

INDUSTRY-UNIVERSITY ENGAGEMENT, INFLUENCE, AND BENEFITS: COMPUTING JOB MARKET IN KUWAIT

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ABSTRACT

Due to increasing competition among the IT sector in Kuwait it has become difficult for fresh graduates to find a steady and inspiring positions at private organizations. Employer's demand updated cognitive skills which the universities have failed to provide. Thus, the new job trend has encouraged a strategic collaboration between industries and academic schools. This study attempts to reconfirm the same. Through the set of questionnaires, we intend to find the opinions of fresh graduates regarding their employment scope. Also, whether companies' strong associations can influence employment opportunity. To establish reliability, Cronbach's coefficient alpha (α) was employed to analyse the measure's internal consistency. The reliability of the questionnaires was assessed using the partial least squares regression (PLS) approach. To assess the data and validate the hypotheses, a structural equation model (SEM) was used.

Out of all the 4-hypothesis postulated. Our data also indicated that the level of collaboration between Kuwaiti Universities and industries and corporations is not so strong. In conclusion, focus needs to be on increasing collaboration between university and corporates sector. This will have a positive influence on Opinion and hiring strategy.

Keywords: *Academia-Industry, Higher Education, School-Industry Collaboration, Job Market, Computing, IT, Employability Skills*

1. INTRODUCTION

The job market for computing education is a dynamic one. The demand for highly educated computing workers has increased as technology has developed. Employers are increasingly seeking qualified experts with training in coding, software engineering, and related industries. Additionally, there are many career prospects for people with the required credentials due to the exponential growth in demand for computer science and engineering. As a result, anyone considering a career in computers should think about obtaining the training, credentials, and work experience needed to succeed in this intensely competitive and lucrative industry.

Furthermore, "competitive graduates in the job market often depend on a strong curriculum of the programs. Graduates are competing among themselves to meet the job market in various sectors. Because of the limited number of jobs available, many graduates end up unemployed" [1] Globalization and economic challenges force employers in the IT sector to seek skillful and knowledgeable graduates. Thus, graduates must

prepare themselves with skills desired to meet the market needs. Employers make it mandatory for their fresh graduates to possess relevant capabilities, skills, abilities, and personal qualities. Industries must prioritize engaging with universities beyond research-funding. Similar to this, if colleges were unable to build the requisite knowledge and skill basis, they would be unable to explain their functions.

Collaboration between information technology companies and colleges is critical for the development of industry-required skills and experience in graduates) [2]. Collaboration between academia and industry is critical for closing the gap between university education and industry) [2].

The government mandates that colleges and universities foster collaboration in education between institutions of higher learning and businesses, as well as the precise alignment of academic fields with market demands and the natural interlinking of talent, industry, and innovation chains [3]

Technology development and advancement depend on the interaction of industry and academia [4]. Collaboration between universities and

industries is critical to improving the "cogency" of information technology education) [2]. Therefore, for graduates to develop the skills and experience that the industry demands, collaboration between information technology companies and colleges is crucial. Thus, Industry university partnerships are a great way to create mutually beneficial relationships between universities and businesses. Universities can gain access to the latest industry knowledge and research, while businesses can benefit from the expertise of faculty and students. These partnerships can be incredibly valuable to both parties, as they can help universities stay abreast of current trends and industry developments, and businesses can take advantage of the innovative ideas and solutions generated by students and faculty. Furthermore, these partnerships can create a pipeline for potential employees, providing businesses with access to a fresh pool of talent. The Kuwaiti job market was studied using online advertisements. The survey displayed approximately 663 job openings available in the IT market.

Figure 1 clearly shows the job availability scenario of Kuwaiti market. At least 40% of organizations want to hire graduates with 5-10 years of work experience and only 5% of organizations fall in the domain of recruiting with 1-year work experience. How can graduates get exposure to a successful career when the market conditions aren't favoring their needs? How can a fresh graduate reach the level of 5-10 years' experience without being recruited with ease at the career entry level?

If the experience demanded is reduced and more focus is put on the soft skills and competencies of graduates, the employability chances can be increased drastically, and the current market scenario can be changed significantly.

Several labor market studies have been conducted in Kuwait and neighboring Gulf countries. Additionally, many governmental institutions conducted labor market surveys. However, this study is dedicated to the field of Computing and Computer related market jobs/needs. It also includes both private and public educational institutions.

The study proposed is not to only complement what has been done but the study outcome is vital for decision makers to issue and update policies towards the development of education in Kuwait.

Based on the Hypothesis, our study aims to establish a correlation between Academic connections, their hiring strategy, company relations & opinion.

The focus of the research is to discover the collaboration level between local corporations and computing universities in Kuwait and analyze the impact of such collaboration on the satisfaction level of employers with the graduates.

2. METHODOLOGY

2.1 Data Description

Data collection was accomplished through the questionnaire with cover letter, each company had a public relations practitioner who was tasked with distributing questionnaires and follow-up messaging to encourage non-respondents to respond.

Participants were informed in survey packets that the survey was part of a study to learn more about the company, how they work, and how employers see computer graduates. Instructions to assess each company's organizational structure and internal communication were included in each survey packet. Questionnaires were sent and returned through the envelopes to the head of IT departments, head of IT Program in academic sector in Kuwait, the sample was gathered from Al-Sayer Company, Kuwait Stock Exchange, Zain, Al-Wataniya and Kuwait University.

2.2 Design of survey instrument:

300 questionnaires were distributed. Only 216 questionnaires were returned, with only 193 valid responses, representing a response rate of 64% of the total questionnaires, were considered as 'valid' to rely on for the study purpose.

3. RESEARCH FINDINGS

3.1 Analysis of results; Reliability and Validity

Cronbach's [5] coefficient alpha (α) was initially used to evaluate the measure's internal consistency to establish reliability. The 30-item scale's estimated Cronbach's coefficient alpha was = 0.889. This estimate was higher than the .70 minimum that Nunnally and Bernstein had recommended [6]. Also, coefficient alpha (α) was examined for each factor of ITEM (It Employee Model), for academic connections factor, Cronbach's coefficient alpha estimate for the 10-items scale was $\alpha = 0.715$, for the 4-item scale's opinion factor, Cronbach's coefficient alpha estimate was = 0.737. Cronbach's coefficient alpha estimate for the company type factor on the 9-item scale was = 0.777, Cronbach's coefficient alpha estimate for the 7-item scale for the hiring factor was = 0.846. So, all four factors achieved the level

of reliability with cronbach's estimates are more than 0.70.

3.2 Analysis of Results Descriptive

We examine the study items using mean and standard deviation with its standard error on mean value. Corrected item-total correlation was prepared to measure the correlation between item and other items, and it should be significant for saving the internal consistency of the study factors. Cronbach's Alpha if Item deleted was measured in Table 1, and all items are above the standard level of reliability ($\alpha > 0.7$). Additionally, item loading was measured to reflect how each item affects the other items under each component. And we conclude from the calculated results that, AQ12, AQ19, AQ20, AQ21, AQ22, BQ4, BQ5 and BQ7, having confused responses and it should be eliminating from the model analysis to get a higher level of model fit.

We tested Convergent validity was tested for the measurement model through composite reliability (CR), factor loadings, and average variance extracted (AVE). As shown in Table1, all item loadings exceeded the $AVE > 0.5$ [7]. Table 2 represent Study Factors Overviews using cronbach's alpha for each factor with its VIF and Pearson correlation between factors to measure if there is any significant correlation between the factors.

Means and standard deviations for continuous variables were provided in Table 2, with observations ranging from (1.00) to (5.00), with an observation average of (3.492) (SD = 0.546), Academic Connections. The average for Company type is (3.386) and (SD = 0.694). Opinion observation average is (2.649) with a standard deviation of (0.941). With an observation average of 3.5880 and a standard deviation of 0.759, the Hiring Strategy factor has observations ranging from (1.0) to (5.0). Additionally, correlation analysis is employed in the current study to quantify the correlations between the study elements, and a Pearson correlation is performed to look at the connection between two scale-level variables [8].

As seen in Table 2, we found correlation among all the study factors (A, B, C and H). For example, Academic Connections and Company Type factor are positively correlated with ($r = 0.459$, $P\text{-value} < 0$). As well as Academic Connections and Opinion factor with ($r = 0.543$, $P\text{-value} < 0$). Furthermore, Academic Connections has a positive significant correlation with Hiring Strategy at significant level

(0.01) with ($r = 0.347$, $P\text{-value} < 0$). Apart from that, VIF was below 10 therefore there was no multi-collinearity problem occurring between items in the independent variables.

4. MODEL SPECIFICATION

We used PLS method where the questionnaires' reliability was calculated by testing the factor loadings. Most questions had a factor loading higher than 0.4, but just one question failed to obtain this value and thus it was removed from the questionnaire (a question in the organizational culture questionnaire). convergent and divergent validity criteria were used to test the questionnaire's validity.

The research model's quality criteria, which rate how well the model fits the data, are shown in Table 3. Absolute fit measures (GFI, AGFI, 2/df, and RMRSEA) and incremental fit measures are among the fit indicators (NFI and CFI). The table lists the requirements for each fit indicator and presents the research findings for each indicator.

The findings show that the model has a good absolute fit because all the indicators (GFI > 0.9 , AGFI > 0.8 , 2/df 6, and RMRSEA 0.08) are within the acceptable ranges. The incremental fit measures (NFI and CFI), both of which exceed the threshold of > 0.9 , also point to good model fit.

The table further lists the average variance extracted (AVE) and composite reliability (CR) for each model construct (Academic Connections, Company Type, Opinion, and Hiring Strategy). The reliability and validity of the constructs are measured, respectively, by the CR and AVE. The findings show that all constructs have good validity ($AVE > 0.5$) and reliability ($CR > 0.7$).

Overall, the findings imply that the research model has good fit and that the model's constructs are reliable and valid.

The subsequent stage was to evaluate the discriminant validity, which was demonstrated by low correlations between the interest-related measure and the measurements of other constructs [9].

The discriminant validity of four constructs, including academic connections, company type, opinion, and hiring strategy, is displayed in Table 4. Table 4 demonstrates that each construct's square root of the AVE (diagonal values) is greater than its corresponding correlation coefficient, indicating sufficient discriminant validity [10].

Academic Connections (A) and Company Type (B) have a moderately positive correlation coefficient of 0.649, indicating a relationship between these

two constructs. Though higher than the correlation between A and B, the correlation coefficient between Academic Connections (A) and Opinion (C) is 0.757. Accordingly, it can be inferred that Academic Connections and Opinion are more dissimilar from one another than Academic Connections and Company Type.

The correlation coefficient between Company Type (B) and Opinion (C) is 0.655, which also shows a moderately positive correlation between these two constructs, but is lower than the correlation coefficient between either of them or Academic Connections.

The moderate to high correlation found in the table suggests that each of the four constructs is unique from the others. In summary, the measurement model demonstrated adequate convergent and discriminant validity.

5. ASSESSMENT OF RESULTS

The conceptual model was reviewed once the scales were validated. A structural equation model (SEM) was used to test the data and check the hypotheses below:

H1: Academic Connections has a positive influence on Hiring Strategy

H2: Company type has a positive influence on Opinion of fresh graduates.

H3: Company type has a positive influence on Hiring Strategy

H4: Company Relations has a positive influence on Opinion of fresh graduates.

According to Hair et al., [11] this methodology was chosen because of the advantages offered by multivariate analysis over other methodologies [11].

The first advantage is that SEM uses a confirmatory rather than an exploratory approach for data analysis. Second, structural equation modelling provides precise estimations of missing and erroneous parameters, whereas traditional multivariate procedures cannot measure these once.

Structural models and hypotheses were tested with SmartPLS 2.0 [12]. For the model used in this study, a Goodness of Fit (GoF) value of 0.598 was calculated (Table 5), which indicates a very good model fit [13].

Table 6 presents the results of the structural model and hypotheses testing, which examines the relationships between the variables. The table presents the original sample (O) and sample mean (M) values, the standard error (STERR), the t-statistics, the P-values, and the 2.50% and 97.50% confidence intervals.

The original sample value is higher than the sample mean of 0.575 for hypothesis 1, which claims that connections in academia have an impact on opinion. 0.062 is the standard error, and 9.159 is the t-statistic. The P-value at a significant level of 0.01 is 0, which is lower than the critical t-value of 2.58. As a result, the findings are consistent with hypothesis 1, which states that connections at the academic level significantly affect one's opinion.

The original sample value for hypothesis 2, which states that company type influence's opinion, is 0.284, which is the same as the sample mean. The t-statistic is 4.086, and the standard error is 0.069. At a significant level of 0.05, the P-value is 0, which is less than the critical t-value of 1.96. As a result, the findings support hypothesis 2, indicating that the type of company has a significant positive influence on opinion.

The original sample value for hypothesis 3, which states that academic connections influence hiring strategy, is 0.374, which is lower than the sample mean of 0.37.

The standard error is 0.076, and the t-statistic is 4.8890. The P-value is 0, which is less than the critical t-value of 1.96 at a significance Level of 0.05. As a result, the findings support hypothesis 3, indicating that academic connections have a significant positive influence on hiring strategy.

For hypothesis 4, which states that company type influences hiring strategy, the original sample value is 0.524, which is lower than the sample mean of 0.53. The standard error is 0.058, and the t-statistic is 9.02. The P-value is 0, which is less than the critical t-value of 2.58 at a significance level of 0.01.

As a result, the findings support hypothesis 4, indicating that company type has a significant positive influence on hiring strategy.

In conclusion, the table shows that all the four hypotheses are supported by the data, pointing to the importance of academic ties and company type in influencing perceptions of and hiring practices in Kuwait's computing job market.

From Figure 2, we can conclude that all the four hypotheses were tested and answered, the Path diagram of the influence of Academic Connections was positively related to Hiring Strategy ($\gamma = 0.374$, $p < 0.05$), which means that companies with stronger academic connections tend to have better hiring strategies. On the other hand, Academic Connections was positively related to Opinion ($\gamma = 0.572$, $p > 0.05$).

Company Type has positive influence on Opinion ($\gamma = .284$, $p > .05$), which means that companies

with stronger academic connections tend to have a better reputation among the public.

Company Type has positive influence on Hiring Strategy ($\gamma = .5240$, $p > 0.05$).

But Opinion doesn't have any significant influence to Hiring Strategy as well as its p-value is greater than the significant level of $\alpha=0.05$, so that hypothesis is not supported. This means that there is no statistically significant evidence to suggest that a company's reputation has a significant impact on its hiring strategy.

6. DISCUSSION

"H1: The level of collaboration /relationship between universities in Kuwait and the local corporations is perceived to be high; and H2: Corporates relation with the Universities is positively related to the satisfaction with the computing graduates" were the first two hypotheses this study answered. The mean scores for the subscales calculated for these hypotheses are inclined towards the agreement of the respondents over the collaboration between computing universities in Kuwait and the local corporations. However, as the mean value for each study variable (organization's relationship with universities, invitation to students to join the organization as interns, and employment of academic members as consultants) is less than 4, it indicates that the level of collaboration between Kuwaiti Universities and corporations is not very strong. It seems imperative to put more effort in establishing collaboration between corporations and universities to improve the skills and knowledge of computing graduates. On the other hand, Academic Connections showed positive relations to Opinion, thereby hypothesis H3 was proved correct. Company Type has positive influence on Opinion ($\gamma = 0.2840$, $p > 0.05$), thus H4 is proved. Company Type has positive influence on Hiring Strategy ($\gamma = 0.5240$, $p > 0.05$).

7. CONCLUSION

Companies throughout the world are boosting their investments in college collaborations to gain access to the best talent, create ties with future employees, and stay ahead of the competition. However, these investments must still be optimized to ensure that businesses are getting the most out of their college collaborations.

The purpose of the research was to examine certain hypotheses about the relationship between the level of collaboration between computing colleges and regional firms in Kuwait and the level of satisfaction experienced by recent graduates working in the sector. While the first two

hypotheses were supported by the data (respondents agreed there was a lot of collaboration between universities and corporations), the mean values contradicted this. Therefore, there is a need for more collaboration between these groups to boost the education and experience of computer graduates. The positive link between academic ties and opinion found in the study provided more evidence for the third hypothesis. The findings also confirmed the fourth hypothesis, which claimed that the type of organization had an impact on recruitment tactics.

Particularly, the type of organization influences perspective and hiring strategy in a positive manner, suggesting that businesses should pay close attention to the graduates they hire to improve their hiring operations.

We found that the average of all research variables was less than four, suggesting a lack of cooperation between Kuwaiti academic institutions and businesses. The skills that individuals acquire, and the abilities considered necessary by businesses have a wide gap.

The study's findings also revealed that industries with higher levels of communication and collaboration with educational institutions have higher levels of satisfaction with computing graduates, whereas companies (both local and international) that do not collaborate with educational institutes have a lower level of satisfaction with computing graduates.

As a result, the study indicates that collaboration between universities and industry is critical for graduates' total skill development so that they can contribute effectively in the workplace.

We also attempted to investigate methods for determining the relevance of academic programs provided at Kuwaiti post-secondary institutions to current and projected job market needs.

One primary goal was to give recommendations for upgrading the existing university curriculum in the IT domain to better meet the needs of real-world employers. According to the study's findings, there is a large difference between graduate job expectations for employers and employer satisfaction with graduates in the corporate sector. This chasm is caused by a lack of collaboration between businesses and institutions.

Furthermore, possible enhancements in motivation, learning, organizing, scheduling, and understanding are required. The primary cause of the growth of this gap is the reluctance and inflexibility of education and training systems. Most institutes adhere to inflexible and traditional educational methods, resulting in a lack of adaptation to meet

the actual needs of the job market, which are always changing.

Strategic alliances between computing colleges and businesses can be a powerful tool to unlock the potential of computer engineering students. By providing students with internships and other opportunities to gain real-world experience, businesses can help shape the future of computing by preparing students for the jobs of tomorrow. Such alliances also provide businesses with access to a pool of highly qualified candidates who are eager to apply their knowledge in practical settings. By forming strategic partnerships, both parties can benefit from the exchange of knowledge and resources, resulting in improved outcomes for all involved.

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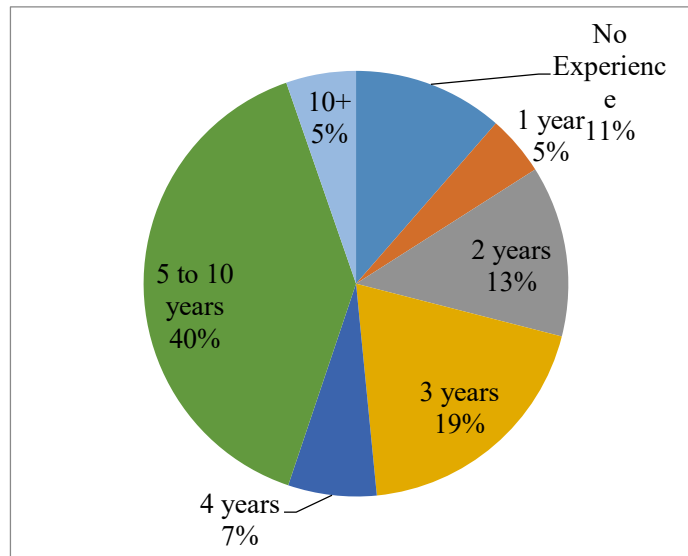


Figure 1: The pie chart showing the experience needed in the current job market.

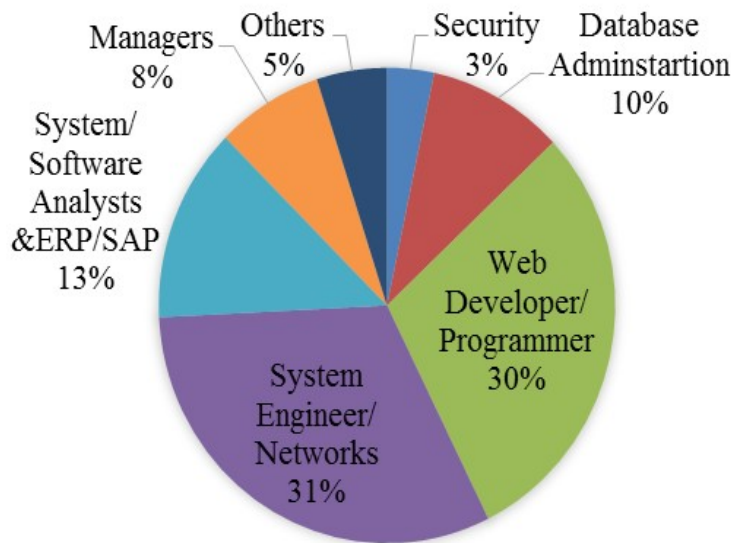


Figure 2: A pie chart shows the growing market need for certified IT graduates.

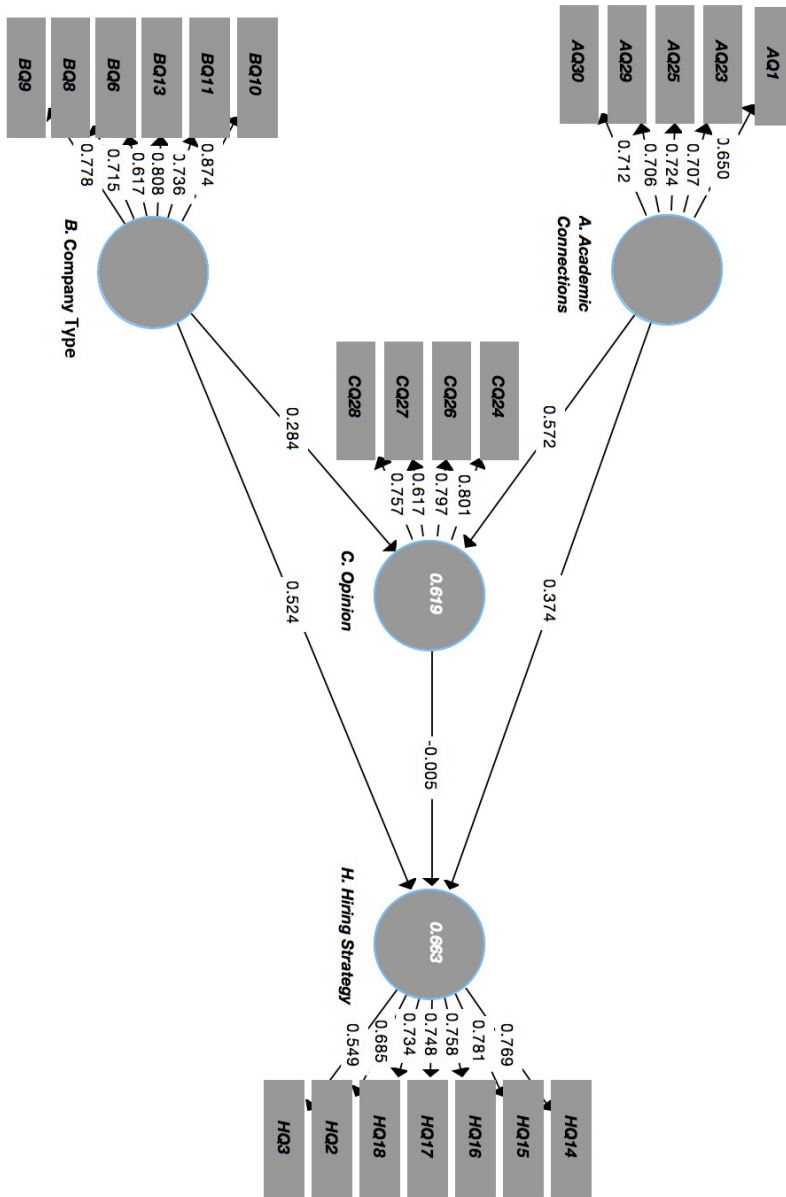


Figure 3: The schematic diagram of the model (ITEM)

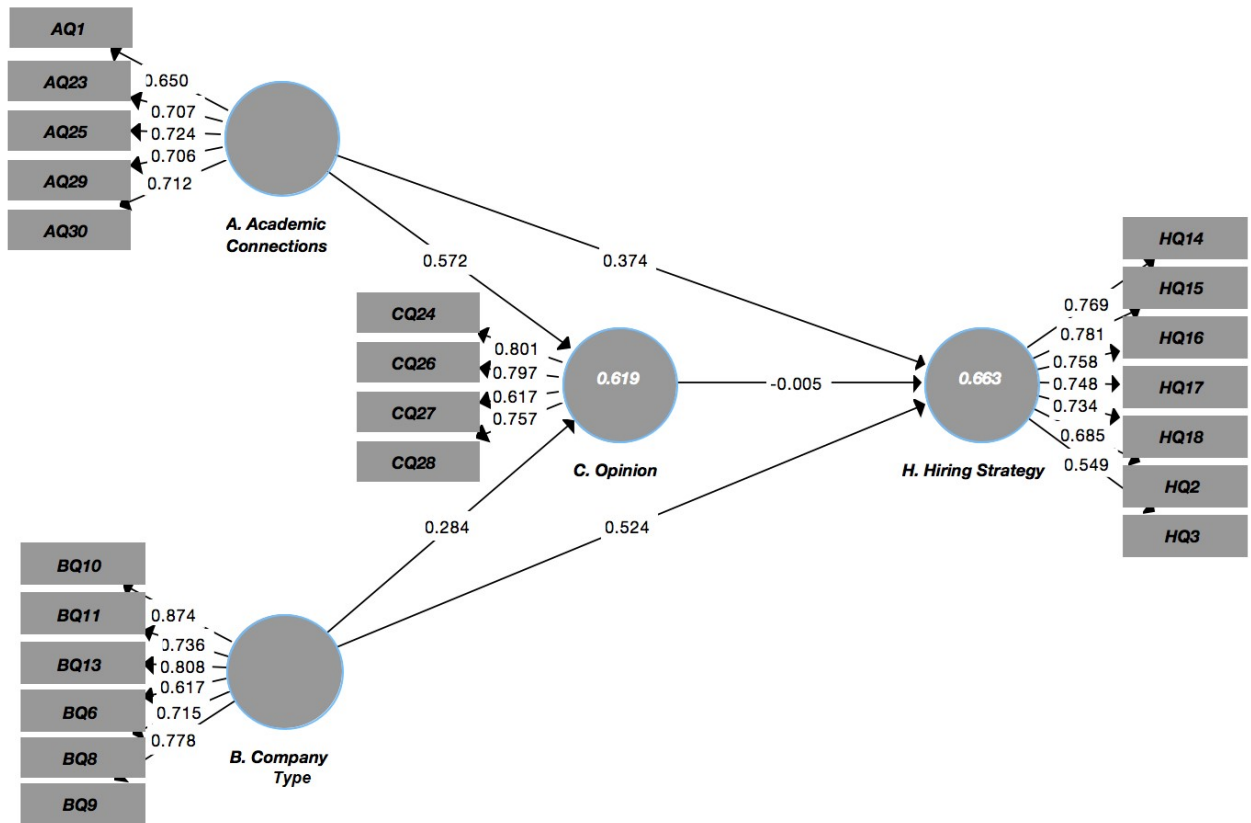


Figure 4: Estimates of Structural model (ITEM)

Table 1: Descriptive analysis, Corrected Item-Total Correlation, Cronbach's Alpha if Item deleted and Item Loading

Item	Mean		Std. Deviation	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Item Loading
	Statistic	Std. Error				
AQ1	3.740	0.072	0.994	0.458	0.885	0.573
AQ12	2.780	0.087	1.214	0.028	0.894	-0.145
AQ19	3.490	0.087	1.211	0.075	0.893	-0.147
AQ20	3.170	0.089	1.236	0.054	0.894	-0.224
AQ21	2.970	0.085	1.188	-0.235	0.899	-0.421
AQ22	3.630	0.090	1.244	0.314	0.888	0.339
AQ23	3.840	0.079	1.091	0.548	0.883	0.630
AQ25	4.270	0.073	1.013	0.654	0.881	0.668
AQ29	3.540	0.079	1.097	0.507	0.884	0.725
AQ30	3.510	0.081	1.126	0.486	0.884	0.728
BQ10	2.560	0.081	1.121	0.120	0.891	0.846
BQ11	2.640	0.084	1.170	0.064	0.893	0.717
BQ13	3.280	0.081	1.118	0.536	0.883	0.792
BQ4	3.760	0.084	1.163	0.355	0.887	0.099
BQ5	3.940	0.074	1.027	0.563	0.883	0.080
BQ6	3.790	0.079	1.094	0.623	0.881	0.656
BQ7	3.620	0.092	1.274	0.676	0.880	0.490
BQ8	3.370	0.088	1.219	0.630	0.881	0.718
BQ9	3.500	0.088	1.225	0.688	0.879	0.766
CQ24	3.910	0.086	1.198	0.628	0.881	0.798
CQ26	4.050	0.080	1.106	0.575	0.882	0.792
CQ27	3.550	0.085	1.183	0.391	0.886	0.597
CQ28	3.430	0.085	1.174	0.595	0.882	0.774
HQ14	3.720	0.073	1.008	0.573	0.883	0.765
HQ15	3.640	0.072	1.006	0.428	0.885	0.778
HQ16	3.500	0.082	1.132	0.599	0.882	0.754
HQ17	3.570	0.082	1.133	0.575	0.882	0.752
HQ18	3.580	0.073	1.010	0.645	0.881	0.735
HQ2	3.600	0.072	1.002	0.538	0.883	0.687
HQ3	3.500	0.077	1.076	0.592	0.882	0.556

Table 2. Factor Descriptive statistics, Correlation, Cronbach's Alpha and VIF

Factor	Mean		Std. Deviation		A	B	C	H	VIF
	Statistic	Std. Error	Statistic						
A. Academic Connections	3.4918	0.0393	0.5459	($\alpha=0.715$)					2.777
B. Company type	3.3856	0.0499	0.6937	.459**	($\alpha=0.737$)				1.960
C. Opinion	3.7357	0.0629	0.8717	.543**	.575**	($\alpha=0.777$)			2.653
H. Hiring Strategy	3.5880	0.0546	0.7586	.347**	.727**	.597**	($\alpha=0.846$)		

Note: N = 193. Figures in parentheses are alpha reliabilities for each scale. * $p < .05$; ** $p < .001$

Table 3. Quality Criteria for Research Model (ITEM)

Fit indicators	Criteria		Research results
Absolute fit	GFI	>0.9	0.9344
	AGFI	>0.8	0.8932
	χ^2/df	<6	5.463
	RMRSEA	<0.08	0.072
Incremental fit	NFI	>0.9	0.9112
	CFI	>0.9	0.9201
A. Academic Connections	CR	>0.7	0.817
B. Company Type	CR	>0.7	0.889
C. Opinion	CR	>0.7	0.887
H. Hiring Strategy	CR	>0.7	0.833
A. Academic Connections	AVE	>0.5	0.528
B. Company Type	AVE	>0.5	0.576
C. Opinion	AVE	>0.5	0.568
H. Hiring Strategy	AVE	>0.5	0.557

Table 4: Discriminant validity

	A	B	C	H
A. Academic Connections	0.7			
B. Company Type	0.649	0.759		
C. Opinion	0.757	0.655	0.747	
H. Hiring Strategy	0.71	0.764	0.621	0.722

Table 5. Goodness of Fit Index

	AVE	R ²
A. Academic Connections	0.528	
B. Company Type	0.576	
C. Opinion	0.568	0.619
H. Hiring Strategy	0.557	0.663
Average Scores	0.557	0.641
AVE * R2	0.358	
GoF = Square root of (AVE * R2)	0.598	

Table 6: Structural estimates (hypotheses testing)

Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Error (STERR)	T Statistics (O/STERR)	P Values	2.50%	97.50%
A. Academic Connections -> C. Opinion	0.5720	0.5750	0.0620	9.1590**	0	0.4510	0.7020
A. Academic Connections -> H. Hiring Strategy	0.3740	0.3700	0.0760	4.8890**	0	0.2100	0.5150
B. Company type -> C. Opinion	0.2840	0.2840	0.0690	4.0860**	0	0.1430	0.4190
B. Company Type -> H. Hiring Strategy	0.5240	0.5300	0.0580	9.0210**	0	0.4150	0.6410

Note: Critical t-values. **2.58 (P<0.01); * 1.96 (P<0.05)

I. APPENDIX: SURVEY QUESTIONS RELATED TO HYPOTHESIS.

Company type
B6.We design and develop our own software systems
B8.We provide network solutions to our customers
B9.We develop mobile applications
B10.We provide distributed system design
B11.We provide wireless and adoptive network services
B13.We design and manage databases
Academic Connection
A1.My organization has relationship with universities
A23.We employ academic members as consultants
A25.The roles we advertise have clear job descriptions
A29.We are planning to expand our business in the coming years
A30.We review our objectives and market needs on a regular basis
Opinion
C24.We feel that the quality of current graduates is not adequate for the market needs
C26.New graduates have a realistic perception of the market
C27.New graduates can cope with time pressure
C28.New graduates can work in teams
Hiring Strategy
H2.We have induction weeks for new employees
H3.We need minimum years of experience for new employees
H14.We encourage recruiting temporary contractors
H15.Most of our employees have a BSc
H16.Our employees should have knowledge of programming
H17.We have in house training schemes
H18.We have a mentoring system in our organization