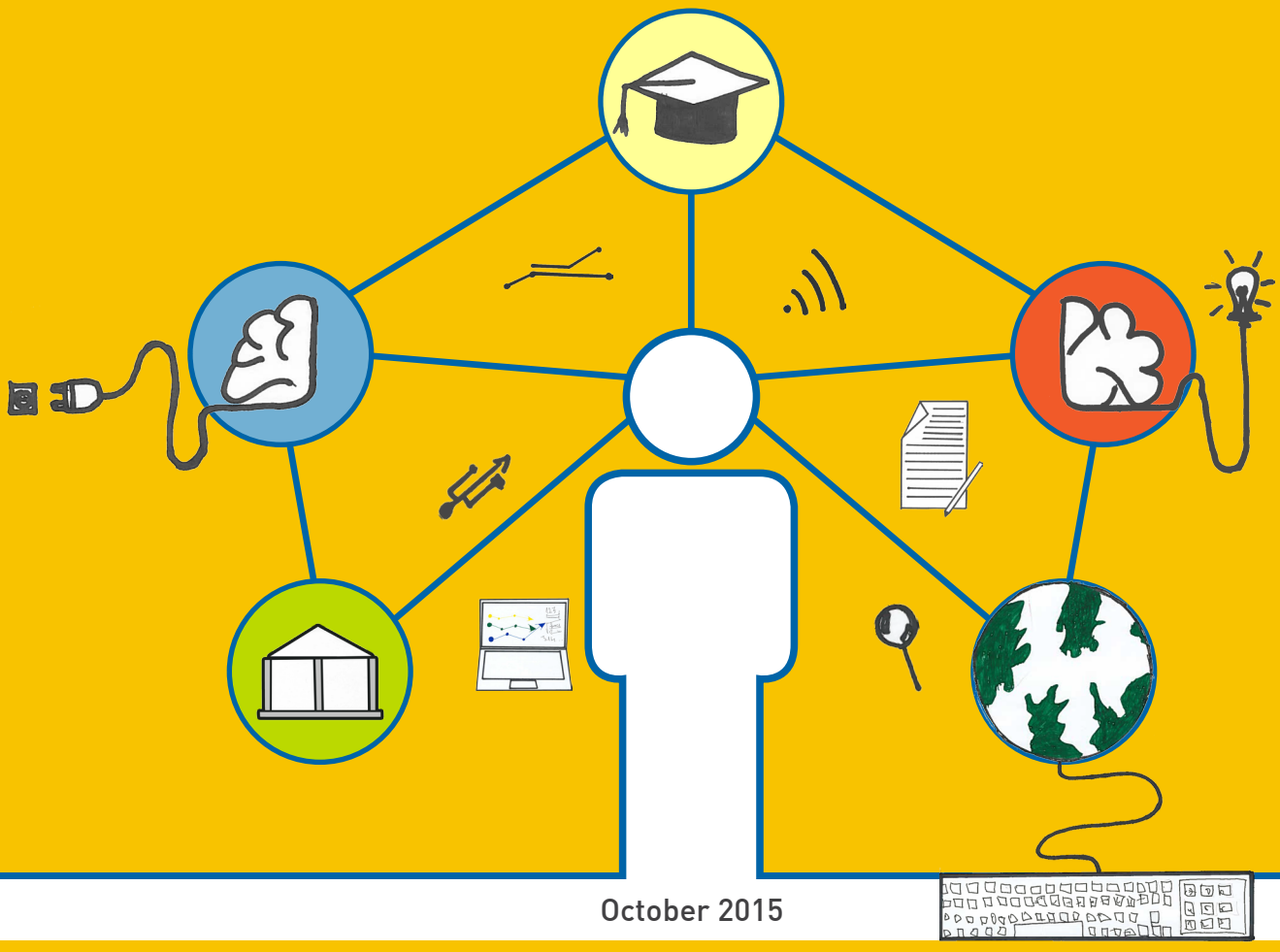
STIKK

SHOQATA PËR TEKNOLOGJI TË INFORMACIONIT DHE TË KOMUNIKIMIT TË KOSOVËS

KOSOVO ASSOCIATION OF INFORMATION AND COMMUNICATION TECHNOLOGY

Mapping of **ICT Sector Labour Supply** and **Demand**

Mapping of supply and demand in the labour market and identifying issues regarding talent generation in the ICT sector



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LIST OF ABBREVIATIONS

BPO	Business Process Outsourcing
CSC	Customer Support Centers
ICT	Information and Communications Technology
IT	Information and Technology
STIKK	Kosovo Association of Information and Communication Technology
VET	Vocational Education and Training
ISP	Internet Service Provider
TAK	Tax Administration of Kosovo
PwC	PricewaterhouseCoopers
KAS	Kosovo Agency of Statistics
MEST	Ministry of Education, Science, and Technology
MTI	Ministry of Trade and Industry
UP	University of Prishtina
USAID	United States Agency for international Development
UNDP	United Nations Development Program
VTC	Vocational Training Centers
XaaS	Everything as a Service

EXECUTIVE SUMMARY

The objective of this research project is to map the supply and demand in the labor market and to identify the issues regarding the talent generation in the ICT sector. It focuses in the identification of the gap between demanded skills in ICT industry and the ICT skills supplied by the educational and training institutions of Kosovo which will serve as a reference during the curricula build for the new STIKK Education Program.

Compared to other previous reports on ICT sector and its workforce in the period of 2011-2014, there is not a significant change of the situation. Kosovo, as a developing country, despite its rapid progress in the last two decades is still experiencing an undersupply of skilled professionals, especially in the ICT industry. Findings from this study emphasize that ICT companies are not satisfied with the quality of employees graduating from higher education institutions in Kosovo were the majority of the most critical skills highly demanded in industry are missing.

University graduates are not readily employable. In addition to specific technical competency, skilled employees are expected to have experience related to IT project management and IT sales. Eventhough university graduates are not immediately employable, businesses expect employees to be university educated. Besides, there is a lack of formal or informal labor needs assessment(s) and lack of an established feedback mechanism from the ICT labor market (businesses) to the educational institutions and training service providers.

Despite the troublesome economic environment, the optimism appears to be prevalent among businesses in the ICT sector as the majority of them appear to have a positive outlook with respect to future growth. One third of the businesses in the future consider export expansion as the main driver of business growth.

Development of software products/software applications and systems integration/turnkey solutions are the main anticipated areas for business growth by companies. The anticipated development projections of the businesses can be considered as a strong indicator for expanding export opportunities, an export commodity model which has already been tested by various companies operating in the ICT sector in Kosovo.

1. CONTEXT

From a handful of hardware and software retailers and a single dialup ISP provider in the 1999, the ICT sector in Kosovo features a vibrant transition through the years. According to TAK's registry of businesses, in 2015 a total of 571 companies are registered to have ICT or some form of ICT component as primary business activity. In this category, a large number are assumed to be small computer retail and service shops, nonetheless, their presence and sustainability is a strong indicator of market demand.

The structure of ICT sector in Kosovo is dynamic in terms of specialty areas, which according to PriceWaterhouseCoopers (PwC)[1] is a characteristic of the ICT sector worldwide due to the very nature of ICT, which is subject to fast cycles of innovation and obsolesce. Conventional framing still may be applied to differentiate between businesses with core activities related either to hardware, software, telecom, systems integration, either a combination of mentioned categories. There are also categories of businesses that are found in the margins and intersect with ICT sector, such as design, media, and call center companies. In Kosovo, small domestic economy is the principal constraint that does not allow for companies to specialize; because in small economies businesses are forced to pursue diversification of revenue segments, often integrating horizontally to include complimentary or supplementary products and services.

According to Kosovo Agency of Statistics (KAS), Kosovo still boasts the youngest population in Europe, with nearly 50% of the population falling below 30 years of age[2]. With respect to the digital divide, internet penetration in Kosovo is large at 77 % according to STIKK[3], where even very remote areas are serviced by one of the countries principal ISP. Mobile internet of the 4th generation has started in late 2014, and is followed with limitations due to technical constraints and is also poorly supported by the lagging regulatory acts.

From the educational perspective, statistics for the school year of 2013/2014 of the MEST[4] emphasize an expected inflow in the near future in the labor market, where many will be seeking jobs as well as job related skills to improve their competitiveness in the labor market.

1 PwC (2015). Technology Industry Outlook 2015. Value and Innovation
2 Kosovo Agency of Statistics. Labor Force Survey 2014
3 Fazliu, A (2013). Internet Penetration and Usage in Kosovo, STIKK
4 Ministry of Education Science and Technology (MEST). Education Statistics in Kosova 2013/14

Type of institutions	Professional schools			Gymnasiums			Total		
	Men	Women	Total	Men	Women	Total	Men	Women	Total
Students	32,990	21,902	54,892	20,230	24,456	44,686	53,220	46,358	99,578

A policy document regarding the education strategy in Kosovo 2011-2016[1], among a list of priorities it also contains "better relation between labor market and education system..." as well as" development of ICT in all levels of education." Estimated implementation cost for the ICT objective according to the MEST strategy 2011-2016 is 73 million EUR. The actual implementation of this strategy has been challenged in terms of budgetary constraints that Government of Kosovo faces.

According to USAID's report[2] education in Kosovo is considered to be one of the principle factors of economic development. The rationale for education is due to the fact that the society is transforming rapidly from an agrarian to a modern economy. To meet the demand of the developing economy, education and training are seen as crucial mechanisms to help the society prosper in the universal information economy. According to a Microsoft's report of 2004[3], a prolonged shortage of ICT skilled workforce negatively affects country's competitiveness not only in the ICT sector, which is considered as one of the fastest emerging industries in the global economy, but in every sector of the country's economic welfare.

Compared to other business sectors active in Kosovo, ICT sector has experienced a rapid progress in the last decade, creating a strong and prosperous foundation. Based on the Ministry of Trade and Industry report on Sector Profile of ICT[4], among various segments of ICT sector, Business Process Outsourcing and Customer Support Centers are considered to be very promising sectors for youth engagement and innovation (representing approximately 20% of 120 active ICT businesses) and the main contributors in the country's economic development. A STIKK report on Skills Gap Analysis in 2013[5] estimates that ICT sector in 2013 employed 1716 workers, with new jobs opening opportunities planned for the next years and strong future growth projections in the domestic market.

Moving the focus from the greater perspective of Kosovo, towards the ICT labor market, two patterns emerge with respect to tracks that produce the ICT workforce supply in Kosovo.

1 Ministry of Education, Science, and Technology. Kosovo Education Strategic Plan 2011-2016
2 USAID Kosovo Private Enterprise Program (2011). Skills Gap Analysis for Information and Communication
3 Microsoft (2004). ICTs as enablers of development
4 Kica, D (2014). Sector Profile of ICT. Ministry of Trade and Industry
5 Berisha, V and Ilazi, B (2013). ICT Skills Gap Analysis, STIKK

First and the largest pattern is related to the track where the supply of labor in the ICT market in Kosovo comes from the UP faculty of Electrical Engineering (Dept. of Computer Sciences) and UP faculty of Natural Sciences and Mathematics. There are also private higher education institutions that provide ICT education programs such as: University for Business and Technology, the American University in Kosovo, AAB Riinvest University, Iliria, Dardania, and others. ICT professional that have studied in universities abroad also fall under this category.

The second pattern related to development of the ICT labor supply comes from the private vocational education and training centers. According to USAID's report of 2011 and 2013[1] this track is also considered to be very important in terms of preparing workforce for the ICT sector.

A complementary track is serviced by specialized or authorized training service providers for vendor certified or specialist courses, such as Oracle, Microsoft, SQL, SAS, CISCO, etc. This track may be seen also as part of the private education or training services provider category.

Geographic distribution of ICT companies in Kosovo is very uneven. According to the report from the Ministry of Trade and Industry on ICT Sector Profile, ICT companies are distributed in a pattern that corresponds with clusters of general economic activity, with majority being located in Prishtina 45%[2]. The city of Prizren remains second largest cluster with 9.8% of companies registered in this municipality. Due to uneven distribution of companies coupled with the fact that most of universities, and training and development institutions are in Pristina, access to the supply of skilled labor as well as access to information and business opportunities is likewise much better in Prishtina compared to other cities.

According to UNDP Kosovo Human Developing Report of 2012, ICT companies currently operating in Kosovo are not satisfied with the capabilities of ICT graduates entering the market force. There is a need for further investment in training of the workforce, as a result of deficiencies in the formal education systems. The implication is that the formal education systems available in country are not preparing a qualified labor force which is ready for the industry. The report emphasizes that academic programs are not in accordance with the latest global ICT development and there is a lack of innovative opportunities for students[3].

1 USAID Kosovo Private Enterprise Program (2011). Skills Gap Analysis for Information and Communication Technology, STIKK. USAID – ICT Country Profile 2013, ESI Center Eastern Europe

2 Kica D, (2014). Sector Profile of ICT. Ministry of Trade and Industry

3 United Nations Development Program UNDP (2012) Kosovo Human Development Report

On the other hand, the activities of the Ministry of Labor and Social Welfare (MLSW) contemplate with the need of improving the performance of Vocational Training Division. Particularly, upgrading of VTCs was one of the main objectives of the Ministry of Labor and Social Welfare during the recent years. According to a policy paper of MLSW 2012 there is a need to start with the identification of the bottlenecks in offering vocational training, improving the delivery quality of these training through different accreditation processes, as well as making VTCs accessible to the wider public[1].

Despite the systemic difficulties in providing skilled labor, the rapidly growing sector has been largely developed in response to market needs and opportunities identified by advancing entrepreneurs, in pursuit of business flowing from technology and innovation.

1 Ministry of Labour and Social Welfare (2012). Vocational Training Strategy 2012-2014 Kosovo

1.1. STIKK

STIKK represents that largest formal ICT industry association in Kosovo. Established in 2008, STIKK - The Kosovo ICT Association was founded by six member companies and supported by the Norwegian Ministry of Foreign Affairs, Crimson Capital and IKT Norge, with the purpose of performing as a joint voice of the ICT industry. STIKK currently is supported by 125 + partners, which embodies 90% of the whole ICT market of Kosovo. Considered as one of the main influencers in development of the ICT industry in Kosovo, STIKK initiated various projects with the goal to promote ICT sector in Kosovo, advance its managing framework, conduct research and industry specific studies, and empower professional progression of sector's actors.

STIKK has advanced many platforms, activities, and projects in response to interests and needs of the ICT sector in Kosovo. Notable projects and initiatives of STIKK are: Innovation Center Kosovo (ICK), KosICT, STIKK Education, and Kosovo-Your Outsourcing Destination. Many policy papers, and sector studies have shown that the key to unlocking ICT potential in Kosovo is to ensure an adequate supply of skilled labor, that it is readily deployable or productive at short entry period. STIKK has been pursuing this general shortcoming of the labor force supply and demand related to ICT through various studies such as Skills GAP analysis and ICT market research studies. Sector studies have been undertaken to program interventions in the progression of labor supply either through rapid and direct interventions via training programs, or through policy recommendations to address national system shortcomings i.e. in education curriculums, establishment of dialogue between business and universities, and other. This research is also a continuation of the ICT sector demand and supply of labor force, aiming at micro level needs and expectations of businesses from the labor force.

1.2. OBJECTIVES

The objective of this study is to map the supply and demand in the labor market and to identify the issues regarding the talent generation in the ICT sector. As a result, a review will be produced of a comprehensive understanding for the needed skills in the ICT sector.

The purpose of skill gap analysis is to indicate the following:

- What skills are currently needed in the ICT market locally;
- What skills are currently needed in the ICT market internationally (technology trends);
- What skills will the ICT industry need in 3 to 5 years' time;
- Where should the education and training institutions focus in skills development in ICT, especially the pillars provided on STIKK Education program.

The identification of the gap between demanded skills in ICT industry and the ICT skills supplied by the educational and training institutions of Kosovo will serve as a reference during the curricula build for the new STIKK Education program. The analysis will identify the main ICT skills needed within the scope of trainings that will be provided by STIKK Education program, the skills needed in the local and international markets, and analyses of skill gap using an economic-theory driven approach.

1.3. EARLIER STUDIES

The ICT sector in Kosovo, is still in the early stages of consolidation and there are a handful studies that are conducted for this industry where majority are commissioned by STIKK. Only a few specific studies of the ICT labor supply have been conducted in Kosovo. On the other hand, this subject has frequently been encountered and marginally reviewed in other researches that were often related to general education strategies, issued youth unemployment, and other cross-cutting agendas.

Currently available studies in the public domain concerning the state of workforce in the ICT industry in Kosovo are provided in the following publications:

- Skill Gap Analysis 2011/2013, STIKK;
- ICT Country Profile 2013, by Regional Centre Initiative - KPEP/USAID;
- IT Barometer 2015, STIKK;
- Kosovo ICT Market Analysis 2013;
- Internet Penetration and Usage in Kosovo 2014;
- STIKK South East Europe IT Industry Barometer (SEEITIB) 2014 –Results for Kosovo.

2. METHODOLOGY

For the purpose of this research a mixed method approach was used, by utilizing primary and secondary research of both qualitative and quantitative nature. Initially this research project started with the review of the existing publications in the subject, to develop the context and to help with the development of the data collection instrument. Theoretical background for the development of the instrument has been drawn from standard Organizational Behavior framework of employee traits vis-à-vis requirements of the job or organization. Specifically the theoretical background used assesses employee as an abstract category over two dimensions, aptitude and attitude. Furthermore, both dimensions are further broken down into subcategories and specific questions that relate to employees in the ICT industry.

Primary research data have been collected through direct interviews with ICT business owners and managers, using a structured interview format (questionnaire). Obtained primary data upon processing and analysis have been synthesized with other data from secondary sources to produce answers for the objectives set forth for this study. The primary study has used the list of 40 businesses in the ICT sector that are members of STIKK.

2.1. DESK RESEARCH

Desk research process consisted of collecting and reviewing relevant data and background information of existing studies, assessments and reports prepared by relevant government institutions, NGOs, STIKK association, donor agencies and their implementing partners in regard to ICT skills development in Kosovo. Higher emphasis was given to the identification of studies and publications related to the recent developments in ICT sector in Kosovo comparing them with STIKK's previous reports "ICT Market in Kosovo 2013", "Skills Gap Analysis 2013", "Skills Gap Analysis for Information and Communication Technology 2011", and "ICT in Kosovo- A sector decoded 2010".

In global perspective, important information for the ICT sector comes from strategic IT sections of PwC and Deloitte. In the fierce competitive environment, innovation remains the key component according to both sources with business strategies shifting heavily towards cost cutting and delivering everything as extras model (XaaS). High growth areas are cloud computing, cyber security, data analytics, and digital content. The achievement of this progress is contingent on arrays of hardware (servers and networks) and armies of developers (Java, Python, C Sharp), all in low cost. Implying that all that can be outsourced to low cost development environment will flow to those countries. According to Deloitte's industry outlook "the talent should be on tech sector radar. Innovation has, and always will be, the engine of technology growth. However, the shortage of talent will continue to rise. Given talent shortages and the rapid pace of technology change, tech enterprises cannot rely solely on developing and hiring new talent. They will need to draw in expertise and creativity from wherever it happens to be." Modis, a reputable IT job placement company forecasts that by 2022 in US there are going to be 685,000 new IT jobs[1]. Unfortunately such forecasts are not available for Kosovar market or for the greater region, however given the fact that domestic economy is growing at a slow pace, tapping into global markets is a tangible and rewarding strategy. Reed, a top online job placement company in UK, at the time of writing this report posts 2680 positions for software developers[2]. Of the posted vacancies for software developer, most wanted skills are: JavaScript Developer, C# Developer, NET Developer, Web Developer and Front End Developer. Mobile computing and mobile applications have long since opened a market for application development to service a broad range of business, social, educational, medical, and other facets of modern society. Many of these specific niches are being slowly adopted to Kosovar social and business context.

1 Modis (2015), Tech Jobs on the Rise
2 Reed (2015), Software Jobs - www.reed.co.uk

2.2. STRUCTURED INTERVIEWS

Structured interviews were conducted with 40 owners/managers of companies in the ICT sector in Kosovo. The survey instrument was developed with respect to objectives which were transliterated and disaggregated into worded and concise questions, over a joint working group between UBO-Consulting and STIKK. The sample consisting of key stakeholders was finalized in coordination with STIKK staff. Interviews with owners/managers served to assess skill need, intern opportunities, plug & play employee opportunities, and skill forecasting in the ICT sector in Kosovo. Interviews have been conducted over the last two weeks of September of 2015. Completed interviews have been entered into a custom build database for processing and analysis.

3. FINDINGS

3.1. BUSINESS OUTLOOK

Average tenure of companies in the surveyed sample is 8 years, with the earliest company being established 25 years ago. Two third of companies are less than 7 years old. The relative young age of companies is a strong indicator of the recent development of the sector as a whole.

In the pie chart below are presented the main product and/or service lines of the surveyed companies, where application development is the single largest category at 25%. ICT consultancy and trading in hardware followed represent an important revenue generation activity for ICT companies, thus rank both second at 14%.

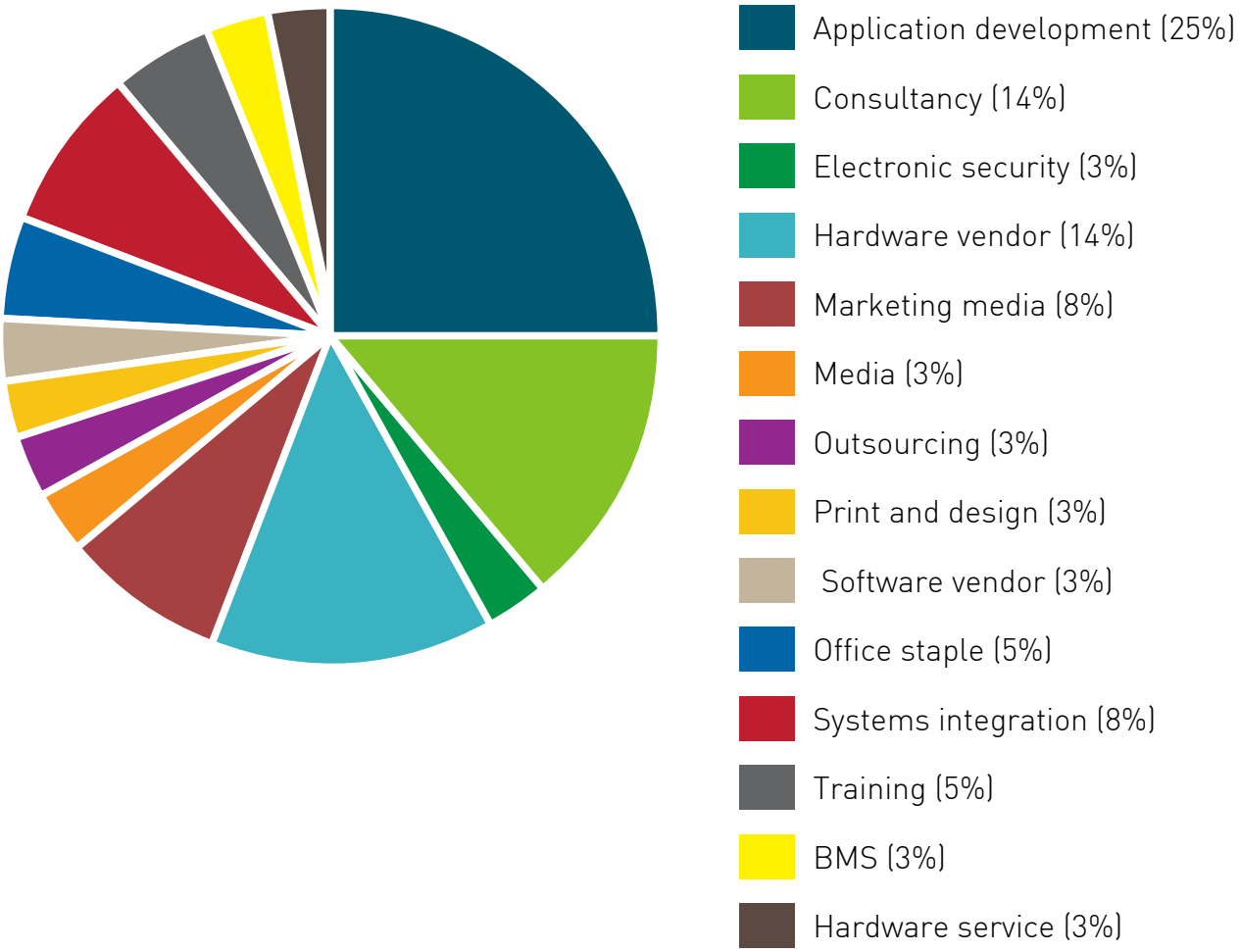

Figure 1: Main product-service lines of the companies

Half of the surveyed companies said that in the period 2014/2015 they realized small profits. Whereas 38% said that they their business was as expected in terms of profit, that is, in line with their projections. While 12% said that they have been running at no profit or at break-even. In the given economic context, where the government represents the single largest consumer, with respect to slowdown as a result of lengthy impasse after the elections of June 2014 the result is sort of impressive but respectable nonetheless. Reported business results match with results from other economic sectors, indicating close relationship or dependency of the ICT sector on the demand that is generated from other economic sectors, be that trade, retail, construction, education, service, or other.

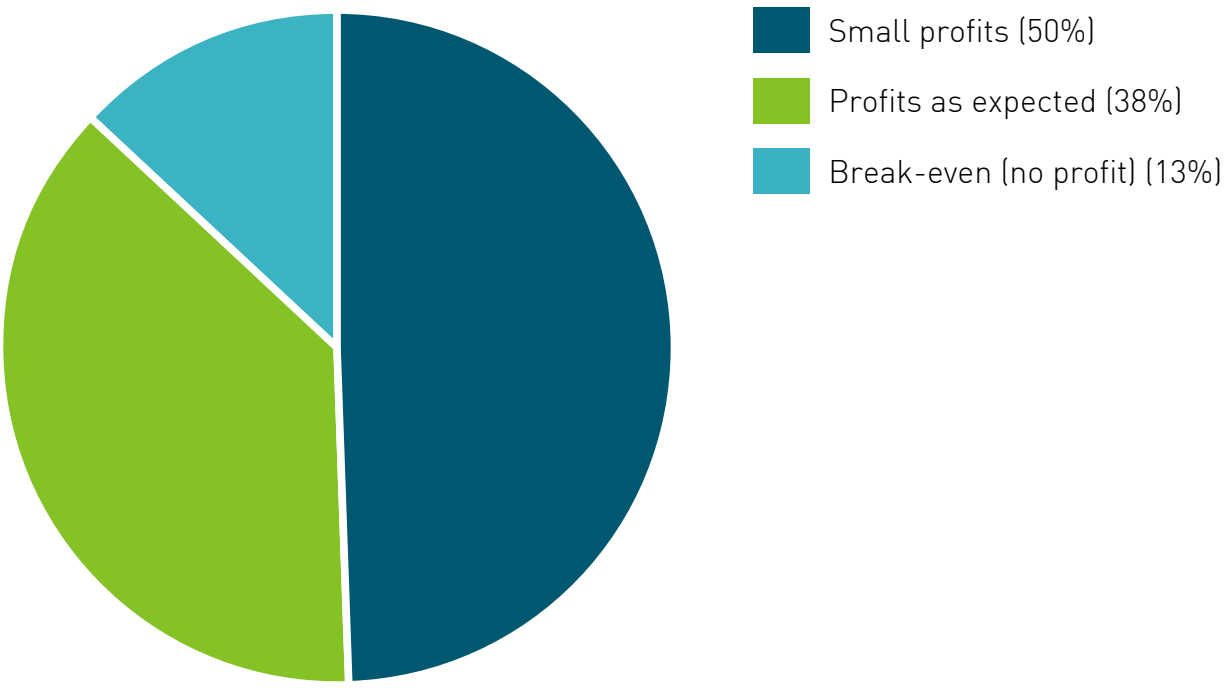

Figure 2: Company's overall performance 2014/2015

When asked about their expectation about the future, in terms of business increase of decrease, absolute majority of businesses or 69% of them said that they expect an increase over the next three year period. Nearly a third or 31% said that they expect business to remain at the same level of the next three years. Despite the troublesome economic environment, the optimism appears to be prevalent among businesses in the ICT sector. No business reported that they expect a decline in activity over the following three year period.

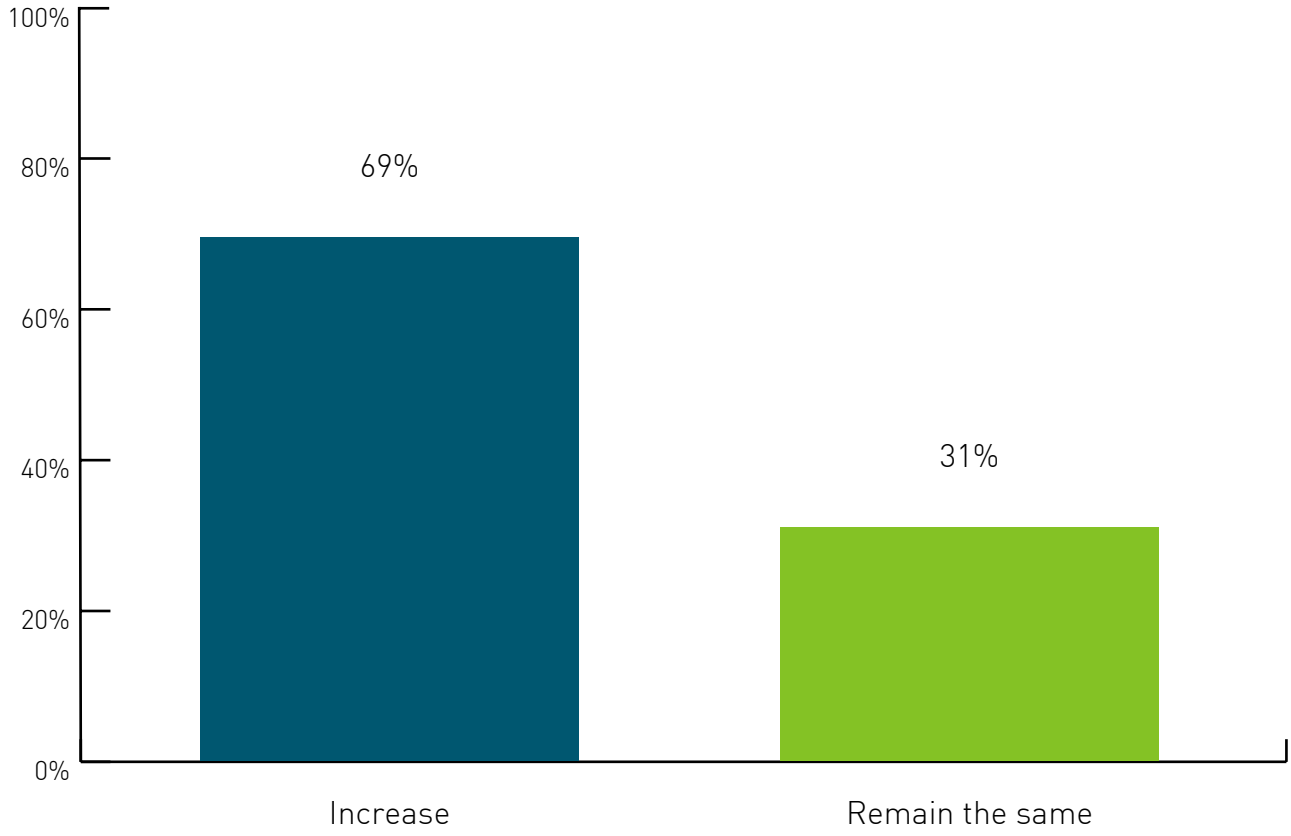

Figure 3: Company's expectations for growth in the next three years

Businesses that have said to expect growth over the next three years were asked about the source of this growth. Specifically, businesses were asked to identify segments where they are anticipating growth. The single largest category of growth is anticipated in export expansion 27.3%, followed by improvements in the efficiency and technology 22.7%. Third growth anticipated segment is expected in sales increase as a result of new products and services 18.2% and reduction in other costs 18.2% to be the main segments of the anticipated business growth. There are also less prominent, nonetheless important segments upon which businesses base their anticipated growth in business. The Figure 4 provides detailed breakdown of anticipated segments of business growth.

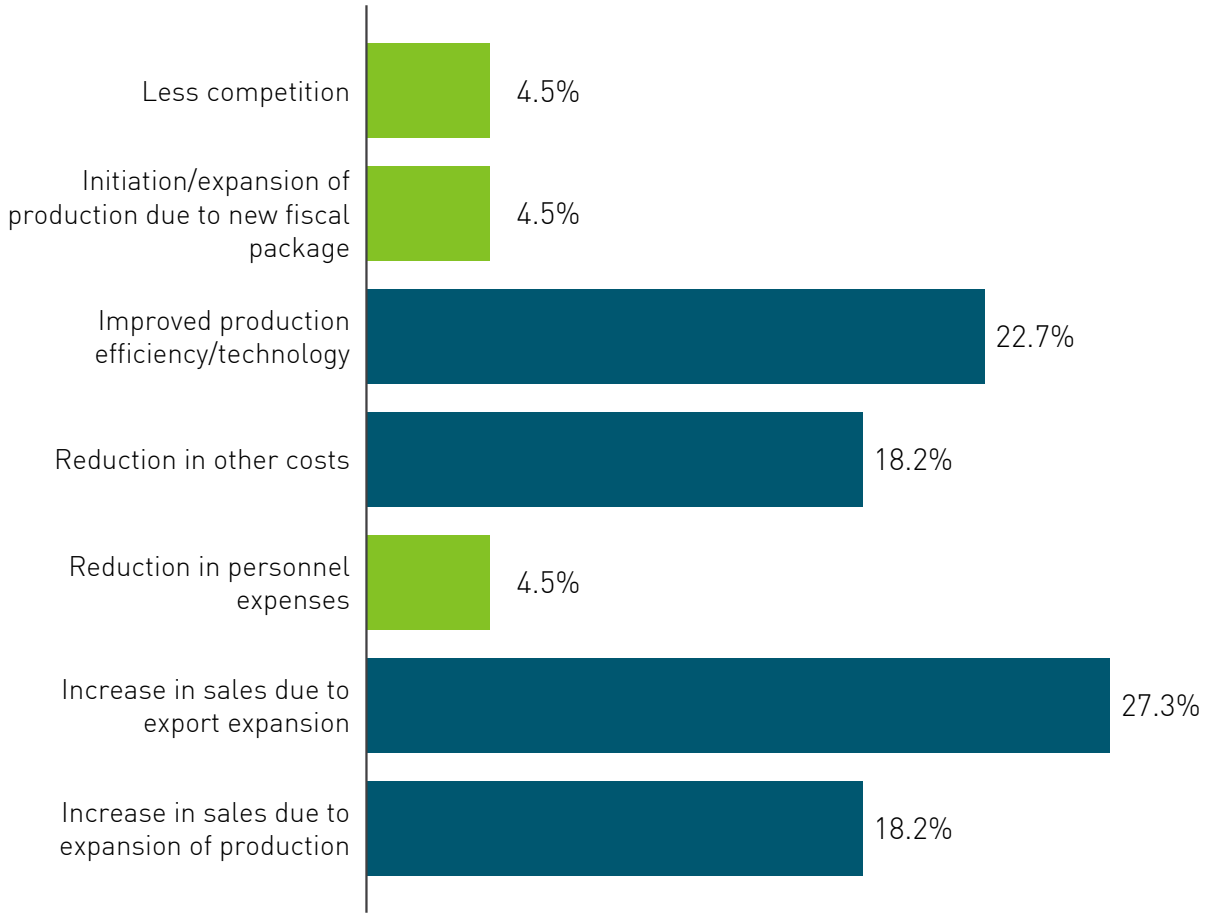

Figure 4: The anticipated growth opportunities

In the pie chart below are presented the ICT areas where companies foresee future growth and anticipate business opportunities for future growth. The main anticipated areas for business growth by companies are the "Development of software products/software applications" (31.3%) and "Systems integration/turnkey solutions "(28.1%) are. These are followed by "Development of hardware components" (9.4%) and "Provision of services/troubleshooting-call center "(9.4%). There are also less prominent areas where ICT businesses are anticipating growth, as can be seen in the fig 5 below. Software and application development is a strong indicator of the visionary outlook for the opportunities in business, since this is already seen and tested model of an export commodity produced by the ICT sector in Kosovo. Nearly a third of the companies see their future in the development of software applications.

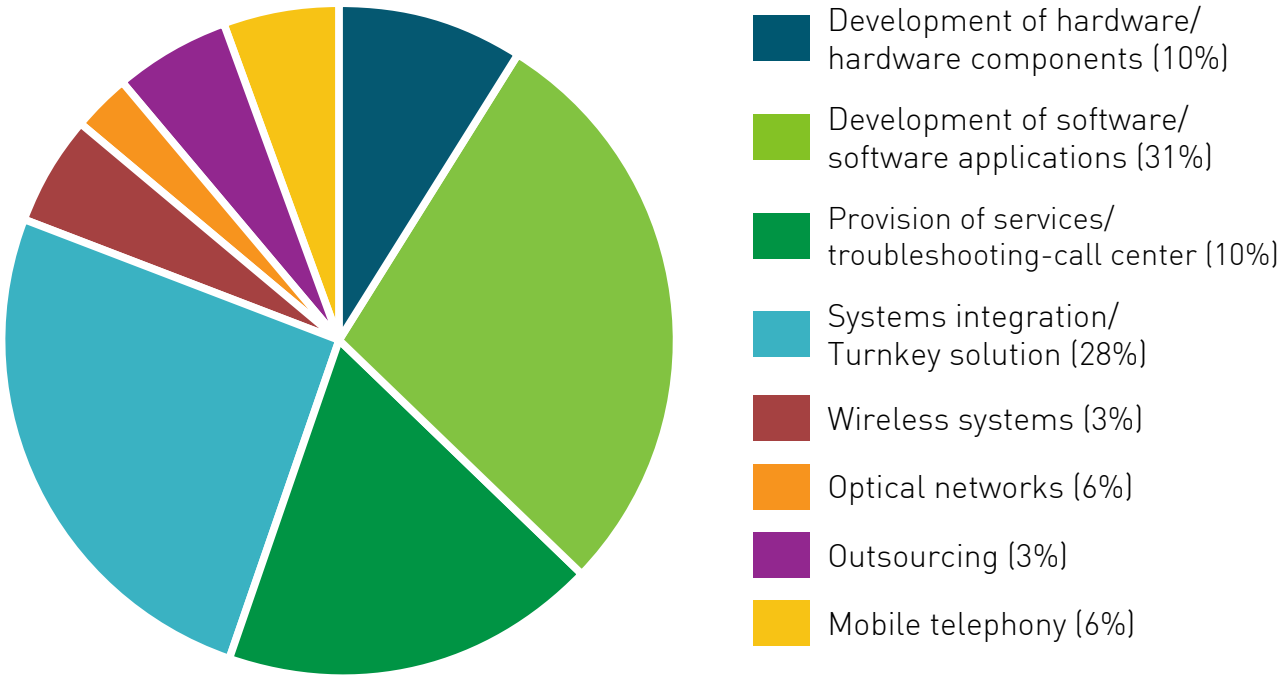

Figure 5: Foreseen future growth in ICT areas

3.2. LABOUR DEMAND SKILLS

When asked about the areas of current shortage in the labor supply, businesses pointed largely to a category of employee with experience in specific ICT area, such as networks/ software development /or other skilled ICT professional (36%). This number implies that one third of the companies lack such employees, and that potentially there is an opportunity cost associated with the shortage of such category of workforce. Lack of employees with experience and general skills in the ICT sector, constitute the second largest category of workforce in shortage. Out of total sample of companies, 20% of them stated that they are facing such shortage. Skilled employees with specific competency in networking, software development, or other ICT related, with no work experience constitute the third largest group of workforce shortage, with 16% of businesses saying that they face a shortage of such profile. Almost one fifth of the surveyed companies (12%) doesn't really know what kind of employee profile they are in short of. Only 4% of the surveyed companies said that they are not currently short of skilled employees, implying potentially sizable employment opportunity for a workforce that qualifies to employers' criteria! STIKK's Skill Gap Analysis of 2013 is echoed in the responses provided by businesses in this survey, where the demand is still by many folds over the supply of skilled ICT professionals.

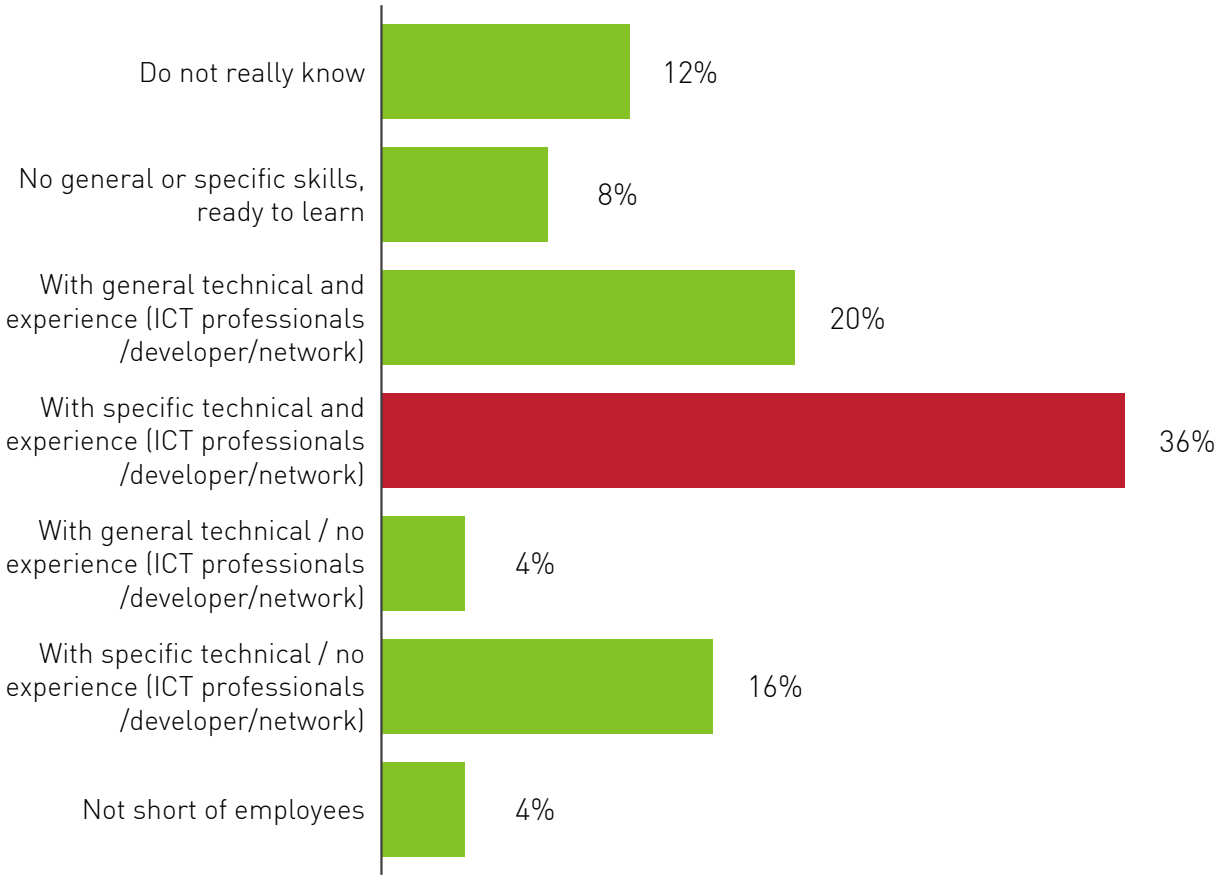

Figure 6: Areas with shortage of labor supply

Businesses that have said that they face a current shortage of skilled labor, were asked about the specific skills that an immediate employee should have, such as: type of specialization, experience and years of experience, university education, and about professional certification (in the specific fields of IT). The results are presented in the figure 7 below, with bar charts for each field of specialization. Half of the surveyed businesses or 50% of them stated that they need database programmers, and all or 100% of them need to have working experience in that specific field. Whereas only 60% of the required database programmers were required to have university education or a professional certification. Thirty-eight 38% of businesses said that they are short of employees specialized on sales and business management skills, all of them are expected to have between 3 to 5 years of working experience and hold a university degree. They are also expected to have professional certificate in any of the IT fields. Nearly one third of the surveyed businesses faced a shortage of skilled people with Windows related skills, 80% of them with experience, 40% of them with university degree and 60% with a professional certification. One quarter or 25% of surveyed businesses faced a shortage of employees with MS-SQL skills, three fourth of them with an average of 3 years of experience and only a quarter of them with university education or professional training certificate. Persons with more specialized skills in ICT such as specific programming languages or development tools are reported as a shortage in a range from 6% to almost 20% of the surveyed companies. Almost all would be asked to have experience in a range from 2 to 5 years, where most of them are not required to have any university degree or specialist training certificate. Specific ICT skills that were asked are: .NET, PHP , Hardware installation/setup, C++, HTML/ XML, mSQL / mySQL, ODBC, Application Programming/ Developer, Delphi, ILE/400, Java/JavaScript, Objective C, PL/SQL, Python, Shell - C-Shell/K-Shell/Bourne-Shell, SQL, ISO 27001, ISO 20000, CMM / CMMI. From this group of skills .NET and PHP were selected by 19% of businesses. The average tenure of required experience for all types of skills is found in the range from 2 to 5 years, with a mean of 3.7 years. The analysis above implies that businesses demand is highly oriented toward killed labor with professional experience.

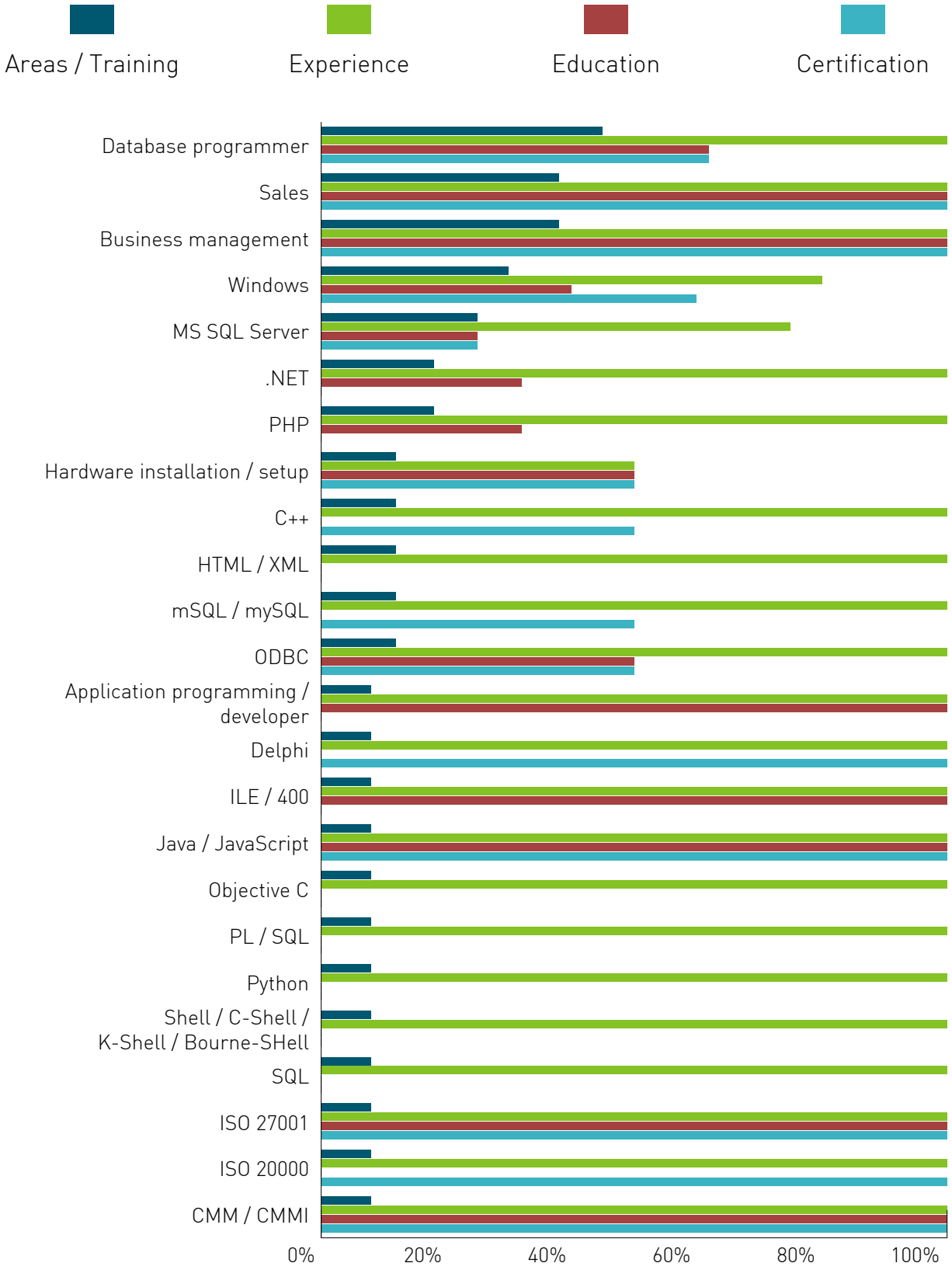

Figure 7: What kind of skills are required?

Businesses were asked to allocate 100 points according to their priority to four different categories or areas where would be supported by additional workforce. According to the allocation of points, 40% of the businesses said that the largest part would be used to support existing domestic or current clients or areas of business. A quarter or about 24% of businesses stated that they are in need for additional workforce to support new international business or international markets activities. Nearly one fifth or 22% of businesses stated that additional workforce would be needed to support business activities related to new domestic business areas. Whereas 14% of businesses claimed that current international or export markets business areas would be supported by additional workforce. The Figure 8 below, provide the detailed breakdown of business activities to be supported by additional workforce.

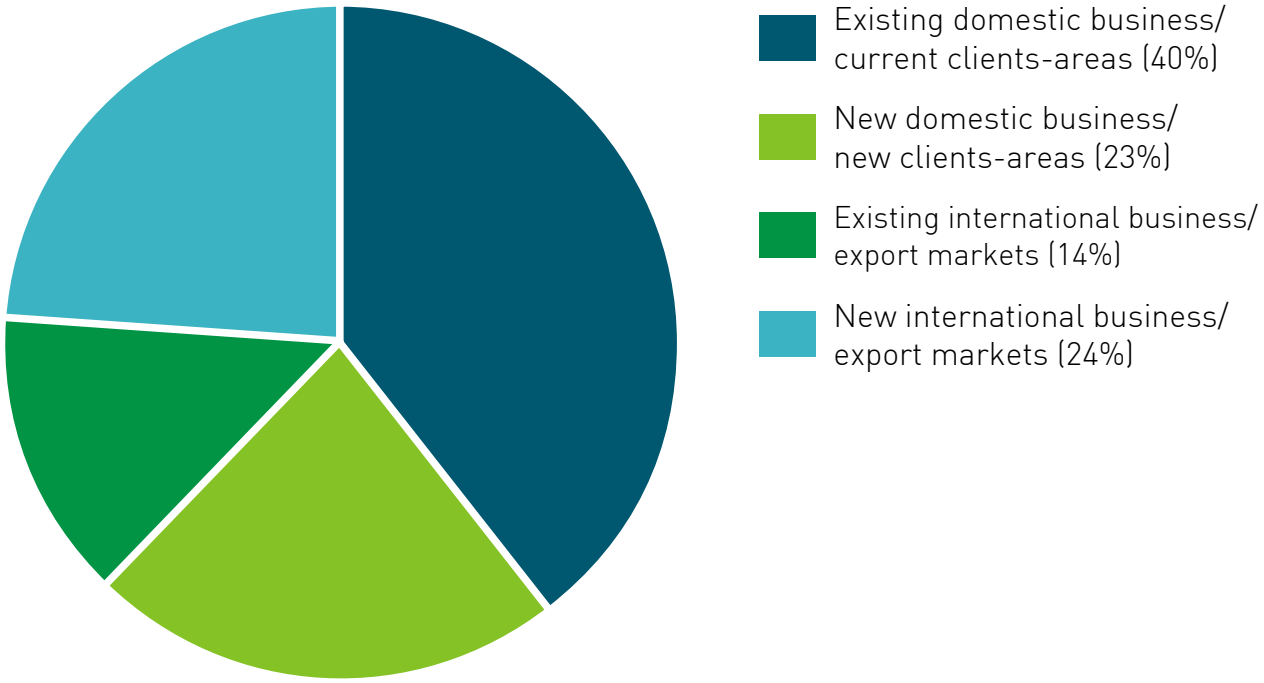

Figure 8: What part of your business activities would be supported by additional workforce?

Analysis of the results presented above indicates two implications. The first implication is that domestic market is still considered to have most of the potential for growth, and it would potentially represent 62% of the overall business. While, the second implication is that about 14% of businesses operating in the international markets or export markets have the potential to grow almost to a sizable of 38% of the total markets for ICT companies in Kosovo.

Businesses were asked to rate what are the most critical and missing specific skill gaps that are important to their line of business, referring to their current and well as future employees. The chart with rankings on a scale from 1 to 5 is presented below in Figure 9. The "Java script" is seen as the single most critical skill of the workforce, current and future, with respect to the needs of their companies. The "Knowledge of systems integration" is also seen as a critical skill, ranking second to knowledge of Java programming. The knowledge of SQL and Real-time systems are ranked third and fourth as employee critical skills. Knowledge of .NET programming is also a highly rated skill in terms of importance for the company, ranking fifth in a list of 103 different skill sets. At this point, the overlap with trends and outlook in the global markets is evident, since experts with expertise in Java script and Java derivatives are expected to be in high demand in the future. Likewise with .NET and other web as well as cross computing platforms, together with database programming skills, the future is expected to generate more and more demand for products and services from people with such skills. The large variety of skills that are rated as critical by businesses demonstrates that businesses operate across a broad range of business segments, where different skill sets are highly needed and deficient, hence becoming critical for the company. Longer list of critical skills is provided in the figure below.

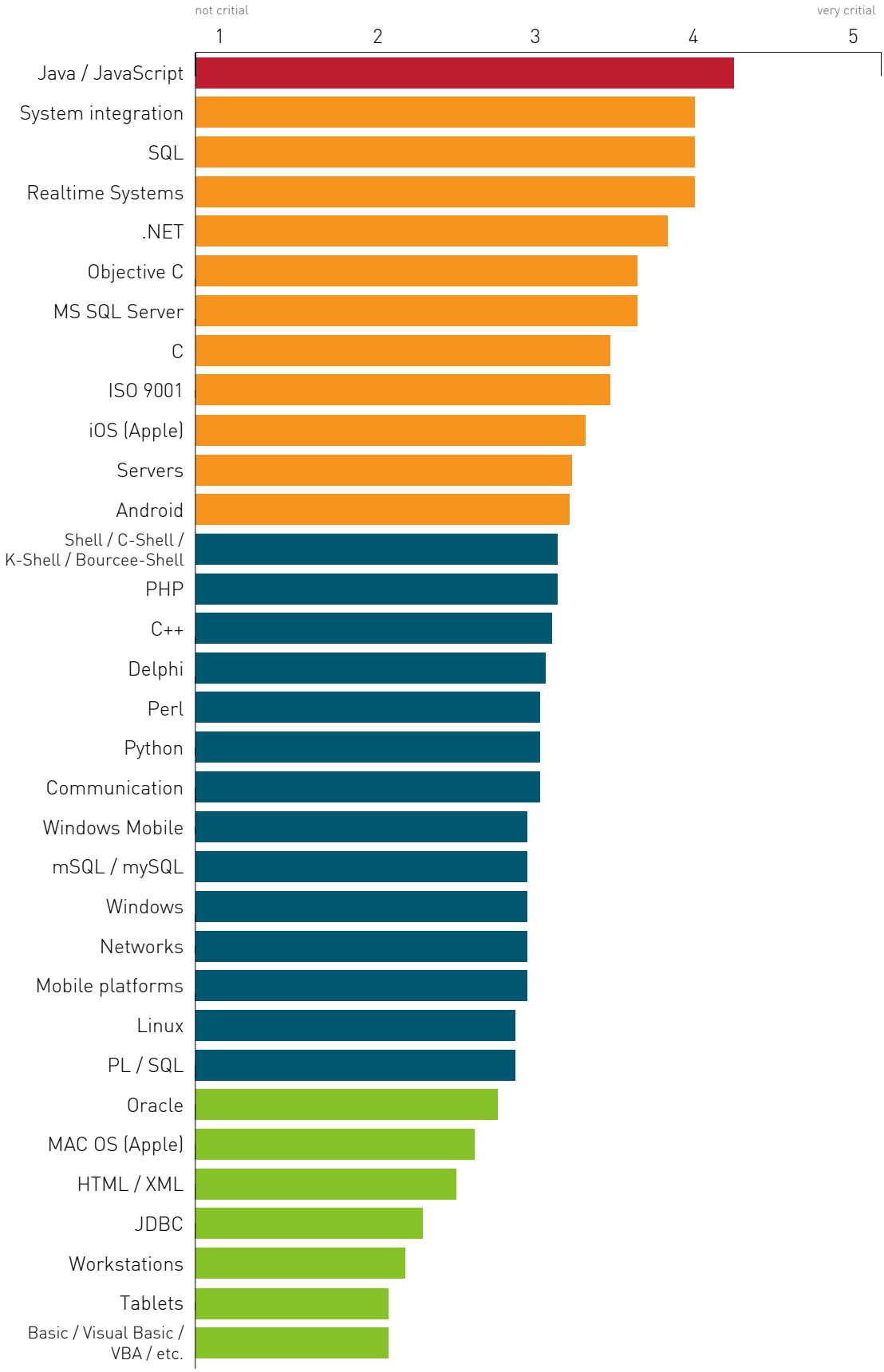

Figure 9: Most critical and missing skill gaps for current and future employees

Besides specific knowledge and skills related to software and hardware, businesses were also asked what are the most important or critical skills in terms of general competencies of an employee related to knowledge of software and applications. The question of importance is related to the needs of their own business. Question refers to current and missing employees that could be hired over the following three years. Categories of skills were rated on a 5 point scale, where 1 is less critical and 5 is very critical (important). Analysis of the answers shows that in the context of general skills, problem solving is rated as the most valuable skill followed by conceptual programming or OOP. Application development is rated third, nonetheless all top three skills are rated 4 or higher compared to other skills.

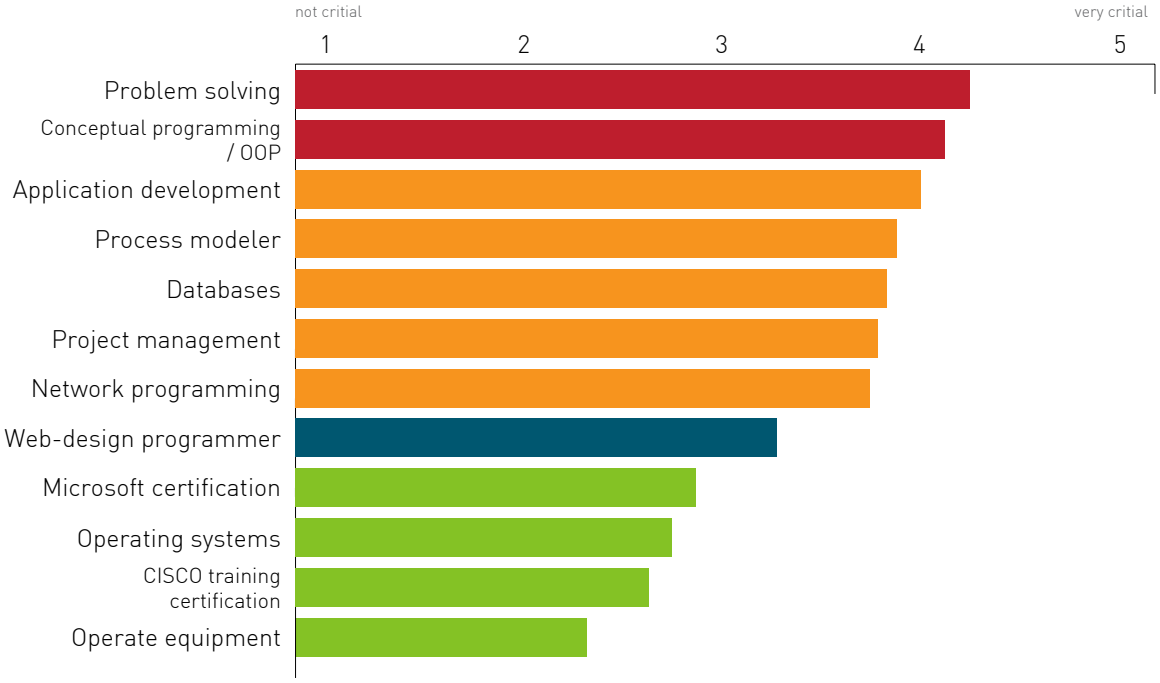

Figure 10: Most important and missing general software and hardware skills

3.3. LABOUR SUPPLY

In an environment of newly developed industry with a rapid growth, well-structured and functioning supply mechanism of valuable talents is an important and critical factor for running a successful business. Businesses were asked to provide information where do they get their workforce, referring to the channels of sourcing skilled labor, what methods do they use. Public vacancies, internships, and professional networks are the most frequent methods used for hiring the skilled workforce, with about 27 % of companies stating that. This is followed by personal networks, which is the case at about 15% of companies, and the least used sources are found among universities and schools, as well as from recruitment agencies at 3%. Patterns correspond to certain level with findings given in the Skill Gap Analysis of 2013 by STIKK, with respect to disconnection of Universities with ICT businesses. Report emphasizes the dissatisfaction of ICT companies with the skills of employees (skills gap) coming from different in-home universities.

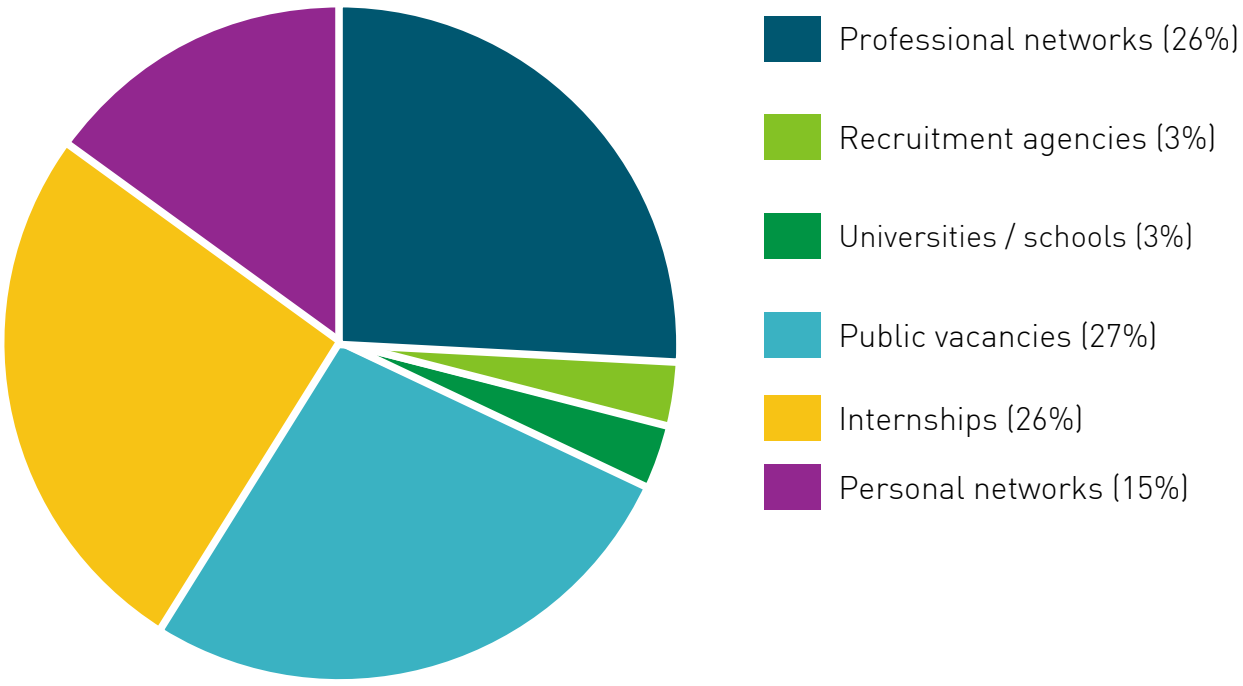

Figure 11: Firm's frequent forms of recruitment

Businesses were asked about the compensation structure for skilled employees, which in a market economy operates as signal for workforce orientation. Prevailing compensation forms and levels are used to determine the cost benefit, looking at investment in education and training vs. compensation and employment opportunities. The prevailing method of businesses to structure salaries for skilled employees is through negotiation, where 38% of surveyed businesses uses this approach. Different and variable models to structure salaries between employees within the same company are used by 25% of businesses. Whereas market pricing and flexible (fixed fee + percentage on sales/projects) are used by 19% of the businesses. Provided information for the level of monthly salaries for skilled employees, indicate that salaries run in a range from 400 EUR to 1050 EUR, with an average of 627 EUR.

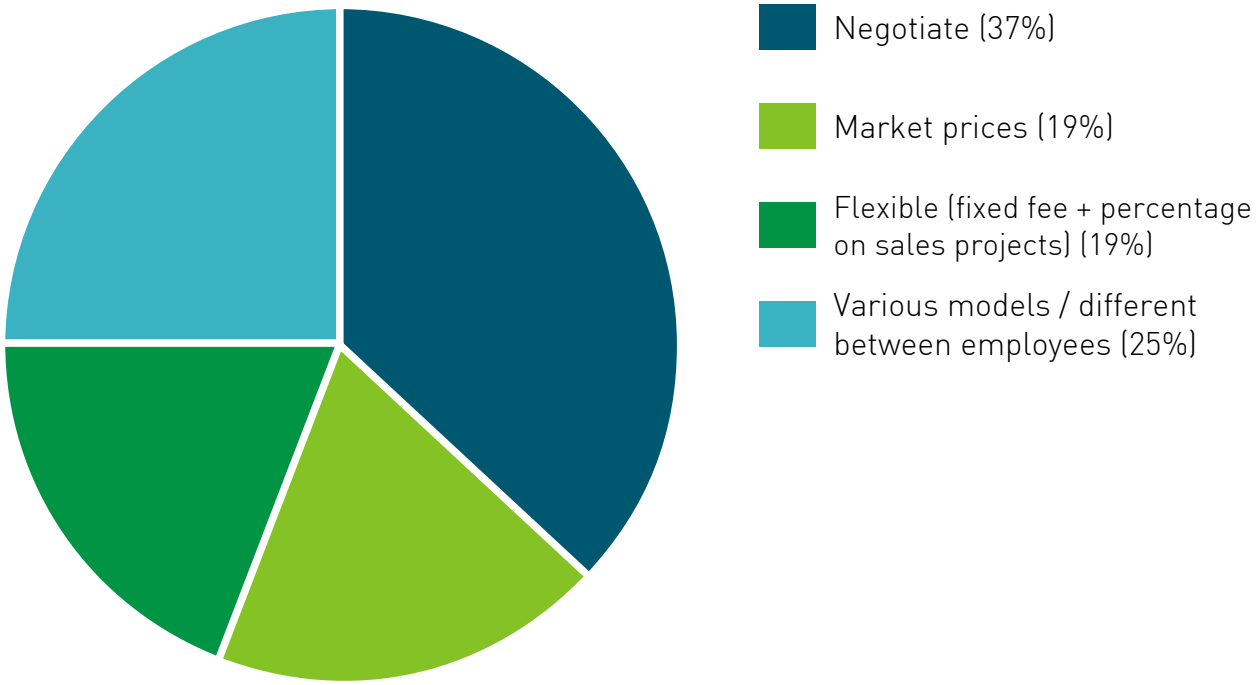

Figure 12: Method of structuring salaries

Career development track is another aspect that employees look for when opting for employment, in addition to the financial compensation, this is because the absolute majority of skilled labor are young and take into account the value of a professional development track. Businesses were asked if they have provided in the past or are they currently providing employee career development track, such as certified trainings, scholarships, or on job trainings. The absolute majority of businesses, 94% said they provide career development track for employees.

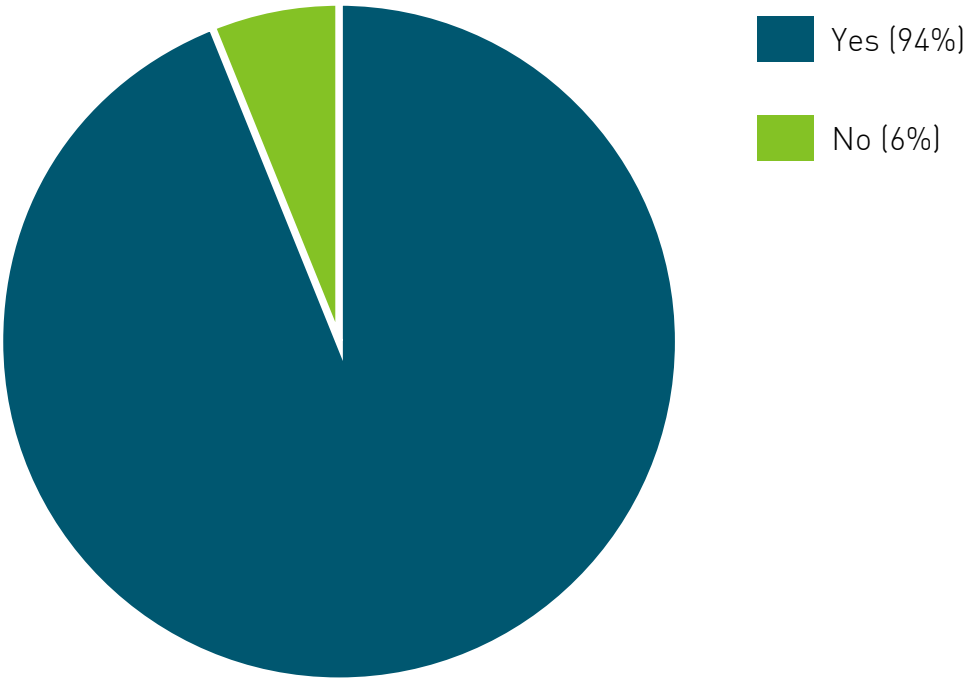

Figure 13: Provide employee career development track?

Since the human capital is one of the most critical factors in the ICT industry, it would be expected that businesses with a clear objective and a business plan to have a staffing needs assessment or a plan at least to a basic level. Businesses were asked if they have done any formal research or informal review of the workforce that their company needs. More than half of the businesses or 56% said that they have not done any formal or informal assessment of the workforce needs of their companies. This is a trait of small and rapidly growing companies with focus on the survival and technology and less to the organizational aspect and strategic business growth. In addition, the absence of a clear staffing plan is a challenge for the accomplishment of business objectives. Observed in the context of disorganized recruitment practices, the implication is that future staffing needs will be addressed through reactive management practices that are often casual rather than considered or analyzed at any greater complexity. On the other-hand, 44% of businesses have said to have conducted a workforce assessment either a formal research or informally considered this aspect. This figure on the other-hand is an indicator that businesses in the ICT industry are considering organizational aspects at strategic and tactical level, as human capital is one of the dominant critical factors for successful growth and development.

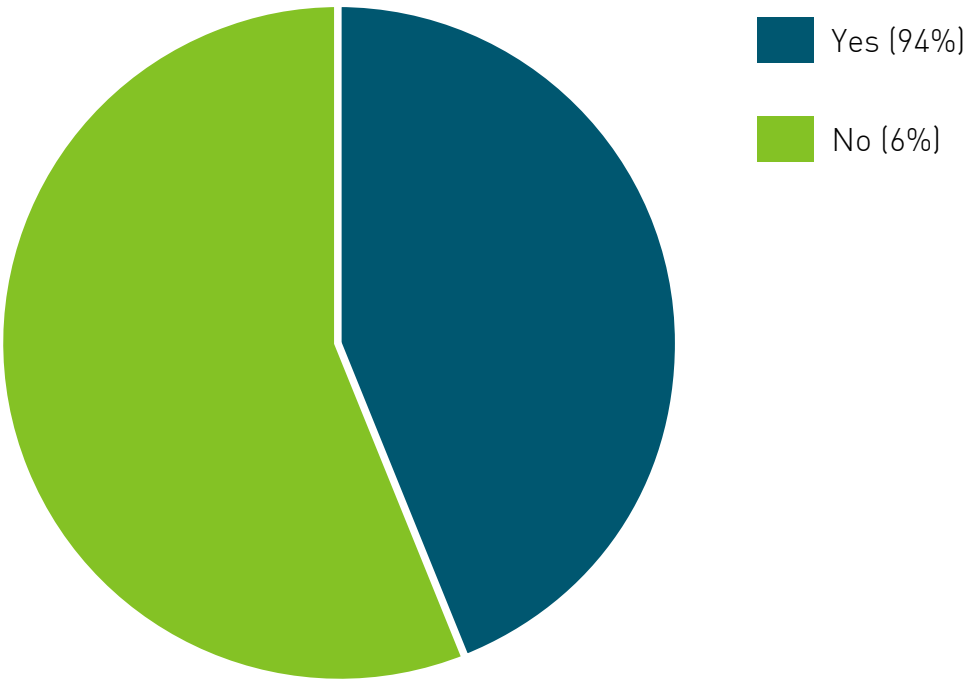

Figure 14: Have you done any research or review of the workforce for the needs of your company?

Subsequently businesses were asked if they are aware of their workforce requirements, and an overwhelming 94% have said yes. A very low number of businesses, only 6% have said that they are not aware about the workforce requirements of their companies. Considered in the context where 56% of companies have not done any assessment or review of the company workforce needs, a suggestion emerges that companies determine their workforce needs in models other than ones based on the relationship between business objectives, organization, and its human resources.

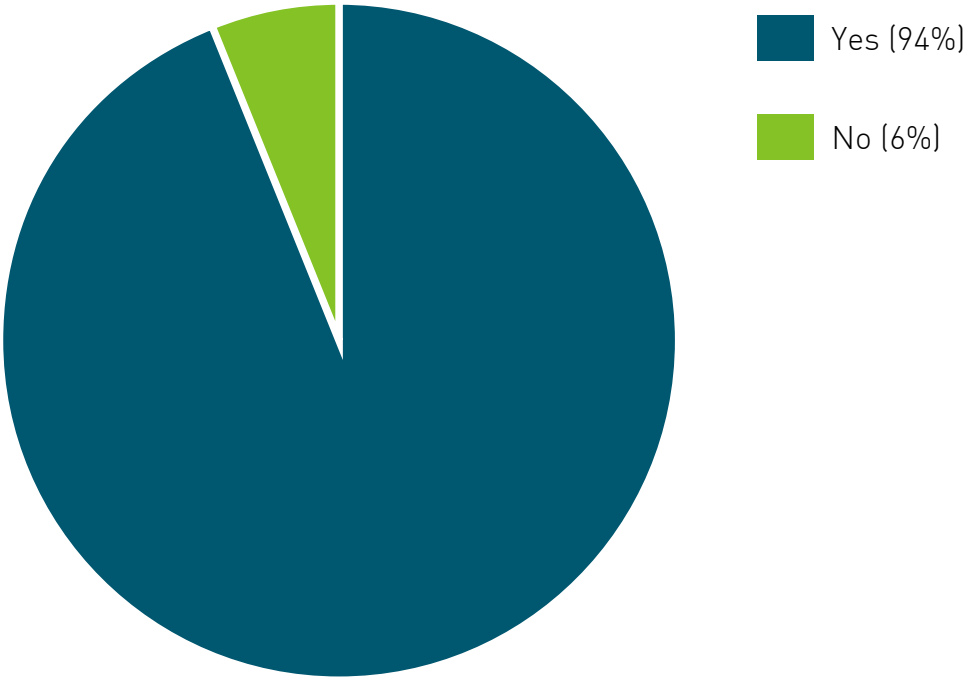

Figure 15: Is your company aware of its workforce requirements?

In an open answer format, businesses were asked to elaborate their perspective in a form of suggestion for the curriculum of the STIKK Education Program. Specifically, businesses were asked to give their recommendation about directions and topics that academy could offer with the aim of providing a better equipped and readily deployable workforce for the ICT industry in Kosovo. Besides specific training courses for application development such as Java, .NET, SQL, and other web application development tools; predominant recommendations relate to provision of training courses for IT business development, IT project management, and IT hardware and software sales skills. Only one of the respondents said that training course contents should be closely linked to market demand, as an established format that reflects in timely manner changes in the market demand. This particular answer implies that the situation regarding the offer of the STIKK academy should be considered in a fluid and evolving context, rather than in a rigid and slowly adapting attitude which is already a feature of other education and training services providers.

In addition to technical skills and ability to keep up with innovations, soft skills related to personality and motivation are important factor predicting successful integration and performance of an employee. Soft skills in this part relate to the aptitude as a relevant dimension for employees with respect to the organization or business. Businesses were asked, in the area of aptitude and motivation where are the most critical and missing skill gaps or areas that are important for their businesses when considering current or future employees. Data analysis shows that, unsurprisingly, businesses want a person skillful in organization, multitasking, and prioritization. Second comes commitment, which is certainly a valuable trait related performance and dedication. Third, fourth, and fifth are rated almost equally with respect to importance, which is innovativeness, self-initiative, and perseverance. Other aspects are also rated above average, as may be observed below in Figure 16.

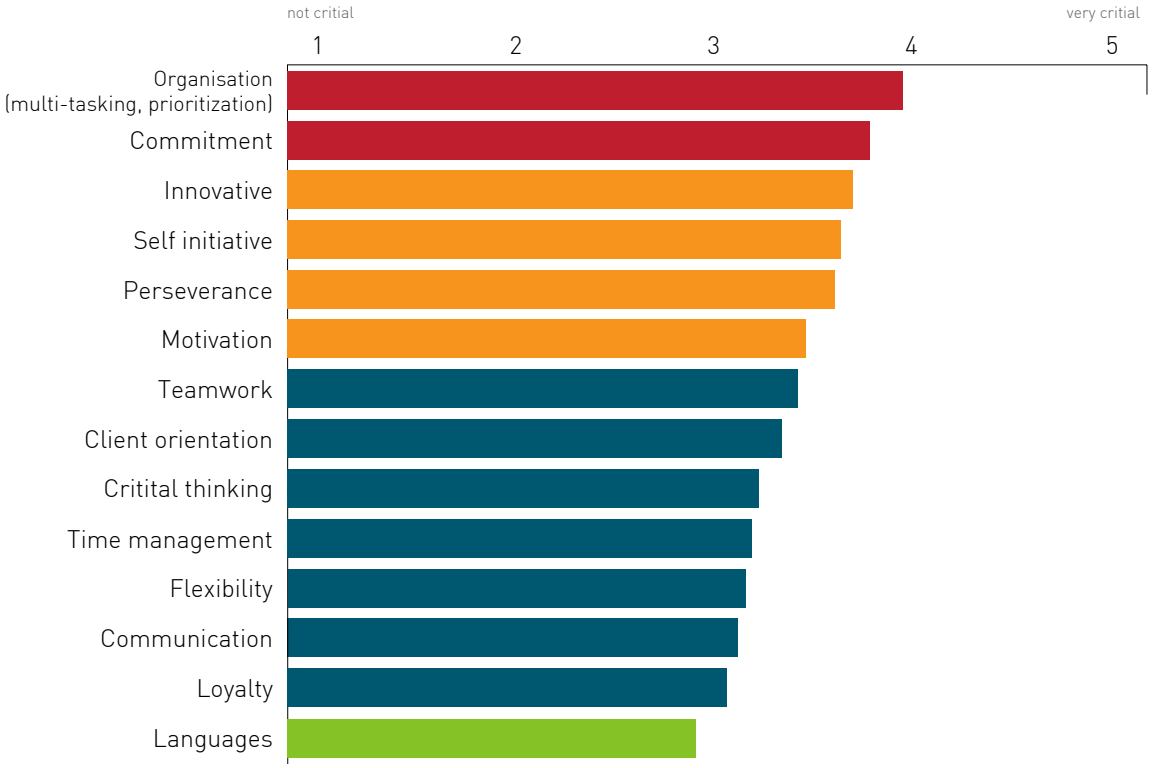

Figure 16: Aptitude critical and missing skill areas

Employee compensation is a strong attractor, drawing talents years ahead into particular career tracks. To see how the labor supply is stimulated from the demand side, businesses were asked how compensation is used as means to attract skilled employees. Specifically, businesses were asked how they currently structure compensation with the aim of attracting employees with particular skills that meet criteria according to needs and requirements of their businesses. Businesses were asked to allocate 100 point to the following five compensation categories such as: Salary, Overtime/compensation by hour, Bonus/performance related, Perks (phone, car, flexible schedule), Career/professional development track. The following structure of compensation is obtained in the ex-post analysis.

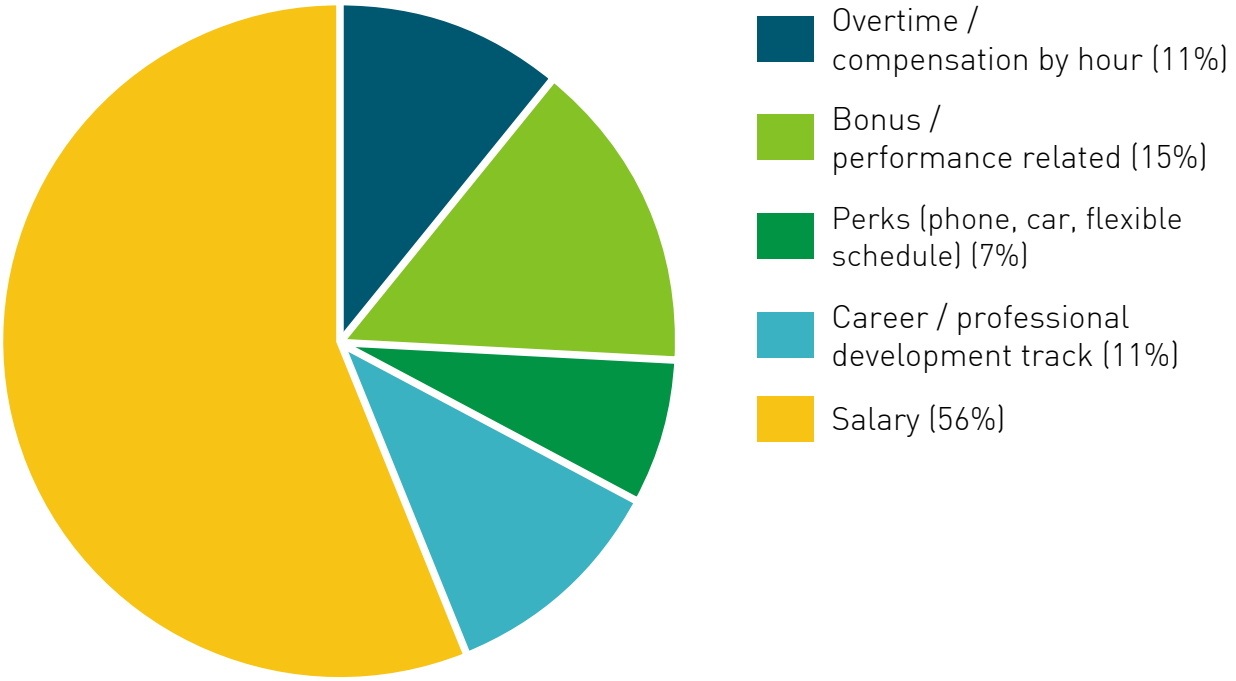

Figure 17: Compensation structure to attract qualified employees

From the Chart above in fig 17, it may be seen that compensation in the form of salary is used foremost 56% by businesses to attract skilled employees. Whereas 15% are allocated to performance related bonus system of compensation structure, thus demonstrating that risk remains with businesses at large when targeting skilled employees as well as limiting possibilities of reward based on performance for skilled employees. Overtime compensation and offer of a career or professional development track are seen by businesses at a rate of 1/10 or 11% of the allocated points as means of structuring compensation package by businesses to attract skilled labor. Perks are the least utilized compensation segment for the purpose of attracting skilled labor by only 7% of the businesses.

With respect to demographic descriptors of the skilled labor, gender was absolutely irrelevant by 100% of the surveyed businesses. When asked for the preferred age group, 44% of businesses said that age doesn't matter. A younger cohort (20-25 year) is preferred by 25 of businesses, and 31% of businesses prefer a cohort group of (36-45 year). The implication may be drawn that somewhat more than half, 56% of businesses have a preference with respect to age for the skilled workforce for the needs of their business. When considering the rapid development lifecycle for ICT products and services, it may be explicable that younger cohorts are better situated to follow, understand, and assimilate innovative trends with respect to products and services. However, some aspects of ICT, particularly deeper skills that are required in the back-office systems, such as database programming, architecture of hardware and peripheries, requires skilled experts with experience and tenure, thus challenging age factor in a detrimental aspect for younger cohorts. The conclusion in the context of preferred age cohorts is that it may be very much dependable on the type of required skill and employment position.

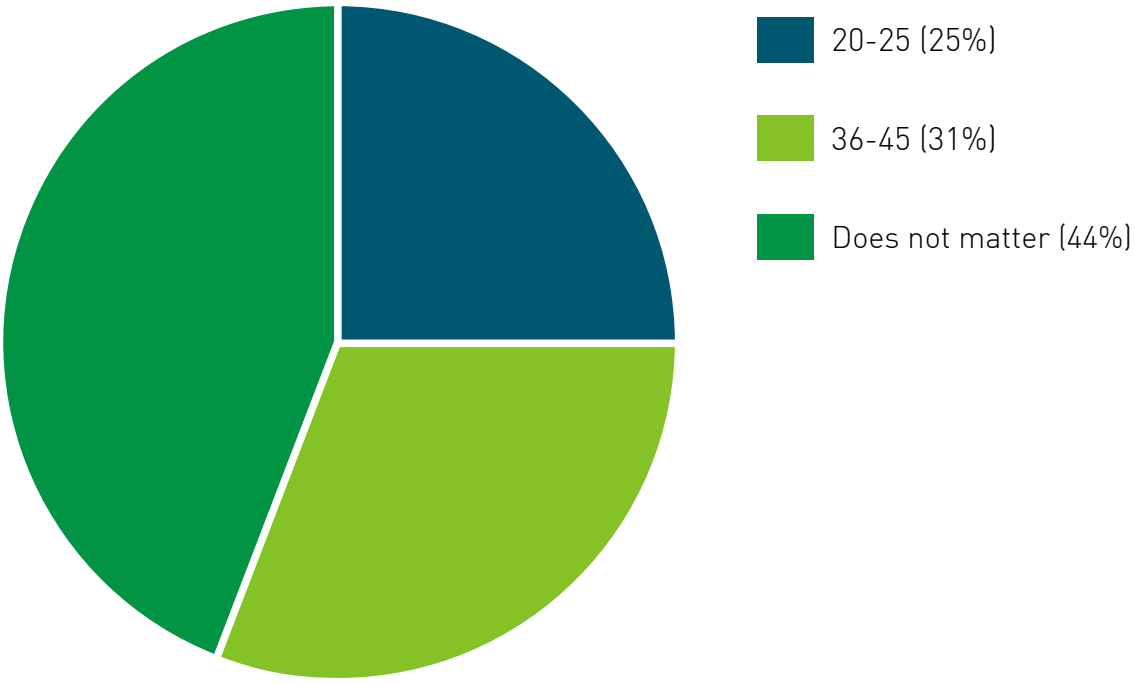

Figure 18: Preferred age group for skilled employees

Businesses were asked about preference in terms of education background for the skilled employees, where 50% of them preferred to have skilled employees with university background. In addition, 12.5% of businesses have a preference for skilled employees with advanced university degrees. On the other-hand 37.5% of the businesses said that they don't have any preference, that is, educational background doesn't matter. Preference for university degree, in cumulative aspect, 62.5% compliments the general skills that are seen as critical such as organizing and prioritization, commitment and innovation; besides specific skills which are related to designated university program(s) to larger extent, and even more so to advanced university degrees (programs).

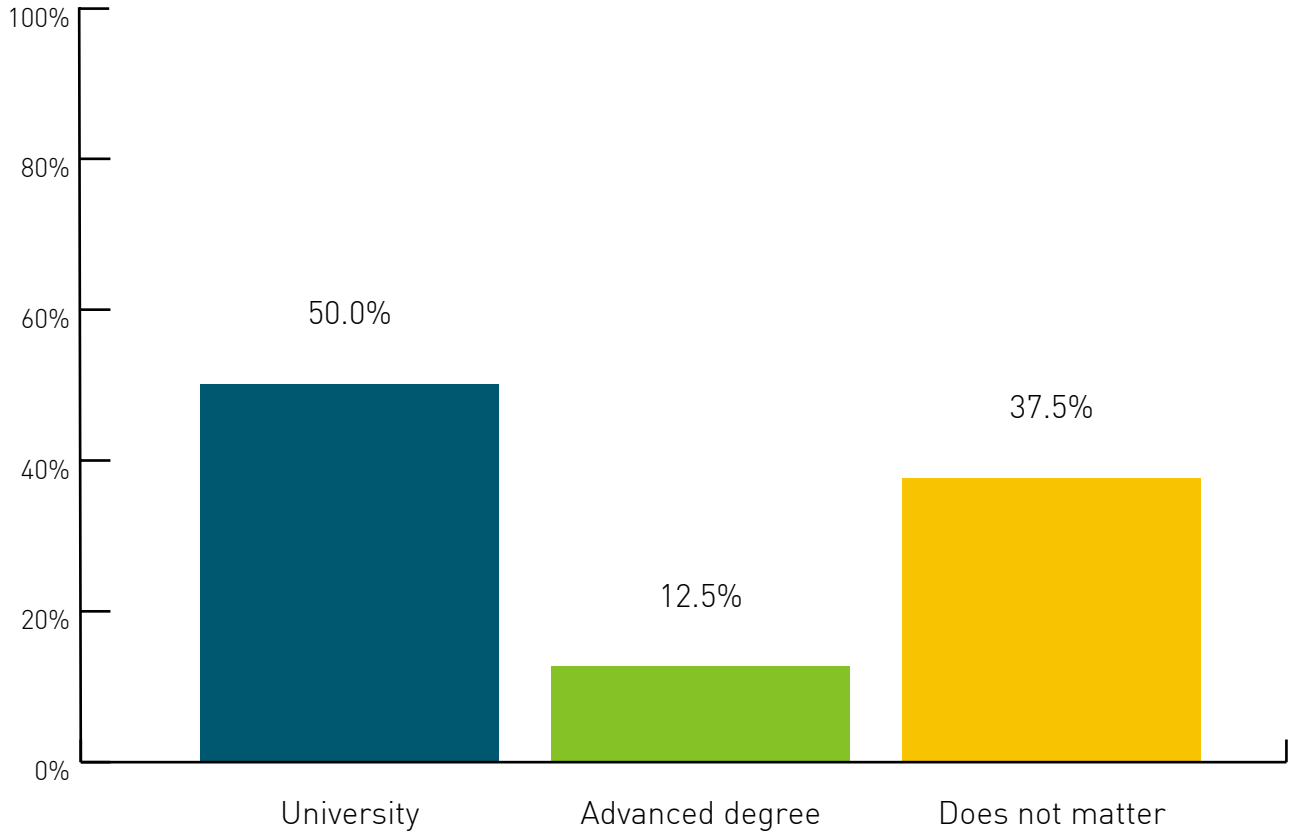

Figure 19: Preferred education background for skilled employees

4. CONCLUSION AND RECOMMENDATIONS

Results from the analysis point at many directions, however the results may be broadly summarize in four categories of conclusions.

- There is a shortage of skilled labor in the ICT industry, and businesses are aware of that.
- Businesses have a positive outlook with respect to future business growth.
- Domestic business represents the thickest segment, nonetheless one third of the business in the future is anticipated in export markets.
- University graduates are not readily employable, where skilled employees are expected to have experience and in addition to specific technical competency are expected to have skills related to IT project management and IT sales.
- Despite the fact that university graduates are not immediately employable, businesses expect employees to be university educated.

The array of conclusions from the survey implies a set of recommendations for the STIKK Education program, as to what it is needed from ICT businesses in terms employee skills, else what businesses expect from prospective ICT employee:

1. Prepared with business skills (sales and project management).
2. Equipped and upgraded labor force with technical knowledge for database programming (SQL) and software development tools (Java, .Net, and PHP).
3. Experienced and able to operate with soft skills.

The main and most critical missing skills of the workforce which are highly demanded in ICT industry and which should be part of the STIKK Education curricula are the following:

1. Software and Applications - (Java Programming, System Integration, SQL, Real-time systems, NET Programming, Conceptual Programming/OOP, App Development, Process Modeler Databases and Project Management);
2. Aptitude and Motivation - Organization (Problem-solving skills, Multi-tasking, Prioritization, Commitment, Innovative, Self-initiative, and Perseverance).

Furthermore, this survey points two specific findings that are on the margins of this research, (i) lack of formal or informal labor needs assessment(s), and (ii) lack of established information feeding mechanism from the ICT labor market (businesses) to educational institutions and training service providers.

Consequently, there is a strong rationale to help ICT companies develop workforce needs assessment in the context of their business plans and future business intentions. Hence, those formal business plans will serve STIKK Education program as a model in preparing the workforce to match the demand from the business side both in time and subject skill (competency).

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6. ANNEX

6.1. INSTRUMENT

Name of Institutions	Name of Person	Role of Respondent	Contact	Type of Entity	Date of Interview

A1. How long is your organization in the business of ICT? [ ] Years

Business information / profile

A2. What are the firm's main product lines or service activities?

First main product / service		**A2A**
Second main product / service		**A2B**
Third main product / service		**A2C**

A3. Please can you tell us the number of employees, when the company was established and currently, broken by gender:

	Male		Female	
a. When the firm was stablished?		**A3AM**		**A3AF**
b. In 2015?		**A3BM**		**A3BF**

A4. Can you please tell us which statement best characterizes your firm's overall performance in 2014/ or 2015?

1 = Large losses

2 = Small losses

3 = Break-even (no profit)

4 = Small profits

5 = Profits as expected

6 = Large profits

	A4

A5. When you think about the near future, can you please tell us what are your expectations/ anticipation for the **next three years**, do you expect to:

1. Increase→→ go to A6
2. Remain the same →→ go to A8
3. Reduce→→ go to A7
4. Don't know →→ go to A8

For business that plan to increase in the next three years

A6. Can you please tell us where do you expect that the growth of business will come?

(Select all that apply) [Then go to A8]

1. Increase in sales due to expansion of production
2. Increase in sales due to export expansion
3. Increase in sales due to higher prices
4. Reduction in procurement costs
5. Reduction in personnel expenses
6. Reduction in other costs
7. Improved production efficiency/technology
8. Initiation/expansion of production due to new fiscal package
9. Less competition
10. Other (_____)

A7.What would be the reason of the expected reduction in business in the near future, please select the reason(s). **(Select all that apply)** [Then go to A8]

1. Decrease in sales due to lower level of production
2. Decrease in sales due to lower exports s
3. Reduction in sales due to higher prices
4. Increase in procurement costs
5. Increase in personnel expenses
6. High finance costs
7. Increase in fuel costs and utilities (electricity, gas, etc.)
8. Inefficiency/obsolete technology
9. Increase of competition
10. Other (_____)

A8. Can you please tell us in which area of ICT do you foresee future growth that is relevant to your business, in what areas do you anticipate business opportunity for your company? [multiple answer]:

1. Development of hardware/hardware components
2. Development of software/software applications
3. Provision of services/troubleshooting-call center
4. Systems integration/Turnkey solution
5. Networks
6. Wireless systems
7. Optical networks
8. Media/TV/ISP
9. Mobile telephony
10. Other (please specify)_____
11. Don't know

A8. Can you please tell us in what area of expertise/know-how are you currently facing a shortage of labor supply ? [multiple answer]

1. Not short of employees
2. With specific technical skills/no experience (ICT professionals/developer/network)
3. With general technical skills/no experience (ICT professionals/developer/network)
4. With specific technical skills and experience (ICT professionals/developer/network)
5. With general technical and experience (ICT professionals/developer/network)
6. No general or specific skills, ready to learn
7. Support staff – office or help desk
8. Don't really know

A8a. If there a shortage of employees with general or specific skills, what kind of skills are required? (see categories), and mark with 1- YES, 0-No all that applies as a necessity.

No.	Categories	Select	Experience	Years	Formal education	Certification
1	Database programmer					
2	Application Programming/Developer					
3	Hardware installation/setup					
4	Wiring/Networking					
5	Telecommunication equipment/Wireless					
6	Support staff/data entry					
7	Sales					
8	Business management					
9	Help desk/Customer service					
10	Windows					
11	Realtime Systems					
12	MAC-OS					
13	OS/400					
14	SUN OS, Solaris					
15	Windows Mobile					
16	Linux					
17	UNIX					
18	ABAP4					
19	Assembler					
20	Basic - Visual Basic, VBA etc.					
21	C					
22	C++					
23	Clipper					
24	CList					
25	CL/400 - AS/400 Control Language					
26	Cobol					
27	CORBA IDL					
28	dBase					
29	Delphi					
30	Eiffel					
31	ESQL/C					
32	Fortran					
33	Foxpro					
34	Gupta, Centura					
35	HTML, XML					
36	ILE/400					
37	Java, JavaScript					

No.	Categories	Select	Experience	Years	Formal education	Certification
38	JCL					
39	Lisp					
40	Lotus Notes Script					
41	Macro Languages– others					
42	Natural					
43	.NET					
44	Objective C					
45	Pascal					
46	Perl					
47	PHP					
48	PL/SQL					
49	PL/1					
50	Powerbuilder					
51	Python					
52	QMF					
53	Rexx					
54	RPG					
55	SAS					
56	Script Languages – others					
57	Shell - C-Shell,K-Shell,Bourne-Shell					
58	Smalltalk					
59	Tcl/Tk					
60	Visual Objects					
61	VRML					
62	Xt, Motif					
63	yacc/lex					
64	4g					
65	Access					
66	Adabas					
67	BTrieve					
68	DAO					
69	DB2					
70	DB/400					
71	DL/1					
72	Gupta, Centura					
73	IDMS					
74	IMS					
75	Informix					
76	Ingres					
77	Interbase					

No.	Categories	Select	Experience	Years	Formal education	Certification
78	ISAM					
79	JDBC					
80	Lotus Notes					
81	MS SQL Server					
82	mSQL / mySQL					
83	Object Store					
84	ODBC					
85	Oracle					
86	Paradox					
87	POET					
88	Progress					
89	RDB					
90	SAS					
91	SESAM					
92	SQL					
93	Sybase					
94	UDS/IDMS					
95	VSAM					
96	xBase - dBase, FoxPro, Clipper...					
97	4th Dimension					
98	ISO 27001					
99	ISO 20000					
100	ISO9001					
101	CMM / CMMI					
102	ITMark					
103	SPICE					

A9. Can you please tell us, what part of your business activities would be supported by additional workforce? Please rate in percentage, by distributing percentages in the provided categories, see that the total sums to 100.

a. Existing domestic business / current clients-areas ..... [____]
b. New domestic business / new clients-areas ..... [____]
c. Existing international business / export markets ..... [____]
d. New international business / export markets..... [____]

Total 100

A10. Where are you currently getting your workforce, forms of recruitment? Select all that apply

1. Public vacancies
2. Internships
3. Personal networks
4. Professional networks
5. Recruitment agencies
6. Universities/schools
7. Other (describe)_____

A11. Can you please tell us how do you compensate, or how do you structure salaries for the skilled employees?

1. Negotiate
2. Market prices
3. Flexible (fixed fee + percentage on sales/projects)
4. Various models/different between employees
5. Other (specify)_____

A11a. Can you please tell us, in average what is the monthly salary of the skilled employee in your company?

EUR _____

A12. Do you provide or have provided employee career development track, ie. provide certified trainings, scholarships, on job trainings?

1. Yes
2. No

A13. Can you please tell us, have you made any formal research or informal review of the workforce that your company is short, or is in need of?

1. Yes
2. No

A14. Is your company aware of its workforce requirements, in terms of precise requirements in the number of employees and required set of skills?

1. Yes
2. No

Employee Attitude (general professional and technical skills)

B1. In the area of SPECIFIC KNOWLEDGE FOR HARDWARE AND SOFTWARE, can you please tell us where are the most **critical and missing skill gaps** (areas) that are important for your business when you consider your current employee(s), or future employee(s) (someone that you would be hiring in time period between tomorrow and the next three years)? Can you please tell us what are the important missing skills for an immediately employable jobseeker in your business?

Rate in the scale from 1 to 5 (1 = is not critical/not missing; and 5 = is very critical and missing)

No.	Skills area	1	2	3	4	5	Do not know / Does not apply
1	Networks						
2	Communication						
3	Servers						
4	Workstations						
5	Tablets						
6	Mobile platforms						
7	IOS - Apple						
8	Android						
9	Systems integration						
10	Windows						
11	Realtime Systems						
12	MAC-OS						
13	OS/400						
14	SUN OS, Solaris						
15	Windows Mobile						
16	Linux						
17	UNIX						
18	ABAP4						
19	Assembler						
20	Basic - Visual Basic, VBA etc.						
21	C						
22	C++						
23	Clipper						
24	CList						
25	CL/400 - AS/400 Control Language						
26	Cobol						
27	CORBA IDL						
28	dBase						
29	Delphi						

No.	Skills area	1	2	3	4	5	Do not know / Does not apply
30	Eiffel						
31	ESQL/C						
32	Fortran						
33	Foxpro						
34	Gupta, Centura						
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36	ILE/400						
37	Java, JavaScript						
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44	Objective C						
45	Pascal						
46	Perl						
47	PHP						
48	PL/SQL						
49	PL/1						
50	Powerbuilder						
51	Python						
52	QMF						
53	Rexx						
54	RPG						
55	SAS						
56	Script Languages – others						
57	Shell - C-Shell,K-Shell,Bourne-Shell						
58	Smalltalk						
59	Tcl/Tk						
60	Visual Objects						
61	VRML						
62	Xt, Motif						
63	yacc/lex						
64	4g						
65	Access						
66	Adabas						
67	BTrieve						
68	DAO						
69	DB2						

No.	Categories	Select	Experience	Years	Formal education	Certification
70	DB/400					
71	DL/1					
72	Gupta, Centura					
73	IDMS					
74	IMS					
75	Informix					
76	Ingres					
77	Interbase					
78	ISAM					
79	JDBC					
80	Lotus Notes					
81	MS SQL Server					
82	mSQL / mySQL					
83	Object Store					
84	ODBC					
85	Oracle					
86	Paradox					
87	POET					
88	Progress					
89	RDB					
90	SAS					
91	SESAM					
92	SQL					
93	Sybase					
94	UDS/IDMS					
95	VSAM					
96	xBase - dBase, FoxPro, Clipper...					
97	4th Dimension					
98	ISO 27001					
99	ISO 20000					
100	ISO9001					
101	CMM / CMMI					
102	ITMark					
103	SPICE					

B2. In the area of GENERAL KNOWLEDGE FOR SOFTWARE/APPLICATIONS, can you please tell us where are the most **critical and missing skill gaps** (areas) that are important for your business when you consider your current employee(s), or future employee(s) (someone that you would be hiring in time period between tomorrow and the next three years)? Can you please tell us what are the important missing skills for an immediately employable jobseeker in your business?

Rate in the scale from 1 to 5 (1 = is not critical/not missing; and 5 = is very critical and missing)

No.	Skills area	1	2	3	4	5	Do not know / Does not apply
1	Operating systems						
2	Databases						
3	Network programming						
4	Application development						
5	Web-design programmer						
6	Conceptual programming/OOP						
7	Process modeler						
8	CISCO training certification						
9	Microsoft certification						
10	Operate equipment						
11	Problem solving						
12	MAC-OS						

B3. Do you have recommendation about the curriculum of STIKK Education regarding the trainings of the new workforce that would be ready for the labor market, the areas of that require intervention/skill(s) development (immediate job placement)?

_____

_____

B4. In the area of APTITUDE AND MOTIVATION, can you please tell us where are the most **critical and missing skill gaps** (areas) that are important for your business when you consider your current employee(s), or future employee(s) (someone that you would be hiring in time period between tomorrow and the next three years)? Can you please tell us what are the important missing skills for an immediately employable jobseeker in your business?

Rate in the scale from 1 to 5 (1 = is not critical/not missing; and 5 = is very critical and missing)

No.	Skills area	1	2	3	4	5	Do not know / Does not apply
1	Communication						
2	Languages						
3	Flexibility						
4	Motivation						
5	Perseverance						
6	Commitment						
7	Loyalty						
8	Teamwork						
9	Organization (multi-tasking, prioritization)						
10	Innovative						
11	Critical thinking						
12	Client orientation						
13	Time management						
14	Self-initiative						

Compensation

C1. Can you please tell us, how would you structure compensation to attract employees that meet the qualification criteria according to your needs and requirements? Please rate in percentage, by distributing percentages in the provided categories, see that the total sums to 100.

a. Salary ..... [____]
b. Overtime / compensation by hour ..... [____]
c. Bonus / performance related..... [____]
d. Perks (phone, car, flexible schedule) ..... [____]
e. Career / professional development track ..... [____]

Total 100

C2. Can you please tell us if your company has preference related to employee demographics, is so what are the demographic requirements?

C2.a Gender	M	F	Doesn't matter	Don't know/NA
Answer/tick				

C2.b. Age group	Up to 20	20-25	26-35	36-45	46-65	Does not matter	Do not know / NA
Answer / tick							

C2.c. Education	Elementary	Secondary	University	Advanced degree	Doesn't matter	Don't know/ NA
Answer/tick						

Demographic profile of the respondent/ interviewee

D1. Age ..... [ ]

D2. Gender 1.M 2.F

D3. Education

1. No formal education
2. Elementary
3. Secondary
4. University
5. Upper post-graduate

D4. Municipality of residence

_____

Thank you for your time!

STIKK

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