after graduation. Kaplan–Meier subgroup comparisons showed no statistically significant differences by sex, pre-employment supplementary training, job–major alignment, or cohort. In the adjusted Cox model, graduation cohort was the only statistically significant predictor, with the 2022 cohort showing a slower transition than the 2020 cohort. These findings suggest that time-to-employment can complement conventional employment-rate indicators by capturing the speed of labor market entry. However, the results should be interpreted cautiously due to interval-based time measurement, missing data, and the absence of job quality, income, and labor market indicators. Future studies should examine both the timing and quality of graduate

employment transitions.

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