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LABOR MARKET STUDY

FRESH GRADUATE EMPLOYMENT IN THE ICT SECTOR OF JORDAN

OCTOBER, 2016

PREPARED BY



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EXECUTIVE SUMMARY

Human resources are the raw materials, fundamental development building blocks, and growth enablers for the ICT (Information and Communications Technology) sector of Jordan. Though the sector does face multiple challenges, a major and debilitating challenge is matching the right resources and expertise with the right opportunities, so as to enable competitive capabilities and growth within the local industry while increasing employment. Employment is vitally important as there are a large number of students graduating with ICT focused disciplines from the different universities in Jordan on an annual basis, but with only a minority finding work within their respective disciplines.

Though there are multiple factors contributing to the lack of proper matching with the skills of the graduating students and the requirements of the industry, some of the major and relatable key challenges to employment of fresh graduates include outdated university curriculums combined with lack of soft skills, lack of personal awareness and experience of global technology trends, and little to no practical hands on experience. Furthermore, "Brain Drain" to neighboring countries creates another challenge to local ICT companies in retaining skilled labor.

Therefore, joint efforts and coordination between private, public, and academia are required to play a significant part in bridging the gaps between academic outcomes and private sector requirements, in addition to focusing on improving the skills and competencies of graduates according to the unique sector needs and trends.

JORDAN ICT SECTOR

Jordan is a developing country with highly educated human resources; it is improving in fields where there is fast development in education, computerization, e-government, in addition to a rapid spread of knowledge centers in remote areas, and the establishment of a legal environment sustaining this progress. The ICT field is an area that is seen as an opportunity in which Jordan can increase its competitive advantage over other countries in the region. Consequently, Jordan has taken very serious steps towards launching major ICT initiatives aiming at developing the ICT sector.

Additionally, the sector has focused on major efforts in response to a challenge put forward by his Majesty King Abdullah II entitled REACH 2025, which aims at nurturing a vibrant, export-oriented, and internationally competitive ICT sector through developing a regulatory framework, providing an enabling infrastructure and environment, while offering advancement programs, Human Resource development in addition to capital and finance. As a result, annual sector growth has recently risen to an estimated 25% and has generated income representing approximately 12% of the country's GDP according to Information and Communications Technology Association of Jordan - int@j.¹

EMPLOYMENT VS. DEMAND

Despite the recent growth of the ICT sector, Jordan has encountered significant challenges over the past few years as a result of different

¹ INFORMATION AND COMMUNICATIONS TECHNOLOGY ASSOCIATION- INT@J WEBSITE: www.intaj.net

factors, and although various reform programs and plans have been implemented successfully, the Jordanian economy is still suffering from many set-backs, most importantly being unemployment, while at the same time companies are searching for relevant resources. Although this challenge is not new, one of the more troubling aspects is the effect on fresh graduates. Jordan, like most countries, is investing in developing strategies directed towards curtailing high youth un-employment as a key policy priority to allow a fair chance to work and develop professionally. Previous studies on the Jordan Market attribute some of the major causes of youth unemployment to a number of factors. These include factors such as the lack of career guidance counselling for students and unemployed people, lack of opportunities to find satisfying work following graduation, difficulty for individuals obtaining jobs compatible with their qualifications, poor wages and working conditions offered by local firms, gaps between the skills of graduates and the needs of employers, and social and cultural obstacles such as the full integration of women into the labor market².

According to the Jordan Department of Statistics, the unemployment rate has reached 13.6% during the fourth quarter of 2015. Along gender lines, the unemployment rate has reached 11.7% for males and 23.0% for females³.

STUDY OBJECTIVE

This report provides the findings of a study into the perceptions of the employability skills of ICT fresh graduates by ICT sector companies. The study was conducted by Jordan Skills and

Standardization Organization – JoSSOr with the support of the Information and Communications Technology Association of Jordan - int@j. Main data collection began in February 2016, and was completed in April 2016.

The purpose of this study is to determine the significant factors that influence unemployment among ICT fresh graduates in Jordan. The respondents comprised of 136 employers from the ICT sector in Jordan.

The study's objectives were:

1. Explore the perceptions of employers concerning the skills, knowledge and characteristics, which help new graduates to become better prepared for the labor market.
2. Ascertain whether perceptions vary by employment industry.
3. Outline the perceptions of employers towards Higher Education Institutions (HEI) learning outcomes in terms of curricula and learning opportunities to enhance students' employability skills.
4. Overview of employment opportunities of employers and their recruitment strategy.

As a general observation from the perspective of the ICT industry concerning the employability of fresh graduates, main issues include lack of employability skills, English proficiency, motivation, and productive attitude.

ORGANIZATION OF THE REPORT

The report first highlights contextual information on the ICT sector and unemployment amongst fresh graduates in Jordan with particular reference to addressing employability and the perceived needs of employers.

The report then draws on the qualitative strand of the study to explore the views of employers.

² "UNEMPLOYMENT IN JORDAN" - THE EUROPEAN TRAINING FOUNDATION

³ QUARTERLY REPORT ON THE UNEMPLOYMENT RATE DURING THE FOURTH QUARTER OF 2015- DOS JORDAN

In particular, the study highlights what they believe promotes graduate employability and their own experiences in this process, such as their considerations for candidate knowledge, skills and competencies; as well as from which

academic institutions candidates graduated from.

The final part of the report considers some ways employers and higher education institutions can better work together to promote employability.

JORDAN SKILLS STANDARDIZATION ORGANIZATION

The Jordan Skills Standardization Organization – JoSSOr is a program supported and implemented by The Information and Communications Technology Association- int@j. JoSSOr has received support from the USAID Jordan Competitiveness Program⁴ and from the International Finance Corporation – IFC World Bank⁵, under the Education for Employment (E4E) project.

JoSSOr is dedicated to creating a strong, diverse and highly educated Jordanian ICT industry and workforce. JoSSOr is a catalyst for change, pushing for innovations that will provide labor market intelligence, life-long professional development, quality education and training for the industry, educators, governments and the workforce. JoSSOr is an engine to bridge that gaps and enhance Jordanian human capital effectiveness. Ideally, this will lead to greater business performance, in addition to increasing the international competitiveness of the Jordanian ICT sector for export of ICT products and support Business Process Outsourcing – BPO.

JoSSOr contributes either directly or indirectly in the continued and sustainable development and

growth of the ICT sector in Jordan. JoSSOr fulfills the industry sector talent needs in terms of quality and quantity to enable a sustainable pipeline that is industry ready. It plays a key role in reducing the digital divide between Jordan and more developed countries by using ICT to enable greater competitiveness and create sustainable job growth. JoSSOr will support the development of a nationally recognized skill and competency standards required in the labor market, made available to higher education institutes, training institutes, employers, and present and future employees.

VISION

To Ensure the sustainable growth of Jordan's ICT sector and enable the Kingdom's evolution into a knowledge-based economy by creating skilled and employable professionals that are educated by a world-class and high quality academic and training ecosystem.

MISSION

Bridge the skills gap between the supply of qualified workers and employers by setting and maintaining skills and occupational standards, enabling the quality development of ICT talent, and increasing sector and labor market transparency and intelligence.

⁴ <http://www.jcp-jordan.org/>

⁵ <http://www.ifc.org/>

ROLE:

JoSSOr exemplifies sector-based skills systems for Jordan to:

- Engage directly with industry, education and governmental interests
- Develop competency standards to drive workforce improvement
- Produce labor market analysis at the sectoral level, identifying skills gaps and shortages
- Improve labor market supply and demand.

To address the challenges and fulfill the unique needs of Jordan, JoSSOr aims to play four key roles:

Role	Description
Sector Stimulator	Contribute either directly or indirectly to the continued and sustainable development and growth of the ICT sector in Jordan
Standards Regulator	Uphold common standards, especially those pertaining to sector qualifications and ICT education delivery to ensure greater consistency and transparency
Competency Aligner	Effectively match the supply and demand needs of the ICT sector, especially as it relates to human capital needs, i.e. competencies required by industry
Talent Developer	Ensure that the existing and potential workforce in Jordan is adequately skilled and proficient to become productive stakeholders in developing the ICT sector

To achieve its goals, JoSSOr focuses on four areas that are proven building blocks of a healthy, forward-looking sector:

Standards - provide competency and skills definitions to enable employers, educators and individuals to work effectively in the ICT sector.

Labor Market Intelligence - provide up-to-date statistics, reports and analysis of human resource developments in the ICT sector.

Career Pathways - provide information to individuals, students and career transition persons, on pathways to employment in the ICT sector.

Partner Activities - provide information on potential activities for which employers, industry associations, individual fresh graduates, universities, E-TVET organizations, and governments can partner in.

JoSSOr believes that "national" standards and certification are an important step to establishing an effective and efficient system of professional competence within the ICT industry. At the same time JoSSOr helps to enhance the employability skills of the Jordanian fresh graduates who are unemployed.

1.OVERVIEW OF LABOR MARKET STUDY

METHODOLOGY

This study references data collected directly from companies whom responded either to an online survey or by face-to-face meetings where necessary. The data was analyzed using statistical procedures such as mean point value and correlation analysis. The result of the study presented in this report contributes to the assumptions made towards the factors influencing unemployment among fresh graduates.

FINDINGS

1.1. GENERAL COMPANY INFORMATION

Section 1.1 of the study inquired about contextual information on various companies in the ICT sector. Respondents were asked to give information about their businesses, target markets, services and employment practices. 136 companies completed this section.

1.1.1. COMPANY PROFILING

Respondents were asked about their company size based on the number full time employees. Categories are based on the classification of entities by the Central Bank of Jordan as illustrated in Figure 1:

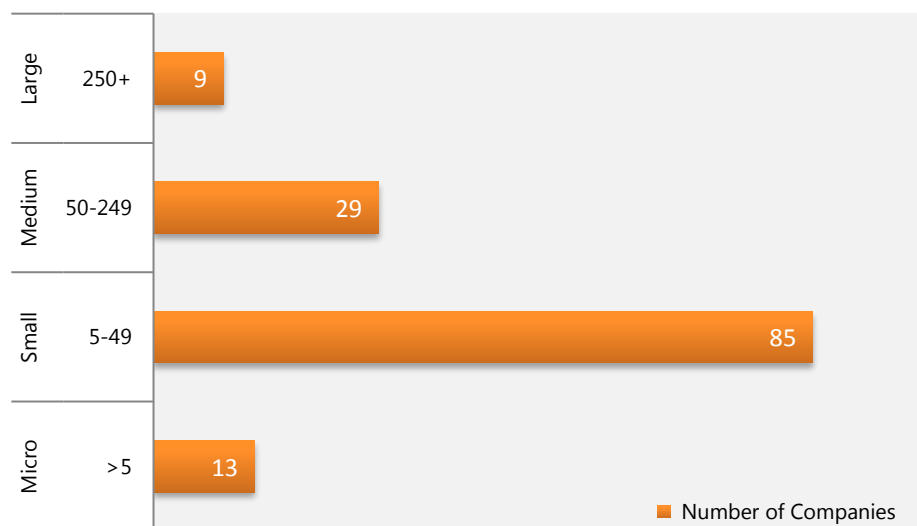


Figure 1: Company Size

The respective percentages are as follows:

- Large: 6.6%
- Medium: 21%
- Small: 62.5%

- Micro: 9.5%

Clearly, Small to Medium Enterprises (SMEs) dominate the ICT landscape. Though this is the indication of the companies who responded, other ICT Companies who did not partake in the survey (due to the fact that they are still too small or do not have a high profile within the industry to be approached) would likely be classified in the Micro or Small Sizes, increasing the percent of these classifications.

ICT statistics are prone to inconsistencies as there is no consistent classification system regularly utilized for the Jordan ICT sector. Companies can be grouped around technologies, solutions or business verticals, and ICT products and services cut across a wide range of economic activities. As a result, the ICT sector does not fit comfortably within the common industry classification definitions, except for the telecommunications sector. To better align to a standard this study uses the International Standard Industrial Classification (ISIC) of All Economic Activities, Revision 4.0⁶, to best classify each business (which excludes computer retail shops, assembly shops, vocational training providers, call centers and internet cafés). Accordingly the activities (industries) of the respondents in the ICT sector were grouped into ICT manufacturing industries, ICT trade industries, ICT services industries and others. Respondents of the study were asked to specify activities according to ISIC rev 4.0 as shown in table 1. *Respondents were able to choose more than one industry whenever applicable:*

ICT manufacturing industries	
Manufacture of electronic components and boards	2
Manufacture of computers and peripheral equipment	1
Manufacture of communication equipment	0
Manufacture of consumer electronics	0
Manufacture of magnetic and optical media	0
ICT trade industries	
Wholesale of computers, computer peripheral equipment and software	10
Wholesale of electronic and telecommunications equipment and parts	12
ICT services industries	
Software publishing	44
Telecommunications	
Wired telecommunications activities	13
Wireless telecommunications activities	14
Satellite telecommunications activities	7
Other telecommunications activities	13
Computer programming, consultancy and related activities	
Computer programming activities	45

⁶ Department of Economic and Social Affairs Statistics Division, Series M No. 4/Rev.4- UN PUBLICATIONS

Computer consultancy and computer facilities management activities	41
Other information technology and computer service activities	56
Data processing, hosting and related activities; web portals	
Data processing, hosting and related activities	26
Web portals	30
Repair of computers and communication equipment	
Repair of computers and peripheral equipment	6
Repair of communication equipment	4
Other	
Logistics	2
Marketing and Distribution	2
Training	5
Courier	1
Cartoon Animation	1
Economic Development	1
Customer Care /Call Center	1
e-Learning	2
VoIP	1
Recruitment	1
e-commerce	2
VAR and SI	1
Fintech	1
Internet Provider	1
MVNO	1
Broadcast Media	1
Value Added Services Provider	1

Table 1: Company Industry Classification

1.1.2. EMPLOYMENT

Companies hesitate to employ fresh graduates due to the fact that they may lack the hands on experience, skills, and knowledge of how to work in a corporate environment as well as being untested in real life situations. Nevertheless fresh graduates may be able to bring in fresh skills, open minded attitudes, and cost efficiency.

The respondents were asked to provide the number of full time jobs opened in the last three years from 2013- 2015, and how many of these jobs were for ICT fresh graduates. Findings revealed that 2,471 jobs were opened in 2013; 2,436 in 2014; and 2,331 in 2015. Of which 739, 742, and 812 jobs were for ICT fresh graduates respectively. Therefore, findings in figure 2 illustrate the **increasing** percentage share of fresh graduates' jobs relatively to total job market in ICT sector.

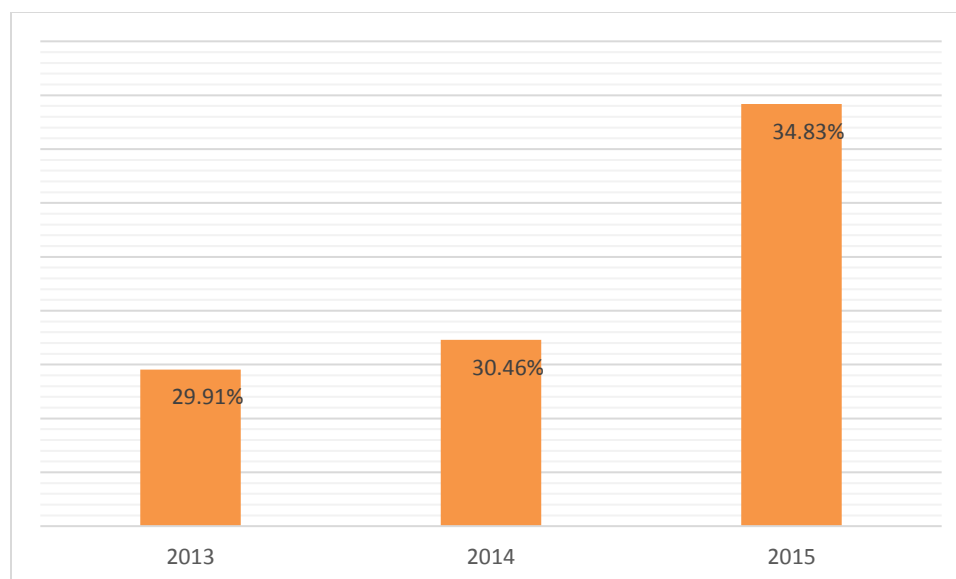


Figure 2: percentage share of fresh graduates' jobs relatively to total job market

Concerning gender equality, Jordan witnessed significant improvements on the fronts of providing for women, nevertheless only a small percentage of women participate actively in the Jordanian economy. The ICT sector has the potential to offer high quality, relatively well-paid, mainly professional or technical jobs for the population as a whole and to women. The advantage of the ICT sector, especially in terms of the integration of women, is the wide variety of ICT subsectors, jobs and tasks requiring different sets of skills and predispositions. The character of the sector

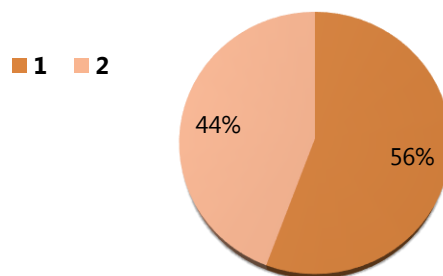


Figure 3: Gender Based Hiring in the past three years

also enables different working routines such as teleworking or working from home. When companies were asked about the number of females hired as ICT fresh graduates in the past three years, women constituted a 44% share of all the new recruits during the last 36 months, as per figure 3.

The ICT sector has a high potential for economic growth and job creation and it is seen as a priority sector by the government. To gauge the potential, companies were asked to provide planned job acquisitions for 2016 and 2017. Findings, illustrated in figure 4, projected jobs being created to between 441 and 990 in 2016, while 2017 is likely to encompass 504 to 1,059.

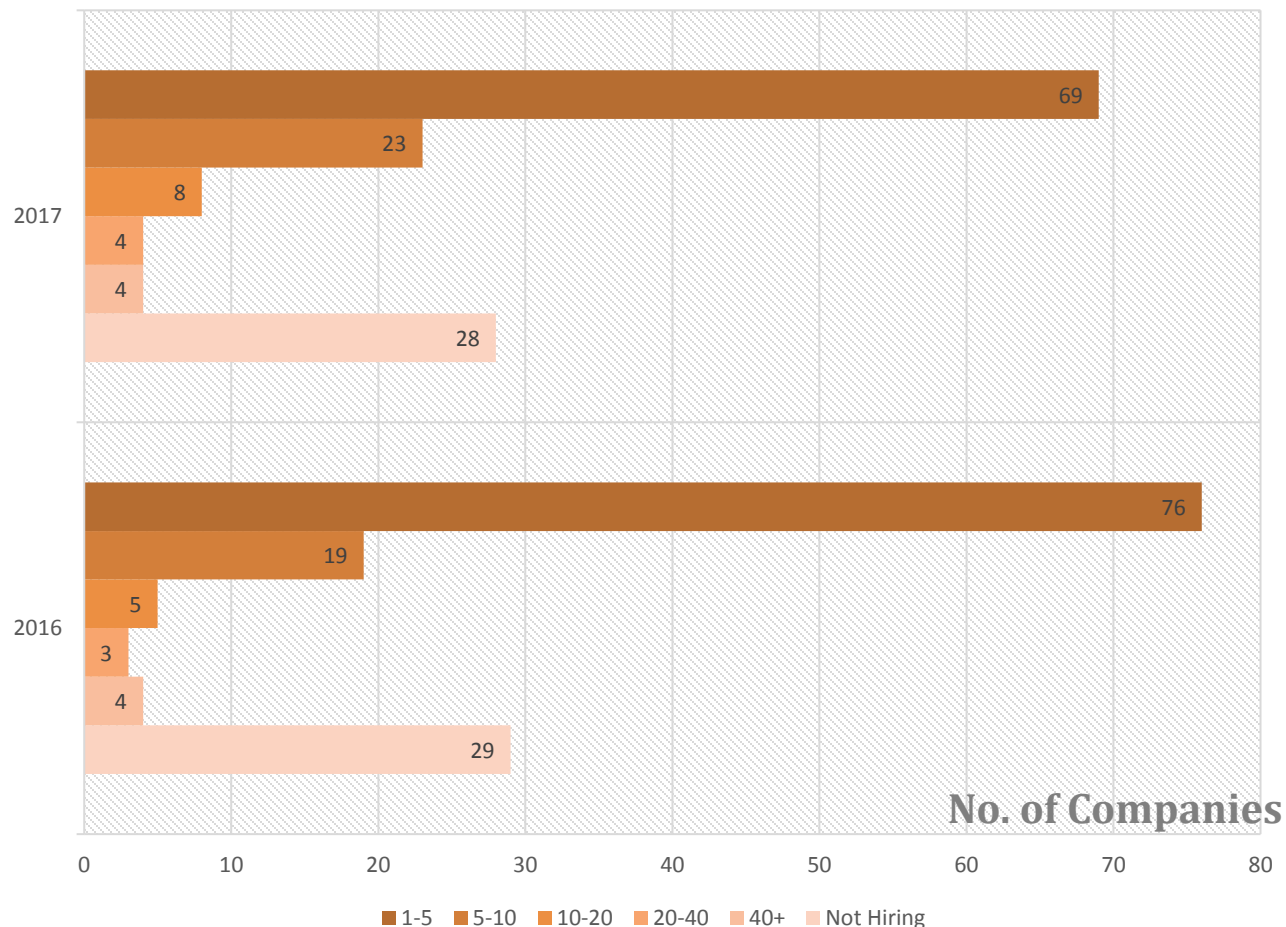


Figure 4: Projected Hiring in 2016 and 2017

Though Jordan did not technically go into an official recession by the economic crisis of 2008 (defined as successive periods of negative output growth), there was a decline in the rate of economic growth which was by all means significant, and the crisis created challenges for the sector. Relevant for the economic growth of the sector is access to skilled and creative human capital. As per a previous note, the Jordan job market struggles in retaining enough skilled labor through “brain drain” to other markets. As per the survey concerning Human Capital migration in table 2 below, a majority of employers confirmed former employees have moved to work in the GCC in the last 2 years. This equated to approximately 376 total employees.

Answer Options	Response Percent
No	27.2%
Don't know	17.6%
If Yes, then how many:	55.1%

Table 2: Human Capital Migration

In addition to the shortage of skilled workers, a significant amount of employers were required to outsource specialized ICT tasks outside of Jordan as illustrated Figure 5.

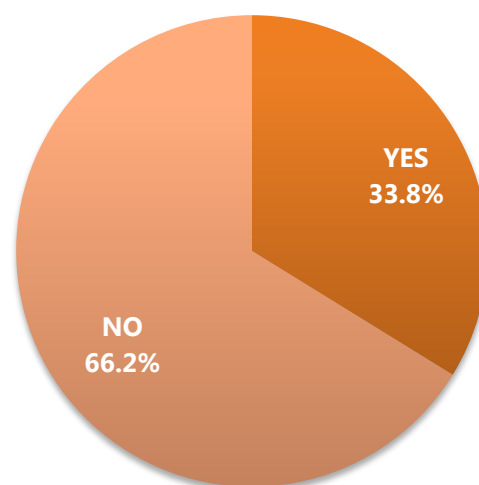


Figure 5: Percent of Companies Outsourcing ICT Services Outside Jordan in the past 3 Years

1.2. RECRUITMENT PROCESS FOR FRESH GRADUATES

In this section 101 out of the 136 respondents had hired ICT Fresh Graduates without previous professional experience from Jordan. For better illustration for some of the survey results, the companies were divided in this section into industry's subsectors as a "best fit" based on their input in Section 1 as per their ISIC Options (company/industries) as follows: Software & Web, Telecoms, Manufacturing, Trade, Other Services, and No Category.

1.2.1. EDUCATIONAL BACKGROUND

This part indicates the educational background as indicated from the companies who showed interest in hiring ICT Fresh Graduates based on the educational level, Major or Field of study, and Educational Institution. Please note that these are only the opinions of the respondents to the survey and are not part of any recognized ranking system, nor do these reflect the opinion of JoSSOr.

Respondents of the survey were asked to provide if they required an educational degree and what type would be acceptable from ICT fresh graduates. The companies could select from a 2 year college or a 4 year university or both. All 101 Companies that Responded indicated that they require that an ICT Fresh graduate have at least one type of degree except for one company which commented that they have no preference for institutional degrees. This is to be expected as work from graduates going into ICT are required to have some education and relevant skills as a basis to do their work. Findings are illustrated in Figure 6:

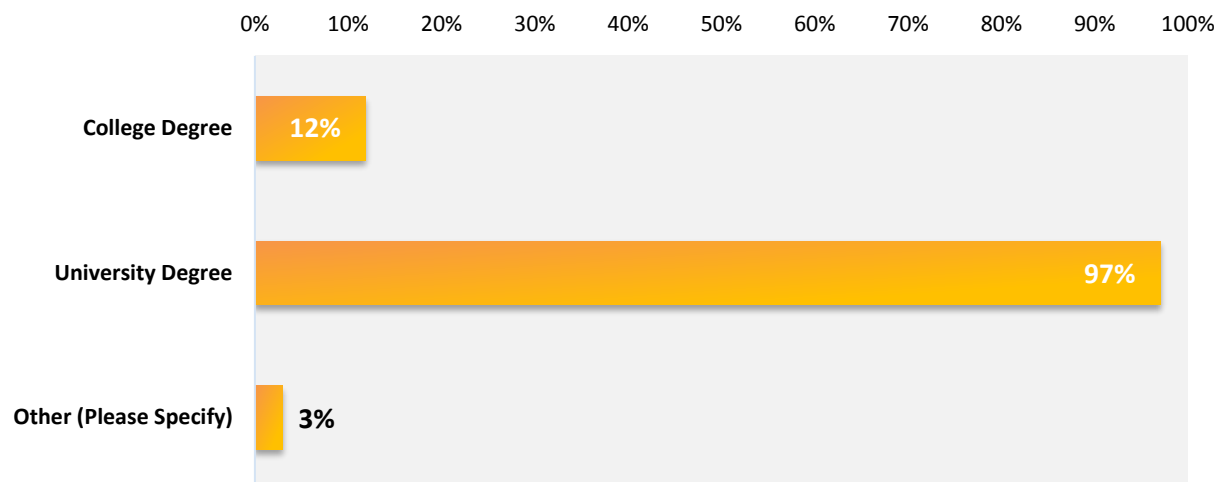


Figure 6: Percentage of Companies Preferring Educational Degrees when hiring and at what Level (Note in this context a College Degree is a two-year program, while a University Degree is a four-year program)

Ranked information in the below part concerning major or field of study is based on a quantitative approach summing up the ranks as points giving the least important 1 point and the most important 5 points (This system was used for all questions when companies were required to rank among preference).

Respondents were surveyed about university majors or fields of study in accordance to the preference in hiring ICT fresh graduates. The most highly ranked fields of study taking into account all 101 respondents without segmentation are Computer Science and Computer Engineering; while the lowest ranked are Accounting Information Systems & Business Information Systems, illustrated in figure 7 below.

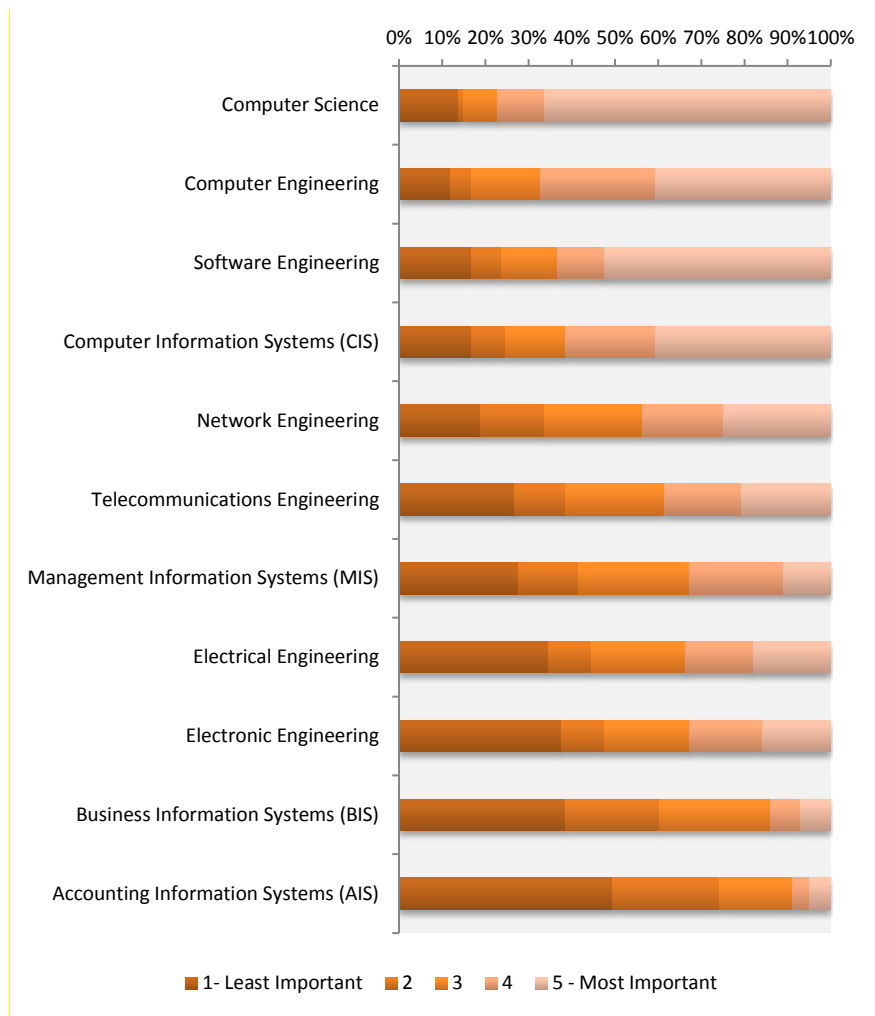


Figure 7: Rank of University Majors (Based on Responses from All Companies in General)

For a more qualitative approach, breaking findings down into an ICT subsector basis the Telecom companies comprising of approximately 14% of the respondents in this section (but employing a significant number of employees and fresh graduates) tended to rank engineering higher starting with Network Engineering, Computer Engineering, Telecommunications Engineering, Computer Science and Electrical Engineering while ranking the Information Systems Disciplines lower. Companies that were related to Software and Web solutions which comprised of around 48% of the respondents in this section ranked the Computer Science and Software Engineering highest followed by CIS, Computer Engineering, and MIS. As per figure 8 below:⁷

⁷ subsectors such as Trade, Manufacturing, and Other Services, their rankings mirror the rankings of the combined figure for all companies

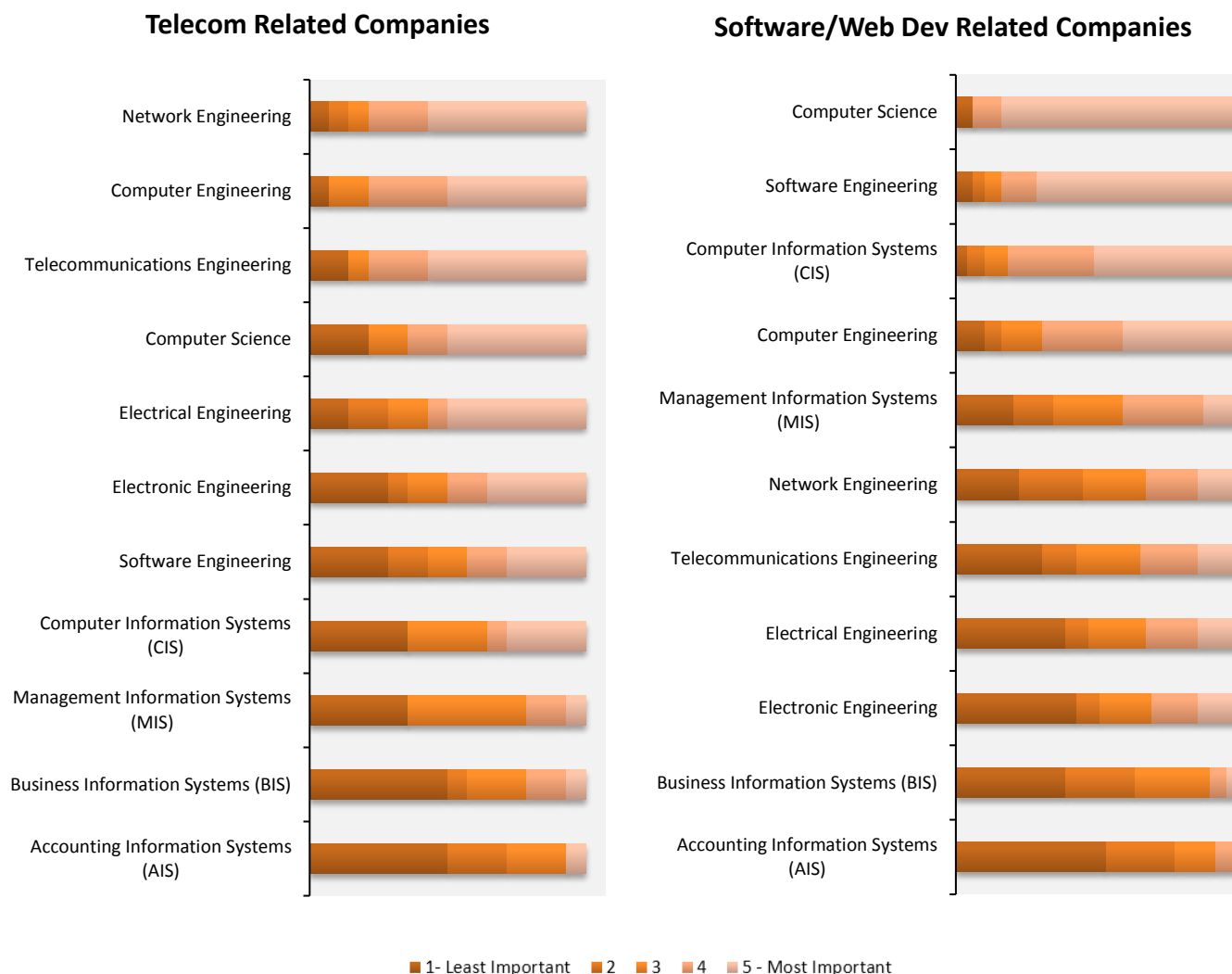


Figure 8: Rank of University Majors (for Telecom and Software Segments Companies)

By analyzing the responses using different approaches, in general Computer Information Systems and Management Information Systems were rank somewhat of higher importance or in the middle when comparing as they are still considered technical degrees. On the other hand, Business Information Systems and Accounting Information Systems were ranked least important to most respondents in ICT as they are related more to business applications in non-ICT focused Sectors (which is out of the scope for this particularly study).

University Recruitment

In this final part of the educational background section, companies were asked to select which universities they prefer recruiting from. As per the general consensus, the top five Universities that the ICT sector companies preferred to recruit from in no particular order are the German Jordan University, The University of Jordan, Jordan University of Science and Technology (JUST), Princess Sumaya University for Technology (PSUT), Yarmouk University.

To restate, please note that these are only the opinions of the respondents to the survey and are not part of any recognized ranking system, nor do these reflect the opinions of int@j, JoSSOr or associated entities.

1.2.2. TECHNICAL SKILLS AND COMPETENCIES

Companies were surveyed about what technical skills and competencies they consider while hiring fresh graduates. This list includes a number of widely used skills that are of interest to companies in the process hiring fresh graduates and can be used in consideration by fresh graduates on how to prepare themselves for what companies are looking for.

Concerning Technical Skills, Companies were asked to select from a list of pre-defined job skills preferred when hiring. The results showed that Software & Web Development Companies, which comprise the largest number of companies, require skills most relevant in Programming Languages, Web Development, Application & Web Server, and Web Services. This was the general case with most of the other subsectors with exception to Telecom Companies where their top responses were Knowledge of Operating Systems, Networking, and Tools. A breakdown of skills per ICT Subsectors is as Figure 9 Below.

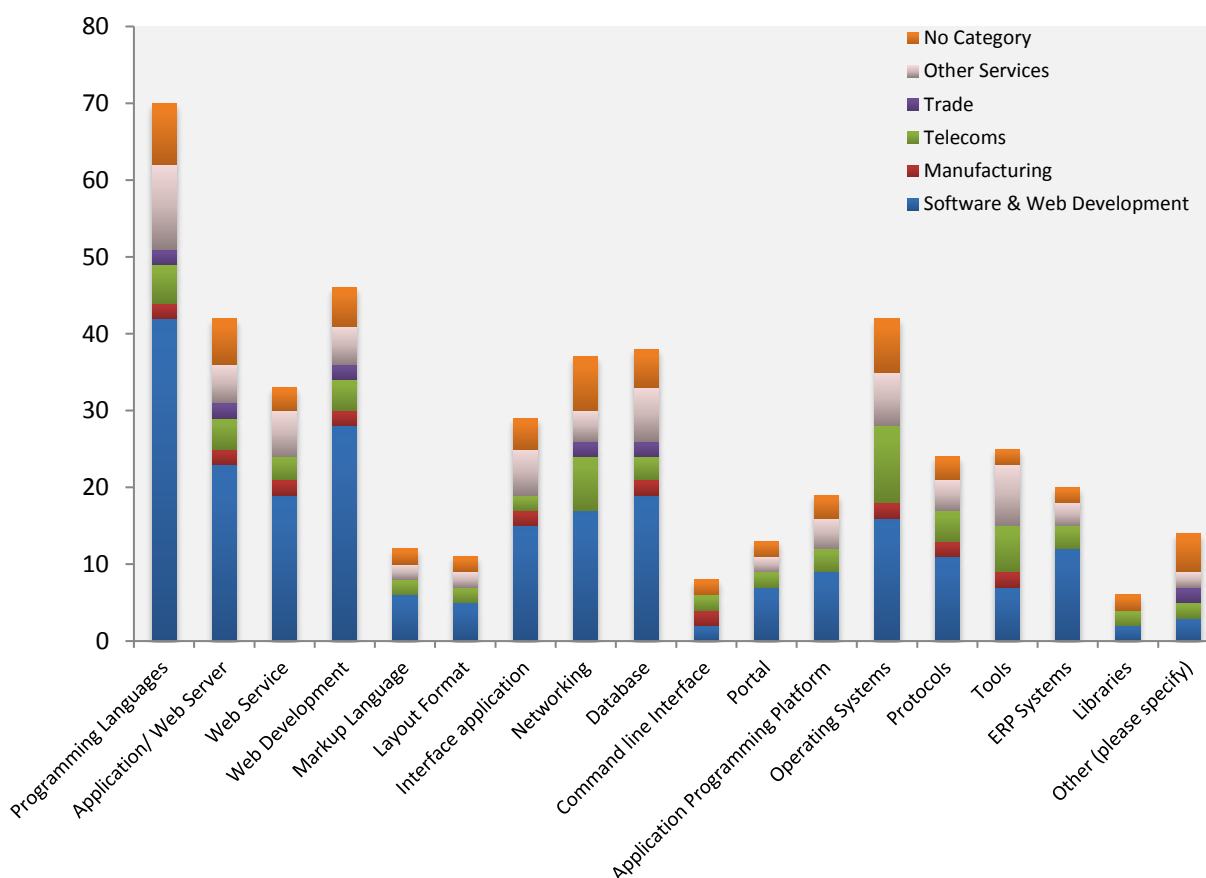


Figure 9: ICT Sector Job Skills

Furthermore, companies were asked to select up to two preferred specific technical competencies they considered essential in hiring. Figure 10 represents the responses from the 35 companies (totaling 44 competencies) in addition to frequency of the selected competency. The top competencies which were generally indicated were Programming Languages such as C# and Java followed by Web Development Competencies such as PHP and ASP.NET. Mobile Platform Competencies such as Android and iOS did appear but less frequently than anticipated. Other skills of interest expressed but which were not included in the pre-defined selection include the following:

- Logistics
- Cartoon Animation
- GSM
- Hardware Knowledge
- SPSS (Statistical Package for Social Sciences, statistical analysis and data mining software)

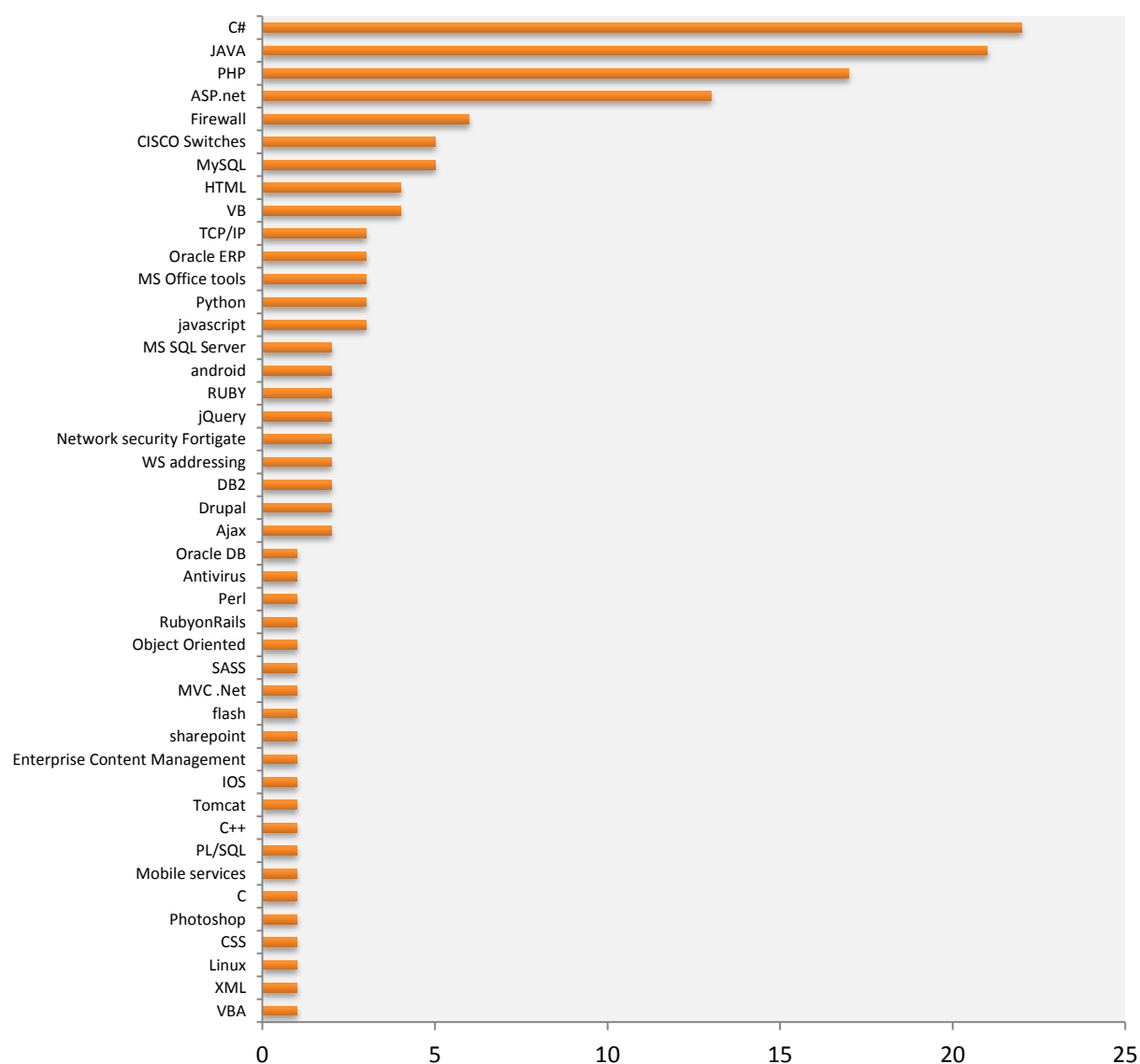


Figure 10: ICT Sector Job Competencies

1.2.3. BUSINESS & INTERPERSONAL SKILLS AND COMPETENCIES

In addition to Technical Skills, companies were asked what business and interpersonal skills were most important when hiring. In many cases these skills are what recruiters value, especially with fresh graduates as most lack technical skills and practical experience.

Companies were asked to rank each of the interpersonal competencies presented according to preference in hiring ICT fresh graduates as per Figure 11. In this case, all 101 companies responded with Ethics being the top interpersonal competency followed by Verbal Communications. Additional competencies mentioned as optional notes were Loyalty, Presentation Skills, and Hard Work.

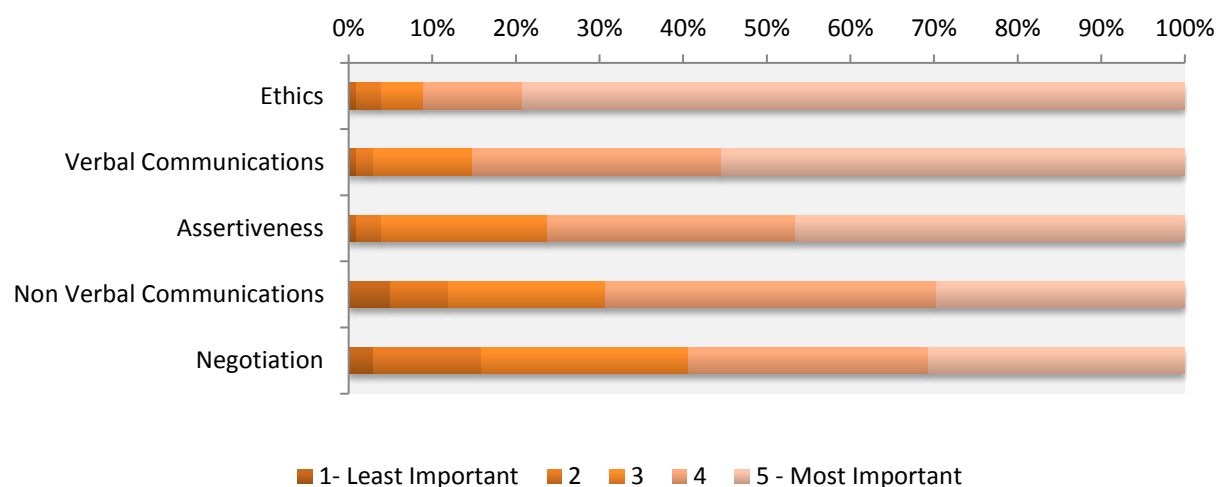


Figure 11: Interpersonal Skills

Companies also provided feedback on the business competencies they look for when hiring ICT graduates as per Figure 12. As per the responses that employers value a worker with the abilities to learn and keep learning, work well with a team, and have the motivations to develop.

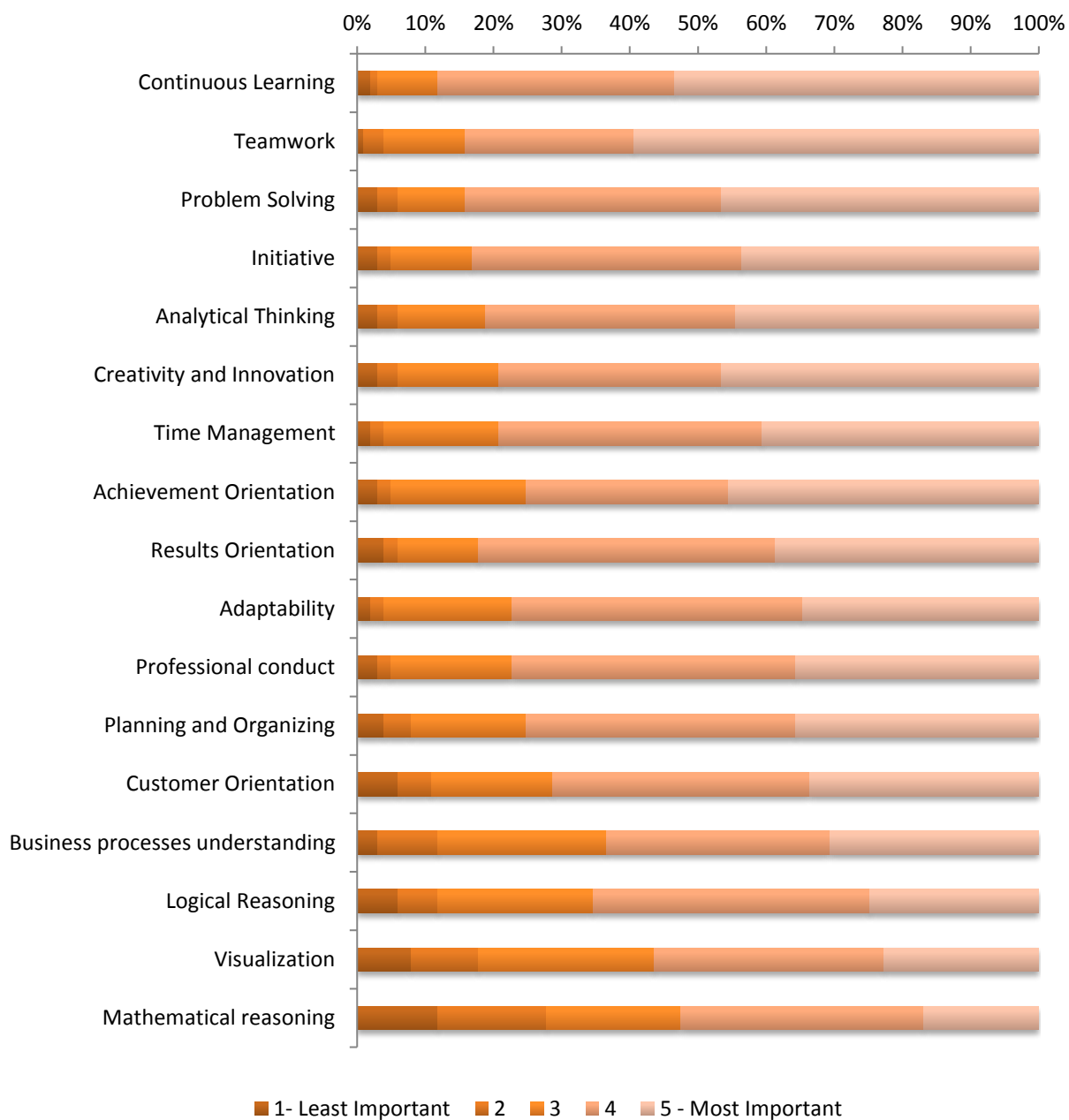


Figure 12: Business Competencies

1.2.4. CERTIFICATIONS & TRAINING

In the modern ICT economy, especially in Jordan, Training is crucial in allowing ICT companies to produce and stay competitive to the international market. Technology training is important for guaranteeing operational efficiency and effective productivity from the employees. Keeping employees, including management and staff, up to date with emerging trends allows for adequate and achieving employees producing at a higher efficiency and production value, which leads to less costly mistakes and decrease in miscellaneous or unseen expenses and disappointment from customers. Nevertheless, there are some troubling trends concerning proper training and continuing learning for fresh graduates. Due to the fact that University Curricula has not kept up with modern ICT Trends, Companies would become more responsible for qualifying new graduates with modern technologies. During a recent JoSSOr workshop⁸ a guest speaker likened the current need for ICT Graduates to gain additional training or apprenticeships to other professions such as a doctor, lawyer or accountant. On the other hand, Companies are becoming more reluctant to spend the sufficient time and resources due to variety of reasons to hire fresh graduates because of financial and time constraints in addition to the anxiety of losing employees to other opportunities. In the survey, a respondent stated with frustration about hiring and training fresh graduates:

“We train Engineers, then after 5 years when they find a job in the Gulf countries they leave as we can’t pay the same as Gulf countries, so our the training is wasted for the benefit of others... So I think it’s a waste of time and resources to hire new graduates as we invest a lot of our time and resources to train them”

The conclusion is that graduates, and in reality most if not all of the ICT workforce, must face the reality that more of the burden lies mostly on their own shoulders to prepare for the workplace. Therefore the chances for fresh graduates becoming employed increase if they have invested more on themselves in terms of training, acquiring relevant certifications, and participating in relevant internships and work programs. To exemplify this, respondents were asked about the importance of ICT Certifications and training as well volunteering in terms of hiring ICT Fresh Graduates. Please refer to Figure 13.

As per to be expected companies preferred previous experience and training and they generally favored graduates with an ICT Certification. Nevertheless, the companies preferring such initiatives were less than expected. This may be due to the lack of practical and real life experience in addition to the quality of training and apprenticeship programs. The results also indicate that volunteering may improve chances with some companies, but does not show to be significant pertaining to this in the market.

⁸ JSSO Workshop 22-March-2016

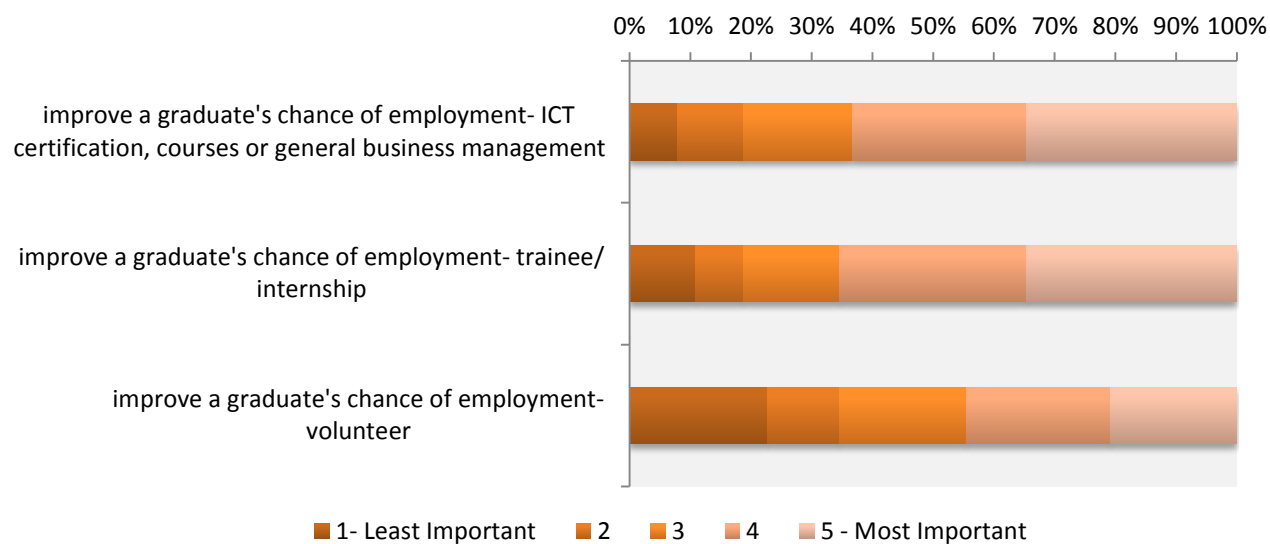


Figure 13: Extracurricular Activity

Companies who showed interest in hiring fresh graduates with ICT certifications responded that they took into consideration the following categories of certifications as per Figure 14 below (*Respondents were able to choose up to four options whenever applicable*). Further elaboration on these categories is detailed in Table 3 in the appendix.

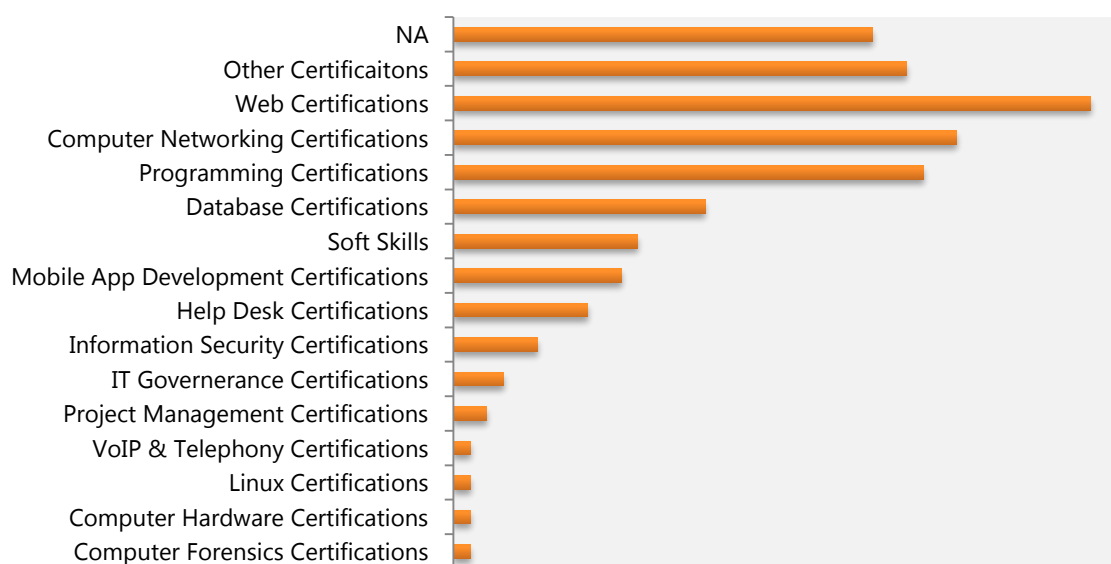


Figure 14: Top Certifications/Types

Nevertheless, survey results show that at least 71% of the companies do offer in house training as illustrated in Figure 15.

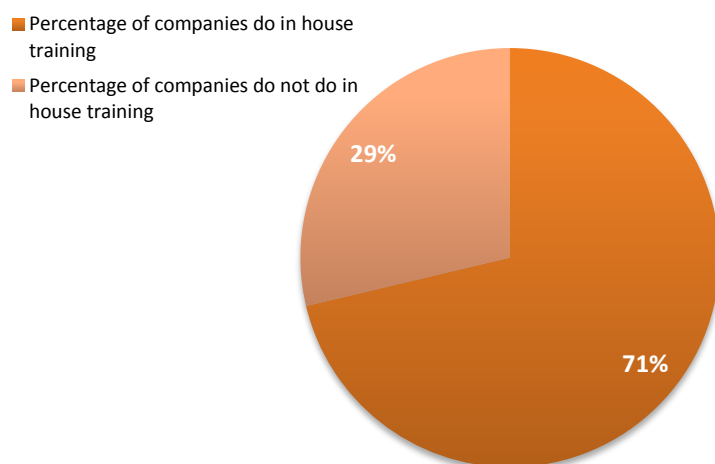


Figure 15: Percentage of Companies Offering Training

Companies who showed interest in offering fresh graduates with professional development responded that they took into consideration the following categories of training as per Figure 16 (*Respondents were able to choose up to six options whenever applicable*). Further elaboration on these categories is detailed in Table 4 in Appendix.

In this case the results were split between **Technical Training** which has to do with as a skill relating to a specializing, industrial practice, or practical technical knowledge to do with a specific ICT component; and **Non-Technical Training** to do with interpersonal skills, business competencies and the English Language.

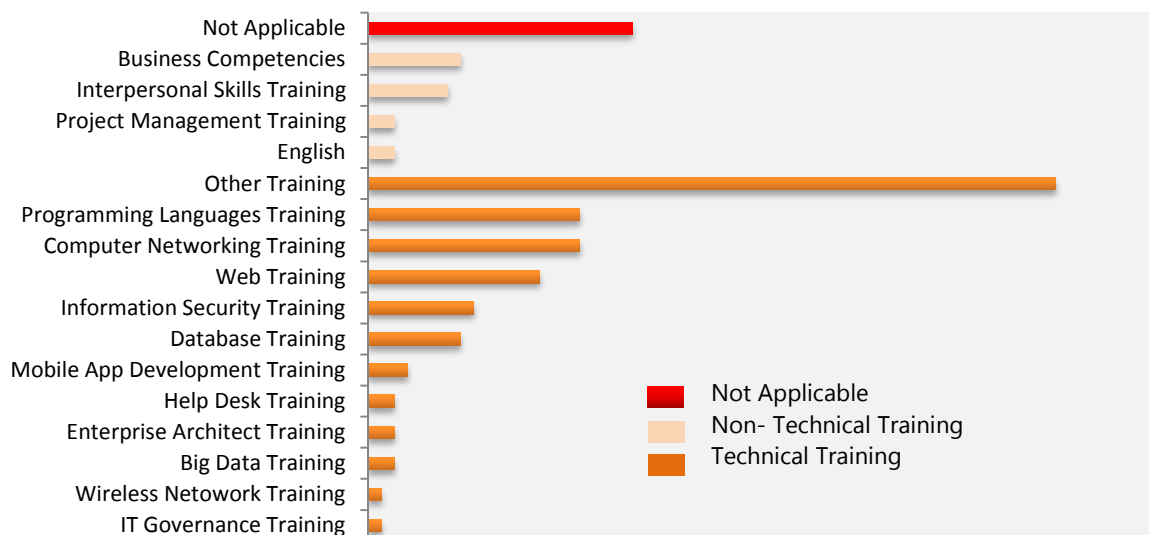


Figure 16: Corporate Training

Benchmarking Jordan Skills to International trends

Worldwide ICT sectors are experiencing disruptive growth and innovation with new technologies and trends popping up all the time.

Though Jordan is very competitive in the regional fronts when benchmarking the ICT outlook with international trends, the Jordan market tends to follow at a slower pace. Gartner lists their Top 10 Strategic Technology Trends for 2016⁹ as follows:

1. The Device Mesh
2. Ambient User Experience
3. 3D Printing materials
4. Information of Everything
5. Advanced Machine Learning
6. Autonomous Agents and Things
7. Adaptive Security Architecture
8. Advanced Customer Architecture
9. Mesh App and Service Architecture
10. Internet of Things Architecture and Platforms

While Jordan could be more closely compared to or starting to grasp the potential of trends from the Gartner Strategic Technology Top 10 trends of 2014¹⁰ especially for the following 6 trends:

1. Mobile Device Diversity and Management
2. Mobile Apps and Applications
3. The Internet of Everything
4. Cloud/Client Architecture
5. The Era of Personal Cloud
6. 3-D Printing

In addition, analysis from the respondents in terms of preferred ICT Skills & Competencies and preferred Certifications & Training provided from local companies show trends towards the majority of the sector providing more traditional based solutions with proven business potential such as with Telecoms, IT Infrastructure, Enterprise solutions, Online Web Applications and Content Solutions as opposed to newer emerging trends. There was interest from the respondents for emerging technologies such as mobile based development, but at a surprisingly low level. After discussion from local based IT Experts from the software solutions industry, there was a big emphasis with mobile development before two to three years within the Jordan ICT market (2012 – 2013) which included mobile solutions and game development. However, with the lack of clear business potential, many companies either ceased operations or adapted to more traditional based solutions as mentioned above. Other technologies briefly mentioned though likely requested in smaller instances are cloud based computing and virtual reality.

⁹ <http://www.forbes.com/sites/peterhigh/2015/10/06/gartner-top-10-strategic-technology-trends-for-2016/#518b7693d055>

¹⁰ Gartner: Top 10 Strategic Technology Trends For 2014

1.2.5. EMPLOYMENT SALARIES AND TURNOVER

ICT Sector Companies were asked to provide their average starting salaries for ICT bachelor degree holders as reflected in Figure 20. In general the range that ICT Graduates get is between 300 JOD to 400 JOD with the average starting salaries being around:

- Engineer Graduate: 388 JOD/ month
- IT Graduate: 361 JOD/ month

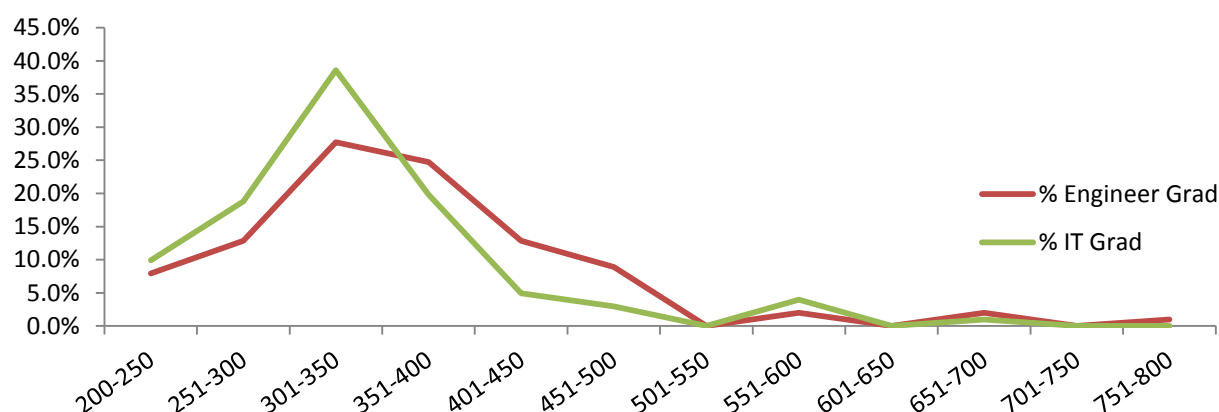


Figure 17: Salary Ranges for ICT Graduates

Companies were also asked to indicate their Turnover of ICT Fresh graduates who have left over the last two years within both 0-3 months and 4-12 months.

As per the analysis of the companies that responded, for the first 0-3 months of hiring, 50% of companies generally retain their new hires within this period while 87% do not have turnover of more than 3 employees. Some companies have a very high turn-over due to the type of business. For example, call centers have high rates of hiring and turn-over.

Of the companies that responded, for the 4-12 month period after an ICT graduate is hired, 32% of the companies retain their new hires while 75% do not have turnover of more than 3 employees.

The results lean towards a relatively low amount of turnover from most of the companies within the first 3 months and a modest amount for the 4-12 month period.

1.3. CONTRIBUTION WITH LOCAL UNIVERSITIES

As illustrated in the section above, respondents generally required some kind of continuing college or university education, so in this case the industry is a vital stakeholder to the universities even if both have

different objectives and are sometimes on different sides. On the other hand, Jordan universities must be effective in teaching various ICT disciplines compared with other regional and international universities. This will only be achieved by better cooperation with the industry, influential governmental authorities, and the academic institutions¹¹; and ultimately more flexibility with the curriculum and emphasis on how skills are demonstrated before rewarding a degree.

This section aims to address the challenge of bridging the industry-university divide by highlighting what makes universities attractive as industry partners, what structures make for excellent partnerships and what approach produces more effective and efficient interactions. It also offers information from the employers' side about the state of industry-university collaboration. A total of 136 companies completed this section.

1.3.1. INDUSTRY-UNIVERSITY GAP

When companies and universities work in coherence to push the frontiers of knowledge, they become a powerful engine for innovation and economic growth. To address this, employers in this study were asked about their company's current contribution with local universities in Jordan. Findings are illustrated in figure 18 through 21.

- *How much do you collaborate with universities at present regarding the supply of new employees and raise skills and competencies of the existing workforce.*
- *What kind of collaboration does your company contribute to the universities?*
- *How important do you think ongoing university industry cooperation is to ensuring a match between your needs for qualified new graduates- and the relevance of and quality of the supply?*
- *In order to meet the skills needs of the ICT industry in Jordan, would you be willing to contribute your time or time of senior staff to ad-hoc committees reviewing and providing input to ICT skills standards for different ICT occupations.*

¹¹ Paraphrased passage from "E-Government, ICT Professionalism & Competences Service Science".

Figure 18: Industry- Universities collaboration at present regarding the supply of new employees and raise skills and competencies of the existing workforce.



Figure 19: Kind of collaboration between industry and universities

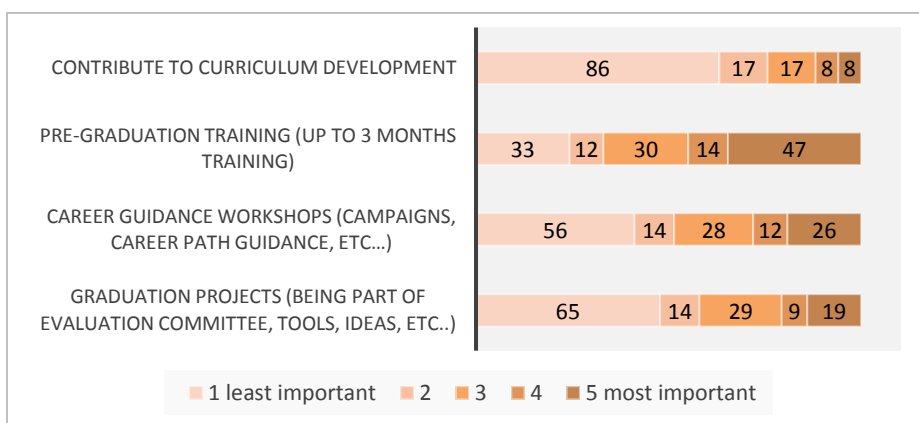
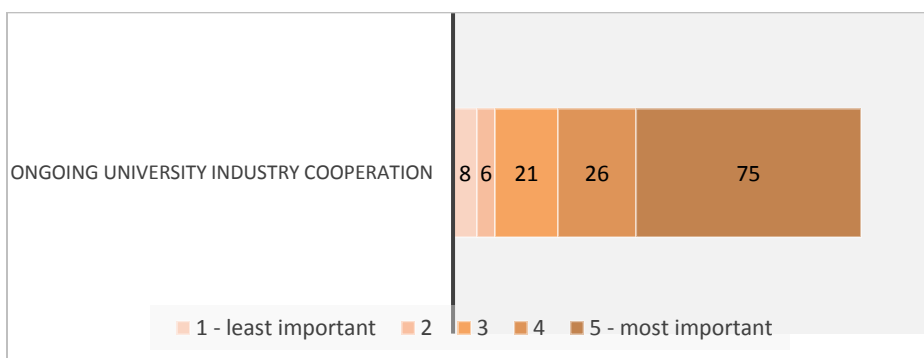


Figure 20: Ongoing university industry cooperation



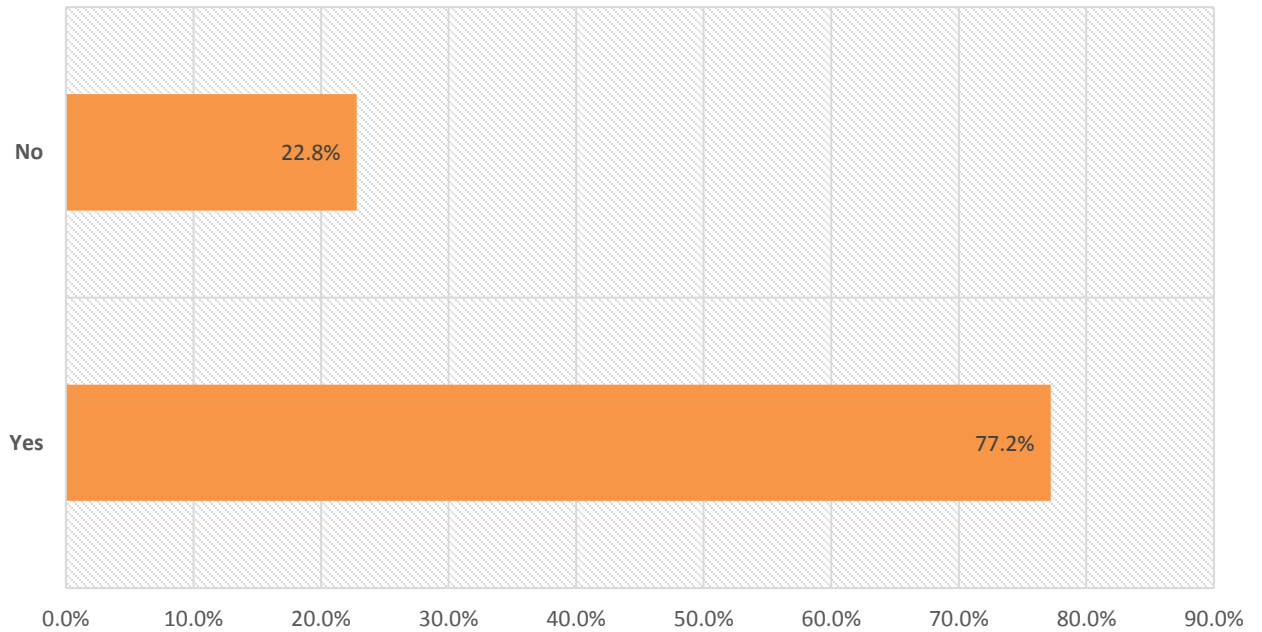


Figure 21: Industry Contribution of Resources

As per the responses, the industry as a whole, though intrinsically dependent on the supply and quality of supply of resources from Universities and other academic institutions, do not collaborate considerably. However, there is some collaboration from some companies in specific subsectors, but the collaboration is not always clear or beneficial for the parties involved and not sufficiently spread. Much of the lack of cooperation is due to the fact that many companies are not familiar with the means of creating and sustaining an effective partnership.

1.3.2. OVERCOMING CURRENT CHALLENGES

Information and Communication Technology (ICT) is unique as a sector and is central to the development of the modern economy. It is one of the main forces transforming the economic environment and the principle driver of the knowledge economy. Therefore, to overcome the challenges that were discussed in this report, employers were asked in open ended questions about any information regarding their needs in the ICT sector in the Jordanian market, or bridging the skills gap or skills mismatch between the supply of graduates and the demand of the market. Respondents of the survey concluded overcoming the current challenges through:

The Re-Development of Curricula: A major challenge that had come under criticism is the outdated university curricula and the lack of the practical content or training.

“ Graduates do not have any practical knowledge in developing portals and systems; they also lack the knowledge of modern languages needed by the market. ICT graduates need to work on their interpersonal skills as well...”

“ tried to contribute with many universities and unfortunately I failed in this they don't have an updated information about the graduates and they have very slow procedures. ”

Internship and Apprenticeship Programs: A variety of the respondents of the survey recommended involving students early on in their studies with the industry to empower them and provide them with real life experience. They also advised the facilitation of mentorship between the industry and students.

“1- Universities to apply practical experience between the different majors inside the faculties. 2- involvement of companies with students among the years of studies to empower them and provide them with experiences and success stories. 3- Sharing success stories with students to motivate them...”

Career Guidance: Respondents repeatedly addressed the issue of lacking motivation among graduates. Responses included advice to provide career guidance/ pathways at early stages of study.

“University students need to be made more aware of the type of career paths they can follow upon graduation. This motivation towards more career option awareness also needs to be done in the early stages of the students studies at the university, so they can know where to focus their efforts and plan their path towards starting a certain career after graduation....”

Mismatched Skills: Job mismatched skills, English proficiency and employability skills are significant factors that influenced unemployment among graduates in the ICT sector, as profoundly emphasized by employers.

***“Fresh** graduates lack English language skills, in terms of reporting, communicating, presenting themselves or their work. We face difficulties in finding the adequate grads to implement our systems at clients’ servers, due to lack of experience, knowledge, responsibilities and cooperation....”*

***“Lack** of communication and teamwork skills from graduates as needed by the ICT sector. 2- Practical and business approach skills from graduates. 3- Universities do not contribute and equip their students with the efficient skills for the market, also life outside university, and that*

every day is an opportunity to learn... ”

***“Universities** to prepare students while they are studying to work environment, in terms of work ethics, communication skills, flexibility and adaptation...”*

In addition, such a challenge creates frustrations among employers looking to hire Fresh Graduates on the expense of time, cost, and wasted effort.

“ Previously, I would interview 3 to 4 people to find the right person, now I have to interview 10 or more to come up with the same result, if at all. ”

2.RECOMMENDATIONS AND NEXT STEPS

As per the outcomes of the study, the recommendations below are meant to achieve better learning outcomes in the higher-learning institutions; better prepare the future generation for the job market with more structured programs which will provide fresh graduates with better tools and knowledge to make them more employable; create a strong, more robust competitive and sustainable ICT sector; which will ultimately reduce the un-employment rate in Jordan.

Therefore the recommendations are as follows:

- A clear and comprehensive strategy or framework is required to foster Industry-University cooperation -- with direction from the authoritative governmental institutions -- which can direct willing companies and universities to work closer together, exchange ideas, not work in isolation, and have a better impact on shaping the future of the ICT workforce and sector.
- The results of this survey point to the fact that graduates must have more training/certifications in real life technology applications. As University Curricula is not adapting fast enough, and ICT Sector Companies are less willing for different factors to cover training costs, Graduates should be required in order to graduate to take at least one of an accredited and recognized training/certification program such as networking (i.e. Routers, Switching, etc...), programming (Java, C#, C++), web development, or any other discipline and become certified. Having a JoSSOr certification should also be encouraged as a "quick-win" approach.
- Employers expressed preference when hiring ICT fresh graduates with practical experience. Part of the Industry-University strategy or framework should allow for Quality and Monitored Internship and Apprenticeship programs to give practical and real life training as opposed to the way they are given now which are not observed or correctly guided which ultimately lack quality and trust from the sector. Universities in Jordan should require students with technical degrees to have an internship at any registered local or international company doing ICT work consisting of pre-defined and outlined criteria for a set timeframe and outcomes.
- Referencing the previous two points, to take into account the extra costs for professional development, Universities should allow flexibility for students to utilize or substitute electives for practical work experience for an internship or accredited training. Universities can partake in cost sharing with the companies or training centers.
- For better insight to what jobs have been created in the market, a yearly study which is based on a very direct survey should be disseminated to the local companies listing ICT Jobs created within the previous year. This will empower students to have a better perspective on how to plan their educational and career paths. The results should be published and actively shared with all the major universities and colleges.
- To better match prospective employees with employers and to reduce their frustration combined with the feedback from the survey, it is recommended to use a national qualification standard program to better evaluate graduates and guide them to suitable employment or continuing education. In the short term the JoSSOr assessment program can be used to identify graduates with the skills and competencies to match the demand and requirements of the ICT Market.

APPENDIX

The table below demonstrates more on the certifications preferred by ICT companies.

Numbers display the number of responses per each detail:

Computer Forensics Certifications		Project Management Certifications	
Computer Hacking Forensic Investigator CHFI	1	Project Management Professional PMP	2
Computer Hardware Certifications		VoIP & Telephony Certifications	
Programmable Logic Controllers PLC	1	VoIP	1
Computer Networking Certifications		Soft Skills	
Cisco Certified Network Associate CCNA	17	Communication Skills	2
Cisco Certified Network Professional CCNP	5	Critical Thinking	1
Cisco Certifications in General	4	English	3
CompTIA Network+ & TCP/IP	1	Soft skills	3
HP Networking	1	Team Lead Skills	1
Networking	2	TOEFL	2
Database Certifications		Web Certifications	
Database	3	ASP.NET	14
Database Administrator DBA	2	Web Design	1
Oracle Certified Professional OCP	4	Drupal	1
Oracle Forms & Reports Certification	1	Java Script	1
Structured Query Language SQL	5	Microsoft HTML5	1
Information Security Certifications		Model View Controller MVC	1
Certified Ethical Hacker CEH	2	PHP	13
CompTIA Security+	1	Web development	5
Security	2	Zend	1
IT Governance Certifications		Help Desk Certifications	
Information Technology Infrastructure Library ITIL	2	A+	7
Microsoft Certified IT Professional MCITP	1	Customer Service Satisfaction	1
Programming Certifications		Other Certifications	

.net	4	3D Design	1
Application Programming Platform	4	Computer Knowledge training ICDL	3
C	1	Certified Tester Advanced Level CTAL	1
C#	1	Certified Tester Foundation Level CTFL	1
C++	3	IT certificates	1
Java Programmer Certification	10	Microsoft Certified Solutions Expert MCSE	4
Programming Certificate In General	4	Microsoft Certified Technology Specialist MCTS	1
VB.NET	1	Microsoft Certifications in General	8
Mobile App Development Certifications		Microsoft Office	1
Android	5	Technical	4
iOS	4	System Analysis	1
Mobile services	1	Other	1
Linux Certifications		Not Applicable	
CompTIA Linux+ & Server+	1	Not Applicable	25

Table 3: Specific Certifications Preferred by ICT Companies

The table below elaborates more on the categories of training provided by companies to recently joined graduates, as an in-house professional development activity:

Numbers display the number of responses per each detail:

Technical Training

Big Data	Basic & Advanced Excel workshop	1
	BI Tools	1
Computer Networking	CISCO CCNA	8
	CISCO CCNP	2
	CISCO Training in General	1
	Installing Networks	1
	Networking Training in General	3
	Switching and Routing Configuration	1
Database	Database training in General	4
	Oracle Training in General	3
Enterprise Architect	Information Architecture	1
	Magneto	1
Help Desk	Computer Maintenance	1
	Systems Administrator	1
Information Security	Certified Ethical Hacker	2
	Certified Secure programmer	1
	CompTIA Security+	1
	Fortinet Orientation	1
	Information Security Fundamentals	1
	Security	2
IT Governance	ITIL	1
Web	JS	1
	PHP	3
	ASP.NET	1
	Portals	1
	Ruby on Rails	2
	Web application development	1
	Web Architecture	1
	Web Design	2
	Web Developer (General)	1
Wireless Network	Radio Frequency	1
Programming Languages	.NET	1
	Development Basics	1
	Induction for the Required Programming Lang.	1
	Java	3
	Object oriented course	3
	Programming training	2
	Python	1
	Self-Reading On Certain Programming Languages and Techniques	1
	Software Development	1

	Swift (Programming Language)	1
	VBA	1
Mobile Development	App	
	A10 Specialist	1
	IOS App Development	1
	Android App Development	2
	Mobile Application Development in General	3
Other	Any needed training	1
	Any new technologies	1
	Big Data	1
	Business Planning workshop	1
	Career Path	24
	Certified Tester-Foundation Level	1
	Company Product Orientation	1
	Design	6
	Game Engine Orientation	1
	Microsoft Training in General	2
	New technology like Virtual Reality, Augmented Reality	1
	On the Job Training	1
	PI system	6
	RCS training	1
	Technical Certificates (General)	1

Non-Technical Training

Business Competencies	Business analyst	1
	Capturing Tools	1
	Critical Thinking	1
	CV Writing	1
	Teamwork	2
	Technical Writing	1
English	English	2
Interpersonal Skills	Communication Skills	5
	Soft/Communication Skills	1
	Project Management	2

Not Applicable

NA	Not Applicable	20
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Table 4: Detailed List of Training