University-Business Collaboration, Technical Training, and Youth First Employment: Evidence from Honduran Employers

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***Abstract*— Youth transition to employment remains a persistent socioeconomic challenge in Latin America, including Honduras, marked by high labor informality and a business landscape dominated by micro and small enterprises. This study examines Honduran employers' perceptions of collaboration with educational institutions, technical training, internships, and lack of experience, and their association with the self-reported need for first-employment support. A structured survey was administered to 940 firms (925 valid cases; non-probability sample). Descriptively, 71.8% of firms perceived internships as facilitating youth labor-market entry, 67.8% perceived a need for stronger educational linkage, 64.5% demanded technical training, 61.9% identified lack of experience as a barrier, and 61.5% reported requiring institutional support. Spearman correlations supported all three hypotheses: need for first-employment support was associated with educational linkage (ρ = 0.575), internships (ρ = 0.528), and lack of experience (ρ = 0.540; all p < .001). An ordinal regression model (N = 925) showed associations consistent with the bivariate results (OR 1.20–2.18), with educational linkage showing the largest effect and appreciable explanatory power (Nagelkerke R^2 = 0.506); these associations remained largely robust in a complementary model additionally adjusting for sector, size, and hiring plans. Sector and firm-size comparisons, corrected using the Holm method, showed no significant differences. Results are interpreted through human capital theory, signaling theory, and education-to-work transition models, without implying these were tested as competing causal models. Given the cross-sectional, non-probabilistic design, findings reflect employer perceptions associated with first-employment transitions and should not be interpreted as direct measures of youth employability or causal effects.**

Keywords*— *university-business collaboration; employer perceptions; technical and engineering education; internships; youth first employment.

I. INTRODUCTION

Youth transition into stable, quality employment continues to be one of the most pressing structural problems facing Latin American economies. The region shows persistent youth unemployment and informality, driven by both economic-cycle fluctuations and structural labor-market factors [1], [2], [3], [4], [5]. In countries such as Chile, Argentina, Brazil, Colombia, and Mexico, labor precarity has been shown to disproportionately affect young people, who face higher rates of underemployment, informality, and job turnover than adults [4], [6]–[8].

Honduras is no exception to this problem, and it presents additional structural features that intensify the challenge of the transition to first employment. The country exhibits high levels of labor informality, a business landscape dominated by micro and small enterprises with limited capacity to structure formal recruitment and training processes, and a still-incipient institutionalization of internship and professional-practice programs. Compounding this is a persistent gap between the training offered by educational institutions and the competencies demanded by firms, repeatedly identified as one of the main obstacles to youth labor-market insertion [9], [10]. Studies in comparable contexts show that, although there is partial overlap between what higher-education and technical programs teach and what employers require, relevant gaps persist—particularly in self-management, communication, and practical-experience skills [9]. These structural conditions—informality, a predominance of small production units, and weak articulation between education and the productive sector—make Honduras a pertinent case for examining how firms perceive the mechanisms available to facilitate this transition, beyond simply being an understudied country in the literature.

Against this backdrop, university-business collaboration (UBC), technical training, and internship or work-based learning programs have emerged as central strategies for narrowing the gap between educational supply and labor demand and for facilitating youth transition into first employment [11], [12], [13]. However, empirical evidence on the effectiveness and employer perception of these mechanisms in Central American contexts—and in Honduras in particular—remains limited. This study aligns with the conference's thematic tracks on university-industry transfer and educational innovation by examining the institutional mechanisms through which educational institutions and firms can articulate technical training, internships, and first-employment programs; the emphasis of the paper remains on UBC as a mechanism of educational and institutional innovation, rather than as a general labor-market study.

The objective of this paper is to analyze Honduran employers' perceptions of collaboration with educational institutions, technical training, internships, and lack of experience, as well as their association with the self-reported need for business support for youth first-employment programs. Three specific objectives follow from this general aim: (i) to characterize the level of employer agreement with each perception item; (ii) to determine the degree of statistical association among them; and (iii) to identify which perceptions are associated with a greater self-reported need for institutional

support for first-employment programs. The instrument did not measure youth employability as an integrated construct; instead, it assessed discrete employer perceptions related to the transition to first employment. Accordingly, the expression "employer perceptions associated with the transition to first employment" is used throughout the paper instead of "youth employability," except when referring to international literature that uses the latter term. The following working hypotheses were formulated: (H1) the perceived need for linkage between firms and educational institutions is positively associated with the self-reported need for support for first-employment programs; (H2) favorable evaluation of internships is positively associated with the self-reported need for support for first-employment programs; and (H3) the perception of lack of experience as a barrier is positively associated with the self-reported need for support for first-employment programs. Technical training is included as an additional explanatory variable in the exploratory model, without constituting an independent hypothesis, given that its theoretical role (human capital) differs from that of internships and experience (signaling).

This paper makes a twofold contribution. First, it provides employer-side evidence from a Central American context that is underrepresented in the literature on university-business collaboration and transition to first employment, identifying patterns of association among educational linkage, internships, technical training, lack of experience, and the need for institutional support, in a country whose studies on these mechanisms have mostly originated in Europe, Asia, or South America [11]–[14]. This contribution should be understood as contextual, empirical, and applied—not as a novel theoretical contribution—and is relevant for higher-education and technical institutions seeking to ground decisions on collaboration programs. Relative to this international evidence, the Honduran data show a distinctive pattern: educational linkage—rather than internships or technical training, more commonly emphasized in prior European and Asian studies—carries the strongest association with employers' self-reported need for first-employment support, and this valuation is shared across firm sizes rather than concentrated among larger firms, consistent with a business landscape dominated by micro and small enterprises (Section I). These two features—together with the employer-side (rather than student- or graduate-side) perspective, which remains scarce in the literature reviewed in Section II—delimit what the Honduran case specifically adds to the existing international findings. Second, it contributes to the university-industry transfer and educational innovation research community an applied case linking technical and engineering education to the transition to first employment, with implications for curriculum design, accreditation of technical programs, and collaboration policies of higher-education institutions across the region.

II. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

A. University-Business Collaboration

UBC has been studied as a key mechanism for aligning human-capital formation with labor-market needs. European projects such as Think4Jobs have shown that systematic collaboration between universities and business organizations for curriculum co-design strengthens 21st-century competencies, such as critical thinking, and improves graduate employability, provided that clear objectives, defined roles, effective communication, and continuous process evaluation are in place [13]. Similarly, faculty members' prior experience in business settings has been found to positively affect the quality and sustainability of university-industry linkages [15].

Multiple documented experiences in Europe and Asia support the relevance of cooperation between educational institutions and the productive sector for improving the labor-market relevance of higher and technical education [16], [17], [18], [19], [20]. In institutional-management terms, quality-management systems in higher-education institutions have been found to affect student employability when they mediate industry-academia collaboration processes [21], and business clusters within "creative helix" models have been shown to favor both collaboration and graduate employability [22]. In developing countries, virtually situated learning environments have been proposed as a way to bring business training closer to market needs when face-to-face collaboration infrastructure is limited [14], while local business-community engagement experiences have shown benefits for transforming teaching-learning processes [23].

Taken together, the literature shows that university-business collaboration can favor curricular relevance, skills development, and labor-market transition, particularly when shared objectives and continuous evaluation mechanisms exist [13]. However, inconsistent results persist regarding which specific institutional conditions determine the success of these processes, and most evidence comes from Europe and Asia, while studies examining these relationships from the employer perspective remain scarce in Central America. This study addresses this gap with evidence from Honduran firms.

B. Technical and Vocational Training

The literature agrees that alignment between technical and vocational education and training (TVET) and actual industry needs is a key determinant of employability. Effective collaboration between vocational training institutions and industry partners for joint curriculum design has been shown to improve both student employability and employer satisfaction [12]. In emerging economies such as Laos, expert recommendations have been identified for strengthening industry collaboration, work-based learning, and labor-market relevance of curricula [24], while studies in Indonesia have identified determinants of the success of university-industry partnerships in vocational education [25].

In engineering- and technology-related technical training, university-industry linkages have been reported to strengthen

both employability and entrepreneurial intentions among graduates of electrical/electronic technology programs [26], and technological innovation has been shown to require continuous updating of technical curricula—such as the maritime curriculum in the Jamaican case—to respond to changing market requirements [27]. In Chile, evidence shows that labor-insertion processes among secondary technical-vocational students display particular configurations, marked by heterogeneous education-to-work trajectories [7].

In sum, the literature establishes that curricular alignment with industry improves technical graduates' perceived employability, but the specific mechanisms through which firms determine which technical training they require remain insufficiently documented, and available evidence is heterogeneous across sectors and educational levels. This study addresses this gap by directly measuring Honduran employer perceptions of the need for technically trained personnel and its association with other employment-transition mechanisms.

C. Internships and Work-Based Learning

Work-based learning (WBL) and internships have been consistently identified as effective mechanisms for facilitating youth transition to employment. MOOC design experiences oriented toward work-based learning for Latin America and the Caribbean have shown both the potential and the methodological tensions of scaling this type of practical training in the region [11], [28]. Studies on curriculum analytics have explored the development of professional competencies through the tracking of learning trajectories [29], while research on experiential simulation learning has shown its positive influence on the development of life skills and graduate employability [30].

School-business cooperation and student motivation have been identified as relevant predictors of the labor competitiveness of graduates from application-oriented universities [31]. Using expert-consultation methods, internships have been estimated to significantly affect the comprehensive development of university students [32]. Along the same lines, polishing employability skills through work-integrated learning has been shown to improve recent graduates' career opportunities [33], and project-based learning frameworks that integrate industry collaboration strengthen students' preparedness for their professional future [34]. Complementarily, a dual-pathway model for work-based learning has been proposed based on employer perceptions of graduate competencies in Mexico, a context close to the Honduran one [10].

Collectively, these studies indicate that internships and work-based learning favor competency development and labor-market transition, but much of this evidence stems from student or graduate perception measures, and studies documenting the employer perspective on the value of internships remain comparatively scarce, particularly in Central America. This study contributes direct employer-side evidence on this mechanism for the Honduran case.

D. Youth Labor Transition, Informality, and First Employment in Latin America

Early labor-market insertion in Latin America is conditioned by both demand-side factors—the specific needs of the business sector—and the availability of formal first-employment mechanisms [35]. Recent research has analyzed how the economic cycle affects the proportion of youth who neither study nor work (NEET) in the region [1], and how the relationship between unemployment and economic growth—following Okun's law—varies heterogeneously across Latin American countries [5]. Informality and the duration of youth unemployment have been documented with particular attention in countries such as Ecuador [2], and studies on employment policy have explored their impact on wages and employability in local labor markets in Chile [6].

From a comparative perspective, youth labor precarity in Argentina, Brazil, Colombia, and Mexico has been characterized as a structural phenomenon that transcends economic cycles [4], while studies focused on Chile have examined skills formation and its relationship with unemployment [8], as well as new configurations of labor-insertion processes among secondary technical-vocational students [7]. In Europe, research on the case of Kosovo has identified key determinants affecting the interface between higher-education provision and labor-market needs [36], and a recent systematic review of employability in Chilean higher education (2000–2025) synthesizes the main explanatory factors [37]. Finally, social entrepreneurship among Central American university students has been proposed as a complementary pathway for youth economic insertion, particularly relevant in high-informality contexts [38].

Overall, prior research suggests that UBC, technical training, and internships do not operate in isolation but as interrelated components of a single employment-transition ecosystem. However, most of these studies come from European, Asian, or South American contexts, with scarce specific evidence for Honduras and Central America—a gap that motivates the present study.

E. Integrative Theoretical Framework

To conceptually articulate the variables analyzed, this study draws on three complementary theoretical frameworks. From human capital theory, technical training and practical experience increase the competencies that firms value in young workers, so that greater employer demand for technical training would be consistent with this perspective. Complementarily, signaling theory posits that internships and early work experiences function as observable signals of readiness, commitment, and adaptability, particularly useful when information on a young candidate's actual productivity is limited or costly to obtain; this perspective is consistent with employers' favorable evaluation of internships and with the perception of lack of experience as a barrier. Finally, education-to-work transition models posit that university-business collaboration can act as an institutional mechanism that facilitates the transition between training and first employment

by reducing informational frictions between both sectors. These three frameworks are not mutually exclusive: they are used complementarily to interpret the results in Section V, without implying that the study design allows them to be formally tested as competing causal models.

III. METHODOLOGY

A. Design and Sample

A non-experimental, cross-sectional, descriptive-correlational design was used, based on a structured survey administered to Honduran firms of various sectors and sizes. The original database contained 940 records. Comparing all response fields, excluding the identifier, confirmed 15 exactly repeated patterns; retaining a single observation per pattern left a main sample of 925 firms. Additionally, 55 uniform-response patterns were identified in the substantive items E01.1–E08.5 (identical category across all items); because it was not possible to determine whether these corresponded to invalid responses or to genuinely homogeneous opinions, they were retained in the main analysis and excluded only in a sensitivity analysis (n = 870). Because the secondary database did not document the firm contact and selection procedure or the response rate, the sample was conservatively classified as a non-probability convenience sample, and results should not be interpreted as statistically representative of the universe of Honduran firms.

B. Instrument and Variables

The instrument included five core items (E08.1 to E08.5), measured on a four-category ordinal scale (strongly disagree, disagree, agree, strongly agree; higher values represent a greater level of agreement), referring to: the need for stronger linkage between firms and educational institutions (E08.1), the need for technically trained personnel (E08.2), the perception that internships facilitate youth labor-market entry (E08.3), the perception that lack of experience limits youth hiring (E08.4), and the need for business support to develop first-employment and training programs (E08.5). Additionally, an exploratory verification item from a different battery of the instrument—E02.1, similarly referring to lack of experience as an obstacle to youth hiring—was used to explore the convergence of this perception across two independent sections of the survey. Each variable was measured using a single Likert-type item; therefore, the variables should not be interpreted as validated multi-item scales or constructs, and it was not possible to compute internal-reliability indicators (e.g., Cronbach's alpha) or formal psychometric validity. Throughout the paper, the expression "perception items" is used to refer to these variables, avoiding terms such as "dimensions" or "constructs," which would imply a validation process that was not conducted. No missing data or out-of-range values were recorded for these items. Information on the identity or position of the person who answered the questionnaire within each firm is also unavailable, which precludes assessing whether responses reflect the perspective of owners, human-resources managers, or other staff.

C. Statistical Analysis

Descriptive analyses (frequencies and percentages) were conducted to characterize the sample and the perception items. Given the ordinal nature of the variables, bivariate associations were estimated using Spearman's correlation coefficient (ρ), interpreted using conventional social-science criteria (weak: <0.30; moderate: 0.30–0.59; strong: ≥ 0.60). Because eight bivariate correlations were evaluated simultaneously, a conservative significance criterion was applied using Bonferroni correction (adjusted $\alpha = 0.05/8 = 0.00625$); all reported associations comfortably exceed this threshold ($p < .001$). An exploratory ordinal logistic regression model was estimated, with the need for support for first-employment programs (E08.5) as the dependent variable, using as explanatory variables the need for educational linkage, the need for technical training, the evaluation of internships, and the perception of lack of experience as a barrier; the model did not include firm-level control variables in its primary specification (sector, size, or hiring plans), so as reported below, a second, adjusted specification was estimated to evaluate the sensitivity of these associations to firm characteristics. This unadjusted model is presented first because it corresponds most directly to the study's three working hypotheses; a complementary adjusted model additionally including sector (9 dummy covariates, reference = Commerce), firm size (3 dummy covariates, reference = Micro), and hiring plans (2 dummy covariates, reference = Yes) as covariates is reported alongside it (Table V) to assess the robustness of the unadjusted associations. Comparisons by economic sector and firm size were also conducted separately using the Kruskal-Wallis test for the five items and the two grouping variables (ten tests in total), complemented with the epsilon-squared effect size. Given the number of tests performed, the Holm correction method was applied to the ten reported p-values to control the family-wise Type I error rate arising from multiple comparisons (Table VI). Finally, a sensitivity analysis was conducted excluding the 55 uniform responses, to verify the stability of the main results. All analyses were evaluated at a conventional significance level of $\alpha = 0.05$, unless otherwise indicated.

D. Methodological Limitations of the Design

Several methodological limitations related to data collection and measurement condition the interpretation of the results. First, the survey did not include a direct measure of employer willingness to hire young people, nor a comprehensive, validated measure of youth employability; consequently, results should be interpreted as employer perceptions and statistical associations, not as evidence of actual hiring behavior. Second, as noted in Section III.A, the sample should be considered non-probabilistic: the selection procedure, sampling frame, response rate, and whether more than one response per firm existed are not documented, which precludes calculating a formal sampling error margin and ruling out self-selection or geographic/sectoral coverage biases. Third, because all items come from the same instrument and a single, unidentified respondent per firm, common method bias and possible social-desirability effects cannot be ruled out, so

association magnitudes may be partially inflated. Fourth, because these are individual items without prior psychometric validation, it cannot be guaranteed that they fully and stably capture the concepts they are intended to measure.

IV. RESULTS

A. Sample Characteristics

The main sample comprised 925 Honduran firms. Commerce firms predominate (34.8%), followed by services (17.7%) and the "other" category (14.8%). By size, the distribution is relatively balanced across micro (25.2%), small (28.3%), medium (22.6%), and large firms (23.9%). Regarding hiring plans for the next twelve months, 51.9% of firms indicated they planned to hire staff, 16.5% said they did not, and 31.6% reported not yet knowing (Table I). The available database did not include additional characterization variables—geographic distribution, firm age, number of employees, ownership type, respondent's position, or prior experience with interns—that would have allowed a more precise assessment of the sample's diversity and applicability; incorporating these variables in future instruments is recommended.

TABLE I
SAMPLE CHARACTERISTICS (N = 925)

Variable	Category	n	%
Sector	Commerce	322	34.8
	Services	164	17.7
	Other	137	14.8
	Financial	62	6.7
	Agriculture	56	6.1
	Industry	53	5.7
	Technology	50	5.4
	Construction	34	3.7
	Tourism	26	2.8
	Livestock	21	2.3
Size	Micro	233	25.2
	Small	262	28.3
	Medium	209	22.6
	Large	221	23.9
Hiring plans	Yes	480	51.9
	No	153	16.5
	Don't know	292	31.6

B. Descriptive Results for the Core Items

Table II summarizes the level of agreement (sum of "agree" and "strongly agree") for each item. The strongest support was for the statement that internships help incorporate young people into the labor market (71.8%), followed by the need for stronger linkage between firms and educational institutions (67.8%) and the need for more technically trained personnel (64.5%). Additionally, 61.9% of firms considered that lack of experience limits youth hiring, and 61.5% reported requiring support to develop first-employment and training programs. Fig. 1 illustrates the total level of agreement reached by each item.

TABLE II
LEVEL OF AGREEMENT WITH THE CORE ITEMS (N = 925)

Item	SD	D	A	SA	Total	M	SD*
E08.1	13.1	19.1	36.6	31.1	67.8	2.86	1.00
E08.2	14.7	20.8	36.5	28.0	64.5	2.78	1.01
E08.3	11.2	17.0	36.1	35.7	71.8	2.96	0.99
E08.4	15.6	22.5	31.0	30.9	61.9	2.77	1.05
E08.5	15.8	22.7	34.6	26.9	61.5	2.73	1.03

E08.1: linkage; E08.2: technical training; E08.3: internships; E08.4: lack of experience; E08.5: first-employment support. SD/D/A/SA/Total in %. M: mean; SD: standard deviation (1–4 scale).*

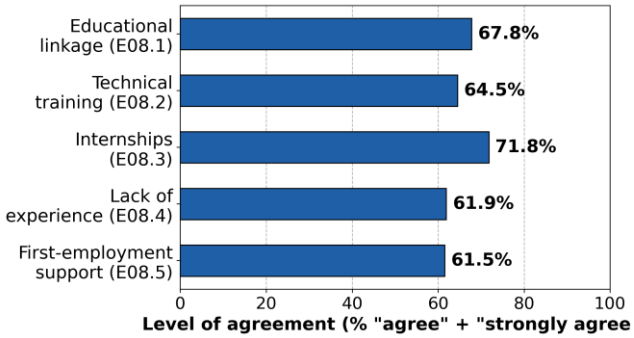


Fig. 1. Employer level of agreement with core items E08.1–E08.5.

In sum, these descriptive results indicate a predominantly favorable employer evaluation of educational-linkage, technical-training, and internship mechanisms, together with the recognition of lack of experience as a relevant constraint on youth hiring.

C. Relationships Among Variables

Spearman's correlation coefficient was used given the four-category ordinal nature of the variables. As shown in Table III and Fig. 2, all eight correlations evaluated were positive, statistically significant ($p < .001$), and of moderate magnitude. Regarding the research hypotheses, the need for first-employment support (E08.5) showed a moderate association with the need for educational linkage (H1: $\rho = 0.575$), with the evaluation of internships (H2: $\rho = 0.528$), and with the perception of lack of experience as a barrier (H3: $\rho = 0.540$); this last correlation, computed directly between E08.4 and E08.5, supports H3 with bivariate evidence equivalent to that available for H1 and H2. Technical training was also associated with the need for first-employment support ($\rho = 0.471$), although it does not constitute an independent hypothesis (Section I). Among the mechanisms themselves, the need for educational linkage was associated with the need for technical training ($\rho = 0.592$) and with the evaluation of internships ($\rho = 0.586$), and technical training with internships ($\rho = 0.492$). Finally, the association between E08.4 and E02.1 ($\rho = 0.418$) provides exploratory evidence of convergence between two related questions on lack of experience as a hiring barrier, posed

in independent sections of the instrument; because these are individual items without psychometric validation, this convergence should be interpreted with caution and not as evidence of internal consistency in the strict psychometric sense.

TABLE III
SPEARMAN CORRELATIONS AND HYPOTHESIS TESTING

Relationship analyzed	ρ	p
H1: Linkage – First-job support	0.575	<.001
H2: Internships – First-job support	0.528	<.001
H3: Lack of experience – First-job support	0.540	<.001
Tech. training – First-job support	0.471	<.001
Linkage – Tech. training	0.592	<.001
Linkage – Internships	0.586	<.001
Tech. training – Internships	0.492	<.001
Convergence E08.4 – E02.1	0.418	<.001

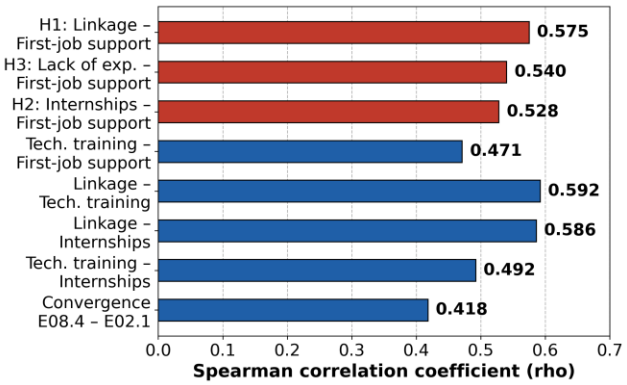


Fig. 2. Spearman correlation coefficients among the analyzed items.

D. Exploratory Ordinal Regression Model

An ordinal (cumulative logit) regression model was estimated with E08.5 (need for first-employment support) as the dependent variable, without firm-level control variables (Table IV). The model included the 925 cases from the main sample (log-likelihood = −952.16; AIC = 1918.32; BIC = 1952.13). Higher values of each predictor represent a greater level of agreement with the corresponding statement.

TABLE IV
ORDINAL REGRESSION MODEL (DV: E08.5; N = 925)

Predictor	β	SE	z	OR	95% CI	p
Educational linkage	0.781	0.098	8.00	2.18	1.80–2.65	<.001
Lack of experience	0.671	0.083	8.09	1.96	1.66–2.30	<.001
Internships	0.589	0.093	6.36	1.80	1.50–2.16	<.001
Technical training	0.180	0.088	2.05	1.20	1.01–1.42	.041

β: ordinal coefficient; SE: standard error; z: z-statistic (β/SE); N = 925 cases included; log-likelihood = −952.16; AIC = 1918.32; BIC = 1952.13. Pseudo-R²: Cox & Snell = 0.472; Nagelkerke = 0.506; McFadden = 0.237.

Holding the other predictors constant, stronger agreement with UBC was associated with 2.18 times higher odds of reporting a greater need for first-employment support (β = 0.781, SE = 0.098); the perception of lack of experience showed 1.96 times higher odds (β = 0.671, SE = 0.083); evaluation of internships showed 1.80 times higher odds (β = 0.589, SE = 0.093); and technical training showed the smallest association (OR = 1.20; β = 0.180, SE = 0.088; p = .041). This is an exploratory model that does not directly measure youth hiring, does not include firm-level control variables in its primary specification, and does not permit establishing causal relationships or predictions in the strict sense. Accordingly, this paper avoids the verb "predict" and instead uses "is associated with" or "shows higher odds of reporting a higher level of need within the model." The pseudo-R^2 values indicate appreciable explanatory power within the model; because there is no universal criterion for classifying these indicators in ordinal regression, they should not be interpreted as a percentage of explained variance in the linear-regression sense.

To evaluate the robustness of these associations to firm characteristics, an adjusted model was estimated additionally including sector, size, and hiring plans as covariates (Table V). The four core associations remained materially unchanged in direction and magnitude: educational linkage (OR = 2.24, 95% CI 1.85–2.72), lack of experience (OR = 1.98, 95% CI 1.68–2.33), and internships (OR = 1.85, 95% CI 1.54–2.22) remained statistically significant at $p < .001$, while technical training attenuated from a nominally significant to a marginal association (OR = 1.16, 95% CI 0.97–1.38, p = .097). Model fit improved only modestly (log-likelihood = −942.26; AIC = 1926.52; BIC = 2027.95; Nagelkerke $R^2 = 0.518$, versus 0.506 without controls), and a likelihood-ratio test comparing the two models indicated that the block of 14 firm-level covariates did not significantly improve fit, $\chi^2(14) = 19.80$, p = .137. Of the individual covariates, only the dummy for the Tourism sector reached nominal significance (OR = 3.83, 95% CI 1.60–9.17, p = .003); given that this is one nominally significant result among 14 covariates tested without correction for multiple comparisons, and that it is not corroborated by the Holm-corrected Kruskal-Wallis comparisons by sector (Section IV.E, Table VI), it should be interpreted with caution rather than as robust evidence of a sector effect. Overall, this adjusted specification supports the conclusion that the associations reported for the three research hypotheses are not primarily an artifact of uncontrolled sector, size, or hiring-plan differences across firms.

TABLE V
ADJUSTED ORDINAL REGRESSION MODEL (DV: E08.5; N = 925)

Predictor	β	SE	z	OR	95% CI	p
Educational linkage	0.807	0.098	8.21	2.24	1.85–2.72	<.001
Lack of experience	0.681	0.083	8.16	1.98	1.68–2.33	<.001
Internships	0.615	0.093	6.60	1.85	1.54–2.22	<.001
Technical training	0.148	0.089	1.66	1.16	0.97–1.38	.097

β: ordinal coefficient; SE: standard error; z: z-statistic (β/SE); N = 925 cases included. Model additionally includes 14 dummy covariates for economic sector (9, reference = Commerce), firm size (3, reference = Micro), and hiring plans (2, reference = Yes), not shown individually here (see Section IV.D). Log-likelihood = −942.26; AIC = 1926.52; BIC = 2027.95. Pseudo-R²: Cox & Snell = 0.483; Nagelkerke = 0.518; McFadden = 0.245.

Regarding the proportional-odds assumption (parallel lines), a complementary diagnostic was applied: coefficients from three cumulative logistic models (one per E08.5 cut point) were compared using a Wald test with bootstrap covariance (300 replications), $\chi^2(8) = 8.87$, $p = .354$. No evidence of assumption violation was found using this complementary diagnostic, which is not equivalent to the exact parallel-lines test from SPSS's PLUM procedure, not directly executable on the original data; the model therefore remains exploratory.

E. Comparisons by Sector and Firm Size

The Kruskal-Wallis test identified a nominally significant difference by economic sector (9 degrees of freedom, corresponding to 10 sector categories) only for item E08.2, $H(9, N = 925) = 19.99$, $p = .018$, $\varepsilon^2 = 0.012$, before any multiple-comparison adjustment; the remaining items, including E08.5, $H(9, N = 925) = 15.92$, $p = .069$, $\varepsilon^2 = 0.008$, did not reach nominal significance. By firm size (3 degrees of freedom, corresponding to 4 categories), no item reached nominal significance (H between 1.60 and 4.45; p between .217 and .660; $\varepsilon^2 \leq 0.002$ in all cases). After applying the Holm correction to the ten Kruskal-Wallis p-values (five items by sector and five by size), none of the ten comparisons remained statistically significant: the lowest adjusted p-value corresponded to E08.2 by sector (p-Holm = .179), followed by E08.5 by sector (p-Holm = .618); the remaining adjusted values reached the upper bound of 1.000 (Table VI). Accordingly, no statistically significant differences by economic sector or firm size were sustained for any of the five items evaluated, not even nominally for E08.5. This result does not demonstrate perceptual equivalence between groups, but rather that the available evidence did not allow robust differences to be identified once Type I error risk was controlled.

TABLE VI
KRUSKAL-WALLIS TESTS WITH HOLM CORRECTION (10 TESTS)

By economic sector (df = 9)

Item	H	p	p-Holm	ε^2	Decision
E08.1	9.97	.353	1.000	0.001	n.s.
E08.2	19.99	.018	0.179	0.012	n.s.
E08.3	5.05	.830	1.000	0.000	n.s.
E08.4	6.10	.730	1.000	0.000	n.s.
E08.5	15.92	.069	0.618	0.008	n.s.

By firm size (df = 3)

Item	H	p	p-Holm	ε^2	Decision
E08.1	3.51	.319	1.000	0.001	n.s.
E08.2	1.60	.660	1.000	0.000	n.s.
E08.3	4.45	.217	1.000	0.002	n.s.
E08.4	3.28	.350	1.000	0.000	n.s.
E08.5	1.66	.647	1.000	0.000	n.s.

H: Kruskal-Wallis statistic. p-Holm: Holm-adjusted p-value across the 10 combined tests (α = 0.05). No adjusted value falls below α.

F. Sensitivity Analysis

When additionally excluding the 55 uniform-response cases (n = 870), agreement percentages increased slightly (between 1.6 and 2.2 percentage points), but the ranking and significance of results remained unchanged (Table VII), supporting the stability of the main conclusions.

TABLE VII
SENSITIVITY ANALYSIS: n = 925 VS. n = 870

Item	n = 925	n = 870	Diff.
E08.1	67.8%	69.8%	+2.0
E08.2	64.5%	66.3%	+1.8
E08.3	71.8%	74.0%	+2.2
E08.4	61.9%	63.6%	+1.6
E08.5	61.5%	63.1%	+1.6

G. Hypothesis Testing Summary

TABLE VIII
RESPONSE TO THE RESEARCH HYPOTHESES

Hypothesis	Decision
H1	Supported: the perceived need for linkage (E08.1) is positively associated with the self-reported need for first-employment support (E08.5), both in the bivariate analysis ($\rho = 0.575$; $p < .001$) and in the ordinal model (OR = 2.18; $p < .001$).
H2	Supported: favorable evaluation of internships (E08.3) is positively associated with E08.5 ($\rho = 0.528$; $p < .001$; OR = 1.80; $p < .001$).
H3	Supported: the perception of lack of experience as a barrier (E08.4) is positively associated with E08.5, both in the bivariate analysis ($\rho = 0.540$; $p < .001$) and in the ordinal model (OR = 1.96; $p < .001$).

Note: given the cross-sectional, non-probabilistic, and perceptual design of the study, these associations should not be interpreted as causal relationships.

V. DISCUSSION

The findings are broadly consistent with international evidence, with Honduran-specific nuances discussed below. Internships received the highest employer agreement as a labor-market-entry mechanism (71.8%), consistent with prior work on work-based learning and employability [11], [28]–[34]. From a signaling perspective (Section II.E), this may reflect firms' ability to observe candidates' performance before hiring—a relatively low-cost signal against the uncertainty of inexperienced staff—though this mechanism was not directly measured and warrants confirmation with actual hiring data.

The second most endorsed item—stronger linkage between firms and educational institutions (67.8%)—reinforces evidence on the perceived benefits of university-business collaboration [12], [13], [15]–[19], [21], [22], [24], [25], and showed the strongest association with first-employment support (OR = 2.18), consistent with education-to-work transition models in which firms view linkage as a direct mechanism for reducing informational frictions. The cross-sectional design, however, cannot establish whether this perception precedes or results from prior collaboration experience, and the literature

cautions that declared interest does not guarantee effective collaboration [9], [19].

Technical training (64.5%) showed the smallest association with first-employment support ($\rho = 0.471$; OR = 1.20)—only moderately lower than the other predictors—possibly because it is perceived as a more general, medium-term condition than the more immediate aspects captured by linkage, internships, and experience, consistent with the literature on curricular alignment with industry [7], [12], [24]–[27], though not directly tested against the data. It was also the only item showing a nominal sectoral difference ($p = .018$), not sustained after the Holm adjustment (Section IV.E).

Lack of experience as a hiring barrier (61.9%) aligns with the literature on youth labor precarity and informality in Latin America [3], [4], [8]–[10], and is associated with first-employment support both bivariately (H3: $\rho = 0.540$; $p < .001$) and in the regression model (OR = 1.96; $p < .001$), giving H3 evidence equivalent to H1 and H2. Future work should examine why favorable perceptions do not always translate into hiring—including training costs, limited administrative capacity among micro and small firms, and the absence of specific incentives—factors not measured here.

No significant differences by firm size were found for any item—reflecting the limits of the available evidence rather than group equivalence—consistent with linkage, technical training, and internships being valued across micro, small, and large firms alike, relevant given Honduras's productive fabric (Section I). If confirmed with greater statistical power and controls, this would support linkage policies not restricted to firms with greater administrative capacity, aligning with studies on alternative youth economic-insertion mechanisms in high-informality Central American contexts [38].

Overall, the results align with international evidence but reflect Honduran nuances—high informality, the predominance of micro and small firms, and still-incipient internship institutionalization (Section I)—that may explain why educational linkage carries the largest association among the mechanisms studied. These explanations are interpretations in light of the theoretical framework in Section II.E, not directly measured findings; and because each item was measured with a single, non-validated Likert indicator (Section III.B), the ranking of associations should be read as a pattern specific to this instrument rather than a precise, error-free ordering of the underlying perceptions.

A. Study Limitations

In addition to the data- and measurement-related limitations noted in Section III.D, the following analytical and interpretive limitations should be considered. (1) Construct validity: because the database lacks a direct measure of actual hiring or of employer disposition toward youth employment, conclusions are restricted to the perceptual level and do not allow inferring actual hiring behavior or measuring youth employability as an integrated construct. (2) Cross-sectional design: the data correspond to a single point in time, which precludes evaluating the temporal direction of the observed associations and does not rule out reverse causality—for example, that firms already engaged in internships perceive fewer barriers, rather than favorable perceptions preceding engagement. (3) Geographic generalization: as a national case study with a non-probability sample, results are not extrapolable to other Central American countries nor statistically representative of the universe of Honduran firms, although consistency with the regional literature suggests shared patterns warranting further empirical verification. (4) The primary ordinal regression model did not include control variables for sector, size, or hiring plans; a complementary adjusted model incorporating these covariates was estimated to probe this concern (Section IV.D, Table V) and yielded materially unchanged associations for the three research hypotheses, with technical training's association attenuating from nominally significant to marginal ($p = .097$). The covariate block did not significantly improve model fit ($\chi^2(14) = 19.80$, $p = .137$), and of the 14 covariates tested without correction for multiple comparisons, only one (the Tourism-sector dummy) reached nominal significance—a result that should be interpreted cautiously given the number of comparisons and its lack of corroboration in the Holm-corrected Kruskal-Wallis tests (Section IV.E). Coefficients, standard errors, pseudo-R^2, relative fit indices (AIC, BIC), and a complementary bootstrap diagnostic of the proportional-odds assumption that found no evidence of violation are available for the primary model (Section IV.D), although this diagnostic is not equivalent to the exact parallel-lines test from SPSS's PLUM procedure. (5) Type I error from multiple comparisons across the ten Kruskal-Wallis tests was controlled using the Holm correction (Section IV.E), although the exploratory ordinal regression model was not subject to an equivalent adjustment. These limitations do not invalidate the findings but precisely delimit the scope of the claims that can be sustained.

B. Implications for Technical and Engineering Education

For the university-industry transfer and educational innovation research community, these results carry concrete applied implications. Given educational linkage's strong association with first-employment support (OR = 2.18), regional technical and engineering institutions could explore formal collaboration mechanisms with industry—advisory boards, co-designed curricula, internship agreements—as a complement to isolated technical-training interventions. Because no significant differences by firm size were detected, these mechanisms may be viable with both large corporations and micro/small firms, particularly relevant outside the region's main urban centers where smaller-scale business predominates, though this claim requires verification with greater statistical power and controls. In sum, the results support institutional collaboration models integrating advisory committees, curricular co-design, supervised internships, and first-employment programs—without implying that such measures have already demonstrated effectiveness.

VI. CONCLUSIONS

This study yields five central messages. First, among the mechanisms evaluated, internships received the highest employer evaluation as a facilitator of youth labor-market incorporation. Second, educational linkage showed the largest association with the self-reported need for support for first-employment programs, both in the bivariate analysis and in the ordinal regression model, suggesting its possible articulating role within the employer perceptions studied, without this being equivalent to causal evidence. Third, all three research hypotheses (H1, H2, H3) were supported with equivalent bivariate and multivariate evidence, reinforcing the notion that educational linkage, internships, and lack of experience do not operate in isolation, but as interrelated components of employer perceptions of the transition to first employment. Fourth, after applying the Holm correction, no statistical evidence of robust differences by economic sector or firm size was found. Fifth, a complementary regression model adjusting for sector, size, and hiring plans left the three hypothesis-related associations materially unchanged, indicating that they are not primarily an artifact of uncontrolled firm characteristics, although technical training's association weakened to marginal significance under this adjustment.

This study contributes employer-side evidence from a Central American context underrepresented in the literature on university-business collaboration and transition to first employment. The main design limitations—non-probability sample and cross-sectional design—are detailed in Sections III.D and V.A and should be kept in mind when interpreting these messages; in sum, findings should be read as employer perceptions and statistical associations, not as causal evidence or as a direct measure of actual hiring. Future research should incorporate probability sampling, longitudinal designs, direct measures of employer disposition to hire young people, and comparative replications in other Central American countries, ideally combining these design improvements with the kind of firm-level controls introduced here on a cross-sectional basis.

From a public-policy and institutional perspective, the findings justify exploring the strengthening of formal UBC instruments and the expansion of internship and work-based learning programs in Honduras. The effectiveness of specific instruments—such as subsidies, tax incentives, or business mentoring programs—was not evaluated in this study and should be determined through dedicated research before recommending their implementation.

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