





demonstrates the poor or inadequate practical application of theory and the poor design of the curriculum. Furthermore, it demonstrates the poor linkage between higher education institutions and the relevant industry which will recruit these students when they graduate. This raises the concern that higher education institutions need to liaise with the industry to help design and deliver an adequate curriculum that helps students in their future career.

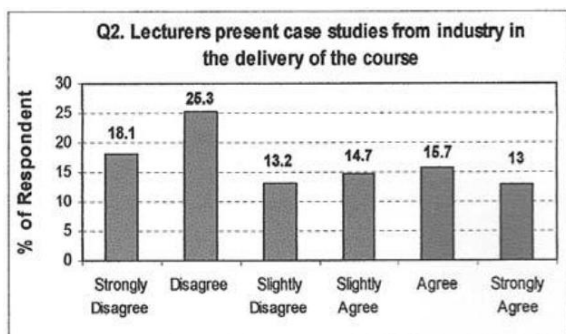


Figure 2: Students’ perception of lectures presenting case study from industry

**(Q3). Visiting industrial sites relevant to their Study**

When asked whether they enjoy visiting industrial sites that are relevant to their study (Q.3), more than half of respondent students indicated their agreement with this issue, in contrast to around onequarter of them (25.6%) who indicated that they did not enjoy visiting such sites. A minority of 16.0% of students were either slightly agreeing or slightly disagreeing. On the whole, it can be said that most students enjoyed such visits, possibly they felt that such visits would give them an idea of the nature and type of work carried out in these sites, and also give them some practical insight of the job that they might have after graduation. Such visits would increase students’ knowledge and can prepare them for their future career.

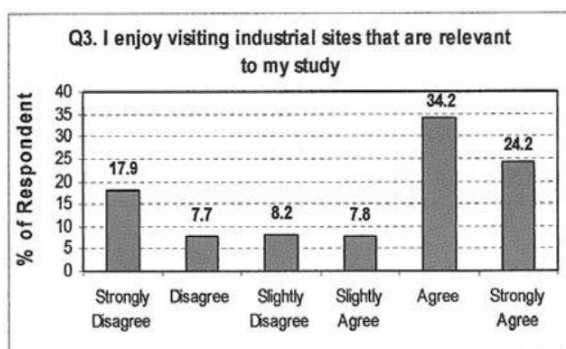


Figure 3: Students’ perception of visiting industrial sites relevant to their study

**(Q4). Students’ training in relevant industry as part of their study**

Students were also asked whether they like to spend time on training in relevant industry to their study (Q.4), most of the respondent students (71.2% of the sample) indicated their agreement with this item, in contrast to a minority of 11.0% of them who disagreed with this statement and 18.5% of them who were either slightly agreeing or slightly disagreeing with this statement. Overall, the majority agreed with this issue. Spending time on training in relevant industry is very important for engineering students in order to see at hand how they are expected to do their jobs after graduation and recruitment by the industry.

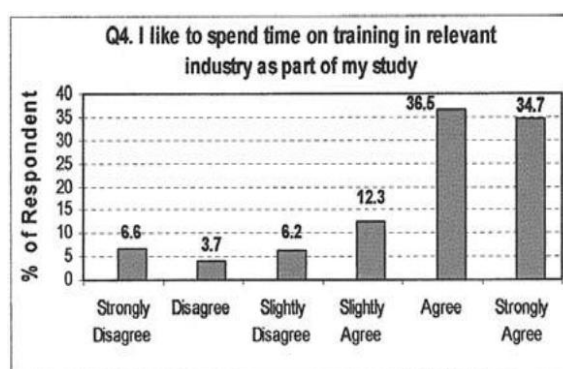


Figure 4: Students’ perception of their training in industry as part of their study

**Partnership with Higher Education and Vocation Training Institutions Engineers’ and Technicians’ Perception**

**(Q5). TVET institutions’ role in updating and enhancing their skills**

Engineers and technicians were asked whether TVET institutions play a key role in updating and enhancing their skills (Q.5). About 40.0% of respondents agreed that TVET institutions play a key role in updating and enhancing their skills, whereas many of them (37.8% of the sample) slightly agreed or slightly disagreed. Around 20.0% of these indicated their disagreement with the statement. Overall, more than half of them agreed. This pattern is more in agreement more than disagreement, since those with a Bachelor Degree are expected to have graduated from universities as engineers whereas most of the other group has attended TVET colleges.

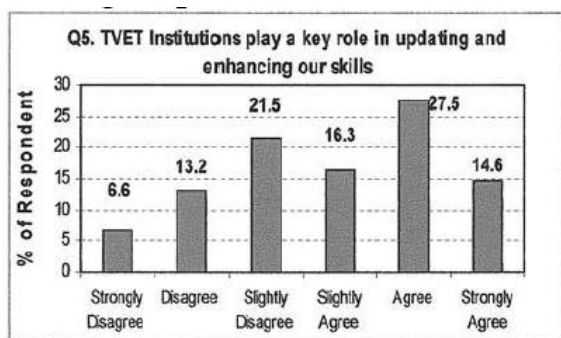


Figure 5: Engineers' perception about the TVET institutions play a role in updating their skills

**(Q6). Hosting engineering and technical students in organizations**

In response to (Q.6), whether hosting engineering and technician students in organisations will prepare them better for their future professional career, most engineers and technicians (69.4%) agreed that placing students at their organizations will prepare them better for their professional career, and only an insignificant minority (5.8%) disagreed, and 24.8% of them slightly agreed or slightly disagreed. This pattern of responses might be due to engineers and technicians' experience and perception of the usefulness of industrial placement for acquiring employability skills. Industrial placement will help students to acquire further knowledge and skills relating to the nature of their future jobs and would become more productive and more efficient in carrying out their jobs after graduation and recruitment.

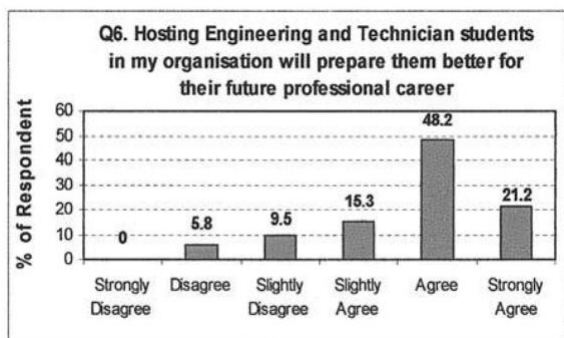


Figure 6: Engineers' perception of hosting engineering and technician students in organization

**(Q7). Consultation with TVET institutions**

When engineers and technicians were asked whether they consult TVET institutions to solve technical problem, develop new product or to enhance performance (Q.7), most engineers and technician (56.2% of the sample) disagreed that they

do so, in contrast to 22.6% of them who agreed, and 21.1% who either slightly disagree (10.9%) and slightly agree (10.2%). Overall, it can be said that more than two-thirds of engineers and technicians disagreed with this statement. This pattern of responses clearly reveals the poor linkage between TVET institutions and the relevant industry.

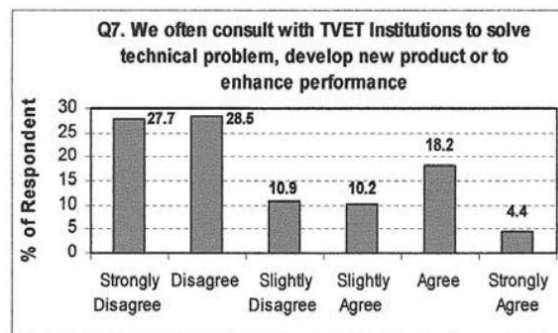


Figure 7: Engineers' perception of consulting with TVET institutions

**(Q8). Keeping contact with college/university after graduation**

Engineers and technicians were asked whether they have kept their contacts with their college or university after their graduation (Q.8). The majority of respondents (70.1% of the sample) disagreed with the statement, indicating that they have no contacts after graduation; only 10.9% of them agreed that they have kept contacts after graduation and 18.9% of them either slightly disagree (13.1%) or slightly agree (5.8%). Overall, it can be said that the majority of respondents (including those slightly disagreeing) have not contacted their colleges or universities since graduation. This pattern of response may also tie up somewhat with the pattern of responses to (Q.7) above, and also indicates the poor linkage between TVET institutions and industry. This pattern of response, however, is not surprising in Libya, as is the case in most Arab universities and colleges, in which higher education institutions do not run programmes such as 'alumni' programme, as is the case in the UK, hence, contacts stopped as soon as the students graduate and nothing is known about them by their colleges and universities.

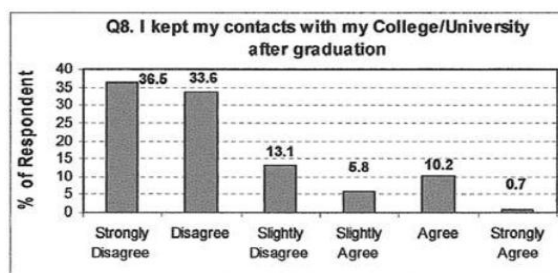


Figure 8: Engineers' perception of their contact with TVET college/university after graduation

**(Q9). Placement of lecturers in manufacturing organisations**

When asked whether placing lecturers in manufacturing organisations will improve their awareness of employers’ requirements (Q.9), the majority of respondents agreed with the statement; only a small minority (9.4%) disagreed and 18.9% either slightly agree (10.9%) or slightly disagree (8.0%). Placing academic staff in manufacturing organization will provide them with the opportunity to see at hand what these organisations make or produce and what sort of engineers and technicians are required by them so that they can suggest to their institutions of the programmes needed that would help improve the design and delivery of curricula to make more geared to the requirements of these organisation and supply them with staff that can succeed in their jobs. This will also help strengthen the ties and linkages between higher education institutions and the manufacturing organisations.

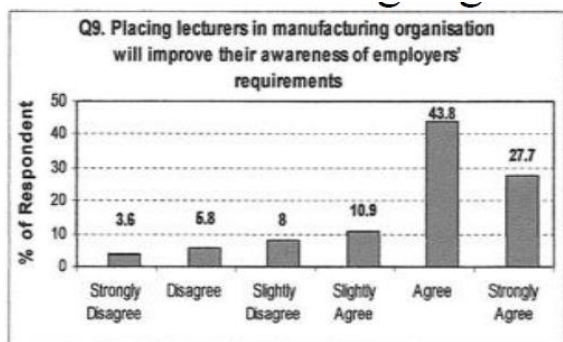


Figure 9: Engineers' perception of placing lecturers in manufacturing organization

**(Q10). Studying for a higher qualification if an opportunity arises**

Finally, when asked whether they will go back to college or university to study for a higher degree should an opportunity arise (Q.10), more than half of respondent engineers and technicians (54.7%) agreed that they will do so; only (16.7%) of them disagreed, and 28.4% of them either slightly agree (10.9%) or slightly disagree (17.5%). This pattern of responses indicates that most of the respondents want to pursue their studies if they have the chance to do so. Those agreeing with the statement are motivated individuals who want to improve and further their career by obtaining higher qualifications that help their promotion within their organisations.

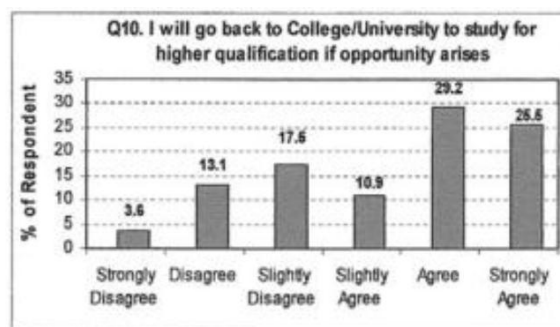


Figure 10: Engineers' perception of studying for higher qualification if an opportunity arises

**5. Conclusion**

In summary, with a global economy that interconnects every country around the world, the demand for qualified experts’ increases. Attracting students into and graduating students from engineering degree programmes is a growing challenge. Evidence is emerging that competence-based teaching, combined with a strong connection to manufacturing sectors, can positively impact student academic outcomes. One of the missions of universities and TVET institutions are to guide and encourage students’ qualified integration. Consequently, higher education programmes should prepare students and train mature workers according to the manufacturing industry demands and technological evolution, focusing teaching on competences, in order to face the economic and social challenges ahead. On the other hand, the involvement of enterprises and industry is crucial and should be made in different aspects: curricula design; interchange of students, organisation of study visits and bringing professional to schools; quality assessment and regular feedback.

Notwithstanding that the TVET institutions have increased substantially during the last ten years or so, there are still some problems in the system that affects their performance. TVET institutions, considered by the government as the main supplier of highly skilled manpower, have been unable to produce the required graduates both in quality and quantity. In fact, many of these TVET institutions suffered from the shortage in physical and human resources that are essentially required for this type of educational institutions. All these issues hampered TVET from performing their required functions in society in general and the manufacturing industry in particular. Furthermore, it can be concluded from the findings and discussions above that TVET institutions in Libya is based on a weak foundation and that TVET education is still out of step with changes that have taken place in the national economy. This weakness should be remedied so that courses given at HEIs are linked positively with the industry. This weak linkage may reflect on poor

coordination between the various sectors of industry and HEIs. This weak linkage is also substantiated by the fact that the majority of students are not presented with case studies from the relevant industry. It can therefore be concluded that theory is not put into practice. However, it can also be concluded that students enjoyed their field trips to industrial site, and most of them spent some time on training in relevant industry as part of their study. This can be seen as an attempt by the educational institutions to put theory into practice.

From the engineers' and technicians' perspectives, it can be concluded that TVET institutions played a role in updating and enhancing their skills and placing engineering and technician students in organisations help prepare them for future work. It can also be concluded that consultation with TVET institutions to resolve technical problems is not up to the required standard; this substantiates the poor linkages between TVET institutions and the relevant industries.

This poor linkage is further substantiated by the fact that most participants did not keep contacts with their educational institutions after graduation. Placing lecturers in manufacturing organisation was perceived to improve their awareness of the employers' requirements. It can also be concluded that many respondents wanted to study further should the opportunity to do so becomes accessible.

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